



UNIVERSITY *of*  
RWANDA

**COLLEGE OF MEDECINE AND HEALTH SCIENCES**

Department of Anesthesiology and Critical Care Medicine

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**Establishing a Regional Anesthesia Service in a Low-middle income  
country:**

**A prospective survey of patients receiving perioperative nerve blocks  
at the University Teaching Hospital of Kigali (CHUK), Rwanda**

Dissertation submitted in partial fulfillment of the requirements for the award of the degree of  
Masters of Medicine in Anesthesia and Critical care of the University of Rwanda

By

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Kigali, May, 2019

**DECLARATION**

I hereby declare that this thesis: **“Establishing a Regional Anesthesia Service in a Low-middle income country: A prospective survey of patient receiving perioperative nerve blocks at the University Teaching Hospital of Kigali (CHUK), Rwanda”** is of my composition and that the research contained in it is my own unless stated otherwise. It has not been submitted to any university in Rwanda award of any degree or professional qualification.

Signed ..... Date .....

**Dr. IRAKOZE Alain**

Approval for submission by Supervisors:

**Dr Matthew HO**

Signature.....Date.....

**Dr. Cynthia KHOO**

Signature..........Date..........

## **ACKNOWLEDGEMENTS**

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I also give special thanks to you members of my family, my mother, brothers and sister. We did this journey together.

For you all, cited or not cited herein, find true recognition of your love and support.

Dr IRAKOZE Alain

## **DEDICATION**

To the almighty GOD

To my mother: RUSINGIZANDEKWE Régine

To my late father

To my brothers and sister

## ABREVIATIONS

<b>CHUB</b>	Centre Hospitalier Universitaire de Butare
<b>CHUK</b>	Centre Hospitalier Universitaire de Kigali
<b>KUTH</b>	Kigali University Teaching Hospital
<b>CASIEF</b>	Canadian Anesthesiologists 'Society International Education
<b>ASAGHO</b>	American Society of Anesthesiologists & Global Humanitarian outreach
<b>RMH</b>	Rwanda Military Hospital
<b>SD</b>	Standard deviation
<b>IRB</b>	Institutional Review Board
<b>LMIC</b>	Low Middle Income Countries
<b>PNB</b>	Peripheral nerve block
<b>HRH</b>	Human Resource in Health
<b>IQR</b>	Interquartile Range
<b>ID</b>	Identification number

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## Appendix A: Regional Block Room Log book

### Patient Demographics

1. Patient Name \_\_\_\_\_
2. Patient ID # \_\_\_\_\_
3. Patient's Phone # \_\_\_\_\_

### Procedure Information

1. Date of Surgery \_\_\_\_\_
2. Time patient entered block room \_\_\_\_\_
3. Duration performing block \_\_\_\_min
4. Anesthesia provider (name/rank) \_\_\_\_\_
5. Surgical provider \_\_\_\_\_
6. Surgical Procedure \_\_\_\_\_
7. Type of Block/s Performed:
  - i. \_\_\_\_\_
  - ii. \_\_\_\_\_
8. Spinal Done Yes \_\_\_\_\_ No \_\_\_\_\_

### Procedure Details

1. Purpose of block: Anesthesia   
Analgesia
2. Sterility: Sterile gloves   
Skin cleaned with antiseptic   
Probe Cover
3. Sedation used:  drug and amount \_\_\_\_\_
4. Needle used: Type \_\_\_\_\_  
Gauge \_\_\_\_\_  
Length \_\_\_\_\_
5. Method Ultrasound   
Nerve stimulator  Minimum twitch \_\_\_\_mA  
Awake Patient   
Injection pressure



6. Drug: Drug name \_\_\_\_\_  
Total amount used \_\_\_\_\_  
Total volume used \_\_\_\_\_
7. Complications  paresthesia  blood aspirated  
 other: \_\_\_\_\_
8. Top-up required  yes details  
\_\_\_\_\_
9. Unplanned GA required  yes details  
\_\_\_\_\_
10. Anesthesia success  yes  N/A

**Name, (Anesthesia Provider):** \_\_\_\_\_

**Signature, (Anesthesia Provider):** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Time:** \_\_\_\_\_



## Appendix B: Study Data Collection Sheet

### Patient Demographics

1. Patient Name \_\_\_\_\_
2. Patient ID # \_\_\_\_\_
3. Patient's Phone # \_\_\_\_\_

### Additional Procedure Information

1. Anesthesia provider difficulty rating (0-10) \_\_\_\_\_
2. Patient satisfaction rating (0-10) \_\_\_\_\_
3. Surgeon Satisfaction rating (0-10) \_\_\_\_\_
4. Surgeon suggestions for improvement:
  - block effectiveness
  - patient anxiety
  - communication with team
  - time performing block
  - safety
  - none

Name, (Anesthesia Provider): \_\_\_\_\_

Signature, (Anesthesia Provider): \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

## Appendix C:



### Regional Block 24-hour follow-up

#### Patient Demographics

1. Patient Name \_\_\_\_\_
2. MRN # \_\_\_\_\_
3. Patient's Phone # \_\_\_\_\_
4. Date & Time of Phone Call \_\_\_\_\_

#### Procedure Information

1. Date & Time of Surgery \_\_\_\_\_
2. Anesthesia provider \_\_\_\_\_
3. Surgical Procedure Done \_\_\_\_\_
4. Block Performed \_\_\_\_\_
5. Spinal Done Yes \_\_\_\_\_ No \_\_\_\_\_

#### Questionnaire

1. Rate Worst Level of Pain since surgery (0-10) \_\_\_\_\_
2. What time did this occur? \_\_\_\_\_
3. Rate Current Level of Pain (0-10) \_\_\_\_\_
4. What time did the pain start/ block wear off? \_\_\_\_\_
5. What medications did you take to help the pain (time, dose)? \_\_\_\_\_
6. Do you have any numbness or weakness in your limb now? Yes  No
7. Can you move your fingers?  toes?  (check for Yes)
8. Can you feel normal touch and temperature in the area blocked? Yes  No
9. Would you have a block again in the future? Yes  No
10. Rate your overall experience with the block (0-10) \_\_\_\_\_

Do you have any comments or want to express any other problems since surgery?

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**Name, (Anesthesia Provider):** \_\_\_\_\_

**Signature, (Anesthesia Provider):** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Time:** \_\_\_\_\_

Appendix D:



Regional Pre-Anesthesia Assessment



Patient Demographics

- 1. Patient Name \_\_\_\_\_
- 2. MRN # \_\_\_\_\_
- 3. Patient's Phone # \_\_\_\_\_
- 4. Date & Time of Phone Call \_\_\_\_\_

Pre-block Assessment

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Previous problems with regional anesthesia                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | Radicular pain or numbness  |
| <input type="checkbox"/> | <input type="checkbox"/> | Weakness  |
| <input type="checkbox"/> | <input type="checkbox"/> | Back problems/back surgery/difficulty lying flat                            |
| <input type="checkbox"/> | <input type="checkbox"/> | Bowel or bladder dysfunction  |
| <input type="checkbox"/> | <input type="checkbox"/> | Infectious disease (TB, hepatitis B/C, HIV, etc)                            |
| <input type="checkbox"/> | <input type="checkbox"/> | Blood clotting disorder (easy bruising/bleeding or history of blood clots)  |
| <input type="checkbox"/> | <input type="checkbox"/> | Anticoagulant or antiplatelet medication and the time and date of last dose |
| <input type="checkbox"/> | <input type="checkbox"/> | Drug allergy  |

Details:

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Checklist / Time Out

- Patient Identification: Name, DOB, MRN
- Surgical Consent
- Surgical Site marked
- Anesthesia Consent
- Bloods                      PLT \_\_\_\_\_      Other \_\_\_\_\_

- Monitors:
  - Pulse Oximetry \_\_\_\_\_
  - NIBP \_\_\_\_\_
  - (ECG) \_\_\_\_\_

Specific Surgical or Anesthesia concerns:  
\_\_\_\_\_  
\_\_\_\_\_

**Name, (Anesthesia Provider):** \_\_\_\_\_

**Signature, (Anesthesia Provider):** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Time:** \_\_\_\_\_

## **ABSTRACT**

### **Background**

Despite the advantages of regional anesthesia as a safe, cost-effective anesthetic and analgesic technique, there is a low utilization in Low middle income countries (LMIC)[1], especially in Rwanda and in particular, at the University Teaching Hospital of Kigali (CHUK). As it is still a new service in Rwanda, ensuring efficacy and efficiency is one way to promote its use and allow its sustainability in our country especially at CHUK.

### **Objective**

We aim to quantify success of regional anesthesia practice based on data collected in patients receiving peripheral nerve blocks at CHUK, according to five parameters: 1) quantity of blocks performed, 2) block efficacy, 3) block safety, 4) block efficiency and 5) perioperative team member satisfaction

### **Method**

This is a prospective clinical survey of all patient receiving peripheral nerve blocks anesthesia at CHUK, from April until September 2016 (6 months)

### **Results**

Of 60 patients, 40 were male and 20 female, sex ratio (male: female) was 1:2. The ages ranged from 13 years to 85 years. The majority of peripheral nerve blocks were done by residents, 34 cases (56,7%), consultants 21 cases (35%), and non-physician anesthetists 5 cases (8,3%)  
The majority of blocks were upper extremity nerve blocks with supraclavicular nerve blocks in 41 cases (68,3%), intercostobrachial in 16 cases (26,7%), interscalene blocks in 8 cases (13,3%), axillary in 5 cases (8,3%). Lower extremity blocks included one popliteal block (1,7%), one femoral nerve block (1,7%) and one ankle block (1,7%). The success rate was at 95%, 2 blocks (3%) required supplementation or top-up to complete the peripheral nerve blocks and one peripheral nerve block required a deep sedation (1,7%) using propofol with midazolam. The use of monitoring was 100% for the use of pulse oximetry, 86,7% for the use of non-invasive blood pressure. Sterility measures included 100% use of sterile gloves, 100% use of skin cleaning solution and 92% use of probe covers ( also known as condoms). Team satisfaction

was high, with a 94,04% satisfaction rate among surgery team, and 94% satisfaction rate from patients.

## **Conclusion**

A local regional anesthesia service established in a resource-limited academic teaching hospital delivered a reasonable quantity of peripheral nerve blocks with demonstrated efficacy, safety, minimal complications and excellent satisfaction amongst staff and patients.



## INTRODUCTION

### *The Global Health burden*

Although there is an advancement in health care provision in low-middle income countries (LMIC), perioperative mortality remains at least three times that of high-income countries[1]. Research have found this problem particularly apparent in sub-Saharan Africa, with avoidable anesthesia mortality rate been recorded between 1:504 in Malawi[2] and 1:133 in a teaching hospital in Togo[3].

### *Regional Anesthesia is safe, efficient and cost-effective*

Regional Anesthesia is the loss of sensation in an area of the body produced by application of a local anesthetic to the nerves supplying that region[4]. Regional neuraxial and peripheral nerve block anesthesia techniques are components of modern perioperative care[5]. Regional techniques may allow avoidance of general anesthesia, and therefore, the maintenance of the patient's own airway, breathing and consciousness. This is important because certain factors contributing to poor outcomes in LMIC are specific to general anesthesia risk: oxygen and electricity failure, failed airway complications, ventilator malfunction and lack of pulse oximetry[3]. Many studies have showed an association of local regional anesthesia with improved analgesia, decreased costs ,better patient satisfaction, increased operating room efficiency, and reduced the length of stay in post-anesthesia care unit (PACU) for some surgeries when regional anesthesia is used[6]. The cost reduction and improved perioperative efficiency is particularly valuable in lower-resourced settings.

There is a paucity of literature assessing the success of regional anesthesia services in LMIC. A survey of Nigerian anesthesia providers showed that while regular use of spinal anesthesia was 92.9%, epidural and peripheral nerve blocks was 15%, and 2.9%, respectively[7]. A high percentage of respondents (47.1%) had never performed a nerve block. Available data in Rwanda showed only 10-15% of patients receive peripheral nerve blocks for lower limb surgery[8].

## *Rwanda*

Rwanda is one of the smallest country in Central and East Africa .Land-locked country, with a population around 12 million, Rwanda, is among most densely populated countries in the word[1]. Compare to developed countries, the Rwandan health care provision is poor, with annual health expenditure at \$162 per capita (compared with Canada's \$4759 per capita)[1]. In 2006, the Canadian Anesthesiologists' Society International Education Foundation (CASIEF) partnered with the University of Rwanda (UR) to support anesthesia teaching for postgraduate physicians[9]. In early 2016, Canadian and Rwandan anesthesiology staff collaborated to introduce a structured regional anesthesia service in the University Teaching Hospital of Kigali (CHUK). Patients receiving regional peripheral nerve block anesthesia were studied to assess the outcomes of this program[10].

While the benefits of regional anesthesia techniques are well documented[11], literature assessing regional anesthesia outcomes in LMIC settings is sparse, especially in the context of a recently established regional anesthesia service[12]. As CHUK is the first hospital in Rwanda to establish a regional anesthesia service, results from this study will help direct quality assurance and future improvements for this service at CHUK; guide the establishment of other regional anesthesia services in Rwanda; and promote advocacy for the investment into regional anesthesia as a safe and effective method of anesthesia in LMIC.

## *Study Objectives*

The purpose of this study is to assess the success of establishing a new regional anesthesia service in terms of the following parameters: the quantity and extent of regional anesthesia practice; the efficacy of regional anesthesia blocks; the safety of regional anesthesia practice; the efficiency in conduction regional anesthesia blocks; and the satisfaction amongst perioperative staff members and patients receiving regional anesthesia blocks.

## **METHODS**

### *Study design*

This is a prospective observational study of all patients who received a peripheral nerve block anesthesia at CHUK, from 1<sup>st</sup> April to 30<sup>th</sup> September 2016 (6 months). CHUK is a public, tertiary referral hospital in Kigali, Rwanda. With 565 beds, and 6 operating theatres, it provides approximately up to 4164 major operative cases across all surgical services every year[13].

### *Selection criteria*

All patients (inpatients or outpatients) who received a peripheral nerve block at CHUK between April and September 2016 were included in the study. This includes patients who received peripheral nerve blocks in addition to other forms of anesthesia (general anesthesia, sedation, spinal anesthesia). We excluded inadequately filled patient records of the data collection forms.

### *Data collection and analysis*

All patients receiving peripheral nerve block regional anesthesia at CHUK had specific pre- and intra- and post-procedure data sheets recorded as part of standard medical record charting (Appendices A, B, C, D). These data sheets were stored separately from the standard patient medical records (see below).

Descriptive analysis using excel was used to analyze patient study data. Mean + Standard Deviation (SD) were used for normally distributed parameters; and median + Interquartile Range (IQR) for non-normally distributed parameters.

### **Ethical considerations**

Patients will not be exposed to any direct risk from this study. With respect to chart reviews, the inherent risk of breached patient confidentiality is possible and methods of mitigating these risks are discussed below. None of the patients benefitted directly from this study. However, future patients receiving regional anesthesia techniques may benefit from improved regional anesthesia availability, which may also lead to better perioperative outcomes.

### **Confidentiality**

The patient study data sheets were distributed to the regional anesthesia staff by one of the co-investigators. After this was completed, all data sheets were collected and stored in a locked filing cabinet in the CHUK Operating Theatres Storage Room. All computer data were

stored on a password protected computer, accessible only by the study investigators. Only data related to the study were collected from the health records reviewed. This data was reviewed in the anesthesia resident office of CHUK, before being locked again in the CHUK operating theatres filing cabinet. Patients were identified only by their unique identification number (ID). Patient names were removed during data collection and analysis.

This project was approved by the Research Ethics Board of the University of Rwanda, College of Medicine and Health Sciences. The study was headed by Dr Alain Irakoze, Mr. Etienne Nsereko under the supervision of Drs. Matthew Ho and Cynthia Khoo.

## RESULTS

### Quantity of block perform

During our study period, following our data gathered on specific sheet (see Appendices), we had in total 62 cases of peripheral nerve blocks (2 cases were removed due to missing data). The majority of performed peripheral nerve blocks (PNB) were for upper extremities: 41 cases of supraclavicular blocks, 16 intercostobrachial blocks, 8 interscalenic blocks and 5 axillary blocks. For lower limbs we performed in total 3 peripheral nerve blocks: 1 femoral nerve block, 1 ankle nerve block, 1 popliteal block

### Block efficacy

Results showed a success rate at 95% for surgical peripheral nerve blocks, 3% of cases required a top up to complete the peripheral nerve blocks, 1 case required deep sedation using propofol and midazolam for the operation.

### Block safety

Following pre-planned criteria (see appendix A), the preoperative checklist was followed at 100%. For monitoring, the use of pulse oximeter for each patient was at 100%, the use of noninvasive blood pressure was at 86.7%, unfortunately the electrocardiogram (EKG) was not used. Sterility measures (see appendix A) were followed at 100% for using sterile gloves, at 92% for using a probe cover and at 100% for using cleaning solution (povidone 5% or chlorhexidine 3 to 5%)

### Block efficiency

The average duration time was respectively 28 minutes for a supraclavicular peripheral nerve block (PNB), 31 minutes for an axillary peripheral nerve block, 25 minutes for an interscalenic block, 30 minutes for an ankle block, 40 minutes for a popliteal nerve block, 10 minutes for a femoral nerve block.

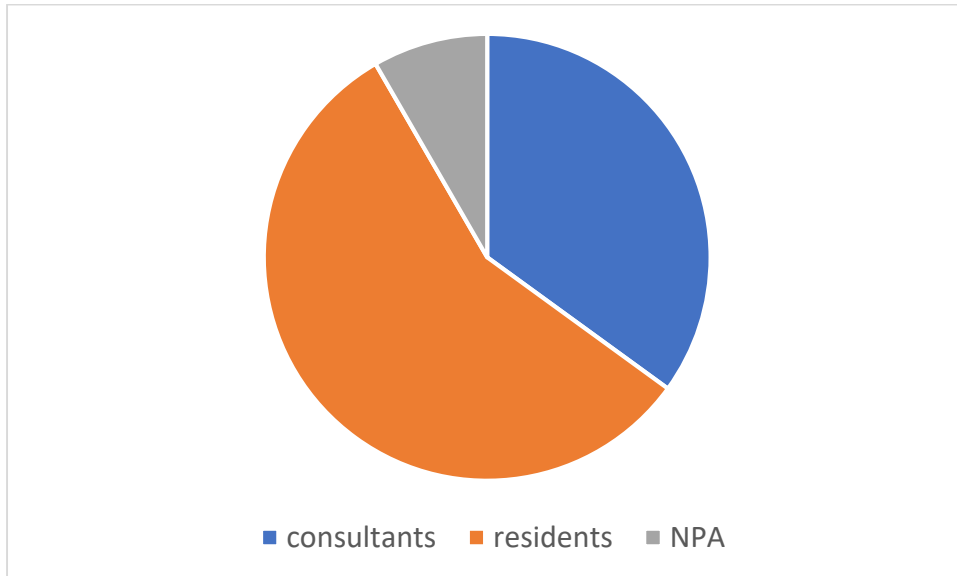
### Perioperative member satisfaction

Results showed that surgery team was satisfied at 94%, patients were satisfied at 94%. The degree of difficulty for anesthesia provider was 29% due to an effective training and guidance of an expert in local regional anesthesia. Results were gathered together for each group following questions on appendix B and an average was generated.

In general, the success rate for peripheral nerve block was high at 95%, patients and member of surgery team were satisfied although some suggestions have been made specially to improve on starting time in order to facilitate the work.

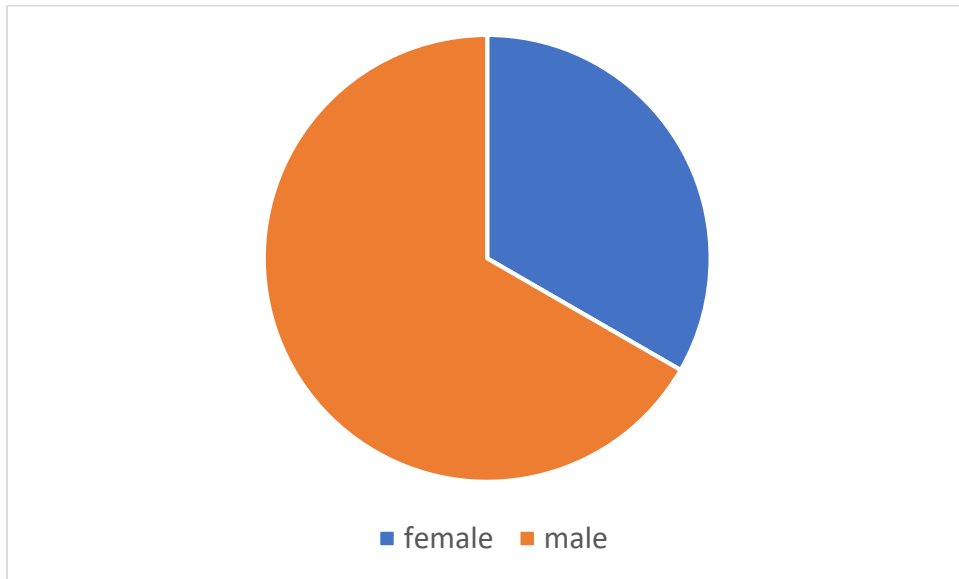
## Demographics

### Provider demographics



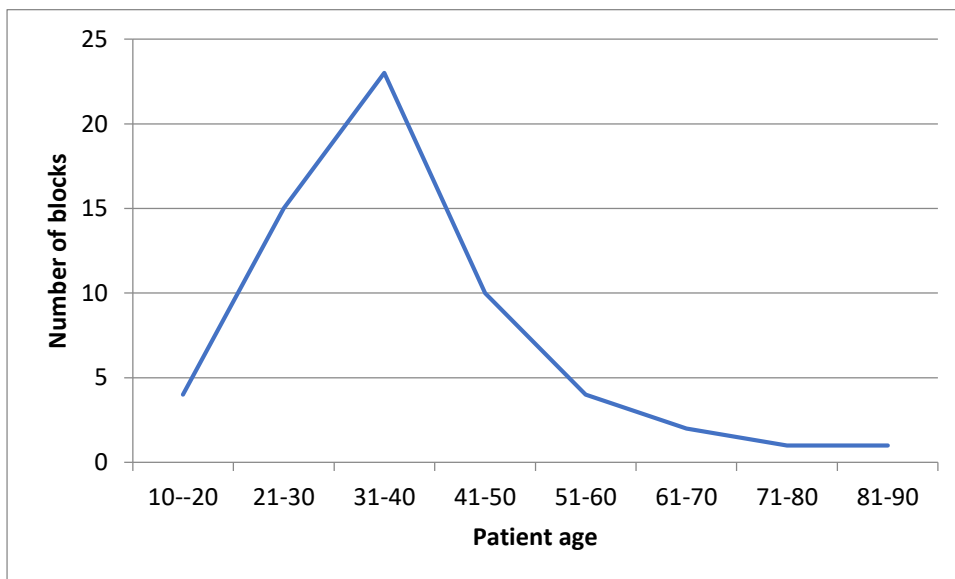
**Figure 1. Number of blocks performed by type of anesthesia providers: residents (57%), consultants (35%), and Non-Physician Anesthetist (NPA) (8%)**

Patient demographics



**Figure 2: Percent**

**of patients of each gender: 33% female (N=20), 67% male (N=40).**



**Figure 3: Number of blocks performed by patient age N=60. Mean age +/- SD: 37 years old +/- 14 years**

## IV.2 Extent of practice

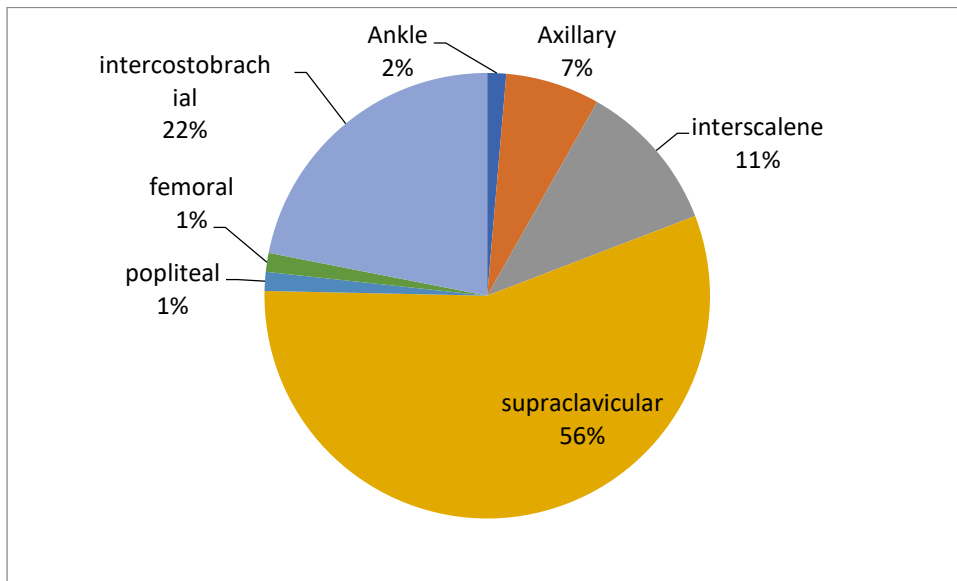


Figure 4: Types of nerve blocks performed (N = 60)

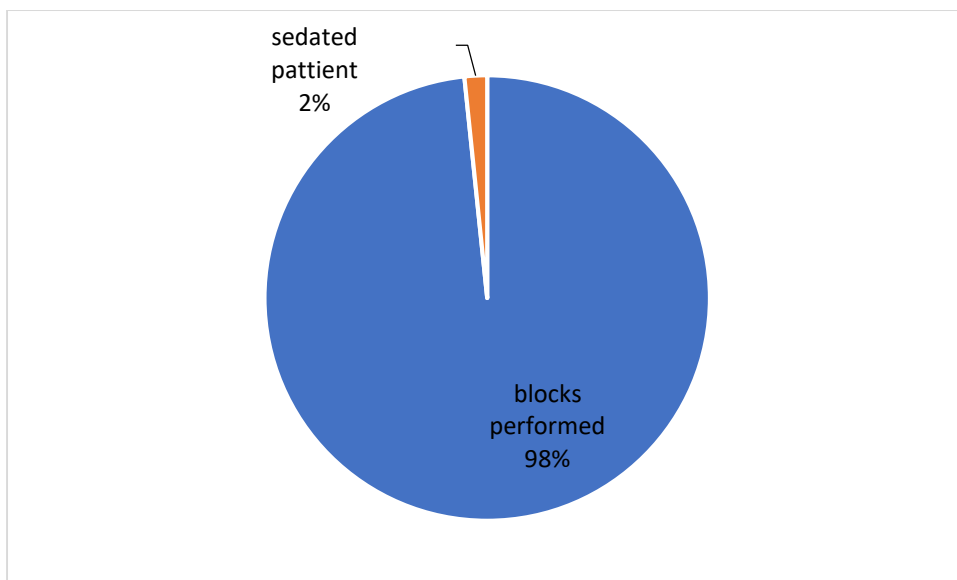
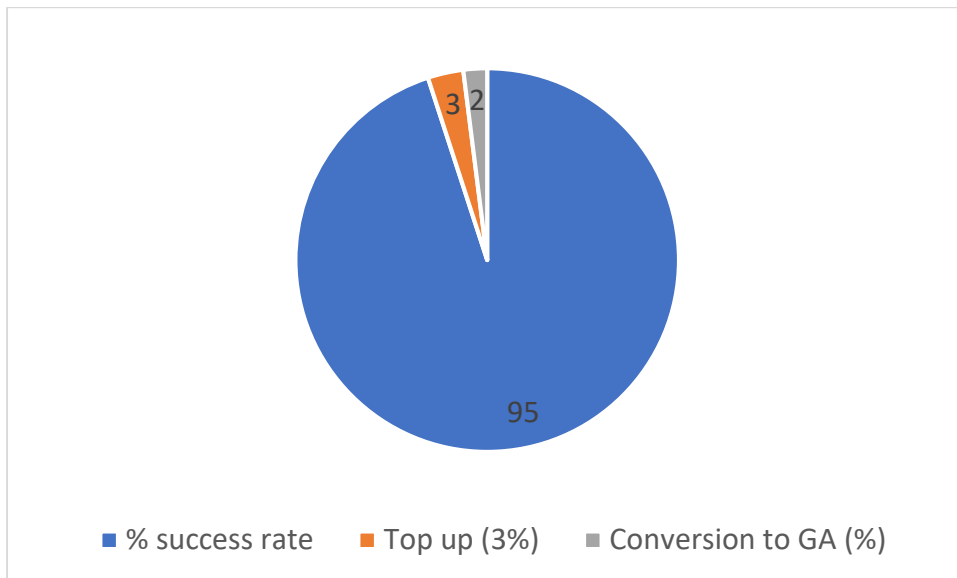


Figure 5: Percentage of blocks that required sedation (N=60)



### IV.3 Block efficacy

- Block success rate
- Block top-up rate
- Conversion to general anesthesia rate



**FIGURE 6. Block success rate**

### IV.4 Block safety

- Compliance with Pre-operative safety checklist
- Compliance with monitoring
- Compliance with sterility
- Rate and types of complication

	Compliance with Pre-operative safety checklist	Compliance with monitoring	Compliance with sterility
Number of cases	60	52	55
Percentage	100%	87%	92%

**TABLE 1. Compliance with block safety protocol including pre-operative safety checklist, compliance monitoring, and sterility (N = 60)**

**Compliance with monitoring**

	Use of pulse oxymeter	Use of ECG	BP monitoring
Number of cases	60	0	52
Percentage	100%	0%	87%

**TABLE 2. Compliance with monitoring of pulse oximeter, electrocardiogram and blood pressure (N=60)**

**Compliance with sterility**

	Use of sterile gloves	Use of probe condoms	Skin cleaned
Number of cases	60	55	60
Percentage	100%	92%	100%

**TABLE 3. Compliance with sterile technique including use of sterile gloves, probe condoms and skin disinfectant (N = 60)**

**Rate and type of complications**

**Types of complications**

	Failure	Top up	Intraneural injection	Local anesthetic toxicity
Number of cases	1	2	1	0
Percentage	2%	3%	2%	0%

**TABLE 4. Number of block complications out of 60 cases**

#### IV.5 Block efficiency

- Duration performing block
- Duration of time in regional block room

#### Duration performing block by all anaesthesia providers

Type of blocks	Number of block performed	Average time for performing block (min)	Standard deviation
Ankle	1	30	
Axillary	5	31	SD +/-5.78
interscalene	8	25	SD +/- 5.77
supraclavicular	41	28	SD+/-5.91
popliteal	1	40	
femoral	1	10	
intercostobrachial	16	*	

**TABLE 5. Average time for peripheral nerve block procedure (in minutes) \*** Intercostal block was performed during supraclavicular blocks and mean time was 28 minutes

### Supraclavicular block with intercostobrachial

Numbers of block	time
1	30
2	30
3	40
4	35
5	20
6	30
7	30
8	20
9	30
10	25
11	30
12	30
13	20

The mean is 28,46min

**TABLE 6. Time for performance of supraclavicular block with intercostobrachial**

### Supraclavicular without any other blocks

Number of block	time
1	15
2	30
3	20
4	20
5	30
6	30
7	30
8	25
9	25
10	15
11	30
12	30
13	40
14	15
15	20

16	30
17	20
18	30
19	60
20	30
21	30
22	30
23	25

The mean is 27.3 min No big difference between the 2 groups (supra with or without interchostobrachial)

**Table 7**

Axillary nerve block

Axillary block	Time for performing block
1	30
2	25
3	30
4	40
5	30

**TABLE 8 : Time for performance of an axillary block**

interscalene block

Interscalene block	Time for performing
1	20
2	25
3	15
4	30
5	25
6	30
7	30
8 this one is combined with a supraclavicular block	

**TABLE 9: Time for performance of an interscalene block**

**IV.6 Perioperative team member satisfaction**

- Anesthesia provider difficulty rating (out of 10 every anesthesia provider was rating the difficulty accounted)
- Surgical provider satisfaction (rated following block effectiveness, time performing block, patient anxiety, safety, communication with team )
- Patient satisfaction

Anesthesia provider difficulty rating	<b>Average</b>	<b>percentage</b>
Anesthesia provider difficulty rating	<b>138</b>	<b>29,3%</b>
Surgical provider satisfaction	<b>442</b>	<b>94,04%</b>
Patient satisfaction	<b>442</b>	<b>94,04%</b>

**TABLE10: Perioperative team member satisfaction**

## DISCUSSION

In total, 62 patients were followed in our study; 2 patients records were removed due to missing data. In general, the success rate for our peripheral nerve block (PNB) was high (95%). The majority of blocks were for upper limbs (95,1%), and only 3 peripheral nerve blocks were performed for lower limbs (lower limbs operations are done most of the time under spinal anesthesia). The satisfaction among patients was at 94% almost similar for surgery team.

### *Study strengths*

This study aimed to evaluate the success of new regional anesthesia techniques in a challenging environment. We did this using data collection sheets which were clear and simple to collect and analyze. This study did not place a great financial or time burden on the local hospital or its staff members, and was able to be completed with the assistance of external volunteer research experts.

### *Study weaknesses*

Among weakness found during our study, we were not able to compare the outcome with the standard of care (general anesthesia). Although we didn't experience major complications in the first 24 hours post operation, we were not able to follow patients in long term and we may have missed some complications like peripheral neuropathy. 2 cases were removed from our study due to missing data. Lack of equipment (needles, drugs, probe covers) and constant supervision from local or international regional anesthesia experts, obliged anesthesia providers to use general anesthesia for some upper limbs operations.

### *Comparison of findings with previous studies*

There is a paucity of data about establishment of a local regional anesthesia service in low and middle income countries[12]. Some available studies in western Africa show a low uptake of these new techniques, despite its advantages in affordability and safety compared to general anesthesia[7].

### *Consideration of clinical and scientific implications*

This study demonstrates the enormous potential of promoting new regional anesthesia programs in. Despite the inherent limitation of regional anesthesia equipment and training, the staff at CHUK were able to perform 62 nerve blocks in 6 months, with demonstrated safety, efficacy and efficiency. This study affirms that establishing regional anesthesia in tertiary centers in LMIC can be done successfully.

### *Suggestions for future research*

This preliminary study needs follow up regarding its long-term impact on practices and patient care at CHUK. While outcomes were excellent in the first 6 months after establishment of the services, it remains to be seen whether the service itself, and these good outcomes, are sustainable in the long-term. For example, staff who learned the peripheral nerve blocks could be followed to determine how much the skill retention (or improvement). Patients can be followed to assess for longer term functional outcomes, or complications. While some research has showed that local regional anesthesia is economically advantageous compared to general anesthesia in Western countries[6], it would be particularly important to study this in LMIC such as Rwanda.



## **CONCLUSION**

Staff at CHUK encountered major challenges when establishing a new regional anesthesia service in a busy public hospital. We believe the high levels of block safety, efficacy and efficiency are testimony to the planning and leadership of the CHUK staff in establishing this service. They identified the main challenges as: lack of equipment (local anesthetic drugs, ultrasound machines, probe covers, block needles); lack of staff training; over-worked operating theatre staff; and reliance on external experts for teaching. Local staff also acknowledged the most important ingredients of the regional anesthesia service: a dedicated 'block room'; the training and leadership of local experts who could teach other staff; the initial donation of equipment by external staff while local supplies were sourced.

Despite these challenges, it is clear that regional anesthesia was performed well for the first 6 months after establishment at CHUK. These results pave the way for improvement of the service at CHUK; expansion to other hospitals in Rwanda; and uptake by other tertiary institutions in LMIC.

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