UNIVERSITY of RWANDA

THESIS

KNOWLEDGE, PRACTICES AND FACTORS INFLUENCING SURGICAL COUNTING SAFETY PRACTICES AMONG OPERATING ROOM NURSES AND MIDWIVES

A CASE OF FOUR REFERRAL TEACHING HOSPITALS IN RWANDA

NYIRASAFARI Emerthe

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF NURSING AND MIDIWIFERY

MASTER OF SCIENCES IN PERIOPERATIVE NURSING

2019

UNIVERSITY of RWANDA

Title

KNOWLEDGE, PRACTICES AND FACTORS INFLUENCING SURGICAL COUNTING SAFETY PRACTICES AMONG OPERATING ROOM NURSES AND MIDWIVES OF REFERRAL TEACHING HOSPITALS IN RWANDA

By

NYIRASAFARI Emerthe

ID: 216339251

A dissertation submitted in Partial fulfillment of the Requirements for the degree

MASTER OF SCIENCES IN NURSING

PERIOPERATIVE TRACK

In the College of Medicine and Health Sciences (CMHS)

Supervisor: Dr. Lilian Omondi

Co-Supervisor: Mr Christian Ntakirutimana

September, 2019

DECLARATION

I, NYIRASAFARI EMERTHE do hereby declare that is dissertation submitted of the degree of Masters of Sciences in Nursing/Perioperative Track in the University of Rwanda/College of Medicine and Health Sciences is my original work and has not previously been submitted elsewhere. I do also declare that a complete list of references is provided indicating all sources of information quoted or cited.

NYIRASAFARI Emerthe

DEDICATION

I am glad from the bottom of my heart to dedicate this work to:

Almighty God,

My dearly loved husband Théoneste Ndagijimana on behalf of his worries as well as assistance throughout my learning phase,

My daughters Erica Tressy and Elida Tricia and son Emery Théos for your love and patience,

All my parents, neighboring friends and all our relatives for their invaluable support shown,

All my colleagues intended for good collaboration during the moment shared mutually,

At last, I strongly dedicate to every one of you who made this work feasible and achieved.

ACKNOWLEDGEMENTS

I want to express my sincere common sense of thanks to Almighty God for his blessings and for guiding my steps in the achievement of my studies. His omnipresence personality has been a source of my happiness throughout the unpredictable firm periods.

I express my sincere gratitude and appreciation to Dr. Lilian OMONDI and Mr. Christian NTAKIRUTIMANA for their commitment in supervision, changeable critics, audacity and careful direction that allowed me to generate this effort at moment.

Great acknowledgments are addressed to Dr. Mary COHEN from Stellenbosch University in favor of her go-ahead to make use of as well as to adjust the questionnaire she developed to my real clinical field.

I would like to state my appreciation and thankfulness towards the University of Rwanda in collaborating with the College of Medicine and Health Sciences, School of nursing and midwifery which made this program possible and for sponsoring my studies.

I am very thankful to the administrative bodies and to all nurses and midwives from the operating rooms in the University teaching hospital of Kigali (CHUK), University Teaching hospital of Butare (CHUB), Rwanda Military Hospital (RHM) and Oshen King Faysal Hospital (KFH) who accepted to participate in this study and made this work reasonable.

I also articulate my admiration to my classmates for their authentic teamwork during my studies in sharing life experience and knowledge.

Lastly and most prominently, I expand my deepest hearted thanks to my family who has supported me through their love, patience, encouragements and prayers throughout my studies.

My sincere gratitude goes to all of you who assisted me in different means for the achievement of my Master's studies.

May Almighty God bless you all, abundantly!

ABSTRACT

Background: The retained surgical item is a critical double burden to the patients and their families. One way of minimizing the risks of this critical burden is the surgical counting process which is the method most applicable and observed in developing countries.

Aim: To determine the knowledge and practice towards surgical counting safety practices among operating room nurses and midwives at referral teaching hospitals in Rwanda.

Methodology: A non-experimental, cross-sectional descriptive study was conducted at four referral teaching hospitals. The stratified random sampling was used to select 160 nurses and midwives working in the operating rooms. Data were collected using self-administered questionnaire and observation checklist. Data were entered in Statistical Package for Social Sciences (SPSS version 21.0) and analyzed by statistical tests (Descriptive statistics, bivariate analysis & multivariate logistic regression) and presented in the tables. The ethical principles were valued.

Results: Level of knowledge was poor at the proportion of 78, 2% by 154respondents and poor practice of surgical counts safety (57.69%) was also reported by the respondents. Only 23 (65.7%) from 35 observed participants performed surgical counts initially. Shortage of staff and long procedures influence surgical counting at the agreement rate of 87.2 %(n=136/156) of the respondents respectively. Also 83.9% agreed that communication and interpersonal difficulties among staff influence surgical counting practices. Chi- square test exposed a statistical significant association between observed practice of surgical counting and demographic characteristics: gender and working experience with p-value of $p \leq 0.015$&$p \leq 0.04$ respectively. Multivariate analysis also showed that surgical count practice associated with demographic data of the respondents influence positively the counting [Gender (OR: 3.030562; $p \leq 0.027$); working experience (OR; 9.215279; $p \leq 0.002$)]. **Conclusion:** Lack of knowledge and poor practice of surgical counting safety practices were confirmed by the respondents and observed by the researcher. Factors influencing surgical counting safety practices highlighted by the respondents are Staff shortage, long procedures, communication and interpersonal difficulties. Need assessment is essential to be conducted and to properly train operating rooms nurses& midwives on surgical counting even the development of innovative surgical counting guidelines.

Key words: Surgical count, Operating room, practice and Referral hospital

TABLE OF CONTENTS

LIST OF SYMBOLS AND ACRONOMYS/ABBREVIATIONS

&: and

%: percentage

N=number

AORN: Association of periOperative Registered Nurses

CHUB: Centre Hospitalière Universitaire de Butare

CHUK: Centre Hospitalière Universitaire de Kigali

ICU: Intensive Care Unit

KFH-K: King Faisal Hospital, Kigali

NICU: Neonatal intensive care unit,

OPD: Outpatient department

RMH: Rwanda Military Hospital

SPSS: Statistical Package for Social Sciences

TJC: The Joint Commission

WHO: World health Organization

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER ONE: INTRODUCTION

This chapter is comprised of introductory part, the situational background and study objectives as well as research questions. Furthermore, the introductory section highlights the problem statement and the significance regarding this study and the operational definitions and the subdivision of the study.

1.1 INTRODUCTION

Globally, World health Organization (WHO, 2018, p.2) stated that one in ten patients are harmed when they are receiving healthcare services. In most cases of surgical interventions, retention of surgical objects in abdominal opening is accidental error but continues to happen over time; this may cause severe clinical mistake and patient harm that can raise the rate of mortality and morbidity in surgical domains (Beukes and Cohen, 2016, p. 22).

Furthermore, this error causes the financial charges to the patients and considerable severe complications; therefore the operating rooms need the secured and competent skills to minimize the retention of surgical objects (Beukes, 2016,p.40).

Surgical counting process is still the one way of minimizing the risks of retained surgical object and a large amount frequent unknown maintained items counts 70% in the abdominal opening due to their regular utilization and tiny dimensions (Susmallian, Raskin and Barnea, 2016,p.1). However; due to failure in team members and due to ineffective message in operating room, there is a significant increased amount of mistakes that may influence negatively the presumed results to the patients, family members, attendant healthcare providers and the organization in return. Most of clinical errors like retained surgical objects after surgery, wrong site procedures and medication errors are originated from miscommunications issues observed in operating room (Ongun P, & Intepeler ,2017, p. 1210).

The international guidelines from WHO, AORN, American College of surgeons and TJC recommend the use of standardized surgical counting protocol in order to decrease the hazard of preserved surgical sponges or devices for surgical safety and saving patient's life as reaffirmed by Rwandan preoperative students nurses (Karonkano *et al.*, 2017,p.3).

1.2 BACKGROUND

Globally, around 234 million of surgical interventions are executed inside the operating room per year and the difficulties are counted in 3-16% of performed operating room interventions (Melekie and Getahun, 2015) .

In USA, in excess of 1500 situations of maintained surgical objects happen per annum; hence this use of standard surgical checklist that must be considered to minimize the risk of errors that could occur before, in or after minor or major abdomen opening interventions (Sharma and Bigelow, 2014, p. 31).

When the procedure is at the end, the surgical team in operating theatre reviews the instruments and objects around and records the procedure done in the patient file before this team leaves the operating theatre. The nurses and midwives are mentioned to work together with the team to check if the needles, sponges and other items counts are totally available in operating room (WHO, 2009). Incorrect surgical counting resulting in critical outcomes such as retention of surgical objects, are common though can be prevented in operating rooms. The World Health Organization (WHO) designed a standardized 19-tool surgical safety to enhance operating room information transfer and continuity of care would be safe in order of minimizing the risk of complications and; also the mortality rate accompanying unsafe surgery procedures(WHO,2009). The retention of surgical objects may be prevented by counting every piece of equipment as quick as possible when they are remaining in sterile environment then to recheck at the end of surgical interventions(Maria and Paulo, 2016,p.7).

In addition, it is recommended that a colorless floorboard can be provided in theatre and a nurse can note there instrument and materials or make sure that there is someone charged to this daily; even if surgical count technique is controlled, the likelihood of retention of surgical item may relate to individual factors.(Candas *et al.*, 2017,p.57)

Regionally, in one European Country such as Portugal, Maria and Paulo (2016) highlighted that the surgical counting process is considerably related to clinical organization and the existence of surgical counting technology as well as other methods of surgical counting(Maria and Paulo, 2016,p.8).

In Asia, the Turkish researchers worked on the surgical count implementation in the operating room and realized that standardized surgical count procedures are available and almost all incidents regarding the retention of surgical swab or instrument occur in abdomen surgeries, moreover some unprepared surgical interventions, existence of many theatre team members in operating room, procedures periods and complicated procedures are also taken in action (Candas *et al.*, 2017,p.57).

In Africa continent; recently in South Africa, the study put in consideration the ways the operating room members try doing their best to make sure that the patient safety during surgical counting is significant, however some interruptions might occur such as transfers during surgical interventions, and staff shifting (Beukes, 2016;p.43).

In East Africa; the study conducted in Uganda on use of standardized WHO Surgical Safety Checklist and surgical sponge as well as items calculations at regional referral hospital realized that there was no implementation of this protocol and patients were no longer safe and some of them were dying due to retained surgical items (Lilaonitkul *et al.*, 2015).

In Rwanda, studies were conducted in operating rooms regarding surgical sites infections and others than the practice of surgical counting among nurses and midwives. The observation done by the perioperative student nurses during their clinical practices mentioned that there are many challenges regarding the retained surgical instruments (Karonkano *et al.*, 2017).

The source of factors that limit safe practice of surgical counting as seen by the Joint commission were boundaries with the authorities, lack of effective communication and lack of working as team in operating rooms(Wallace, 2017,p.31).

The burden of this issue elevates the idea of the study to assess the knowledge and practices of surgical counting and identifying the barriers that may hinder the operating room nurses' practices on standardized surgical counts method.

1.3 PROBLEM STATEMENT

The retained surgical items have been seen as a critical double burden economically to the patients and their families. There is also a time lost for repeated procedures either in radiology or in operating room. The financial challenge may also be considered where the patients and the institutions in charge of insurance are paying the clinical incidents which are very preventable when the implementation of standardized surgical counts method meets the criteria(Hariharan and Lobo, 2013).

There is a considerable reduction of morbidity and mortality rate where the implementation of the standardized surgical counting procedure is applicable(Lilaonitkul *et al.*, 2015). The knowledge of theatre nurses about the use of standardized tool specifically during surgical counting progression in different district hospitals may decrease the frequency of the cases referred at major operating rooms due to retained surgical equipment (Beukes, 2016).

For instance, during my observation all the surgical team members are responsible to make sure that the surgical counting practices during any type of surgical process meet the requirements to ensure patient safety.

In Rwanda, Studies related to surgical domains were also conducted on different subjects like knowledge and practice of nurses regarding the prevention of surgical site infections at referral hospital in Rwanda and the report done by perioperative nurse students during the clinical settings in the different operating rooms in Rwanda revealed that even though the surgical count policies exist; they are not clear and are not implemented systematically for every procedure deemed necessary for surgical count; therefore they recommend deep studies to analyze surgical count in Rwandan hospitals (Karonkano *et al.*, 2017,p.8).

Yet, it was methodologically based on experiences and observation during clinical placement without systematic research methodology and no quantitative data was revealed. So, this study assessed knowledge and practice of counting safety among operating room nurses and midwives at referral teaching hospitals in Rwanda.

1.4 THE AIM OF THE STUDY

The present study aimed to determine the knowledge and practice towards surgical counting among operating room nurses and midwives at referral teaching hospitals in Rwanda.

1.5 RESEARCH OBJECTIVES

1. To determine the knowledge of operating room nurses and midwives on surgical counting safety practices at referral teaching hospitals in Rwanda.

2. To assess the surgical counting safety practices among operating room nurses and midwives at referral teaching hospitals in Rwanda.

3. To identify the factors influencing surgical counting practices in operating room at referral teaching hospitals in Rwanda.

1.6 RESEARCH QUESTIONS

1. What is the level of knowledge of operating room nurses and midwives about the surgical counting practices in referral teaching hospitals in Rwanda?
2. What is the surgical counting practice among operating room nurses and midwives at referral teaching hospitals in Rwanda?
3. What are the factors influencing surgical counting practices among operating room nurses and midwives at referral teaching hospitals in Rwanda?

1.7 SIGNIFICANCE OF THE STUDY

Nursing research: The results will be used to develop the researcher's set of information for further studies that will be aimed to determine the surgical counting practices in the operating theatre.

Nursing education: This dissertation will be used as orientation tool in terms of health education and the strategies to develop the level of education with performance of surgical counting safety practices by nurses and midwives will be developed and evaluated in nursing & midwifery schools and colleges eventually. The nursing education delivered to healthcare providers related to surgical procedures will take in consideration the surgical safety counting practices in the operating theatres in the way of minimizing the hazard of maintained surgical instruments in the opened cavities.

Nursing practice: This study will be done to assess the awareness of surgical counting performances among operating theatre nurses and midwives in referral hospitals and to identify overall factors hindering the implementation of surgical counting protocol. Methods to reinforce good practice and to alleviate recognized obstacles will be an apprehension to this study.

Nursing leadership and management: The findings of this study will help the hospitals' authorities to identify the needs of developing the approaches and procedures of surgical counting that would be implemented by nurses and midwives working in operating rooms or training the operating room nurses and midwives about surgical counting based on study results. Other referral hospitals will expand the ways of advancing the guidelines and policy related to the surgical counting process.

1.8 OPERATIONAL DEFINITION OF KEY CONCEPTS

Surgical count: "Counting the exact number of sponges, instruments, and other materials before, during, and after an operation in order to reduce the likelihood of leaving an object inside a body cavity" (Medical dictionary, 2009, p. 1).

Operating room: Also called operating theatre; it is a room in a hospital specially equipped for surgical operations (Oxford University Press, 2018, p. 1). In this study, operating room (OR) is the place where the surgical procedures are carried out in array to accomplish the permanence of concern via the opening process or using laparoscopy to reach the internal organ in the sterile circumstances.

Practice: In this study, practice is the application of interferences initiated on the guiding principles and policy regarding the execution of organized surgical counts protocol.

Referral hospital: In this study, Referral hospital is the tertiary care facility and has the capacity of managing the cases which are not managed at the District hospital including operating room major procedures. This hospital-type also has the capacity of training new graduates in clinical (medical, nursing, midwifery…) domains, even providing refreshers' courses to clinical professionals.

1.9 STRUCTURE/ORGANIZATION OF THE STUDY

This study was composed by six chapters including introduction, literature review, methodology, results and discussion and conclusion and recommendations.

1.10 CONCLUSION OF CHAPTER ONE

The custody of surgical object maintained in the opening after surgical interventions is critical point to take into consideration as it is a possible avoidable clinical error. The significant outcomes of this burden have big impact on both the clients and health services providers. The purpose of this study was to determine the knowledge and practice of surgical items counting safety practices among operating room nurses and midwives of referral hospitals; and advocate for consistency and strengthening of accurate counting performances, in that way the occurrence of inaccurate surgical count and retention of surgical object will be reduced.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This is the literature review of this study presenting the theoretical and empirical review, conceptual framework related to surgical count practices and patient safety.

2.2 THEORETICAL LITERATURE

The "surgical count is the responsibility of the scrub and circulating nurses. If there is no scrub nurse, the circulating nurse and the surgeon or another perioperative nurse/technician conducts the count. All sponges, sharps, sutures, designated miscellaneous items and instruments used on the sterile field during a counted surgical procedure are x-ray detectable (BC Women's Hospital and Health Centre, 2015, p. 1).

2.2.1 SURGICAL COUNTING PROCESS

All items are counted and recorded upon dispensation during the operation. During the invasive surgeries, surgical counts are performed for all procedure when the following body cavities are entered: Peritoneal, Pelvic and Retroperitoneal. A compulsory responsible item is a reusable or disposable thing which by its natural world is at threat of being kept in the patient. It is for that reason an area under discussion to obligatory documentation on the count page(Zejnullahu *et al.*, 2017,p.99).

In minimally invasive surgeries, all sponges, sharps, sutures, designated miscellaneous items and small endoscopic part and non-endoscopic count is done prior to the commencement of surgery. When the procedure does not convert to an open procedure, only a closure count of sponges, sharps, sutures, designated miscellaneous items and small endoscopic parts is required. Items are counted and recorded with respect to the way they are counted as " first counted, first recorded" and the counted item is recorded before proceeding to counting of the next item. The breaks during the counting progression are circumvented(Zejnullahu *et al.*, 2017,p.98). Formerly the counting is started; the objects are not taken away from the operating room counting waste as well as laundry awaiting the completion of final counting. The scrub nurse straights the counting and the succession of counting is mops, blunts, stitches, selected heterogeneous objects and devices(Spruce, 2018).

Articles of tools among numerous portions are calculated while one piece in the midst of the quantity of fractions in categories e.g. one times three. Things taken out from the sterile field are included furthermore visibility presented (BC Women's Hospital and Health Centre, 2015).

Closure counts are determined by a mark or a tick through an object indicating that one has been handed off the sterile field and this indicates that is no longer the active part of the count. During closure of the cavity, the count is done in stages that are mentioned as earlier than the closure of a cavity inside the hollow, previous to the beginning to close the wound and when the team reaches to the skin closure or at the ending of surgery. Results of all counts are announced audibly to the surgeon. The circulating nurse receives verbal acknowledgement from the surgeon (Rothrock, 2014; p.30).

2.2.2 DOCUMENTATION OF SURGICAL COUNT ITEMS

The documentation of items counting should comprise the items on the instrument table at the opening of the procedure as well as those added during the practice. The counts should be performed audibly and with each sharp, soft good and absorbent items and instrument visualized by both the scrub person and the Perioperative nurse and should be recorded. During the procedure the scrub person should be aware of the location of items on the sterile field(Spruce, 2018).

To facilitate counting, the circulating nurse places the soft goods in visible pocketed bags. Needles are retained on the sterile field and counted according to the number indicated on the package; the scrub person verifies this number with the Perioperative nurse when the package is opened. Broken or missing needles must be reported to the surgeon and accounted for in their entirety(Rothrock, 2014,p.29-32).

At closure, direction of count is sponge bucket, back table, mayo stand and operative field. Sponges left in an incision as packing when leaving the Operating Room are identified by type, and those removed from an incision upon entry into the Operating Room are all counted and documented in the appropriate section in the Operative Records. The vascular items which are **v**essel loops called ligaloops; snuggers; snares; tapes; ligareels and ligaboots named instrument shods; clip cartridges; bulldog clamps and vascular clamp or haemostats are counted clearly in the manner of separated instruments(Rutherford, 2012,p155-160).

In thoracic and abdominal spinal procedures involving a large quantity of complex instrumentation where an instrument count cannot be done with accuracy and confidence, an appropriate x-ray is taken prior to closure of the cavity. The x-ray is read by the surgeon or designate prior to the completion of the surgery. And for Retraction devices are mostly used in fish hooks and Visceral retractors(North Sydney MOH, 2013).

2.3 EMPIRICAL LITERATURE

2.3.1. EPIDEMIOLOGY OF RETAINED SURGICAL ITEMS

Retention of surgical items is found in various operating rooms all over the world; this dangerous error has many causes as mentioned by Gibbs, including lack of reliable surgical counting practice, using manual surgical items counting and assuming a correct surgical counting while the parts of the items were retained inside the bodyGibbs (2011, pp. 1532–1537). In United States, an estimated incidence of retained surgical items of 0.3-1 per thousand abdominal operations was documented and around 1500 cases of retained surgical items are reported annually (Zejnullahu *et al.*, 2017).

Zejnullahu and collaborators (2017) also pointed communication among surgical team as an important element that would prevent retention of surgical items. Similarly, a nationwide study in US revealed an incidence of 13 per 100,000 cases-years (Elsharydah *et al.*, 2016, p. 60).

The problems in leadership (27.6%, n= 394 of 1430) and communication (23.1%, n=330 of 1430) were also identified as the majority classes of contributing factors to retained surgical sponges frequently(Steelman *et al.*, 2018).

The retained surgical items are mostly found in general surgery and gynecological surgery; a three year evaluation of retained surgical objects after surgery was conducted in one Asian country; Iran and found that among 38 participants 73% of all retained objects were sponges, 27% were other instruments, 18.42% were other bandages, 5.26% were scissor and 2.63% was a forceps (Zarenezhad *et al.*, 2017). Since the operating room is a locked employment area with more than a few class of profession in different specialties the incidence of communication issues and connection disagreements is ordinary, particularly between medical team and nursing staff, in view of the fact that the medical group has a propensity to position itself in the hierarchy place better than the nursing team(Gutierres *et al.*, 2018).

Incorrect items count was mentioned among other risk factors for retained surgical items including multiple operations happening at the same time, increased patient body mass index, unexpected intraoperative event, long duration of operation, multiple nursing teams in operating room and changeover of operating room staff when the operation is still ongoing (Moffatt-Bruce *et al.*, 2014; Wang *et al.*, 2015). Contrarily to that, the same meta-analysis (Moffatt-Bruce *et al.*, 2014) proved that body mass index, changes in nursing staff were not significantly associated with increased retained surgical items(Stawicki *et al.*, 2013).

In Africa, a retrospective study conducted in Togo found that most of retained surgical items were sponges and were frequent in gynecological and emergency surgery; the study further revealed an incidence of 1/3030 procedures (Tchangai *et al.*, 2017)

2.3.2. CONSEQUENCES OF RETAINED SURGICAL ITEMS

The retained surgical object was classified as a "Never event" that could be totally prevented; however some cases are still present and they are associated with high morbidity and mortality rate. In one study conducted in Togo, the retained surgical object was associated with postoperative complication including entero-cutaneous fistula in 2 patients, incisional hernia in 2 patients and wound sepsis in 1 patient while other 2 patients (13,3%) died in postoperative period mentioning high mortality rate associated with retained surgical objects (Tchangai *et al.*, 2017)

In their case report on surgical sponge forgotten for nine years in the abdomen, Susmallian & colleagues (2016) demonstrated that the surgical mop had been forgotten in the abdomen of a 34 years old women after cesarean section for the period of nine years and they mentioned that the morbidity involving the client, an elapsed unknown body item can engage a court case designed for the surgeon himself and the involved nurses. The reimbursement decided by the courts related to such cases seems being very high and the institution even the medical doctor are at high risk to lose their name and status(Susmallian, Raskin and Barnea, 2016,p.298).

2.3.3. KNOWLEDGE & PRACTICES OPERATING ROOM NURSES AND MIDWIVES TOWARDS SURGICAL COUNTING

One of the risks of retained surgical items includes counting error that might be related to knowledge of surgical counting and its practice by operating room nurses. Knowledge deficit

regarding fundamental surgical counting procedure was revealed among 76 nurses working in the operating rooms of public hospitals in South Africa(Beukes & Cohen, 2016,p.31).

In this study, 6.6% were not aware of that only x- ray detectable swabs are used in any surgery and 13.2% agreed that when a counting inconsistency occurs, the closing of the hollow space prolongs normally; in the other hand all participants agreed that counting practices are performed to manage swabs, needles, blades and instruments and surgical count should be done aloud(Beukes and Cohen, 2016,p33). Another cross sectional study conducted in Brazil using a sample of 55 nurses, revealed that 55.8% of nurses reported that they count surgical instruments: the most surgical item to be counted was sponges as reported by 86.5% of all participants.

And 48.1% reported that the surgical counting included the counting of sharp objects (Freitas, Mendes and Maria, 2016). Furthermore, Freitas, Mendes and Maria (2006) also stated that surgical counting was reported differently by nurses working in the same hospital which show either the lack of protocol or lack of standardized procedure during the implementation of surgical counting, and surprisingly, some nurses (5.5%) reported that the surgical counting is not done in their services.

2.3.4. FACTORS INFLUENCING SURGICAL COUNTING PROCESS

The factors that may influence the accurate surgical counting process include orderly surgical counts of materials applied within the time of the surgical procedure, use of tracking devices for electronic sponge counts and counting before the cavity and skin are closed (Zejnullahu *et al.*, 2017). In the study carried out on surgical count process, the results shows that 5.5% of respondents explained that the surgical count progression was not done in the operating room they were working. In the same study, the respondents reported that the surgical count procedure was done in a different ways, which showed the nonattendance of guidelines/policies of surgical counting in their healthcare institution long, none of the operating room nurse saw the use of scanning technology in the hospital where they worked (Maria and Paulo, 2016,p.6).

Distracters in operating room may also influence the surgical counting process; the most common distracters observed in the operating room are changes in the surgical procedure, shortage of staff and change of shift as indicated by more than half of the respondents in one study conducted in South Africa (Beukes, 2016,p.48).

In contrast, the study conducted by Stawicki & colleagues (2013) demonstrated that confirmed that the body mass index, some unplanned intraoperative occasions or unplanned surgical procedures and the surgical interventions duration were associated with the high risk of retained surgical items. The incidence of some safety discrepancy, in addition to the particularity of a mistaken surgical counting next to sometime throughout the surgical process was also correlated with increased retained surgical items(Stawicki *et al.*, 2013).

In the study conducted by Steelman & collegues (2018) on "Retained surgical sponges: descriptive study of 319 occurrences and contributing factors from 2012-2017" revealed that the most contributing factors leading to retained surgical sponges were human factors and leadership where was the most frequently identified cause of a retained surgical sponges (30.2%,n=126/417) where they mentioned lack of surgical team member peer assessment of count and lack of with subcategories medical staff peer review and lack of team member documentation (Steelman *et al.*, 2018,p.5).

Interaction sandwiched between theater team members is significant throughout collective procedures. Every one operating area is supposed to comprise a guiding principle designed for counting surgical mops as well as devices that is reliable through countrywide references. A count should be measured previous to an exchange of surgical team members in operations next to elevated chance of mistakes. A radiograph acquired for the reason that of a mistaken calculation should be assessed by a radiologist to guarantee tolerable anatomic treatment. Once the radiograph is negative, a follow-up computed tomography scan should be considered (Grant-orser, Davies and Singh, 2012).

2.4 RESEARCH GAP IDENTIFICATION

Researchers worked around the world on the topic of surgical count practice. In Rwanda, Studies related to surgical domains were also conducted on different subjects but scholars published their experiences during their clinical placement in different operating rooms of referral hospitals on surgical counting practice without involving all systematic steps in research. Another literature gap is that the paper does not highlight any quantitative data of knowledge and practice of nurses towards surgical counting safety practices. The researchers recommended deeper studies regarding that matter of surgical counting.

2.5 CONCEPTUAL FRAMEWORK

The conceptual framework of this study was adopted throughout the WHO Conceptual framework for international classification of patient safety. The WHO had a focus on 10 level class levels that were made by forty eight key models. These main groups are incident type, patient outcomes, patient characteristics, incidents characteristics, contributing factors/hazards, organizational outcomes, detection, mitigating factors, ameliorating factors and actions taken to reduce the risk(WHO, 2009,p.7).

Transfers and medical prerequisites(Rees *et al.*, 2015,p.1029). Patient outcomes were defined as the theories that communicate the collision leading a patient that totally or moderately characteristic to an occurrence. These may be categorized according to the sort of damage level of damage, some communal or financial chock(WHO, 2009,p.9). Patient characteristics were mentioned as socio-demographic of the individual, the initial cause of looking medical care and first analysis.

Incident characteristics were classified in personal , situational and systemic characteristics(Halpern *et al.*, 2012,p.7-10).

Contributing factors/hazards are the conditions, activities or pressures from which was started the initial development of an event or involved in the danger of occurrence. Here are some examples like individual issues; attitudes, presentations even statement. System issues like employment settings and external issues further than the management of the institution like legal guidelines, normal areas. More than one contributing mistakes can characteristically be involved in the distinct event of patient safety(WHO, 2009,p11).

Organizational outcomes submit to the force leading an institute which is completely or in part attributed to the occurrence. These ones specify the penalties straight to the institution like improved utilization of sources to be concerned by the patient, public notice about communication, legislative implication in opposition to medical or clinical outcomes of the patient(WHO, 2009,p.11).

The charge of the supplementary occasion, the imaging and the radiographer's bill intended to interpret the picture must be important and might not be compensated (Perkhounkova, Storm and Mathias, 2015,p.499).

Detection and mitigating factors are the activities or conditions taken to find out an event, avoid or to broke the progress of an occurrence on the way to damaging the client. Once these actions are not met, ameliorating activities take place to modify the situations by compensating any injury following the occurrence. These are applied to the patient (re-operation, treatment deliverance…) and to the institution (team member debriefing, behavior modification, complaints control). The actions taken to reduce the risk focus on top of stepladders fully to avoid the future incident of the identical or equivalent patient safety occasion also scheduled to improve structure flexibility(WHO, 2009,p.13).

In case of any factors influenced surgical counting safety practice, incident type is noticed that is retained surgical object. Patient presentation for the surgery may be the co- factor to the incident type like if he /she have emergency procedure, obese patient on abdominal surgery. Near miss becomes the incident characteristics.

Once the incident type is identified, detection like the use of radiograph machine to check the x-ray swab and mitigating factors took place to improve both the patient outcomes and organization outcomes. If not managed, ameliorating factors are added to alter the situations by compensating any injury following the occurrence. Actions taken to reduce the risk are also involved to make the preventive measures regarding such event or similar incident to the patient (training, policy/guidelines development, provision of resources…). The outcomes are appropriate surgical counting safety practices for surgically ill patients.

The independent variables include knowledge of nurses and midwives towards surgical count process, availability of surgical count policy, shortage of staff, staff communication, and noise. The outcome variable is surgical counting practice. The conceptual framework below was adopted from WHO Conceptual framework for international classification of patient safety.

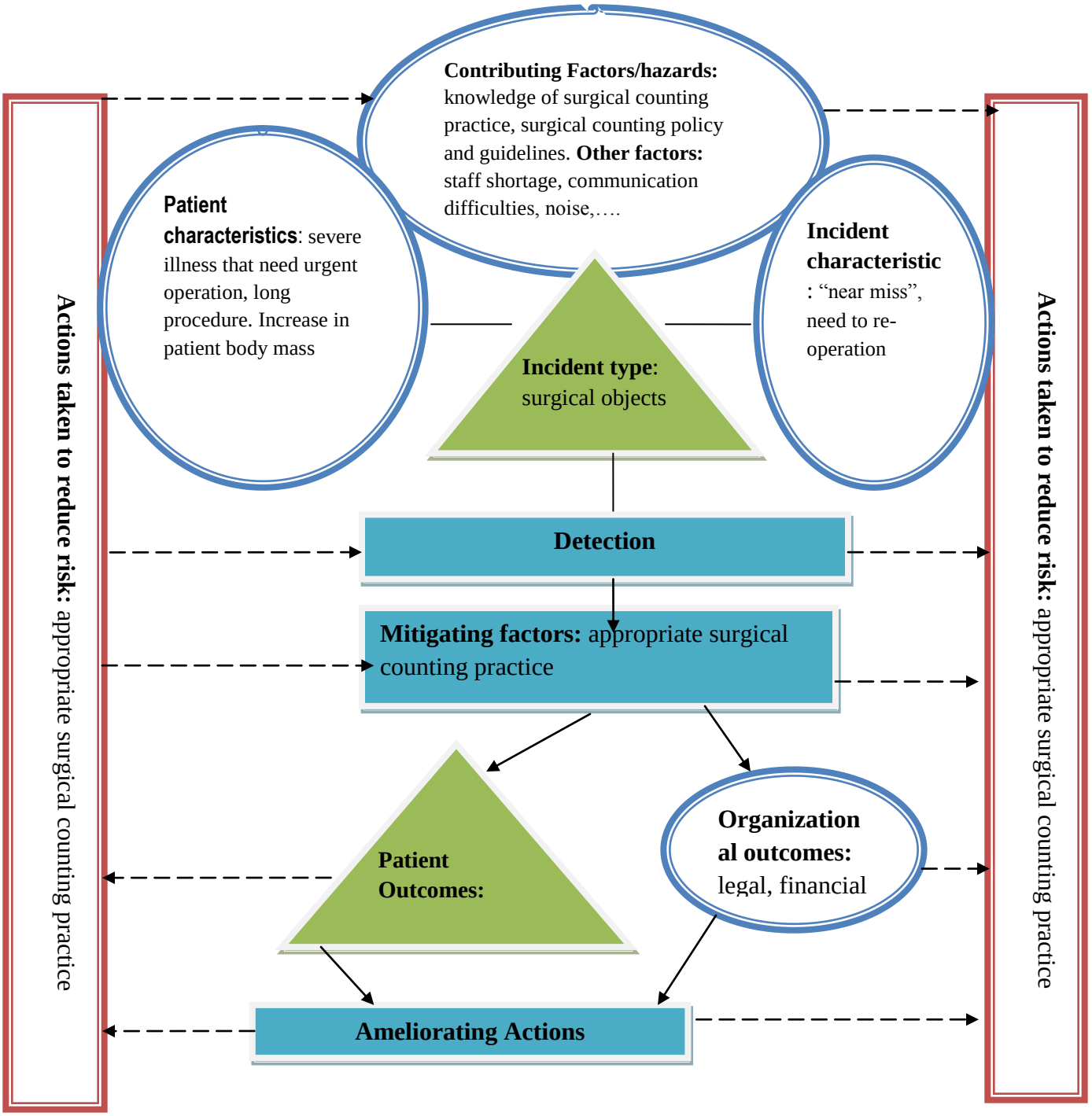

Figure 2.1: Study conceptual framework adopted from Conceptual framework for international classification of patient safety(World Health Organization, 2009,p.8).

2.6 CONCLUSION

In this chapter, theoretical and empirical literatures were described in details relating to study variables and emphasized to the evidence based findings. Research gap regarding surgical count practices was identified. In addition, the conceptual framework was designed.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The following chapter explains in details the research methods that were used in this study. It develops the description of study area, the study design, the study population, the sample size and sampling strategies, instruments and data collection methods, the ways of analyzing the data was to manage the data collected as well as ethical considerations. It also outlines limitations and challenges that the researcher encountered.

3.2 RESEARCH DESIGN

The quantitative research can be descriptive, exploratory, correlation, quasi-experimental or experimental (Polit and Beck, 2008, p. 20; Grove, Burns and Gray, 2013, p. 23). In this study, a descriptive cross-sectional design was used to assess the practice of surgical counting safety practices among nurses and midwives working in different operating rooms of referral teaching hospitals in Rwanda. The researcher also conducted an observation on the practices of surgical count safety among nurses and midwives of the same units at the cited settings.

3.3 RESEARCH APPROACH

Quantitative methodology focuses to the understanding and splits down observable facts in small measurements with the intention of evaluating the results. Grove and colleagues (2013, p. 23) describe quantitative research as a official, purposeful, methodical procedure by which arithmetical statistics are developed to obtain innovative information with reference to the humankind. In this study, the researcher has used a quantitative approach where a set of dichotomous and leading questionnaire were structured and observation checklist organized according to the study objectives have been used to assess the surgical counting practices of operating room nurses and midwives during surgery.

3.4 RESEARCH AREA

This study took place in operating rooms of four referral teaching hospitals; three of them find their locality in Kigali including Kigali University Teaching Hospital (CHUK) located in Nyarugenge District, Rwanda Military Hospital (RMH) located in Kicukiro District, King Faisal Hospital (KFH) located in Gasabo District, and one referral hospital located in Huye District; namely Butare University Teaching Hospital (CHUB).

3.5 DESCRIPTION OF RESEARCH AREAS

Rwanda military hospital (RMH) is a referral and teaching hospital which is situated in Kigali city, KICUKIRO District and KANOMBE sector it receives all cases of patients either nationally or internationally who come for looking diverse care according to their sickness, including surgical care. RMH has 275beds and dissimilar services counting operating theatres. Operating theatre of RMH has 5 different operating rooms together with orthopedic room, general surgeries, gynecological surgeries room, specialties room, ophthalmology surgery room. Operating theatre of RMH has 32 general nurses and the gynec-obstetric operating room composed by 13 nurses and midwives. RMH operating theatre has 5 operating tables, and it has a capacity to receive 5 patients at the same time and able to receive 20 patients a day and the capacity to receive an average of 250 patients par month (as reported in RMH theatre patient register 2015-2016). During day shift all elective, urgent and emergency cases are operated and during night shift operate only emergency.

This study was conducted at Kigali University teaching hospital (CHUK) which is a referral hospital, locate in Kigali city, Nyarugenge district and Nyarugenge sector, has different services including the operating theatres and its capacity is 513 beds in hospitalization. Operating theatre of CHUK has 35 general nurses. CHUK operating theatre has 6 operating tables, and it can accommodate 6 patients all at once and it has the capacity of receiving 20 surgical cases per day and the ability to take delivery of an standard of 300 surgical cases for every month (as reported by theatre patient register) in the operating theatre staff works in two shifts (day and night). The CHUK gynec-obstetric department has an operating room occupied by 3tables with 65 midwives rotating there according to the situation. 4 midwives are allocated in operating room on day shift and 2midwives are allocated there on night duty for emergencies. Everyone is eligible to assist in operating room as scrub or circulating midwife (as mentioned by the matron's report).

This study was also conducted at Butare University teaching hospital (CHUB) which is a referral hospital; locate in Southern Province, Huye district and Ngoma sector. This hospital has a capacity of receiving 450 patients in hospitalization.

The operating theatres are included in the major services found at CHUB and counted 19 registered general nurses working regularly in 4 rooms with 4operating tables. Four patients can be simultaneously operated and this theatre is competent to deliver service to20 cases per day & to provide care to an average of 180 patients monthly (as reported by theatre patient register).

The staff allocated in the operating theatre works in two different shifts (day and night). During day shift all elective, urgent and emergency cases are operated and during night shift operate only emergency cases. The CHUB gynec-obstetric department has an operating room occupied by 3tables with 50nurse/ midwives, 4nurses/midwives work on day shift and 2nurses/midwives work on night duty for emergencies in the operating room. Everyone is eligible to be allocated in operating room according to the matron's report.

This study was also done at King Faisal Hospital which is also a referral hospital located in RWANDA country, Kigali city, Gasabo district and Kacyiru sector. KFH receives global cases with different sickness and checkup either national or international patients counting surgical cases. KFH has many services including operating theatre and this hospital has the capacity of 150 beds for hospitalization and day care. Operating theatre of KFH has 5 operating rooms which are named room I, II, III, IV, and room V.

Operating theatre of KFH has 26 registered general nurses. KFH operating theatre has 5 operating tables, and its capability allows that hospital to give care to 5 patients simultaneously and KFH has the ability to surge more than 20 cases per day. This means that can receive an average of 250 surgical cases monthly (as reported by theatre patient register). The healthcare providers from the operating rooms work in shifts (day and night). During all elective, urgent and emergency cases are operated at day and night shift depending on the theatre list booked as mentioned by the Nurse unit Manager. The information regarding the sty settings, target populations and operating data and duty roster shifts were given by the Human resources managers.

3.6 POPULATION

A population is a complete cluster of human beings, materials or articles that get together the same inclusive criterion mentioned by the researcher (Grove, Burns and Gray, 2013, p. 44). Population was made by the nurses and midwives who work in operating rooms and gynec-obstetrics department from four different main referral hospitals in Rwanda (CHUK, CHUB, RMH and KFH). Midwives in gyneco-obstetric operating room, work either as a scrub nurse or circulating nurse during cesarean section and other gyneco-obstetric surgical procedures. All midwives were concerned because they were eligible to rotate in the operating rooms according to their allocation from the nurse unit managers/matrons. The whole population was composed by 240 operating room nurses and midwives.

Table3.1: Number of participants according to their hospital

POPUTATION / HOSPITAL	NURSES	MIDWIVES	TOTAL	PERCENTAGE
RMH	32	13	45	19%
CHUK	35	65	100	42%
CHUB	19	50	69	28%
KFH	26	0	26	11%
TOTAL	112	128	240	100%
PERCENTAGE	47%	53%	100%	

3.7 SAMPLING

3.7.1 SAMPLE SIZE

Sample size estimation is a really essential footstep to design and conduct the study(Sami *et al.*, 2018,p.311). This formula is based on confidence level of 95% and P value of 0.05. Therefore, a total number of 150 respondents was calculated from the target population using Taro Yamane formula: n=N/1+N (e^2)in order to get the sample size(Israel, 1992,p.4).

According to the formula, 240/1+240(0.05^2) =240/1+240(0.025) =240/ (1+0.6)=240/1.6= 150 population sample.

n: sample size; N: population and e: margin error
Considering the margin of error of 0.05, the required sample size is 150 nurses and midwives working in operating room. Therefore, the number of nurses proportioned to 47% from 150 respondents was represented by 75 nurses while the number of midwives proportioned to 53% was represented by 85 nurses/ midwives from 150 respondents.

Table 3.2: Sampling proportion of participants from each hospital

HOSPITAL	CATEGORY	SAMPLE PROPORTION
RMH	**Nurses**	**22(29%)**
	Midwives	**9(10%)**
CHUK	**Nurses**	**23(31%)**
	Midwives	**43(51%)**
CHUB	**Nurses**	**13(17%)**
	Midwives	**33(39%)**
KFH	**Nurses**	**17(23%)**

To outfit for attrition & uncertainty of non-response rate; ten percent nurses and midwives was added; thus the sample size reached 160 participants in this study(Sim and Lewis, 2011,p.7).

3.7.2. SAMPLING STRATEGY

The researcher used the probability stratified random sampling which is proportional to size for minimizing selection bias and ensuring that everyone of the target population had the chance to be recruited in the study sample by considering each strata proportion. This increased also the representativeness of the study sample to the population as the sample size estimated to establish the least number of the participants to respond to the questions under the study(Whitehead *et al.*, 2016,p.1058).

As the table 3.2 explained the sampling proportion of respondents from each hospital, nurses who are working in general operating theatre represented 47% of the whole sample means 75 nurses and those nurses and midwives working in gyneco-obstetric theatre represented 53% of the sample means 85 nurses and midwives. Study participants were recruited from four referral teaching hospitals and in each hospital (except King Faysal hospital with only one operating theatre), 2 strata were formed including stratum of nurses working in general operating theatre and another stratum of those working in maternity's theatre. The number of respondents in each stratum was proportional to its size and the selection of respondents was random. Participants who met the inclusion criteria were randomly selected and were eligible to take a part in this study until the required sample size was achieved.

3.8 INCLUSION AND EXCLUSION CRITERIA

3.8.1 INCLUSION CRITERIA

This study included the nurses and midwives who have been registered in National council for nurses and midwives of Rwanda working formally in operating room and maternity of one of cited referral hospitals, who consented to participate in this study and who had experienced operating room at least one year in the same hospital.

3.8.2 EXCLUSION CRITERIA

This study excluded the nurses and midwives who did not fill the informed consent or approval of participation and the nurse and midwife who was in leave, even those who did not work in operating room. Other health professionals and other operating room members were also excluded from this study. Nurses and midwives who had been working in operating room under one year were also excluded for reducing bias of inadequate perception of the institutional culture and function regarding surgical counting practices.

3.9 VALIDITY AND RELIABILITY OF RESEARCH INSTRUMENT

A questionnaire used was developed and pre-tested by Beukes and Cohen (2016) and was also accepted ahead by the researchers (Annexure I) and slight modification was made to adapt it to both the study objectives and the clinical practice reality using various literatures.

The questionnaire which includes adopted tool was originally developed in English and was translated into French by the professional translator to facilitate every respondent to read, understand and respond in his or her easiest language. The observation checklist remained in English as it was used by the principal investigator only. This assisted to recognize challenges the operating room nurses and midwives are facing for performing surgical counting safety practices in more cross-cutting way rather than facility-based confronts.

3.9.1 VALIDITY OF THE RESEARCH INSTRUMENT

Validation of the researcher's modified questionnaire and observation checklist was done by the Perioperative nurse expert to ensure that is readable and easily understandable. According to Treece & Treece (1982) in Johanson and Brooks (2010, p. 395), for testing instrument, 10% of the entire sample is need for pilot testing; therefore, the tool was piloted in 15 nurses and midwives from another hospital out of the study settings to ensure its validity in current study population. These participants also signed the informed consent for being the pilot study respondents. In response to the results of the pilot study, errors were rectified to ascertain the precision, appearance and content validity of the survey. Time of filling the questionnaire and phraseology related to its structure were also determined and rectified to the questionnaire as the permission to do it was accorded before ensuring internal validity.

3.9.2 RELIABILITY OF THE RESEARCH INSTRUMENT

Reliability means that the instrument is measuring what it is intended to measure. An instrument is reliable to extend that it provides consistent measures across topic and is constant in excess of occasion. The evaluation of internal consistent of a scale had to be treated in ranges of 0 and 1(Sharma, 2016,p272). The reliability of this study was tested by distributing the questionnaire made of five point likert-type scale in both positive and negative worded items with reverse coded negatively to15 respondents fulfilling the inclusion criteria for piloting to refine the methodology and make sure for the usefulness of the questionnaire.

As a result, the internal consistency reliability was computed after completion of instrument review. Each of 3 sections was found to have acceptable reliability with Cronbach's Alpha greater than or equals to 0.70. The coefficient reliability was ranged from 0.731 to 0.792. This study had Cronbach's alpha coefficient of 0.755.The data collection tool had 51 questions and the checklist had 19 elements.

Table3.3. Content validity relating the study objectives, conceptual framework and the questionnaire

Objectives of the study	**Components of the conceptual framework**	**Items in questionnaire**
To determine the knowledge of operating room nurses and midwives about surgical items counting practices during surgery	Contributing Factors: Knowledge of surgical counting practice, surgical counting guidelines	This was in section B of the questionnaire
To assess the surgical counting practices of operating room nurses and midwives during surgery	Action taken to reduce the risk (i.e. of surgical objects retention): appropriate surgical counting practice Mitigation factors: appropriate surgical counting practice	This was in Section C of the questionnaire
To identify the factors influencing surgical items counting practices in operating room	Severe illness that need urgent operation	Section D

3.10 DATA COLLECTION METHODS

After getting the Institutional review Board (IRB) approval and the permission of Hospital authorities, the researcher approached the unit managers of operating rooms to organize a meeting with study respondents for explaining the purpose of the study. The respondents were well ensured regarding the privacy and discretion of the data that were collected and were allowed to ask questions to the researcher and those who accepted to be part of the study signed the informed consent form and became the "study respondents" then they agreed to proceed with data collection and allowed me to observe them during surgery.

The study respondents were issued the self-administered questionnaire to be filled in using a pen in their free time without interrupting their work. As the participants completed filling the given questionnaire, the researcher was kept away from close closeness of the respondents for assuring the anonymity. After signing the informed consent forms and completing the questionnaires, the respondents deposed the paper sheets in the unit managers 'office and the researcher assigned to collect all paper sheets and thank the respondents for their contribution. Only codes were used on self-administered questionnaire, checklist and computer. The investigator conducted the observation using the checklist on the surgical count safety practices in operating theatres among nurses and midwives attending different surgical procedures including caesarian sections, orthopedic surgeries, neurosurgeries and general surgeries where opening cavities were practiced and Ear, nose& throat (ENT) to make sure that count was complete. A number of five operating room nurses and midwives were observed at each hospital for two days but indifferent procedures for one scrub nurse and the participants were not alerted that they were being observed at the time of the procedure to avoid rectification and information bias. The researcher applied this design to 35 participants within the period of 15th April to May 22nd 2019 where a researcher spent a week to each study setting to gather information.

3.11 DATA ANALYSIS

The study used the Statistical Package for Social Sciences (SPSS) version 21.0 to analyze descriptive data. To determine the association between socio-demographic variables and surgical counting practice; inferential statistics namely bivariate analysis (Pearson Chi-square) and multivariate logistic regressions were used and p-value under 0.05 was measured significantly.

3.12 ETHICAL CONSIDERATIONS

3.12.1 ETHICAL APPROVAL

The Institutional Review Board (IRB) of the college of Medicine and Health Sciences of the University of Rwanda reviewed and approved the study, and the authorities of four referral teaching hospitals through their respective research committees guaranteed permission to conduct the study.

3.12.2 PARTICIPANT CONSENT

The contributors assigned to respond were explained the rationale and the process of the research and after they voluntarily accepted to participate, they signed informed consent form and they were explained that they might extract from the study without any consequence at any time.

3.12.3 RESPECT OF RESPONDENTS' RIGHT

Respect of respondents' privacy, confidentiality and anonymity was considered; no personal identifiable information such as name was mentioned on the questionnaire as the code was used in the place of names and all used tools were be kept in a locked cupboard and the dataset was kept in a personal password-protected computer to ensure the confidentiality of respondents' information. Coding the hospital and the questionnaire to protect the hospital and the respondents' identity were ensured. The selection of the participants was fair based to their qualifications and the area of the study. The detailed informed consent for a study respondent is shown in the pages of appendices.

3.13 DATA MANAGEMENT

After data collection, data were entered in a computer and were coded for data quality, then, were analyzed. The questionnaires were stored in locked cupboard and electronic data kept in a protected computer with a personal password. To ensure the security of collected data; the backup was done on 2 hard drivers protected with a pass code. The tools used in this study will be destroyed after 5 years.

3.14 DATA DISSEMINATION

The present study was conducted for the academic award. After analyzing the data, the findings will be presented to the school of nursing and midwifery panel to be awarded, and then the results will be shared after the final of the study. The researcher will disseminate the data by providing the hard copy of the original study to different settings (hospitals and School of nursing and Midwifery) that were involved in research project. The dissemination also will be done via publication either in conferences or in journal.

3.15 LIMITATIONS AND CHALLENGES OF THE STUDY

During this study, limitations and challenges were encountered. The researcher observed how the surgical counting practices are performed and the results were compared to the participants' self-reporting regarding the same practice. Data collection methods either self administered questionnaire or observation checklist at different four hospitals in city and rural district was somehow complex but made this study very meaningful in the study areas.

In some settings, there is a lack of coupled team (scrub person and circulator nurse) to perform standardized surgical counting safety practices during the surgical procedures, so this weakened this study to be generalized beyond the study settings. The overloaded work of some respondents limited the data collection process where they took longtime to fill the questionnaire.

Lack of updated studies regarding surgical counts practices in Rwanda with accurate information was a big challenge of getting updated data. Other challenge was the time to get the ethical clearances approval from some referral hospitals, this delayed the scheduled time for data collection for a period of approximately two months.

3.16 CONCLUSION

This study was conducted in the operating rooms of referral teaching hospitals which are located in Rwanda. The researcher preferred to use a descriptive cross-section design and the population was composed by Nurses and midwives working in the operating rooms and the researcher used the probability stratified random sampling to minimize the bias in selection and to ensure equal chance to the target population. The methodology specifically data collection and the research settings were the strong point to consider included both participants' responses and observation. Approval and consent to conduct the study were required and guaranteed from University of Rwanda authorities and the hospitals administration involved in the research. Approval forms were delivered to the contributors to confirm& to guarantee the data discretion. Feedback will be known with different ways of results dissemination.

CHAPTER FOUR: RESULTS

4.1 INTRODUCTION

This chapter presents the research findings. The results of this study are presented to answer the research questions starting from socio-demographic characteristics of the respondents, followed by the knowledge and clinical practices related to surgical counting safety and also some factors that are influencing surgical counting safety practices in the operating rooms. All results of the study were being presented in tables displaying the frequencies and the percentages. The data analysis of participants 'observation was also done in the same way as self- reported responses to show the association between demographic data and surgical count practices.

4.2 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 4.1: Demographic characteristics of the respondents

Demographic characteristics		PARTICIPANTS RESPONSES(n=156)	
		Frequency	Percentage %
GENDER	Male	58	37.2
	Female	98	62.8
	Total	**156**	**100**
AGE	21-29 years	20	12.8
	30-39 years	84	53.8
	40-49years	36	23.1
	Above 50years	16	10.3
	Total	**156**	**100**
MARITAL STATUS	Single	27	17.3
	Married	110	70.5
	Divorced	6	3.8
	Widower	13	8.3
	Total	**156**	**100**

Table 4.2: Demographic characteristics of the respondents (Continued)

Demographic characteristics		RESPONDENTS N=156)	
		Frequency	Percentage %
PROFESSIONAL CATEGORY	Diploma nurse	128	82.1
	Bachelor	20	12.8
	Master	8	5.1
	Total	**156**	**100**
WORKING EXPERIENCE	1 year	14	9.0
	1-3 year	36	23.1
	3-6years	32	20.5
	6-9years	58	37.2
	Above10years	16	10.3
	Total	**156**	**100**

The study sample was made up of 160 respondents from different referral teaching hospitals and was limited to nurses and midwives with the experience more than one year in the department and who participates actively in surgical counting practices in the operating room of general theatres or of Maternity theatres. However, due to overloading work in the operating theatre, during, some respondents were not presented to respond and we got the response rate of 97.5 % where 156 respondents completed the questionnaire correctly.

Regarding the gender of the respondents, (37.2%) respondents were male and (62.8%) were female. According to the results, by looking to their age category, the majority (53.8%) of the respondents were in the average of 30-39years.

The majority of respondents (70.5%) were married and most of the respondents (82.1%) had advanced diploma (A1) nursing or midwifery. The minority of respondents (5.1%) had got the training at masters' level in Nursing, but (37.2%) had work experience that was between 6 to 9 years in the operating theatres.

4.3 THE LEVEL OF KNOWLEDGE OF OPERATING ROOMS NURSES AND MIDWIVES TOWARDS SURGICAL COUNTING SAFETY PRACTICES.

The levels of knowledge are categorized as continuous data using likert scale where the participants responded according to their understanding towards surgical count practice. Different options of answers were given in the self administered questionnaire and the participants had chosen one according to their agreement or disagreement to the given statement. For affirmatively worded items, the percent of positive responses is the percentage combination of respondents who answered "Strongly agree" or "Agree" depending on the response categories used for the item.

For negatively worded items, the percent of negative responses is the percentage combination of respondents who answered "Strongly disagree" or "Disagree" depending on the response categories used for the item. The respondents who had chosen Neutral were considered as unaware of the information.

Table4.3: Summary statistics of levels of knowledge of operating rooms nurses and midwives

KNOWLEDGE	*RESPONDENTS=156*				
	S.D*	***Disagree***	***Neutral***	***Agree***	***S.A****
Surgical counts are conducted by two persons	11(7.0)	19(12.1)	29(18.5)	48(31.0)	49(31.4)
Surgical counts are conducted for certain surgical procedures only.	8(5.1)	12(7.7)	8(5.1)	53(34.0)	75(48.0)
All swabs in use are kept to a minimum during surgery	8(5.1)	7(4.5)	39(25.0)	34(22.0)	68(43.5)

S.D*: strongly disagree; S.A*: strongly agree

Table 4.4 Summary statistics of levels of knowledge of operating rooms nurses and midwives (continued)

KNOWLEDGE	***S.D****	***Disagree***	***Neutral***	***Agree***	***S.A****
If a change in team members performing initial count, counting can be omitted.	53(33.9)	76(48.7)	138.3)	6(3.8)	8(5.1)
Due to interruption, the count can be continued without restarting	75(48.1)	63(40.4)	6(3.8)	7(4.5)	5(3.2)
Recording of all items and instruments done as the hospital policy.	11(7.0)	17(11)	15(9.6)	72(46.1)	41(26.2)
Surgical counts should be done aloud.	7(4.5)	12(7.7)	8(5.1)	49(31.4)	80(51.2)
Swabs use holding X-ray detectable strip.	8(5.1)	11(7.0)	13(8.3)	76(48.7)	48(30.7)
Surgical counts are conducted to control swabs, needles, blades and instruments.	3(1.9)	4(2.6)	3(1.9)	114(73.1)	32(20.5)
If any count discrepancy, closure of the cavity continues as usual.	84(53.8)	48(30.7)	10(6.4)	8(5.1)	6(3.8)
Surgical counts are recorded and controlled on a white board.	5(3.2)	11(7.0)	13(8.3)	53(33.9)	74(47.4)
Surgical counts recorded as correct or incorrect on the patient s' file	3(1.9)	5(3.2)	19(12.1)	78(50)	51(32.6)
Items intentionally left in a wound are not documented in patient's records.	52(33.)	53(33.9)	25(16.0)	17(11)	9(5.8)
Surgical counts are conducted in standardized multiples of fives.	54(34.6)	44(28.2)	21(13.4)	25(16.0)	12(7.7)
Items included in the count can be removed from the theatre before the final count.	72(46.1)	36(23.0)	22(14.1)	17(11)	9(5.8)

S. A*: strongly agree; S.D*: strongly disagree

Respondents presented various perceptions on knowledge of surgical count safety practices. Each of the specified statements above was answered by 156 respondents by disagreeing or agreeing with the statement in order to score their knowledge and some of the respondents become neutral. Statements were evaluating surgical count practices' knowledge of the nurses and midwives who are working in operating rooms of the four different settings. The majority of respondents (62.1 %) agreed and strongly agreed that surgical counts are conducted by two persons , by a scrub and a circulating nurse and 82% agreed and strongly agreed that surgical counts are conducted for certain procedures only. Of 156 respondents, 65.5 % agreed and strongly agreed that they keep the total number of swabs to a minimum used during surgery to enhance control. A large number of the respondents (82.9%) disagreed and strongly disagreed that if there is any change in the members of nursing staff who performed initial swab, instruments and needles count, surgical count cannot be omitted. The majority of the participants (88.5%) also disagreed and strongly disagreed that in case of interruption of surgical count practice, the count for those items cannot be continued without beginning again.

The large number of the respondents (72.3%) gave their agreement saying that that recording of all swabs, needles, blades and instruments used should be done according to the hospital policy. The majority of the respondents (82.7%) strongly greed and agreed that surgical count should be done loudly. Also 79.4% of the respondents agreed and strongly agreed that only x-ray detectable swabs are used intra-operatively and 93.6% agreed and strongly agreed that surgical counts are conducted to control swabs, needles, blades &instruments. Eight four point five percent of the respondents strongly disagreed and disagreed that in the events of a count discrepancy, closure of the cavity does not continue as usual. Of 156 respondents, 81.3% strongly agreed and agreed that surgical count are recorded and controlled on the white board during the surgical procedure. Interestingly, 82.6% agreed or strongly agreed that surgical counts should be recorded as correct or incorrect on the patients' operating sheet and 67.2% the respondents kept a disagreement of that item intentionally left in a wound was not documented.

A large number(62.8%) strongly disagreed and disagreed that surgical count are not conducted in standardized multiples of fives in their settings and 69.2% of the respondents strongly disagreed and disagreed that items included in the surgical count cannot be removed from the operating room before the final count is completed.

It was considered poor level of knowledge if the score is less than 60% and from 61% was measured as good level of knowledge.

Table4.5: Distribution of respondents by the levels of knowledge on surgical counting practices

Variables	RESPONDENTS (n=156)	
Levels of Knowledge	Frequencies	Percentage
Poor Knowledge	122	78,2%
Good Knowledge	34	21,8%
Total	156	100%

After classifying the respondents, levels of knowledge were categorized using mean score of knowledge as cut of point the researcher realized that the majority of the respondents (78.2%) had poor knowledge and only the small proportion (21, 8%) had good knowledge on surgical counting practices**.**

4.4 THE SURGICAL COUNTING PRACTICES OF OPERATING ROOM NURSES AND MIDWIVES AT REFERRAL TEACHING HOSPITALS.

Different options of answers were given in the self administered questionnaire and the participants had chosen one answer according to their agreement or disagreement to the given statement. For affirmatively worded items, the percent of positive responses is the percentage combination of respondents who answered “Always” or often” depending on the response categories used for the item. For negatively worded items, the percent of negative responses is the percentage combination of participants’ respondents who answered “Never” or seldom” depending on the response categories used for the item. The respondents who had chosen “sometimes” were considered like neutral or lack of practice skills.

Table4.6: Summary statistics respondents self reports on surgical counting practices

PRACTICES	RESPONDENTS (n=156)				
	Never	***Seldom***	***Sometimes***	***Often***	***Always***
Perform surgical counts according hospital policy	2(1.3)	2(1.3)	25(15)	69(44.2)	58(37.2)
Do count continuously throughout the surgical procedure	13(8.3)	31(19.9)	21(13.5)	45(28.8)	46(29.5)
Check all items used before and after use.	2(1.3)	11(7.0)	46(29.5)	44(28.2)	53(34.0)
Use of swabs holding X –ray detectable strip	40(25.6)	39(25.0)	27(17.3)	32(20.5)	18(11.5)
Maintain an organized and tidy sterile field during and after the surgery.	11(7.0)	21(13.5)	31(19.9)	46(29.5)	47(30.1)
Documentation of the initial count/ additional /removal of items to the field on the board	2(1.3)	4(2.6)	13(8.3)	94(60.2)	43(27.6)
Report the count status to the surgeon at all stages of closure for acknowledgement	3(1.9)	14(9.0)	21(13.5)	54(34.6)	64(41.0)
Perform surgical counts: before the procedure	11(7.0)	3(1.9)	24(15.4)	43(27.5)	75(48.1)
Perform counting: Before closing of a cavity	1(0.6)	1(0.6)	7(4.5)	96(61.5)	51(32.7)
Perform surgical counts: before wound closure	70(44.9)	31(19.9)	13(8.3)	24(15.4)	18911.5)
Perform surgical counts: At skin closure or end of a procedure.	0(0.0)	5(3.2)	24(15.4)	85(54.5)	42(26.9)
Perform surgical count: at permanent relief of either the scrub person or circulating nurse	5(3.2)	4(2.6)	9(5.8)	112(71.8)	26(16.7)
Perform counts & record of additional items	1(0.6)	1(0.6)	3(1.9)	70(44.9)	81(51.9)
Inform the surgeon and nurse manager in case of a count discrepancy.	1(0.6)	1(0.6)	18(11.5)	54(34.6)	82(52.6)
Recording of the surgical counts results as correct or incorrect in the patient's records.	13(8.3)	16(10.2)	36(23.0)	48(30.7)	43(27.5)

During the study period, one hundred fifty six who received the questionnaire and all returned them well filled. The respondents often and always perform surgical counts according to the hospital policy were 81.4%. Among those who performed surgical count, only 91of 156(58.3%) often and always carry out surgical counts continuously throughout the surgical procedure respectively. Concerning the check of all items used before and after use for completeness, only 62.2 % in 154 responded they often check respectively. Unfortunately, a large number 50.6 % never or seldom use swabs with the presence of X-ray detectable.

To ensure an acute count of all items during and after the surgical procedure, 59.6 %of the respondents often or always maintain an organized and tidy sterile field respectively. Of 156 respondents, 137(96.2%) often or always ensure the circulating nurse documents the initial surgical count on the dry erase board (writing board) and additional swabs, needles and instruments added or removed from the sterile field respectively. Correspondingly, among the respondents, 118 of 156(75.6%) often report surgical count status to the surgeon at different stages of closure of the surgical cavity, who should give verbal acknowledgements. Only 48.1 %(n=75/156) perform surgical counts before the procedure to establish the baseline and 32.7% always perform surgical count before closing of a cavity within a cavity. Regarding the count before wound closure begins, 44.9% never perform surgical count and 26.9% only performs surgical counts at the skin closure or end of a procedure.

A large proportion of the respondents (71.8%,n=112/154) often perform surgical counts at the time of permanent relief of either the scrub person or circulating nurse and 51.9% of the respondents always perform surgical counts when additional items are added to the surgical field, they are counted and recorded. Only 52.6 % always inform the surgeon and the nurse manager in case of a count discrepancy and 58.2% often and always ensure that the results of the surgical counts are recorded as correct or incorrect in the patient's records.

4.5 Distribution of respondents by the levels of practices of surgical counting safety practice

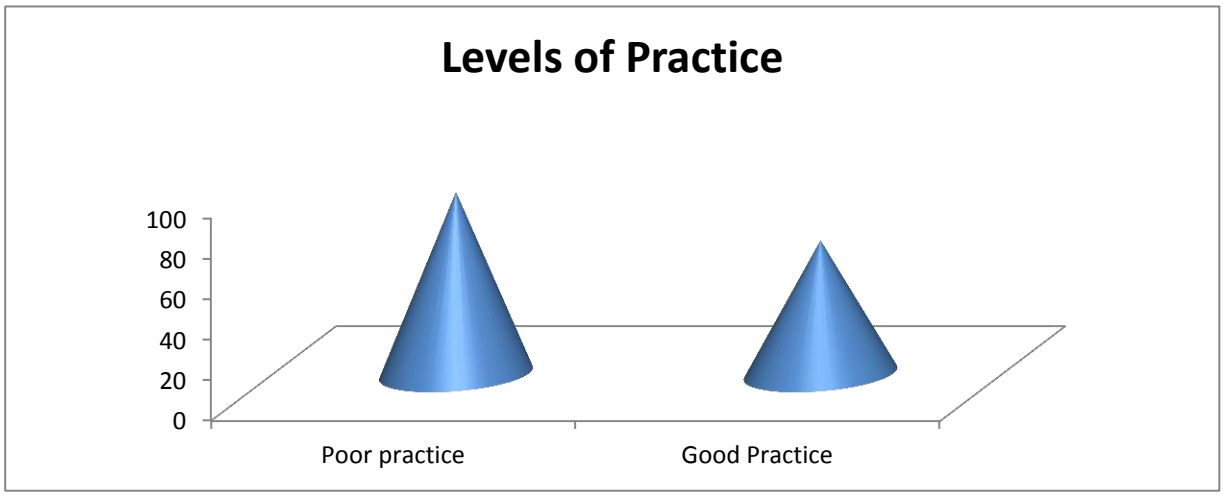

Figure4.1: Distribution of respondents by the levels of practices on surgical counting safety practice

After classifying the respondents' levels of practice were categorized using mean score of practice as cut of point. In 154 respondents, the researcher realized that the majority of the respondents (57.8%,n=89) had poor practice and (42.2%,n=65) had good practice on surgical counting practices**.**

4.5 FACTORS INFLUENCING SURGICAL COUNTING PRACTICES IN OPERATING ROOM AT REFERRAL TEACHING HOSPITALS

Table 4.8.Summary statistics of factors influencing surgical counting practices.

FACTORS	RESPONDENTS (n=156)				
	S. A*	***Agree***	***Neutral***	***Disagree***	***S.D****
Different styles of surgical counting	59(37.8)	41(26.3)	27(17.3)	25(16.0)	4(2.5)
Change from routine counting practice	48(30.8)	28(17.9)	28(17.9)	15(9.6)	37(23.7)
Staff from other facilities count differently	31(19.9)	52(33.3)	33(21.2)	36(23.1)	4(2.6)
Untidy sterile field due to disorganized scrub person	50(32.1)	48(30.8)	30(19.2)	20(12.8)	8(5.1)
Chaos influence the counting accuracy	41(26.3)	60(38.5)	13(8.3)	23(14.7)	19(12.1)
Communication and interpersonal difficulties amongst staff	50(32.0)	81(51.9)	10(6.4)	7(4.5)	8(5.1)
Surgeons not keen to explore wound due to incorrect counts occur	15(9.6)	24(15.4)	11(7.0)	32(20.5)	74(47.4)
Increased body mass of the patient who undergoes surgery	60(38.4)	54(34.6)	6(3.8)	16(10.2)	20(12.8)
Unexpected change in planned surgical procedure	42(26.9)	41(26.3)	22(14.1)	25(16.0)	26(16.7)
Emergency procedures	26(16.7)	66(42.3)	32(20.5)	24(15.4)	8(5.1)
Long procedures	90(57.7)	46(29.5)	4(2.6)	7(4.5)	9(5.8)
Large surgical teams with different requests	53(34.0)	60(38.5)	15(9.6)	28(17.9)	0(0.0)
Shortage of staff	90(57.7)	46(29.5)	5(3.2)	7(4.5)	8(5.1)
Surgical counts handover in shift change	24(15.3)	32(20.5)	8(5.1)	53(34.0)	39(25.0)
Multiple mentors with different methods surgical counts	37(23.7)	51(32.6)	19(12.2)	27(17.3)	22(14.1)
Misinterpretation of the surgical count policy	27(17.3)	61(39.1)	25(16.0)	39(25.0)	4(2.6)

S. A*: strongly agree; S.D*: strongly disagree

Here are presented the predetermined factors influencing surgical counts safety practices. In their work environment, 16 factors influencing surgical counting practices were proposed by the researcher in the questionnaire and the respondents showed their option of responses. A proportion rate of 64.1 % strongly agreed and agreed that different styles of surgical counting procedure may be a barrier. Of 156, only 48.7%strongly agreed and agreed that they have experienced issue during the change from routine counting practice and 53.2% of the respondents agreed and strongly agreed that staff from other facilities count differently.

A proportion of the respondents 62.9 %experienced that an untidy sterile field due to a disorganized scrub sister may affect counting accuracy and 73.1% agreed and strongly agreed that distracters during surgery such as noise, idle chatter and telephones' ringing influences the counting accuracy.

The majority of the respondents 131(83.9%) agreed and strongly agreed that communication and interpersonal difficulties among staff influence surgical counting practices. The large proportion of 60.9% strongly disagreed and disagreed that the surgeons do not keen to explore wound when incorrect counts occur. Also the majority of the respondents strongly agreed and agreed that increased body mass of the patient undergoes surgery may interfere surgical counting (38.4% and 34.6% respectively)and unexpected change in planned surgical procedure was strongly agreed and agreed at the response rate of 26.9%&26.3% correspondingly(n=83of 156). Of the respondents, 59.0% agreed and strongly agreed that emergency procedures may impede surgical counting and 87.2% strongly agreed and agreed that long procedures do, too. Large surgical teams with different requests may influence surgical counting at the agreement rate of 72.8%of the respondents and shortage of staff may influence surgical count at the agreement rate of 87.2 %(n=136/156) of the respondents respectively.

Fifty nine percent strongly disagreed and disagreed that handover of surgical counts during change of nursing shift influence surgical counting practice and 56.3% of the respondents agreed and strongly agreed that multiple mentors with different methods demonstrating how to conduct surgical counts hinder surgical counting practice. A proportion rate of 56.4%of respondents agreed and strongly agreed that misinterpretation of the surgical count policy by the nurses may influence surgical counting practice.

4.7 DISTRIBUTION OF LEVEL OF OBSERVED PRACTICES AND SELECTED DEMOGRAPHIC CHARACTERISTICS

Table 4.10: Relationship between Gender and observed practice of surgical counts

PRACTICE		GENDER			p- value
		Male	Female	Total	
		Frequency	Frequency	Percentage	
Use of swabs containing the X –ray detectable strip	Yes	9(60.0)	6(40.0)	15(100)	0.015*
	NO	4(20.0)	16(80.0)	20(100)	

***** The Chi-square test showed the statistical significant association between gender and observed practice of surgical counting at the use of swabs to check for x –ray detectable strip with at the p-value of 0.015.

Table4.11: Relationship between Working experience and observed practice of surgical counts

PRACTICE		WORKING EXPERIENCE						p-value
		<1 year	1-3 year	3-6years	6-9years	>10 years	Total	
		Count	Count	Count	Count	Count	%	
Before wound closure begins,	yes	2(25.0)	2(25.0)	0(.0)	3(37.5)	1(12.5)	8(100)	0.04*****
	NO	0(.0)	8(29.6)	8(29.6)	10(37.0)	1(3.7)	27(100)	

*****The Chi-square test showed the statistical significant working experience is associated with performance of the surgical counting practice before the wound closure begins at the P-value of 0.04.

4.8 OBSERVED PRACTICE OF SURGICAL COUNTING

Table 4.12 below targeted to present observation of operating room nurses and midwives towards surgical counting safety practices.

Table 4.12: Summary statistics of observed practice of surgical counting

SURGICAL COUNTS PRACTICE	PARTICIPANTS OBSERVED (n=35)		
	Yes	**No**	**Total**
According hospital policy	15(42.9)	20(57.1)	35(100)
Continuously throughout the surgical procedure	13(37.1)	22(62.9)	35(100)
Check all items used before and after use for completeness.	21(60.0)	14(40.0)	35(100)
Use of swabs containing the X –ray detectable strip	15(42.9)	20(57.1)	35(100)
Maintain an organized and tidy sterile field to ensure an accurate count	20(57.1)	15(42.9)	35(100)
Ensure the circulating nurse documents the initial surgical count and addition	11(31.4)	24(68.6)	35(100)
Report count status to the surgeon at different stages of closure	17(48.6)	18(51.4)	35(100)
Before the procedure to establish a baseline	19(54.3)	16(45.7)	35(100)
Before closing of a cavity within a cavity,	21(60.0)	14(40.0)	35(100)
Before wound closure begins,	8(22.9)	27(77.1)	35(100)
At skin closure or end of a procedure,	29(82.9)	6(17.1)	35(100)
At the time of permanent relief of scrub or circulating nurse	22(62.9)	13(37.1)	35(100)
Perform counts if the items are added to the surgical field.	27(77.1)	8(22.9)	35(100)
Inform the surgeon/nurse manager in case of discrepancy	24(68.6)	11(31.4)	35(100)
Ensure the results of the surgical counts are recorded as correct or incorrect in the patient's records	17(48.6)	18(51.4)	35(100)

Of 35 participants observed, a proportion of 42.9% participants performed surgical counting according hospital policy. Only 37.1% did surgical counts of swabs, needles& instruments continuously throughout the surgical procedure with the same scrub nurse and circulating nurse.

Sixty percent verified all items used before and after use for completeness and only 42.9% utilize swabs with x-ray detectable strip but 57.1% were observed during surgical procedures performed at the absence sponges/ swabs containing x-detectable bands with the sponges used in intraoperative experience. The respondents also agreed that they did not yet see such type of sponges in the operating rooms where they were working.

A proportion of 57.1% maintained an organized and tidy sterile field to ensure an accurate count of all items during and after the surgical procedure.

The large proportion 68.6% did not document the initial surgical count on the dry erase board (writing board) and additional swabs, needles& instruments added or removed from the sterile field. A small number of the observed participants 48.6% reported surgical counting status to the surgeon at different stages of closure of the surgical cavity; this one should give verbal acknowledgement. Almost the half of observed participants 54.3% performed surgical counting before the procedure to establish a baseline and the majority of the participants 60.0% carried out surgical counts before closing of a cavity within a cavity.

Remarkably, a smallest number 22.9% performed surgical counting before wound closure begins, contrarily 82.9% of the observed participants performed surgical counting at skin closure or end of a procedure. At the time of permanent relief of either the scrub person or circulating nurse, 62.9% performed surgical counts. A large proportion of the observed participants 77.1% performed surgical counting when additional items are added to the surgical field, they are counted and recorded.

Observed participants informed the surgeon and nurse manager in case of a count discrepancy at the proportion rate of 68.6% but only 48.6% ensured the results of the surgical counts are recorded as correct or incorrect in the patient's records after surgical procedure.

4.8 MULTIVARIATE ANALYSIS OF THE LEVELS OF PRACTICES SURGICAL COUNTING

Table4.13: Association of demographic characteristics and levels of practice.

Level of Practice	Odd ratio	p-value	95% Confidence Interval	
			lower	upper
GENDER				
Female	3.030562	0.027	0.336388	5.724736
AGE				
30-39 years	-33.5557	0.994	-8192.81	8125.702
40-49years	-32.3619	0.994	-8191.62	8126.896
super 50years	0.077442	1	-9644.12	9644.273
MARITAL STATUS				
Married	28.42623	0.995	-8130.83	8187.685
Divorced	13.6154	0.997	-6672.6	6699.828
Widower	-2.08911	1	-9646.29	9642.107
WORKING EXPERIENCE				
1-3 years	9.215279	0.002	3.393264	15.03729
3-6years	5.6875	0.034	0.430089	10.94491
6-9years	3.194439	0.098	-0.58987	6.978751
10years and above	7.503446	0.022	1.091063	13.91583

Association: Odds Ratio›1

Protector effect: Odds Ratio‹1

Absence of association: Odds Ratio=1

Statistically significant: Confidence interval does not contain value 1 and p-value≤0.05

All four independent variables remained their statistical relationship with the dependent variable in bivariate analysis, but 2 variables including Gender and working experience positively had influence on good surgical counting safety practices whereas Age and marital status influence negatively surgical counting safety practice.

Multiple logistic regressions were used to check how the levels of practice are associated with the demographic characteristics.

Odds ratios with a confidence interval of 95% with lower and upper limits were calculated. The confidence interval can't include value 1 and p-value must be less than or equal to 0.05 to show the variable with statistic significance. Here, poor practice is coded 0 and good practice was coded 1.

The table 4.13 shows that female nurses and midwives are 3.0 times more likely to perform surgical count practice than male nurses and midwives. And the respondents who were experienced between 1-3 years are more likely to perform surgical counting practice 9.2 times and compared to those who have one year of experience [Gender(OR:3.030562;p≤0.027);working experience(OR; 9.215279;p ≤0.002)]

4.10 CONCLUSION

This chapter presented the results from the study responding to the study objectives. The collected data included demographic characteristics and awareness of surgical counting safety practice and also factors influencing this practice.

Multiple logistic regressions revealed that there is statistical significant relationships between surgical count practices and Gender, Age group, Marital status and working experience showed the p-values lesser than 0.05.

Staff shortage, long procedures, communication and interpersonal difficulties among staff and increased body mass index of the patient underwent surgery were identified as the factors influencing surgical counting practices. Lack of X-ray detectable strip was almost common in the selected hospitals as showed by the statistical significant of p-value=0.015 at the association with gender and p-value was less or equal to 0.04 after its association with working experience.

CHAPTER FIVE: DISCUSSION

5.1 INTRODUCTION

This chapter is aimed to discuss the results from the study in the line of the study objectives that have the main aim of determining the knowledge and practice towards surgical items counting safety practices among nurses and midwives that were working in the operating rooms at referral teaching hospitals. The findings were compared with the literature reviews of studies conducted by different researchers to swap views of the authors on the set objectives. Within the context, the results discussion will be guided by the study objectives including demographic characteristics of the participants, level of knowledge regarding surgical counting safety, the practices of surgical counting and some factors that might influence surgical count practices in the operating rooms.

5.2 DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Of the 156 participants, (82.1%) had advanced diploma (A1) nursing or midwifery. A small proportion of participants 5.1% had got the training in the Perioperative Nursing with qualification and only 37.2% had a working experience that was between 6 to 9 years in the operating theatres. These findings seem to identify that by large, the operating rooms nurses and midwives at the four area settings have limited qualification with moderate experience in operating rooms. A cross-section study done with 55nurses on surgical count process: evidence for patient safety in 15 hospitals of a city in State of Sâo Paulo revealed that the time for profession practice in the operating room ranged from 1 to 456months (38years) with median of 72 months(Maria and Paulo, 2016). According to the current demographic characteristics of the participants, the more the staff is experienced the more they perform safety as it is similar to that study conducted in State of Sâo Paulo on surgical count process. This means that being well skilled in operating room has good impact on surgical counting practices.

While the study done in South Africa revealed that the large number of the participants respondents were female (n=70/92) at the regular statistical gender report of nursing staff according to their nursing council(Beukes, 2016,p.28). Similarly, Gender and working experience in the operating rooms were seen as the significant demographic data during this current study at the study settings.

5.3 THE LEVEL OF KNOWLEDGE OF OPERATING ROOMS NURSES AND MIDWIVES TOWARDS SURGICAL COUNTING SAFETY PRACTICES AT REFERRAL TEACHING HOSPITALS.

Under this objective of determining the level of knowledge of operating room nurses and midwives in terms of surgical count safety practices, 15 questions were administered. Of 156(97.5 %) who responded to the questionnaire, only 62.1% confirmed that surgical count would be conducted by two persons, by scrub and circulating nurse. Although 81.9% wrongly agreed and strongly agreed that surgical counts practice is done for certain procedures only. This statement is supported by the study conducted by Cohen and Beukes(2016)where the majority of respondents reported negative responses regarding knowledge to surgical item count(Beukes, 2016,p.32). Also the descriptive study carried out on 261 operating room nurses on surgical count implementations in the operating rooms: An example from Turkey by Candas and colleagues affirmed that surgical item count was performed in the abdomen surgical procedures as the abdominal size can lead to surgical objects cases' retention(Candas *et al.*, 2017,p.57).

Contrary, World Health organization(WHO) and the Association of periOperative Registered Nurses (AORN) recommended that counting of surgical items would be better being performed for every surgical procedure during which the likelihood for a retained object may exists (Maria and Paulo, 2016). Lack of knowledge in relation to surgical counting safety practices for procedures in the operating room may lead to unplanned patients' outcomes like delay in hospitalization stay, repetition of open surgical procedure, high financial bill rate even sometimes the morbidity and the mortality rate associated with the retained surgical object increased in the patients who underwent surgery (Tchangai *et al.*, 2017,p.6). We can't ignore that the hospital's satisfaction is also reduced due to lack of meeting patients' healthcare outcomes (Perkhounkova, Storm and Mathias, 2015). On the other hand, the present study has demonstrated that there is poor level of knowledge towards surgical counting practices among operating room nurses and midwives at the study settings as they strongly disagreed and disagreed that surgical counts practice is done for certain procedures only. Also in their case report, Susmallian & colleagues (2016) demonstrated that the surgical mop had been forgotten in the abdomen of a 34 years old women after cesarean section for the period of nine years and they mentioned that the morbidity involving the client, an elapsed unknown body item can engage a court case designed for the surgeon himself and the involved nurses.

The reimbursement decided by the courts related to such cases seems being very high and the institution even the medical doctor are at high risk to lose their name and status(Susmallian, Raskin and Barnea, 2016,p.298).

5.4 THE SURGICAL COUNTING PRACTICES OF OPERATING ROOM NURSES AND MIDWIVES AT REFERRAL TEACHING HOSPITALS.

Of 156 respondents, only 37.2% of operating rooms nurses and midwives answered that they always perform surgical count practices and 44.2% they often perform surgical count practices when they are assigned to participate during intra-operative phase. This showed the poor practice of surgical counting but it is recommended to perform surgical count at any type of surgical procedure, from the beginning up to the end by two persons such as scrub and circulator nurses or robotic machine if it is available(WHO, 2009).

Of 35 participants observed were experienced in the operating room and were assigned to assist the cases they used to assist daily in almost their working schedule as scrub nurse/midwife but only a proportion of 65.7% performed surgical items counts according to hospital policy. The observation was done in different types of surgical procedures as the study done in the Iran on "Three years evaluation of retained foreign bodies after surgery" showed that unknown items retained in everybody hollows were included peritoneal hollow, thoracic cavity, gastrointestinal zone urogenital tract, facial region abdominal-pelvic area with the majority of abdominal and peritoneal cavities(55,26%) and chest cavities(18.42%)(Zarenezhad *et al.*, 2017,p.23).

Twenty four observed participants did not document either at the initial surgical counts on the white board or on additional swabs, needles and instruments. Lack of documentation' skills from the initial surgical counting or continuously through surgical procedure might be influenced by a protocol of transfer information and responsibility of the surgical personnel(Walt *et al.*, 2017).. In the study conducted in Turkey by Candas and colleagues (2015) to the participation of 261operating room nurses, where practically all the respondents (95.0%) affirmed that instruments and materials were counted before to establish the baseline at their clinical settings(Candas *et al.*, 2017, p.58). The current study revealed that a proportion rate of 54.3% performed surgical counts procedure before the surgical procedure to establish the baseline. Here there is slight resemblance where 54.3% perform the initial surgical counting in the way of ascertaining the baseline.

The surgical counting is in the control of the circulating nurse and scrub nurse but the small proportion observed participants45.7% acted as circulating nurse without scrub person and the surgical count was performed by the surgeon assistant and the circulating nurse in diverse way as it is not following all the steps of universal protocol and surgical safety checklist.

Also the cited study conducted in Turkey titled" Surgical Count Implementations in the Operating Rooms" reported that the majority of respondents (88.5%) that the scrub nurses were the one who conducted the surgical item count and they mentioned also that the count performed during surgery was in the control of the circulating and scrub nurse(Candas *et al.*, 2017). Additionally, the international guideline recommended that the registered nurse(RN) circulator and the scrub person perform a surgical count before starting the procedure and the circulator nurse documents in handout file or in software documentation system(Freitas *et al.*, 2013). Their affirmation clearly demonstrated that surgical count safety practice would be performed at the beginning till the end of surgery in control of the circulator nurse and the scrub nurse. Furthermore, The Joints Commissions (TJC) in their journal on Quality patient safety emphasized on the introduction of two important rules named "Red rules" offered to and developed by the operating room team members additionally at that moment implemented by the operating room management team as unbreakable regulations of accomplishment in the Theatre.

The first rule is the implementation of Universal protocol designed for Client recognition and breaks in proceedings and the second rule is that all the surgical counting of instruments and sponges are being required to be performed by two surgical team members in the consistent approach(WHO 2009,p.125). Therefore, the implementation of guidelines/policy of placing two nursing staff (scrub and circulator) in one operating room during surgical procedure had an impact in improving the surgical count safety practices. The association between surgical counting practice and demographic characteristics calculated using chi-square revealed that good practice may be associated with gender, age group, marital status and working experiences.

Also the multivariate analysis showed that female nurses and midwives are 3.0 more at greater practice than male nurses and midwives even if both working the operating rooms and participants who were experienced had the chance to practice surgical counting safely 9.2times greater than those who were less than one year of experience.

5.5 FACTORS INFLUENCING SURGICAL COUNTING PRACTICES AMONG OPERATING ROOM NURSE AND MIDWIVES AT REFERRAL TEACHING HOSPITALS.

Factors that may influence surgical counting practices in the operating rooms at Referral teaching hospitals as reported by the respondents are mostly highlighted at the large proportion of 87.2% 90/156) are Staff shortage and long procedures firstly and communications difficulties among staff secondly. Insufficient institutional personnel commonly directs to a traumatic employment surroundings by means of an augmented impending on behalf of difficult incidents(Ghatasheh and Alkhawaldeh, 2017,p.102). The similarity of such factors was seen in the study conducted in South Africa on the knowledge of surgical counting practices of operating room nurses in provincial hospitals in the Cape Metropole to 164 nurses revealed that most common distracters observed in the operating room are changes in the surgical procedure, shortage of staff and change of shift as indicated by more than half of the respondents(Beukes,2016,p.47).

In the study conducted by Steelman et al(2018) on "Retained surgical sponges: descriptive study of 319 occurrences and contributing factors from 2012-2017" revealed that the most contributing factors leading to retained surgical sponges were human factors and leadership where was the most frequently identified cause of a Retained surgical sponges (30.2%,n=126/417) where they mentioned lack of surgical team member peer assessment of count and lack of communication with subcategories medical staff peer review and lack of team member documentation (Steelman *et al.,* 2018). The problems in leadership (27.6%, n= 394 of 1430) and communication (23.1%, n=330 of 1430) were also identified as the majority classes of contributing factors to retained surgical sponges frequently(Steelman *et al.,* 2018). This study confirmed the points of contributing factors that influence surgical counting safety practices among operating room nurses and midwives like lack of communication skills and interpersonal difficulties including leadership misunderstanding and lack of effective documentation. As confirmed by Gutierres et al(2018) in the study titled good practices for patient safety in the operating room: nurses' recommendations confirmed that Since the operating room is a locked employment area with more than a few class of profession in different specialties the incidence of communication issues and connection disagreements is ordinary, particularly between medical

team and nursing staff, in view of the fact that the medical group has a propensity to position itself in the hierarchy place better than the nursing team(Gutierres *et al.*, 2018).

However, WHO surgical safety checklist promotes effective and clear communication between surgical team members. That lineup method enables to guarantee that the circulator nurses are relaxed to follow up with the surgeons regarding incorrect surgical counting process. The researchers mentioned also that safety is constantly at the top of surgical priority of the team members preserve to recover it (Grant-orser, Davies and Singh, 2012,p.1278) . Increased body mass index in patients who undergo surgical procedures was seen as the forth risk factor where the proportion of 73.0 %(n=114of 156) agreed that this may influence negatively surgical count practice.

Similarly to the study conducted by Stawicki et al (2013), they confirmed that the body mass index, some unplanned intra-operative occasions or unplanned surgical procedures and the surgical interventions duration were associated with the high risk of retained surgical items. The incidence of some safety discrepancy in addition to the particularity of a mistaken surgical count at any time during the surgical procedure was also associated with increased retained surgical items(Stawicki *et al.*, 2013). These results imply that the factors influencing surgical count practices are available categorically. Confirmed by the study done in Iran whereas the shortage of human resources(environmental and structural factors scored 80.25%, personal factors scored 75.27% and management factors scored 61.75%)and tasks performance by the surgical personnel(33-60%) were classified among the main significant factors in making surgical counting (Zabihirad, Mojdeh and Shahriari, 2018,p4).

As shown in the part of the identified factors, those who are at high occurrence in the study areas could be staff shortage accompanied by long procedure, communications difficulties among team members and increased body mass index of the patients. Emergency surgeries, unplanned changes in the performed procedure and patient increased body mass index were also mentioned in the study doe in England by Gawade& colleagues (Gawande *et al.*, 2003,p.232). The issues of human resources (for example staff shortage and x-rays detectable bands) were not observed only in Rwanda, as the study done in Uganda at Mbarara regional referral hospital, also had such barrier on the implementation of WHO surgical safety checklist and they involved the specific trainings on checklist for the students form medical department who were in clinical

practices in the operating room during every rotation. These students were utilized to complete the surgical safety checklist when there is poor staffing.

The researchers experienced a high applicability by a repetition of ‘plan -do -study –act’ cycles to recognize and conquer limited factors in a little resource environment(Rooney, 2015,p.1346). The application combined with training of surgical counting practice may help the future nursing learners to develop the culture of surgical safety counting practices for their lifelong of clinical practices. The clinical experience done by Karonkano and collegues on prevention of retained surgical items for the practice of surgical counts in rwandan operating rooms revealed also that there are many challenge s regarding the retained surgical instruments(Karonkano *et al.*, 2017). Similarly to this present study in the four referral teaching hospitals revealed that they are remarkable factors influencing surgical counting safety practices in the operating rooms such as staff shortage, long procedures, communication and interpersonal difficulties.

5.6 CONLUSION

This chapter targeted the discussion of the results obtained from the study. The research findings are discussed in relation to the study objectives, conceptual framework and incorporated with the findings from the literature.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

In this study, a research approach and study design used facilitated the researcher to find out the knowledge and the practice of surgical counting safety among nurses and midwives working in different operating rooms in referral teaching hospitals and identifying some factors that may influence negatively the counting process .The objectives of this study were achieved and the study questions were answered. The current chapter of this study presents the conclusion and recommendations from the major results and what can be done to enhance appropriate surgical counting safety practices and the possible utilization of these results.

6.2 CONCLUSIONS

This study determined the knowledge and practice towards surgical items counting among nurses and midwives working in the operating room at referral teaching hospitals in Rwanda. This means that the knowledge and practices of surgical count safety practices among nurses and midwives working in the operating rooms at referral teaching hospitals come into view of inadequate levels as mentioned by the respondents and confirmed by the researcher s' observation done in the operating rooms of the mentioned study settings during different surgical procedures. The practice was observed at low level due to some factors that might influence negatively the surgical counting safety practice The experience and gender of the participants who were working in the operating rooms reported to be associated with the knowledge and practices towards surgical count safety practices at the study settings and showed that lack of x-ray detectable strip swabs was almost common in the selected hospitals as showed by the statistical significant of p-value=0.015 at the association with gender and p-value=0.04 after its association with working experience. Being knowledgeable that use of x-ray detectable strip swabs facilitated the counting according to the operating room nurses& midwives' experiences.

Staff shortage, long procedures, communication and interpersonal difficulties among staff and increased body mass index of the patient underwent surgery were identified as the factors influencing surgical counting practices**.** As observation, long surgeries are influenced by staff shortage of personal stand-in during surgical procedures even the lack of communications difficulties towards those factors impending surgical counting safety.

6.3 RECOMMENDATIONS

From the conclusions, the following recommendations can be drawn from the results to improved practices at the following levels:

Referral hospitals:

1. Develop strategies, actions plans and provide in service training towards surgical counting safety practices for all operating rooms nurses& midwives and; the new recruited nurses and midwives, who will be allocated in the operating rooms.

2. The hospital authorities need to reconsider the staffing norms compared to international guidelines by sticking to 2:1; this mean 2 nurses (scrub and Circulator nurse)/ patient ratio for any type of surgical procedures in the operating rooms.

3. To avail all the material required specifically swabs/sponges with x-ray noticeable strip with robotic machine to implement measures of surgical count safety practices during surgical procedures in case of discrepancy.

4. To coordinate, monitor and evaluate the implementation of policy regarding surgical count in ways of preventing the risks related to unsafe surgical count practices.

The Ministry of Health

1. To conduct needs assessment for surgical counting practice and properly allocate resources and personnel in operating theatres of all referral and district hospitals.

2. To develop innovative surgical counting guidelines based on the contribution of theatre users' analysis in relation to surgical counting practices.

The nursing & midwifery schools and colleges

1. Train the new graduate in nursing/midwifery on surgical counting safety and evaluate its implementation in their clinical practices.

2. Provide education campaign on the awareness and communication skills among team members in the operating rooms regarding surgical counting safety practices.

REFERENCES

BC Women's Hospital and Health Centre (2015) 'Surgical count policy. Fetal Maternal Newborn and Family Health Policy & Procedure Manual'. Vancouver: BC Women's Hospital and Health Centre, pp. 1–4.

Beukes, R. D. and Cohen, M. A. (2016) *Knowledge of surgical counting practices of operating room nurses in Provincial Hospitals in the Cape Metropole*. Stellenbosch University.

Burns, N. and Grove, S. K. (2007) *Understanding Nursing Research-Building an evidence based practice*. Edited in 4th edition. Philadelphia: Saunders Elsivier.

Candas, B. *et al.* (2017) 'Surgical Count Implementations in the Operating Rooms : An Example from Turkey', 13(2), pp. 55–58. doi: 10.7438/1584-9341-13-2-2.

Edel, E. M. (2012) 'Surgical Count Practice Variability and the Potential for Retained Surgical Items', *AORN*. AORN, Inc., 95(2), pp. 228–238. doi: 10.1016/j.aorn.2011.02.014.

Elsharydah, A. *et al.* (2016) 'Retained surgical items after abdominal and pelvic surgery: Incidence, trend and predictors- observational study', *Annals of Medicine and Surgery*, 12, pp. 60–64. doi: https://doi.org/10.1016/j.amsu.2016.11.006.

Freitas, P. S., Mendes, K. D. S. and Maria, G. C. (2016) 'Surgical count process : evidence for patient safety', *Revista Gaúcha de Enfermagem*, 37(4). doi: http://dx.doi. org/10.1590/1983-1447.2016.04.66877.

Freitas, S. *et al.* (2013) 'Surgical count process for prevention of retained surgical items : an integrative review', pp. 1835–1847. doi: 10.1111/jocn.13216.

Gawande, A. A. *et al.* (2003) 'Risk Factors for Retained Instruments and Sponges after Surgery', pp. 229–235.

Ghatasheh, A. and Alkhawaldeh, J. (2017) 'Documentation of Incident Reports by Jordanian Nurses in Accredited Private Hospitals: Types and Causes', *IOSR Journal of Nursing and Health Science*, 06(03), pp. 19–36. doi: 10.9790/1959-0603041936.

Gibbs, V. C. (2011) 'Retained Surgical Items and Minimally Invasive Surgery', (March), pp.

1532–1539. doi: 10.1007/s00268-011-1060-4.

Grant-orser, A., Davies, P. and Singh, S. S. (2012) ‘Practice’, 184(11), pp. 1275–1278.

Grove, K. S., Burns, N. and Gray, R. J. (2013) *Practice of Nursing Research: Appraisal, Synthesis, and Generation of Evidence*. Seventh ed. St. Louis, Missouri: Elsevier Inc.

Gutierres, L. de S. *et al.* (2018) ‘Good practices for patient safety in the operating room: nurses’ recommendations’, *Revista Brasileira de Enfermagem*, 71(suppl 6), pp. 2775–2782. doi: 10.1590/0034-7167-2018-0449.

Halpern, J. *et al.* (2012) ‘The critical incident inventory : characteristics of incidents which affect emergency medical technicians and paramedics’.

Hariharan, D. and Lobo, D. N. (2013) ‘Retained surgical sponges, needles and instruments’, *Annals of the Royal College of Surgeons of England*, 95(2), pp. 87–92. doi: 10.1308/003588413X13511609957218.

Israel, G. D. (1992) ‘Determining Sample Size 1’, (November), pp. 1–5.

Jackson, S. and Brady, S. (2008) ‘Counting Difficulties:Retained Instruments,Sponges, and Needles’, *AORN Journal*, 87(2), pp. 315–321.

Johanson, G. A. and Brooks, G. P. (2010) ‘Initial Scale Development: Sample Size for Pilot Studies’, *Educational and Psychological Measurement*, 70(3), pp. 394–400. doi: DOI: 10.1177/0013164409355692.

Karonkano, G. *et al.* (2017) *Prevention of Retained Surgical Items : Practice of Surgical Counts In Rwandan Operating Rooms*.

Lilaonitkul, M. *et al.* (2015) ‘Implementation of the WHO Surgical Safety Checklist and surgical swab and instrument counts at a regional referral hospital in Uganda - A quality improvement project’, *Anaesthesia*, 70(12), pp. 1345–1355. doi: 10.1111/anae.13226.

Maria, C. and Paulo, S. (2016) ‘Surgical count process : evidence for patient safety’, 37(4).

Medical dictionary (2009) *Surgical Count, Farlex and Partners*.

Melekie, T. B. and Getahun, G. M. (2015) 'Compliance with Surgical Safety Checklist completion in the operating room of University of Gondar Hospital, Northwest Ethiopia', *BMC Research Notes*. BioMed Central, 8(1), pp. 1–7. doi: 10.1186/s13104-015-1338-y.

Moffatt-Bruce, S. *et al.* (2014) 'Risk factors for retained surgical items: a meta-analysis and proposed risk stratification system', *Journal of Surgical Research*, 190, pp. 429–436. doi: https://doi.org/10.1016/j.jss.2014.05.044.

North Sydney Ministry of health (2013) 'Management of Instruments, Accountable Items and Other Items used for Surgery or Procedures', (98).

Ongun P, Intepeler SS(2017), Operating room professionals' attitudes towards patient safety and the influencing factors. Pak J Med Sci.2017;33(5):1210-1214. doi: https://doi.org/10.12669/pjms.335.13615

Oxford University Press (2018) *Operating room, English Oxford living Dictionaries*.

Perkhounkova, Y., Storm, H. E. and Mathias, M. (2015) 'The Hidden Costs of Reconciling Surgical Sponge Counts', *Association of Registered Nurses*. Elsevier Ltd, 102(5), pp. 498–506. doi: 10.1016/j.aorn.2015.09.002.

Polit, F. D. and Beck, T. C. (2008) *Nursing Research: Principles and methods*. Seventh ed. Lippincott Williams and Wilkins.

Rees, P. *et al.* (2015) 'Safety Incidents in the Primary Care Office Setting', *Pediatrics*, 135(6), pp. 1027–1035. doi: 10.1542/peds.2014-3259.

Rooney, K. D. (2015) 'Original Article', pp. 1345–1355. doi: 10.1111/anae.13226.

Rothrock, J. (2014) *Alexander's Care of the Patient in Sugrery*. 15th edn. Edited by D. McEwen. DelawaleCounty Community College Media, Pennyslvania: Library of Congress Cataloging-in-Publication Data,MOSBY,Elsevier LTD.

Rutherford, C. J. (2012) *Differentiating Surgical Instruments*.

Safety, P. (2009) 'A Multidisciplinary Team Approach to Retained Foreign Objects', 35(3).

Sami, W. *et al.* (2018) 'Special communication sample size determination in health research',

30(2), pp. 308–311.

Sharma, B. (2016) ‘A focus on reliability in developmental research through Cronbach ’ s Alpha among medical , dental and paramedical professionals’, 3(4), pp. 271–278. doi: 10.21276/apjhs.2016.3.4.43.

Sharma, J. and Bigelow, J. (2014) ‘Retained Foreign Bodies: A Serious Threat in the Indian Operation Room’, *Ann Med Health Sci Res.*, 4(1), pp. 30–37.

Sim, J. and Lewis, M. (2011) ‘The size of a pilot study for a clinical trial should be calculated in relation to considerations of precision and efficiency’, *Journal of Clinical Epidemiology*. Elsevier Inc. doi: 10.1016/j.jclinepi.2011.07.011.

Spruce, L. (2019) ‘Back to Basics : Counting Soft’, pp. 297–303.

Stawicki, S. P. A. *et al.* (2013) ‘Retained Surgical Items : A Problem Yet to Be Solved’, *Journal of the American College of Surgeons*. American College of Surgeons, 216(1), pp. 15–22. doi: 10.1016/j.jamcollsurg.2012.08.026.

Surgery, S. and Lives, S. (2009) ‘WHO Guidelines for Safe Surgery 2009’.

Susmallian, S., Raskin, B. and Barnea, R. (2016) ‘Surgical sponge forgotten for nine years in the abdomen : A case report’, *International Journal of Surgery Case Reports*. Surgical Associates Ltd, 28, pp. 296–299. doi: 10.1016/j.ijscr.2016.10.026.

Steelman, V.M., *et al.* (2018) ‘Retained surgical sponges: A descriptive study of 319 occurrences and contributing factors from 2012 to 2017’, *Patient Safety in Surgery*. Patient Safety in Surgery, 12(1), pp. 1–8. doi: 10.1186/s13037-018-0166-0

Tchangai, B. *et al.* (2017) ‘Incidence , root cause , and outcomes of unintentionally retained intraabdominal surgical sponges : a retrospective case series from two hospitals in Togo’. Patient Safety in Surgery, pp. 1–7. doi: 10.1186/s13037-017-0140-2.

Treece, E. W., & Treece, J. W. (1982) *Elements of research in nursing*. 3rd edn. Mosby: St. Louis, MO.

Wallace, S. C. and Introduction, C. (2017) 'Retained Surgical Items : Events and Guidelines Revisited', 14(1), pp. 27–36.

Walt, J. J. N. Van Der *et al.* (2017) 'Implementation of a postoperative handoff protocol', *Southern African Journal of Anaesthesia and Analgesia*. Taylor & Francis, 1181(December), pp. 1–5. doi: 10.1080/22201181.2016.1244317.

Wang, B. *et al.* (2015) 'ScienceDirect Association for Academic Surgery Hospital and procedure incidence of pediatric retained surgical items', *Journal of Surgical Research*. Elsevier Inc, 198(2), pp. 400–405. doi: 10.1016/j.jss.2015.03.054.

Whitehead, A. L. *et al.* (2016) 'Estimating the sample size for a pilot randomised trial to minimise the overall trial sample size for the external pilot and main trial for a continuous outcome variable'. doi: 10.1177/0962280215588241.

World Health Organization (2009) 'Conceptual Framework for the International Classification for Patient Safety: Version 1.1', ... *Available at: http://www. who. int/patientsafety/ ...*, 1(January), p. 154. doi: WHO/IER/PSP/2010.2.

World Health Organization (2018) *Patient safety, World Health Organisation*.

Zabihirad, J., Mojdeh, S. and Shahriari, M. (2018) 'Nurse's perioperative care errors and related factors in the operating room', *Electronic Journal of General Medicine*, 16(May 2018), pp. 2–7. doi: 10.29333/ejgm/94220.

Zarenezhad, M. *et al.* (2017) 'Three years evaluation of retained foreign bodies after surgery in Iran', *Annals of Medicine and Surgery*. Elsevier Ltd, 15, pp. 22–25. doi: 10.1016/j.amsu.2017.01.019.

Zejnullahu, Valon A *et al.* (2017) 'Retained Surgical Foreign Bodies after Surgery', 5(1), pp. 97–100.

APPENDICES

ANNEXURE I**: PERMISSION TO USE THE TOOL FOR CONDUCTING THE STUDY**

JUN 5, 2018

Emerthe Nyirasafari 2:35 PM

Dear Madam,

I am Nyirasafari Emerthe, student at the University of Rwanda/ College of Medicine and Health sciences. I am admitted in October 2017 at the above cited University with the Registration number 216339251 in Postgraduate Studies/ Peri-operative nursing Track.

Refer to my topic of research project"Surgical counting safety among operating rooms 'nurses in district hospitals in Rwanda", I realize that your experiences in research and working in the operating rooms can help me once you allow and give me a chance to use/ adapt the validated tool used in the study called "Knowledge of Surgical counting practices of operating room nurses

in provincial hospital at Cape metropole " with Robertha Devona Beukes.

As future perioperative nurse, that tool seems being the nice one for me to fulfill the requirement of writing a dissertation in operating room domain. I will recognize your assistance and acknowledge you in this study.

I am looking to hearing from you.

Sincerely,

Mary Cohen 2:45 PM

Thanks

Good day Emerthe

Thank you for contacting me. I do provide permission for you to use the tool in your dissertation but you may have to validate the tool before implementing it as part of your research in Rwanda. Validation of tools used in another setting is extremely important to ensure validity and reliability of your findings. There are a number of research

methods you can employ to achieve this.
In addition, I am also willing to assist you by language editing your work as an outreach project as a peri-operative nursing colleague! I have a qualification from Stellenbosch University in copy editing.
Should you require assistance you may contact me on my email address:

swaalakc@mweb.co.za.

Kind regards
Mary cohen

Emerthe Nyirasafari 2:49 PM

Dear madam,
I am very thankful for such assistance.
Once I face any inquiry, I will contact you for sure.

Thank you very much!

Mary Cohen 2:49 PM

You're welcome

ANNEXURE II**: QUESTIONNAIRE /English Version**

INSTRUCTIONS:

- Please answer all the questions by marking your choice / view / experience with a tick (√), e.g.: Are you a Nurse?

Yes	No
√	

- Please use a pen (blue or black) to complete the questionnaire.
- This questionnaire consists of 5 pages and will take approximately 20 minutes to complete.

SECTION A. DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Please tick [√] the best answer

1. **Gender:** Female ☐ Male ☐
2. **Age**

A. 20 – 29 years ☐

B. 30 – 39 years ☐

C. 40 – 49 years ☐

D. > 50 years ☐

3. **Marital Status**

A. Single ☐

B. Married ☐

C. Divorced ☐

D. Widowed ☐

4. **Your category of profession is**

A. Diploma Nurse ☐

B. Bachelor of Nurse ☐

C. Masters degree ☐

5. **Working experience in the respective unit**

A. 1 year ☐

B. 1 – 3 years ☐

C. 3 – 6 years ☐

D. 6 – 9 years ☐

E. >= 10 years ☐

SECTION B. SURGICAL COUNTS – KNOWLEDGE

In this section, please indicate whether you believe the statement to be "**Strongly disagree**" or "**disagree**" or " **Neutral**" or "**Agree**" or "**Strongly agree** "in the column by a tick (√) .

No.	To MY KNOWDLEGE	Strongly disagree	Disagree	Neutral	agree	Strongly agree
6	Surgical counts are conducted by two persons, by a scrub and circulating nurse.					
7	Surgical counts are conducted for certain surgical procedures only.					
8	I should keep the total number of swabs to a minimum used during surgery to enhance Control.					
9	If there is a change in the members of nursing staff who performed the initial swab, Instrument and needle count, surgical counts can be omitted.					
10	When a surgical count is interrupted, the count for those items can be continued without beginning again.					
11	Recording of all swabs, needles, blades and instruments used should be done according the hospital policy.					
12	Surgical counts should be done aloud.					
13	Only x-ray detectable swabs are used intra-operatively.					
14	Surgical counts are conducted to control swabs, needles, blades and instruments.					
15	In the event of a count discrepancy, closure					

	of the cavity continues as usual.					
16	Surgical counts are recorded and controlled on a white board (writing board) during the surgical procedure.					
17	Surgical counts should be recorded as correct or incorrect on the patients operating sheet.					
18	Items intentionally left in a wound are not documented in patient's records.					
19	Surgical counts are conducted in standardized multiples of fives.					
20	Items included in the surgical count can be removed from the operating room before the final count is completed.					

SECTION C: SURGICAL COUNTS – CLINICAL PRACTICE

In this section, please indicate whether the given statement is typical of what you do in the theatre, by "**always**" or "**often**" or "**sometimes**" or "**Seldom**" or "**Never**" in the column with a tick (√).

No	**When I scrub for a case I …**	**Always**	**Often**	**Sometimes**	**Seldom**	**Never**
21	Perform surgical item counts according hospital policy to prevent surgical item retention					
22	Do surgical counts of swabs, needles & instruments continuously throughout the surgical procedure with the same scrub nurse and circulating nurse.					
23	Check all items used before and after use for completeness.					
24	Open up swabs when counting to check for the presence of the X –ray detectable strip					
25	Maintain an organized and tidy sterile field to ensure an accurate count of all items during and after the surgical procedure.					

26	Ensure the circulating nurse documents the initial surgical count on the dry erase board (writing board) and additional swabs, needles & instruments added or removed from the sterile field.					
27	Report surgical count status to the surgeon at different stages of closure of the surgical cavity, who should give verbal acknowledgement.					
28	Perform surgical; counts: before the procedure to establish a baseline					
29	Perform surgical counts: Before closing of a cavity within a cavity,					
30	Perform surgical counts: Before wound closure begins,					
31	Perform surgical counts: At skin closure or end of a procedure,					
32	Perform surgical counts: At the time of permanent relief of either the scrub person or circulating nurse					
33	Perform surgical counts when additional items are added to the surgical field, they are counted and recorded.					
34	Inform the surgeon and nurse manager in case of a count discrepancy.					
35	Ensure the results of the surgical counts are recorded as correct or incorrect in the patient's records.					

SECTION D: FACTORS INFLUENCING THE COUNTING PROCEDURE

In this section, please indicate whether you believe the statement to be or "**Strongly agree"**or "**Agree**" or "**Neutral"** or "**disagree**" or "**Strongly disagree"** in the column by a tick (√).

No	In my work environment I have experienced….	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
36	Different styles of surgical counting procedure					
37	Change from routine counting practice					
38	That staff from other facilities count differently					
39	That an untidy sterile field due to a disorganized scrub sisters may affect counting accuracy					
40	General chaos during surgery such as noise, idle chatter and telephones ringing influences my counting accuracy					
41	Communication and interpersonal difficulties amongst staff					
42	Surgeons not keen to explore wound when incorrect counts occur					
43	Increased body mass of the patient who undergoes surgery					
44	Unexpected change in planned surgical procedure					
45	Emergency procedures					
46	Long procedures					
47	Large surgical teams with different requests					
48	Shortage of staff					
49	Handover of surgical counts during change of nursing shift					
50	Multiple mentors with different methods demonstrating how to conduct surgical counts					
51	Misinterpretation of the surgical count policy by nurses					

Thank you for your willingness to participate in this research study.

ANNEXURE III **: QUESTIONNAIRE/ Version française**

TITLE : Connaissance, Pratiques et Facteurs Influençant les Pratiques de Sécurité du Comptage d'Instruments Chirurgicaux entre les Infirmiers(ères) et Sage Femme dans Les Salles d'Opération des Hôpitaux Universitaires et de Référence au Rwanda.

INSTRUCTIONS:

• S'il vous plaît répondre à toutes les questions en marquant votre choix / point de vue / expérience avec une coche (√), par exemple: Êtes-vous une infirmière?

Oui	Non
√	

• Veuillez utiliser un stylo à bille bleu/noir pour remplir le questionnaire et comprend 5 pages et durera environ 10 minutes.

SECTION A. CARACTÉRISTIQUES DÉMOGRAPHIQUES ET SOCIOÉCONOMIQUES

Veuillez cocher [√] la meilleure réponse

1. **Genre**: Femme ☐ Homme ☐

2. **Age**

A. B. 20 - 29 ans ☐
C. 30 - 39 ans ☐
D. 40 - 49 ans ☐
E.> 50 ans ☐

3. État civil

A. Célibataire ☐
B. Marié ☐
C. Divorcé ☐
D. Veuf (ve) ☐

4. **Votre catégorie de profession est**

A. Infirmière Diplômée ☐
C. Infirmier Gradué ☐
D. Maîtrise ☐

5. Expérience de travail dans l'unité respective

A. 1 an ☐

B. 1 - 3 ans ☐

C. 3 - 6 ans ☐

D. 6 - 9 ans ☐

E.> = 10 ans ☐

SECTION B. CONNAISSANCES SUR LE COMPTAGE D'INSTRUMENTS CHIRURGICAUX

Dans cette section, veuillez indiquer si vous estimez que la déclaration est «**Fortement d'accord, D'accord, Neutre,Desaccord ou Fortement Desaccord**».avec une coche(√**)**

(√).

N0	**A MA CONNAISSANCE;**	**Fortement Désaccord**	**Desaccord**	**Neutre**	**D'accord**	**Fortement D'accord**
6	Les comptes chirurgicaux sont effectués par deux personnes : un infirmier instrumentiste et une infirmière circulante.					
7	Les comptages d'instruments chirurgicaux sont effectués pour certaines interventions chirurgicales uniquement.					
8	Je dois garder le nombre total des compresses utilisées pendant l'intervention chirurgical pour améliorer le contrôle.					
9	En cas de changement d'un membre d'équipe des personnel infirmiers qui ont préparé les compresses, matériels chirurgicaux, aiguille leurs comptage peut être omis					

10	Quand le comptage des instruments dans la salle d'opération, est interrompu, le comptage des peut être poursuivie sans recommencer.					
11	L'enregistrement de tous les tampons, aiguilles, lames des bistouris et instruments utilisés doit être effectué conformément aux normes de l'hôpital.					
12	Le comptage des matériels chirurgicaux dans la salle d'opération doit être effectué à haute voix.					
13	Seuls les compresses détectables aux rayons X sont utilisés en préopératoire.					
14	Les comptages chirurgicaux sont effectués pour contrôler les compresses, les aiguilles, les lames de bistouris et les instruments.					
15	En cas de différence de nombre dans le comptage, la fermeture de la cavité se poursuit normalement.					
16	Les comptages d'instrument chirurgicaux sont enregistrés et contrôlés sur un tableau blanc (tableau d'écriture) pendant l'intervention chirurgicale.					
17	Les comptages d'instrument chirurgicaux doivent être enregistrés comme corrects ou incorrects sur la fiche d'opération du patient.					

18	Les objets laissés intentionnellement dans une plaie ne sont pas documentés dans les dossiers du patient.					
19	Les comptages d'instrument chirurgicaux sont effectués dans des multiples normalisés de cinq ans.					
20	Les articles inclus dans le compte d'instrument chirurgicaux peuvent être retirés de la salle d'opération avant que le décompte final ne soit terminé.					

SECTION C: PRATIQUE CLINIQUE DE COMPTE DES MATERIELS CHIRIRGICAUX DANS LA SALLE D'OPERATION

Dans cette section, veuillez choisir si l'affirmation donnée est typique de ce que vous faites dans la salle d'Opération, en indiquant «**Toujours, Souvent, Quelque fois, Rarement** ou **Jamais**» avec une coche **(√).**

N0	**Quand j'assiste le cas dans la salle d'Opération comme instrumentaliste Je….**	**Toujours**	**Souvent**	**Quelque fois**	**Rarement**	**Jamais**
21	Effectuer le comptage d'instruments chirurgicaux conformément à la politique de l'hôpital pour empêcher la rétention des articles chirurgicaux					
22	Faites des comptages d'instrument chirurgicaux des compresses, des aiguilles pendant toute la durée de l'intervention chirurgicale avec l'instrumentaliste et l'infirmière					

	circulent.					
23	Vérifiez que tous les matériels utilisés avant et après l'intervention sont complets.					
24	Utilization des compresses containant la bande détectable par rayons X					
25	Maintenir un champ stérile organisé et ordonné pour assurer un comptage précis de tous les instruments pendant et après l'intervention chirurgicale.					
26	Assurez-vous que l'infirmière en service documente le comptage chirurgical initial sur le tableau effaçable à sec (tableau d'écriture), les compresses, aiguilles et instruments supplémentaires ajoutés ou retirés du champ stérile.					
27	Donner le rapport de comptage d'instruments au chirurgien à différents étape de la fermeture de la cavité chirurgicale, qui doit donner un accusé de réception verbal.					
28	Effectuer un comptage d'instruments avant					

	une intervention chirurgicale pour établir une base de référence					
29	Effectuer des comptages d'instrument chirurgicaux: avant de fermer une cavité dans une cavité,					
30	Effectuer des comptages d'instrument chirurgicaux: avant le début de la fermeture de la plaie,					
31	Effectuer des comptages d'instrument chirurgicaux: à la fermeture de la peau ou à la fin de la technique,					
32	Effectuer des comptages d'instrument chirurgicaux: au moment du soulagement permanent de la personne par l'instrumentaliste ou par l'infirmière circulant					
33	Effectuez des comptages d'instruments chirurgicaux lorsque des matériels supplémentaires sont ajoutés au champ opératoire, ils sont comptés et enregistrés.					
34	Informer le chirurgien et l'infirmière gestionnaire en cas de divergence.					
35	Assurez-vous que les résultats des					

	comptages des matériels chirurgicaux sont enregistrés comme étant corrects ou incorrects dans les dossiers du patient.					

SECTION D: FACTEURS INFLUENÇANT LA PRATIQUE DE COMPTAGE DES MATERIAUX CHIRURGICAUX DANS LA SALLE D'OPERATION

Dans cette section, veuillez indiquer si vous estimez que la déclaration est «**Fortement D'accord, D'accord, Neutre,Desaccord ou Fortement Desaccord**».avec une coche(√**)**

N0	**Dans mon n'environnement de travail, j'ai vécu l'expérience …**	**Fortement D'accord**	**D'accord**	**Neutre**	**Desaccord**	**Fortement Desaccord**
36	Différent styles de comptage d'instrument chirurgical					
37	Modification de la pratique de comptage de routine					
38	Que le personnel des autres établissements compte différemment					
39	Qu'un champ stérile désordonné en raison d'un instrumentaliste désorganisée peut affecter la précision du comptage					
40	Chaos général pendant une intervention chirurgicale comme le bruit, les bavardages et la sonnerie des téléphones influence la précision de comptage					
41	Difficultés de communication et interpersonnelles parmi le personnel					
42	chirurgiens qui ne donnent pas le					

	temps d'explorer la plaie lorsque des comptages incorrects se produisent					
43	Augmentation de la masse corporelle du patient					
44	Changement inattendu dans l'intervention chirurgicale survenue					
45	Intervention chirurgicale d'urgence					
46	Intervention chirurgicale très longues					
47	grandes équipes chirurgicales avec des demandes différentes					
48	Pénurie ou manque de personnel					
49	Comptage effectué lors de la remise et reprise du staff dans le bloc opératoire					
50	Des chefs d'équipe multiples avec différentes méthodes de comptage d'instrument chirurgicaux.					
51	Interprétation erronée des normes de comptage d'instruments chirurgicaux par les infirmières					

Merci de votre volonté de participer à cette étude de recherche

ANNEXURE IV**: OBSERVATION CHECKLIST**

Section A: Personal information

Please tick [√] the best answer

1. **Gender:** Female ☐ Male ☐
2. **Age**

A. 20 – 29 years ☐

B. 30 – 39 years ☐

C. 40 – 49 years ☐

D. > 50 years ☐

3. **Your category of profession is**

A. Diploma Nurse ☐

B. Bachelor of Nurse ☐

C. Masters degree ☐

4. **Working experience in the respective unit**

A. 1 year ☐

B. 1 – 3 years ☐

C. 3 – 6 years ☐

D. 6 – 9 years ☐

E. >= 10 years ☐

Section B: Surgical count practice

Please, indicate whether they do what the statement say by "**yes**", or "**no**" with a tick (√).

No	The Scrub nurse and the Circulating nurse, they….	Yes	No
1	Perform surgical item counts according hospital policy to prevent surgical item retention		
2	Do surgical counts of swabs, needles & instruments continuously throughout the surgical procedure with the same scrub nurse and circulating nurse.		
3	Check all items used before and after use for completeness.		
4	The use of swabs with the X –ray detectable strip		
5	Maintain an organized and tidy sterile field to ensure an accurate count of all items during and after the surgical procedure.		
6	Ensure the circulating nurse documents the initial surgical count on the dry erase board (writing board) and additional swabs, needles & instruments added or removed from the sterile field.		
7	Report surgical count status to the surgeon at different stages of closure of the surgical cavity, who should give verbal acknowledgement.		
8	Perform surgical; counts: before the procedure to establish a baseline		
9	Perform surgical counts: Before closing of a cavity within a cavity,		
10	Perform surgical counts: Before wound closure begins,		
11	Perform surgical counts: At skin closure or end of a procedure,		
12	Perform surgical counts: At the time of permanent relief of either the scrub person or circulating nurse		
13	Perform surgical counts when additional items are added to the surgical field, they are counted and recorded.		
14	Inform the surgeon and nurse manager in case of a count discrepancy.		
15	Ensure the results of the surgical counts are recorded as correct or incorrect in the patient's records.		

ANNEXURE V: **INFORMATION DOCUMENT**

Project title:	Knowledge practices and factors influencing surgical counting safety practices among operating room nurses and midwives of referral, teaching hospitals in Rwanda.
Study principal investigator:	NYIRASAFARI Emerthe University of Rwanda, College of medicine and Health Sciences School of Nursing and Midwifery E-mail address: emerthe82@gmail.com Cell:+250788425841
Supervisor	**Lilian A. Omondi PhD, RN** Training specialist: Human Resource for Health - Rwanda New York University, Rory Meyers College of Nursing Lecturer, School of Nursing Sciences, University of Nairobi, Kenya **University of Rwanda** College of Medicine and Health Sciences, School of Nursing and Midwifery, Kigali, Rwanda (P) +250-789924968 *Email: lo25@nyu.edu/liliathis@gmail.com/laomondi@uonbi.ac.ke*
Co-Supervisor	Christian NTAKIRUTIMANA RN, BSN &MSN IN Perioperative track Assistant lecturer at University of Rwanda, College of medicine and Health Sciences ,School of Nursing and Midwifery E-mail address: ntakituchris@gmail.com Cell: +250788515358

Dear Participant,

Introduction

My name is **Emerthe NYIRASAFARI.** I am a Master Student in Nursing, Perioperative Track at University of Rwanda conducting my Master's research project. I am requesting you to participate in this project which will consist of assessment of knowledge, practices and factors influencing surgical counting safety practices among operating room nurses and midwives of Referral teaching hospitals in Rwanda.

1. **Purpose of the study**

The purpose of the project is to assess the knowledge and practices of nurses and midwives working in operating theatre towards surgical count safety practices and to determine the factors influencing the practice of surgical count in referral teaching hospitals in Rwanda, and be able to take decision on additional training courses on surgical counting and enhancing the surgical safety policy and procedures.

2. **Description of study procedures**

You are expected to be in the study for 20-25 minutes. There are series of questions asking the knowledge, practice and factors towards surgical counting practice that you will answer in your private space. The answer you will provide will not affect your job performance and will be kept confidential and your name will not be recorded on the questionnaire. The questionnaire will be self-administered and will be anonymous (not identifiable). The observation checklist will be done by the principal investigator on surgical count practice.

3. **Confidentiality**

Confidentiality will be assured as no names will appear on the questionnaire at any stage of data collection as they will be coded. Signed consent forms will not be attached to instruments to ensure anonymity. If you are willing to participate, a consent form will be signed to indicate acceptance.

Data will be stored in a locked cabinet and not be accessible to any other person other than the investigators. The study staff (researcher and supervisors) will have access to all the information collected in this study. In addition, there are organizations that may inspect or copy your research records for quality assurance and data analysis and these include the institutional review board (IRB). Furthermore, all documents for the study will be destroyed after 5 years of study completion.

4. **Right to refuse or withdraw from the study**

You are allowed to refuse or withdraw at any stage of the study. Also, you will have the option of not responding to one or more questions of the questionnaire when you feel not comfortable to respond, without any adverse consequences on your performance at your workplace.

5. Benefits of participating in the study

Study Participants will have information on standard surgical counting practice after completion of data collection.

6. Risks expected in the study

There are no risks associated with this project and the participation is voluntary.

For any concern about this project, please contact

College of Medicine and Health sciences

Institutional Review Board chairperson on 0788490522

Or

The Deputy Chairperson on 0783340040.

If you agree to participate in this project, please sign the informed consent form.

Thank you.

ANNEXURE VI: **INFORMED CONSENT FORM**

I ……..voluntarily want to participate in the research project "**Knowledge, practices and factors influencing surgical counting safety practices among operating room nurses and midwives of referral teaching hospitals in Rwanda".**

I understand that the project will inform the hospitals about surgical counting practice and I will benefit from information on standard surgical count practice which will help me to fulfill my tasks and enhance the clients' safety.

……. Date: ……/…… 2019

Participant's signature

……

Date and signature of the researcher

Cher(ère)participant,

Introduction

Je m'appelle Emerthe NYIRASAFARI. Je suis une étudiante en maîtrise en Sciences infirmières, filière périopératoire de l'Université du Rwanda, menant mon projet de recherche de maîtrise.

Je vous demande de participer à ce projet qui consistera en une évaluation connaissance, pratiques et facteurs influençant les pratiques de sécurité du comptage d'instruments chirurgicaux entre les infirmiers (ère/s) et sage femme dans les salles d'opération des hôpitaux universitaires et de référence au Rwanda.

1. **But de l'étude**

Le but du projet est d'évaluer les connaissances et les pratiques des infirmières et des sages-femmes travaillant en salle d'opération en ce qui concerne les pratiques de sécurité du comptage des interventions chirurgicales et de déterminer les facteurs qui influent sur la pratique de la numération des interventions chirurgicales dans les hôpitaux universitaires de référence au Rwanda, et pouvoir prendre une décision. Cours de formation supplémentaires sur le comptage chirurgical et l'amélioration de la politique et des procédures de sécurité chirurgicale.

2. **Description des procédures d'étude**

Vous êtes censé être dans l'étude pendant 20-25 minutes. Il y a une série de questions demandant les connaissances, la pratique et les facteurs de la pratique du comptage chirurgical auxquelles vous allez répondre dans votre espace privé. La réponse que vous fournirez n'affectera pas votre travail, restera confidentielle et votre nom ne sera pas enregistré sur le questionnaire. Le questionnaire sera auto-administré et sera anonyme (non identifiable).

3. **Confidentialité**

La confidentialité sera assurée, car aucun nom n'apparaîtra sur le questionnaire à aucun stade de la collecte des données, car ils seront codés. Les formulaires de consentement signés ne seront pas joints aux instruments garantissant l'anonymat. Si vous êtes prêt à participer, un formulaire de consentement sera signé pour indiquer votre acceptation. Les données seront stockées dans un classeur verrouillé et ne seront accessibles à aucune autre personne que les enquêteurs.

Le personnel de l'étude (chercheur et superviseurs) aura accès à toutes les informations recueillies dans le cadre de cette étude.

En outre, certaines organisations peuvent inspecter ou copier vos enregistrements de recherche aux fins d'assurance de la qualité et d'analyse de données, notamment le comité d'examen institutionnel (IRB). En outre, tous les documents de l'étude seront détruits au bout de cinq ans d'achèvement.

4. **Droit de refuser ou de se retirer de l'étude**

Vous êtes autorisé à refuser ou à vous retirer à n'importe quel stade de l'étude. En outre, vous aurez la possibilité de ne pas répondre à une ou plusieurs questions du questionnaire si vous ne vous sentez pas à l'aise de répondre, sans que cela ait des conséquences néfastes pour votre performance sur votre lieu de travail.

5. Avantages de participer à l'étude

Les participants à l'étude disposeront d'informations sur la pratique de comptage chirurgical standard une fois la collecte des données terminée.

6. Risques attendus dans l'étude

Il n'y a aucun risque associé à ce projet et la participation est volontaire.

7. Détails du contact

Pour plus d'informations ou pour signaler des événements indésirables liés à l'étude, contactez moi ou mon superviseur à l'adresse et aux numéros suivants:

Université du Rwanda

Collège de médecine et des sciences de la santé

École des sciences infirmières et obstétricales

Kigali, Rwanda

Emerthe NYIRASAFARI: +250788425841

Christian NTAKIRUTIMANA: +250788515358

Pour toute question concernant ce projet, veuillez contacter

Collège de médecine et sciences de la santé

Président de la commission d'examen institutionnel au 0788490522

Ou le vice-président au 0783340040.

Si vous acceptez de participer à ce projet, veuillez signer le formulaire de consentement.

Formulaire de consentement éclairé

Je…….Souhaite volontairement participer au projet de recherche «connaissance, pratiques et facteurs influençant sur les pratiques de sécurité du comptage d'instruments chirurgicaux entre les infirmiers (ère/s) et sage femme dans les salles d'opération des hôpitaux universitaires et de référence au Rwanda» à partir d'une information sur la pratique de comptage chirurgical standard qui m'aidera à remplir mes tâches et à améliorer la sécurité des clients.

……. Date: ……/…… 2019

Signature du Participant ……

Date et signature de l'enquetrice

ANNEXURE VII**: ETHICAL CLEARANCE APPROVAL**

UNIVERSITY OF RWANDA — COLLEGE OF MEDICINE AND HEALTH SCIENCES

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 14/01/2019
Ref: CMHS//IRB/058/2019

NYIRASAFARI Emerthe
School of Nursing and Midwifery, CMHS, UR

Dear NYIRASAFARI Emerthe

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled ***"Knowledge, Practices And Factors Influencing Surgical Counting Safety Practices Among Operating Room Nurses And Midwives Of Referral Teaching Hospitals In Rwanda"***.

Having reviewed your protocol and found it satisfying the ethical requirements, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.

Professor Jean [illegible]
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:
- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate studies, UR

ANNEXURE VIII**: REQUEST APPROVAL NOTICE FROM UNIVERSITY TEACHING HOSPITAL, KIGALI (CHUK)**

CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL

Quality Health Care
Training & Research

Ethics Committee / Comité d'éthique

February 08th, 2019 **Ref.: EC/CHUK/022/2019**

Review Approval Notice

Dear **Nyirasafari Emerthe,**

Your research project: ***"Knowledge, practices and factors influencing surgical counting safety practices among operating room nurses and midwives at CHUK"***

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 08th February, 2019 to evaluate your request for ethical approval of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your research project.

You are required to present the results of your study to CHUK Ethics Committee before publication.

PS: Please note that the present approval is valid for 12 months.

Yours sincerely,

ETHICS COMMITTEE CHUK

Dr. Emmanuel Rusingiza
The Chairperson, Ethics Committee,
University Teaching Hospital of Kigali

"University teaching hospital of Kigali Ethics committee operates according to standard operating procedures (Sops) which are updated on an annual basis and in compliance with GCP and Ethics guidelines and regulations"

B.P. 3283 Kigali- RWANDA www.chk.rw Tél. Fax : 00 (250) 536638 E-mail: chuk.hospital@chukigali.rw

ANNEXURE IX**: REQUEST APPROVAL NOTICE FROM UNIVERSITY TEACHING HOSPITAL, BUTARE (CHUB)**

CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL

CENTRE HOSPITALIER UNIVERSITAIRE DE BUTARE (CHUB)
OFFICE OF DIRECTOR GENERAL

Huye, 28/02/2019

N° Ref: CHUB/DG/SA/82/0377/2019

Mrs. Emerthe Nyarasafari
UR-CMHS
Phone: +250788425841
Email: emerthe82@gmail.com

Dear Nyirasafari,

Re: **Your request for data collection**

Reference made to your letter requesting for permission to collect the data within University Teaching Hospital of Butare for your research proposal entitled "***Knowledge, practices and factors influencing surgical counting safety practices among operating room and nurses and midwives of referral teaching hospital in Rwanda.*** ", and based to the different approvals **Ref: CMHS/IRB/058/2019** from Institution Review Board of University of Rwanda and **No: RC/UTHB/013/2019** from our Research-Ethics committee, we are pleased to inform you that your request was accepted. Please note that your final document will be submitted in our Research Office.

Sincerely,

Dr. Augustin SENDEGEYA
Director General of CHUB

Cc:

- Head of Clinical Services Division
- Director of Education and Research
- Chairperson of Research Committee
- Research officer

CHUB

ANNEXURE X**: REQUEST APPROVAL NOTICE FROM KING FAISAL HOSPITAL, KIGALI (KFH, K)**

KING FAISAL HOSPITAL KIGALI

KING FAISAL HOSPITAL, KIGALI

Patient Centered Care

20th March, 2019

NYIRASAFARI, Emerthe
School of Nursing and Midifery
University of Rwanda
Phone: +250 788425841
Email: emertge82@gmail.com

We acknowledge receipt of your study protocol: **"Knowledge, practices and factors influencing surgical counting safety practices among operating room nurses and midwives of referral teaching hospitals in Rwanda".**

After a thorough review; the reviewers of KFH, K Ethics Research Committee find the proposal plausible apart from the few issues raised.
Therefore; it is recommended that the postgraduate student be permitted to commence work at KFH, K immediately but be requested to address the issues raised by the reviewers in due course. The response should be deposited to the secretariat of the committee found in the office of Continuing Quality Improvement of the hospital.

N.B. It is a requirement that you deposit a final copy of your research in the office of Continuous Quality Improvement in King Faisal Hospital, Kigali for our records.

Best Regards

King Faisal Hospital by OSHEN Healthcare / Rwanda

Prof. Samuel Lutalo
Clinical Professor of Medicine;
Chief Consultant Physician and
Chairperson KFH, K Ethics Research Committee

CC:
- Chief Executive Officer, Oshen- KFH
- All KFH, K Ethics-Research Committee Members.

ANNEXUREN XI: **REQUEST APPROVAL NOTICE FROM RWANDA MILITARY HOSPITAL (RMH)**

REPUBLIC OF RWANDA
RWANDA MILITARY HOSPITAL
Website: www.rwandamilitaryhospital.rw
P.O. Box: 3377 Kigali, Tel: (+250)252586420, Hotline: 4060
Email: info@rmh.rw

March 29, 2019 **Ref.: RMH/IRB/008/2019**

REVIEW APPROVAL NOTICE

Dear **NYIRASAFARI Emerthe**
School of Nursing and Midwifery, CMHS
University of Rwanda

Your Research Project: **"Knowledge, Practices and Factors Influencing Surgical Counting Safety Practices among Operating Room Nurses and Midwives of Referral Teaching Hospitals in Rwanda".**

With respect to your application for ethical approval to conduct the above stated study at Rwanda Military Hospital, I am pleased to confirm that the RMH/Institutional Review Board (IRB) has approved your study. This approval lasts for a period of **12 months** from the date of this notice, and after which, you will be required to seek another approval if the study is not yet completed.

You are welcome to seek other support or report any other study related matter to the Research office at Rwanda Military Hospital during the period of approval.

You will be required to **submit the progress report** and any major changes made in the proposal during the implementation stage. In addition, you are required to **present the results** of your study to the RMH/IRB before publication.

Sincerely,

Prof. Alex M. Butera
Colonel
Chairperson Institutional Review Board, RMH

CC