KNOWLEGDE AND PRACTICE OF STANDARD PRECAUTIONS FOR INFECTION CONTROL AMONG SURGICAL TEAM MEMBERS AT RWANDA MILTARY HOSPITAL

by

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College Of Medicine and Health Sciences

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DECLARATION

I declare that this Dissertation contains my own work except where specifically acknowledged

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DEDICATION

I wish to thank the following persons for their contributions to this dissertation:

Rwanda Military Hospital administration which facilitated along period of study.

My wife, MUKAYIRANGA Beathe, my twins boys Pedro Miguel Manzi and Pablo mikel Ngenzi , for her invaluable support and encouragement.

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ABSTRACT

Introduction: The primary goal of surgical team is to prevent the surgical site infection but also to ensure the safety of both patients and operating room health care team. Surgical team members and patients are highly exposed to hospital acquired infections (HAIs) such as Human immune virus (HIV), hepatitis virus B and C (HBV and HCV) and other blood borne diseases due to invasive procedures result in blood and body fluid which prevented by applying standard precautions for infection control. The research intended to assess the knowledge and practice of standards precautions (SPs) for infection control among surgical team members working at Rwanda Military Hospital (RMH)

Methods: A cross-sectional study design using a self-administered questionnaire was used on 105 participants including nurses (32.4%), surgeons (20%), anesthesia providers (23.8%) and17.1% students working in operating theatre at RMH .They selected by simple Random sampling method. Data were analyzed using SPSS version 16 with descriptive and inferential statistics.

Results

The majority of study participants were males (61%), 20-29years old (51.4%), with 0-4years (42%) and 5-9years (38.1%) of experience. 71.4% of participants were aware of the concept with 62.8% that had a good knowledge of SPs, associated with experience, age and Gender (men) ($P<0.005$). Practices of SP was good for hand washing (>86%) but the use of PPEs and solid wastes management were poor. good knowledge on Infection Prevention SPs was associated with hands hygiene practices (p-value<0.001) with water and soap for 10-15 seconds (P-value=0.024) and complying with 5 Moments of hands hygiene (p-value=0.018). But it was not associated with needles and sharps management and solid wastes managements (p-value< 0.05). Facility do not provide all necessary equipment and supply to perform infection control SPs (80%)

Conclusion

More than a half but not enough of study participants had good knowledge on standards precaution and they had a training SPs. Practice of wastes management and PPEs use were poor, and the facility does not provide all necessary equipment to apply SPs.

OPERATIONAL DEFINITIONS OF KEY TERMS

Infections: are living organisms that growing and multiply in human body, in tissue or body surface and can cause harm or diseases and tissue reaction. And transmitted through duty hands of healthcare providers or patients.

Standard precautions are combination of measures elaborated by CDC for governing infection control practice in health care settings to both protect patients and healthcare providers; from different sources of infection mainly body fluids, blood and secretions. Those standard precautions include hand hygiene, use of personal protective equipment, safe handling of sharps, proper waste disposal

Nosocomial infections is the term used to define contagious diseases acquired in a hospital or other healthcare settings ; by a patient or healthcare providers during hospitalization or during their daily hospital activities either diagnostic ,treatment or rehabilitation due to duty hands .

Infection control is the processes and activities that identify and reduce the risks of acquiring and spreads of contagious diseases among healthcare workers and patient's vice-versa.

LIST OF SYMBOLS, AND ABBREVIATIONS/ACRONYMS

BBF: blood and body fluid

KP: Knowledge, and Practice

HAI: Hospital Acquired Infection

HAV: Hepatitis A Virus

HBV: Hepatitis B Virus

HCV: Hepatitis C Virus

OR: Operating Room

OSHA: Occupational Safety and Health Administration

PPE: personal protective equipment

RMH: Rwanda Military Hospital

SPSS: Statistical Package for the Social Science

SPs: Standard Precautions

SPSS: Statistical Package on Social Science

UR: Univerisity of Rwanda

WHO: Word Health Organization

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CHAPTER ONE: INTRODUCTION

1.0 INTRODUCTION

The chapter one of this study will much explain about background standard precautions; Problem statement, objectives of the study, research questions and significant of the study.

1.1 BACKGROUND

Standards precautions are set of measures or guidelines established by Center for Diseases Control (CDC) 1996 (which were initially 1985 called universal precaution) to minimize hospital acquired infection (HAIs) mainly those spread through blood and body fluid, through hand washing, utilization of appropriate protective equipment (gloves, mask, gown, and eye wear) and proper handle and disposal of sharps and sold waste to prevent injuries and contamination during procedures. (Yakob and Lamaro, 2015, p. 1)

As described by CDC; blood and body fluid, are main sources of Human immune virus (HIV) and different type of hepatitis virus like hepatitis B and C (HBV and HCV) and other various blood borne diseases to minimize those risk of HAI_S transmission. It is advised to each healthcare provider to apply standard precautions to all patients in healthcare setting regardless to diseases or conditions of the patients (Ghidaa Al-Mahdali, 2015, p. 2)

Surgical team members are highly exposed to the different diseases from blood and body fluid; instruments and much soiled waste(Who, 2009, p. 5)

The Occupational Safety and Health Administration (2002) estimates that 5.6 million HCWs worldwide, who handle sharp devices, are at risk of occupational exposure to blood-borne pathogens. Needle stick injuries were shown to be the commonest (75.6%) mechanism for occupational exposure in hospital (Buowari, 2012, p. 12).

In Portugal study concern with evaluation of the knowledge and attitudes to the standard precautions for infection control done in Portuguese central hospital revealed 7% of 174 health care providers are not familiar with standards precaution measures . (Aires *et al.*, 2010)**.**

Studies done in Latin America, Sub-Saharan Africa and Asia and other different parts of the world justified a high different in the prevalence between high income countries and low income countries; as the poor practice, knowledge and adherence to Standards precautions where 40% of all admitted patients have hospital acquired infection in ;5% up to 10% in North America and Europe due to poor adherent to standards precautions among healthcare in those low income countries (Acharya *et al.*, 2013, p. 32).

In brazil **s**howed that despite knowledge presented by healthcare personnel about standard precautions they are poorly perform standard precautions for HAI_S control .therefore knowledge was different from what they practiced (Garcia-Zapata *et al.*, 2010, p. 3).

In India where the study done to assess performance of infection control measures revealed that the few operating room staffs practice infection control measures consistently which is very meaningful to the existing of surgical site infection (Cawich, Tennant and Mcgaw, 2013, p. 3)

In Egypt study reported 71.8 % Nurse had needle stick injuries due to inappropriate handle of sharps, and inconsistent use personal protective equipment (Dorgahm and Obied, 2016, p. 122)

World health organization for explained the degree of poor practice and limited knowledge regards infection control standards precautions by identify the high prevalence of infectious hospital acquired diseases such as HIV hepatitis A and B that due to exposure to blood and body fluid. where 2,5% HIV Hepatitis 40% of A and B infections are due to sharps punctures and blood and body fluid contact (Abdulraheem *et al.*, 2012, p. 1.)

In United states of America study about hospital acquired infection results demonstrated that in 2011, there were an estimated 722,000 hospital acquired infection cases, where by 75,000 patients with HAI died during their hospitalizations (CDC, 2010).

In Africa where many studies are not published .prevalence of HAIS is 2.5 to 14.8 in some countries including Tanzania in Easter Africa and Senegal and Burkina Faso in west Africa But (Who, 2009; Wasswa *et al.*, 2015, p. 3).

Surgical team members is made up by surgeons, nurses, anesthetists these healthcare provides. This group of healthcare workers are highly exposed to hospital acquired infections (HAI_S); due to their work nature that are generate blood and body fluid, which are main sources of Human

immune virus (HIV) and different type of hepatitis virus like hepatitis B and C (HBV and HCV) and other kinds blood borne diseases. Therefore to minimize those risk of HAI_S transmission ; it is the responsibility of each surgical team member to apply standards precautions for infection control(Ghidaa Al-Mahdali, 2015, p. 3). All surgical team members as well as other health care workers are recommended to apply those standards precautions in operating room when they are caring of all patients for mutual safety (Mythri, Arun and Kashinath, 2015, p. 110) .

Differents studies done on standard precautions for infection control most of them concluded that SPs are affordable and effective measures to prevent transmission of infection in healthcare facilities. ;moreover consequences result from noncompliance of standards precautions expose healthcare providers to hospital acquired infection to healthcare personnel (Wasswa *et al.*, 2015, p. 2); (Babaji and Bulama, 2015, p. 2) and (Abdulraheem *et al.*, 2012, p. 1).

unequaly respect to standards precautions for infecfection control between developed contries and developing contries ,was adentified by diffrents reseaarchers where developed contries have high compliance than developing contries.(Alice, Danny and Ikponwonsa, 2013, p. 122) Ttherefore the study is very important to assess knowledge and practice among surgical team members.

1.2 PROBLEM STATEMENT

In Rwanda, the researcher during clinical practices realized that there is limited knowledge and poor practice of standard precautions among surgical team .However there are few documented evidence regarding this issue. World health organization for explained the degree of poor practice and limited knowledge regards infection control standards precautions by identify the high prevalence of infectious hospital acquired diseases (HIV hepatitis A and B) result to exposure to blood and body fluid, where 2,5% HIV Hepatitis 40% of A and B infections are due to sharps punctures and blood and body fluid contact (Abdulraheem *et al.*, 2012, p. 1.).

Various Studies done in developed and developing countries has identified the high different level of practice and knowledge between them among healthcare workers. Where in developed counties they are knowledgeable and perform standard precautions properly than in developing countries as evidenced by the reported prevalence of hospital acquired infection in staffs and in patients (Jacob, 2015.p2)

Based on the increase of hospital acquired infection rate, surgicacal team members are among the most vulnerable risk groups of HAIs due to their work nature . Moreover little is known about infection control standards precautions among surgical team members. These trigger researcher to assess the knowledge and practice of infection control standards precautions surgical team members at Rwanda military hospital.

1.3 OBJECTIVES

1.3.1 Main objective

To assess the knowledge and practice of standards precaution of infection control among surgical team members at Rwanda Military hospital.

1.3.2.specific objectives

To assess the demographic characteristics of respondents among surgical team members at Rwanda military hospital.

To assess knowledge of standards precaution of infection control among surgical team members at Rwanda military hospital.

To assess practice of standards precaution of infection control among surgical team member at Rwanda Military Hospital.

To determine the association between knowledge and practice of infection control standards precautions surgical team members at Rwanda Military hospital.

1.4 RESEARCH QUESTIONS

What are the demographic characteristics of respondents among surgical team members at Rwanda military hospital concerning standard precautions?

What are the knowledge surgical team members at Rwanda military hospital concerning standard precautions?

How surgical team members working at Rwanda military hospital practice Standard precautions?

What is the association between practice and knowledge regarding the infection control standard precautions among surgical team members?

1.5. SIGNIFICANCE OF STUDY

In recognition of surgical team members work that exposes them to the high risk of infectious diseases; there is need to assess knowledge and practice of standards precautions among surgical team members. Therefore findings of study expose the actual knowledge and practice of standards precautions for infection control among surgical team members at Rwanda military hospital in the contest of this institution because the studies done in other hospitals all the countries may not have applicable due to uncommon influencing factors.

This is foundation of planning and interventions relevant to infection control standards precautions at RMH, Country and region. Researchers can use as referencing material conducting studies relevant to this study use as academic knowledge supplement.

1.6 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, and permission to conduct the research.

1.7. 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 TWO. LITERATURE REVIEW

2.0 INTRODUCTION

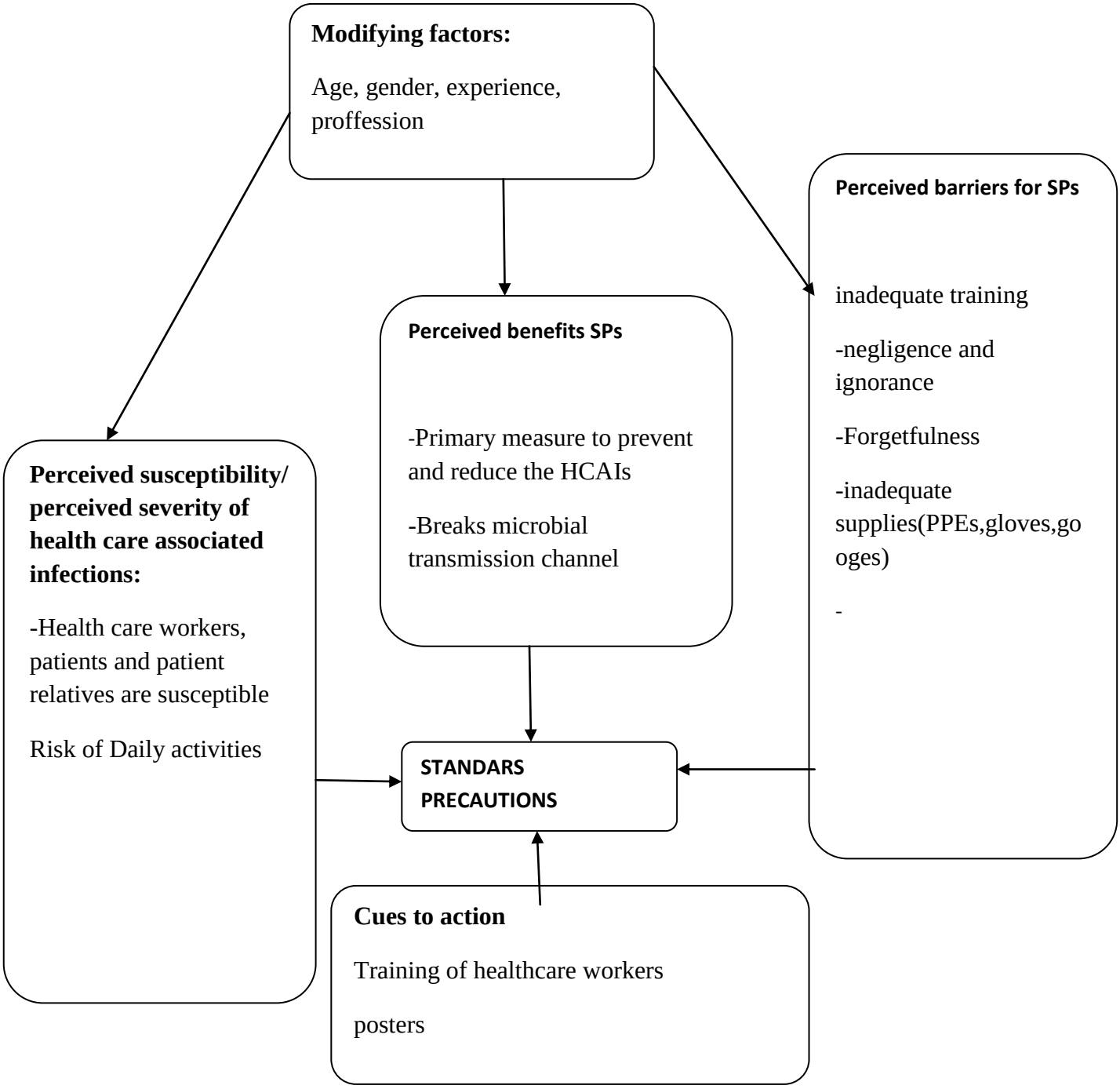
This second chapter of this study the researcher goes to discuss widely about the literature review relevant the assessment knowledge and practice of standards precaution among surgical team members.

2.1. THEORETICAL FRAMEWORK

Researcher preferred to use the health belief model (HBM) as study guide model to assess knowledge and practice of SP_S for infection; as it clarifies the relationship between individual's beliefs and health behaviors. Therefore this model used to improve the culture of prevention of health threatening conditions as well as performing healthcare activities as recommended .The HBM has the following components which will be adopt in the study which are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy has been identified as The HBM six constructs:. Glanz, et.al, 20h08 p7). The above HBM components applied by healthcare workers when they became aware of how the susceptible to the health threatening conditions such as HAI_S due to their daily activities ;and they are aware that it is easy to prevents than cure .They will be eager to know and practice standard precautions in order to prevents any consequences can result from ignorance and negligence in prevention of hospital acquired infection .Moreover training of healthcare workers and provide the reminders in places of worker such as posters can be a good cues of actions which build efficiency and confidence that SPs will minimize the risk getting infected. Therefore the healthcare workers complies with SPs after recognize that those actions are more important than barriers and cost.

Surgical team members are among the healthcare workers who are highly exposed to hospital acquired infections (HAI_S); due to their work naturally, generate blood and body fluid as well as handling sharps and needles which are main risk factors of Human immune virus and different type of hepatitis virus like hepatitis B and C and other blood borne diseases. Therefore to minimize those risk of HAI_S transmission ; it is the responsibility of each surgical team member to apply standards precautions for infection control(Ghidaa Al-Mahdali, 2015)

HEALTH BELIEF MODEL



2.3 KNOWLEGDE ABOUT INFECTION CONTROL STANDARD PRECAUTIONS

Standards precautions are set measures or guidelines designed to control hospital acquired infection mainly those spread through blood and body fluid, applied to all patients in healthcare setting baseless to diseases or condition of the patients. Standard precautions rules explain that body fluid and blood contain of causative agents of infections (Yakob and Lamaro, 2015, p. 2).

According to Hunt,(2003) Knowledge is the way of thinking about the set of expected achievements base on the safety, effectiveness ,comfort and satisfaction as well as taking action to the changing situation due to resets of the objectives and expected achievements.

WHO has worldwide reinforce measures and willing to reduce the hospital acquired infection by suggesting the regular basis staff training, charts in working place that keep the healthcare workers up to date to infection control SPs performance. (Allegranzi, et.al, 2010,p.3)

Studies done identified that the most priority step for infection control is to train healthcare providers. Therefore precautions can't be achieved unless the healthcare providers have enough knowledge about SPs. Limited knowledge is the barrier implementing infection control standard precautions(CDC, 2010, p. 15)

Organization of training about hospital acquired infection simultaneously with standard precautions for infection control showed a greater results regarding of reduction of the rate of infection in healthcare settings.(Ferrer *et al.*, 2016, p. 403)

The research done in one of Portuguese hospital on 174 health care workers relevant to SPS revealed that only 7 over 100 of respondents were not aware of SPs(Aires *et al.*, 2010, p. 192)

the study in Palestine hospital expose that the more health care providers have high qualifications and have training concern infection control the more show positive impact of practice SP_S for hospital acquired infection control . (Fashafsheh, 2015, p. 82).

Study done in Ethiopia about Knowledge, Practice, and Associated Factors towards Prevention of Surgical Site Infection among nurses showed that more than half of the nurses who participated in the survey had inadequate knowledge about the prevention hospital acquired infection.

study about Knowledge, Attitude and Practice about Standard Precautions for Hospital-Acquired Infection in Teaching Hospitals Affiliated to Zabol University of Medic. study was conducted on 170 participants and revealed that 43% of the participants in this study had poor knowledge(H Sarani *et al.*, 2016, p. 193)

knowledge and practice of infection control among health workers in a tertiary hospital in Edo state, Nigeria revealed how the knowledge regarding the hospital acquired infection prevention is relevant to the profession ; where doctors has high number with good knowledge than nurses. (Alice, Danny and Ikponwonsa, 2013, p. 194)

Study done about Implementation of infection control in health facilities in Arua district, Uganda: fairly knowledgeable most infection control measures in healthcare were observed among healthcare workers (Wasswa *et al.*, 2015, p. 2)

In Korea study revealed that there is relationship of proper performance of infection control standard precautions and regular basis training among healthcare providers working in health settings therefore knowledge boosted by regular training .(Abdulraheem *et al.*, 2012, p. 12)

2.4 PRACTICE ABOUT INFECTION CONTROL STANDARD PRECAUTIONS

According to CDC(2010) Health care providers to prevent HAIs should directed by infection control Standard Precautions in their patients care activities by practice regular hand hygiene , use personal protective equipment when contact ,correct disposal of sharps ,other clinical waste and housekeeping.

Literature review about practice of infection control standard precautions organized according to the elements of infection control standards precautions

2.4.1 Hands hygiene

It have been evidenced that the duty hands are the most means of crossing infection between HCWs and the patient to patient and between HCWs themselves .(Ansari *et al.*, 2015)

According to CDC,(2010) the most particular essential and useful infection control standard precautions is hands washing using soap and water or alcohol base products before during and after taking care of the patients to kill germs that attributed to cause the HAIs.

Study done about Knowledge, Attitude and Practice towards Infection Control Measures among Mizan-Aman General Hospital .Workers, South West Ethiopia on 135 respondents. Ninety two (68.7%) of Healthcare providers respect the hand washing in consultation of the patient to prevent cross infection between person to person. 84 (62.5%) of HCWs recap needle immediately after using them (Yakob and Lamaro, 2015, p. 2)

It has worldwide agreed that hand hygiene is very important and cheapest among measures of control HIAs in healthcare settings. However Several studies done worldwide on hand hygiene practice has shown poor adherence to hand hygiene practice due to different factors such as heavy work load (Mahrous, 2016, p. 6).

2.4.2 Personal protective equipment

Personal Protective Equipment(PPEs) is one of infection control standards precautions elements used by healthcare providers to isolate themselves from blood; body fluid which are the source of infection transmitted .however PPEs do not completely remove the risk of acquiring infection. (Who, 2004, p. 112)

Findings of a study done by (Jain &Dogra 2012,p.1) indicated that less than half of the participants used caps, masks, and gowns as part of SPs barrier precautions while Nurses used these maximal barrier precautions.

Study done about Knowledge, Attitude and Practice towards Infection Control Measures among South West Ethiopia on 135 respondents, 57 (42.2%) of Healthcare providers think that they apply standard precaution always. Among respondent 63 (46.8%) of Healthcare providers s practice standard blood and body fluid precautions always. One hundred three (76.5%) of HCWs wear gloves while they took blood sample (Yakob and Lamaro, 2015, p. 2)

A study done by Okechuku, (2012) in Nigeria revealed that HCWs always used gloves when they anticipated contact with body fluids, non-intact skin and mucus membranes and use of other PPEs (Gowns, aprons ,masks and eye protection during procedures likely to generate splashes of blood and body fluids was low . The same results of study about Infection control awareness among healthcare providers in family health settings in ethiopia on 141 nurse revealed that practice of wearing protective gloves when they taking care the patients was 94.3% among Nurses (Salam, El-shazly and Dewidar, 2014, p. 3)

Finding of study done about Health Care Workers Adherence to Infection Prevention Practices and Control Measures: A Case of a Level Four District Hospital in Kenya. In 69 nurses 91.2% of them reported that they use personal protective equipment when they work. (W. Gichuhi, 2015, p. 3)

2.4.3 Sharps managements

According to WHO explained safe injection as the one of standard precautions deal with the effective and best practice of injections without harm to the patient, healthcare providers and community .According (Who, 2004).revealed that there is increase of prevalence HCV and HIV attributed to unsafe inJection50% all injection are posing risk to the patients' healthcare providers and community. Therefore result 41 percent of new HCV infections, and 5 percent of new HIV infections.

Result of study done about Knowledge, Attitude and Practice towards Infection Control Measures among Mizan-Aman General Hospital Workers, South West Ethiopia they have been practice hazardous injection which pose the patients at higher risk of acquiring hospital infection as demonstrated on 135 respondents 84 (62.5%) of HCWs recap needle immediately after using them (Yakob and Lamaro, 2015, p. 3)

According to Wasswa et al.,(2015,p.3) o studies implementation of infection control in health facilities in Arua district, Uganda: a cross-sectional study find there were high rate of HCWS practice hazardous infections in 186 respondents 34.4% of healthcare providers recapping the needle.

2.4.4. Waste disposal

waste disposal is a key in controlling and reducing HAIs as Health care waste is a potential containing microorganism which are need to be handled with care so that limit or prevents the transmission of pathogenic microorganism in healthcare setting therefore reliable and effectiveness of waste management process and appropriate containers should be respected as safety of HCWs as well as the patients. (Umar A, Sc and Yahaya, 2014)

Findings of study about Infection control awareness among healthcare providers in family health settings in Shebin El-kom district, Menoufia revealed the good practice of clinical waste practice properly of disposal of medical and hazardous wastes.(Salam, El-shazly and Dewidar, 2014)

2.5 CONCEPTUAL FRAMEWORK

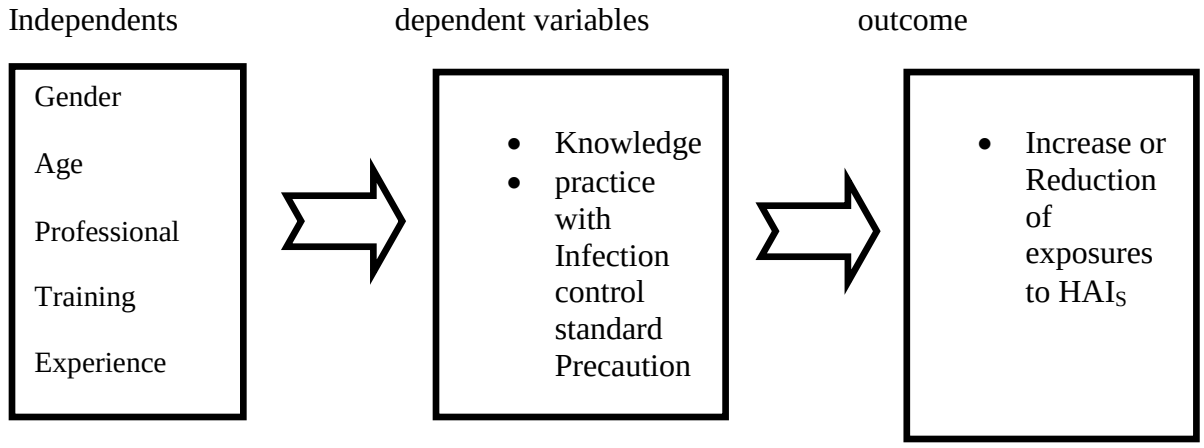


Figure 1. Conceptual framework

CHAPTER THREE: RESEARCH METHODS

3.0 INTRODUCTION

This third chapter of this study of assessing knowledge and practice of standards precaution for infection control among surgical team members working at Rwanda military hospital describe the flowing major contents : Study design, Research approach, Research setting, Population, Sampling Strategy, Data collection instrument, Data collection procedures, Data analysis, Ethical considerations, data management, data dissemination and study limitation.

3.1 STUDY DESIGN

The study employed a quantitative, non-experimental descriptive design, in which numerical will be used to obtain information about knowledge and practice of SPs among surgical team members, describe and examine relationship among dependents and independents variables without manipulation of variables**.**

3.2 STUDY SETTING

The study will be conducted in Rwanda Military Hospital located in Nyarugunga Sector, Kicukiro District, and Kigali City. RMH is one of the four referral hospitals in Rwanda that serving military and civilian population. RMH has different departments out patients, laboratory, medical and surgical departments, diagnostic imaging department and support services. RMH has complex operating theatre which has five active operating rooms; and used by different surgical specialities include General surgery, orthopaedic surgery ,maxilofacial, ENT surgery, Gyneco-obstetric surgery and plastic surgery. Average of twenty surgeries done daily in this operating room.

3.3 STUDY POPULATION

The study population was estimation of 144 surgical team members working in Operating theatre including students. Those participants are nurses ,consultants surgeon postgraduate surgeons, nurse students anesthetists .researcher choose to conduct this study on surgical team members because they are highly exposed ;and prone to Hospital acquired infection due to their daily activities which expose them to blood and body fluid ; Such as participate in surgical procedures

Handling sharps instruments, handle the equipment, taking intravenous lines, and injection practice and manage traumatic wounds patients.

3.4. SAMPLING

3.4.1. Study sample

The sample size was calculated by using Fisher (1998) formula:

n = z^2pn/d^2

n stand for is the minimum sample size

Z is the standard normal deviate set at 95% and the confidence limit is at 1.96

P is the prevalence of nurses who will participate in study equal to 0, 5 (50%)

q = 1-p (complementary probability) =1-0.5=0.5

d is the degree of precision (the margin of error) usually at 5% =0.05

Therefore

n = $(1.96)^2 \times 0.5 \times 0.5/(0.05)^2$

= $3.8416 \times 0.25/0.0025$

= 0.9604/0.0025

= 384.16

If the population is less than 10 000, the following formula is applied:

Nf = $\frac{n}{1}+(\frac{n}{N})$

Where;

Nf is desired sample for population less than 10 000

n desired sample size for population greater than 10 000.

N is estimate of the population size equal to 144

Therefore the desired sample size is 384/1 (384/144)

Nf= 384/ (1+2.66)

Nf =384/3.66

Nf =105

Therefore the sample size was one hundred and five participants

3.4.2. Sampling strategy

Non probability simple random sampling method was used to get study simple ; list of all surgical team members was prepared and whoever met the criteria had equal chance to be recruited for study.

3.4.3. Inclusion and exclusion criteria

Inclusion criteria

Male and Female

RMH Staff Surgical team members

Students theatre who were working in Operating during study period (Nurses and medical)

Exclusion criteria

Working was not part of exclusion criteria as the study was assessing baseline knowledge and practice related to infection control; that all participants supposed to have.

Surgical team members who were not consenting and willing to participate in the study.

3.5. DATA COLLECTION

3.5.1 **Study tools**

To collect quantitative data; semi-structured questionnaire which had three parts which (demographic data, part of assessing knowledge and part of assessing practice) was used. This questionnaire for assessing knowledge and practice on SPs among healthcare workers was first established by center for disease control and used by many researchers in different worldwide countries include one of our region like Kenya by MOYO; in the study of assessing compliance of SPs among nurses. CDC (2010); (MOYO, 2013).Minor changes of questionnaire done to adapt it to operating room context and surgical team members. Its content validity is confirmed by the relationship between objectives of the study and variables to be assessed. The experts in research also approved the tool.

For validity of questionnaire; ten participants were recruited for piloting study of instruments. This enabled the researcher to test the validity of the data collection tools and therefore facilitate

the researcher to make necessary corrections. This questionnaire was checked for completeness and consistency upon collection.

3.5.3. Data collection procedure

After obtaining the ethical approval from University of Rwanda and Rwanda military hospital research committees, researcher presented questionnaires in operating theatre. Researcher met with study participants; obtain informed consent after explain how the study be conducted. The researcher distributed self-administration questionnaires them .The researcher was available to answer any problem arise during filling the questionnaires. Questionnaires were collected and checked from unit manager office to ensure that all the information had been properly collected and recorded.

3.6. DATA ANALYSIS

Statistical Package on Social Science (SPSS) was used to analyze the quantitative data. Chi-square test for independence used to discover if there is a relationship between two categorical variables and Fisher exact test was used for two nominal variables and y wanted to see whether the proportions of one variable are different depending on the value of the other variable. Used it when the sample size was small. .

3.7. THICAL CONSIDERATIONS

Before conducting this study, ethical approval was obtained from university review board and RMH ethical research and education committee. In addition, participants were given information about the purpose of the study. The researcher maintained protection of human rights during this study. Inspect to right to self-determination, participants were included in the study only after signing informed consent. Confidentiality of was ensured to Participants where no disclosed of any personal information (anonymity) by no use of personal identification either name or photo and identity card number. The collected answered questionnaires will be kept in locked locker

3.8. DATA MANAGEMENT

After data collection, all questionnaires were collected back 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.

3.9. DISSEMINATION OF RESULTS

The report on the findings of the study was written and will be presented to University Of Rwanda, School Of Nursing and midwife and Rwanda Military Hospital. The report submitted to everyone who sponsored my study.

3.10. LIMITATIONS AND CHALLENGES

The findings of this study can be generalize to all RMH staff due to small sample.

CHAPTER FOUR. DATA PRESENTATION

4.0. INTRODUCTION

The section presents the findings from the study that took place at RMH theatre from March to May 2017. A total of 130 study self-administered questionnaires were distributed to surgical team members who accepted to participate to the study. Only 115 questionnaires (88%) came back to the researcher. Among them, 105 questionnaires (91.3%) were full completed by the respondents; other 10 questionnaires were poorly completed so that they were not considered during data entry. The data are presented in tables and interpreted.

4.1. DEMOGRAPHIC CHARACTERISTIC

As it is presented in table 4.1, a total 105 surgical team members at Rwanda military hospital participated in this study after signing a consent form**.** The majority of them (**51.4**%, n=54) were 20-29 years old, 4.3% (n=36) were 30-39years old and 14.3% (n=15) were 40-49years old within majority males (61%, n=64) versus females (39%, n=41). Most of the participants are registered nurses (32.4%, n=34) followed by anesthesia team (23.8%, n=25), surgeons (20%,n=21), students nurses (17.1%, n=18) and a small proportion of GP medical doctor (6.5%,n=7).

Regarding the Working experience, the majority has 0-4 years of experience (42%, n=42), 5-9years (38.1%, n=40). Only 20 participants (19%) that have a working experience of more than 10 years.

Table 4. 1. Profile of respondents

Demographic Characteristic	Frequency	Percent
Age		
20-29	54	51.4
30-39	36	34.3
40-49	15	14.3
Sex		
Male	64	61.0
Female	41	39.0
Occupation		
Registered Nurse	34	32.4
Anesthesia team	25	23.8
surgeons	21	20.0
GP* medical doctor	7	6.7
student nurse	18	17.1
Working years of experience		
0-4 years	42	40.0
5-9years	40	38.1
10-14years	3	2.9
15+ years	20	19.0
Total	**105**	**100%**

*GP general practitioner medical doctors.

4.2. KNOWLEDGE OF STANDARDS PRECAUTION OF INFECTION

4.2.1. Knowledge of standards precaution of infection

Table 4.2. Knowledge of standards precaution of infection

Knowledge on Infection control Standard Precautions	Frequency	Percentage
Awareness of infection control SPs		
No	30	28.6
Yes	75	71.4
Total	**105**	**100%**
Self reported knowledge on the elements of SPs		
Yes	75	71.4
No	30	28.6
Total	**105**	**100%**
Knowledge of components /elements of SPs		
Yes	42	40.0
No	63	60.0
Total	**105**	**100%**
Any training on infection prevention		
No	52	49.5
Yes	53	50.5
Total	**105**	**100%**
Training in the last 6 months		
No	22	41.5
Yes	31	58.5
Subtotal	**53**	**100**
Knowledge of Reasons for SPs		
No	10	9.5
Yes	95	90.5
Total	**105**	**100%**
Susceptibility to acquire infections/diseases		
Yes	96	91.4
No	9	8.6
Total	**105**	**100%**
Participants fear contracting the following diseases:		
HIV and HBV	1	1.0
HIV ,HBV and HCV	94	98.0
HIV only	1	1.0
Subtotal	**96**	**100**

The participants reported a good knowledge regarding the Infection control Standard Precautions. As illustrated in table 4.2, 75participants (71.4%) have information on infection control SPs, and they reported themselves to know the elements of infection prevention standards precautions (71.4%, n= 75) but only 40% (n=42) of participants that know the elements/ components of infection prevention standards precautions. Finding highlighted that only 50.5% of participants (n=53) had been trained any time on infection prevention, other 49.5% (n= 52) had never been trained and 58.5% of participants that had been trained within 6months (n=31). On other hand, 95participants (90.5%) knew the reasons for SPs, 96 participants (91.4%) knew that they are at risk for acquiring infections such as HIV, HBV and HCV as reported by 94participants (98%).

These variables mentioned in table 4.2 as knowledge on Infection control Standard Precautions were computed using a score of 8marks. The score which is <5marks was labeled poor knowledge while a score>5 was labeled as good knowledge. These values were used to test the relationship between knowledge on Infection control Standard Precautions and practices of Infection control Standard Precautions and the relationship between knowledge and demographic characteristics (Tables 4.3, 4.7, 4.8, and 4.9).

4.2.2. Knowledge of standards precaution of infection prevention by demographic characteristics

As years of experience increase, the proportion of participants with good knowledge increases too (F= 14.5, P-value= 0.001).Good knowledge is reported 47.6% among participants with <5 years of experience, 62.5% among 6 to 10 years of experience and 95% among participants with 15 years and plus.

As presented in this table, as age increase as the knowledge increase too (X2= 28.6, P-value <0001). Good knowledge is reported 100% among 40-79years old participants, 83.3% among 30.39years old and 39.9% among 20-29years old.

As presented in the table, the men had a good knowledge in infection control (73.4%) than female (46.3%). (X2=7.9, P. value=0.005).

As presented in this table, the surgeons had good knowledge of standards precautions (76.2%), followed by Nurses (67.6%) but the association is not statistically significant (x^2= 3.8, p-value: 0.432).

Table 4.3. Knowledge of standards precaution of infection prevention by demographic characteristics

Demographic characteristics	Knowledge			X^2	df	P-value
	Poor knowledge	Good knowledge	n			
Experience						
0-5years	22(52.4)	20(47.6)	42			0.178
6-10 years	15(37.5)	25(62.5)	40			0.024
11-15	1(33.3)	2(66.7)	3			0.532
15 years and plus	1(5)	19(95)	20			0.005
Total	**39(37.1)**	**66(62.9)**	**105**	**15.7**	**3**	**0.001**
AGE						
20-29	33(61.1)	21(39.9)	54			0.998
30-39	6(16.7)	30(83.3)	36			<0.001
40-49	0	15(100%)	15			0.998
Total	**39(37.1)**	**66(62.9)**	**105**	**28.6**	**2**	**<0.001**
Gender						
Male	17(26.6)	47(73.4)	64			0.006
Female	22(53.7%)	19(46.3)	41			0.006
Total	**39**	**66**	**105**	**7.8**	**1**	**0.005**
Occupation						
RN	11(32.4)	23(67.6)	34			0.217
Anesthesia team	11(44)	14(56)	25			0.697
surgeons	5(23.8)	16(76.2)	21			0.095
GP medical doctor	3(42.9)	4(57.1)	7			0.749
student nurse	9(50)	9(50)	18			
Total	**39(37.1)**	**66(62.9)**	**105**	**3.8**	**4**	**0.43**

4.3. PRACTICES OF STANDARDS PRECAUTION OF INFECTION CONTROL

4.3.1. Hands hygiene practices

As presented in table **4.4** among 105 participants, 96 participants (91.4%) reported that they perform hand hygiene, 91 participants (86.7%) wash hands with water and soap for 10-15 seconds while a small proportion (13.3%, n=14) rubs hands with about 5mls of alcohol based hand rubs. Only 36 participants (34.3%) reported to meet the 5 moments of hands cleaning.

Table 4. 4 Hands hygiene practices

Hands hygiene practices	Frequency	Percent
Hand hygiene performance		
No	9	8.6
Yes	96	91.4
Methods of hand hygiene they use		
Washing hands with water and soap for 10-15 seconds	91	94.8
Rubbing hands with about 5mls of alcohol based hand rub	5	5.2
Moments of hands hygiene		
Before and after contacting each patient	31	31.4
Before and after performing any procedure between patients or on the same patients	20	22.9
Before putting on gloves and after removing gloves	5	4.8
After handling contaminated objects and materials	7	6.7
All the above	30	34.3
Total	**96**	**100.0**

4.3.2. Use of PPE

Table4.5 Use of PPE

Use of PPE when doing procedures which are likely to generate splashes	Frequency	Percent
Items of PPEs used		
Use of at least one PPE	27	25.7
Use of two or more PPEs	78	74.3
Use of gloves		
Always	105	100.0
Use of gowns/apron		
Always	20	19.0
Only when gowns/apron are available	33	31.4
Sometimes	28	26.7
Rarely	7	6.7
No use of gowns and aprons	17	16.2
Use of masks		
Always	27	25.7
Only when masks are available	15	14.3
Some times	45	42.9
Rarely	9	8.6
No use of masks	9	8.6
Use of goggles/eye protection		
Only when goggles/eye protection are available	20	19.0
Sometimes	37	35.2
Rarely	31	29.5
No use of goggles/eye protection	17	16.2
Total	**105**	**100.0**

As presented in this table 4.5, when they are doing procedures which are likely to generate splashes, 78 participants (74.3%) reported to use at least two or more PPEs, only 19% (n=20) participants reported to always use gowns/apron, 33 participants (31.4%) use them when they are available while 17 participants (16.2%) reported to never use them. Regarding the Use of

masks, among 105 participants, only 25.7% (n= 27) always use them, 42.9% (n=45) reported sometimes, 14.3% (n=15) use them when they are available and 8.6% (n=9) never use the mask in theatre for procedures which are likely to generate splashes. No one reported to always use goggles/eye protection when they are doing procedures which are likely to generate splashes. , 37 participants (35.2%) use them sometimes, 31 participants (29.5%) rarely use them while 17 participants (16.2%) never use goggles/eye protectors during procedures. The participants reported to use gloves 100%.

4.3.3. Wastes management

Table 4.6. Wastes management

Wastes management	Frequency	Percent
Management of needles and sharps		
The needle and sharps are disposed off immediately after use into a puncture resistant container	68	64.8
The needle is recapped before disposed into available containers	37	35.2
Management of solid waste		
Waste is disposed into available container after segregating	34	32.4
Waste are disposed into available containers without segregation	71	67.6
Containers disposed when they are 3/4 full		
Yes	9	8.6
No	85	81.0
No knowledge	11	10.5
Facility provides all necessary to perform infection control standards		
Yes	21	20.0
No	84	80.0
Total	**105**	**100.0**

As presented in this table 4.6, the findings revealed the poor practices of wastes management, 37 participants (35.2%) reported that they are still recapping the needles before disposing into available containers, 71 participants (67.6%) reported that Waste are disposed into available containers without segregation, 85 participants (81%) reported no disposal of containers when they are 3/4 full and 11 participants (10.5%) do not know when these containers are disposed. This poor practices may related to

that the facility do not provide all necessary to perform infection control standards as reported by 84 participants (80%).

4.4. ASSOCIATION BETWEEN KNOWLEDGE AND PRACTICE OF INFECTION CONTROL STANDARDS PRECAUTIONS

4.4.1. Significance association between Hand Hygiene Practice and Infection Prevention SPs knowledge

Most of participants who have good knowledge on Infection Prevention SPs are likely to clean their hands (68.8%, $X^2$16.9 p-value=<0.001), while participants who do not clean their hands had a poor knowledge 100%.

Good knowledge was also associated with Washing hands with water and soap for 10-15 seconds (67%, X^2=5.1, P-value=0.024) and complying with 5 Moments of hands hygiene (69.4%, F = 11.2, p-value=0.018).

Table 4.7. Significance association between Hand Hygiene Practice and Infection Prevention SPs knowledge

Hand Hygiene Practice	SPs knowledge			X^2	df	P-value
	poor knowledge	Good knowledge	n=105			
Hand Hygiene n (%)				16.9	1	<0.001
No	3.4(100%)	5.65	9			0.999
Yes	30 (31.2%)	66 (68.8%)	96			
Methods of hands hygiene						
Washing hands with water and soap for 10-15 seconds	30 (33%)	61(67%)	91	5.1	1	0.024
Rubbing hands with about 5mls of alcohol based hand rub	9(64.3%)	5(35.7%)	14			0.292
Moments of hands hygiene				11.2	4	0.018
Before and after performing any procedure between patients or on the same patients	11(45.8%)	13(54.2%)	24			0.232
Before putting on gloves and after removing gloves	1.53	3.47(100%)	5			0.079
After handling contaminated objects and materials	2.13	4.87 (100%)	7			0.023
All the above	11(30.6%)	25(69.4%)	36			<0.001

4.4.2. Relationship and Significance between PPEs use and Infection Prevention SP

Infection Prevention SPs knowledge is statistically associated with Use of gowns/apron and mask (p-value is <0.001), 66.7% (n=22) with good score on SPs knowledge reported the use of gowns/apron only when available, 28(100%) reported sometimes, 37 participants (82.2%) reported use of mask sometimes and when they are available (46.7%, n =7). The correlation

between SPs knowledge and use of Use of goggles/eye protection and Items of PPEs used are not statistically significant, (p-value >0.005).

Table 4.8. Association and Significance between PPEs use and Infection Prevention SPs knowledge

PPEs use n (%)	SPs knowledge			X2	df	P-value
	poor knowledge	Good knowledge	n=105			
Items of PPEs used						
Use of at least one PPE	11(40.7%)	16(59.3%)	27	0.2	1	0.653
Use of two or more PPEs	28(35.9%)	50(64.1%)	78			0.014
Use of Gloves						
Always	39(37.1%)	66(62.9%)	105	-	1	0.009
Use of gowns/apron						
Always	20(100%)	12.5	20	55.5	4	<0.001
Only when gowns/apron are available	11(33.3)	22(66.7)	33			0.584
Sometimes	10.4	28(100%)	28			<0.001
Rarely	2.6	4.4(100%)	7			0.035
No use of gowns and aprons	8(47.1%)	9(52.9%)	17			0.808
Use of masks						
Always	14(51.9%)	13(48.1%)	27	32	4	<0.001
Only when masks are available	8(53.3%)	7(46.7%)	15			0.066
Some times	8(17.8%)	37(82.2)	45			0.161
Rarely	3.3(100%)	6.7	9			<0.001
No use of masks	3.3	6.7(100)	9			<0.001
Use of goggles/eye protection						
Only when goggles/eye protection are available	11(55%)	9(45%)	20	5.5	3	0.138
Sometimes	12(32.4%)	25(67.6%)	37			0.630
Rarely	8(25.8%)	23(74.2%)	31			0.304
No use of goggles/eye protection	8(47.1%)	9(52.9%)	17			0.140

4.4.3 Relationship and Significance between wastes management and Infection Prevention SPs knowledge

Table 4.9. Association and Significance between wastes management and Infection Prevention SPs knowledge

Wastes management: n (%)	SPs knowledge					
	Poor knowledge	Good knowledge	n=105	X2	df	P-value
Management of needles and sharps						
The needle and sharps are disposed off immediately after use into a puncture resistant container	27 (39.7%)	41 (60.3%)	68	0.543	1	0.461
The needle is recapped before disposed o together with other waste into available container	12(32.4%)	25 (67.6%)	37			0.037
Management of solid waste						
Waste is disposed into available container after segregating	11 (32.4)	23 (67.6)	34	0.5	1	0.483
Waste are disposed into available containers without segregation	28 (39.4%)	43 (60.6%)	71			0.176
Containers disposed when they are 3/4 full				F		
Yes	3.3	5.7(100)	9	25.3	2	<0.001
No	28 (32.9)	57(67.1)	85			0.998
No knowledge	4.8(100%)	16.2	21			<0.001
Facility provides all necessary to perform infection control standards						
Yes	1.8	19.2(100)	21	15.5	1	<0.001
No	39(46.4)	45(53.6)	84			0.998

In the group with good knowledge score, 41 (60.3%) reported that the needle and sharps are disposed off immediately after use into a puncture resistant container, 23 (67.6%) reported that Waste is disposed into available container after segregating but the association between the knowledge and sharps and solid waste management is not significant (p-value >0.05). However 9 participants (100%) who reported that Containers are disposed when they are 3/4 full have and 21(100%) who reported that Facility provides all necessary to perform infection control standards have a good knowledge score. The Infection Prevention SPs knowledge statistically correlates with whither participants disposed Containers when they are 3/4 full or the Facility provides all necessary to perform infection control standards (p-value < 0.001).

4.5. CONCLUSION OF CHAPTER FOUR

This chapter presented the findings from this study. The data were presented in tables and interpreted. The presented data are demographic characteristic of study participants, knowledge of standards precaution of infection, practices of standards precaution of infection control, and the relationship between knowledge and practice of infection control standards precautions.

CHAPTER FIVE. DISCUSSION

5.0. INTRODUCTION

This chapter discusses the findings presented in previous chapter on demographic characteristics of respondents, their knowledge on infection prevention standard precautions and their practices on hand hygiene, use of personal protective equipment and waste management. The data from this study are discussed by comparing and contrasting them from the finding from previous studies.

This study assessed knowledge and practice of standard precautions for infection control among surgical team members at Rwanda Military hospital. The primary goal of surgical team is to prevent the surgical site infection but also to ensure the safety of both patients and operating room health care team. Infection control and preventions practices will help to reduce infection risks for both patients and perioperative team members (Ansell care Education, 2015, p. 16)

5.1. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

For effective work in operating theatre, higher skilled staff members are required to coordinates and provide cares necessary to surgical treated patients. The operating theatre staff works in an intense, fast-paced, detail- oriented, technically advanced environment to safely perform surgical procedures (Ansell care Education, 2015). It is this reason that an operating theatre staff of RMH was dominated by males and young population as revealed by the findings where in a total of 105 surgical team members at RMH participated in this study was made of males (61%) and females (39%). Most participants were 20-29years old (51.4%) and majority of them has 0-4years (42%) working experience. The history of Nursing education and Genocide also influenced a lot the staffing of RMH. Nurses with bachelor's and master's degree, the anesthesiologists are being recently trained which explain the small experiences and young participants. RMH is also a university teaching hospital, a non-negligible number of students in nursing, anesthesia and medicine without professional experience play important role.

Majority of participants are registered nurses (32.4%) this explained by the multitasks and responsibilities attributed to the operating room nurses; such as nurses are managers of OR, scrubbing for procedures, circulating and coordinating the procedures (alexander book 13th ed)

5.2. KNOWLEDGE OF STANDARDS PRECAUTION OF INFECTION PREVENTION

In this study, more than half of participants 62.8% had a good knowledge of standards precaution of infection prevention basing on the information they had reported themselves or whether they had been trained on standards precaution of infection preventions (table 4.2, 43).

The findings of this study highlighted that 71.4% of participants had information on infection control SPs concept and reported themselves to know the elements of infection prevention standards precautions (71.4 %,) but only 40% of them that know the elements/ components of infection prevention standards precautions, 90.5% of them know the reasons for SPs, 91.4% and 98% know that they are at risk for acquiring infections such as HIV, HBV and HCV respectively. The study findings are consistent with those of a similar study done by (MOYO, 2013, p. 25) and Okechuku et al (2012) which revealed that more than 70% of the respondents were aware of the universal precautions concept and a fewer number had the correct knowledge on the universal precautions and Sarani *et al.*, (2016, p. 193) .In Teaching Hospitals revealed that 43% of the participants in this study had poor knowledge. the finding are also consistent to (Yakob, Lamaro and Henok, 2015, p. 3) findings from study by Yakob, Lamaro and (Henok, 2015, p.7). In contract, the study by Aires *et al.*, (2010) done in one of Portuguese hospital on 174 health care workers relevant to SPS revealed that only 7 over 100 of respondents were not aware of SPs.

To practice the infection control precaution standards, evidences suggested that higher the qualification and training in infection control the more positive impact of practice SP_S for hospital acquired infection control (Fashafsheh, 2015). However, from this study, 50.5% of participants had been trained any time on infection prevention and only 58.5% of them had up to date training within 6months. The non-training was also reported in the study by Yakob, Lamaro and Henok, (2015, p.7) and MOYO, (2013a, p. 36).

For better practices for infection prevention, good knowlge and skills in infection prevention standards precautions played an important role and poor knowledge of Health care providers (HCPs) was found to be associated with poor practices. Trainings of HCPs at regular and formal basis was found to be effective in improving HCPs knowledge on infection prevention standards precaution (Nagaraju *et al.*, 2013, p. 32) and then practices.

WHO recommended a regular training to reboost the HCPs knowledge and skills in infection prevention (Allegranzi, et.al, 2010) due to that limited knowledge is the barrier implementing infection control standards precautions (Centre for Disease Control, 2002).

This study found out that the proportion with good knowledge significantly increased as years of experience (F= 14.5, P-value= 0.001) and age (X^2= 28.6, P-value <0001) increased too and the men had a good knowledge in infection control (73.4%) than female (46.3%) (X2=7.9, P. value=0.005). this relationship was also reported in the previous studies (Abubakar *et al.*, 2015, p. 1), (Hamed Sarani *et al.*, 2016)and (Fashafsheh, 2015) . The surgeons revealed higher proportion (76.2%) with good knowledge compared to nurses (67.6%) but not statistically significant (x^2= 3.8, p-value: 0.432). This finding is consistent to findings of study by Danny and Ikponwonsa, (2013, p. 11), and (Ansari *et al.*, 2015)and that revealed that medical doctors had good knowledge of infection prevention and hands hygiene than nurses.

This may be attributed to the accountability and commitment in patients' managements and their better education than nurses. In contracts, Hamed Sarani *et al.*, (2016, p.193) found that 43% of the participants had poor knowledge, There was a significant relationship between knowledge and gender (r = 00.8 p = 0.02), but the variables of age, employment, work experience, education were not significantly related to either knowledge of practice, (p>0.05) (Hamed Sarani *et al.*, 2016,p. 193).

5.3. PRACTICES OF STANDARDS PRECAUTION OF INFECTION CONTROL

This study assessed the practices of hands hygiene, PPEs use and wastes management.

The practices of hands hygiene

Regarding the hands hygiene practices, Most participants (91.4%) reported that they practiced hands hygiene, washing them with water and soap for 10-15 seconds (86.7%) or rubbing hands with 5mls of alcohol based hand rubs (13.3%) while WHO also recommended it as the best and fast acting method for hand antisepsis and has broad spectrum antimicrobial activity (Ansari *et al.*, 2015). However, only 34.3% of participants reported to meet the 5 moments of hands cleaning and 31.4% cleaned their hands when before and after contacting with a patient. The findings are similar to one by (MOYO, 2013, p.38) and different from that of Labrague, Rosales and Tizon, (2012, p. 88) that reported the hands hygiene practice before and after cantact patients (96.6%), (Labrague, Rosales and Tizon, 2012).

Unfortunately, a Compliance with hands hygiene practices was not assessed in this study and yet, what reported was found to be different from what practiced. The hands hygiene practices were at least 100% reported versus 16.7%, 2.6 % and 26%, 9.3% observed in the study by MOYO, (2013, p.38), García-zapata, Custódia and Guimarães, (2010, p. 4), Balafama and Opara, (2011, p. 8), frequently before and after contacting patients (Balafama and Opara, 2011, p. 8). (García-zapata, Custódia and Guimarães, 2010)

PPEs use

Regarding the use of PPE, the surgical team reported a poor PPEs use when they are doing procedures that are likely to generate splashes. Only gloves that were always used. The other PPEs are less used and it depends to their availability. The PPEs such as masks (25.7%), goggles/eye protection (0%) and apron (19%) were always used. Most participants also reported that they sometimes use PPEs depending to their availability such as masks (42.9%), goggles/eye protection (54.2%) and apron (58.1%). The regular use of gloves use was also reported or practiced (88.9%) in MOYO, (2013, p.38), 100% in Labrague, Rosales and Tizon, (2012, p. 88) and (Yakob, Lamaro and Henok, 2015) in the studies. The irregular us other PPEs such as masks, goggles/eye protector and apron were sometimes used depending to their availabilities or inconvenience as reported in previous studies (MOYO, 2013, p.38), (Labrague, Rosales and Tizon, 2012, p. 88), (Abubakar *et al.*, 2015, p.5) and (Yakob, Lamaro and Henok, 2015). In contrast, the majority of participant were adherent to PPEs use such as mask, protective suit or gown at 94.5% and 93.1% (Labrague, Rosales and Tizon, 2012, p.89) when performing procedures that might induce splashing of blood, body fluid, secretions and excretions.

Waste management.

The wastes are also poorly managed at RMH OR. Most respondents reported that Wastes are disposed into available containers without segregation (67%), non-disposal of containers when they are 3/4 full (81%) and recap the needles before disposing off together with other waste into available containers (35.2%). The poor practices of SPs may be related to that the facility do not provide all necessary to perform infection control standards as reported by 80% of participants. It is not possible to segregate wastes without having required containers. The bad practice of recapping needles after use were also reported by 23.8%participants in the study by Abubakar *et al.*, (2015, p.5). And this practice was found to be associated with needle stick injuries that were found to at rate of 64% in this study.

5.4. ASSOCIATION BETWEEN KNOWLEDGE AND PRACTICE OF INFECTION CONTROL STANDARDS PRECAUTIONS

The study finding revealed the significant association between knowledge and practice of infection control standards precautions. It was revealed that good knowledge on Infection Prevention SPs was associated with hands hygiene (p-value<0.001) with water and soap for 10-15 seconds (P-value=0.024) and complying with 5 Moments of hands hygiene (p-value=0.018).

Good knowledge was not associated with needles and sharps management and solid wastes managements (p-value < 0.05). Normally, the evidences support that the practices depend on knowledge. In similar study by Hamed Sarani *et al.*, (2016,p. 193), the highest levels of knowledge were related to hand hygiene and precautions to avoid needle stick injuries and the lowest level of knowledge was related to precautions such as wearing the gown, gloves, mask and glasses but the relationship between knowledge and practices was not significant (P=0.3) (Hamed Sarani *et al.*, 2016,p. 193). This poor relationship between knowledge and practice was also confirmed by Abubakar *et al.*, (2015, p.5), (Fashafsheh, 2015), (García-zapata, Custódia and Guimarães, 2010). In the contrast, Nagaraju *et al.*, (2013, p.33) and Fashafsheh, (2015, p.79) studies comfirmed that those who had more knowledge about infection control had a better practice with a statistical significant relationship between knowledge and practices (P<0.005) (Nagaraju *et al.*, 2013, p.33) and (Fashafsheh, 2015, p.79).

5.5 CONCLUSION TO CHAPTER FIVE

Basing on study findings that the study revealed poor practice of waste management, PPEs use and the facility does not provide all necessary equipment and supplies to perform infection control standards.

CAHPATER 6. CONCLUSION AND RECOMMENDATION

6.1.CONCLUSION

Demographic characteristics of RMH Surgical team members males are were males were (61%) Among 105 participants. Most participants were aged between20-29years old. Registered nurses are majorities among surgical team members Professions with (51.4%) of participants followed by (32.4%), anesthesia team (23.8%) and surgeons (20%).

Most participants fall within range 0-4years of working experience (42%) and 5-9years (38.1%) . Regarding the knowledge, 71.4% of participants were aware of infection control SPs concept but only 40% of them that know the elements/ components of infection prevention standards precautions. High number of participants knows the reasons for SPs, and knows that they are at risk for acquiring infections such as HIV, HBV and HCV respectively. Only a half of participants 53(50.5%) had been trained any time on infection prevention and only 58.5% of those 53 participants had up to date training within 6months. Finally it was found that 62.8% had a good knowledge of standards precaution of infection prevention, and was associated with experience (F= 14.5, P-value= 0.001) and age (X^2= 28.6, P-value <0001) and Gender (men) (X2=7.9, P. value=0.005).

Regarding practices of standards precaution of infection control, most participants (91.4%) they practiced hands hygiene, majority of them used water and soap for 10-15 seconds and rubbing few of them use hands with 5mls of alcohol based hand rubs. Regarding the use of PPE, 100% of participants were always use gloves. The PPEs such as masks, goggles/eye protection and apron were irregularly used. Most participants also reported that they sometimes use PPEs depending to their availability.

Regarding Waste management**,** Most respondents reported poor practices regarding Wastes and sharps disposal; where more than half (67%) , disposal of containers when they are 3/4 full (81%) and recap the needles (35.2%). and may participants reported that the facility do not provide all necessary to perform infection control standards .

The study finding revealed that good knowledge on Infection Prevention SPs was associated with hands hygiene practices (p-value<0.001) with water and soap for 10-15 seconds (P-

value=0.024) and complying with 5 Moments of hands hygiene (p-value=0.018). But it was not associated with needles and sharps management and solid wastes managements (p-value < 0.05).

6.2. RECOMMENDATION

Basing on study findings that the study revealed poor practices and knowledge of waste management, PPEs use and that the all necessary to perform infection control standards, the recommendations are the following:

- ✓ The facility would plan training on staff on infection control standards precautions in theatre and avail all necessary to perform infection control standards.
- ✓ Researchers would assess the compliance with infection control standards precautions and barriers to noncompliance of infection control standards precautions.
- ✓ Infection control committee should enforce supervision (oddity) of infection control practice in OR .
- ✓ Educators would train health care providers on infection control standards precautions

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Appendix 1: INFORMED CONSENT

TITLE: KNOWLEGDE AND PRACTICE OF STANDARD PRECAUTIONS FOR INFECTIONS CONTROL AMONG NURSES WORKING AT RWANDA MILITARY HOSPITAL.

RESEARCHER: SINDAYIGAYA Eric,

MOBILE NO: 0788631112 Email: sinderic005@gmail.com

Purpose

You are invite to participate in this research study. The purpose of this study is to assess knowledge and practice of standard precautions for infections control among nurses working at Rwanda military hospital.

You have been chosen because you are one of the nurses working at Rwanda military Hospital

Procedure

You will be requested to fill a semi structured questionnaire you will be requested to do this during lunch break or after finishing patient care and you will be also observed during activities to avoid interrupting patient care activities.

Risks

There are no risks associated with your participation in this study because it will not involve any Invasive procedure

Benefits and Compensations

You will not be compensated for participating in this study and there are no direct benefits for you as an individual participant, however the findings of this study will help in the designing of effective infection prevention programs that would reinforce compliance with infection

prevention standard precautions and therefore reduce hospital acquired infections among health care workers and patients. The findings will also help in the reviewing and improvement of policies, protocols and procedures on infection prevention.

Voluntary Participation and Withdrawal

Your participation is entirely voluntary and should you change your mind, you have the right to withdraw from participating in the study at any time without penalty.

Confidentiality

All data will be kept under lock and key and will only be accessible to those involved in the data collection. Electronic files will be saved on Password. There will be no way to identify individual participants. We will not identify you or use any information that would make it possible for anyone to identify you in any presentations or written reports about this study.

Contact Person

Should you have questions about the content of this study or about your rights as a participant, Please contact

Confirmation of Consent

Are you willing to participate in this study?

Yes_____ No_____

If yes, please sign

Name: _____Sign:_____Time_____Date_____

Researcher: _____Sign:_____Time_____Date_____

Appendix II. RESEARCH QUESTIONNAIRE

This research questionnaire is intent to assess knowledge and practice of standard precautions for hospital acquired infection control among surgical team members at Rwanda Military Hospital
This questionnaire is made by three main parts which are :
Demographic questions, Knowledge on infection control standards precautions and
practice of infection control standards precautions

- ✓ use tick to answer the question

Participants ID_____Date_____/____/_____

Section 1. Socio-demographics

1.1 What is your age?

20-29 ☐ 30-39 ☐
40-39 ☐ 50 + ☐

1.2 What is your gender?

Male ☐ Female ☐

1.4 What is your occupation ?

Registered Nurse ☐ Student Nurse ☐

Anesthesiologist ☐ Anesthetist ☐

Surgeon (specialist) ☐ Resident Doctor ☐

General practitioner ☐ Intern Doctor ☐

1.5 What is your working years of experience?

0-5 ☐ 6-10 ☐
11-15 ☐ 15+ ☐

Section 2. Knowledge on infection control standards precautions

2.1 Have you ever heard about infection prevention standard precautions?

Yes ☐ No ☐

2.2 Do you know the elements of infection prevention standard precautions?

Yes ☐ No ☐

2.3 If yes to Q 2.2

Choose correct elements / components of infection prevention standard precautions?

Hands wash, person protective equipments, waste disposal, sharps managements ☐

Color codes bags, surgical hands scrub, safety boxes ☐

2.4 Have you ever had training on infection prevention?

Yes ☐ No ☐

2.5 If yes to Q2.4,

When were you trained? _____ Year

Section 3: Practice

Have you had needle stick injury or infected blood /body fluid touches or splash on your eyes, skin cuts or wounds in the last 6 months?

Yes ☐ No ☐

3.1 Do you think you are at risk of acquiring diseases / infections by virtue of working in the operating theatre?

Yes ☐ No ☐

3.2 Are there any diseases you fear most contacting when providing patient care?

Yes ☐ No ☐

3.3 If yes to Q3.2

Which of those diseases do you fear most contacting

HIV and HBV ☐ HIV, HBV and HCV ☐

3.4 Do you perform hand hygiene when providing patient care?

Yes ☐ No ☐

3.5 If yes to Q3.4, which method of hand hygiene do you use?

Washing hands with water and soap for 10-15 seconds ☐

Rubbing hands with about 5mls of alcohol based hand rub ☐

3.6 How often do you perform hand hygiene when delivering patient care?

Before and after contact with each patient ☐

Before and after performing any procedure between patients or on the same patient before ☐ putting on gloves and after removing gloves ☐

After handling contaminated objects / materials ☐

All the above ☐

None of the above ☐

3.7 Which of the items of Personal protective equipments are used for the last time during the surgical intervention? (Select all apply)

Apron ☐ Utility glove ☐ Headcover ☐

Boots/shoes ☐ Eye protector/goggle ☐ Mask ☐ Gown ☐

3.8 How often do you use gown/apron when doing procedures which are likely to generate splashes?

Always ☐ Only when gowns are available ☐

Some times ☐ Rarely ☐

I don't use gowns ☐

3.9 How often do you use masks when doing procedures which are likely to generate splashes?

Always ☐ Only when masks are available

Some times ☐ Rarely ☐ I don't use masks ☐

3.9 How often do you use goggles / eye protection when doing procedures that are likely to generate Splashes?

Only when goggles are available ☐ Some times ☐

Rarely ☐ I don't use goggles/ Eye protection ☐

3.10 How do you manage sharps after using on the patient?

The needle and sharps are disposed off immediately after use into a puncture resistant container ☐

The needle is recapped before disposing of the needle and syringe ☐

Syringe , needle and other sharps are disposed of together with other waste into available waste containers ☐

The needle is bent before disposing of the needle and syringe into a puncture resistant container ☐

3.11 How do you manage solid waste generated during provision of patient care?

Waste is disposed into available containers after segregating ☐

Waste is disposed into available containers without segregating ☐

3.12 Does your facility provides all necessary to perform infection control standard precautions ?

Yes ☐ No ☐

APPENDIX III. ETHICAL CLEARANCE

UNIVERSITY OF RWANDA — COLLEGE OF MEDICINE AND HEALTH SCIENCES

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 16/01/2017
Ref: CMHS/IRB/112/2017

SINDAYIGAYA Eric
School of Nursing and Midwifery, CMHS, UR

Dear SINDAYIGAYA Eric

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled ***"Knowledge And Practice Of Infection Control Standard Precautions Among Surgical Team Members At Rwanda Military 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.

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

IRB Vice C

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

EMAIL: researchcenter@ur.ac.rw P.O. Box: 3286, Kigali, Rwanda WEBSITE: http://cmhs.ur.ac.rw/

APPENDIX IV: REQUEST FOR PERMISSION FOR DATA COLLECTION

RMH
Central Secretariat
received on 20/03/2017

SINDAYIGAYA Eric
CMHS, MScN student,
Education, peri-operative Track
E-mail: sinderic005@gmail.com
Tel: 0788631112/073731112

17 /march/2017

The chair Person,
RMH Research Committee

Dear Sir,

RE: Request for permission to conduct research at RMH

I hereby wish to request for permission to conduct research at Rwanda Military Hospital.

In fact I am a masters' student in the track of peri-operative nursing at College of Medicine and Health sciences, University of Rwanda. My research is entitled "knowledge and practice standard precautions of infection control among surgical team members at Rwanda Military Hospital".

The attached herewith is my research Proposal, Ethical clearance, Recommendation Letter from the School of Nursing and Midwifery .

I hope my request will meet your consideration.

Yours faithfully,

SINDAYIGAYA Eric

APPENDIX V. PERMISSION TO COLLECT DATA

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

March 31st, 2017

Ref.: EC/ RMH/ 125/ 2017

REVIEW APPROVAL NOTICE

Dear **SINDAYIGAYA Eric**
UNIVERSITY OF RWANDA

Your research project: **"Knowledge and Practice Standard Precautions of Infection Control among Surgical Team Members at Rwanda Military Hospital".**

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

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

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

Sincerely,

Dr. Pacifique MUGENZI
Lieutenant Colonel
Co Chair: Rwanda Military Hospital Research Ethics Committee

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