



UNIVERSITY *of*
RWANDA

**COMPLIANCE WITH INFECTION CONTROL STANDARD PRECAUTIONS IN
PREVENTION OF SURGICAL SITE INFECTION AMONG STAFF IN OPERATING
ROOM AT A SELECTED REFFERAL HOSPITAL IN RWANDA**

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COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

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ROOM AT A SELECTED REFFERAL HOSPITAL IN RWANDA**

By

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**A dissertation submitted in partial fulfillment of the requirements for the degree of
MASTER of Sciences in Nursing (Perioperative Track)**

In the College of medicine and health Sciences

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October, 2019

DECLARATION

I do hereby affirm that this research project submitted in partial fulfillment for the award of masters of sciences in Nursing at UR-College of Medicine and Health Sciences is my work effort and that was not submitted previously to somewhere else.

In addition, I also declare that a completed reference list is provided to indicate the origin of the information cited.

MUKAMURENZI Emelie Annonciata

Signature

Date: October, 2019

DEDICATION

This study is dedicated to Almighty God for his love and protection to me, to my supervisors for their guidance and help, to my parents, my brothers and sisters for their love and support.

ACKNOWLEDGEMENT

Extra-ordinary gratitude to Heavenly Father, for his love and grace to me, the life and power he gave me to finish this course,

Particular gratitude toward the UR- College of Medicine And Health Sciences

Special appreciation to my Supervisor Dr. Lilian OMONDI

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Thanks to all individuals who have in one or another way contributed to the completion of this research including UTHK theatre staff.

ABSTRACT

Introduction: Surgical site infections cause significant patient morbidity and mortality and are the second most common cause of healthcare associated infections frequently in low and middle income countries. Despite developed and approved the refined standard precautions by healthcare infection control practices Advisory committee (HICPC) of center of diseases control (CDC) to guide patient care across all settings where health care is delivered in infection control and prevention, surgical site infection still high through different health settings in different countries.

Purpose of study: This study aimed to assess compliance with infection control standard precautions in prevention of surgical site infection among theatre staff in operating room at a selected referral hospital in Rwanda.

Method: A descriptive cross-sectional study design using quantitative approach was conducted and total population sampling method was used to select a sample of 90 theatre staff working at University Teaching Hospital of Kigali (UTHK). Ethical approval and authority to conduct a study was granted. A structured Observational checklist with basic global guidelines for the prevention of surgical site infection items and self-administered questionnaire were used to collect data. Descriptive statistics using SPSS version 21.0 was used for data analysis

Results: Among 90 participants, most of participants were females comparing to the males and most of them were falling between 31 to 35 age group and nurses were more than other staff. Insufficient compliance with standards precautions were found: among 90 participants regarding hand hygiene especially on removing artificial nail and nail polish before starting surgical hand decontamination was poor as 52(57.8%) ,hand washing with soap and water on arrival to operating room respecting WHO techniques observed were only 5(5.6) and also only 54(60%) respecting 2-5 min the required time for scrubbing were observed. On the use of personal protective equipment 26(28.9%) did not put on plastic apron, 45(50%) did not use eye protective, also 12(13.3%) did not wear sterile gown when required and 7(7.8%) did not wear surgical gloves. On the environment 31(34.4%) doors and windows were not closed during surgical operations.

Conclusion: This study showed non compliance with infection prevention standard precautions. Therefore, efforts should be made to enhance compliance through training and periodic audits of practice in order to prevent infections especially surgical site infections.

Key terms: Compliance, theater room, infection prevention, standards precautions

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LIST OF ABBREVIATIONS AND ACRONYMS

%: Percentage

CDC: Center of Disease Control

CMHS: College of Medicine

Fq: Frequency

HAI: Health care associated infection

HCWs: Health care workers

HICPAC: Health care Infection Control Practices Advisory Committee

HIV: Human Immune deficiency Virus

IPC: Infection Prevention and Control

IRB: Institutional Review Board

LMICs: Low and Middle Income Countries

N: Targeted Population

OR: Operating Room

PPE: Personal Protective Equipment

SSI: Surgical Site Infection

UP: Universal Precautions

UR: University of Rwanda

USA: United State of America

UTHK: University Teaching Hospital of Kigali

WHO: World Health Organization

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CHAPTER ONE: INTRODUCTION

1.1. INTRODUCTION

Infection control interventions are important for surgeries good outcomes. For this reason, the modern operating room (OR) should have well developed infection control policies (Shamir et al, 2013). Among infection control practices hand hygiene and gloves are essential and personal protective equipment (PPE) should be used to protect yourself as staff care provider in the theatre as well as to protect the patient. Gown or coveralls, protective footwear and head cover help to prevent transmission through non-intact skin and inadvertent contamination of mucosa from soiled skin (WHO, 2016).

1.2. BACKGROUND

Infection prevention and control is essential to ensure that patients who undergo any surgical procedure within the operating theatre receive safe and effective care (Lishman, 2017). A hospital-acquired infection is the most adverse event in surgical admissions and is mostly caused by health care management rather than the disease process (Hold, 2014).

According to International Society for infection diseases, these infections cause significant patients morbidity and mortality and burden healthcare systems with immense costs. Surgical site infections (SSIs) are the second most common cause of healthcare-associated infections but the most frequent in low- and middle-income countries (LMICs) (Dallolio *et al.*, 2017).

In high-income countries (HICs), SSIs are the second most common type of adverse event among hospitalized patients, only surpassed by medication errors, and are the most frequent cause of readmissions and also are associated with virtually any surgical procedure and represent one of the main complications in surgical patients (Dallolio *et al.*, 2017). On the other hand hepatitis B, hepatitis C, and HIV are most common type of adverse event among health care workers in operating room (Lishman, 2017).

Recommendation of the healthcare infection control practices Advisory committee (HICPC) chartered in 1991 to provide advice and guidance to the centers for disease control and prevention has currently developed and approved the refined 8 core practices to guide patient care across all settings where health care is delivered (CDC, 2017).

Among 8 core practices Standard precautions (hand hygiene, environmental cleaning and disinfection, injection and medication safety, risk assessment with use of appropriate personal protective equipment, minimizing potential exposures, reprocessing of reusable medical equipment between each patient and when soiled) are basic practices that apply to all patient care and prevent healthcare personal or the environment from transmitting infections to other patients (CDC, 2017).

Surgical Site Infections(SSI) are primarily acquired during the surgical procedure while the wound is open, for that, a number of infection control practices merit study in the operating room (OR) (Roy *et al.*,2018). According to Dallolio *et al.*, (2017),the lack of compliance with best practices by surgical staff represents some of the factors affecting Surgical Site Infections worldwide (SSIs) . In the USA, there was two million hospital infections per year as a result of which 90 000 patients will die. Among them the incidence of surgical wound infection for all operations is 1-3%, and 10% for colon and bariatric surgery(Hold, 2014).

Recent work by the World Health Organization (WHO, 2016). shows that surgical site infection (SSI) is the most surveyed and frequent type of HAI in low- and middle-income countries and affects up to one third of patients who have undergone a surgical procedure while SSI incidence is lower in high-income countries, but it remains the second most frequent type of HAI in Europe and the United States of America (USA).

In a study conducted to determine incidence and predictors of surgical site infections at surgical ward of Hawassa University Referral Hospital, Southern Ethiopia, on 105 patients, twenty patients (19.1%) developed surgical site infections. Age greater than 40 years, preoperative hospital stay more than 7 days, duration of operation more than 1 hour, and administering antimicrobial prophylaxis before 1 hour of operation, were independent predictors for surgical site infections (Laloto, Gemedo and Abdella, 2017).

In Rwanda, an interventional study conducted in Bushenge provincial hospital to decrease post cesarean section infection rate showed that out of 827 (69/month) cesarean sections in the pre intervention period 55 cesarean interventions(7.2%) developed the Post cesarean section infection (Gilbert., 2017). Referral and teaching hospitals in Rwanda perform many major surgical procedures for different kind of diagnoses that require surgical treatment from different district hospitals. For that, the infection control, prevention measures and guidelines should be practiced by every staff working in theatre to prevent surgical site infection. This study intends to assess the compliance

with infection control standard precautions in prevention of surgical site infection among theatre staff in operating room.

1.3. PROBLEM STATEMENT

The compliance with infection control standards precaution is crucial in prevention of surgical site infections among operating theatre staff. Surgical site infections (SSI) account for 14% to 17% of all hospital-acquired infections and 38% of nosocomial infections in surgical patients (Spagnolo and Amicizia, 2013). Surgical site infection (SSI) is the most surveyed and frequent type of HAI in low- and middle-income countries where it affects up to one third of patients who have undergone a surgical procedure (WHO, 2016). Hospital-acquired infection is one major preventable event cause surgical infections and which caused by the health care management, rather than the disease process (Hold, 2014). According to Dallolio et al (2017) SSIs are primarily acquired during the surgical procedure while the wound is open and therefore, recommend that a number of infection control practices merit study in the operating room (OR) for monitoring staff compliance with infection prevention.

Although there is existing standards precautions in preventing SSI, and transmission of other diseases in the hospitals, there is no study described the compliance with standards precautions among staff in theatre room at Referral hospitals in Rwanda. Therefore, this study assessed the compliance with infection control standard precautions in prevention of surgical site infection among theatre staff in operating room at a selected referral hospital in Rwanda.

1.4. THE AIM OF THE STUDY

To assess staff compliance with infection prevention guidelines in prevention of surgical site infections in the operating room at a selected referral hospital in Rwanda.

1.5. RESEARCH OBJECTIVES

1. To assess the compliance with hand hygiene practices among theatre staff in operating room
2. To assess the compliance with the use of personal protective equipment among theatre staff in operating room
3. To evaluate staff compliance with theatre environment infections prevention standard precautions.

1.6. RESEARCH QUESTIONS

1. How is the staff compliance with the hand hygiene practices among theatre staff in operating room?
2. How is the staff compliance with the use of personal protective equipment among theatre staff in operating room?
3. How does staff comply with theatre environment infections prevention standard precautions?

1.7. SIGNIFICANCE OF THE STUDY

1.7.1. Nursing administration

The findings of the study will be supportive to the policy makers to incorporate strategies towards the infection control and prevention in theatre room.

1.7.2. Nursing practice and patient safety

The study results will be useful to strengthen the level of knowledge, and practice with regard to the infection prevention guidelines in the theatre. The findings of the study will also help nursing managers in targeted service to evaluate themselves to find out the gaps in control and prevention of infections in their service that will help them to take measures and strategies to adhere to the policies and guidelines of infection prevention and control. Particularly the findings will remind nurses working in theatre the principles and importance of complying with infection control and prevention guidelines and finally will increase patient safety and good surgeries outcome in operating theatre.

1.7.3. Nursing education

The results of the study will inform where to emphasize in academic curriculum for good future health care providers.

1.7.4. Further Research

The results of the study will highlight the gaps in the prevention of SSI and serve as the bank of basic knowledge for further researches.

1.8. DEFINITION OF CONCEPTS

Compliance: The acting in accordance with, or the yielding to a desire, request, condition, direction (Aronson, 2015). For this study compliance refer to the acting in accordance with standards precautions in prevention of surgical site infection in theatre.

Infection prevention and control: Is a series of steps that healthcare facilities and hospitals take to prevent the spread of infectious diseases (WHO, 2006). For this study infection prevention and control are the measures taken by staff in theatre to prevent the spread of infection to the open wound during operation.

Standard precautions: are a set of infection control practices used to prevent transmission of diseases that can be acquired by contact with blood, body fluids, non-intact skin (including rashes) and mucous membranes (Adebayo et al, 2015).

Operating theatre: A room equipped and designed for surgical operations(Aronson, 2015)

1.9. ORGANIZATION OF THE STUDY

The research project is divided into six main chapters. Chapter one is introduction of the study composed of background, problem statement of the study, objectives and the significance of the study. Chapter two consists of the literature review which describes theoretical and empirical information about infection prevention guidelines in theatre, gap identification and conceptual framework. Chapter three : Research methodology which is composed of the study area, study design, study approach, study setting, study population, sample size and sampling strategy, validity and reliability of tools, data collection procedures, data analysis procedure, ethical considerations, data management, problems and limitations of the study. Chapter four: Results and presentation of findings. Chapter five: Discussion of results. Chapter six: Conclusion and recommendations. All six chapters are followed by the references list and finally the appendices.

1.10. CONCLUSION

Despite developed and approved the refined standard precautions by healthcare infection control practices, surgical site infections are the second common cause of healthcare associated infections. For that, the study to assess the compliance with standard precautions in prevention of SSIs among staff in operating theatre is needed as it is revealed that most time SSIs occur during operation when the wound is open so that will help to improve patient safety in the operating theatre.

CHAPTER TWO: LITERATURE REVIEW

2.1. INTRODUCTION

This chapter describes the theoretical and empirical literatures of the concept of infection control standards precautions in preventing surgical site infection, identify the gap and shows the conceptual framework of the study.

2.2. THEORETICAL LITERATURE

2.2.1: Concepts of infection prevention and control

Infection prevention and control (IPC) practice is an essential component of health and social care, and policy and guidance are always evolving. Research helps to inform the evidence base for this important area of nursing practice and is inextricably linked to antimicrobial resistance and therefore has a central role in health and social care and public health services(Wiseman, 2017).

Good infection prevention and control is essential to ensure that patients who undergo any surgical procedure within the operating theatre receive safe and effective care(Group, 2017). According to Hold(2014)over 60% of surgical site infections (SSIs) are preventable and most of infections are preventable, and many precautions and guidelines were set to improve IPC in all levels of health of the world in its respective countries.

According to WHO , (2016) guideline in prevention of infection contamination and transmission, hand hygiene and gloves are essential and personal protective equipment (PPE) should be used to protect the mucosa of mouth, nose and eyes from contaminated droplets and fluids. Gowns or coveralls, protective footwear, and head covers help to prevent transmission through non-intact skin and inadvertent contamination of mucosa from soiled skin (HWO, 2016)

Hand hygiene

Since hands are known to carry pathogens to other parts of the body, including the face, and to other individuals, hand hygiene and gloves are essential in infection control(WHO, 2016) .

WHO recommends all health care workers including aides and cleaners to perform hand hygiene as one of standard precautions(WHO, 2014). Hands are washed with soap and water following the procedure by rubbing all hand surfaces for about ten to fifteen seconds and dry hands well using

hand paper towel and antibacterial soap is used to decontaminate hands during hand and arm scrub before the surgical operation in the operating theatre(Massinga, 2012).

According to Roy *et al.*(2016) all members of the surgical team who will work on the operating field should scrub arms and hands with antiseptic solution, for at least 3 minutes before the first procedure of the day, and a shorter period may be appropriate for subsequent procedures. He added that the use of an alcoholic chlorhexidine solution has a greater residual antimicrobial activity, which could give a theoretic advantage during a long surgical procedure but hand rubbing with aqueous alcoholic solution (without water) may be as effective as traditional hand scrubbing and also better tolerated by the surgical team.

The surgical hand washing/hand scrub

In operating theatre, effective surgical hand antisepsis or surgical hand washing is core to remove debris and transient organism, reduce resident microorganisms to a minimum and to inhibit rapid rebound growth on the hand nail, forearms of surgical personnel and the initial scrubbing procedure should last 5 minutes, the subsequent procedure last 3 minutes and when the scrub personnel hands or arms accidentally touch on any unsterile object during scrub cycle they are considered contaminated and the scrub cycle must begin again (Tabrizi,2013).

The surgical Scrub techniques

The scrub procedure must follow the trust policy for hand decontamination that includes (1) Palm to palm(2). Right palm over left dorsum and left palm over right dorsum, (3). Palm to palm fingers interlaced,(4). Back of fingers to opposing palms with fingers interlocked,(5). Rotational rubbing of right thumb clasped in left palm and vice versa,(6). Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa. and Continue to wash the arms but encompassing only two thirds of the forearms to avoid compromising the cleanliness of the hands and hand with arms must be rinsed thoroughly from fingertip to elbow without retracing, allowing the water to drip from the elbow before approaching the gown pack (Nuora,2014) .According to Massinga, (2012). Surgical hand washing involves the use of a sterile brush and a reliable antiseptic for a two to five minute for scrubbing.

Use of personal protective equipment (PPE)

Gloves and other PPEs

Gloves must be worn whenever contamination of the hands is expected. This is always in addition to and not instead of hand washing. Gloves must comply with acceptable quality, free from pinholes and must not be tearing or split easily. Torn or punctured gloves must be changed as quickly as is safely possible. Gloves must be changed and discarded after each procedure or patient episode or if visibly contaminated. Staff should remove gloves prior to handling clean equipment or sundries (Group, 2017).

Gloves are not sufficient alone to protect someone from getting infection; they are additional protective attire that are needed to provide protection: face masks provide a barrier to most microorganisms that are mostly cause of airborne diseases and protects the wearer from getting contact with blood and other body fluids and is not limited to protect the wearer, it also prevent oral secretions from getting splashed to the patient undergoing the surgery in the operating rooms or in ongoing wound dressing (Massinga, 2012). Also Roy *et al.* (2012) said that members of the surgical team entering the OR when an operation is about to begin or already underway should wear a mask and headgear which fully covers hair, sideburns, and neckline as bacteria can be shed from hair, exposed skin, and mucous membranes of both OR personnel and the patient's skin and it is why we use barriers (masks, gowns, hood, boots and drapes) in the OR.

Barriers that interfere in matters of safety and personal protective equipment, such as communication, work overload, physical structure, accessibility of protective equipment and organizational management aspects have been identified in qualitative study conducted in a teaching hospital with 15 nursing professionals to analyze the reasons, attitudes and beliefs of nursing staff regarding adherence to personal protective equipment (Carneiro *et al.*, 2011). During the operation and induction of anesthesia health care workers should wear protective eye that can help to protect the mucous membranes of the eyes, mouth and nose when undertaking procedures that are likely to generate splashes of blood and other body fluids or secretions (Massinga, 2012).

Theatre environment

The surgical suite is usually divided into three designated areas: semi-restricted area in which is limited to authorized personnel and to the patient includes the peripheral support areas of the surgical suite, including storage areas for clean and sterile supplies, sterile processing rooms, scrub stations, and corridors leading to restricted and Surgical attire as well as headgear are recommended in this area. Another area is restricted area the primarily area intended to support a high level of asepsis control which includes the ORs and clean core, surgical attire, head covering, and masks are required where open sterile supplies or scrubbed persons are present (Roy et al., 2012).

Eating is prohibited in the operating theatre. In exceptional circumstances e.g. during long procedures, non-scrubbed theatre personnel are permitted to eat/drink in the anesthesia room provided that a risk assessment has been undertaken by the nurse in charge of the theatre(Group, 2017).

According to WHO, (2016) Cleaners should wear rubber gloves, impermeable gown and boots and in addition, facial protection when undertaking activities with increased risk of splashes or in which contact with blood and body fluids is anticipated, including handling of linen,. Contaminated environmental surfaces or objects should be cleaned and then disinfected as soon as possible using standard hospital detergents/disinfectants (e.g. a 0.5% chlorine solution).

Every effort must be made to reduce wherever possible the movement in and out of theatres of staff during open procedures. Doors to remain closed in order to maintain recommended temperature, humidity and air pressure. Theatre staff must be diligent in relation to minimizing theatre traffic during operating procedure the team leader is responsible for ensuring that the ventilation is working and that the humidity is in a safe zone prior to the operating list starting (Group, 2017).

2.3. EMPIRICAL LITERATURES

Different studies revealed poor compliance with infection prevention guideline in theatre.

2.3.1. Compliance with hand hygiene practices

Studies have shown low to moderate knowledge and compliance with hand washing. In a cross-sectional study conducted among 100 nursing staff and 100 nursing students in a tertiary medical college in Karad to assess the knowledge, attitude, and practice of five moments of hand hygiene the knowledge on hand hygiene was moderate (144 out of 200, 74%) among the total study population(Shinde and Mohite, 2014).

A marked lack of knowledge and defective attitudes and practices to hand washing were observed also in the study assessed existing practices in the operating theatre regarding hand washing (33.3%) incorrectly answered the question about the proper routine and surgical hand washing, 84.4% of surgical and anaesthetic nurses demonstrated poor practice(Hassan et al., 2015).

In health settings hand antisepsis technique remains a cornerstone in surgery to eliminate transient micro-organisms in prevention of surgical site infection. In the study to evaluate and increase the compliance of surgical hand scrubbing with periodic feedback, the rate of compliance varied among the surgeons, technicians and surgical assistants. The lowest compliance rate was found among surgeons, i.e. 6(10%) during the pre-feedback period. The minimum compliance rate among surgical assistants and technicians was 5(15.6%) and 11(18.6%). As soon as feedback was given, compliance rise in all three groups with rates reaching as high as 40(97.6%) among technicians in the middle four weeks of the post-feedback period (Khan and Naushenn, 2017) .

In the observational study examined level of surgical hand preparation among scrub nurses and surgeons when using alcohol based hand rubs in a central hospital in Finland where the researcher observed the nurses and surgeons' pre-surgical hand preparation performed with an alcohol-based hand rub, the average times spent on hand rubbing were mostly insufficient . The correct technique for hand rubbing was observed in 2/3 nurses while 40% of correct techniques was observed for surgeons and the most common reason for an insufficient hand disinfection was that the hand rub was not smeared as far as to the elbow(Tabrizi,2013).

In the systematic study examined the studies on the comparison between the efficiency of surgical hand washing method and the antiseptics being used, it is observed that majority of studies preferred alcohol based washing products instead of traditional hand washing products (scrubbing with a soap or a povidone). In this systematic review, efficiency of antiseptics used in surgical hand washing differs according to the techniques of surgical hand washing and the sample group being used and concluded that efficiency and preference of surgical hand washing solution is still a disputable issue(Goket al,2016).

On the other hand, povidone –iodine has empirically been evidenced to be a higher antiseptic effective as compared to alcohol-based solution in a comparative study evaluated the effectiveness of some conventional surgical antiseptic solutions, and to identify the most effective one, where alcohol-based solution compared with povidone-iodine(91% betadine scrub), Forty-eight surgeons

where enrolled in the study and one hundred and fifty seven sample obtained from flora on the hand of participants after hand scrub and before wearing gloves and immediately after removal of gloves while time of hand rub was respected for all surgeons, 50(30.9%) were positive cultures among 157 obtained sample, and the lowest(10%) frequency of positive culture was observed for the solution containing povidone iodine (10% betadine scrub) (Goket al,2016).

2.3.2. compliance with use of personal protective equipment (PPE)

In his study Hassan (2015) Hassan 2015),about two-thirds (67.7%) incorrectly answered the question on surgical glove disposal, 77.7% incorrectly answered the questions on proper mask use and disposal and Forty-two (93.3%) disposed of surgical gloves inappropriately and regarding the proper use and disposal of head cover, 46.6% of the health personnel answered the questions incorrectly for proper donning of gowns, 37.7%, and Forty (88.9%) demonstrated proper use of hair cover, while 8.9% disposed of the hair cover incorrectly . All 100% used and disposed of surgical gowns correctly and it was observed that 95.5% of the personnel did not use surgical shoes correctly in the operating theatre.

Poor compliance with eye wear on operation room have observed in 24% of 597 health care workers in Prospective observational cohort to evaluate universal precautions (UP) compliance in the operating room (OR) (Hassan *et al.*, 2015). On the other hand Neo et al (2011), in a phenomenological inquiry revealed that wearing protective eyewear was the norm for participants and that using protective eyewear as PPE was part of their peri-operative training and continuous educational intrapersonal and environmental , professional factors such as protecting self, risk appraisal, beliefs, previous experiences, fear, comfort and functionality, professionalism, leadership, forgetting versus routine, time pressure and accessibility, alternatives and patient-centered care were found to be associated with nurses compliance with protective eyewear (Neo et al, 2011) .

2.3.3. Compliance with theatre environment

WHO, (2014) recommended that at the beginning of each day, all flat surfaces should be wiped with a clean, lint-free moist cloth to remove dust and lint. Between cases, hand-touch surfaces and surfaces that may have come in contact with patients' blood or body fluids, should be wiped clean first by using a detergent solution and then disinfected according to hospital policy and allowed to dry. Waste should be segregated at point of generation to enable appropriate and safe handling and all solid, non-sharp, infectious waste should be collected in leak-proof waste bags and covered bins.

In the study on optimizing the surgical patients safety and the operating room environment to reduce SSI showed that the modern practice of surgical antisepsis involves the use of strict sterile techniques inside the operating room (Gaines,2017) .

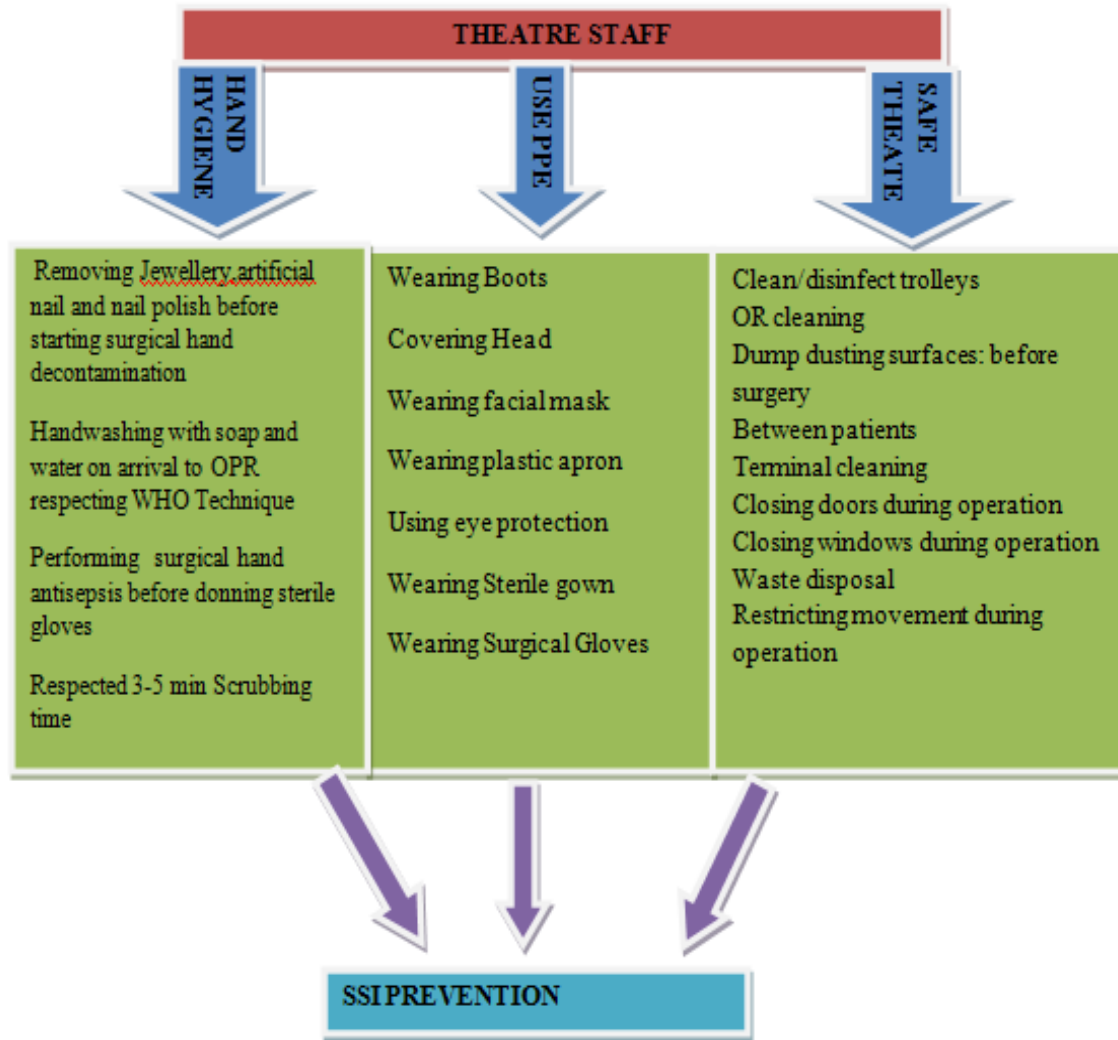
2.4. GAP IDENTIFICATION

The reviewed literature showed the low compliance with standards precautions in different settings. Inadequate compliance was more highlighted in hand washing and surgical hand washing, wearing masks, shoes and incorrect disposal of used gloves. Besides that, few researches were conducted on the compliance with theatre environment. Therefore, studies on the compliance with theatre environment infection prevention standard precautions are still needed.

2.5. CONCEPTUAL FRAMEWORK

To describe and plan this study, to develop the research instruments, to analyze and interpret data;

The conceptual framework for this research is based on WHO recommendations for surgical site infection prevention as written in global guidelines for the prevention of surgical site infection and summarized in the following figure:



World Health Organization (2016).

Figure2. 1. Compliance to the standards precaution in prevention of surgical site infection conceptual framework adopted from WHO (2016).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter describes in details how the study was conducted. It describes the study design, study approach, study setting, population, study sample, sampling strategy, data collection methods, study instruments, data analysis, ethical considerations, data management, problem and limitations of the study.

3.2. STUDY DESIGN

Research design is the process that guide researchers on how to collect, analyze and interpret data and it is a logical model that guide the investigators through various stages of research (Getu, 2016).

A descriptive cross sectional study design was used to assess staff compliance with standard precautions in prevention of surgical site infection in operating theatre at University teaching hospital of Kigali (UTHK) in Rwanda.

3.3 . RESEARCH APPROACH

Quantitative approach that emphasis on collecting and analysing numerical data was used. This approach concentrates on measuring the scale, range, frequency etc of phenomena (Grover, 2015)

3.4. STUDY SETTING

The study was conducted at University Teaching Hospital of Kigali (UTHK), located in centre of Kigali Nyarugenge District in Rwanda. UTHK is the second in the public referral hospitals in Rwanda, currently has 13 following clinical services: Operating room-Anaesthesia and Resuscitation, Physiotherapy, Orthopaedic, Dermatology, ENT, Stomatology, Ophthalmology, Paediatrics, Emergency and accidents, Gynaecology and obstetrics, Surgery and Internal Medicine. It is the first among 3 public referral hospital that perform many and major surgical operations. To respond to the research questions this research was conducted only in the operating theatre.

3.5. TARGET POPULATION

This study was involved all staff working in theatre department at UTHK.

Theatre department of UTHK has 94 staff including 26 surgeons, 23 anesthetists, 39 nurses and 6 cleaners.

3.6. SAMPLING

3.6.1. Sample size

A sample is a portion of the population selected to achieve the objectives of the study. A sample size is a smaller group obtained from accessible population. This group is carefully selected so as to be representative of the whole population with the relevant characteristics (Martínez, 2016). Because the population of this study was not large (94 staff), all available population (90 staff) was used.

3.6.2. Sampling technique

In this study, total population sampling was used. It is a type of purposive sampling technique where the entire populations that have a particular set of characteristics are examined. In such cases, the entire population is often chosen because the size of the population that has the particular set of characteristics that the researcher interested in is very small (Nithya, 2010) .For this study, this type of sampling methods was chosen because the interested group (theatre staff) share characteristics of experiencing the same standard precautions in prevention of surgical site infections and was small number (90 available staff). The researcher considered this type of sampling to be advantage because since total population sampling involves all members within the population of interest, it is possible to get deep insights into the phenomenon that the researcher is interested in .To reach the sample of the study, the unit manager as gatekeeper the researcher has asked her to make a list of all available theatre staff and then after every one was contacted and informed that he/she will participate in the study. Even if total population sampling is nonprobability sampling, creating a list gave a researcher the possibility to make analytical generalizations about the population being studied as simple random sampling (Nithya, 2010).

3.7. DATA COLLECTION

3.7.1. Data collection instruments

In this study, observational checklist and self-administered questionnaire were used to collect data and the tools were composed by basic cores in infection prevention and control in the theatre which are: hand hygiene, use of personnel protective equipment (PPE) and theatre environment control. That used tool was adopted from global guidelines for prevention of surgical site infection developed and published in 2016 by WHO.

3.7.2. Validity and reliability of research instruments

3.7.2.1. Face validity

According to Khandoker (2016), face validity is a subjective judgment of whether measures of certain construct "appears" to measure what it intends to measure. This is usually done by showing the measurements to the experts (could be fellow researchers or teachers) and get their feedback of whether these measures are relevant in measuring what the researcher intended to measure. For this study the tool was given to the in charge of infection control and prevention at Rwinkwavu District hospital to be reviewed. The tool was composed of 3 parts: 1. Part one with 5 items assessing hand hygiene, part two with 8 items that assessing the use of personal protective equipment and part three with 6 items that measure theatre environment. After being reviewed by an expert in infection control all items were accepted to measure the objectives of the study.

3.7.2.2. Content validity of the tool

Content validity help to ensure construct validity and give confidence to the readers and researchers about instruments and refers to the degree that the instrument covers the content that it is supposed to measure (Yaghmale, 2009).

As the tool was drawn from global guidelines for the prevention of surgical site infection, for that the researcher considered the tool to be valid.

3.7.2.3. Content validity table

Objectives	Items assessed	Self report questionnaire	Observational check-list
To assess the compliance to the hand hygiene practice among theatre staff in operating room	<p>Removing Jewellery,artificial nail and nail polish before starting surgical hand decontamination</p> <p>Handwashing with soap and water on arrival to OPR respecting WHO Technique</p> <p>Performing surgical hand antisepsis before donning sterile gloves</p> <p>Respected 3-5 min Scrubbing time</p> <p>Drying well Hand and forearms before donning sterile gloves</p>	Hand hygiene 1,2,3,4,5	Hand hygiene 1,2,3,4,5
To assess the compliance to the use of Personal protective equipment among theatre staff in operating room	<p>Wearing Boots</p> <p>Covering Head</p> <p>Wearing facial mask</p> <p>Wearing plastic apron</p> <p>Using eye protection</p> <p>Wearing Sterile gown</p> <p>Wearing Surgical Gloves</p>	Using personal protective equipment 6,7,8,9,10,11,12,13	Using personal protective equipment 6,7,8,9,10,11,12,13
To evaluate staff compliance to theatre environment infections prevention	<p>Clean/disinfect trolleys OR cleaning</p> <p>Dump dusting surfaces: before surgery</p>	Theatre environment	Environment 15,16,17,18,19

standard precautions.	Between patients Terminal cleaning Closing doors during operation Closing windows during operation Waste disposal Restricting movement during operation	15,16,17,18,19	
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3.7.2.4. Reliability of the tools

To ensure reliability in the context, the pretest was done and the tools were pretested in theatre at Rwinkwavu District hospital where the researcher is working. For observational checklist the researcher and researcher assistant observed one operation using two checklists, each one filled one checklist and after discussed on the findings at the end of the operation to get the same understanding. After the observed data were 100 similar. For the questionnaire, 9 questionnaires were pretested for 9 theatre staff at Rwinkwavu District hospital. Then after completion the coefficient Chronbach alpha 0.784 acceptable values for internal consistence reliability was found.

3.7.3. Data collection procedures

Data collection for this study was done in 1 month. During data collection period the researcher observed the practices regarding infection prevention standard precautions during surgical operation and distributed the questionnaire to the staff to be filled and be collected by unity manager. Helped by unity manager, the researcher has been given the list of staff and the shift timetable. The researcher had to know everyone who consented to participate in the study. Fortunately all staff members agreed to participate in the study.

The observation was done in two sequences: for sequence 1, the researcher observed surgeons, nurses and anesthetists during surgical hand washing. For the second sequence the researcher participated in surgeries with purpose to observe how staff is compliant with guidelines standard precautions. In addition, all activities that happened in the operating room including movements, doors and window closure were observed. In this phase a full explanation of what specifically the researcher had to observe would cause participants to change their normal behavior. Participants

were therefore informed that practices in theatre would be observed using a checklist, without specific details. Before data collection the selected participant was individually given consent verbal or signed to be observed. During observation, the researcher ensured that she will not distract the HCWs as far as possible. In addition data collection was done purposefully where the researcher was used a list of staff to know who would be observed in operating team. Everyone was observed once. For success of this procedure, the researcher was used the service daily schedule in order to reach to every staff.

3.8. DATA ANALYSIS

Data entry was performed using IBM SPSS version 21.0, for statistical analysis. Descriptive statistics was used to describe the individual compliance.

3.9. ETHICAL CONSIDERATIONS

As this study requires the observation of human being, ethical issues was addressed. The considerations of these ethical issues are necessary for the purpose of ensuring the privacy as well as the safety of the participants and confidentiality of the collected information. To ensure confidentiality no name was marked on the checklist and questionnaire. To get the permission to conduct this study, it has been submitted in the institution review board (IRB) of UR-CMHS and in the committee institution review board (IRB) of UTHK for ethical approval to conduct the study. The participation in this study was voluntary and staff members had right to refuse to participate.

3.10. DATA MANAGEMENT

After data analysis, the study results are stored in locked and protected computer , and again they are stored on email which has a unique password for researcher study only, and hard copies are locked in cupboard. The results will be kept for 5 years and after this period of time, all data will be discarded.

3.11. DATA DISSEMINATION

The final report will be submitted to the University of Rwanda Library for guide to the future researchers. The findings of this study will also be disseminated to the University Teaching Hospital of Kigali where the study has been conducted. Finally the research Article will be submitted to peer review journal for publication

3.12. PROBLEMS AND LIMITATIONS

This study had some problems like few literatures for.ex.empirical literatures on theatre environment. The study has also some limitations especially generalizability as the research has been conducted at one referral hospital among 4 referral hospitals, therefore the results cannot be generalized for these Hospitals.

Other limitation is that each participant was observed once that can limit the occurrences of practice and make confusion about compliance assessment.

In addition to that, being aware of the participant about observation could change their behavior regarding their practices.

3.13. CONCLUSION

This chapter discussed the methodology which the researcher followed to conduct the study. It clarified the research design and all procedures were used to get sample, correct data and analyze them. It also discussed the ethical aspect of this study by considering the ethical principles for respect of persons.

CHAPTER FOUR: RESULTS AND INTERPRETATION

4.1. INTRODUCTION

This chapter describes the results of the study following the objectives. Both collected data gathered with questionnaire and from observational checklist were descriptively analyzed, interpreted and are presented in tables. The purpose of the study was to assess compliance with infection control standard precautions in prevention of surgical site infection among theatre staff in operating room at a selected referral hospital in Rwanda

Social demographic data of the study participants: n=90

The following table shows that among 90 participants 32(35.6%) were in between 31-35 of ages, 22(24.4%) in 26-30 of ages, 21(23.3%) were between 36-40 of ages and 4(4.4%) were over 45 of age. the majority of participants (52.2%) were females than males who were 47.8% The most of them 39(43.3%) were nurses, followed by surgeons 26(28.9%), then anesthetists 21(23.3%) and the minority 4(4.4%) were cleaners.

The below table also demonstrates that a higher number of participants 31(34.4%) had between 4-6 years of experience and a lower 15(16.7%) had 1-12months of working experience and that the majority of staff 88(97.8%) participated in the study were not trained in operating theatre infection prevention and control standards precautions; Only 2(2.2%) have got training on them.

Table4.1. Distribution of respondents according to demographic characteristics

Variables	Frequency	Percent
Age group		
20-25	6	6.7
26-30	22	24.4
31-35	32	35.6
36-40	21	23.3
41-45	5	5.6
above 45	4	4.4
Gender		
Male	43	47.8
Female	47	52.2
Professional		
Surgeons	26	28.9
Nurses	39	43.3
Anesthetists	21	23.3
Cleaners	4	4.4
Professional experience		
1-12 months	15	16.7
1-3years	26	28.9
4-6 years	31	34.4
more than 6 years	18	20.0
Training on infection control standard precautions		
Yes	2	2.2
No	88	97.8

The compliance with hand hygiene practices among theatre staff in operating room

The table below 4.2. shows that according to self-report of staff in theatre, some comply to the hand hygiene but others not; as well as 44(48.9%) sometimes wash hand with soap and water on arrival to OR respecting WHO Technique, 1(1.1%) never. 17(18.9%) do not respect respected 2-5 min for Scrubbing, 3(3.3%) do not remove Jewelry, artificial nail and nail polish before starting surgical hand decontamination and sometimes perform surgical hand antisepsis before donning sterile gloves.

Table4.2.Compliance with hand hygiene practices among theatre staff in operating room; self-report.

Fq: Frequency

N/A: Not applicable

Variables		Always	Sometimes	never	N/A
I remove Jewelry,artificial nail and nail polish before starting surgical hand decontamination.N=90	Fq (%)	43 (47.8)	46 (51.1)	1 (1.1)	
I wash hand with soap and water on arrival to OR respecting WHO Technique.N=90	Fq (%)	42 (46.7)	48 (53.3)		
I perform surgical hand antisepsis before donning sterile gloves.N=86	Fq (%)	83 (92.2)	3 (3.3)		4 (4.4)
I respect 3-5 min for Scrubbing=86	Fq (%)	69 (76.7)	17 (18.9)		4 (4.4)
I dry hand and forearms well before donning sterile gloves.N=86	Fq (%)	85 (94.4)	1 (1.1)		4 (4.4)

According to the observational findings, in the following table 4.3,the majority 85(94.4%) do not wash hands with soap and water on arrival to the OR respecting WHO Technique, 38(42.2%) did not remove Jewelry,artificial nail and nail polish before starting surgical hand decontamination, 32(35.6) did not respect respected 2-5 min of Scrubbing time, at the same rate 12(13.3%) did not

dry hand and forearms well before donning sterile gloves and did not perform Surgical hand antisepsis before donning sterile glove.

Table4. 3. Compliance with hand hygiene practice among theatre staff in operating room; observational findings.

Variables		Done	Not done	N/A
Jewelry ,artificial nail and nail polish removed before starting surgical hand decontamination n=86	Fq %	48 53.3	38 42.2	4 4.4
Hand wash with soap and water on arrival to OR respecting WHO Technique.N=90	Fq %	5 5.6	85 94.4	
Surgical hand antisepsis performed before donning sterile gloves N=86	Fq %	74 82.2	12 13.3	4 4.4
Scrubbing time respected 3-5 min N=86	Fq %	54 60.0	32 35.6	4 4.4
Hand and forearms well dried before donning sterile gloves N=86	Fq %	74 82.2	12 13.3	4 4.4

Compliance with use of Personal protective equipment(PPE) among theatre staff in operating room.

The following table 4.4, Shows that according to self- report of respondents, most of them comply to the use of Personal protective equipment in operating room but there is a number of staff that sometimes and/or never do not comply to the use of PPE. The high number 21(23.3%) reported that they never wear Plastic apron , 4(4.4%)reported that sometimes they do not put on eye protective and 2(2.2%) never.27(30.0%) reported that sometimes they wear sterile gown and 3(3.3%) reported that they never do it.

Table4.4. Compliance with use of Personal protective equipment among theatre staff in operating room; self- report.

Variables		Always	Sometimes	Never	N/A
I wear sterile gown N=86	Fq %	56 62.2	27 30.0	3 3.3	4 4.4
I wear surgical gloves N=86	Fq %	86 95.6			4 4.4
I wear Plastic apron N=86	Fq %	65 72.2		21 23.3	4 4.4
I cover my head N=90	Fq %	90 100			
I put on facial mask N=90	Fq %	90 100			
I put on eye protective N=86	Fq %	80 88.9	4 4.4	2 2.2	4 4.4
I change gloves when are torn N=90	Fq %	90 100			
I put on boots N=90	Fq %	90 100			

The table 4. 5, shows that the observational findings highlighted that most of staff comply with the use of PPE but there is a number of staff that did not comply. The high number of staff 44(48.8%) did not comply with the use of eye protective, 21(23.3%) did not comply with the wearing Plastic apron, 16(17.7%) did not comply with the wearing Sterile gown, 3 (3.3%) did not comply with the wearing surgical gloves.

Table4.5. Compliance with use of Personal protective equipment among theatre staff in the operating room; observational findings.

Variables		Done	Not done	N/A
Sterile gown worn N=86	Fq %	70 77.7	16 17.7	4 4.4
Surgical Gloves worn N=86	Fq %	83 92.2	3 3.3	4 4.4
Plastic apron worn N=86	Fq %	65 72.2	21 23.3	4 4.4
Head covered N=90	Fq %	90 100		
Facial mask worn N=90	Fq %	90 100		
Eye protective used N=90	Fq %	42 46.6	44 48.8	4 4.4
Torn gloves changed N=90	Fq %	90 100		
Boots worn	Fq %	90 100		

Compliance with theatre environment infection prevention standard precautions.

The following table shows that majority of respondents reported that they comply with theatre environment infection prevention standards precautions a hundred percent. But 48(53.3%) reported that the doors are sometimes not closed during operation.

Table4.6: Staff compliance with theatre environment infection prevention standard precautions; self-report

Variables		Always	Sometimes	Never	N/A
Equipment are sterilized	Fq	86			4
N=86	%	95.5			4.4
Trolleys are cleaned	Fq	90			
	%	100			
O.R is cleaned before operation	Fq	90			
	%	100			
O.R is cleaned immediately after operation	Fq	90			
	%	100			
Operating table are cleaned and disinfected immediately after operation	Fq	90			
	%	100			
Door and windows are closed during operation	Fq	38	48		4
N=86	%	42.2	53.3		4.4

The following table 4.7.shows that only 55(61.1%) responded that doors were closed during operation, while 31(34.4%) responded that doors were not closed during operation.

Table4.7. Staff compliance with theatre environment infection prevention standard precautions; observational findings

Variables		Done	Not done	Not applicable
Sterile Equipment	Fq	86		4
	%	95.5		4.4
Trolleys cleaned/disinfected	Fq	86		4
	%	95.5		4.4
O.R cleaned before operation	Fq	90		
	%	100		
O.R cleaned after operation	Fq	90		
	%	100		
Operating table cleaned/disinfected	Fq	90		
	%	100		
Doors are closed during operation	Fq	55	31	4
	%	61.1	34.4	4.4
N=86				

4.2. CONCLUSION

The results of the study revealed non compliance with infection prevention and control standard precautions and sex, age and profession were found to be associated with that compliance in the theatre.

CHAPTER FIVE: DISCUSSION

5.1. INTRODUCTION

Chapter five has discussed the findings in regards to other studies. As the study aimed to assess staff compliance to the infection prevention guidelines in the operating theatre at a selected referral hospital in Rwanda, the discussion was done following the objectives that were: to assess the compliance with hand hygiene practice, to assess the compliance with use of personal protective equipments among theatre staff in operating room and the last to evaluate staff compliance with theatre environment infection prevention standard precautions. Both self-administered questionnaire and observational checklist were used for data collection and all findings were discussed comparably in this part.

5.2. PARTICIPANTS DEMOGRAPHICS

According to the findings of the study in table 4.1, the majority (52.2%) of participants were females comparing to males (47.7%). Most participants were falling between 31 to 35 age group and nurses 39(43.3%) were more than other staff. These findings are similar to these of the study conducted by Shamir et al,(2013) on infection control practices in operating room for 179 staff members performing regularly duties in the OR, where almost 70% of respondents were between the age of 21 to 39 and majority(58%) of them were females(Shamir et al,2013).Also the findings are similarly in the study conducted to evaluate appropriate use of PPE among healthcare providers in tertiary centers Tamil Nadu(Archana et al,2018). showed that among 106 staff nurses were more than Doctors and other technicians respectively 41(38.6%) Doctors,55(51.8%) Nurses and 10(9.4%) other healthcare technicians. In this study the higher number of staff were having between 4 to 6 years of experience working in theatre and the majority 88(97.8%) were not trained compared to 2(2.2%) were formally trained about infection prevention standard precautions in theatre.

5.3.THE COMPLIANCE WITH THE HAND HYGIENE PRACTICE

WHO recommends all health care workers including aides and cleaners to perform hand hygiene as one of standard precautions(WHO, 2014). The findings of the study (table 4.2)of self report shows that most of participants had adherence to the hand hygiene practice but the observational findings revealed non adherence on hand hygiene especially on removing artificial nail and nail polish before starting surgical hand decontamination where 38(42.%) observed not done. These results are in line with the observational study conducted by Trepid et al,(2017) . In tertiary hospital showed

that Rings and other Jewells were not removed(5.93% of participants) during surgical hand washing (29 out of 489). The observed results showed also low practice of hand washing with soap and water on arrival to operating room respecting WHO techniques 85(94.4%). These results are supported by an observational study on A total of 28 operations were observed (60 h of observations) where the average of 0.14 hand-hygiene practices per staff member per hour were found (Trepid et al,(2017).

Upon entering or leaving the OR, hand hygiene was performed in 2% (7/363) and 8% (28/333) of opportunities(Crediet et al,2011). Similarly to the observational study examined level of surgical hand preparation among scrub nurses and surgeons when using alcohol based hand rubs in a central hospital in Finland where the researcher observed the nurses' and surgeons'pre-surgical hand preparation performed with an alcohol-based hand rub, the average times spent on hand rubbing were mostly insufficient(Nuora,2014). The results of this study also revealed insufficient time to the required time(3-5 min for scrubbing)32(35.6%) were observed not done. Defective practices to hand washing were observed also in the study assessed existing practices in the operating theatre regarding hand washing, 33.3% incorrectly answered the question about the proper surgical hand washing, 84.4% of surgical and anesthetists staff demonstrated poor practices regarding hand hygiene routine(Hassan et al., 2015). The observed results are similar to the study conducted by Kredie et al, (2011) on hand-hygiene practices at an academic medical Centre in the operating theatre found that adherence to hand-hygiene guidelines by Operating theatre staff was extremely low.

5.4.COMPLIANCE WITH THE USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Low compliance to the wearing of plastic apron (65%) and use of eye protective(42%) were observed. These findings are supported in Prospective observational cohort to evaluate universal precautions (UP) compliance in the operating room(OR) where poor compliance with eye wear have observed in 24% of 597 health care workers (Hassan *et al.*, 2015). On the other hand, Neo et al (2011), in a phenomenological investigation revealed that wearing protective eyewear was the norm for participants and that using protective eyewear as PPE was part of their perioperative training and continuous education regarding theatre environment.

These findings also are in line with the study done on personal protective equipment compliance in secondary and tertiary health facilities in Nigeria where compliance of respondents with PPE was not at an optimal recommended level as well as respondents revealed that eye goggles or face

shields and ear plugs or muffs were never provided nor used for them (Emmanuel and Lucky,2019). Differently to Archana et al,(2018). in the study evaluated appropriate use of PPE among health care providers in the tertiary center Tamil Nadu, found that among HCPs working in OR, appropriate use of gloves, mask, apron, gown and hair cover was 100% but the use of eye protective was low.

5.5. COMPLIANCE WITH THEATRE ENVIRONMENT INFECTION PREVENTION STANDARDS PRECAUTIONS.

Differently to the recommendations of WHO (2014), and UTHK policy regarding traffic control stated that every effort must be made to reduce wherever possible staff voices and movements in and out of theatres during open procedures and doors to remain closed in order to maintain recommended temperature, humidity and air pressure. The results of this study in table 4.6. Self-reports revealed compliance with theatre environment standard precautions but 48(53.3%) of respondents reported non compliance with closing doors during surgical operation. Similarly, the observational findings in table 4.7, Confirmed that doors were not closed during operations as 31 (34.4%) observed not done.

5.6. CONCLUSION

Comparing to the results from other studies done ,it has been shown that not only for this study the compliance with standard precautions in prevention and control of infections in the theatres was generally substantial, especially in order to prevent surgical site infection.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0. INTRODUCTION

This chapter provides the conclusion of the study and recommendations for further increasing compliance with infection prevention and control standard precautions in prevention of surgical site infections (SSIs).

6.1. CONCLUSION

According to the results from this study done, respondents' self-reports showed compliance with some items of infection prevention standard precautions while observational findings revealed non-compliance with most of them. Therefore, efforts should be made to enhance compliance through continuous trainings and periodic audits of practices in the operating theatre in order to prevent surgical site infections.

The results of observational findings showed poor compliance with hand hygiene as social hand washing with soap and water on arrival to the operating room and removing nail polish before starting surgical hand decontamination were poor. Insufficient time for surgical hand washing less than 3-5min required time was observed. Low compliance with use of personnel protective equipment like wearing plastic apron and use of eye protective were observed. Non-compliance with closing doors and windows during operation were found.

6.2. RECOMMENDATIONS

After this study results to enhance compliance of healthcare providers in different theaters, the following recommendations should be considered:

6.2.1. Nursing practice

Continuous in service training on Infection prevention and control is needed for all theatre staff.

6.2.2. Nursing administration

Continuous evaluation and audits on compliance with standard precautions for infection prevention and control need to be done and feedback to be given individually.

6.2.3. Nursing education

Infection prevention and control standards precaution to be emphasized on in the academic curriculum.

6.2.4. Nursing research

Further researches to identify factors contributing to non compliance with infection prevention standard precautions in the operating theatres have to be conducted.

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APPENDIX

COMPLIANCE TO SURGICAL SITE INFECTION (SSI) STANDARD PRECAUTIONS

SELF ADMINISTERED QUESTIONNAIRE

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Age

2. Sex: M F

3. Profession:

Surgeon Nurse Anesthetist Cleaner

4. Professional experience

a. 1-6 months

b. 7-12 months

c. 1-3 years

d. 4-6 years

e. more than 6 years

5. Training in operating theatre infection prevention standard precautions

Yes NO

SECTION B: COMPLIANCE TO SSI STANDARDS PRECAUTIONS

	Standard precaution	Standard precautions compliance			
		ALWAYS	SOMETIMES	NEVER	N/A
	I. Hand hygiene				
1	I remove Jewellery,artificial nail and nail polish before starting hand hygiene				
2	I wash hand with soap and water on arrival to OR respecting WHO Technique				
3	I performe surgical hand antiseptis before donning sterile gloves				
4	I respect respected 3-5 min for Scrubbing				
5	I dry hand and forearms well before donning sterile gloves				
	II. Using personal protective equipment				
6	I cover my head				
7	I put on facial mask				
8	I put on eye protective				
9	I put on boots				
10	I wear Plastic apron				
11	I wear sterile gown				

12	I wear surgical gloves				
13	I change gloves when are torn				
III. Theatre environment					
14	Equipment are sterilized				
15	Trolleys are cleaned				
16	O.R is cleaned before operation				
17	O.R is cleaned immediately after operation				
18	Operating table are cleaned and disinfected immediately after operation				
19	Door and windows are closed during operation				

Igicecyo 2: Ibikorwabikorwa mu kurwanyakwandurakwibisebe mu ibagiro

	Amabwiriza	Uburyobikorwa			
		Burigihe3	Rimwenari mwe2	Ntibikorwa1	Ntibin deba
	Isukuy'intoki				
1	Nkuramo ibikomo n'ama verine ku nzara mbere y'uko ntangira akazi mu nzu y'ibagiro.				
2	Nkaraba intoki n'isabune iyo ngeze mu nzu y'ibagiro.				
3	Nkaraba disinfectant mbere yo kwambara uturindantoki turi siterile.				
4	Nubahiriza imino tahagati y'itatu n'itanu yo gukaraba intoki.				
5	Numutsa intoki kugera ku kuboko mbere yo				

	kwambara uturindantoki turi siterire				
GUKORESHA IMYAMBARO IKURINDA					
6	Nambara ikanzu ibigenewe iri siterire				
7	Nambara uturindantoki tugenewe kwambarwa mu ibagiro turi siterire				
8	Nambara igishura cya parasitiki				
9	Nambara ingofero				
10	Nambara udupfukamunwa n amazuru				
11	Nambara indorerwamo zirinda amaso				
12	Mpindura uturindantoki iyo ducitse				
13	Nambara bote				
Isuku mu nzuy'ibagiro					
14	Ibikoresho biba biri siterire				
15	Ameza ajyaho ibikoresho aba ahanaguye na desinfegita				
16	Icyumba kirasukurwa mbere yo kubaga				
17	Icyumba kirasukurwa uwo mwanya bakimara kubaga				
18	Igitanda cy'umurwayi kirahanagurwa uwo mwanya bamaze kubaga				
19	Amadirishya n`inzugi ziba zifunze iyo barimo kubaga				

OBSERVATIONAL CHECKLIST:

BASIC ELEMENTS OF UNIVERSAL PRECAUTIONS FOR SSI PREVENTION

Standard precaution				
I. Hand hygiene				
		done	Not done	N/A
1	Jewellery ,artificial nail and nail polish removed before starting surgical hand decontamination			
2	Hand wash with soap and water on arrival to OPR respecting WHO Technique			
3	Surgical hand antisepsis performed before donning sterile gloves			
4	Scrubbing time respected 3-5 min			
5	Hand and forearms well dried before donning sterile gloves			
II. Personal protective equipment				
6	Sterile gown worn			
7	Surgical Gloves worn			
8	Plastic apron worn			
9	Surgical site cleaned with disinfectant			

10	Head covered			
11	Facial mask worn			
12	Eye protective used			
13	Torn gloves changed			
14	Boots worn			
III. Theatre environment				
15	Sterile Equipment /			
16	Trolleys cleaned/disinfected			
17	O.R cleaned before operation			
18	O.R cleaned after operation			
19	Operating table cleaned/disinfected			
20	Doors are closed during operation			

INFORMED CONSENT

Dear participants,

I **MUKAMURENZI Emelie Annonciata** student at College of Medicine and Health Sciences (CMHS), University of Rwanda school of Nursing and Midwifery. I am conducting a study in accordance with the requirements for master's degree in nursing sciences track of perioperative.

The topic of the study is “**Compliance with infection control standard precautions in prevention of surgical site infection among theatre staff in operating room at a selected referral hospital in Rwanda**” that will involve staff working in theatre of UTH of Kigali with the population of 90 persons including Surgeons, Nurses, Anesthetists and Cleaners. The study will be done under the supervision of Mrs Joselyne MUKANTWARI and Dr Lilian OMONDI.

The objectives of the study are:

1. To assess compliance with hand hygiene practices among theatre staff in operating room,
2. To assess the compliance with use of Personal protective equipment among theatre staff in operating room,
3. To evaluate staff compliance with theatre environment infection prevention standard precautions.

You are invited to participate in this study by fulfilling the questionnaire for research. The information given by respondents will remain strictly confidential and I guarantee that this study will not have any harmful effect on the person's life. Participants will take part from the beginning until the end of the study and the participation in this study is voluntary and you have the right to stop participating at any time or step without any penalty. If you have any question regarding this study or wish to report any problem you have experienced please call on the researcher contact: **0783190622**.

Thank you.

PARTICIPANT AGREEMENT

I willingly agree to participate in this study.

Date. / / 2019 Signature

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 14/01/2019
Ref: CMHS/IRB/057/2019

MUKAMURENZI Emelie Annonciata
School of Nursing and Midwifery, CMHS, UR


Dear MUKAMURENZI Emelie Annonciata

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled "*Compliance With Infection Control Standard Precautions In Prevention Of Surgical Site Infection Among Theatre Staff In Operating Room At Selected Referral Hospital In Rwanda*".

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

We wish you success in this important study.



Professor Jean Bosco GAHUTU
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:

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



**CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL**

Ethics Committee / Comité d'éthique

March 13th, 2019

Ref.: EC/CHUK/040/2019

Review Approval Notice

Dear MUKAMURENZI Emelie Annonciate,

Your research project: "Compliance with infection control standard precautions in prevention of surgical site infection among theatre staff in operating room at CHUK".

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 25th February, 2019 to evaluate your request for ethical approval of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your research project.

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

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

Yours sincerely,



Mr. Emmanuel MUNYANEZA
The Secretary, Ethics Committee,
University Teaching Hospital of Kigali

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