



**ASSESSING INDWELLING URINARY CATHETER USE
AMONG PATIENTS UNDERGOING SURGERY AT KIGALI
UNIVERSITY TEACHING HOSPITAL**

By

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**College Of Medicine and Health Sciences
School of nursing sciences
Masters of sciences in nursing, perioperative track**

2017



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

MASTERS OF SCIENCES IN NURSING

PERIOPERATIVE TRACK

In the **College of Medicine and Health Sciences (CMHS)**

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Kigali, July 2017

DECLARATION

I here declare that this dissertation contains my own work except where specifically acknowledged.

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Ms.


July, 26th 2017

DEDICATION

This work is dedicated to

Almighty God,

My beloved husband Furere JMV,

My parents and siblings,

My friends that encouraged and helped me during the study process

ACKNOWLEDGEMENTS

I am very thankful to almighty God for the help and guide during the study and making this piece of work successful.

The great thanks to the government of Rwanda and University of Rwanda for allowing me the opportunity to pursue the passion of my heart profession by financial support and security protection during our study.

I would like to extend my special appreciations to my supervisors Mr. Innocent NDATEBA, Dr. Lilian OMONDI, Dr. Donatilla MUKAMANA and Co-Supervisor Prof. Oluyinka Adejumo for their immeasurable assistance and the guidance during the preparation implementation and report of this project.

I address my thanks to university of Michigan University that allowed me to use and edit the study tool used during data collection.

I express my gratitude to CMHS staff and teachers, especially those of Masters Program for an immeasurable support and knowledge they gave me.

I would like to acknowledge the patients, surgical teams and administrative body of Kigali university teaching hospital for their cooperation and help.

Great thanks to all family and relatives, closed friends and classmates for their encouragement and their kindly support for making this project success.

May God bless you all.

ABSTRACT

Background: Up to 86% of operated patients are candidates to routine indwelling urinary catheters (IUC). Studies revealed a high prevalence of Catheter-associated urinary tract infections (CAUTIs). CAUTIs are the 3rd most common post-operative infections. A little is known about CAUTIs and IUC use in Rwandan hospitals.

Aim of the study

To assess the use of indwelling urinary catheter among patients undergoing surgery at Kigali university teaching hospital.

Methodology

The study took place at Theatre of Kigali teaching hospital among patients admitted in Theatre for surgery. A quantitative cross-sectional study design was used. 207 patients were recruited. An observation checklist was used. Data was analyzed by using descriptive and inferential statistics. The ethical principles were respected.

Results:

Among 207 participants recruited for the study, 56.5% of them used IUC. The prevalence was significantly related to Female sex, age of 26-35 years, procedure such as Obstetrics and Gynecology, Laparotomy, urology and neurosurgery, major surgery, emergent surgery, Spinal anesthesia, and presence of physician order ($P < 0.001$). The IUC were placed for appropriate indications (95.7%,) but only one IUC (0.9%) was removed before patient left PACU and 56.5% of participants with IUC in place were not having a documented removal instructions and especially cases of Laparotomy (73.3%), orthopedic surgery(100%), neurologic surgery(100%) and general surgery (100%).

Conclusion

IUC was not routinely used at CHUK theatre except some procedures such as Obstetrics and Gynecology, Laparotomy, urology & neurosurgery. It was used for appropriate indication but the excessive duration due to poor post-operative removal instruction was suspected.

Recommendation

Periodic audit of IUC use and CAUTIs for surveillance, formulation of procedure specific policies governing IUC use, further researches on the duration of postoperative IUC retention and associated factors among patients undergoing surgery.

OPERATIONAL DEFINITIONS OF TERMS

The following terms are defined according to the meaning they have in this project:

Catheter-associated urinary tract infection (CAUTI): is described as any condition within urinary system caused by germs that are transmitted by UC and ascent through it (CDC, 2015a).

Indwelling urinary catheter: is defined as a plastic cylinder that is placed in the urine bladder, by passing the urethra to remove continuously the urine from the bladder to the well coupled urine bag for a certain period (CDC, 2015a, p. 1).

Perioperative: is an adjective that summarizes the period around a surgery. It includes the preoperative, intra-operative and postoperative period. In this study, this period is within 2 hours before surgery since the decision of surgery was made and 24hours after surgery.

Removal order/instructions are defined as a statement documented in the patient file that details the time or condition for removing a postoperative urinary catheter.

LIST OF SYMBOLS, AND ABBREVIATIONS/ACRONYMS

&: and

%: percentage

AORN: American Association of Operating Room Nurses

CAUTIs: Catheter-Associated urinary tract infections

CCU: critical care Unit

CDC: Center for Disease Control (CDC)

HCAIs: Health care-associated infections

HICPAC: Healthcare Infection Control Practices Advisory Committee

IUC: Indwelling Urinary Catheter

PACU: post anesthesia unit

SD: standard deviation

SPSS: statistical package for social studies

UTIs: Urinary Tract Infections

WHO: World Health Organization

AHRQ: Agency for Healthcare Research and Quality.

CHUK: Centre Hospitalière Universitaire de Kigali (Kigali university teaching hospital)

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CHAPTER 1. INTRODUCTION

1.1. INTRODUCTION

The introduction chapter highlights the operational definitions of key terms relevant to the study, background, problem statement, research questions, main objective and specific objectives of the study, significance of the study and subdivision of the study that mentions the main parts of the proposal.

1.2. BACKGROUND TO THE STUDY

Globally, urinary catheters are medical devices that are mostly used in critical care services (Lam *et al.*, 2014, p. 9). About 15% to 25% of hospitalized patients are exposed to urinary catheterization, either intermittent or indwelling urinary catheter, mostly without proper indication (Andrade *et al.*, 2016, p. 2). The use of a urinary catheter is as high as 100% in critical care Unit (CCU) (Jain *et al.*, 2015, p. 76) and patients undergoing surgery are in the critical condition. Most of these techniques of catheterization (21% to 63%) are done without proper indications or extending their unnecessary use (Meddings, Krein, *et al.*, 2014, p. 1).

The catheter-associated urinary tract infections (CAUTIs) are considered as the most challenging Healthcare-associated infections (HCAIs) worldwide (Conway and Larson, 2012, p. 1; Abdel-Aleem, Aboelnasr, TM, *et al.*, 2014, p. 3; Amine *et al.*, 2014, p. 2; Lam *et al.*, 2014, p. 4). Forty percent (40%) of HCAIs are attributed to urinary catheters (Andrade and Fernandes, 2016, p.2; Conway and Larson, 2012, p.2; Klevens *et al.*, 2007, p.161), 20% CAUTIs for short term health services, 50% and even more chronic and palliative care departments (Lindsay, 2014, p. 1) corresponding to one million of CAUTIs each year (Meddings, Krein, *et al.*, 2014, p. 1). The urinary catheters contribute a lot on urinary tract infections(UTIs) morbidity (80%) occurring in hospitalized patients (Lindsay, 2014, p. 1). The UC associated cost is varying on admission and when the catheter causes infections between \$676 and \$2836 respectively

(Lindsay, 2014, p. 2; Meddings, Rogers, *et al.*, 2014, p. 1). The antibiotic resistance rate attributable to UTIs bacteria is increasing and alarming world widely (Muvunyi *et al.*, 2013, p. 3).

Urinary catheterization is mostly done as perioperative routine care for the safety, monitoring and effectiveness of surgery (Abdel-Aleem, Aboelnasr, TM, *et al.*, 2014, p. 3). However, CAUTIs come as 3rd most common infections in addition to site infection and bloodstream infection among operated patients (Wałaszek, 2015, p. 507).

In developing countries, a urinary catheter is also used. Catheterization is most encouraged as primary and secondary prevention of fistula among women with obstructed labor at Nigeria (Fistula Care, 2013, p. 8). The prolonged use of urinary catheters was reported among men with benign prostate enlargement (47.4%) and urethral stricture diseases (52.6%) treated at the urology outpatient clinic of the North-central Nigeria tertiary referral centre, with cost of US \$ 9.31 per catheter placement (Bello *et al.*, 2013, p. 82). The procedure is more common in sub-Saharan Africa and the used catheters exposes patients to CAUTIs. Inappropriate use of urinary catheter was related to insufficiency of trained staff, poor access to health facilities, shortage of equipment and they are mostly done by using clean materials than sterile and septic technique (Labib and Spasojevic, 2013, p. 5).

In Rwanda, a urinary catheter is highly used in hospitalized and operated patients. Unfortunately, the prevalence of its use is not known. There was no study found done on urinary catheter use and CAUTIs in Rwanda. Urinary catheters are used as routine preoperative care in the preparation of patients for surgery. Inappropriate use of indwelling urinary catheter (IUC) is highly suspected in Rwandan hospitals. During clinical practice, the researcher observed that the use of indwelling urinary catheters was common especially during perioperative patients' care. In some instances, it was also used for convenience of nursing care for patients with urinary incontinence due to a shortage of urinary catheter alternatives and health personnel to take care of the patients with urinary incontinence.

A study done at Kigali university teaching hospital and Butare university teaching hospital on UTIs' bacteria resistance to antibiotics found out that Klebsiella, Proteus, Citrobacter, Pseudomonas aeruginosa were predominantly isolated in inpatients. The associated antimicrobial resistance varied from 98.9% for amoxicillin, 90.4% for trimethoprim-sulphamethoxazole, 74.6% for nalidixic acid, 72.3% for amoxicillin-clavulanic acid, 57.4% for ciprofloxacin, 54.3% for ceftriaxone, 53.2% for nitrofurantoin to 50% for ceftazidime and other antibiotics. Use of Urinary catheter was identified as one of the risk factors of resistant UTIs with a prevalence of 50% (Muvunyi *et al.*, 2013, p. 3). Lindsay also reported the overuse of antibiotics among patients with urinary catheters and a connected increase of antimicrobial resistance. Urinary catheters contributed up to 48% of antimicrobial resistance and sources of epidemics of resistant bacteria in acute care facilities (Lindsay, 2014, p. 2). This explains how the appropriate use of urinary catheter contributes a lot to CAUTIs and antimicrobial resistance prevention.

Different intervention to prevent CAUTIs have been studied for their effectiveness including the use of different types of catheters (Jahn, Beutner and Langer, 2012, pp. 6–10; Jamison, Maguire and Mccann, 2013, pp. 6–14; Lam *et al.*, 2014, pp. 3–13; So *et al.*, 2014, pp. 3–6), like antiseptic, antibiotic, silver coated catheters and others (Lam *et al.*, 2014), but no one revealed significant in reducing CAUTIs. Thus, the nonuse or appropriate use of urinary catheter have found to be effective in reducing the incidences of CAUTIs (Fakih *et al.*, 2014, p. 13; Lo *et al.*, 2014, p. 3). Non perioperative use of urinary catheter or immediate removal of urinary catheter after surgery has found to be effective strategies to prevent postoperative CAUTIs (Dunn, Shlay and Forshner, 2008, p. 45)

In 2009, Center for Disease Control (CDC) through the Healthcare Infection Control Practices Advisory Committee (HICPAC) provided new guidelines for using appropriately an IUC to prevent and reduce the cost of CAUTIS. The main guideline is to avoid unnecessary use of a

urinary catheter (Conway and Larson, 2012; Gould *et al.*, 2009;). HICPAC issued indications for appropriate use of the catheter (Fakih *et al.*, 2012, p. 11).

Although the non-placement of urinary catheter and early removal of unnecessary catheters are costless, low risks and effective interventions to prevent CAUTIs and other non-infectious complications like catheter-associated patient discomfort and immobility (Meddings, Krein, *et al.*, 2014, p. 41); a little is known about use of urinary catheter among perioperative patients in Rwandan hospitals. This lack of information on urinary catheter use in Rwanda added to the urinary catheter-associated complications and cost motivated the researcher to assess the perioperative use of indwelling urinary catheter at Rwandan hospital.

1.3. PROBLEM STATEMENT

The urinary catheters have been world widely used. Among the patients that are hospitalized, 15% to 25% of them are exposed to IUC (Andrade *et al.*, 2016, p. 2) and 100% in CCU (Jain *et al.*, 2015, p. 76) use an IUC. They contribute up to 40% of Healthcare-associated infections (HCAIs), 80% of UTIs morbidity among hospitalized patients, 48% of antimicrobial resistance (Lindsay, 2014, p. 2) and cost of \$2836 when complicated by bacteremia (Meddings, Krein, *et al.*, 2014, p. 3). Up to 86% of operated patients are candidates to routine urinary catheters (Heidi L. Wald *et al.*, 2008, p. 552). CAUTIs are the 3rd most common postoperative infection (Walażek, 2015, p. 507). The CAUTIs bacteria are connected with higher antimicrobial use and resistance (Muvunyi *et al.*, 2013, p. 3; WHO, 2015, p. 1).

Although the effective strategies to prevent CAUTIs and other catheter-associated complications are non-placement and early removal of unnecessary urinary catheters that reduced 17% to 65% of CAUTIs (Xie *et al.*, 2011, p. 2); a little is known about use of urinary catheter in Rwandan hospitals especially among perioperative patients. This lack of information motivated the researcher to assess the use of indwelling urinary catheter among patients undergoing surgery at Kigali university teaching hospital.

1.4. OBJECTIVES OF THE STUDY

Main objective

The study purpose is to assess indwelling urinary catheter use among patients undergoing surgery at Kigali university teaching hospital.

Specific objectives

1. To identify the demographic characteristics of respondents undergoing surgical operation at Kigali university teaching hospital
2. To determine the prevalence of indwelling urinary catheter use among patients undergoing surgical operation at Kigali university teaching hospital.
3. To Assess the indications for catheter insertion among patients undergoing surgical operation
4. To assess the removal order of postoperative urinary catheter among patients undergoing surgical operation at Kigali university teaching hospital.

1.5. RESEARCH QUESTIONS

1. What are the demographic characteristics of respondents undergoing surgical operation at Kigali university teaching hospital?
2. What is the prevalence of urinary indwelling catheter use among patients undergoing surgical operation at Kigali university teaching hospital?
3. What are the indications of catheter insertion in among patients undergoing surgical operation at Kigali university teaching hospital?
4. What is the removal order of indwelling urinary catheter among patients undergoing surgical operation at Kigali university teaching hospital?

1.6. SIGNIFICANCE OF THE STUDY

The World widely, the CAUTIs are the 3rd commonest postoperative infection in addition to the site infection and blood stem infections (Walaşzek, 2015, p. 705). The effective CDC and WHO

guidelines on prevention of CAUTIs are an appropriate use of urinary catheter including to place a catheter for appropriate reason and early removal of unnecessary catheter (Fakih *et al.*, 2012, p.3;WHO, 2010, p.1). No study was done in Rwanda on the appropriate use of a urinary catheter in the prevention of CAUTIs. This motivated the researcher to conduct the study.

The findings from this study are likely to stimulate hospitals and other health institutes administrators to do an audit and surveillance of appropriate use of a urinary catheter to prevent CAUTIs (based on CAUTI care bundles) among operated patients and improves where it will be required. They will also be used by the researchers as baseline data for further studies on the appropriate use of urinary catheter and prevention of UTIs and reduce antimicrobial resistance. These findings will inform the educators who teach healthcare providers an appropriate use and indications of a urinary catheter to prevent CAUTIs and abusive use of antimicrobial agents.

1.7. ORGANIZATION OF THE STUDY

This research report is subdivided into six parts. It includes Introduction, Literature review, Methodology, Results presentation, discussion, conclusion and recommendation. The annexes are also attached and include the tool for data collection, ethical clearance, permission to conduct the research, information sheet and consent forms.

1.8. CONCLUSION TO CHAPTER ONE

The first chapter talked about study background, problem statement, main objective and specific objectives of the study, significance of the study, research questions, operational definitions of study key terms, and organization of the study that mentions the main parts of the proposal.

CHAPTER 2. LITERATURE REVIEW

2.1. INTRODUCTION

The second chapter which is literature review highlights the theoretical literatures on IUC use, empirical literatures on IUC use, critical review of literatures and gap identification and conceptual framework. The theoretical literature section provides definition of IUC, accepted standards for IUC use including the indications, the proper technique of IUC use and recommendations to improve the quality of IUC use. The empirical literatures section presents the scientific findings and views on a urinary catheter, prevalence of indwelling urinary catheter use and a link between a urinary catheter use and UTIs, appropriate and inappropriate use of indwelling urinary catheter. The critical review and gap identification section present the gap found during the literature review process and why the researcher conducted this research while the conceptual framework section present the conceptual model of the IUC use and the conceptual framework of the study.

2.2. THEORETICAL LITERATURE

An indwelling urinary catheter is defined as a plastic cylinder that passes through urethra to remove continuously urine from the bladder to attached urine bag or other collecting system for a certain period (CDC, 2015a, p. 1). The Foley catheter was developed and its widespread was introduced in 1930 to help people with urination disorders (Feneley, Hopley and Peter Wells, 2015, p. 459). It is called indwelling catheter, if it is placed and left in place for a certain period connected to the closed collection system to allow a continuous flow of urine (CDC, 2015a, p. 2). However, its use is a risk to patients (Fakih *et al.*, 2014, p. 10).

Accepted standards for urinary catheter use

The use of IUC is guided by a lifecycle of a urinary catheter as the conceptual model of appropriate IUC use. This conceptual model has four key areas that include (1) initial catheter placement, (2) catheter cares, (3) catheter removal as soon as it is no longer indicated, and (4)

catheter reinsertion when it is still needed after removal of the previous one (Meddings, Rogers, *et al.*, 2014, p. 278). To reduce the risks of infections and other complications associated with the urinary catheter, the CDC HICPAC provided guidelines for CAUTIs prevention emphasizing on non-placement of a catheter or appropriate use of it.

The CDC recommends insertion of a urinary catheter for only suitable reasons, keeping in place as needed, reduce the length and frequency of IUC when clients are at high risk of CAUTIs and mortality from catheterization including women, patients with weak immunity and elderly. CDC recommends avoiding catheter use for management of urinary incontinence. Among operative patients, IUC is used only when it is indicated, not at routine basis. When IUC was inserted for right indication, it will be removed when is no longer needed. Most of them are preferably removed within 24 hours, or more when they are still indicated (Gould *et al.*, 2009, p. 10).

Appropriate Indications for appropriate use of IUC (Fakih *et al.*, 2014, p. 11; Meddings, Krein, *et al.*, 2014, p. 3; Meddings, Rogers, *et al.*, 2014, p. 278) were stated as follow: “(1) acute urinary retention or bladder outlet obstruction, (2) accurate measurements of urinary output in critically ill patients, (3) perioperative use for selected surgical procedures, (4) to assist in healing of open sacral or perinea wounds in incontinent patients, (5) prolonged immobilization requirement, and (6) improved comfort for end-of-life care”(Fakih *et al.*, 2013, p. 11).

Urinary catheter is accepted for perioperative use in the following conditions: “(1) urologic surgery or other surgery on nearby structure of genitourinary tract, (2) predictable prolonged duration of surgery and this catheter has to be removed in PACU, (3) patients expected to receive a big amount of fluids or diuretics during surgery”(Gould *et al.*, 2009, p. 11; Meddings, Rogers, *et al.*, 2014, p. 279).

The additional criteria for IUC use among hospitalized medical patients had been developed. For example, a urinary catheter is placed for acute retention with outlet obstruction due to a

noninfectious and no traumatic cause. In the urinary incontinence, an IUC should be appropriate to manage skin cares when other strategies fail to do so. This indication will be appropriate when for instance a patient has the unstable spine pelvic fracture and an order of strict prolonged or temporal immobility, an excess weight (>136 kg) from any cause, obesity or edema. IUC will be used to collect 24 hours urine when other strategies are not possible like a patient with an unrepaired fracture in the prevention of severe acute pain with movements. It will also be used to manage a gross hematuria with blood clots in urine (Meddings *et al.*, 2016, p. 10). Center for diseases control recommends that indwelling urinary catheter placement for any reason different from ones mentioned above is inappropriate (Hu *et al.*, 2014, p. 2) and this catheter is removed immediately when it is not appropriate (Gould *et al.*, 2009, p. 11).

The CDC proposed **some alternatives** of IUC depending to patients like external catheters when the patient is collaborative and do not have urine retention or urethra obstruction. Intermittent catheterizations are recommended for patients suffering from spinal cord injuries, disorders in emptying bladders, and children with myelomeningocele and neurogenic bladder to decrease the UTIs and disorders (Gould *et al.*, 2009, p. 11).

In addition to appropriate indications for placement of IUC, CDC recommends **proper techniques for urinary catheter insertion** (Gould *et al.*, 2009, p. 12). To insert a urinary catheter, hands are washed before and after inserting and care for a urinary catheter or site. It is inserted by properly trained persons, respecting the principles of asepsis of the technique, equipments and gloves. Then secure properly indwelling catheters after insertion, choosing the appropriate size of catheter, keep closed drainage system, replace it if there is any break in asepsis. To insert catheter for appropriate reasons, the transportable ultrasound machine will be used to estimate the amount of urine in the patients' bladder. Bladder irrigation is avoided, IUC bag is kept at lower level to prevent infections (Conway and Larson, 2012, p.2; Gould *et al.*, 2009, p.12; Lindsay, 2014, p.2). Evidence-based guidelines were developed to guide the urinary catheter use. The appropriate urinary catheter size is used. It is better to use the small size

compatible with good drainage of urine (12-16Fr) (Feneley, Hopley and Peter Wells, 2015, p. 464).

It is also recommended that to improve the quality of urinary catheter use and reduction of CAUTIs, the institution should avail policies and guidelines for managing and using appropriately perioperative IUC. Each surgical procedure should have the specific guidelines for IUC placement and post operative IUC management, and protocols for managing postoperative urinary retention such as intermittent catheterization and bladder ultrasound machine use instead of IUC (Gould *et al.*, 2009, p.15).

Any catheter used and not meeting the criteria mentioned above are considered inappropriate. Many cases of inappropriate use of urinary catheter have been observed (Hu et al. 2014, p.1; Meddings, Rogers, et al. 2014, p.277;Wald et al. 2008, p.551; Xie et al. 2011, p.297). Many of the studies revealed that 21% to 55.7% of urinary catheters are used without appropriate indications and many of them were not even in need of catheter (Meddings, Rogers, *et al.*, 2014, p. 279).

Some examples of inappropriate use of urinary catheters are the urinary incontinence when a nurse can turn patient as substitute for nursing cares, to sampling urine for laboratory investigation when the client is able to void, prolonged post-operative use while is no longer indicated (Gould *et al.*, 2009, p. 11; Fakhri *et al.*, 2012, p. 28), patient or family request, patient with bed rest order without strict immobility, management of frequent and painful urination in case of UTIs (Meddings *et al.*, 2016, p. 8). For perioperative patients with catheter that lasts more than 24 hours, it is considered inappropriate unless there was another appropriate indication previously mentioned such as structure repair of urethra, urinary system contiguous structure, and prolonged effect of epidural anesthesia as recommended by HICPAC (Hu *et al.*, 2014, p. 2) (Gould *et al.*, 2009, p. 11).

2.3. EMPIRICAL LITERATURE

2.3.1. Prevalence of indwelling urinary catheter use and associated complications

Indwelling urinary catheter is used as a routine in perioperative care and mostly without proper indications (Heidi L. Wald *et al.*, 2008, p. 551) increasing risks of getting urinary tract infections in addition to other non-infectious complications like urethra trauma, discomfort, and immobility (Meddings, Rogers, *et al.*, 2014, p. 12; CDC, 2015b, p. 1)

This was confirmed by Wald and his colleagues in their study titled “Indwelling Urinary Catheter Use in the Postoperative Period”. They found that 86% of 30 947 patients sampled for the study had a perioperative urinary catheter (Wald *et al.*, 2008, p.554). The numbers were variant depending on the type of surgery: orthopedic surgeries (38%), cardiac surgeries (28%), vascular surgeries(12%), and 22% for GI surgeries (Wald *et al.*, 2008, p.554). Urinary catheters are frequently used in genitor-urinary surgeries to keep an eye on urine output and to prevent urine withholding (Dunn, Shlay and Forshner, 2008, p. 45).

The studies done in 66 hospitals of Europe and 183 US hospitals highlighted that the IUC is the most used indwelling medical device in Europe (17.5%) and in the USA (23.6%). 45-79% of patients having a urinary catheter in place were hospitalized in an adult critical care unit, 17% hospitalized in the medical ward, and 9% in rehabilitation units (Lindsay, 2014, p. 1).

In Australia, the study conducted in Concord Repatriation General Hospital (CRGH) highlighted that the incidence of patients using the urinary catheter by wards was as higher as 87% in CCU, 42% in burns unit, 33% in colorectal, 21% in urology plastic surgery, 20% in orthopedics and psychogeriatrics, 12% in acute geriatrics, rehabilitation, and renal ward respectively. The incidence was as low as 4% in hematology/oncology, gastroenterology/upper GI and neurology/neurosurgery (So *et al.*, 2014, p. 69).

The closed link between urinary catheter and UTIs has been established in many studies (Meddings *et al.*, 2008, p.552; Muvunyi *et al.*, 2013,p.9;Saint *et al.*, 2010, p.227; Trautner and Darouiche, 2010, p.842; Wald *et al.*, 2008, p.551) and associated health complications such as

increased period for hospitalization and excessive loss of patients' incomes, high morbidity rate and increased number of deaths related to UTIs (CDC, 2009, p.1; Klevens *et al.*, 2007, p.160; Lindsay, 2014, p.1; Meddings, Rogers, *et al.*, 2014, p.277; Saint *et al.*, 2010, p.877; Trautner and Darouiche, 2010, p.843; Wałaszek, 2015, p.508; Wald *et al.*, 2008, p.552).

The CAUTIs are commonest challenging health care associated infections (Labib and Spasojevic, 2013, p. 1; Nicolle, 2014, p. 2). The study done in the USA revealed that UTIs rate was more than 560 thousand, with a mortality rate of 2.3% compared to other diseases. Another study in CCU of USA elicited that up to 95% of UTIs were caused by an IUC (Trautner and Darouiche, 2010, p.843). UTI was the main cause infections of secondary nosocomial blood stream (17%). Seventeen percent (17%) of bloodstream infections and 69% of CAUTI are prevented by implementing infection control guidelines (Trautner and Darouiche, 2010, p. 844; Xie *et al.*, 2011, p. 297).

The CAUTIs are the 4th most frequent infection in the USA accounting 12.9% of health care infections (Lindsay, 2014, p.1) and the 2nd cause of bloodstream nosocomial infection while the first cause is a central venous line (Trautner and Darouiche, 2010, p.843). The same prevalence study revealed that 67.7% of the patients were exposed to IUC. In Europe, a prevalence study found out that 1.3% of patients had UTIs, corresponding to 17.2% of all HCAs. It is the third most frequent infection (Lindsay, 2014, p.1).

In china, the prevalence surveys of HCAs conducted in 13 hospitals revealed that UTI was the 3rd most common infection (Xie *et al.*, 2011, p. 297) with the incidence rate of 15.8%. Among 100 patients with UTIs, 72 of them were having a catheter in use (Xie *et al.*, 2011, p. 297).

Few studies are done on the perioperative use of a urinary catheter. A study done by Wald and colleagues at 2965 acute care USA hospitals to illustrate the incidence and length of IUC used in perioperative period, to find out the association between IUC and postoperative outcome found out that 86% of patients undergone major operations had a perioperative indwelling catheter and 50% of them lasted longer than 2 days after surgery which doubled the risk of UTIs

compared to one whom the catheter lasted 2days or less (Wald *et al.*, 2008, p. 551). The study revealed that among operated patients with a postoperative urinary catheter, 82% was having a catheter removal order documented. The mean days was variant among patients, from 2.5 days in orthopedic operations to 5.1 days for GI operations (Wald *et al.*, 2008, p. 551)

It was illustrated that UTIs are the 3rd frequent post-operative complications. IUC contributes to 80% of postoperative UTIs (Wałaszek, 2015, p. 509). A study done in the USA since 2006 to 2012 highlighted some risks factors for CAUTIs among cardiac operated patients revealed that 1.1% of 4,883 patients undergone cardiac operations developed CAUTIs as health care-associated infection. The most common identified bacteria were *Candida albicans* (26.6%), *Enterobacter cloacae*, and *Escherichia coli* (73.4%). The main associated risk factors that the study has identified were old age, female gender, and diabetes mellitus (Gillen *et al.*, 2015, p. 504).

2.3.2. An inappropriate use of urinary catheter according to standards

Any catheter that was placed for inappropriate indication, using inappropriate size of catheter or technique and kept in place for prolonged time without indication was considered inappropriate according to CDC standards (Gould *et al.*, 2009).

The research done by Hu and colleagues on the use of IUC revealed that 52.8% of used IUC among old clients were found to be inappropriate, mostly observed in the female and surgical patient and mostly for lessening required nursing cares (Hu *et al.*, 2014, p. 2).

The duration of catheterization was confirmed as a primary risk factor of CAUTIs by Xie *et al.* (2011), 30-day postoperative mortality, and decreased the chance to discharge to home (Heidi L. Wald *et al.*, 2008, p. 551). In their study, Wald and colleagues found out that a half (50%) of perioperative IUC were kept in place more than 48 hours after surgery which doubled the risk of UTIs compared to one whom the catheter lasted 2days or less (Wald *et al.*, 2008, p. 551).

By reducing the duration of the postoperative catheter, the postoperative UTIs, hospital stay and cost, rehospitalization, abusive use of antibiotics will be reduced respectively and increase the

early mobility of patients (Wald *et al.*, 2008, p. 556). The immediate removal of urinary catheter after surgery had no negative outcome. Less pain was reported compared to one whom their catheter lasted 24 hours and more (Dunn, Shlay and Forshner, 2008, p. 45).

To reduce IUC utilization, the lists to limit UC use to appropriate indications and order the immediate removal of UC when is no longer appropriate are appropriate solutions (Meddings *et al.*, 2016, p. 9). Other approaches to prevent inappropriate IUC use are policies and guidelines for IUC placement, catheter selection and catheter cares , continuous monitoring of CAUTIs and IUC utilization and recommended indicators for quality improvement (Lindsay, 2014, p. 4).

The Avoidance of unnecessary catheter use is the key strategy to prevent CAUTIs (Meddings, Rogers, *et al.*, 2014, p. 279), HICPAC provided a list of appropriate indications to prevent unneeded placement of urinary catheters (stage 1 of lifecycle of catheter) and recommend immediate removal of unneeded catheter (stage 3 of lifecycle of catheter). These indications can be adapted by institutions to include other indications from their opinions and special cases (CDC *et al.* 2010, p.12; Elpern *et al.* 2009, p.537; Fakhri *et al.* 2013, p.6; Fakhri *et al.* 2012, p.11; Gould *et al.* 2009, p.10; Lindsay 2014, p.2; Meddings, Krein, *et al.* 2014, p.3; Meddings, Rogers, *et al.* 2014, p.279; Meddings *et al.*, 2016, p.8).

A meta-analysis study on reducing unnecessary IUC use and interventions highlighted that to address stage 1 of catheter lifecycle in restricting IUC placement and stage 3 in removing unnecessary catheters, some strategies have been successful elements in the multimodal interventions to reduce IUC use and CAUTIs. These strategies included (1) hospital or unity policy on UC placement that emphasize on appropriate indications of urinary catheter, (2) printed catheter orders with limited indications, (3) alternatives to IUC use like condom catheter; (4) in and out UC, (5) use of portable bladder ultrasound prior to catheterization (Meddings, Rogers, *et al.*, 2014) and other protocols for catheter placements like (6) A physician order for indwelling urinary catheter required before placement of a urinary catheter,

(7) utilization of displaceable ultrasound to assess the need for post-operative catheter, (8) remove as soon as possible the IUC, (10) an electronic reminder for nurse and physician and (11) stop-order for catheterizations to decrease unnecessary catheters (Hooton *et al.*, 2010, p. 626).

2.4. CRITICAL REVIEW AND RESEARCH GAP IDENTIFICATION

An IUC is the most used device worldwide. Its association with urinary tract infection was established and CAUTIs is the 3rd common postoperative infection in addition to postoperative pneumonia and surgical site infection. None placement of the urinary catheter is the only way of preventing IUC associated infections. Inappropriate utilization of IUC has been discovered in many studies especially the inappropriate indications. However the utilization of urinary catheter among patient undergoing surgery was less studied. At Kigali university teaching hospital, the use of IUC was not studied, a little is still known.

2.5. CONCEPTUAL FRAMEWORK

A lifecycle of urinary catheter, a conceptual model of the appropriate IUC use

A lifecycle of the urinary catheter was used for its 4 targets area for interventions to reduce IUC placement and CAUTIs and to improve appropriate utilization of a catheter. To assess appropriate placement of IUC, an emphasis is made on these 4 targets areas which are catheter placement, catheter cares, catheter removal and catheter replacement after removal of prior catheter (figure 2.1) (Meddings, Rogers, et al. 2014, p.278). Catheter is a conceptual model adopted to guide this study especially the stage one and the stage three (figure 2.1). Only the stage one and the stage three (figure 2.1) were adopted to guide this study.

The lifecycle of catheter starts with preliminary insertion of IUC. The IUC is left in place for a certain period, and it is removed when is not needed. The cycle restarts by replacement of IUC after removal of the previous catheter (Meddings, Rogers, *et al.*, 2014, p. 278).

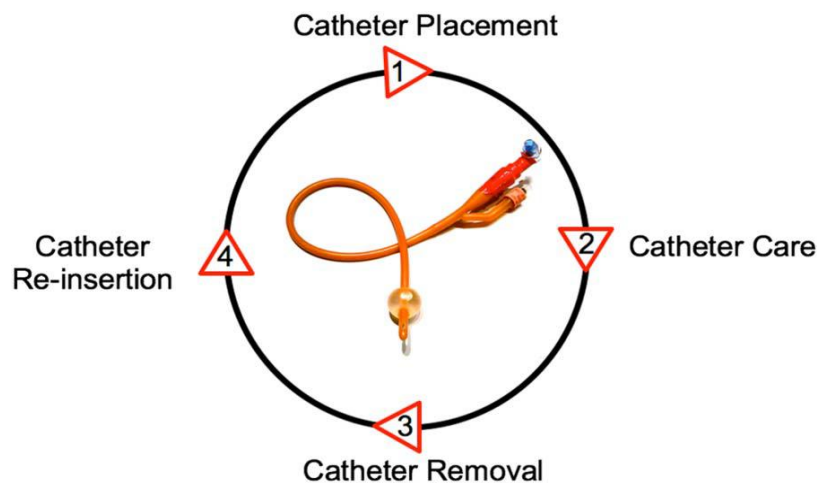


Figure 2.1. lifecycle of urinary catheter, a conceptual model of appropriate IUC use

(Meddings, Rogers, et al., 2014, p 278).

The lifecycle of urinary catheter is a conceptual model that serves as a frame of discussions and interventions on appropriate use of urinary catheter and CAUTIs prevention. By looking at this model, the premier target is catheter placement.

The appropriate placement of urinary catheter is guided by appropriate indication, presence and compliance to institutional policy for appropriate use of IUC, use of sterile technique and sterile equipment, hands hygiene and wearing gloves, patients conditions/ or characteristics and availability of alternatives as recommended by CDC (Fakih *et al.*, 2012, p. 10).

Many interventions to promote an appropriate use of IUC and prevention of CAUTIs tackle the non-placement of an unnecessary urinary catheter as vital intervention (Meddings and Saint, 2011, p. 279). Center for diseases control developed guidelines and standards for appropriate use of catheter including the appropriate indications of IUC use, alternatives to used and recommends immediate removal of unnecessary IUC (Elpern *et al.*, 2009, p. 536; Fakih *et al.*, 2012, p. 11). Establishing bladder bundle, Physician and nurses trainings on bundle of urinary catheter cares, alternatives of IUC and use of bladder ultrasound for assessing urinary retention, avail personnel for addressing extra time needed for caring patient with incontinence have found to be effective in reducing the placement rate of urinary catheter (Meddings and Saint, 2011, p. 1292). CDC also recommends that a catheter should be placed by well-trained

personnel with physician order to promote its appropriate use. This catheter should be used in operated patients only when necessary rather than routinely (Gould *et al.*, 2010, p. 10). Aseptic technique and sterile equipment and supplies will be used when placing a urinary catheter (Fakih *et al.*, 2012, p. 18).

The second stage of urinary catheter Lifecycle model is catheter cares (Meddings and Saint, 2011, p. 1292). The urinary catheter, once it is in place needs special care and monitoring to prevent CAUTIs and other complications. CDC recommends that IUC system have to be well connected and catheter- tube junction well sealed, unblocked flow of urine, fixing the urine bag at low level of the bladder, emptied regularly, daily cleaning of per urethral area and use of personal proactive equipments when caring a catheterization system (Gould *et al.*, 2010, p. 18).

The 3rd step of the model is catheter removal (Meddings,Rogers, et al., 2014, p.275). CDC recommends that IUC should be removed immediately after surgery; without exceeding 24 hours (Gould *et al.*, 2010, p. 18). As the catheter is in place, risk to be forgotten is increased. The electronic reminder, stop-order, and adding IUC on routine assessment checklist interventions have found to be effective in preventing the risk (Skelly, 2008, p. 119). A hospital should design a stop order or reminder to aware physician and nurses to remove the catheter (Meddings and Saint, 2011, p. 1293) .

The 4th stage of the catheter lifecycle model is catheter reinsertion (Meddings and Saint, 2011, p. 1292). To avoid unnecessary replacement of catheters, it is recommended that a bladder ultrasound should be performed to assess the urinary retention (Gould *et al.*, 2010, p. 10).

As many interventions to prompt appropriate indwelling urinary catheter (IUC) use, prevention of CAUTIs and other Catheter-related complications focused on stage 1 and stage 3 of the cycle (Meddings,Rogers, et al. 2014, p.276), this study also focused on catheter placement indications (stage 1) and catheter removal (3stage).

This study assessed the urinary catheter placement and removal. The catheter placement was be guided by IUC placement rate, indications for IUC placement, types of surgeries and individual

characteristics and compliance with institutional policy for appropriate use of IUC or medical order for inserting the catheter. The catheter care, catheter insertion technique, and catheter replacement were not assessed in this study. Regarding the IUC removal, this study assessed whether the IUC was either removed immediately in operating room when is no longer required or a documented order for IUC removal in the postoperative period was present.

From this conceptual model, a study conceptual framework was developed.

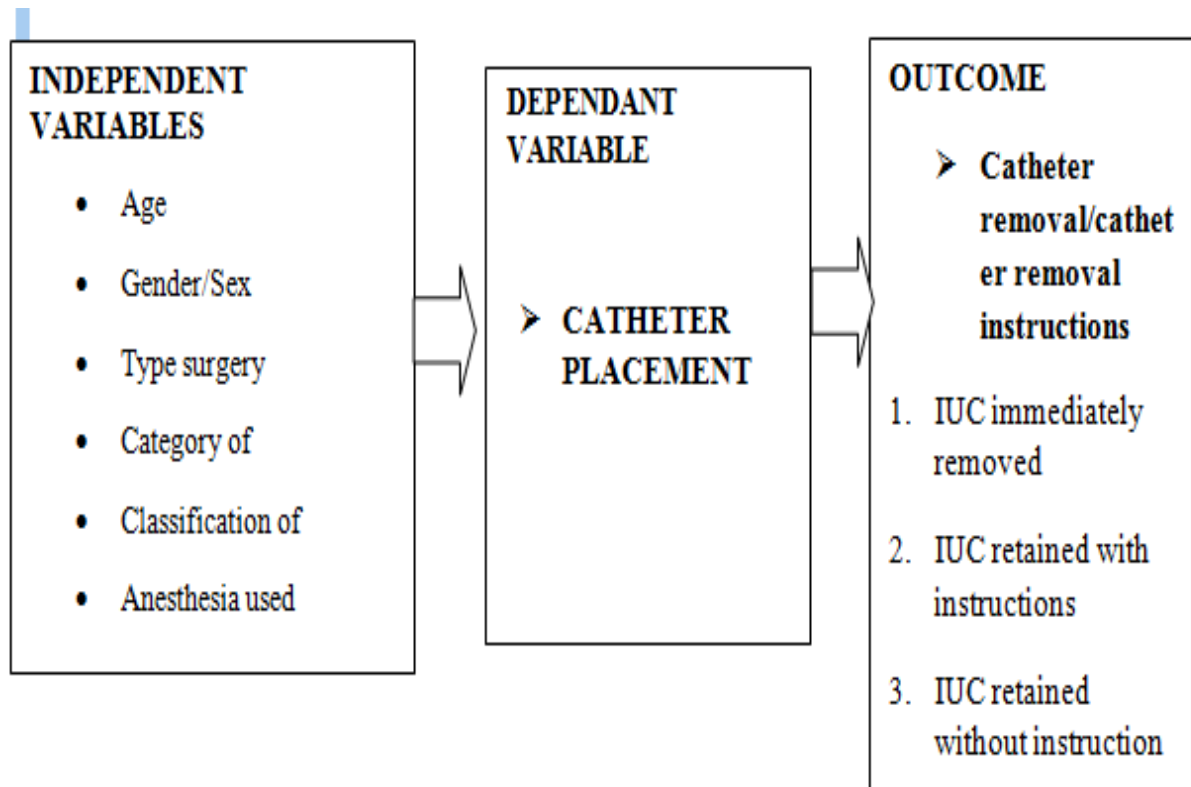


Figure 2. 2. Study conceptual framework

2.6. CONCLUSION OF CHAPTER 2

The 3rd chapter presented the theoretical framework for the study, empirical literature, the gap in the literature review and the conceptual framework that will guide this study.

CHAPTER 3: METHODOLOGY

3.1. INTRODUCTION

The chapter 3 of study titled “Assessing indwelling urinary catheter use among patients undergoing surgery at Kigali university teaching hospital” presents the study area, study design, study population, sampling strategy, study sample, data collection methods and procedures to be used, data analysis, problems and limitations of the study and ethical considerations.

3.2. STUDY DESIGN

To achieve the purpose of this study, a cross-sectional study design was used during this study. The data were collected once on different patients operated from 1st March to 27th April 2017 and analyzed. A study design was explain as blueprint for conducting a study to maximize control over the factors that can interfere with findings’ validity. A cross-sectional study design means that the study was designed to explore and describe a phenomenon in real-life situation; it provides knowledge about a particular field within the study and provides a picture on how a situation naturally happens. It doesn’t examine the sequence of a phenomenon within time or compares groups. The data is collected at a particular point in time (Burns and Grove, 2007, pp.24, 237–242).

3.3. STUDY APPROACH

Quantitative research approach was used during this study. Quantitative data were collected.

Quantitative approach is described as a formal, rigorous, objective, systematic process for generating information about the world. It is conducted to describe the new situation, events, and concepts in the world (Burns and Grove, 2007, p.24).

3.4. STUDY SETTING

This study was conducted at operating theater of Kigali university teaching Hospital (CHUK). CHUK is one of 5 referral hospitals that admitted patients referred from district hospitals for sophisticated assessment, diagnosed and treatment. It is at central level of health system, with responsibility to support technically the peripheral hospitals. It is located in Nyarugenge district, Nyarugenge sector, Kiyovu Cell. This hospital has two operating theaters. One is reserved for

maternity unit. The Obstetrics and Gynecology cases are operated in this operating room. The other cases are operated in the main operating theatre. Both main theater and maternity theater were expected to receive 220 clients and 200 clients respectively on average per month which constituted a study population for the study. Different types of surgeries are performed in this hospital. The way the IUC is used at this hospital may reflect the way the district hospitals are supported in appropriate use of IUC and CAUTIs prevention and other catheter associated complications. It was this reason CHUK was selected for study. Study setting is a place or a location in which the study is conducted (Burns and Grove, 2007, p. 352).

3.5. STUDY POPULATION

The target population of this study was made of all patients admitted for surgery, for different diagnoses, different groups of age and from different backgrounds. The accessible population for this study was 420 patients that Kigali teaching hospital was expected to admit per month. This population included 220 patients for the main operating theater and 200 patients for maternity operating theater in average per month. The study population is set of elements or people that are meeting selection criteria in which the study sample will be selected and findings will be generalized, also named target population of the study. The accessible study population is also described as a portion of target population to which the researcher has a reasonable access (Burns and Grove, 2007, pp. 237–242).

3.6. SAMPLING

Sampling is a process of selecting a group of people, behaviors, events or other elements with which to conduct a research (Burns and Grove, 2007, p. 324).

3.6.1. Sample Size

The recommended sample size from 420 patients expected to be admitted in Kigali teaching hospital was 205 clients. This study sample was calculated using a simplified formula developed by Yamane in 1967 with the margin error of 0.5 and confidence interval of 95%.

$$n = \frac{N}{1 + N(e)^2}$$

These symbols stand for sample size (**n**), population size (**N**) and accepted margin error (**e**).

A number of 207 participants that were meeting the inclusion criteria were recruited for the study. A sample was described as a selected group of people or elements that are representing a study population (Burns and Grove, 2007, p. 324).

3.6.2. Sampling strategy

For this research, a convenient sampling strategy was used to get the expected number of participants. To prevent the selection bias and dispersions in data, the researcher recruited the participants that were meeting the inclusion criteria and available for surgery on the day of data collection. The same number of patients was recruited everyday of data collection. The 5 working days were considered so that the researcher would not recruit the patients for the same surgical procedures and the same surgeons. The sampling strategy or sampling plan is described as methods, process or plan which is used to select a representative sample for the study (Burns and Grove, 2007, pp. 237–242).

3.6.3. Inclusion and exclusion criteria

Inclusion criteria:

To participate in this study, a participant was a patient that was admitted in a theater for either emergency or elective surgery and whether the IUC was inserted in theatre or in ward for surgical purpose. An inclusion criterion is a set of characteristic necessary and essential for eligibility or membership in the target population. The participants or subjects of the study must possess the set criterion to be part of target population (Burns and Grove, 2007, pp. 237–242).

Exclusion criteria:

The patients admitted with an indwelling urinary catheter in situ that was not inserted for surgical purpose were not recruited for this study. The patients with intermittent catheters which

are inserted to empty bladder and removed immediately thereafter, condom catheters were not counted among patients exposed to perioperative indwelling urinary catheters. Exclusion criteria are the characteristics to a subject to be eliminated or excluded from the target population (Burns and Grove, 2007, pp. 237–242).

3.7. DATA COLLECTION

3.7.1. Instrument

To collect quantitative data, a pre-established observation checklist adopted from Catheter out project developed by Michigan university and sponsored by Agency for Healthcare Research and Quality (AHRQ) (Fakih *et al.*, 2012) was used to evaluate IUC use among patients undergoing surgery at Kigali university teaching hospital. This checklist collected data related to participant characteristics such as age, sex, type of surgery, classification and categories of the surgical procedures, and anesthesia used, the use of IUC in terms of the presence of a medical order for placing, indications, and IUC removal related data including immediate removal in case of inappropriateness and the physician order for removal. The checklist was developed to collect baseline data for appropriate use of an IUC at emergency department. Minor modifications such as detailed perioperative indications and demographic characteristics were done by the researcher to adopt it to the perioperative department after requesting the permission to the developers. Its content validity is confirmed by the relationship between conceptual framework, objectives of the study and variables to be assessed. The experts in research also approved the tool.

**Table3. 1. Relationship between conceptual framework, objectives and tool variables:
content validity**

Conceptual framework	Objectives	Tool's Variables
Catheter placement	To determine the prevalence rate of urinary indwelling catheter use	Questions 1,2,3,4,5,6and 7
	To Assess the indications for catheter insertion	Questions 8and 9
Catheter removal	To assess the removal order of postoperative Indwelling urinary catheter	Questions 10 and 11

To ensure the reliability of the tool after slight modifications, the instrument was pretested. The tool was piloted on 17 patients before starting the process of data collection. It was reliable with a Cronbach's Alpha coefficient based on Standardized Items of 0.851.

3.7.2. Procedures used

After getting the permissions from the ethic committee, university, and hospital to conduct the study, the researcher met the operating theater administrator and staffs to present the study and study purpose and tool to be used. The researcher explained to the participants the process of study while awaiting surgery in theatre. The participants were not under premedication and were able to consent. In the meantime, the researcher completed the study checklist. Urinary catheter removal order was obtained from the surgeon notes/ care instructions upon completion of the surgery. Each checklist was verified for completeness before the patient left theatre.

3.8. DATA ANALYSIS

After collecting data, data analysis system of Statistical Package for Social Sciences (SPSS) software version 16 was used to analyze quantitative data by using descriptive statistics and inferential statistics. Descriptive statistics were used to display data in frequencies and

percentages for characteristics of participants, prevalence of IUC use, indications for IUC use and IUC catheter removal and IUC removal instructions among patients undergoing surgery at Kigali university teaching hospital. The relationships between IUC prevalence and participants' characteristics, urinary catheter indications and removal instructions were analyzed using statistical tests such as Pearson chi square test and Fisher Exact test.

3.9. ETHICAL CONSIDERATIONS

Before conducting this study, ethical approval was sought and granted from CMHS IRB and CHUK IRB after checking its safety to patients. Kigali Teaching Hospital administration provided an approval to collect data. To keep the anonymity of collected data and participants, no name of participants were used. Only codes were used on checklists and computer. The researcher used to explain to the participants the purpose of the study, reassure them that data would be collected for research purpose and their confidentiality was respected by keeping them in personal computer locked with a password, just in numbers, not in names. The participation was voluntary after signing an informed consent form for adults in physical, psychological and mental ability to consent on it. For the critically ill patients, the informed consent was obtained from the next of kin and guardians or parents if children. These old children signed an assent form. The consent was obtained before administering anesthesia to the patient at waiting area. The participants had the right to withdraw from the study at any time without consequences.

3.10. DATA MANAGEMENT

After data collection on checklist, all checklists were collected and stored appropriated in locked cupboard. The data were entered into a computer which is secured with a password and external hard disc so that will not disappear. The obtained data will be discarded after 5 years.

3.11. DATA DISSEMINATION

As this study was conducted for the academic award, the findings will be presented at school panel to be awarded, and then published in a journal for public access to findings. The finding

will be also disseminated at Kigali University teaching Hospital. A researcher in collaboration with administration will arrange a staff meeting and disseminated the results.

3.12. LIMITATIONS

During this study, some limitations and problems were encountered. There was a limited time to collect data as planned due to unprecedented community outreaches planned by CHUK during the period of data collection. Consequently, fewer patients than was expected underwent surgery. To overcome the challenge, the sampling strategy was changed from systematic random sampling to convenient sampling strategy. In this regard, the extrapolation of the findings will not be generalized to other hospitals in Rwanda.

3.13. CONCLUSION OF CHAPTER 3

This chapter presented the methodology of research including research design, research approach, research setting, population, sampling strategy, sample size, data collection instruments & procedure, data analysis, ethical considerations, data management, data dissemination limitations and challenges of the study.

CHAPTER 4: RESULTS PRESENTATION

4.1. INTRODUCTION

This chapter presents the results from the study titled “Assessing Indwelling Urinary Catheter Use among Patients undergoing Surgery at Kigali University Teaching Hospital”. The data are presented in figures and tables, interpreted and discussed comparing them to the other studies. The findings are presented in sections corresponding to study objectives and include the characteristics of participants, the prevalence of indwelling urinary catheter, the indications for IUC insertion and IUC removal instructions.

The study was conducted in period of March 1st 2017 to April 23rd 2017 on 207 participants including 108 participants from main theatre and 99 participants from maternity theatre who provided their consent for participating in the research. The participants without IUC were removed for further analysis on IUC indications, and IUC removal.

4.2. THE DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

The demographic characteristics of the participants included age, sex, type of surgery performed, categories of the procedure, and anesthesia technique used (table 4.2). The study revealed that the majority of the respondents were females (58.45%, n=121), 15-35years old (55.1%, n=114) with mean age of 34.7years (SD: 17.7). The obstetrics &gynecology surgeries are the most (31.4%, n=65) performed procedures, followed by general surgeries (18.8%, n=39), laparotomy surgeries (16.9%, n=35) and orthopedic surgeries (16.4%, n=34). More participants underwent major (97.5%, n=203) and emergent (57.5%, n=119) surgeries performed under general anesthesia (58.5%, n=121) and regional anesthesia (40.6%, n= 84).

Table 4.2. Demographic characteristics of respondents

Variables	Values	Frequencies	Percentages
Age of respondent	<15 years	17	8.2%
	15-25 year	31	15.0%
	26-35 years	83	40.1%
	36-45 years	35	16.9%
	46-56years	13	6.3%
	56years and above	28	13.5%
Sex of respondent	Female	121	58.5%
	Male	86	41.5%
Type of Surgery performed	Urology	6	2.9%
	Obstetric & gyn	65	31.4%
	Orthopedics	34	16.4%
	Laparotomy	35	16.9%
	General	39	18.8%
	ENT	16	7.7%
	Neurology	12	5.8%
Categories of Procedure performed	Minor	4	2.5%
	Major	203	97.5%
Classification of procedure	Emergent	119	57.5%
	Elective	88	42.5%
Type of anesthesia used	Local anesthesia	2	1.0%
	Regional anesthesia	84	40.6%
	General anesthesia	121	58.5%
Total		207	100%

4.3. THE PREVALENCE OF INDWELLING URINARY CATHETER AMONG PATIENTS UNDERGOING SURGERY

This section presents the prevalence of IUC use among patients that underwent surgeries, whether placed in operating theatre or in ward for surgical purpose. The prevalence of IUC use was measured by age, sex, type of surgery performed, category of surgery, and classification of surgery, type of anaesthesia and place of catheter placement.

4.3.1. Overall prevalence of indwelling urinary catheter use

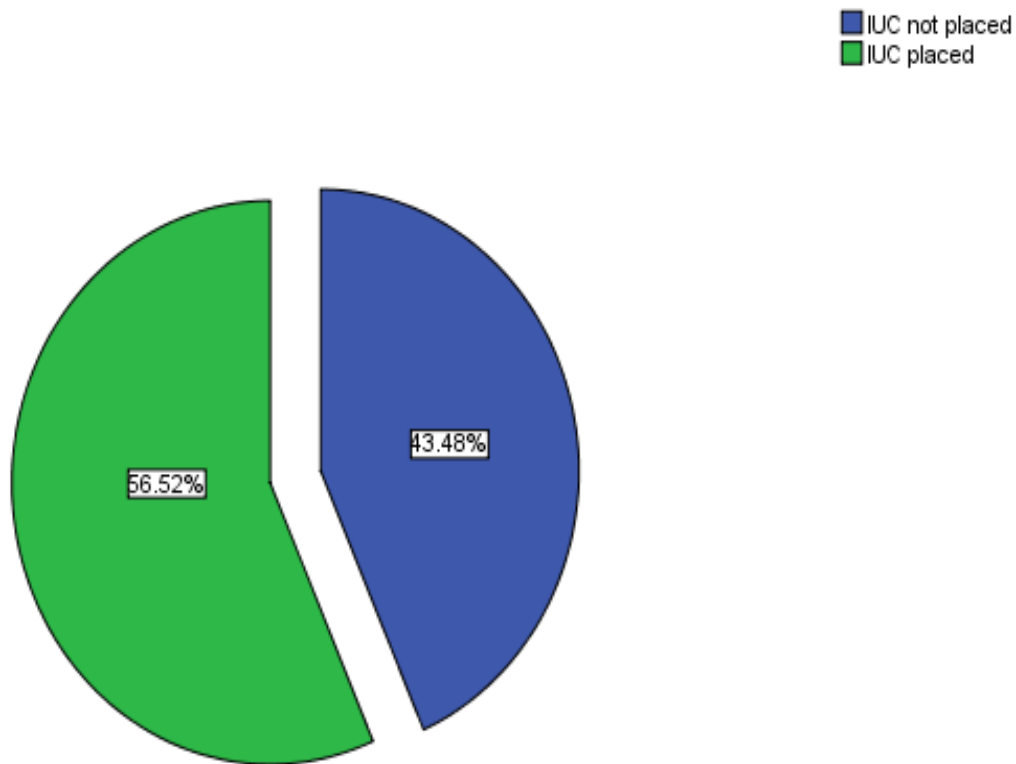


Figure 4.3. Total prevalence of IUC use

As presented in figure 4.2, the IUC is not routinely used in perioperative cares. Among 207 study participants, only 56.5% of them (n=117) were exposed to perioperative indwelling urinary catheter.

4.3.2. Prevalence of indwelling urinary catheter use by Age

As presented in table 4.3, more than a half of the IUC were used in group of 26-35 years (55.6%, n= 65) compared to other groups of age. Age is statistically significant for IUC use ($\chi^2=2.070$, P-Value: <0.001). The main contributing age group is 26-35 years aggregate (P-Value is 0.005).

Table 4.3 Prevalence of indwelling urinary catheter use by Age

Age of respondent, n (%)	IUC USE		n	P-value
	IUC placed	IUC not placed		
<15 years	1(0.9)	16(17.8)	17	0.012
15-25 year	15(12.8)	16(17.8)	31	0.902
26-35 years	65(55.6)	18(20)	83	0.005
36-45 years	16(13.7)	19(21.1)	35	0.735
46-56years	6(5.1)	7(7.8)	13	0.819
56years and above	14(12)	14(15.6)	28	
Total	117	90	207	<0.001

As illustrated in the table 4.4 the IUC prevalence is higher in females (74.4%) than in males (25.6%) and Sex is significantly associated with IUC placement ($X^2=28.03$, P-Value is <0.001).

4.3.3. Prevalence of indwelling urinary catheter use by sex

Table 4.4. Prevalence of indwelling urinary catheter use by sex

Sex of respondent n (%)	IUC USE		n	P-value
	IUC placed	IUC not placed		
Female	87(74.4)	34(37.8)	121	<0.001
Male	30(25.6)	56(62.2)	86	
Total	117	90	207	<0.001

4.3.4. Prevalence of indwelling urinary catheter use by type of surgery performed

The prevalence of IUC depended directly to the procedure as presented in table 4.5. IUC was routinely used in obstetrics and Gynecology surgeries (93.8%, n=61), Laparotomy (85.7%, n=30), Urology and neurologic surgeries (66.7%, n=8) and not used at all in ENT surgeries. This relationship between IUC and surgical procedure was statistically significant ($X^2=1.13$, P-Value is <0.001).

Table 4. 5. Prevalence of indwelling urinary catheter use by type of surgery performed

Procedure specialties Type of Surgery performed, n(% within procedure)	IUC USE			P-value
	IUC placed	IUC not placed	n	
urology	4(66.7)	2(33.3)	6	<0.001
Obst &Gyn	61(93.8)	4(6.2)	65	<0.001
Laparotomy	30(85.7)	5(14.3)	35	<0.001
Orthopedic	9(26.5)	25(73.5)	34	<0.001
neurosurgery	8(66.7)	4(33.3)	12	<0.001
general	5(12.8%)	34(87.2)	39	<0.001
ENT	0	16(100)	16	<0.001
Total	117	90	207	<0.001

4.3.5. Prevalence of indwelling urinary catheter use by category, classification of surgery and anaesthesia used

Among 117 participants exposed to IUC, 97.5% of them were operated for major surgery but the IUC placement rate is low as 57.1% within the participants operated for major surgery (table 4.6), and category of procedure is not statistically significant for IUC prevalence (Fisher's Exact Test, P-value is 0.319). However, 73.1% of participants within emergent procedures were

exposed to IUC. The IUC was found to be significantly associated with class of procedure (χ^2 : 31.341; P-value: <0.001, 95% CI). The IUC prevalence is as high as 70.6% among patients operated under Spinal anesthesia with statistical significance (P-value is 0.001). The relationship between IUC use and type of anesthesia used is statistically significant (Fisher's Exact Test: 22.4, P-value is 0.002).

Table 4. 6. Prevalence of indwelling urinary catheter use by category and classification of surgery and anaesthesia used

Variables	IUC USE			n	P-value
	IUC placed	IUC not placed			
Category n (%)					
minor surgery	1(25)	3(75)	4		
Major surgery	116(57.1)	87(42.9)	203		0.319
Class n(%)					
Emergent	87(73.1)	32(26.9)	119		<0.001
Elective	30(34.1)	58(65.9)	88		
Anesthesia n(%)					
Local anesthesia	0	1(100)	1		
Regional anesthesia	60(70.6)	25(29.4)	85		0.001
General anesthesia	57(47.1)	64(52.9)	121		
Total					0.002
Total	117	90	207		

4.3.6. Prevalence of indwelling urinary catheter use by place of catheter placement

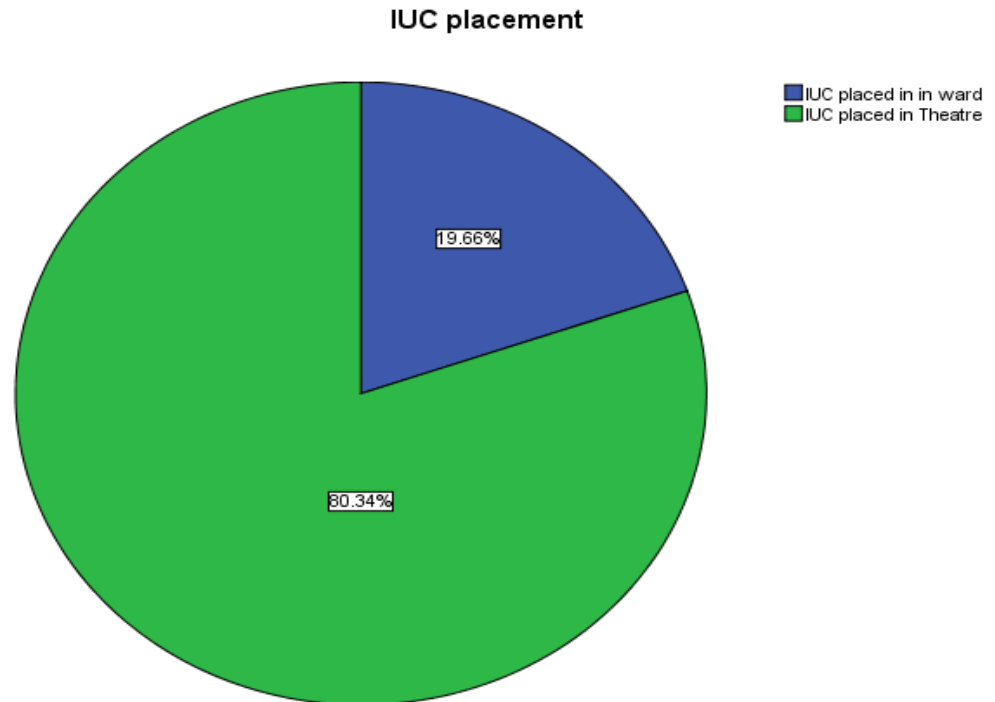


Figure 4.4. Prevalence of indwelling urinary catheter use by place of catheter placement

This figure 4.3 highlighted that the majority of IUC were placed in operating room (80.3%, n=94).

4.4. THE INDICATIONS FOR IUC INSERTION

This section presents the indications for IUC placement and the presence of medical order. For appropriate use of IUC, the presence of medical order and appropriate indications for IUC placement and timely removal of IUC are the critical elements.

4.4.1. The appropriateness of catheter use among patients who had catheter

The findings presented in the table 4.7 highlighted that among 117 placed IUCs either in operating room or in hospitalization wards, 95.7% of them were placed for appropriate indications (statistically significant, $F=37.3$, $p\text{-value}<0.001$), 50 IUCs (42.7%) were placed for Surgery contiguous to genitourinary track to prevent bladder injuries, 19.6% (n=23) for emergent surgery with anticipated large fluid resuscitation, and 15.3% (n=18) for Intraoperative Urine output monitoring.

Table 4. 7. Appropriateness of indwelling urinary catheter by indications

Indication of IUC	Appropriateness of indications		n
	inappropriate indication	appropriate indication	
urologic surgical procedure	-	7	7
surgery contiguous to genitourinary track	-	50	50
emergency surgery with anticipated large fluid resuscitation	-	23	23
prolonged duration of surgery	-	6	6
Intraoperative Urine output monitoring	-	18	18
Need for immobilization	-	6	6
Sacral or perinea wounds in incontinence	-	2	2
Fluid monitoring in non critical patient	1	-	1
Incontinence	2	-	2
immobility not related to trauma	2	-	2
Total	5(4.3%)	112(95.7%)	117

The table 4.8 Illustrated that among 117 participants that were exposed to catheter, 72 (61.5%) were having a documented physician order for IUC placement and 94 IUCs (80.3%) were placed in theatre. However, The Presence of Physician order is statistically associated with IUC use (Pearson Chi-Square test, two-sided, P-value is <0.001) but did not affect weather IUC was placed in Theatre or in ward (Pearson Chi-Square test, two-sided, P-value is 0.686).

Table 4. 8. IUC placement by Presence of Physician order

Presence of Physician order, n (%)	IUC placement		Total
	Yes, in Theatre	yes, in ward	
YES	57(79.2)	15(20.8)	72(61.5)
NO	37(82.2)	8(17.8)	45(38.5)
TOTAL	94(80.3)	23(19.7)	117(100)

4.5. THE IUC REMOVAL AND REMOVAL INSTRUCTIONS.

Table 4.9. IUC removal instructions

IUC removal instructions	Frequency	Percent
removal within 24hours(1)	32	27.4
Above 24hours to 48 hours (2)	14	12.0
More than 48 hours (3)	1	.9
No removal instructions (4)	66	56.4
Any Other (5)	4	3.4
Total	117	100.0

As presented in this table 4.9, 66 (56.5%) of participants with IUC in place were not having a documented removal instructions. Only 32 (27.3%) were supposed to be removed within 24 hours, 14 (12%) in above 24hours to 48 hours.

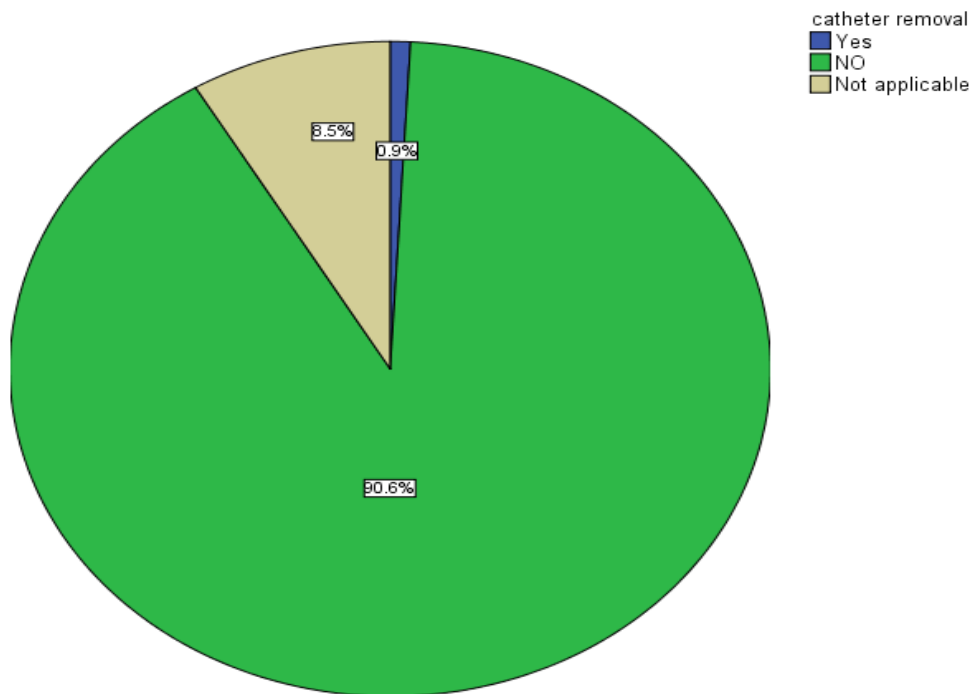


Figure 4.5.IUC removal after surgery

The finding from this study revealed that before discharging the patients from PACU to their respective wards of hospitalization, only one catheter (0.9%) was removed among 107 IUCs that were judged unnecessary basing on available evidences and CDCs recommendations

(Gould *et al.*, 2009) and clinical status of the participants. Other 10 IUCs (8.5%) were still indicated.

There was a link between non removal of IUCs and the IUC removal instructions. As presented in table 4.10, among the 117 placed IUCs in operating room or hospitalization ward for surgical purpose, none of them had an immediate removal instruction.

Table 4.10. Catheter removal instructions by Types of Surgery performed

Type of Surgery performed n (%)	catheter removal instructions					n
	removal within 24hours	Above 24hours to 48 hours	More than 48 hours (4)	No removal instructions (5)	Any Other (6)	
Urology surgery	0	1(25)	0	3(75)	0	4
Obstetric surgery	29(54.7)	7(13.2)	0	15(5)	2(3.8)	53
Laparotomy surgery	1(3.3)	4(13)	1(3.3)	22(73.3)	2(6.7)	30
Gynecology surgery	2(25)	2(25)	0	4(50)	0	8
Orthopedic surgery	0	0	0	9(100)	0	9
Neurologic surgery	0	0	0	8(100)	0	8
General surgery	0	0	0	5(100)	0	5
Total	32(27.4)	14(12)	1(0.9)	66(56.4)	4(3.4)	117

This Cross tabulation in table 4.10 shows that the IUCs that used for obstetric surgeries had short duration. They are 90% of IUCs to be removed with 24 hours and 54.7% within the obstetric procedures. However, Urology surgery (75%), Laparotomy surgeries (73.3%), Gynecology surgery (50%), orthopedic surgeries (100%), Thoracic surgeries (100%), Neurologic surgery (100%), and General surgery (100%) were not having removal instructions which should increase the unnecessary duration of IUC.

Table 4.11 the relationship between presence of physician order, performed procedures, indication of IUC placement and removal instructions.

Variables	Chi-Square	df	P-value
Physician order	3.532	2	0.171
Indication of IUC	10.959	18	0.896
Procedure	5.594	14	0.976

The relationship between Physician order, Indications of IUC, types of Procedure performed and instructions for IUC removal is not statistically significant (P-values is >0.05)

4.5. CONCLUSION OF CHAPTER 4

This chapter presented the results from study responding to the study objectives. The collected data included the demographic characteristics of respondents, the prevalence of IUC use among patients undergoing surgery by age, sex, procedures performed, their emergence and seriousness of surgery and anesthesia techniques used. They also presented the indications of IUC placement, their appropriateness, IUC removal and postoperative instructions for IUC removal. The study revealed that among 207 participants recruited for the study, 56.5% of them used IUC. Female sex, 26-35 years age, procedure such as Obstetrics &Gynecology, Laparotomy, urology & neurosurgery, major surgery, emergent surgery, Spinal anesthesia, and presence of physician order are significantly associated with IUC use, (P-value <0.001). The IUC were placed for appropriate indications (95.7%, p-value <0.001) but only one IUC (0.9%) was removed before patient left PACU. 56.5% of participants with IUC in place were not having a documented removal instructions and included cases of Laparotomy (73.3%), orthopedic surgery, neurologic surgery and general surgery (100% respectively).

CHAPTER 5. DISCUSSIONS OF THE RESULTS

5.1. INTRODUCTION

This chapter discusses the analysis and interpretation of the study results in relation to the existing literature and in relation to the study subject. The discussion is guided by the study objectives to include the demographic characteristics of the participants, prevalence of indwelling urinary catheter among patients undergoing surgery, the indications for IUC placement and an IUC removal and removal instructions

5.2. DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

The Demographic characteristics of the participants (table4.2) included age, sex, type of surgery performed, categories of the procedure, and anesthesia technique used.

Almost three quarters (73.3%) of the participants were aged between 15-45 years old. This ties in closely with the demographics from National Institute of Statistics of Rwanda (2015, p.2) in which 71.6% of total population is aged between 15-34 years old. However, the slight difference observed may be attributed to the type of surgery which dominated. Most of the participants were of child bearing age and underwent obstetric surgeries (31.4%). The other reason could be partly due to the sampling method used. In light of the dominating surgical procedure, (58.45%) were female whose surgery necessitated the use of urinary catheters to protect the pelvic organs (Abdel-Aleem, Aboelnasr, Jayousi, *et al.*, 2014, p. 7). Elsewhere studies have shown the number of females undergoing surgery to be higher than that of males (Wald *et al.*, 2008, p.553; Nymana *et al.*, 2013, p.1592; Brouwer *et al.*, 2015, p.51). On the contrary, Wałaszek, (2015, p. 508) reported male dominance having studied neurosurgical patients only.

Besides , obs/gyn, other procedures performed included general surgeries, laparotomy surgeries and orthopedic surgeries. Most of these surgeries were classified major and emergent according

to CHUK protocol of surgical classification (table 4.2). Being a teaching and referral hospitals, CHUK quite often receives category of patients who require major operations and more often referrals from smaller health institutions especially emergency caesarian section as was the case in this study. This is in agreement with global distribution of surgeries that estimated the higher proportion of emergent obstetric surgeries in low income countries, Rwanda included, in relation to cesarean deliveries (Weiser *et al.*, 2016, p. 201). Similarly, a study conducted in East African countries revealed that the scope of surgical procedures undertaken were narrow, including the emergent life saving procedures and obstetric surgeries are the most common performed procedures (Galukande *et al.*, 2010, p. 1).

The other surgeries performed in big portion included general surgeries (20.4%) and Gynecology surgeries (20.4%) (Raffaele *et al.*, 2008, p. 280). Brouwer *et al.*, (2015, p. 51) adds to the list abdominal surgeries, mainly laparatomies and orthopedic surgeries especially the extremities in tandem with this study. In contrast to African setting, Wald *et al.*, (2008, p.3) reported that orthopedic surgeries (38%), cardiac surgeries (28%), and gastrointestinal surgery (22%) were the most performed to USA hospitals. Urological and obstetric procedures were not included probably because they are scarce like cardiac surgery patients who were not included in this study because they are less performed in the Rwandan hospitals and were unavailable at the time of data collection.

General anaesthesia technique was the most used in this study followed regional anesthesia according to practice at CHUK in addition to patients considerations, similar to techniques used as reported in Brouwer *et al.* (2015, p. 51) study. In contrast, Nymana *et al.*, (2013, p.1594) study found that the majority of participants were operated under spinal anesthesia (70%) relating to that the study was conducted among patients undergoing hip surgery.

Rothrock (2015, p.127) asserts that factors that guide the choice of anesthesia should include “patient physiological status, presence and severity of coexisting diseases, patient’s wishes and

understanding of the types of anesthesia that could be used, patient's mental and psychologic status, postoperative recovery from various kinds of anesthesia, options for management of postoperative pain, type and duration of surgical procedure, patient's position during surgery and surgeon's particular requirements" among others.

5.3. PREVALENCE OF INDWELLING URINARY CATHETER AMONG PATIENTS UNDERGOING SURGERY

The prevalence of indwelling urinary catheter was calculated by dividing the number of patient with placed IUC by total number of operated participants, multiplying by 100 during data collection period. The prevalence of indwelling urinary catheter use among patients undergoing surgery at CHUK according to this study was (56.5%) (Figure 4.2). Prevalence was lower than the prevalence revealed by the previous studies (Conterno *et al.*, 2014, p. 169; Wald *et al.*, 2008, p. 553) that were dominated by cardiac surgeries contraly to the current study that was dominated by the obstetrics and gynecology studies in which catheter was used routinely to protect the pelvic organs. However, Brouwer *et al.* (2015, p. 49) study found that among the patients operated in different specialities ,IUC was needed by 8.6% depending to their bladder capacity and 11.8% without considering individual bladder capacity. This means that type, location and duration of the procedure determine the need for use or non use of IUC and confirmed by a routine use of IUC in some procedures such as obstetrics and Gynecology surgeries (93.8%), Laparotomy (85.7%) and the IUCs placed to empty bladder before pelvic surgery to prevent risks for bladder injuries and other pervic organes traumatisme and monitor input & out and fluids resuscitation for prolonged surgeries such as laparatomies. Similar to the previous studies by Wald *et al.*, (2008, p. 553); Raffaele *et al.*, (2008, p. 280); Nymana *et al.*, (2013, p.1593), and Brouwer *et al.*, (2015, p.51) the prevalence IUC use was found statistically significant in relation to the type of surgery, age, , cathegory of surgery and anesthesia

technique used and female sex except Brouwer *et al.*, (2015, p.51)'s findings where the sex is not significantly relating with use of IUC.

The regional anesthesia technique that provides a reversible loss of sensation in specific region or area (Rothrock, 2015, p. 130) and most used for procedures that do not require patients to sleep was found associated with postoperative urine retention (36.6% for regional Anesthesia vs 18.8% for general anesthesia) (Baldini *et al.*, 2009, p. 1149). This means the need for urinary catheter either to prevent injury during procedure or treat urine retention in post-operative period. The need of catheter relating to spinal anesthesia use contributes significantly to the prevalence of IUC use among patients undergoing surgeries. However, the guidelines for appropriate use of IUC recommend the suprapubic cystostomy and repeated or intermittent catheterizations than IUC for managing postoperative bladder emptying problems. The bladder scan is recommended to rule out that any intestines between the bladder and abdominal wall and bladder capacity before inserting catheter (Gould *et al.*, 2009, p. 15; Tammela, 2014, p. 1).

5.4. THE INDICATIONS FOR IUC INSERTION

Infection as a postoperative complication is the serious and critical to be underestimated as it threatens patients' lives and success of surgery (Nancy, 2017, p.20). CAUTIs have been identified as the 3rd most common postoperative infection (Walażek, 2015, p. 507). In this regard, (Nancy, 2017, p. 20) recommended that all perioperative patient care team should know and carefully apply the principles of aseptic and sterile techniques at all times during procedures. In the same light, CDC has provided guidelines on indications for IUC use and removal for specific surgical procedures to minimize CAUTI (Fakih *et al.*, 2012, p.11). The guidelines cite that perioperative IUC is indicated in selected surgical procedures of urology and structures contiguous to genitourinary tract, emergency surgery with anticipated large fluid resuscitation, prolonged duration of surgery, Intraoperative urine output monitoring in addition to other appropriate indications such as urine retention, need for immobilization and for

patients with sacral or perineal wounds who are incontinent. (Gould *et al.*, 2009, pp. 11–12), advocates that IUC placement should be performed under medical order and in theatre.

The findings of this study revealed that 95.7% of perioperative IUCs were placed for appropriate indications based on CDC guidelines surgery contiguous to genitourinary track (42.7%) such as gynecology and obstetrics procedures or urologic procedures and other pelvic procedures. In contrast, some studies have evidenced that IUC is not required in cesarean delivery, hysterectomy and other gynecologic procedures, if the patient is haemodynamically stable (Ghoreishi, 2003, p.267; Baldini *et al.*, 2009, p.1139; Bharti *et al.*, 2014, p.68 ; Pandey *et al.*, 2015, p.1). Patients are usually requested to void and empty bladder before surgery. Usually, for patients requiring catheter insertion during surgery, immediate removal after the procedure is recommended if the catheter is not required to remain in-situ in order to prevent postoperative CAUTIs and other related complications (Abdel-Aleem, H., Aboelnasr and Habib, F., 2014, p. 4),(Revello and Gallo, 2013, p. 66; Andrade *et al.*, 2016, p. 1).

Although CDC recommends that perioperative IUC be used for medical reason and not for routine or convenience of care (Gould *et al.*, 2009, p. 17; Fakih *et al.*, 2012, p. 11). Most studies have not ventured to assess the preoperative medical diagnosis and the duration of surgery that may guide the surgeon in deciding the use or nonuse of IUC. This study considered physician's order to assess appropriateness for IUC placement which was found only in 61.5% of the participants because it is not a common practice in CHUK.

5.5. THE IUC REMOVAL AND REMOVAL INSTRUCTIONS

The excessive duration of IUC after surgery was reported as the most frequent reason for inappropriate use of IUC (Raffaele *et al.*, 2008, p.280), and risk factor for postoperative CAUTIs. The chance for getting UTIs was twice higher for participants with catheter that lasted more than 2 days (9.4% vs 4.5%; P=0.004) (Wald *et al.*, 2008, p. 554). IUCs placed for surgical

purpose are to be removed immediately after surgery or as soon as they are no longer necessary, preferably without exceeding 24 hours as recommended by CDC(Gould *et al.*, 2010, p. 18).

The immediate removal of IUC after surgery was found to be effective in prevention of postoperative CAUTIs, urethra trauma, voiding related pain and facilitates early ambulation (Heidi L Wald *et al.*, 2008; Abdel-Aleem *et al.*, 2014; Joshi *et al.*, 2014; Dunn, Shlay and Forshner, 2008, p. 45). This study found out that 56.5% participants with IUC in place were not having a documented removal instruction and only 32 placed IUCs (27.3%) were ordered to be removed within 24 hours. Wald *et al.*, (2008, p. 551) in their study reported a higher rate of documented removal order compared to this study (80% versus 43.5% in this study) in addition, 46.7% of placed catheters had a duration lesser than 2 days versus 39.4% who had the removal order within two days in this study. The finding from this study also revealed that before discharging the patients from PACU to their respective wards of hospitalization, only one catheter (0.9%)was removed among 107 IUCs that were judged unnecessary basing on available evidences and CDCs recommendations (Gould *et al.*, 2009, p.3) and clinical status of the participants. The duration of postoperative IUC retention and factors associated with non immediate removal of catheter was not explored because it was not within the scope of the study.

However, prolonged duration of postoperative IUC was reported in previous studies associated with poor outcomes and complications (Dunn, Shlay and Forshner, 2008; Raffaele *et al.*, 2008; Bharti *et al.*, 2014; Pandey *et al.*, 2015; Alvarez *et al.*, 2016). The available guidelines are addressing indications in general and the evidences to support the need of IUC in each procedure are still needed. The medical condition of patients and the duration of surgery determine the need for IUC. Unfortunately, they were not assessed in this study.

5.6. CONCLUSION OF CHAPTER 5

Basing on the findings from this study and previous studies on perioperative use of IUC, little research is done on the perioperative use of IUC. Some studies were undertaken on special

surgeries like major surgeries (Wald *et al.*, 2008, p. 553), hip surgeries (Nymana *et al.*, 2013, p. 1592), cardiac surgery (Gillen *et al.*, 2015, p. 504) cesarean section (Ghoreishi, 2003, p. 268; Baldini *et al.*, 2009, p. 1149; Bharti *et al.*, 2014, p. 68; Pandey *et al.*, 2015, p. 78), neurosurgery (Walażek, 2015, p. 508), and hysterectomy (Dunn, Shlay and Forshner, 2008, p. 3; Bharti *et al.*, 2014, p. 68) assessing different outcomes.

CHAPTER 6. CONCLUSION AND RECOMMENDATION

6.1. INTRODUCTION

This chapter presents the conclusion and recommendations from the main findings of this study. It points out the areas for future research, what can be done to improve appropriate use of IUC, and the possible use of these findings.

6.2. CONCLUSION

The objectives of the study were achieved and the research questions were answered. The findings highlighted that the prevalence of using IUC among surgical patients at Kigali university teaching hospital was 56.5%. IUC was routinely used in obstetrics & gynecology, laparotomy, urology, neurologic, emergent surgeries, surgeries performed under Spinal anesthesia, females and 26-35 years old group.

The IUCs were placed for appropriate indications according to CDC guidelines such as surgery contiguous to genitourinary track, emergent surgery with anticipated large fluid resuscitation; intraoperative urine output monitoring and physician order was present in 61.5% of placed IUCs. The removal orders was absent in 56.5% of patient with catheter in situ predominantly in cases of laparotomy, orthopedic surgery, neurologic surgery and general surgery. Only 1IUC was removed before patients left the PACU. The duration of postoperative IUC retention and associated outcome were not assessed in this study

6.3. RECOMMENDATIONS

The IUC was routinely used in some procedures such as obstetrics and gynecology surgeries, Laparotomy, urology and neurosurgery. Therefore, the recommendations included:

- Annual periodic audit of IUC use and CAUTI among surgical patients for surveillance
- Formulation of policies governing IUC use in the perioperative period with emphasis on indications, insertion and removal protocols and IUC alternative.
- The assessment of duration of postoperative IUC retention and factors associated with non immediate removal of catheter
- Assessment of the medical condition of patient and the duration of surgery, risk factors for prolonged postoperative IUCs and the feasibilities of IUC alternatives.

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APPENDICES

1. STUDY CHECKLIST

Instruction

This checklist was developed to evaluate use of indwelling urinary catheter among patients undergoing surgery at Kigali university teaching hospital. A researcher will complete the checklist when the patient will be admitted in operating room and urinary catheter removal order will be checked when patient will be admitted in PACU.

This questionnaire has 3 sections. The first section is for demographic characteristics, the second section is for indwelling urinary catheter placement and indications of IUC placement and indications. Section three is concerned with removal of urinary catheter.

SECTION1. DEMOGRAPHIC CHARACTERISTICS

Patient code _____ Date _____

Question Number	Question	Observed Variables	
1	Age of Patient :	<15 years (1)	
		15-25(2)	
		26-35 (3)	
		36-45 (4)	
		46 -55 (5)	
		56 and above(6)	
2	Sex :	Female(1)	
		Male (2)	
3	Type of surgery:	Urology surgery (1)	
		Obstetric surgery (2)	
		Laparotomy surgery (3)	
		Gynecology surgery (4)	
		Orthopedic surgery (5)	
		Thoracic surgery (6) mass	
		Neurologic surgery (7)	
		General surgery(8)	
		ENT surgery (9)	
		Maxillo-facial (10)	
		Plastic surgery (11)	
		Others (12)	
4	Classification of surgery	Minor (1)	
		Intermediate(2)	
		Major(3)	
5	Emergence of the procedure	Emergent (1)	
		Elective (2)	
6	Type of anesthesia used	Local anesthesia (1)	

		Regional anesthesia (2)	
		General anesthesia (3)	

SECTION TWO: IS FOR INWELLING URINARY CATHETER PLACEMENT AND INDICATIONS.

Question Number	Question	Observed Variables	
7	Was Indwelling urinary (Foley) catheter placed	Yes, In theatre (1)	
		Yes, in Ward (2)	
		Not placed (3)	
8	If yes, Was the physician order present?	Yes (1)	
		No (2)	
		Not applicable (3)	
9	If IUC was placed, what was the indication? select only one reason	Urologic surgical procedures (1)	
		surgeries contiguous to genitourinary tract(2)	
		Emergency surgery with anticipated large fluid resuscitation (3)	
		Prolonged duration of surgery (4)	
		Need for intraoperative urine output monitoring (5)	
		Need for immobilization because of trauma with multiple fractures (e.g., pelvic fractures, hip fracture with risk of displacement) or unstable spine (6)	
		Urinary flow obstruction or retention (7)	
		Acceptable conditions per institutional guidelines(8)	
		Assist healing of sacral and perineal wounds in those with incontinence(9)	
		Dementia/chronic confusion? (10)	
		Debility (very frail patients) (11)	
		Monitoring fluids in non-critically ill patients (12)	
		Urine specimen collection (13)	
		Patient request(14)	
		Incontinence? (15)	
		Morbid obesity? (16)	
		Immobility not related to trauma ?(17)	
		Others (18)	
		Not applicable (19)	

SECTION THREE: REMOVAL OF URINARY CATHETER

Question Number	Question	Observed Variables	
10	If selected reason was	Yes (1)	
	inappropriate, was the urinary	No (2)	
	catheter removed?	Not applicable (3)	
11	What is the urinary catheter	Immediate removal (1)	
	removal order?	Removal within 24 hours(2)	
		Above 24hours to 48 hours (3)	
		More than 48 hours (4)	
		No removal instructions (5)	
		Any Other (6) specify -----	
		Not applicable (7)	

.....**End**.....

2.REQUEST FOR PERMISSION FOR USING AGENCY FOR HEALTHCARE RESEARCH AND QUALITY TOOLKIT

Request permission for using Catheter out data toolkit for reducing catheter associated urinary tract infections in Emergence department

MUKANTWARI JOSELYNE <mujoselyne@gmail.com>

05/11/2017

À kefowler

Dear Karen E. Fowler,

I am a student at University of Rwanda. I am doing master's program of perioperative nursing. I would like to evaluate a perioperative use of indwelling urinary catheter among patients undergoing surgery at Kigali teaching hospital.

I would like to request permission to use the data collection tool published in the document available on this website <https://catheterout.org/sites/webservices.its.umich.edu.drupal.Bladder%20Bundle/files/ED%20Urinary%20Catheter%202012%2002.27.2012.pdf.pdf>.

Some additions will be made to includes demographic characteristics of participants and perioperative indications of urinary catheter will be detailed.

I am looking forward your support.

Sincerely,

Mrs MUKANTWALI Joselyne

Fowler, Karen <kefowler@med.umich.edu>

Yes you have our permission to use the toolkit and modify the data collection tools as needed. Best of luck!

Karen

Karen E. Fowler, MPH
Project Manager - M-Safety Lab

VA Ann Arbor HSR&D Center for Clinical Management Research (152)
P.O. Box 130170
Ann Arbor, MI 48113-0170,

Phone: (734) 845-3611
Fax: (734) 222-7503

MUKANTWARI JOSELYNE <mujoselyne@gmail.com>

17/11/2016

À Karen

Dear Karen,

I would like to thank you for allowing me to use the tool. you will be acknowledged in this study.

Regards

3. INFORMATION SHEET

Introduction:

I am Joselyne MUKANTWALI; I am a candidate of master's program of perioperative nursing at University of Rwanda, college of medicine and health sciences, school of Nursing sciences. I am doing researcher on indwelling urinary catheter use among patients undergoing surgery at Kigali university teaching hospital which is the commonest used device in The Rwandan hospitals and mostly associated with infections and other complications. I would like to provide information on this study and encourage your participation in this research. If you met unclear information, do not hesitate to request more explanations to me or someone else in operating theatre.

Goal of the research

This study's aim is to assess the use of indwelling urinary catheter (IUC) among patients that are undergoing surgery at Kigali teaching hospital. IUC is a plastic cylinder that is placed in the bladder through urethra to remove continuously the urine for some time. From previous studies, it has been highlighted that IUC use was associated with UTIs contributing up to 40% of hospital acquired infections and other complications like injuries, painful urination, and prolonged hospitalization and associated cost, ineffectiveness of antibiotic drugs. Only non use of the urinary catheter and appropriate use that had been found to be effective to prevent the complications attributed to Indwelling urinary catheter. This catheter is likely to be used in Theatre without proper reasons. The findings from this study will help hospitals to find out the appropriate practice and improve quality of care to our customers in theatre. This study is also conducted for academic purpose as requirement to fulfill master's program in perioperative nursing.

Type of Research Intervention

There is no intervention. The researcher will assess whether the catheter has be inserted into the bladder or not. If inserted, the reason of insertion and time for removal of the catheter will be recorded.

Participant selection

I am inviting all patients that will undergo surgery at Kigali teaching hospital who will be admitted to operating theatre. The first patient of the day is selected for the study, then I escape one, and the 3rd is selected for the study and so on.

Voluntary Participation

It is your will to be or not be part of study. You choose to or not to involve yourself in this research. Your choice will not affect the follow up or care that you receive from the health facility.

Procedures and Protocol

During this research, you will not be asked any question. I will use a checklist to observe whether the catheter was inserted or not. Then check in your file the reason for insertion of catheter, type of surgery, and time to remove the catheter. I will be collaborating with the surgeon and nurses that cared for you during surgical procedure.

Duration

This research will last 1 month but you as a participant you will not be required to remain for one month. The data will be collected when you will be in recovery room which is the room you will stay 20to 30 minutes after surgery to observe any complication that may arise from anesthesia.

The potential risks or inconveniences of being in the study

There isn't any intervention to be done. So, there is no associated risk to participate to the study.

Benefits

If you participate in this study, there may not benefit you directly because there is not any reimbursement. This study is not sponsored. But later you will benefit from it receiving quality healthcares. Your participation will help use to find out the answer the research question that will benefit the whole community and future generation in preventing catheter associated infections and other complications, cost and antibiotic use. The country will save money for other purposes.

Confidentiality

During this research, the data will be collected in operating Theatre. It is not usual that we assess the use of catheter. Someone else may ask about what is happening but the researcher will keep confidential the collected information. The collected data will be kept confidential with codes and note names, the checklists will be stored in locked cupboard and password protected computer up to 5year. Then they will be destroyed.

Sharing the Results

As this study will be conducted for the academic award, the findings will be presented at school panel to be awarded; then disseminated at Kigali University teaching Hospital. A researcher in collaboration with administration will arrange a staff meeting and disseminated the results. Finally, findings will be published in a journal for public access to findings.

Right to Refuse or Withdraw

The participation in this research is voluntary. You should withdraw from study at any time you want. And this many not affect your treatment and other benefits from hospital.

Who to Contact

If any concern or question regarding the research, you may contact the researcher: MUKANTWALI Joselyne, at University of Rwanda, college of medicine and Health science (CMHS). Tel: 0788853576 E-mail: mujoselyne@gmail.com.

You may also contact the reviewing board of this project. Contact: proof. Gamut Jean Boaco +250783340040, Mr. Sunday Francois Xavier: +250788563311.

4. AMAKURU KU BUSHAKASHATSI

INTANGIRIRO

Nita Joselyne MUKANTWALI; node umunyeshuli muri kaminuza y'u Rwanda, muri koreji y'umuzima n'ubuvuzi. Ndi kwiga icyiciro cya gatatu cya kaminuza mu ishami ry'ubuforomo mu bijyanye no kuvura imbagwa/ abarwayi babazwe. Ndi gukora ubushakashatsi ku ikoreshwa ry'agapira kinjizwa mu muyoboro w'inkali mu barwayi babagirwa mu bitaro bikuru bya kaminuza bya Kigali.

Aka gapira rero kazwi nka “ urinary catheter” mu ndimi z' amahanga, dukunze kwita sonde, karakoreshwa cyane mu bitaro byose byo mu Rwanda mu gufasha kuyobora inkari mu gihe ugakoresha atabishoboye. Nubwo bwose aka gapira gafasha abarwayi gashobora gutera ibibazo bitandukanye aribyo gukomereka mu rwungano rw' inkari no kwandura indwara zitandukanye zo mu bitaro (infections).

Ngiye kugusomera amakuru yose ajyanye n'ubushakashatsi, mbonereho no kugusaba kwitabira ku bushake ubu bushakashatsi, umaze kubitekerezaho no kubaza ibibazo aho utasobanukiwe. Aho utumva neza, wemerewe kumpagarika ukambaza ikibazo nkagusobanurira cyangwa ukaba undi muganga cg umuforomo wo mu iseta.

Icyo ubushakashatsi bugamije

Intego y' ubushakashatsi nukumenya uko ikoreshwa ry' agapira bashyira mu mu muyoboro w' inkali mu barwayi bose babagirwa mu bitaro bikuru bya kaminuza bya Kigali. Sonde ni agapira ka parasitike bashyira mu ruhago kanyuze mu muyoboro w' inkali kugirango gasohore inkali kakagumamo muhihe cy' amasaha, iminsi cyangwa amezi.

Mu bushakashatsi bwakozwe mbere bwerekanye ko aka gapira gatera 40% y' indwara zandurira mu bitaro, n' ibindi bibazo byishi nko gukomereka mu mu muyoboro w' inkali, kubabara wihagarika, gutinda mu bitaro, gutakaza mafaranga menshi wivuzwa, gutuma imiti itakaza ubushobozi bwo kuvura, n' ibindi byinshi. Nta kundi wakwirinda izo ngaruka zose keretse kudagakoresha cyangwa kugakoresha neza aka gapira. Aka gapira gakunzwe gukoreshwa mu barwayi baje kubagwa akenshi bitari na ngombwa ko gakoreshwa. Amakuru tuzavana mu bushakashatsi azadufasha gukosora aho bizaba bitameze neza, kurinda izo ngaruka zose abagana ibitaro, no konoza serivisi nziza duha abatugana. Ubu bushakashatsi kandi bukozwe kugirango nuzuze ibisabwa kugirango mpabwe impanyabumenyi y' icyikiro cya gatau cya kaminuza.

Ikizakorwa

Nta cyo uzakorerwa kidasanzwe, umushakashatsi azareba ko bagushyizemo ako gapira cyangwa ntako bagushyizemo. Nibaba bakagushyizemo arebe mu ifishi yawe impamvu bakagushyizemo n' igihe bazagakuriramo.

Uko duhitamo abitabira ubushakashatsi

Umuntu wese uje kubagirwa mu bitaro bikuru bya kaminuza bya Kigali yemerewe kwitabira ubushakashatsi. Umurwayi uje bwa mbere tumuhitamo kwitabira ubushakashatsi mu gihe abyemeye, tugasimbuka uwa kabiri tugahitamo ukurikiyeho, bigakomza gutyo.

Kwitabira ubushakashatsi si itegeko

Witabira ubushakashatsi kuko ubishaka. Iyo utabishaka, ni uburenganzira bwawe kubireka kandi ntibibangamira cyangwa ngo bingure serivisi wari bubone muri ibi bitaro uje kubagirwamo

Uko ubushakatsi bukorwa

Nkuko nabikubwiye haruguru, nta cyo uri busabwe gukora cg gukorerwa. Nta kibazo uri bubazwe. Umushakashatsi areba niba bagushyizemo ako gapira ubundi akareba mu ifishi yawe impamvu bagashyizemo cyangwa akabaza muganga wawe ugiye kukubaga. Barangiza akareba ko bagukuyemo agapira cyangwa banditse igihe bazakagukuriramo.

Igihe ubushakashatsi buzamara

Ubu bushakashatsi buzamara ukwezi kumwe gusa, ariko kuri wowe ubwitabiriye, birangirana nuko usohotse mu iseta. Umaze kubagwa uzamara iminota iri hagata ya 20 na 30 mu nzu wabagiwemo tureba ko nta kibazo wagize ku kinya,ubundi usubire ku gitanda cyaho waje kubagwa uturutse.

Ingaruka ushobora kugira

Nta ngaruka nimwe uzagira ngo nuko wagize uruhare mu bushakashatsi.

Inyungu

Inyungu zishobora kudahita zikugeraho vuba kubera ko tutazakwishyura cg ngo tukwishyurire ibyo wakorewe kwa muganga. Nta nkunga yatewe ubu bushakashatsi. Ariko aruhare rwawe mu bushakashatsi buzadufasha kumenya ibitagenda neza, ubutaha tuzakurinde za ngaruka mbi twabonye ziterwa n'ako gapira. Izi nyungu zizagera kuri wowe, umuryango wawe n' abaturage bose muri rusange.

Ibanga ry' ubushakashatsi

Ubu bushakashatsi buzabera mu nzu y'ibagiro (iseta). Nta bantu benshi baba bahari. Kubera bidasanzwe hari abashobora kubaza amakuru y' ibiri kuba, umushakashatsi ntacyo ababwira ku bijyanye n' amakuru aba yagukuyeho. Impapuro dukoresha tugenda twuzura, nta mazina abaho. Ni nimeru zonyine zikoreshwa kuva kuri rimwe kugera kuri 205. Izi mpapuro zizabikwa ahantu

hafunze kugeza ku myaka itanu ubundi zitwikwe. Ntawe uzazigeraho kereka umushakashatsi gusa.

Gutangaza ibyavuye mu bushakashatsi

Kubera ko ubushakashatsi bwakozwe kugirango huzuzwe ibisabwa ku kiciro cya gatatu cya kaminuza, ibivuye mu bushakashatsi bizatangwa ku ishuli, ubundi umushakashatsi abifashijwemo n' ubuyobozi bw' ibitaro bya Kigali buhamaze abarwayi bazaba babishoboye n' abaganga bamenyeshwe ibyavuye mu bushakashatsi ubundi bishyirwe ku mbuga nkoranyambaga abantu bose bamenye amakuru yavuye mu bushakashatsi. Mbibutse ko nta zina cyangwa ikindi cyose cyatuma hamenyekana uwagize uruhare mu bushakashatsi gitangazwa.

Uburenganzira bwo kutitabira ubushakashatsi

Nkwibutse ko kwitabira ubushakashatsi ni ku bushake si agahato. Ufite uburenganzira busesuye bwo kutagira uruhare mu bushakashatsi kandi ntacyo biri buhindure kuri serivisi wari buhabwe.

Uwo wabaza amakuru

Mu gihe ugize ikibazo kijyanye n' ubushakashatsi, ubaza amakuru yizewe umushakashatsi ari MUKANTWALI Joselyne, ni umunyeshuli akaba n' umukozi wa kaminuza y' u Rwanda, koreji u' ubuzima n' ubuvuzi. Telefoni ye ni: 0788853576, E-mail: mujoselyne@gmail.com.

Ubu bushakashatsi bwakorewe isuzuma, bwemezwa na CMHS IRB n' ibitaro, ikaba ari komite ishinze kureba ko ubushakashatsi nta ngaruka mbi buzagira ku wagize uruhare mu bushakashatsi. Ukeneye andi makuru wababaza uri izi numero; Umuyobozi: **+250788490522**, umwungirije: **+250783340040**.

5. CONSENT FORM

I, confirm that I have been explained very well the reasons for the above study and all procedures that I am being asked to participate in. I have had the opportunity to consider the information ask question and have had these answered satisfactory. I clearly understand what I will be required to do if I agree to take part in this study. I also know that I am free to withdraw from the study at any time if I do not want to continue. I am aware that all the information that I give and all the findings of the study may be locked at by responsible individuals and are the use of this study. I am guaranteed anonymity for the information obtained from me as well as the findings of this study. I consent voluntarily to participate as a participant in this research.

Name and Signature of participant _____

Date _____

URUHUSHYA RWO KUGIRA URUHARE MU BUSHAKASHATSI

Njyewe, ndemeza ko nabonye ubusobanuro ku bunshakashatsi giye gukorwaho n' uko ubu bushakashatsi buri bukorwe. Nabonye umwanya wo kubaza ibibazo kandi byasubijwe neza, nzi impamvu bampisemo ngo ngire uruhare mu bushakashatsi. Ni kubshake si agahato kandi igihe nabishakira mfite uburenganzira bwo kuva mu bushakashatsi. Numvise neza ko amakuru ntanga azabikwa mu ibanga rikomeye. Nemeye ku bashake kugira uruhare mu bushakashatsi.

Izina n' umukono w' uwagize uruhare mu bushakashatsi

_____ **date** _____

6. INFORMED ASSENT FOR CHILDREN THAT WILL BE ADMITTED TO KIGALI TEACHING HOSPITAL OPERATING THEATRE FOR SURGERY.

I..... give voluntary permission to participate in the research project
“Assessing indwelling urinary catheter use among patients undergoing surgery at Kigali
university teaching hospital.”

I understand that I will not benefit the project directly but it will help to improve the quality of
healthcare provided to patient undergoing surgery in Rwanda. I understand that the participation
in the study will not affect the way I will be treat and that I will not have any risk related to
participation in the study.

Child’s signature and date_____

URWANDIKO RWEMEZA KUGIRA URUHARE MU BUSHAKASHATSI (ABANA)

Njyewe,..... Nemeye kubushake kugira uruhare mu bushakashatsi
ku “*ikoreshwa rya sonde/agapira bashyira mu ruhago kanyuze mu muyonboro w’ inkari mu
barwayi babagira mu bitaro bikura bya kaminuza bya Kigali*”.

Nasobanuriwe neza ko ntari bwishyurwe ariko bizafasha kurinda indwara n’izindi ngaruka
ziterwa no gukoresha ako gapira. Numvise ko kugira uruhare mu bushakashatsi nta ngaruka
bizangiraho yaba kuvurwa na nyuma hayo.

Itariki n’ umukono w’ umwana_____

7 GUARDIAN/ PARENTAL PERMISSION

I,understand the information that has been read to me regarding the research project named “*Assessing indwelling urinary catheter use among patients undergoing surgery at Kigali university teaching hospital*”. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily for my child..... to participate as a participant in this study and understand that I have the right to withdraw her/him from the study at any time without in any way affecting our care at this Centre.

Date_____ Parent or legal guardian signature _____

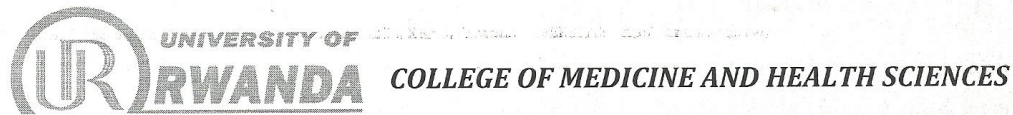
URUHUSHYA RWO KWEMERERA UMWANA KUGIRA URUHARE MU BUSHAKASHATSI

Njyewe, numvise neza ubusobanuro k’ ubushakashatsi ku ikoreshwa rya sonde/ agapira bashyira mu ruhago kanyuze mu yoboro w’ inkari mu barwayi babagirwa mu bitaro bikuru bya Kaminuza bya Kigali.

Nagize umwanya wo kubaza ibibazo kandi nasubijwe neza. Nemeye kubushake ko umwana wanjye agira uruhare mu bushakashatsi kdi nkaba mfite uburengazira bwo kumukura mu shakashatsi igihe cyose naba mbishatse kandi ntibire ingaruka kuri serivisi yahabwaga kuri ibi bitaro.

Itariki_____ umukono w’ ububyeyi _____

8. ETHICAL CLEARANCE



CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 16/01/2017
Ref: CMHS/IRB/107/2017

MUKANTWALI Joselyne
School of Nursing and Midwifery, CMHS, UR

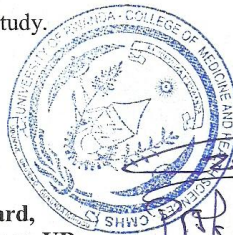
Dear MUKANTWALI Joselyne

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance of the revised protocol of the study entitled *"Assessing Indwelling Urinary Catheter Use Among Patients Undergoing Surgery At Kigali University Teaching Hospital"*.

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.



Fol Professor Kato J. NJUNWA
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Prof. JB Gahutu
IRB Vice-Chair

Cc:

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

9. REQUEST FOR PERMISSION TO COLLECT DATA

0701518949
~~M. Barbra~~
2.02.2017

MUKANTWALI Joselyne
Kigali, Nyarugenge
E-mail: mujoselyne@gmail.com
Contact: 0788853576
February, 2nd 2017

TO: Director of Kigali University Teaching Hospital

Respected Sir,

RE: Request permission for data collection

I would like to request permission for data collection and conducting a research at Kigali Teaching hospital that you are heading.

I am a candidate of Master of Nursing sciences at University of Rwanda, college of medicine and health sciences (CMHS), perioperative nursing track, and I would like to conduct research as my thesis project as fulfillment for the degree. The project purpose is to *assess indwelling urinary catheter use among patients undergoing surgery at Kigali university teaching hospital*. The study will take place at Theatre of Kigali teaching hospital among patients admitted in Theatre for surgery. A quantitative cross-sectional study design will be used. 205 patients will be recruited as a sample for study using a systematic sampling technique. An observation checklist developed by developed by Michigan University and Agency for Healthcare Research and Quality (AHRQ) will be used to collect data. Data will be analyzed by using descriptive and inferential statistics.


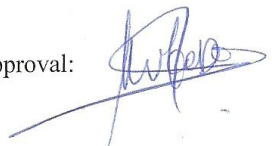
The participation will be voluntary after signing a consent form, parental permission and child's assent form. The study will be done in two months which will be February and March 2017. The study will not benefit participants immediately but it will help to improve the quality of health care. The ethical principles will be respected in this study.

I am looking forward your positive consideration.

Yours Sincerely,

MUKANTWALI Joselyne

Supervisor approval:

10. PERMISSION TO CONDUCT RESEARCH



**CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL**

Ethics Committee / Comité d'éthique

February 10th, 2017

Ref.: EC/CHUK/271/2017

Review Approval Notice

Dear Mukantwali Joselyne,

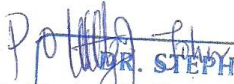
Your research project: "Assessing indwelling Urinary Catheter use among patients undergoing surgery at Kigali University Teaching Hospital."

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 10/02/2017 to evaluate your protocol of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your protocol.

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,


DR. STEPHEN RULISA
The President, Ethics Committee,
University Teaching Hospital of Kigali
CHUK

<<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. :655 Kigali- RWANDA www.chk.rw Tél. Fax : 00 (250) 576638 E-mail : chuk.hospital@chukigali.rw