



UNIVERSITY of
RWANDA

College of Medicine and Health Sciences

School of Medicine and Pharmacy

**POSTOPERATIVE PAIN ASSESSMENT AND MANAGEMENT
IN PEDIATRIC SURGICAL PATIENTS AT KIGALI
UNIVERSITY TEACHING HOSPITAL.**

Dissertation submitted in partial fulfillment of the requirement for the award of the degree of
Masters of Medicine in Anesthesiology.

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DECLARATION

I hereby declare that this dissertation “Postoperative pain assessment and management in pediatric surgical patients at Kigali University Teaching Hospital” is my own work. This study in whole or in part has neither been submitted for publication anywhere nor has it been submitted for award of other university.

Signed

Date...15/06/2021

A handwritten signature in blue ink, appearing to be 'Brigitte Kalala Mwadi', written in a cursive style.

Dr Brigitte Kalala Mwadi.

I hereby declare that this dissertation has been submitted with my approval as the supervisor.

Signed

Date 15/06/2021

A handwritten signature in blue ink, appearing to be 'Prof Paulin R. Banguti', written in a bold, cursive style.

Prof Paulin R. Banguti

ABSTRACT

Background

Pain is a global health issue which may cause poor health outcomes. African children are so highly at risk to disease and injury, subsequently to pain. In the postoperative period, timely and accurate pain assessment is prerequisite to safe and effective pain management. However, pain can be difficult to assess in low and middle-income countries exceptionally in children. This put these particular patients vulnerable to pain and inadequate pain control. To date, there has been no research on postoperative pain management in pediatric surgical populations at Kigali University Teaching Hospital (KUTH).

Objectives: The purpose of this research was to evaluate the level of postoperative pain assessment and management in pediatric surgical patients at KUTH.

Methodology: This prospective cross-sectional study was carried at KUTH from July to November 2019. An IRB from UR-CMHS and KUTH was obtained and informed consent forms from participants were obtained before conducting the study. Pediatric surgical patients less than 15 years of age were eligible for inclusion. Participants were recruited before surgery and followed from the end of surgery until two days after surgery. Data was collected using a pre-established questionnaire and analyzed using SPSS 21.

Results: Overall, 123 patients were recruited into the study. The median age was 6 years (IQR: 2.37, 11) and 90(73.2%) were male and 33(26.8%) were female. The majority of patients were from general surgery 50(40.7%) and the least number come from urology 6(4.8%). None of the patients were assessed for pain in their recovery room post-surgery, although, more than half of the patients 65(52.8%) spent between 1-4 hours there. In the ward, 69 (56.1%) of the patients received a pain assessment within 24 hours post-surgery. Among those who received the assessment, 35(50.7%) experienced moderate to severe pain within 24 hours post-surgery. All 123 patients were prescribed a postoperative analgesia with paracetamol being the most common. Nurses were compliant in administering patients prescribed analgesia 62.6% of the time.

Conclusion: Pediatric Post-Operative Pain was found better assessed and managed in the ward than in recovery room with a significant difference of nurse compliance to the type of analgesia given.

Key words: *Postoperative Pain Assessment, pediatric, Management, compliance*

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DEFINITION AND ABBREVIATION

CASIEF: Canadian Anesthesiologist's Society International Education Foundation

CHEOPS: Children's Hospital of Eastern Ontario Pain Scale

CNS: Central Nervous System

CRIES: Crying Require oxygen for saturation >95 % Increased vital sign Expression Sleepless

FLACC: Face Leg Activity Cry Consolability

GA: General Anesthesia

IRB: Institution Review Board

IV: Intravenous

KUTH: Kigali University Teaching Hospital

MOH: Ministry of Health

N: Number

NSAIDS: Non steroid Anti-Inflammatory Drugs

PACU: Post Anesthesia Care Unit

PO: Per Oral

SC: Subcutaneous

SPSS v 21: Statistical Package for the Science version 21

Suppo: Suppository

UTH: University Teaching hospital

VAS: Visual Analogue Scale

WHO: World Health Organization

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DEDICATION

To my almighty God

To all children who endure pain.

To you my mother Mwamaye Kibawa who didn't see the accomplishment of this dissertation.

To my father Ruchacha Bikumu Felicien, for your encouragement and technical support.

To my Husband Guy Muhindo for your support and disruption I make in your life.

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To our brothers, sisters and friends for your encouragement.

I dedicate this work.

CHAPTER 1. INTRODUCTION

Though adequate pain management is recognized across the world as a human right, pain remains a significant global health problem (1). In fact, the WHO estimates that more than 80% of global population lacks access to adequate management of moderate to severe pain (2). Pain is of particular concern for postoperative period. Pediatric surgical patients are mostly at risks to inadequate pain control and its impacts.

The International Association of Pain defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”(3). In postoperative patients, tissue damage causes pain and increases sensitivity to pain. Tissue damage triggers inflammatory cascades, which release allogeinic substances, activates nociceptive receptors, sends nociceptors impulses to the neuroaxis and invoke hyperalgesia (4). Since pain has neurological with much cognitive component's, the level of pain recognized does not automatically reflect the severity of the illness.

Postoperative pain can cause physiological and behavioral distress and lead to poor health outcomes. Uncontrolled perioperative pain activates the sympathetic nervous system, which can result in tachycardia, hypertension and syncope. Pain also activates the stress hormonal axis, which increases blood cortisol levels and impairs wound healing. Furthermore, abdominal and thoracic pain can impair respiratory function. Patients in pain are also not favored to mobilize in postoperative time, increasing their risk of atelectasis, chest infection and deep venous thrombosis. These complications often compound, resulting in longer and more expensive hospitalizations. Research suggests that pain in children can have devastating consequences – repeated exposure to painful procedure in early life is associated with long-lasting adverse effects, including delayed postnatal growth, altered brain development and alteration of pain response later in life (5).

Minimizing pain requires careful effective postoperative pain assessment and management. Assessing pain is prerequisite to adequate and appropriate pain management. Pain, mostly has been considered as “fifth vital sign,” should be assessed and documented frequently. Accurate pain assessments are important for effective pain treatment in patients of all ages suffering from an acute surgical or medical illness. Yet, a study among 105 European hospitals in seventeen nations found that dairy pain evaluation and record are still fewer (6).

Unfortunately, children remain particularly vulnerable to postoperative pain. Pain is a complex, multidimensional subjective experience that can be challenging for health professionals to evaluate and treat, particularly in infants and young children (7,8). An investigation of challenges related with pediatric pain treatment in sub-Saharan Africa suggests that pediatric pain treatment in the region remains highly unsatisfied. In this region, additional barriers like, lack of enough incomes, inadequate training, language barriers and culture diversity may limit the ill and injured children from receiving even little pain treatment (7).

Despite the rapid development of pediatric postoperative pain management practices, postoperative pain in pediatric patients remains under-assessed and undertreated across multiple hospital settings(4,5,8) . A prospective study done at one hospital in Canada , found that in the 24 hours after admissions, 64% of pediatric patients experienced moderate to severe pain but only 27% had a pain score documented within this period (10). Studies in sub-Saharan Africa have produced similar results. In a survey of 43 pediatric surgeons and trainees in Nigeria, 27% reported that pain is not usually assessed at their institution (6). A prospective study of 106 children at Togo's Sylvanus Olympio Hospital University Teaching Hospital (UTH) found that the majority of pediatric surgical patients did not have a pain assessment at postoperative hours 0, 24 and 48 (11). To our knowledge, there has been no research to date on postoperative pain assessment and management in pediatric surgical populations at KUTH, where over 909 pediatric surgery are performed (12). The purpose of current research was to evaluate how pain assessment and treatment of pediatric surgical patients is performed at KUTH.

CHAPTRE2. LITERATURE REVIEW

Nociceptive neurons have two different types of axons, A-Beta fibers and slower conduction fibers. A-Beta fibers, which send fast action potentials to the spinal cord and ascend through the CNS, develop early in gestation. Though slower conduction fibers are mature in neonates, their thalamocortical connections are immature. (13)

Repetitive pain experiences early in life cause long term changes in pain processing. These disturbances can include decreased pain threshold, hyperalgesia, allodynia, altered brain development and altered postnatal growth. (5,14) Untreated acute pain may lead to fear and even avoidance of future medical procedures (15).

2.1. Pain assessment tools

Self-report: Self-report is the always a good indicator of pain because pain is a subjective experience. It is the only direct measure of pain and is often considered as the “gold standard” pain measurement (16). Self-report allows patients to localize, describe and quantify the intensity of pain. Unfortunately, self-report is not possible for younger pediatric patients, often age 4 and younger. Capacity to communicate one’s pain may explain different pain patterns in different pediatric age groups. For an example, a Togo-based study found that postoperative pain in children younger than seven-years-old increases in the 24 hours after surgery. In contrast, pain in children between age seven and fifteen gradually decreased over the same period. The older age

Pain Measurement Scales: Postoperative pain control begins during preoperative pain assessments. Early accurate pain assessments facilitate recognition of pain and can prevent future pain. Despite the availability of tools to measure pain, these tools are used inconsistently (4, 5, 8). More tools have been created for different age groups.

Wong and Baker FACE scale: This tool is validated for children ages 3-18 years old. The scale depends on the patient’s age and their understanding of pain evaluation. (17). In our setting, we use the FACES Pain Rating Scale for all pediatric patients, regardless of age.



Figure 1: Face scale (17)

VAS: Extensive evidence supports the VAS pain rating as a reliable indicator of pain in children above 3 years of age (17). In VAS, pain is measured by the horizontal or vertical line that ranges from no pain (zero) to unbearable pain (ten). This tool can be difficult to employ postoperatively because it requires patient concentration and coordination.

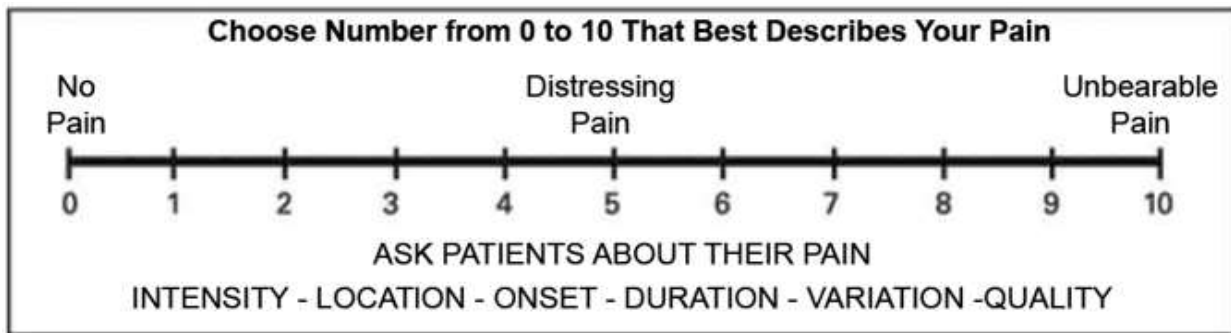


Figure 2: VAS scale

CRIES: This tool measure of postoperative pain in neonates and infants up to 6months. It assess grimacing, crying, oxygen requirement, vitals sign, and sleepiness (17,18).

CHEOPS: Is observational measure of postoperative pain in children used for children 1-12 years.(17)

FLACC: It is used for postoperative and per procedural pain.

Face, Legs, Activity, Crying, Consolability: This tool has been developed in 1997 by Sandra Merkel and is suitable for children of 2 months to 7 years (12). The FLACC scale measures pain by quantifying pain behaviors with scores ranging from 0 to 10. Each of the five items scores 2 points (19), FLACC Scale

Categories	Score 0	Score 1	Score 2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

At KUTH, we used the Wong and Baker FACE Scale to assess all pediatric patients (ages 0 to 15-years-old).(Patients charts)

2.2. Management of acute pain

Effective pain treatment needs an interdisciplinary method that includes behavioral, psychological and physical techniques used alone or in combination with pharmacologic treatments (20). Planning for postoperative pain management should begin in the preoperative period. Providers should facilitate discussions about pain management with patients and their caregivers. Likewise, patients and their caregivers should feel empowered to communicate their analgesic needs to providers. Open communication can build trust, identify areas of concern and help formulate a pain plan. For patients and their caregivers, these discussions can alleviate fear and anxiety surrounding unrelieved pain.

In the past, analgesia for preterm infants was largely neglected. However, we now know that most of the neural pathways that conduct nociceptive information are functional by week 24 of gestation. Today, it is widely accepted that even the smallest and most premature infants are capable of responding to painful stimulation and thus children of all ages require appropriate

analgesia when pain is observed (20). There are many factors to consider when managing postoperative pain. Pain can vary in severity and therefore, may require different analgesics. The time interval between administrations of drugs is also important to consider.

Non-opioids drugs: These drugs are mostly used to manage mild pain. They can also be used to treat moderate to severe pain when given in combination with opioids. Examples of non-opioid drugs include paracetamol and NSAIDs. Paracetamol is mainly antipyretic but also has analgesic effects. It acts by reducing the synthesis of prostaglandin. NSAIDs are a category of drugs commonly used for analgesia. These medications act by inhibiting the cyclooxygenase (COX) enzyme and reducing the production of prostaglandins. Some preferentially block COX-1 (ex. aspirin, naproxen), some preferentially block COX-2 (ex. diclofenac) and others are non-selective (ex. ibuprofen).

Opioids: Exogenous opioids act in a similar manner as endogenous opioids peptides and bind to specific opioids receptors. These opioids receptors are located in the presynaptic and postsynaptic sites of the brain, spinal cord and peripheral nerves (21). Opioids are associated with side effects such as respiratory depression, dysphonia, hypertonia, tachycardia, tachypnea and mydriasis. Neonates and infants are particularly susceptible to apnea when they receive opioids (21).

Spinal blocks: Single-shot caudal analgesia is the most commonly used spinal block technique. This method has been shown to be reliable and safe in the hands of an experienced practitioner. It is usually done in patients with more than 10kg (21).

Continuous epidural analgesia: Continuous epidural analgesia can be used when prolonged blockades are desired. In this treatment, in insertion of an epidural catheter allows repeated injections and or continuous infusions of analgesics (21). When employed in the postoperative setting, the catheter should be placed as close as possible to the dermatome affected by the surgical incision.

Local skin infiltration: Local anesthetic skin infiltration aims to anesthetize nerve ends of a specific infiltrated area. Pre-incision skin infiltration and wound infiltration have both been shown to reduce postoperative pain.

2.3. Problem statement.

Postoperative pain is difficult to assess and manage in pediatric surgical patients. Effective pain assessment and management is important for patients of all ages in order to minimized acute

physiological and behavioral distress. There is no prior research done at KUTH regarding assessment and management of postoperative pain in pediatric surgical patients. Pain is stressful experience that is considered to be a global health problem. With this study we will know how postoperative pain assessment and management is done at KUTH and therefore we will be able to improve policies around pain management.

2.4. Research question

1. When and where is pain being assessed after surgery?
2. What medications are being prescribed to manage postoperative pain?
3. Are nurses compliant with given prescribed medications?

Outcomes:

Is pain assessment regularly documented?

Which medications are prescribed?

Main objective

To evaluate postoperative pain assessment and management in pediatric surgical patients at UTH.

Specific Objectives

1. To identify socio-demographic characteristics of pediatric surgical patients at KUTH
2. To assess when and where post-operative pain assessment in pediatric surgical patients take place at KUTH
3. To determine routes of medication delivery and types of analgesia prescribed during post-operative pain management in pediatric surgical patients at K
4. To assess the level of compliance of nurse's orders in providing prescribed analgesia

CHAPTRE3. METHODOLOGY

3.1.Study design

This is a descriptive prospective study design using a quantitative approach. This design was used to gain information about postoperative pain assessment and management in pediatric surgical patients <15 years. Where questionnaires with closed-ended question have been used.

3.2. Study setting:

This study took place at Kigali University Teaching Hospital (KUTH). It is the largest public tertiary care hospital in Rwanda located in Kigali's Nyarugenge District. It has 11 operating rooms including 6 main theaters, 1 ophthalmology, 3 obstetric-gynecologies, and 1 room dedicated for pediatric operations. However, pediatric surgeries are still completed in any of the 6 rooms except gynecology. The hospital has one pediatric surgeon and one pediatric anesthesiologist.

3.3. Study population:

The study populations consisted of pediatric patients <15 years who were admitted in hospital for surgical procedure.

3.4. Study duration:

This study took place over sixteen months. This included, six months for study for conception, proposal writing and to gain ethical approval from University of Rwanda and Kigali teaching hospital. Data collection was completed from July to November 2019. Data analysis and final dissertation write up took five months.

3.5. Inclusion criteria

Inclusion criteria included pediatric surgical children younger than 15 years old who underwent a surgery (General, ENT, Plastic, Urology, Orthopedics surgeries) at KUTH during the time of this study. In addition to parents or caregivers giving signed the consent.

3.6. Exclusion criteria

Exclusion criteria consisted of

1. Any parent, children or caregiver who refused to give assent and sign the consent form.
2. Any patient who presented to KUTH who did not undergo surgery, were only at KUTH as an outpatient or a day case.

3. This study also excluded any pediatric patients who were discharged before 48 hours postoperative.

3.7. Sampling

We used convenience sampling to recruit participants for this study. From July to November 2019 we approached all pediatric surgical patients who met inclusion criteria if they would consent to be part of the study. In total we enrolled 123 pediatric surgical patients, no patient were excluded.

3.8. Data collection instrument

Once a patient was enrolled into the study, data was collected over four different time periods during the patient stay at the hospital, using a pre-established questionnaire. This included pre operatively, intra operatively, 24 hours postoperatively and finally 48 hours postoperatively. The pre-established questionnaire was made of the following parts:

Section A: Socio-demographic characteristics and preoperative questions

Section B: Intra operative anesthetic records

Section C: Recovery room and ward

Section D: Pain outcome

Variables included; age, sex, type of surgery, discussion between healthcare provider and patient or caretaker about pain management modality, the type of anesthesia performed, intraoperative analgesia duration of surgery, time spent in the recovery, PACU analgesia given, if pain assessment took place in recovery room, if analgesia was administration as scheduled by nurses , and whether a pain assessment took place in the ward at 24 hours and then again at 48 hours and lastly the pain level of the patients.

Patient was followed up from the end of surgery up to 48 hours postoperatively. Two trained assistant researchers assisted in data collection. The data were collected from mixed sources including the verbal report from pediatric inpatient, care givers and the record of medical/nursing charts.

3.9. Statistical analysis:

Data entry was completed using Excel software and analyzed via SPSS v21. The epidemiologic profile and assessment of pain and its management for the population was characterized using descriptive statistics. Summary statistics were calculated using frequencies and percentages for all variables, and continuous variables were summarized using median and interquartile ranges.

Differences in characteristics were assessed using Chi square tests for categorical variables and P value less than 0.05 were determined to be statistically significant.

3.10. Ethical considerations

Permission and ethical approval were given from IRB CMHS (No 301/CMHSIRB/2019). A formal authorizing approval was obtained from the ethical committee IRB/ KUTH (EC/CHUK/0133/2019) prior to study initiation and data collection. The data collectors explained the aim of the study and possible benefits to participants and or their caregiver. Informed consents were obtained from caretakers before enrolling the patient in the study. Participants voluntarily agreed to participate and were allowed to withdraw from the study at any time. Participants were informed that they would not be penalized if they chose to withdraw. To protect participant privacy and confidentiality, participant codes were recorded instead of patient names. There was no incentive to participation.

CHAPTER 4. RESULTS

4.1 Socio-demographic features of respondents

A total of 123 patients were enrolled into our study. All of the patients who were approached during enrollment agreed to be part of the study, meaning that no patients were excluded. The study sample characteristics are outlined in Table 1. Of the 123 patients the median age was 6 years (IQR: 2.37, 11) with the majority of patients being male (73.2%). The majority of patients were between one to five years of age (35.8%) followed by participants being 10 years or older (25.2%). Participants were most frequently undergoing general surgery (40.7%) or orthopedic surgery (28.5%). Urology was the least common surgery whereas only 4.9% of patients received it.

Table 1: Socio-demographic features of respondents

Variables		Frequencies	%
Age	< 1year	26	21.1
	1-5 years	44	35.8
	6-10 years	22	17.9
	>10 years	31	25.2
Sex	Male	90	73.2
	Female	33	26.8
Type of surgery	General surgery	50	40.7
	Orthopedic surgery	35	28.5
	ENT surgery	20	16.3
	Plastic surgery	12	9.2
	Urology	6	4.9

4.2 Postoperative pain assessment

We Classified the intensity of pain by: 0-1= No pain; 2-4= Mild pain; 5-6= Moderate pain; 7-10= Severe pain. Overall, pain was never assessed in the recovery room of any of the participants, even though, 46.3% of participants spent between 1 to 4 hours in the recovery room. After the recovery room patients were moved into the wards. While there, within 24 hours postoperative,

56.1% had a pain assessment performed by a nurse. Among those who received a pain assessment the majority of patients experienced moderate to severe pain (50.7%). After 48 hours postoperative, a total of 72 patients (58.5%) had received a pain assessment of which, moderate to severe pain decreases to 22.2%. a total difference of 28.5%. However, even after 48 hours a total of 51 pediatric patients (41.5%) had yet to receive a pain assessment (**Table 2**)

Table2: Postoperative pain assessment.

Variables		Frequency (n)	Percentage (%)
Was pain assessed in the recovery	0-1hour	0	0
	1h-4hours	0	0
	4h and above	0	0
	Not assessed	123	100
Total time spent in the recovery room	0-1 hour	58	47.1
	1-4 hours	57	46.3
	4 hours or above	8	6.6
Was pain assessed in the ward	Assessed within 24 hours	69	56.1
	Not recorded within 24 hours	54	43.9
	Assessed within 48 hours	72	58.5
	Not recorded within 48 hours	51	41.5
Pain intensity within first 24hours postoperative	no pain	6	8.6
	Mild	28	40.5
	Moderate	12	17.3
	Severe	23	33.3
	not recorded	54	43.9
Pain intensity after 48hours postoperative	no pain	15	20.8
	Mild	41	56.9
	Moderate	14	19.4
	Severe	2	2.7
	not assessed	51	41.5

4.3 The level of post-operative pain management in pediatric surgical patients

Among the 123 participants, only 13(10.6%) participants had a discussion with a health professional about post-operative pain before surgery. The vast majority 110 (89.4%) of participants had no discussion about the potential for post-operative pain or had a plan if it occurred. In addition, only one patient (0.8%) had a discussion about postoperative pain management with a health professional post-surgery.

Before the operation, a total of 19 patients (15.4%) received pre-emptive analgesia. During the operation the vast majority of patients received opioids (96.7%). Among Types of analgesia prescribed in the ward, Paracetamol + NSAIDs was the combination mostly prescribed (61.8%) whereas NSAIDs alone (0.8%) was the least prescribed. The combination of analgesics were given; Paracetamol+ NSAIDs + Opioids combination was prescribed (4.1%), Paracetamol + Opioids (13.8%) and Paracetamol alone (19.5%). Frequently, a drug was administered orally (41.5%) followed by Suppository + Per Oral (17.8%). This is compared to using an IV (4.9%) or SC + Suppository (0.8%) being administered the least.

Table 3: Postoperative pain management

Variables		Frequency	Percentage
Did a discussion between a healthcare provider and patient/caregiver occur about postoperative pain	No	110	89.4
	Yes	13	10.6
Did a discussion of postoperative pain management take place after the surgery	No	122	99.2
	Yes	1	0.8
Pre-emptive analgesia	Yes	19	15.4
	No	104	84.5
Opioids used intraoperatively	Yes	119	96.8
	No	4	3.2
Types of analgesia prescribed	Paracetamol alone	24	19.5
	Paracetamol+ NSAIDs	76	61.8
	Paracetamol+ Opioids	17	13.8
	Paracetamol+ NSAIDs + Opioids	5	4.1
	NSAIDs alone	1	0.8
Route of administration of medication prescribed	IV	6	4.9
	Suppository	21	17.0
	Per oral	51	41.5
	IV+Per oral	10	8.1
	IV+Suppository	4	3.5
	SC+Per Oral	5	4.1
	SC+Suppository	1	0.8
	SC+Suppository+Per oral	3	2.4
	Suppository+Per Oral	22	17.8

4.4 Assessment of compliance of nurses providing prescribed analgesia

Nurses were compliant in administering patients prescribed analgesia 62.6% of the time. Frequently, nurses were most compliant with giving Paracetamol alone at 83.3%. Whereas, NSAIDs alone was never actually given to the patient. Paracetamol+Opioids also had low administration compliance as only 41.2% of patients were truly given the medication. We found a statistically significant difference between the analgesia types and if nurses were compliant in administering it to pediatric patients (p=0.030)

Table 4Assessment of compliance of nurse providing prescribed analgesia

Analgesia Type	Compliance		
	Yes (%)	No (%)	P value
Paracetamol alone	20(83.3%)	4(16.7%)	
Paracetamol+NSAIDs	47(61.8%)	29(38.2%)	
Paracetamol+Opioids	7(41.2%)	10(58.8%)	0.030
Paracetamol+NSAIDs+opioids	3(60.0%)	2(40.0%)	
NSAIDs alone	0(0.0%)	1(100%)	
Total	77(62.6%)	46(37.3%)	

CHAPTRE5. DISCUSSION

This study provides key data on postoperative pain assessment and management in pediatric population in a large tertiary hospital in Kigali, Rwanda. Worldwide postoperative pain after surgery remains a significant problem. Pain experienced early in life can intensify behavioral and emotional reactions to pain later in life (22). The ability to assess and manage pain is a crucial factor for a full and fast recovery in patients, ultimately leading to better health outcomes. To our knowledge, this is the first study specifically looking at pain assessment and management in a pediatric postoperative in KUTH, Rwanda. In this study, we evaluated four key objectives related to the assessment and management of postoperative pain in pediatric patients.

5.1. Socio demographic characteristics of participants

The present study findings revealed that the majority of participants are between 1- 5 years in age. group. The average was 5.7 years and median age was 6 years (IQR:2, 11). contrary to the study done in Sylvanus Olympia UTH Togo where the average ages was 9 years ranging 0 month to 15 years old.(11). In our study most of participants were male with proportion of 72.3% and a slightly similar result was found in study done about epidemiology of pediatric surgery in Rwanda where 69.3% were males(12). The most performed operation was general surgery 40.7%, contrary to the study done in Ethiopian Hospital where 35.7% were pediatric orthopedic patients (23).

5. 2.Postoperative pain assessment

In our prospective study we evaluated whether-and when pain was assessed in the recovery room and in the ward 24 hours and again at 48 hours post-surgery. We found that pain assessments are severely lacking post-surgery in pediatric patients. In total, not one patient received a pain assessment when they were located in the recovery room, this is despite the fact that 52.8% of patients spent between 1 to 4 hours there. This can be compared to a study also performed at KUTH where they found that 9% of adult patients received a pain assessment in the recovery room(24). This shows that there may be a difference in pain assessment for pediatric patients than adults and should warrant further investigation. In either case though, the number of patients who are receiving pain assessment in the recovery room remains low.

Twenty-four hours postoperatively, only 56.1% of patients received a pain assessment in the wards. While this is a major improvement in the frequency of assessments from the recovery room, it is still lacking. These findings are similar to a study conducted at the University

Teaching Hospital (UTH) of Togo, where they found 46% of pediatric patients received a pain assessment after twenty-four hours postoperative (11). As both of these study settings are in a low- and middle-income country, they are similar that historically wards are understaffed and therefore they may not have time to carry out pain assessment for all patients.

At 48 hours, postoperative pain was assessed 58.5% of the time. This result is vastly different than which was found in the study conducted at UTH of Togo, where they found that only 13% of pediatric patients received a pain assessment at 48 hours post-surgery. (11) This difference may be attributed to the fact that pain was reported to decrease after 24 hours post-surgery, making the first 24 hours imperative to receive a pain assessment.

Overall, this study showed inadequate postoperative pain assessment and documentation in children. This may be attributed to the lack of adequate training skills, and knowledge about pain assessment, documentation, insufficient staff specially anesthesiologist who could play the role to train how to assess and manage pain. The adequate assessment of pain is the first critical step to developing an effective pain management plan. Selection of appropriate assessment tool should consider the age, cognitive level and the presence of eventual disability and types of pain and situation in which pain occurs in children.(16) . Pain is among fifth vital sign need to be assessed and documented.

5.3. Postoperative pain management

Furthermore, communication between patient and providers seems to be also seriously lacking. We found that only 10.6% of patients were educated or informed about postoperative pain in preoperative period. This is similar to study conducted in Ethiopian where they found 8.8% of adult patients had a discussion with a health provider before surgery (23). Informing patients and caregivers about pain and its possible management is crucial as they need to be consulted and encouraged to participate in this process. This should include communication between patient or caregiver and provider pre-operation about what to expect after surgery as it may contribute to better outcomes.

We found that intraoperatively it is very common for pediatric patients to receive opioids. This is similar to other studies such as one conducted in a Ethiopian hospitals where 90.5% received general anesthesia plus opioids in (25,26).

During our study, doctors prescribed a wide variety of postoperative analgesia ranging from Paracetamol to opioids. It was also common in our study for doctors to prescribe a combination of analgesia such as paracetamol and NSAIDs or paracetamol and opioids. Pediatric patients received paracetamol and NSAIDs 61.8 % of the time and medications were most likely to be given orally (41.4%). This is compared to the study conducted in Togo where children above the age of 7 received it 40% (11). Our findings also differ from a study conducted in Nigeria where most analgesia prescribed was paracetamol in neonates 89.2% or pentazocine 32.4 (6). This difference in type of medication and route of administration could be due to availability of drugs at the respected hospitals or different protocols for postoperative pain management. In our setting there is no protocol for pain management in pediatric patients.

5.4 Assessment of compliance of nurses in providing prescribed analgesia

In our study every patient was prescribed postoperative analgesia, however not every patient received the medication. Overall 62.6% of nurses were compliant in administering the prescribed medication. Nurses were most compliant with giving paracetamol alone whereas, NSAIDs alone or paracetamol +opioids showed the least compliance. We did find a statistically significant difference between the analgesia types and if nurses were compliant in administering it to pediatric patient ($p= 0.030$).

The lack of compliance may be due to multiple factors which warrant more investigation. However, we hypothesized three possibilities. Historically, one of the major challenges in postoperative pain management in low- and middle-income countries is the lack of availability of medication. In our study it is possible for the doctor to have prescribed a medication but for it to be out of stock in the hospital. This then makes it impossible for the nurse to give the medication, therefore, making the nurse non-compliant. Another hypothesis could be that nurses are hesitant or scared to give stronger medications such as opioids due to side effects in pediatric patients. Lastly, it could be that nurses are understaffed making it difficult to give medications on time. Further study should be conducted to establish the reasonable causes.

LIMITATION OF THE STUDY

There are several limitations to note. First, the data reported about pain assessments were based on clinical reporting and patients' charts. We were unable to include direct observation of clinical routines or discuss directly with patients or their family members. In addition, this study only included acute postoperative pain and did not include chronic pain patterns, its prevalence, and risk factors. Lastly, our study was a single-center study whereby generalization is limited.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1. Conclusion

From our findings, we conclude that Pediatric Post-Operative Pain was poorly assessed and managed in the recovery, but better assessed and managed in the ward during the 24-48 hours. However, there was a significant difference of nurse compliance to the type of analgesia given. These study findings are a call to create and refine pain assessment and management policies at KUTH.

6.2. Recommendation

Understanding when and how pediatric postoperative pain is assessed and managed will allow for providers and policymakers to refine and create new policies design to improve postoperative care.

1. Pediatric Postoperative Pain should be assessed and managed adequately for all surgical patients. Therefore protocol should be put in place to have regular pediatric pain assessment and audits must be conducted to measure compliance.
2. Further studies should be carried out to establish reason of no pain assessment records and management revealed by the study.
3. The ministry of health in a joint collaboration with KUTH should establish policies and procedures, protocols and guidelines regarding postoperative pain assessment and management for benefits of the pediatric patient.

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APPENDICES

DATA COLLECTION SHEET

Perioperative pain assessment and management in infant and children less than fifteen years at Rwandan tertiary hospital care (CHUK).

Study Subject #: _____

ID #: _____

Age: _____ Years

Sex: _____ M/F/Other

Surgery: _____

Surgery Date: (DD/MM/YY) ____ / ____ / ____

Risk factors for postoperative pain _____

Follow Up Date (DD/MM/YY) ____ / ____ / ____

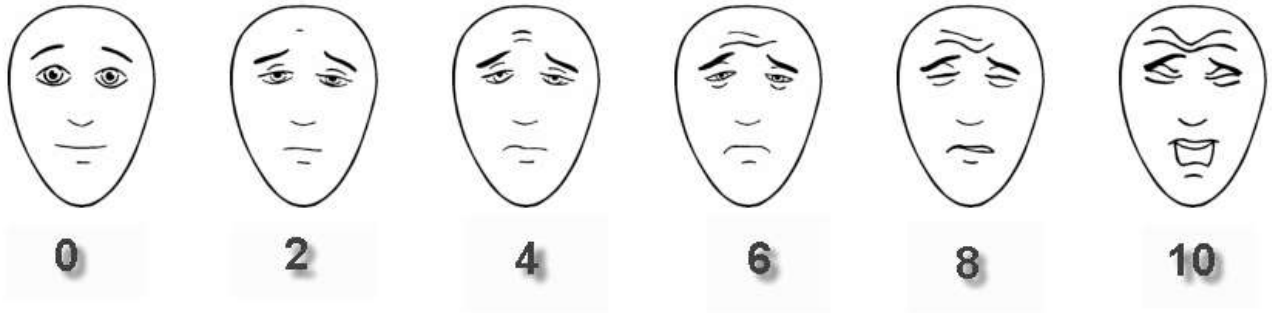
<u>A. Holding area:</u>	Circle one	Comments
A1. Did a discussion of postoperative pain take place?	Yes No	
A2. Did a discussion of postoperative pain management options take place?	Yes No	

<u>B. Intra-operative anesthetic record:</u>	Circle one	Comments
B1. Pre-emptive analgesia?	Yes No	
B2. Type of anesthetic delivered intra-op	GA Sedation Regional/Spinal	
B3. Opioids used intra-op?	Yes No	
B4. Duration of Surgery	1. <1H 2. 1-2H 3. 2-4H 4. >4H	
B5. Local anesthesia skin	Yes No	

infiltration done		
<u>C. Recovery room:</u>	Circle one	Comments
C1. Was pain evaluated in the recovery room?	Yes No	
C2. Was pain medication given in the recovery room?	Yes No	
a) If yes to the above question what was the time between assessment and administration of medication in the recovery room?	1. 0-15mins 2. 15-30 mins 3. 30mins-1H 4. >1H 5. NA	
C3. Time spent in recovery room?	_____ H	
<u>D. Post-operative:</u>	Circle one	Comments
D1. Type of analgesia prescribed by surgeon	1. Paracetamol alone 2. Paracetamol + NSAIDS 3. Paracetamol+ opioids 4. Paracetamol+ NSAIDS+ opioids 5. Opioids alone 6. NSAIDS alone 7. NSAIDS+ Opioids	
D2. Route of administration	1. IV 2. Suppository 3. PER ORAL 4. IM 5. IV+Suppository 6. IV+IM 7. IV+PER ORAL 8. IM+PER ORAL 9. IM+Suppository 10. SC	

	11. SC + PER ORAL 12. SC + Suppository 13. SC + Suppository + PER ORAL	
D3. Is a pain assessment being done on ward?	Yes No	
D4 when pain was assessed	0. NA 1. within 24 hours 2. 48 hours	
D4. Analgesia prescribed given as scheduled on ward	Yes No	
D5. If no to above, when you or your child was in pain:		
Did you receive pain medication when it was asked for?	Yes No	
If yes, how long did it take for pain medication to be given after it was requested?	1. 0-15mins 2. 15-30 mins 3. 30mins-1H 4. >1H 5. NA	

Faces Pain Scale - Revised



At postoperative day (POD) #1: International Pain Outcomes (IPO) Questionnaire

Item	Answer format
P1. On this scale, please indicate the <u>worst pain</u> your child had since his/her surgery:	0 1 2 3 4 5 6 7 8 9 10 _ _ _ _ _ _ _ _ _ _
P2. On this scale, please indicate the <u>least pain</u> your child had since his/her surgery:	0 1 2 3 4 5 6 7 8 9 10 _ _ _ _ _ _ _ _ _ _
P3. How often was your child in <u>severe pain</u> since his/her surgery? Please circle your best estimate of the percentage of time your child experienced <u>severe pain</u> :	0 10 20 30 40 50 60 70 80 90 100% _ _ _ _ _ _ _ _ _ _
P4. Circle the one number below that best describes how much, since your child's surgery, <u>pain interfered with or prevented him/her from ...</u>	
a. Doing <u>activities in bed</u> such as turning, sitting up, changing position	0 1 2 3 4 5 6 7 8 9 10 _ _ _ _ _ _ _ _ _ _
b. <u>Breathing deeply</u> or <u>coughing</u>	0 1 2 3 4 5 6 7 8 9 10 _ _ _ _ _ _ _ _ _ _
c. <u>Sleeping</u>	0 1 2 3 4 5 6 7 8 9 10 _ _ _ _ _ _ _ _ _ _
d. Has your child been <u>out of bed</u> since his/her	Yes No

<p>surgery?</p> <p>If yes, how much did <u>pain interfere or prevent him/her from doing activities out of bed</u> such as walking, sitting in a chair, standing at the sink:</p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>P5. Pain can affect our mood and emotions.</p> <p>On this scale, please circle the one number that best shows how much, since your child’s surgery, <u>pain caused him/her to feel ...</u></p>	
<p>a. <u>Scared</u></p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>P6. Has your child had any of the following <u>side effects</u> since his/her surgery?</p> <p>Please circle “0” if no; if yes, circle the one number that best shows the severity of each:</p>	
<p>a. <u>Nausea</u></p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>b. <u>Drowsiness</u></p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>c. <u>Itching</u></p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>d. <u>Dizziness</u></p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>P7. Since your child’s surgery, how much <u>pain relief</u> has he/she received?</p> <p>Please circle the one percentage that best shows how much relief he/she has received from all of his/her <u>pain treatments</u> combined (medicine and non-medicine treatments):</p>	<p>0 10 20 30 40 50 60 70 80 90 100%</p> <p> _ _ _ _ _ _ _ _ _ _ _ _ _ _ </p>
<p>P8. Would your child have liked <u>MORE pain treatment</u> than he/she received?</p>	<p>Yes No</p>
<p>P9. Did your child receive any <u>information</u> about his/her <u>pain treatment</u> options?</p>	<p>Yes No</p>
<p>P10. Were you/your child <u>allowed to participate</u></p>	

<p><u>in decisions</u> about his/her <u>pain treatment</u> as much as you wanted to?</p>	<p>NA</p> <p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ </p>
<p>P11. Circle the one number that best shows how <u>satisfied</u> you are with the results of your child's <u>pain treatment</u> since his/her surgery:</p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ </p>
<p>P12. Did you use or receive any <u>non-medicine methods</u> to relieve your child's <u>pain</u>? If yes, <u>check all</u> that apply:</p> <p>1. cold pack, 2. heat, 3. deep breathing, 4. prayer, 5. talking to doctors/nurses, 6. walking, 7. massage, 8. talking to friends or relatives, 9. playing with toys, 10. thinking positive, 12. distraction (using cellphone, watching TV, listening to music, reading), 13. Relaxation 14. sleeping, 15. other (please describe)</p>	<p>Yes No</p>
<p>P13. Did your child have a <u>persistent painful condition for 3 months</u> or more before coming into hospital for this surgery?</p>	<p>Yes No</p>
<p>a. If yes, <u>how severe</u> was the <u>pain</u> most of the time? Please circle the number that indicates this.</p>	<p>0 1 2 3 4 5 6 7 8 9 10</p> <p> _ _ _ _ _ _ _ _ _ _ _ </p>
<p>b. If yes, <u>where</u> was this <u>persistent pain</u> located? (Circle one) Site of surgery, elsewhere, both (site of surgery and elsewhere)</p>	

Study Titles: POSTOPERATIVE PAIN ASSESSMENT AND MANGEMENT PEDIATRIC SURGICAL PATIENT LESS THAN 15 YEARS AT RWANDA TERTIARY HOSPITAL CARE (CHUK)

INFORMATION SHEET AND CONSENT FORM

I am Dr KALALA BRIGITTE, a student in the school of Medicine at University of Rwanda. We are hoping to study the way pain is assessed and managed after surgery. Your participation is voluntary. If you wish to participant ,you will be ask to sign this form ,if after signing the form ,you wish to withdraw from the study ,you are free to do so without giving reason whatsoever.

WHY THIS STUDY BEING DONE

This is being to determine the practice of pain assessment and management in paediatric patient. We know that pain after surgery can have much bad effect on your body. By improving by assessment and management that can help their quick recovery and get them faster to the hospital.

PROCEDURE OF THE STUDY

If you agree to participle in this study, we will collect the following information from your medical shart and you: age, sex,type of surgery, type of anaesthesia, type of analgesia during and after surgery, route of administration, time spent in recovery and time of assessment in recovery, assessment of pain in the ward.

We also asked you about pain after surgery. If you discussed about pain and their management before operation.

Are there any Risk and discomfort

You will not be expose at any risk by be enrolling in this study

Possible benefits

You may not benefit from the result of this study directly. The result of this study, we help to known how paediatric pain is done at KUTH and that can help to improve postoperative pain among paediatric patient.

Confidentiality

Your confidentiality will be respect. No information disclosure your identity will be release published.

Consent

Your participation is strictly voluntary. You may withdraw at any time. You do not have to provide any reason. They will not suffer any penalty if you decide to not participate in this study.

Thank you for your participation. If any question, clarification, concern, please contact Dr KALALA BRIGITTE at telephone number (+250)785182653

CONSENT/ASSENT FORM

English Version

Consent /assent form

Date-----Month-----Year-----

I -----, have been given information and explained about **perioperative pain assessment and management children and infant less than 15years at Rwanda Tertiary care hospital CHUK**, I accept voluntary to participate in the study.

I have right to refuse the consent without any consequences to the care of my child or my self

Patient’s name -----

Parent’s name-----

Signature-----

Health provide/Research assistant-----

Signature-----

Kinyarwanda

Amasezerano yo kwemera gukorerwaho ubushakashatsi

Italiki-----,Ukwezi-----,Umwaka-----

Ngewe-----,nahawe

amakuru nasobanurirwa ibijyanye n’ubushakashatsi bwo gusuzuma ububabare no kubuvura mugihe cyo kubagwa mu bana bari muni yikigero cy’imyaka 15 mu rwanda ,mubitaro bikuru byakaminuza bya Kigali, nemeye kubushake kujya murubwo bushakshatsi.

Mfite uburenganzira bwo kwanga kujya mubushakashatsi ntibingireho ingaruka kubuvuzi nemerewe.

Amazina y’umurwayi-----

Isinya-----

Amazina y’ababyeyi-----

Isinya-----

Umuganga /umushakashatsi-----

Isinya-----