



**KNOWLEDGE AND PRACTICE REGARDING MEDICAL WASTE
MANAGEMENT AMONG THEATRE STAFF IN OPERATING ROOMS OF
THREE REFERRAL HOSPITALS IN KIGALI**

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Master of per -operative nursing

Kigali, July 2017



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A dissertation submitted in partial fulfilment of the requirements for the degree of
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In the College of Medicine and Health Sciences

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Kigali, July 2017

DECLARATION

I do hereby declare that this dissertation submitted in partial fulfillment of the requirements for the degree of **MASTERS OF SCIENCE** in **NURSING**, at the University of Rwanda/College of Medicine and Health Sciences, is my original work and has not previously been submitted elsewhere. Also, I do declare that a complete list of references is provided indicating all the sources of information quoted or cited.

Date and Signature of the Student

.....

DEDICATION

I dedicate this work to almighty God for all he did for me, to my beloved husband my daughters, families and friends and to all classmates for all the time we passed together.

I strongly dedicate my work to all of you who made this study possible and accomplished.

May almighty God bless everyone!

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ABSTRACT

Health care services including operating theatre, generate waste which is a public health concern. World Health Organization report, indicates that worldwide every year, about 8 to 16 million and 2,3 to 4,7 of people are contaminated by Hepatitis B and C viruses respectively, while a total number of 80, 000 to 160, 000 people are contaminated by Human Immunodeficiency Virus (HIV) due to unsecured injections disposal and poor waste management systems. Poor waste management is a global issue, reported in both developed and developing countries due to poor knowledge, lack of appropriate equipment and lack of policies regarding medical waste management system.

Aim of the study: is to assess the level of knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals of Kigali.

Methodology: A cross sectional descriptive quantitative research design was used. A total number of 240 populations were selected systematically. Data were analyzed using SPSS version 20. Descriptive statistics, bivariate and multivariate analyses were performed.

Results: Most of respondents (59%) were aged 30-39 years, the predominant education level was advanced diploma (42%) and most of them were registered nurse (40%). The level of knowledge among theatre staff regarding medical waste management was found good at 54%. Medical doctors and nurses have good knowledge than other group of population. The level of practice was relatively good and scored at 55%. Findings reveal that first four factors influencing medical waste management are lack of equipment (71%), negligence (66%), lack of awareness and training toward medical waste management (57%), and lack of coordination (45%). Age, education level, practice, and perceived factors were reported as predictors of knowledge among the study population ($P < 0.05$). **Conclusion:** The knowledge and practice among theatre staff was reported to be above the average though the low level reported is worrying in hospital settings. This implies that participants' knowledge increase or decrease has a role in waste management decision making. The higher the knowledge, the likelihood to better practice. The education level, experience, position of the medical practioners, hospital in which the practioners work and the age of the participants was reported to be associated with the knowledge on medical waste management at the study site. This implies that medical waste management knowledge and practice may be affected by different factors from the settings or from the staff and most of them may be preventable.

Key words: Knowledge, practice, medical waste management, operating theatre, referral hospital, Rwanda.

LIST OF SYMBOLS AND ABBREVIATIONS/ACRONYMS

CHUK: Centre Hospitalière universitaire de Kigali.

HIV: Human immune deficiency virus.

ICRC: International committee of Red Cross.

KFH: King Faisal Hospital

MOH: Minister of health.

MW: Medical waste.

MWM: Medical waste management.

OAG: Office of the Auditor General of State Finances

OR: Operating room.

OT: Operating theatre.

PPE: Personnel protective equipment.

RMH: Rwanda Military Hospital.

RMOH: Rwanda minister of health

WHO: World health organization.

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CHAP ONE: INTRODUCTION

1.1. BACKGROUND

Like other human activities, health care services including operating theatre generates waste which has to be managed and disposed in a safe way to avoid or minimize the risks it poses to the health of the healthcare providers, clients and to the community (Akum, 2014, p1).

In hospitals, clinics and places where diagnosis and treatment are conducted there are medical waste and management of these wastes is a challenges of great concern due to possible public health risks associated (Awodele et al. 2016, p1).

The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste, inadequate and inappropriate knowledge of handling healthcare waste should have serious direct and indirect health consequences to the health care providers ,waste handlers and a significant impact on the environment (Madhukumar& Ramesh 2012).

The others authors mentioned that poor medical waste management presents a high risk to doctors, nurses, technicians, sweepers, hospital visitors and patients (Adogu et al. 2014, p1). In addition inappropriately segregated waste increases the amount of waste that is specially treated, and may have significant impact on the cost of disposal and indirectly may affect sterility (Kagoma 2012).

The rising amounts of medical wastes also cause significant public health and environmental problem worldwide. This situation is worsened by improper medical waste disposal methods, insufficient of physical resources, and lack of research done on medical waste management (Salman 2015).

The World Health Organization (WHO) estimates that each year about 8 to 16 million new cases are diagnosed for Hepatitis B virus (HBV), 2. 3-4. 7 million cases diagnosed for Hepatitis C virus (HCV) and 80, 000–160, 000 diagnosed for Human Immunodeficiency Virus (HIV) due to unsecured injections disposal and mostly due to very poor waste management systems (cited in Awodele et al. 2016, p. 2).

Medical wastes are classified into seven class including general waste, infectious waste, pathological waste, sharps waste, chemical waste, radiological waste and pharmaceutical waste.

According to (Adogu, ubajaka,Nebuwa, 2014p 833), 75% to 90% of the total waste produced in health care facilities are general waste which are not need special processing and disposal and the rest 10 to 25% of those waste are hazardous which could be composed by sharps (needles, lancets etc.), syringes, blood or body fluid, contaminated surgical instruments, delivery bowls, used gauzes and gloves, plasters; it may also contain expired drugs, laboratory reagents and other chemicals and these kind of waste need special processing and disposal in order to avoid public health risk .

Even though operating theatre occupy a small area of the hospital(Kagoma 2012) found that it tend to generate about 20%-33% of total hospital waste. The same authors add that up to 80% of solid waste derived from a single operation is generated before a patient enters the operating room most composed by the plastic packaging of the materials.

Segregation of medical waste at source and the use of different color-coding bags for segregation is one of the most important parts of healthcare waste management rule (Adogu et al. 2014). however improper disposal of waste was reported in the operating room, where up to 92% of discarded biohazard waste may be nonhazardous (Kagoma ,Rubinstein, Noudie 2012).

In addition (Rushyuan 2012) states that between 20% and 70% of health care waste originates from a hospital's operating room, and up to 90% of operating room waste is inappropriately sorted and sent for expensive and unneeded hazardous waste processing.

Poor waste management also was reported by (Manyele & Lyasenga 2010) in African countries such as South Africa, Mozambique, Swaziland, Kenya and Tanzania due to insufficient training of personnel, insufficient personal protective equipment and lack of knowledge regarding the proper use of such equipment .

The other studies reveal that good medical waste management in hospital depends on a committed waste management team, good administration, careful planning, sound organization, adequate financing and full participation by trained staff (Awodele et al. 2016,p2).

The safe disposal and subsequent destruction of medical waste is a key step in the reduction of illness or injury through contact with this potentially hazardous material and contribute in the prevention of environmental contamination ((Adogu, .ubajaka, c, F.Nebuwa, E 2014).

As it is mentioned under the bio-medical waste Management rules 1998 that each and every health care provider must have adequate knowledge regarding medical waste management and should respect correct practice of handling and disposal medical waste (cited in Ranu.et al.2016, p257).

Different authors revealed that lack of knowledge; poor attitude and inefficient practice toward proper waste management and poor implementation of the policies are some of the factors influencing poor medical waste management in the hospitals (Adogu, ubajaka, Nebuwa 2014) .

Poor health care waste management (HCWM) was reported in Rwanda referral hospitals by the Office of the Auditor General of State Finances, Rwanda (OAG) in its audit done in 2014 on medical waste management in five referral hospital where found that the referral hospitals have irregularity in medical waste management steps (OAG 2014) but no study conducted in Rwandan operating theatre on medical waste management . Hence this study seeks to assess the knowledge and practice regarding medical waste management and associated perceived factors among theatres staff of three referral hospitals in Kigali.

1.2. PROBLEM STATEMENT

Operating theatre tend to generate 20% to 70% of the total hospitals waste and the management of those waste is a challenge where up to 90% of them is inappropriately sorted and sent for expensive and unneeded hazardous waste processing.

Medical waste management continues to be a major problem mainly in most healthcare facilities of the developing countries where it is affected by different factors such as technology, economic, social difficulties and inadequate training of staff responsible for handling of medical waste (Awodele et al. 2016).

The other factors like Age, profession, experience , overtime working hours in a day, no availability of appropriate equipment, lack of coordination, lack of awareness and training toward medical waste management found as major challenge against medical waste management in developing country including Rwanda (Muduli & Barve 2012).

As a consequence, these factors increase the risk for nosocomial infections (pneumonia, diarrhea and wound infection), impaired staff and patient safety, increased infectious disease like hepatitis B, C, HIV among health care providers and medical waste handles, poor environmental hygiene, bad smell of the environment and increased waste disposal cost (Awodele et al. 2016, p1).

Although the Rwandan Ministry of Health had set the policy and procedures regarding medical waste management in health care facilities, and availed all the necessary to support medical waste management, like providing trainings to the hospitals staff ,availability of personnel protective equipment and incinerators building , in the referral hospital poor medical waste management still being a major problem as reported by office of the auditor general of state finances, Rwanda in it's audit done in 2014 in five referral hospital where found that in different referral hospitals waste are not managed as required and the health care providers ,visitors and patient are more exposed.

Some identified gaps in referral hospital by OAG are lack uniform standards ,lack of coordination, lack of training plan toward MWM, Absence of monitoring and record system, lack of appropriate equipment, bad practice manifested by waste mixing, poor sealing , labeling and overfilling of the safety box above the warning line indicating three-quarters full and consequently the syringes and needles were protruding outside the safety box, poor storage, poor transport and poor waste disposal (OAG 2014) .

In addition to that a researcher have seen an example of poor medical waste management in the operating theatre of one of the referral hospital where medical waste segregation at the point of generation which is an important step of medical waste management is not respected ,which cause these waste to be all disposed as hazardous waste and had wondered if the theatre staff had the required knowledge and practices towards the management of medical waste generated in operating room and some factors that influence their medical waste management practice .

Unfortunately no study has been done in Rwandan health facilities regarding medical waste management in the operating rooms. Hence this study seeks to assess the knowledge and practice regarding medical waste management and associated perceived factors among theatres staff of three referral hospitals in Kigali.

1. 3. PURPOSE OF THE STUDY

1.3.1. Main objectives

To assess the level knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals in Kigali.

1.3.2. Specific objectives

1. To determine the level of knowledge of operating room staff regarding medical waste management at three referral hospitals in Kigali.
2. To describe operating room staff level of practices regarding medical waste management at three referral hospitals in Kigali.
3. To identify perceived factors associated with medical waste management in the Operating Room staff of three referral hospitals in Kigali.
4. To determine relationships between revel of knowledge and practice and selected socio-demographic variables.

1. 4.RESEARCH QUESTIONS

1. What is the level of knowledge of operating room staff regarding medical waste management at three referral hospitals in Kigali?
- 2 . What is the level practice of operating room staff regarding medical waste management in three referral hospitals in Kigali?
3. What are the perceived factors associated with medical waste management in the OR staff of three referral hospitals in Kigali.
4. Is there any relationship between level of knowledge and practice and selected socio-demographic variables?

1.5. STUDY SIGNIFICANCE

The results from this study may help the patient, visitors, health care provider and medical waste handlers to be safe from all possible hazardous and injuries which may come from poor medical waste management in the operating theatre .In research this study may provide further information to researcher about knowledge and practice of OR staff toward medical waste management .

Practice: study may help health care workers to improve the way medical waste is managed.

Education: Study will provide further information's to the students and lectures about medical waste management.

To the three selected Referral hospitals in Kigali's administration, this study may help them to know the level of knowledge and practice of their staff toward medical waste management in the operating room and the associated factors and it may help them to improve the quality of medical waste management.

This study may help the ministry of health to take appropriate measures regarding medical waste management audit in different hospitals OR in order to prevent inappropriate medical waste management, health risks associated and to ensure all operating theatre users safety and adequate sterility of the area.

1.6. DEFINITION OF KEY CONCEPTS

Medical waste or health care waste: According to (Manyele, S.V. and Lyasenga 2010) healthcare waste is defined as all the waste hazardous or not, generated by health institutions during medical activities, preventive, curative or diagnostic.

Waste Management: The activities, administrative and operational, that are used in handling, packaging, treatment, conditioning, reducing, recycling, reusing, storage and disposal of packaged waste(RWANDA MOH 2016) .

Referral hospital or tertiary care centre: Referral hospital or tertiary care centre: I s a highly specialized hospital which have specialized staff and technical equipment ,specialized clinical services like cardiology, neuro surgery,, ICU, and specialized imaging units; this might have teaching activities and bed ranging from 300-1,500 beds (Mulligan ,et al.2003,p20).

Operating room: is a place where surgical procedures are performed in sterile condition, this might be an open surgery or laparoscopic in order to achieve internal organs.

Anatomical Waste or Pathological Waste: waste which consists of tissues, organs, body parts, blood and bodily fluids from patients and animal but excludes teeth and hair(Emmanuel et al. 2014).

General waste: Rwanda ministry of health defines general waste as waste that is generated from a health care facility which does not contain the infectious agent (RWANDA MOH 2016) .

Highly hazardous waste: are healthcare wastes which consist of sharps, highly infectious non-sharp waste, stools from cholera patients, bodily fluids of patients with highly infectious diseases, large quantities of expired or unwanted pharmaceuticals and hazardous chemicals and radioactive wastes, genotoxic wastes, teratogenic wastes (USAID, 2013, p. 2).

Infectious wastes: are waste that are generated from health care facilities which contain pathogenic microorganisms which can be infectious to the patients , health care providers or to the public reason why these waste need special management (Akum 2014, p3).

Sharps waste: Sharps are items that could cause cuts or puncture wounds, including needles, hypodermic needles, scalpels and blades, knives, infusion sets, broken glass or pipettes and they are usually considered highly hazardous health-care waste and should be treated as they were potentially infected (Emmanuel et al. 2014,p23).

Chemical Waste: It is a waste containing of chemical substances from laboratory including solvents, disinfectants, photographic developers and fixers. These waste, also consist of discarded solid, liquid, and gaseous products that contain dangerous or polluting chemicals.

Radioactive waste: includes solids, liquid and gaseous materials contaminated with radionuclide. It is produced as result of procedures such as in vitro analysis of body tissue and fluid, in vivo organ imaging, tumor localization, various investigative and therapeutic practices (Susan, 2012).

Genotoxic waste –these are hazardous medical waste that may cause life threatening due to their properties of being mutagenic, teratogenic and carcinogenic and includes cytostatic drugs, vomit, urine or stool from the patients treated with cytotoxic drugs (chemotherapy), chemicals and radioactive materials (Thareja et al. 2015).

Color coding System: a system used to segregate medical waste within different color coded container and plastic bag according to their categories(Akum 2014).

Biohazard Symbol: This is a symbol which is necessary to be on the side of all infectious, pathological and sharp waste containers (Emmanuel et al. 2014, p. 9).

Theatre staff: are the personnel who work in operating theatre who have to accomplish different tasks, including nurses, doctors, anesthetists, pharmacists, sweepers and biomedical engineers.

Knowledge: is defined as an active human process of justifying personal belief towards the truth (Nonaka 2006) .

Practice: Is the action or process of performing or doing something.
<http://www.dictionary.com/browse/practice>

1. 7. SUBDIVISION OF THE STUDY

This research report is divided into six main chapters. The first chapter is introduction that includes: background of the study, research objectives, research questions, problem statement and significance of the study and definition of key terms. The second chapter is literature review, the third chapter is methodology, the fourth is results, the fifth is discussion and the sixth is conclusion and recommendation.

CHAPTER TWO: LITERATURE REVIEW

2.0. INTRODUCTION

In this section we are going to give a review of the literature that guides this research. The knowledge and ideas that have been established on this topic will be provided. The strength, weaknesses as well as the gaps will be discussed in this chapter as well as design of Conceptual framework. We will focus on the details about knowledge and practice regarding medical waste management in context of health care facilities. Both theoretical and empirical literatures will be presented.

2.1. OVERVIEW OF MEDICAL WASTE MANAGEMENT

Medical waste is defined as any solid waste that results from the treatment, diagnosis, immunization of humans at hospitals, and in health-related research facilities (Akum 2014). The others authors defined medical waste as all wastes produced in health-care or in diagnostic activities and classify medical waste into two type of medical waste which include municipal or general waste which occupy 75 % to 90 % of total waste generated in health care facilities and special waste which occupy the rest of 10 to 20% of hospital wastes (Elisabeth 2011, P14).

In addition (Rushyuan 2012) stated that medical waste are divided into two main categories including general and regulated waste, he defined general waste as daily household waste which cannot be hazardous to human beings and which are not require special disposal and processing, those waste including bio-degradable waste (cotton, paper, packaging materials, and rest of food) and non-bio-degradable waste which are plastic, soil, caps and tops.

The same author also described regulated waste as hazardous or contaminated waste which can cause a potential health hazard to human beings and require special processing and disposal, including infectious waste, pathological waste, sharps, and pharmaceuticals, chemical waste and radioactive materials.

However (Ola-adisa et al. 2015) differentially classified medical waste into two main categories liquid waste and solid waste, and he describe that liquid waste consist of Biological waste which consist of blood, excrement, and body fluid, Chemical waste which

include of solutions and inorganic salts, Over date medicine and Radioactive waste including Wastes from radiology.

The same author defined solid wastes as waste which composed by Perforating and cutting wastes, including (Needle, syringes, scalpels, blades, broken, glass, vials) and Non perforating waste from treatment including(dressings, stool napkins, plaster, Parts of the body, and organs like placentas, tissues and household type wastes) .

In other hand (USAID 2013) classify medical waste into three categories: including first category were General healthcare waste, which is identical to domestic waste, including materials such as packaging or unwanted paper and add that this kind of waste is generally harmless and needs no special handling, the second category were hazardous healthcare wastes which include infectious waste (waste from patients with highly infectious diseases) and is characterized by a small quantities of chemicals , pharmaceuticals, and non-recyclable pressurized containers and the third category which is highly hazardous healthcare wastes composed by sharps, highly infectious non-sharp waste, stools from cholera patients, bodily fluids of patients with highly infectious diseases, large quantities of expired or unwanted pharmaceuticals , hazardous chemicals , radioactive wastes, genotoxic wastes, and teratogenic wastes (USAID 2013, p2).

According to the Ministry of health of Rwanda medical waste is classified into 7 categories including: Infectious waste, pathological waste, sharps waste, pharmaceutical waste, radioactive waste, chemical waste and non hazardous general waste and these waste should be managed appropriately in order to prevent health risks associated (RWANDA MOH 2016).

Medical waste management is define as all activities that involved in the handling, treatment, conditioning, storage, transportation and disposal of medical waste in order to control infection spreading through medical waste in health facilities or in environment (OAG 2014).

Medical waste management (MWM) has an important role in hospital cleanliness and infection control, therefore waste produced by health care institutions must be managed within the suitable and well recognized flow from their point of generation to their last disposal. This flow is composed of different stage that consist of waste generation, separation, collection, storage, transportation, and disposal (Ogbonna et al. 2012).

Similar to study done by (Manyele & Lyasenga 2010, p2) state that all type of medical waste must be managed through several steps including waste generation, segregation, transportation, storage, treatment and final disposal.

According to Thareja et al. (2015, p4) describe hierarchical way of MWM process which involve seven steps including minimization, source reduction, re-use, recycling, energy recovery, treatment and disposal. In addition this waste management hierarchy is also recommended by Rwanda Ministry of Health(MOH) to be used in Rwanda health facilities toward medical waste management (RWANDA MOH 2016) .

Waste minimization is most favorable way used in medical waste management which may promote sustainable program; this step is composed by reduction at source, reuse, recycle, and compositing of medical waste (Thareja et al. 2015, p4).

Medical waste segregation steps at the point of generation is also very important in MWM process where medical waste should be separated according to their nature by using appropriate color coded plastic bag (amakugo et al. 2016).

In addition MW segregation facilitates waste minimization by decreasing amount of biohazard waste generated and solid waste which can be cost effectively managed through recycling and composting.

According to MOH recommendation regarding medical waste management state that the colored bag should be inside in each MW collection bin and should be covered in order to prevent spillage of waste in the clinical area and during its transport, and MW Management committee also should develop posters and put them on walls in wards, in hospital corridors and in any area where collection bin is located that can help in communication of the process of MW segregation and to orient health care providers, patient, cleaners and the visitors to put the waste in appropriate container (OAG 2014, p118).

According to WHO color code plastic bag recommended are yellow, red, brown, black and purple (RWANDA MOH 2016) .these colors different from the category of waste should be thrown inside, WHO recommend that infectious waste should be in yellow bag marked with international biohazard symbol ,pathological or anatomical waste should be in red bag with international biohazard symbol ,

sharps waste should be in yellow container marked with "Sharps", pharmaceutical and chemical waste should be thrown in brown bag, and general waste should be in black bag, radio-active waste have to be in white bag marked with radioactive sign, and genotoxic waste in purple color bag WHO guideline cited in (RWANDA MOH 2016).

Medical waste should not be allowed to build up at the generation area, they should be collected daily and taken to storage site, nursing or other clinical staff must ensure that the waste bag are well closed and sealed at $\frac{3}{4}$ full, avoid staples when closing the waste bags, a sealed sharps container should be placed into yellow infectious labeled bag ,after removing the waste bag, is mandatory to replace it immediately with the one of the same category, and the person in charge of waste bag supply should ensure that enough bags are supplied at least for 3months and should avoid their stock out (Rwanda MOH 2016, P29).

MW bags and sharps containers should be labeled by showing the source, date of waste generation, type and quantities of waste produced and international biohazard symbol where it's necessary (OAG 2014, p119).

After collection of medical waste, these wastes should be stored and the storage area should be cool and storage time should not exceed 48 hours during cool season and 24 hours in hot season. Cytotoxic waste should be stored away from other medical waste in secured area and radioactive waste should be stored in container that prevent dispersion and labeled as required and infectious waste should be kept way from general waste (RWANDA MOH 2016, p27).

Before final disposal of infectious medical waste should be treated in order to minimize the risk of contamination, therefore there are several ways of medical waste treatment including on- site medical waste treatment and off-site medical waste treatment.

Onsite medical waste treatment is concerning the use of disinfection and autoclaving which are the preferred treatment method used now days, autoclaving is mostly used on sharps and other infectious waste treatment, this is done in closed chambers where both heat and pressure are used over a determined period of time to destroy all the pathogenic agents that may be present in medical waste before final disposal. This method is cheap and it has a capacity to process up to 90% of medical waste, and are easily scaled to meet the needs of any medical organization (Salman 2015).

The same as A microwave heat treatment system, is method used to decontaminate medical waste at the site of generation which consist of mixing of waste with a little water in order to make them slightly wet to facilitate best heat penetration and effective effect on pathogenic agent.

Chemical Treatment is used decontaminate liquid medical waste at the point of generation before conducting them into sewer and the preferred product is breach.

After on –site medical waste treatment, the waste can be disposed as non infectious waste (Kim.2016).

However most of off-site medical waste disposal method is incineration and land disposal. Incineration is mostly used for pathological and pharmaceutical waste and can destroy about 99% of microorganism and it leave minimal of them. Incineration of medical waste should be performed under control to ensure complete combustion in order to minimize any negative effects for the environment, and land disposal is used for disposal of decontaminated waste however a specialized landfill is used for disposal of infectious waste (Kim, 2016).

In Rwanda sharps, pathological, pharmaceutical waste are incinerated and infectious waste must be incinerated or disposed in deep burial and general waste are disposed in secured landfill or recycled or reuse them (Rwanda MOH 2016, P34).

2.2. KNOWLEDGE TOWARD MEDICAL WASTE MANAGEMENT

The knowledge of health care providers is very important to the best practice of waste management this help them, community, and environment to be safe from hazardous (Nagaraju et al. 2013).

Furthermore in study done by (Ola-adisa et al. 2015, p4) found that Knowledge and Practices of stakeholders play an important role in MWM.

In addition in the study done by Amukugo et al. (2016, p674) found that MW segregation is a task of doctors, nurses, paramedical staffs who generate them even the cleaners who handle these waste are concerned and this task may be well accomplished when the concerned people have a positive knowledge and practice related to MW segregation.

In the same study Health care workers such as doctors , nurses, ward assistants and cleaners were examined on knowledge and practice regarding medical waste management and found that housekeeping staff including cleaners were less knowledgeable about waste segregation and disposal than nurses and Doctors (Amukugo et al. 2016, p683).similar to study done in

Mangalore city by pullisher (2016) on awareness, knowledge and practice of biomedical waste management found that Doctors, nurses, and laboratory technicians are more knowledgeable than sanitary staff toward biomedical waste management and Knowledge regarding the color coding and waste segregation was found to be better among nurses and laboratory staff as compared to doctors.

However in the study done by (Adogu et al. 2014) found that knowledge of participant was poor toward medical waste management and this lead to poor practice of medical waste management.

According to study conducted in Indian North Bengal Medical College by (Das 2016,p21) , found that only 6.6% of participant knew about five- color coding of plastic bag used for MW segregation including red, black, yellow and blue color.

Lack of knowledge toward MWM practices has negative impact on medical waste management's methods implementation in the study done at Magalore city found that 68 participants (43.31%) agreed that their health care setting provide annual education on biomedical waste management, whereas 57 participants (36.3%) reported that their health care setting do not provide any education ,the same study revealed that the sanitary staffs who handle the medical wastes are completely unaware of the harmful effects caused by these wastes (Pullishery et al. 2016).

2.3. PRACTICE TO WARD MEDICAL WASTE MANAGEMENT

Good practice of medical is very important in environmental cleaning and health hazard prevention. However study done on healthcare waste management practices among healthcare workers in healthcare facilities of Gondar town, Northwest Ethiopia found that all surveyed health facilities didn't have appropriate and adequate color coded containers and plastic bags for healthcare wastes collection, waste bin was not labeled and all visited health facilities didn't have waste management guidelines in one of health center (Muluken et al. 2013).

Therefore Akum (2014) in his study done at Bawku Presbyterian Hospital of the Upper East Region of Ghana found that (86. 67%) responded that waste is not separated before disposal in the larger storage containers while (13. 33%) indicated that the waste is separated before disposal therefore the others study done in the other hospitals revealed that all participants from the various department said that wastes from the several health care units are disposed into the large storage containers without segregated.

According to observation study done in Indian North Bengal Medical College revealed that In each and every ward visited there was posters and guidelines in working areas except in the Radiotherapy ward and author highlight that even though the posters was available there was some MW containers which was lacking the posters like on red color code and the others was not well printed which lead to poor medical waste segregation (Das 2016,p22).

In study done by Pullisher et al.(2016,p31) in Mangalore city on Awareness, Knowledge and Practices on Bio-Medical Waste Management among nurses, doctors, laboratory technicians and sanitary staff found that 70,6% of the participant agreed that their do not label the infectious waste with biohazard symbol.

In study done in Mangalore on Awareness ,Knowledge and Practices on Bio Medical Waste Management Among Health Care Professionals by (Pullishery et al. 2016,p33) found that in medical waste treatment method autoclaving (67%) was the most widely used in health facility and followed by burning (51%), incineration (46%), segregation (37%), deep burial (21%).Furthermore a study conducted in Indian North Bengal Medical College found that 50% of the observation during day duty staffs placed the infected MWs in the disinfectant

solution hypochlorite (1%) as indicated by the BMW rules 1998 and their give priority to disposal of the sharps.

However further study done in Indian found that human anatomical waste and animal waste are incinerated or disposed in deep burial, microbiology and biotechnology waste are treated by local autoclaving and incineration, sharps are treated by autoclaving and disinfection, Discarded Medicines and Cytotoxic drugs treated by incineration and landfill disposal, Solid Waste (Items contaminated with blood, and body fluids are treated by incineration and autoclaving, and wastes generated from disposable items other than the waste sharps such as tubing , catheters, I. V set are treated by autoclaving and disinfection, liquid waste treated by disinfection and discharge in drains, incineration ash are disposed in landfill, and chemical waste are treated by Chemical treatment and discharge into drains for liquids and secured landfills for solids (Thareja et al.2015, P5).

2.4. FACTORS INFLUENCING MEDICAL WASTE MANAGEMENT

Waste management practices in health care facilities some time be impended by several number of factors ,in Africa study done in Gondar University Hospital, North West Ethiopia revealed that Age, profession, experience year, overtime working hours in a day, no availability of color coded containers, and lack of biohazard symbol on medical waste containers and use of non labeled containers are the major factors that affect medical waste management (Mesfin et al. 2014,p206) .

In addition in Indian lack of coordination, medical waste management committee, operation strategy ,lack of awareness and training toward medical waste management, lack of pressure and lack of appropriate equipment was founded as major challenge against medical waste management (Muduli & Barve 2012,p63). In addition (WHO, 2015) state that Lack of awareness about the health hazards related to health-care waste, inadequate training in proper waste management, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems connected with health-care waste and lack of appropriate regulations, or do not enforce them in many countries.

2.5. THEORITICAL FRAMEWORK

2.4.1. Original Theoretical Framework

Conceptual framework is a system of concepts, assumptions, expectations, beliefs, and theories that support and explain the study in quantitative research (Nicholas 2013,p2).

In the present study a conceptual framework developed to integrate the concepts derived from the review of literature is based on the Health Belief Model (HBM), which is a model used on health behavior that focus on the beliefs and actions of individuals and help to adopt change (Quiwa and Jimeno,2014).

The HBM was developed initially in the 1950s by social psychologists in the U.S. Public Health Service to explain the widespread failure of people to participate in programs to prevent and detect disease (Hochbaum, 1958; Rosenstock, 1960, 1974). Later, the model was extended to study people's responses to symptoms (Kirscht, 1974) and their behaviors in response to a diagnosed illness, particularly adherence to medical regimens (Becker, 1974).

HBM composed by six concept that predict why people will take action to prevent, to screen for, or to control illness conditions; these include perceived susceptibility, Perceived seriousness, perceived benefits and barriers to a behavior, cues to action, and perceived self efficacy (Glanz et al.,2008).

Perceived susceptibility is defined as chance of being exposed to a kind of condition in the present study this concept defining people at risk of being affected by medical waste including all health care providers, patients, visitors and medical waste handlers(Bartlett 2003).

Perceived seriousness :This concept is defined as the seriousness of a condition to public health ,in the present study this concept is defined as consequences or risks associated with medical waste including Hepatitis B&C,HIV , tuberculosis, wound infection, and diarrhea, physical injuries, environmental pollution and elevated cost of disposal (Glanz et al.,2008).

Perceived benefit: This concept is defined as efficacy of the advised action taken to reduce risk or seriousness of impact and clarify positive impact to be expected (Glanz et al.,2008). in this study this concept defined as the outcome of an action .if appropriate action are taken into consideration toward medical waste management the hospital waste disposal cost may be decreased, nosocomial infection ,physical injuries may be also decreased and hospital environment may look smart.

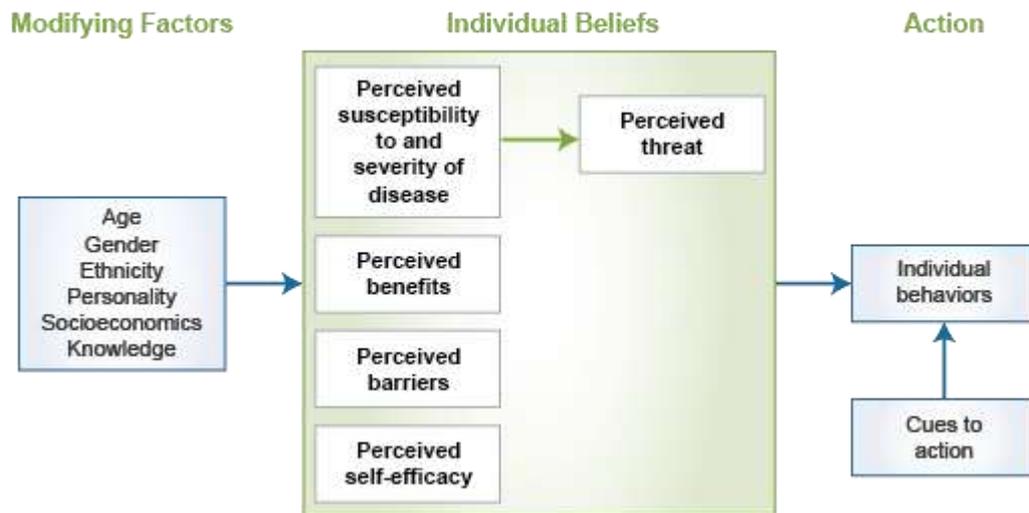
Perceived barriers: Belief about the tangible and psychological costs of the advised action (Bartlett 2003). In the present study this concept is defined as challenges faced by Medical waste management including lack of knowledge on medical waste management, Overtime working hours, age, financial issue, lack of equipment and infrastructure, lack of waste management committee, lack of policies and procedure guiding medical waste, low priority given to the medical waste management issue were defined by different authors as the factors that prevent medical waste management actions to be implemented.

Cues to actions: This concept in the present study is defined as strategies or activities to activate readiness. Regarding medical waste management different activities should be used like use of socio media, availability of policies, posters and guidelines in health care facilities.

Self- efficacy: this concept is defined as confidence in one's ability to take action (Glanz et al., 2008).

In the present study WHO recommendations should be respected in order to promote medical waste management, including respect of medical waste management steps (waste minimization, waste segregation at the point of generation, waste treatment, safe storage, safe transport and safe disposal), training of medical staff and waste handlers on medical waste management, Establish medical waste management policies, guidelines and posters, availability of waste management committee, Hospital organization and commitment, availability and use of appropriate MWM equipment such as PPE, plastic bags, MW containers, financial, human resource and infrastructures.

The figure below illustrates how the concepts inter-relate in the adopted HBM applied in the present study of knowledge and practice regarding medical waste management among theatre staff of three referral hospitals in Kigali.



Source: Glanz K, Rimer BK, Viswanath K, eds. 2008. *Health Behavior and Health Education: Theory, Research, and Practice* (4th ed). San Francisco: Jossey-Bass.

Figure 2 1 Adopted health belief model

CHAPTER THREE: METHODOLOGY

3.0. Introduction

This chapter describes the methods or principle to be used in this research. It will consists on description of the study area, study design, study population, sample size and sampling strategy, instrumentation, Data collection procedure, Data analysis and Ethical consideration.

3. 1. Study area

This study was carried out in the operating theatre of three referral hospitals which are located in Kigali including Rwanda military hospital (RMH), King Faisal hospital (KFH) and Kigali teaching hospital (CHUK). this area was selected because these hospital have been audited by the MOH in 2014 toward medical waste management and different gaps in waste management steps was ruled out therefore this study was assessed knowledge and practice of operating theatre staff regarding medical waste management in three referral hospital in Kigali..

3.2. Description of study area

Rwanda military hospital (RMH) is a referral hospital which is located in Kigali city, KICUKIRO District and KANOMBE sector it receive national and international patients who come for seeking different care according to their illness, including surgical care. It has 275bed and different services including: accident and emergency, OPD (outpatient disease), maternity, internal medicine, pediatric, surgical ward, neonatology, ICU, Operating theatre, radiology, laboratory and dentistry. Operating theatre of RMH has 5 different operating room including orthopedic surgical room, general surgeries room, gynecological surgeries room, specialties room, ophthalmology surgery room and 1tea room, 1recovery room and 1pharmacy. Operating theatre of RMH has 30 general nurses, 35 anesthetists technician, 13surgeons, and 5 cleaners. RMH operating theatre has 5 operating tables, and it has a capacity to receive 5 patients at the same time and able to receive 20 patient a day and the capacity to receive an average of 250 patients par month (as reported in RMH theatre patient register 2015-2016). In the operating theatre, staff working in shift day and night, day shift composed by 13Nurses and 10 anesthetists technician and night shift composed by three nurse, 2anesthetist and 1 cleaner .During day shift all elective ,urgent and emergency cases are operated and during night shift operate only emergency.

This study also was involve Kigali University teaching hospital (CHUK) which is a referral hospital, locate in Kigali city, Nyarugenge district and Nyarugenge sector, It has different services including: accident and emergency, intensive care unit(ICU), neonatal intensive care unit(NICU), OPD (outpatient department), maternity, internal medicine, pediatric, surgical wards, Operating theatre, radiology, laboratory, dentistry, ophthalmology department and 513 beds. Operating theatre of CHUK have 6 operating rooms 2 for general surgery, 1 for emergency surgeries, 2 for orthopedic and the other 1 for neuro surgery.

Operating theatre of CHUK has 30 general nurses, 25 anesthesia providers, 14 general surgeon, 11 specialist doctors, 4 anesthesiologist and 8cleaners. CHUK operating theatre has 6 operating tables, and it a capacity to receive 6patients at the same time and able to receive 20 patients a day and the capacity to receive an average of 250 patients per month (as reported by theatre patient register). in the operating theatre staff working in shift day and night, day shift composed by nine Nurses and 10 anesthesia providers, 1anesthesiologist, 5surgeons and 3cleaners, and night shift composed by three nurse, 2anesthetist and 1 cleaner. During day shift all elective, urgent and emergency cases are operated and during night shift operate only emergency cases.

This study also done at King Faisal Hospital which is also a referral hospital located in RWANDA country, Kigali city, Gasabo district and Kacyiru sector. KFH receive national and international patients who come for seeking different care according to their illness, including surgical care. KFH has different services including: accident and emergency, OPD (outpatient disease), maternity, internal medicine, pediatric, surgical ward, Neonatal intensive care unit, (NICU), ICU, Operating theatre, radiology, laboratory, dentistry and has 150 bed . Operating theatre of KFH has 5 operating room which are named room I, II, III, IV, and room v. room I is reserved for specialties cases, room II is for orthopedic and neuro surgeries cases, room III for general surgeries and gynecologic cases, room IV for minor surgeries and room V for septic surgeries and sometime this room is booked for emergencies, tea room, recovery room and pharmacy are there.

Operating theatre of KFH has 25 registered, general nurses, 12 anesthesia provider, 5 health care assistants, 17 surgeons, and 5 cleaners. KFH operating theatre has 5 operating tables, and it has a capacity to receive 5 patients at the same time and able to receive 20 patient a day and the capacity to receive an average of 200 patients per month(as reported by theatre patient register). All the operating theatre staff working in shift day and night, day shift composed by nine Nurses and 8 anesthesia providers and night shift composed by three

nurse, 2anesthetist and 1 cleaner. During day shift all elective, urgent and emergency cases are operated and during night shift operate only emergencies.

3. 3. Study design

In this study a cross sectional descriptive quantitative research design was used to assess knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals in Kigali. Quantitative research generates numerical data that can be converted into numbers for a statistical review (Criss, 2011) and is called cross-sectional because it was gathered information at only one point in time (Olsen et al. 2004).

3. 4. Study population

Population are the individuals participant or object to be measured (Tran, 2013).

Therefore this study was involve 240 populations, including 85 (35%) nurses and 55 (23%) surgeons, 76 (32%)anesthetists technician, 5 (2%) health care assistant, and 18 (8%) cleaners from all selected hospitals.

Table 3. 1 .Number of participants according to their hospital.

POPULATI ONS HOSPITAL	NURS ES	ANESTHET ISTS	SURGE ONS	HEALTH CARE ASSISST ANT	CLEAN ERS	TOT AL	%
CHUK	30	29	25	0	8	92	38 %
KFH	25	12	17	5	5	64	27 %
RMH	30	35	13	0	5	83	35 %
TOTAL	85	76	55	5	18	240	100 %
PERCENT AGE	35%	32%	23%	2%	8%	100 %	

3. 5. Sample size

In this study a formula established by Yamane was used to calculate a sample size, this formula is based on confidence level of 95% and P value of 0.05. Therefore, a total number of 150 respondents was calculated from the target population of 240 by using Yamane’s formula 1967 (Israel, 1992; Polonia, 2013, p8). The detail of calculation is shown in table below

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

$$n = \frac{240}{1 + 240(0.05)^2}$$

$$n = \frac{240}{1 + 240(0.025)} = \frac{240}{1 + 0.6} = \frac{240}{1.6} = 150 \text{ population sample}$$

n=sample size
N=population(240)
e=acceptable sampling error (0.05)

Table 3 2 Proportion of sampling of the participant in each hospital.

HOSPITALS	CATEGORY	Sample proportion
CHUK	Nurses	20%
	Anesthetist	17%
	Surgeons	16%
	Cleaners	5%
KFH	Nurses	16%
	Surgeons	11%
	Anesthetists	8%
	HCA	3%
	Cleaners	3%
RMH	Nurses	20%
	Surgeons	8%
	Anesthetists	20%
	Cleaners	3%

3. 6. Sampling strategy

A total of 3 referral hospitals among these audited by OAG,2014 were selected by convenient sampling and sampling method for the participant was stratified random sampling which is a method of sampling consist of division of the population into a small groups called strata based on their characteristics then randomly a researcher pick a sample into strata(Stephen,2003,p1). In this study the participant were grouped into five strata according to their job: nurses, surgeon, anesthetist, health care assistant and cleaners, then researcher used a list of each group and picked a sample among them randomly according to their availability.

3. 7. Inclusion criteria

The study included nurses, anesthesia providers, health care assistant, cleaners and Medical doctors who worked in the operating rooms of the three referral hospitals in Kigali, who were available had above 6months of experience in operating room accepted to sign consent.

3. 8. Exclusion criteria

The study excluded nurses, anesthetist providers, Medical doctors, health care assistant and cleaners who had less than 6months of working experience in operating room.

3.9. Data Collection Methods and Procedures.

Data collection method is defined as a process of obtaining data from individual or group members and those data are later manipulated into a representation of the group as a whole. (Van Gog, 2008, P765).

3.10. Instruments

Data collection instrument are tools used to collect information for an evaluation, including survey, test, questionnaire, interview, case logs and attendance record (Carline, 2003). For this study data were collected using self administered questionnaires composed by close ended and multiple choice questions.

To ensure the validity of the questionnaire a researcher prefer to use the adopted questionnaire used in other similar study conducted on knowledge and practice of medical waste management in health facilities ,adopted study was done in Indian by (Ostwal et al. 2015).

The researcher has developed the other questionnaires after reviewing similar published articles based on objectives and research question. To ensure reliability a researcher piloted the questionnaire to test the suitability of the questions to the local context and readability of

the questions and reliability coefficient was calculated and found 7.3. The questionnaire were made up by the following sub-groups: Questions to deal with demographic information of the participants, knowledge, practice regarding medical waste management and perceived factors influencing medical waste management in the operating theatre of three referral hospitals in Kigali.

The questionnaire which includes adopted tools and researcher's own are originally composed in English and was translated into French and Kinyarwanda by a professional translator to facilitate every respondent to read, understand and respond in his or her easiest language. Interview was used for the participant who was not able to read the questionnaires.

Reliability describes how far a particular test, procedure or tool, such as a questionnaire, produces similar results in different circumstances, assuming nothing else has changed (Robertson *et al* 2006, p41).

In order to ensure the reliability of the data collection instrument, the researcher used a validated questionnaire used in other settings and has developed the other questionnaire according to objective and research questions, thereafter the reliability coefficient was calculated and found 7.3. .

Validity it is about the closeness of what we believe we are measuring to what we intended to measure (Roberts *et al* 2006, p41).

In this study researcher ensure validity by submitting the questionnaire to the supervisors, who evaluated the questions in relation to the objectives of the study. Content-related validity was achieved through an extensive literature search on medical waste management knowledge and practice. The questionnaires has four section including section A composed of socio-demographic questionnaires, section B which composed of knowledge questions related to the first objective which supposed to determine the level of knowledge of operating room staff regarding medical waste management in three referral hospitals .section C which composed of practice questions which respond to second objective supposed to measure

3. 11. Data collection Procedure

The data collection started after obtaining approval from UR/College of medicine and health sciences institutional review board and permission to collect data from the management of selected hospitals. A researcher went to collect data three times a week; Monday, Tuesday and Wednesday in a period of 8 weeks. The participant meet with a researcher in their operating theatre early morning before starting their work and during their break time, a researcher explained to them briefly about objective and significance of the study and gave them the consent form to sign and they were informed that they can withdraw at any time if their want. Then the questionnaires were administered to every participant who are allowed to respond during the time he/she needs. The respondents were allowed to ask questions to researcher. Before completing questionnaires, the respondents were ensured about the privacy and confidentiality of their information, after completing the questionnaires researcher collected them and thank the respondents.

3. 12. Data analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS version 20). Descriptive statistics were performed to report on both demographics information, the levels of knowledge and practice as well as perceived factors with medical waste management. The bivariate analysis using Chi-Square statistical test was performed to report on possible relationships between knowledge, practice and selected variables. Multivariate analysis was used, thus the logistic regression analysis reporting odds ratios were performed to test the correlated variables in bivariate analysis and then to confirm predictors of levels of knowledge and practice of staff working in operating rooms.

3. 13. Problems and limitations

The main problems associated with this study were more emergencies case which made the respondents busy and work overloaded.

The present study is limited in scope as the results focus on referral hospitals and not representing the whole health care system in Rwanda thus make the findings to not be generalized to all operating rooms in Rwanda and study tool was self administered questionnaire which make this study to miss some information.

3.14. Ethical considerations

Written Permission and approval to carry out the study was sought from UR/College of medicine and health sciences authorities and then RMH, CHUK, KFH administration were approached for further authorization. a researcher gave the consent form to the participants to sign before data collection and they were informed that they can withdraw at any time if necessary and confidentiality was ensured that their names cannot be mentioned on the questionnaires, the participation was voluntary and the participants was ensured that no one shall face any harm or discomfort through the study.

3.15. Data management

Hard copies of data collected were kept in a locked cupboard and Soft copies in password-controlled computer without have access to anyone except the researcher and her supervisors.

3.16. Data dissemination

Report will be submitted to UR College of Medicines and Health sciences and to three selected hospitals involved in the study.

CHAPTER FOUR: PRESENTATIONS OF RESULTS

4.0. INTRODUCTION

This chapter presents the results from the study which was aimed to assess knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals in Kigali. It is composed by five sections according to study objectives including socio-demographic characteristics, level of the Knowledge and practice of the participants, perceived factors associated with medical waste management among theatre staff of three referral hospitals in Kigali and relationship identification between level of knowledge, practice and selected socio-demographic variables.

4.1. SAMPLE CHARACTERISTICS.

The study sample was made up of 150 hospital staff and was restricted to nurses, medical doctors, anesthesia providers, health care assistants and cleaners with an experience of 6 months and above who works only in operating rooms in the three selected referral hospitals in Kigali. However, the response rate was 143 (95%).

4.2. SOCIO DEMOGRAPHIC CHARACTERISTICS

The results in table 4.1 show that the majority of the participants fall in the age range of 30-39(59%), male represents 55% while 42% holds advanced diploma. Forty percent are registered nurses while the high numbers of participants have work experience between 2-5 years in operating theatre (36%) and it is evident that the majority of the study participants were from Kigali University Teaching Hospital (37%), the least response was from King Faisal Hospital. This is due the fact that KUTH is a public referral hospital while KFH is a private tertiary hospital whose workload of staff is always huge and this is likely to affect the response rate.

Table 4 1 Socio-demographic characteristics of the study participants

<i>Demographic data</i>	<i>Frequencies</i>	<i>Percentage</i>
<i>Age of the participants</i>		
20-29 years	30	21%
30-39 years	85	59%
40-49 years	23	16%
50 years and the above	5	3%
<i>sex of the participant</i>		
Male	79	55%
Female	64	45%
<i>Marital status of the participants</i>		
Married and living together	104	73%
Single	35	24%
Widower	4	3%
divorce or separated	0	0%
<i>Education level of participant</i>		
primary school	4	3%
ordinary level	4	3%
complete secondary school	7	5%
advanced diploma	60	42%
bachelors degree	55	38%
masters degree	13	9%
Illiterate	0	0%
<i>position of participant</i>		
registered nurse	57	40%
anesthesia provider	41	29%
medical doctor	31	22%
Cleaner	10	7%
health care assistant	4	3%
<i>Years of experience of participant</i>		
6 months-1 year	16	11%
2-5 years	52	36%
6-10 years	42	29%
10 -15 years	20	14%
more than 15 years	13	9%
<i>Working place</i>		
Rwanda military hospital	50	35%
King Faisal hospital	40	28%
Kigali university teaching hospital	53	37%

4.3. KNOWLEDGE OF OPERATING ROOM STAFF REGARDING MEDICAL WASTE MANAGEMENT

The knowledge of operating room staff on medical waste management is presented in table 4.2.

The knowledge scores were calculated from 29 questions depicting knowledge items, the scores were calculated by assigning each question correct and incorrect options. Then after, the mean score was calculated to get the cutoff point required to categorize knowledge levels among the study participants. The cutoff of was calculated from the mean score of the 29 questions.

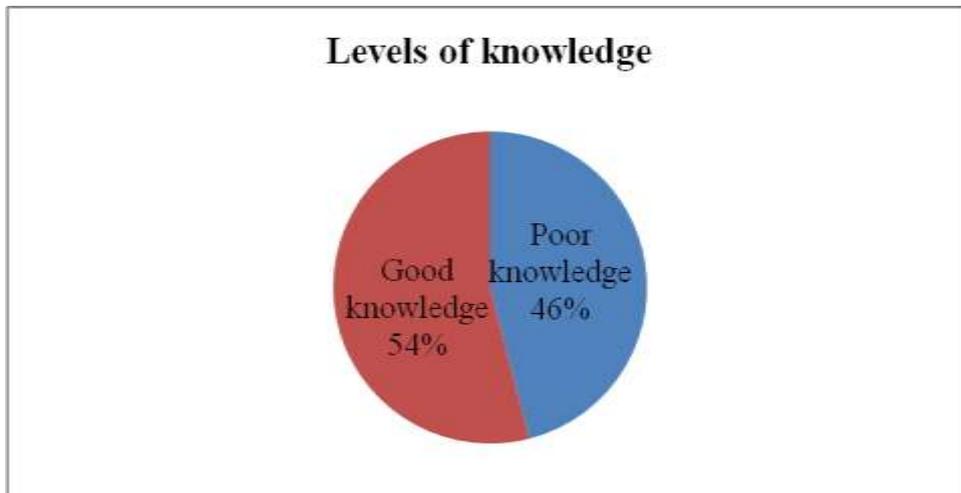
This study results shows that the lowest score is 8 while the highest is 27 out of 29 questions answered by the study participants. Then after, the mean score was calculated to come up with knowledge levels of the study participants with regard to medical waste management among theatre staff in three selected referral hospitals. The mean knowledge score was 21 with the highest score of 27 and the lowest of 8. According to the mean level of knowledge of participants was categorised into two category less than the mean were classified as “poor knowledge” while all the above the mean represent the highest level of knowledge in the present study classified as “Good knowledge”

Table 4 2 Distribution of respondents by knowledge scores

Knowledge Scores	Frequency	%
N=143, Minimum=8, Max=27, Mean=21 , Std=3		
8	1	1
15	2	1
16	6	4
17	7	5
18	2	1
19	17	12
20	15	10
21	15	10
22	21	15
23	13	9
24	24	17
25	11	8
26	5	3
27	3	2
Total	143	100

The results in figure 4.1 clearly show that 54% of the study participants have good knowledge on medical waste management, while only 46% have poor knowledge toward medical waste management although this number is relatively high.

Figure 4 1 Distribution of participants by levels of knowledge on medical waste management



The classification of knowledge was based on the mean score calculated from the total scores, the cut off was set at 21 scores as discussed in earlier section. This is a researcher classification based on adapted questions in the present study.

4.4. LEVEL OF PRACTICE REGARDING MEDICAL WASTE MANAGEMENT

The practice of operating room staff on medical waste management were summarized for the 64 questions in relation to the practices regarding medical waste management in the theatre. The individual responses show that throughout the responses, answers vary according to the items. From the individual responses, the total score for practice was calculated from the computed practice items. The negative items were coded in a way that if the participant scores the correct answer; that is to mean he/she knows that it is incorrect to that particular item, while on positive items, the correct answer means the correct response. In addition from these score the practice levels were calculated by computing all practice items into one composite variable.

The scores were calculated by adding together all 64 items measuring the practices of the study participants with regards to medical waste management at the study site.

4.4.1. Distribution of participants by practice scores

The levels of practice as far as waste management is concerned were reported from the scores. The higher the score, the better the practice and vice versa.

The practice levels were categorized into two from the lowest to the highest.

The mean score was calculated and found out 48, and this was used as cutoff point required to quantify practice on medical waste management, any score that is lesser than the mean was classified as poor practice while the above mean score is classified as good practice with regards medical waste management.

Table 4 3 Distribution of participants by practice scores

Scores	Frequency	%	
Minimum:37.00, Maximum: 56.00, Mean score: 48.5594, Std. Deviation: 4.75842			
Practice scores	37	3	2.1
	38	2	1.4
	39	2	1.4
	40	5	3.5
	41	2	1.4
	42	5	3.5
	43	4	2.8
	44	7	4.9
	45	6	4.2
	46	10	7
	47	6	4.2
	48	12	8.4
	49	7	4.9
	50	9	6.3
	51	12	8.4
	52	20	14
	53	14	9.8
	54	8	5.6
	55	4	2.8
56	5	3.5	
Total	143	100	

4.4.2. Distribution of Levels of practice scores

The levels of practice were classified based on the mean score calculated from the total scores, the cut off was set at 48 score as discussed in earlier section. This is a researcher classification based on adapted questions in the present study. The results in figure 4.2 show that 55% of the study sample reported good practice with regards medical waste management at the study site, while 45% reported the poor levels of practice.

Figure 4 2 Distribution of Levels of practice scores



4.5. PERCEIVED FACTORS ASSOCIATED WITH MEDICAL WASTE MANAGEMENT AMONG THEATRE STAFF

The study participants were requested to mention the perceived factors which might be influencing medical waste management from the list of 9 predetermined factors namely: Overtime working hours in a day, shortage of staff, lack of appropriate equipment, lack of coordination, lack of medical waste management committee, lack of awareness and training towards medical waste management, institutional financial issues, supplier who delay to supplier the equipment, negligence at the study site. Those factors were categorised into two groups depending on what the participants scored” Yes” as the right perceived factor and” No “as the factor which is not considered by the participants.

4.5.1. Distribution of participants by perceived factors of medical waste management.

Table 4.4 indicates that lack of equipment was reported as the first perceived factors affecting knowledge (71%) and practice followed by negligence(66%), lack of awareness and training toward medical waste management(57%) and lack of coordination(45%) were the first four factors reported.

Table 4 4 Distribution of participants by perceived factors of medical waste management

Perceived factors	Answers	N	%
Overtime working hours in a day	No	103	72
	Yes	40	28
	Total	143	100
Shortage of staff	No	84	59
	Yes	59	41
	Total	143	100
Lack of appropriate equipment	No	41	29
	Yes	102	71
	Total	143	100
Lack of coordination	No	79	55
	Yes	64	45
	Total	143	100
Lack of medical waste management committee	No	96	67
	Yes	47	33
	Total	143	100
Lack of awareness and training toward medical waste management	No	61	43
	Yes	82	57
	Total	143	100
institution financial issues	No	112	78
	Yes	31	22
	Total	143	100
supplier who delay to supplier the equipment	No	80	56
	Yes	63	44
	Total	143	100
Negligence	No	48	34
	Yes	95	66
	Total	143	100

4.5.2. Factors associated with medical waste management.

Factors associated with medical waste management were grouped into categories basing on mean score of factors that respondents have correctly scored.

The results show that those who think that lesser than 4 factors are likely to influence both knowledge and practice are 59 % while those who think that more than 4 factors which might influence the knowledge and practice are 41%.

Table 4 5 Score of perceived factors associated with medical waste management

Variables		N	%
Mean score: 4			
Factors scores	0	4	3
	1	25	17
	2	17	12
	3	11	8
	4	28	20
	5	21	15
	6	10	7
	7	11	8
	8	7	5
	9	9	6
	Total	143	100.0

Table 4 6 Factors associated with medical waste management

Variables		N	%
Factors associated with medical waste management	Lesser than 4 factors	85	59
	More than 4 factors	58	41
	Total	143	100

4.6. RELATIONSHIP BETWEEN LEVELS OF KNOWLEDGE AND SELECTED DEMOGRAPHIC VARIABLES

The relationship between knowledge and socio demographic data were summarised in table 4.7.

It is evident that 6 demographic variables are associated with knowledge levels on medical waste management. Those variables are age of the study participants, marital status, education level, the hospital in which the study participant work, position and work experience of the participants ($P < 0.05$). In order to confirm the relationships, the variables associated with outcome in the bivariate analysis were entered into logistic regression analysis to confirm the relationship.

In table 4.7, only the sex was not associated with the reported levels of knowledge with regards to medical waste management at the study site.

Table 4 7 Cross-tabulation between levels of knowledge and socio-demographics

Socio-demographic variables		Levels of knowledge		Total	P_Value
		Poor knowledge	Good knowledge		
Age of the participant	20-29 years	23	7	30	0.000
		76.70%	23.30%	100.00%	
	30-39 years	37	48	85	
		43.50%	56.50%	100.00%	
	40-49 years	5	18	23	
		21.70%	78.30%	100.00%	
50 years and the above	1	4	5		
	20.00%	80.00%	100.00%		
Total	66	77	143		
	46.20%	53.80%	100.00%		
sex of the participant	Male	34	45	79	0.4
		43.00%	57.00%	100.00%	
	Female	32	32	64	
		50.00%	50.00%	100.00%	
	Total	66	77	143	
46.20%		53.80%	100.00%		

**Table 4 7 Cross-tabulation between levels of knowledge and socio-demographics
(Continued)**

Socio-demographic variables		Levels of knowledge		Total	P_Value
		Poor knowledge	Good knowledge		
Marital status of the participant	married and living together	42	62	104	0.023
		40.40%	59.60%	100.00%	
	single	23	12	35	
		65.70%	34.30%	100.00%	
	widower	1	3	4	
		25.00%	75.00%	100.00%	
Total	66	77	143		
	46.20%	53.80%	100.00%		
Which hospital do you work in?	Rwanda military hospital	29	21	50	0.03
		58.00%	42.00%	100.00%	
	King Faisal hospital	12	28	40	
		30.00%	70.00%	100.00%	
	Kigali university teaching hospital	25	28	53	
		47.20%	52.80%	100.00%	
Total	66	77	143		
	46.20%	53.80%	100.00%		

Table 4 8 Cross-tabulation between levels of knowledge and socio-demographics

Variables		Levels of knowledge		Total	P value
		Poor knowledge	Good knowledge		
Education level of participant	primary school	4	0	4	0.019
		100.0%	0.0%	100.0%	
	ordinary level	3	1	4	
		75.0%	25.0%	100.0%	
	complete secondary school	6	1	7	
		85.7%	14.3%	100.0%	
	advanced diploma	26	34	60	
		43.3%	56.7%	100.0%	
	bachelors degree	24	31	55	
		43.6%	56.4%	100.0%	
masters degree	3	10	13		
	23.1%	76.9%	100.0%		
Total	66	77	143		
	46.2%	53.8%	100.0%		
position of participant	registered nurse	22	35	57	0.014
		38.6%	61.4%	100.0%	
	anesthesia provider	21	20	41	
		51.2%	48.8%	100.0%	
	medical doctor	11	20	31	
		35.5%	64.5%	100.0%	
	Cleaner	8	2	10	
		80.0%	20.0%	100.0%	
	health care assistant	4	0	4	
		100.0%	0.0%	100.0%	
Total	66	77	143		
	46.2%	53.8%	100.0%		

**Table 4.8. Cross tabulation between levels of knowledge and socio-demographics
(Continued)**

Variables		Levels of knowledge		Total	P_Value
		Poor knowledge	Good knowledge		
Years of experience of participant	6 months-1 year	9	7	16	0.000
		56.30%	43.80%	100.00%	
	2-5 years	36	16	52	
		69.20%	30.80%	100.00%	
	6-10 years	13	29	42	
		31.00%	69.00%	100.00%	
	10 -15 years	6	14	20	
		30.00%	70.00%	100.00%	
	more than 15 years	2	11	13	
		15.40%	84.60%	100.00%	
Total	66	77	143		
	46.20%	53.80%	100.00%		

4.7. DISTRIBUTION OF LEVELS OF PRACTICE AND SELECTED DEMOGRAPHIC VARIABLES

The relationship between practice and socio demographic data were summarised in table 4.9. It is evident that only one demographic variable is associated with practice levels on medical waste management. The significant variable is hospital in which the health professionals work ($P < 0.05$). Contrary to the knowledge, most of socio-demographic characteristics were not associated with practice among the study participants. One significant variable will be entered also in logistic regression to confirm the relationship.

Table 4 9 Cross tabulation between levels of practice and socio-demographics

Variables		Levels of practice		Total	P_ Value
		Poor practice	Good practice		
Age of the participant	20-29 years	13	17	30	0.227
		43.30%	56.70%	100.00%	
	30-39 years	40	45	85	
		47.10%	52.90%	100.00%	
	40-49 years	11	12	23	
		47.80%	52.20%	100.00%	
	50 years and the above	0	5	5	
		0.00%	100.00%	100.00%	
Total	64	79	143		
	44.80%	55.20%	100.00%		
sex of the participant	male	40	39	79	0.116
		50.60%	49.40%	100.00%	
	female	24	40	64	
		37.50%	62.50%	100.00%	
	Total	64	79	143	
		44.80%	55.20%	100.00%	

Table 4.9. Cross tabulation between levels of practice and socio-demographics (Continued).

Variables		Levels of practice		Total	P_ Value
		Poor practice	Good practice		
Marital status of the participant	married and living together	48	56	104	0.682
		46.20%	53.80%	100.00%	
	single	15	20	35	
		42.90%	57.10%	100.00%	
	widower	1	3	4	
		25.00%	75.00%	100.00%	
	Total	64	79	143	
44.80%		55.20%	100.00%		
Education level of participant	primary school	3	1	4	0.662
		75.00%	25.00%	100.00%	
	ordinary level	1	3	4	
		25.00%	75.00%	100.00%	
	complete secondary school	3	4	7	
		42.90%	57.10%	100.00%	
	advanced diploma	24	36	60	
		40.00%	60.00%	100.00%	
	bachelors degree	26	29	55	
		47.30%	52.70%	100.00%	
	masters degree	7	6	13	
		53.80%	46.20%	100.00%	
	Total	64	79	143	
		44.80%	55.20%	100.00%	

Table 4 9 Relationship between levels of practice and socio-demographics (continued)

Variables		Levels of practice		Total	P_ Value
		Poor practice	Good practice		
position of participant	registered nurse	21	36	57	0.259
		36.80%	63.20%	100.00%	
	anesthesia provider	22	19	41	
		53.70%	46.30%	100.00%	
	medical doctor	15	16	31	
		48.40%	51.60%	100.00%	
	Cleaner	3	7	10	
		30.00%	70.00%	100.00%	
	health care assistant	3	1	4	
		75.00%	25.00%	100.00%	
Total	64	79	143		
	44.80%	55.20%	100.00%		
Years of experience of participant	6 months-1 year	6	10	16	0.148
		37.50%	62.50%	100.00%	
	2-5 years	28	24	52	
		53.80%	46.20%	100.00%	
	6-10 years	21	21	42	
		50.00%	50.00%	100.00%	
	10 -15 years	6	14	20	
		30.00%	70.00%	100.00%	
	more than 15 years	3	10	13	
		23.10%	76.90%	100.00%	
Total	64	79	143		
	44.80%	55.20%	100.00%		

Table 4.9. Relationship between levels of practice and socio-demographics (Continued)

Variables		Levels of practice		Total	P_ Value
		Poor practice	Good practice		
Which hospital do you work in?	Rwanda military hospital	33	17	50	0.000
		66.00%	34.00%	100.00%	
	King Faisal hospital	8	32	40	
		20.00%	80.00%	100.00%	
	Kigali university teaching hospital	23	30	53	
		43.40%	56.60%	100.00%	
Total	64	79	143		
	44.80%	55.20%	100.00%		

4.8. RELATIONSHIP BETWEEN LEVELS OF KNOWLEDGE AND PRACTICE AMONG THE STUDY PARTICIPANTS

The relationship between the knowledge and practice is statistically significance ($P < 0.05$). ,means that there is a positive association between knowledge and practice as shown in table below 4,10 that poor knowledge lead to poor practice and good knowledge lead to good practice .

Table 4 10 Relationships between knowledge levels and practice

Variables		Levels of practice		Total	P_ Value
		Poor practice	Good practice		
Levels of knowledge	Poor knowledge	36	30	66	0.029
		54.5%	45.5%	100.0%	
	Good knowledge	28	49	77	
		36.4%	63.6%	100.0%	
Total		64	79	143	
		44.8%	55.2%	100.0%	

4.9. RELATIONSHIP BETWEEN LEVELS OF KNOWLEDGE AND PERCEIVED FACTORS

The perceived factors to medical waste management in table 4.13 is reported to be associated with the knowledge levels of the study participants ($P < 0.05$)

Table 4 11 Relationship between levels of knowledge levels and perceived factors

Variables		Factors associated with medical waste management		Total	P Value
		Lesser than 4 factors	More than 4 factors		
Levels of knowledge	Poor knowledge	47 71.2%	19 28.8%	66 100.0%	0.008
	Good knowledge	38 49.4%	39 50.6%	77 100.0%	
Total		85 59.4%	58 40.6%	143 100.0%	

4.10. RELATIONSHIPS BETWEEN PRACTICE AND PERCEIVED FACTORS

The perceived factors of medical waste was not reported to be associated with the practice of medical staff ($P>0.05$).

Table 4 12 Relationships between practices and perceived factors

Variables		Factors associated with medical waste management			P value
		Lesser than 4 factors	More than 4 factors	Total	
Levels of practice	Poor practice	35	29	64	0.297
		54.7%	45.3%	100.0%	
	Good practice	50	29	79	
		63.3%	36.7%	100.0%	
Total		85	58	143	
		59.4%	40.6%	100.0%	

4.11. LOGISTIC REGRESSION ANALYSIS OF THE SIGNIFICANT VARIABLES WITH KNOWLEDGE LEVELS AND DEMOGRAPHIC DATA

The results in table 4.13 confirm that age, position of the participants, education level, work experience, practice and the perceived factors positively influence the knowledge of participants with regards to medical waste management [P<0.001, OR:3.10; P<0.05,OR:0.69; P<0.05,OR:1.7; P<0.001, OR:1.9; P<0.05, OR: 2.1; P<0.05,OR:2.5] respectively.

Table 4 13 Logistic regression analysis of demographic data positively associated with knowledge levels

Variables	Odd ratios	[95% Conf. Interval]		P_ Value
Levels of Knowledge				
Age	3.106021	1.732901	5.56718	0.000
Marital status	0.576316	.2998794	1.107579	0.098
position of participant	0.6992652	.5079606	.9626177	0.028
education	1.788803	1.217817	2.627501	0.003
Experience	1.958733	1.382043	2.77606	0.000
hospital	1.235178	.8366352	1.823573	0.288
Levels of practice	2.1	1.073428	4.108332	0.03
Perceived factors	2.538781	1.266603	5.088736	0.009

4.12. MULTIVARIATE ANALYSIS OF POSITIVELY CORRELATED WITH LEVELS OF KNOWLEDGE VARIABLES IN LOGISTIC REGRESSION ANALYSIS

In the table 4.14 all variables that were significant in logistic regression were entered into multiple regression model to confirm the relationships. It is evident that age, education level, practice, and perceived factors are predictors of knowledge among the study population ($P < 0.05$). On the other hand experience and working position of the study participants were not confirmed by the model to be a predictor of knowledge on medical waste management ($P > 0.05$)

Table 4 14 Multiple regression analysis of factors associated with knowledge levels.

Variables	Odd ratios	[95% Conf. Interval]		P_ Value
Levels of Knowledge				
Age	2.195276	1.094119	4.404675	0.027
Education	1.961556	.6112035	1.359111	0.005
Position	0.9114237	.6112035	1.359111	0.098
Experience	1.35536	.8707471	2.109685	0.178
Levels of practice	2.381117	1.082726	5.236518	0.031
Factors	2.259084	1.002165	5.092437	0.031

Table 4 15 Regression analysis of practice and associated factors

Levels of practice	Odds		P_ Value
	Ratios	CI	
	1.573043	1.056194	0.026
hospital		2.342813	

The results in table 4.15 did not confirm any relationship with hospital in which the staff works and the medical waste management practices.

CHAPTER FIVE: DISCUSSION

5.0. Introduction

This chapter discusses the results of the study in relation to study objectives. The socio-demographic characteristics followed by levels of knowledge and practice of theatre staff towards waste management are discussed. The chapter ends by the perceived factors associated with medical waste management in the operating room staff of three referral hospitals in Kigali.

5.1. Socio-demographic variables

The demographic characteristics in table 4.1 show that the dominant age category was between 30-39 years of age (59%), the predominant education level of the participants is advanced diploma (42%) and most of them were registered nurse (40%), the other categories were represented at the different levels. Medical doctors and other health professionals responded to the questionnaire at relatively low level. This is in line with the evidence that the responses rate for physician and other medical doctors responses to survey are relatively low in relation to the general public, this is explained by the fact that physician are always having high demanding tasks that hinder them to participating in research, and the fact that they are always approached for data collection which might affect the response rate on future occasions (Flanigan et al. 2008) .

5.2. The level of knowledge of operating room staff regarding medical waste management at three referral hospitals in Kigali

The present study has demonstrated that the levels of knowledge of the operating room staff at the study sites have relatively good knowledge regarding medical waste management. This is witnessed by the fact that 54% of all study participants scored correctly to the knowledge questions, though the remaining percentage of low knowledge is worrying in such site prone to infections in hospital settings. The medical doctors and nurses were reported to have good knowledge than others. These results are consistent with the study by (S.A. Hakim, A. Mohsen, Bakr 2014; Adogu et al. 2014) which confirm that doctors and nurses have better knowledge than other staff regarding medical waste management. In the present study this was testified by the cross tabulated data which indicates that in the whole sample doctors with good knowledge are more than other professionals (64%) and followed by the nurses (61%) the present study also state that cleaners and health care assistant have poor knowledge toward medical waste management. Similarly to the study done by (Amukugo

H.j.* Anna Ndapandula Haifete* and Hermine Iita 2016) found that housekeeping staff including cleaners was less knowledgeable about waste segregation and disposal than nurses and Doctors. Similar to study done in Mangalore city by (Pullishery et al. 2016) on awareness, knowledge and practice of biomedical waste management found that Doctors and nurses are more knowledgeable than sanitary staff toward biomedical waste management.

The study results in the present study tackled the variables that might influence knowledge on medical waste management. The education level, experience, position of the medical practioners, hospital in which the practioners work and the age of the participants were significantly associated with the levels of knowledge on medical waste management($P < 0.05$). This is consistent with the literature which says that people with higher education tend to have greater awareness than the less educated; and can be related to working experience as well as position in the working environment. Medical doctors, nurses and other paramedical practioners are too exposed to acquire knowledge and skills than others (Adogu et al. 2014). In the present study, this was in addition confirmed in the multivariate analysis where four variables were reported to be influencing knowledge among the study participants namely age, education level, level of practice and perceived factors by the medical professionals.

5.3. The level of practice of operating room staff regarding medical waste management at three referral hospitals in Kigali

The attempt to document the levels of practice show that the practice regarding medical waste at the study site is relatively good as the majority of the participant scores correctly to practices questions at 55%. The levels of practice was positively associated with the hospital in which the staff work in bivariate analysis ($P < 0.001$) though in logistic regression, there was no strong association observed. The practice and knowledge was positively associated in both in univariate, logistic regression and multivariate analysis in the present study. The results are in line with the study done by (Nagaraju et al. 2013) which reports that lack of knowledge and awareness on medical waste management of medical staff leads to poor practice.

5.4. Perceived factors associated with medical waste management in the operating room staff of three referral hospitals in Kigali

The perceived factors as reported by the respondents were reported in category and those who believe that factors related to lesser than four factors among: overtime working hours in a day, shortage of staff, lack of appropriate equipment, lack of coordination, lack of medical waste management committee, lack of awareness and training towards medical waste management, institutional financial issues, supplier who delay to supplier the equipment, negligence at the study site; are enough to influence either knowledge or practice of medical waste management at the study site (59%). The first four stated factors are lack of equipment (71%) and practice followed by negligence (66%), lack of awareness and training toward medical waste management (57%) and lack of coordination (45%). These factors are mainly related to workforce and environmental. The results are consistent with the study done by (Mosadeghrad 2014) which states that personal factors of the provider, and factors pertaining to the healthcare organisation, healthcare system, and the broader environment affect healthcare service quality, thus healthcare quality can be improved by supportive visionary leadership, proper planning, education and training, availability of resources, effective management of resources, employees and processes, and collaboration and cooperation among providers. In this view health care quality involves medical waste management to prevent the likelihood of nosocomial infections in hospital settings. Similarly to the study done by (Muduli & Barve 2012) on challenge to waste management in Indian health care sector found that lack of coordination, medical waste management committee, operation strategy, lack of awareness and training toward medical waste management, lack of pressure and lack of appropriate equipment are the major challenge against medical waste management in the same line to (WHO, 2015) report say that Lack of awareness about the health hazards related to health-care waste, inadequate training in proper waste management, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems connected with health-care waste and lack of appropriate regulations are the major factors that influence medical waste management in clinical settings.

The results of the present study therefore attempted to answer the objectives of the present study as stated before.

5.5. Relationships between level of knowledge and practice and selected socio-demographic variables.

The relationship between levels of knowledge, practice and socio-demographic variables were documented to show any linkage between the practice of waste management in hospital settings and the variables deemed to influence waste management decision making.

The results in the present study show that age, position of the participants, education level, work experience, practice and the perceived factors positively influence the knowledge of participants with regards to medical waste management. This implies that participants' knowledge increase or decrease has a role in waste management decision making. The higher the knowledge, the likelihood to practice medical waste management. In absence of any knowledge, improper waste segregation may occur. According to Infection Prevention Control Guidelines, health care workers should be trained so that they can acquire proper knowledge on waste segregation (Anna Ndapandula Haifete 2016).

In addition, work experience also is key tool to have a required exposure to possible side effects of bad waste management practice; therefore, medical practioners should continuously be trained in medical waste management as they practice so that the required knowledge is passed onto them. Finally, It was evident that age, education level, practice, and perceived factors are predictors of knowledge among the study population ($P < 0.05$) though the working experience and position of the study participants were not confirmed to be predictors of knowledge on medical waste management ($P > 0.05$). Any attempt to increase education levels among the advanced health care providers, and improved practice can definitely improve medical waste management practices at the study site.

CHAPTER: SIX. CONCLUSION AND RECOMMENDATIONS

6.1. CONCLUSION

The knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals in Kigali was reported to be above the average though the low level reported is worrying in hospital settings prone to infections control and injuries. The education level, experience, position of the medical practioners, hospital in which the practioners work and the age of the participants was reported to be associated with the knowledge on medical waste management at the study site. The perceived factors as reported by staff themselves are related to to human force and environmental factors mainly lack of equipment, negligence, lack of awareness and training toward medical waste management and lack of coordination.

6.2. RECOMMENDATIONS

From the conclusions the following recommendations can be drawn from the results.

To Operating room staff at the study sites

To be trained on medical waste management

To increase the awareness amongst the staff on impact of negligence in medical waste management towards responsible medical personnel.

To improve on team work spirit at working places

To the hospital administration

To improve coordination, monitoring and evaluation towards medical waste management

To increase the number of operating room workforce to bring about improved team work and task shifting.

To avail appropriate equipments for medical waste management at right time

To ministry of Health

To monitor the implementation of the policies in relation to medical waste management in all health facilities

To organize regular training for operating room specifically and other medical practioners in general.

To the researchers: to use a check list for further study to evaluate practice on medical waste management.

To conduct the same study in district hospital and the other rest referral hospitals.

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APPENDIX

RESEARCH QUESTIONNAIRES

RESEARCH TOPIC:KNOWLEDGE AND PRACTICE REGARDING MEDICAL WASTE MANAGEMENT AMONG THEATRE STAFF IN OPERATING ROOMS OF THREE REFERRAL HOSPITALS IN KIGALI

Relationship between questionnaires and study objectives

This questionnaire is composed by 4 sections, A, B, C, and D.

SECTION A will assess demographic data of the participant

SECTION B composed by **16** questionnaires which are supposed to assess level of knowledge of theatre staff toward medical waste management.

SECTION C is characterised by **15** questionnaires which will assess operating room staff practices regarding medical waste management.

SECTION D is characterized by **2** questions which will identify the factors associated with medical waste management in the OR.

Instructions

1. The questionnaire is addressed to you individual do not consult with another provider.
2. No name must be mentioned on the questionnaire.
3. Select the appropriate responses by a tick in provided case
4. Put a symbol **V** in a box with an appropriate answer.
5. Where seems to be necessary more than one option may be given to answer.
6. you can ask if question is not well understandable.

SECTION A: DEMOGRAPHIC INFORMATION

1. Age a. 20-29years

b. 30-39years

c. 40-49years

d. >50 years

2. Sex: M F

3. Marital status Married/living together

Single

Widower

Divorce or separated

4. Education level:

a. A2 b. A1 c. A0 d. 0 level e. Primary school f. None g. Other
,specify.....

5. Qualification

a. Registered nurse b. Nurse anesthetist c. Medical doctor d. Cleaner
e. Associate nurse or health care assistant

6. Experience

a. .6months-1 year b. 2-5yrs c. 6-10 yrs d. 10-15 yrs e. >15 yrs

7. What hospital you work in?

a. Rwanda military hospital b. King Faisal hospital c. Kigali University teaching hospital

SECTION B: KNOWLEDGE REGARDING MEDICAL WASTE MANAGEMENT

1. Which of the following statement describes medical waste?

- a. Materials that may be poisonous, toxic, or flammable and do not pose disease-related risk.
- b. Waste that is saturated to the point of dripping with blood or body fluids contaminated with blood.
- c. Any waste that results from the treatment, diagnosis, immunization of humans at hospitals, and in health-related research facilities.

2. Do you know that your operating theatre has policies guiding management of medical waste generated during your daily activities?

A. YES B. NO

3. What is the amount of infectious waste that should be thrown in the waste container?

a. at 3/4 full b. More than 3/4 full 1/2 full . c. Not Know

4. What is the importance of medical waste management?

- a. infection control only
- b. hygiene purpose only
- c. hazards and disease prevention only
- d. all the above

5. List category of medical waste that you know are generated in your operating theatre

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6. Which of the following is considered as general waste in the operating theatre?

- a. Papers, food, unsoiled gauze,
- b. Body tissue, papers, needles, and surgical blade
- c. Blood, pus and syringes

7. Which of the following are considered as infectious waste in the operating theatre? pick all possible response.

- a. Soiled gauze, soiled cotton, and soiled gloves.
- b. Body part, placenta, syringes
- c. Bandage and removed dressing.
- d. unsoiled gauze, unsoiled gloves

8. In the following medical waste which can be classified under pathological or anatomical waste?

- a. Body part, placenta, fetus
- b. Bandage and removed dressing from the infected wound
- c. Unsoiled gauze, unsoiled glove
- d. i do not know

9. In the following type of waste, which one should be disposed in safety boxes?

- a. Pathological waste
- b. General waste
- c. Sharps
- d. infectious
- e. i do not know

10. According to the Biomedical Waste (Management & Handling) Rules, waste should not be stored at the generation point beyond:

- a. A6- 12 hours
- B.24- 48 hours**
- C.60-72 hours
- D.96-100 hours
- e. Don't know

11. Have you been injured by needle or blade when are not well disposed?

yes or no

if yes, how many time?

- A. 1time
- B. 2-4times
- C. 5 times and more

12. Do needle stick and sharp injuries need to be reported?

A. **YES** B. NO

If yes, where ?specify.....

13. Have you been trained on medical waste management?

YES or NO

If yes how many times?

a. 1 time b. 2-3 times c. 4-5 times d. >5 times

14. What is the role of biohazard symbol in medical waste management?

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.....
.....

15. What is the colour code of bag for the medical waste to be autoclaved, or disinfected before final disposal?

A. Red B. Blue **. Yellow** Black not know

16. Medical waste management involves how many steps?

a. 4 **b. 7** c. 10 d. do not know

SECTION C: OPERATING ROOM STAFF PRACTICE REGARDING MEDICAL WASTE MANAGEMENT

17. Do you segregate medical waste produced during your daily activities?

YES NO

18. What type of labeling is used for marking segregated waste before its transport?

.....
.....

19. In your operating theatre according to color coded system where do you dispose general waste?

a. Red bag b. Yellow bag c. **Black bag** d. White bag e.
no specific bag available any where

20. In your operating theatre according to color coded system where do you dispose pathological waste ?

- a. **Red bag** b. Yellow bag c. Black bag d. White bag e. Green bag
f. No specific bag available g. Any where

21. In your operating theatre according to color coded system where do you dispose infectious waste ?

- a. **Red bag** b. **Yellow bag** c. Black bag d. White bag e. Green bag
f. No specific bag available g. Any where

22. In your operating theatre according to color coded system where do you dispose food waste ?

- a. Red bag b. Yellow bag c. Black bag d. **White bag** e. Green bag
f. No specific bag available g. Any where

23. In your practice when do you discard a sharps containers?

- a. 100% full b. **¾ full** c. 2/4 full d. Any time

24. In your daily practice where do you place waste containers in your theatre?

- a. Sluice room
b. **Close to the point of waste generation**
c. Receiving area
d. Any where in operating theatre
e. corridor

25. Who is responsible to practice medical waste management in your operating theatre?

- a. Nurses b. Medical doctor c. Anesthetist d. Health care assistant
e. **Whoever generates the waste** f. cleaner

Other specify ,.....

26. Do you wear personnel protective equipment during medical waste handling in your operating room?

- YES** OR NO

If YES, in the following personal protective equipment which do you wear ?

- a. **Helmet**, b. **Face masks**, c. **Eye protectors**, d. **Aprons**, e. **boots**
f. **Disposable gloves**

others, specify,.....

I f NO,
why?.....

27. In which of the following medical waste do you wear personnel protective equipment ?

- a. **Infectious waste** b. **pathological waste** c. general waste d. **sharp**

28. Are the medical waste management posters available in your operating room?

YES or NO

If yes, where the posters are located ?

- a. on the medical waste containers
b. In the corridors of operating theatre
c. **Any area in operating theatre where waste collection bins are located**
d. I do not know

e. others specify.....

29. Are bags and containers for infectious waste marked with the international biohazard symbol ?

a. **YES**

I don't know

b. **NO**

30. What category of medical waste do you treat on site before final disposal?

- a. **infectious waste** b. Pathological waste c. **sharp** one

e. others specify.....

31. What are the medical waste treatment method do you use in your operating theatre?

- a. **Autoclaving** b. **microwave** c. **chemical** None of the above

e. others ,specify.....

SECTION D: FACTORS INFLUENCING MEDICAL WASTE MANAGEMENT PRACTICE (IF APPLICABLE).

32. Among the following factors, what do you consider as factors contributing to poor waste management in the operating room? Apply all possible response.

- a. Overtime working hours in a day,
- b. Shortage of staff
- c. Lack of appropriate equipment
- d. Lack of coordination,
- e. Lack of medical waste management committee
- f. Lack of awareness and training toward medical waste management
- g. institution financial issues
- h. supplier who delay to supplier the equipment
- i. negligence

33. Are there other factors ?specify

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QUESTIONNAIRES DE RECHERCHE

TITLE :L A CONNAISSANCE ET LA PRATIQUE CONCERNANT LA GESTION DES DECHETS MEDICAUX CHEZ LE PERSONNEL QUI TRAVAILLE DANS LES SALLES D'OPERATION DE TROIS HOPITAUX DE REFERENCE A KIGALI

Relation entre les questionnaires et les objectifs de l'étude

Ce questionnaire est composé de 4 sections, A, B, C et D.

SECTION A évaluera les données démographiques du participant

SECTION B composée de 16 questionnaires censés évaluer le niveau de connaissance du personnel de la salle d'opération sur la gestion des déchets médicaux.

La SECTION C est caractérisée par 15 questionnaires qui évalueront les pratiques du personnel des salles d'opération en matière de gestion des déchets médicaux.

La SECTION D est caractérisée par deux questions qui permettront d'identifier les facteurs associés à la gestion des déchets médicaux dans la salle d'opération.

Instructions

1. Le questionnaire s'adresse à vous ne consulter personne avec un autre fournisseur.
2. Aucun nom ne doit être mentionné sur le questionnaire.
3. Sélectionnez les réponses appropriées en cochant une case
4. Mettez un symbole V dans une boîte avec une réponse appropriée.
5. Lorsqu'il semble nécessaire, plus d'une option peut être donnée pour répondre.
6. vous pouvez demander si la question n'est pas bien compréhensible.

SECTION A: RENSEIGNEMENTS DÉMOGRAPHIQUES

1. Âge a. 20-29 ans

B. 30-39ans

C. 40-49ans

ré. > 50 ans

2. Sexe: M F

3. État matrimonial

Marié / vivant ensemble

Célibataire

Veuf

Divorce ou séparé

4. Niveau d'éducation:

A.A2 b.A1 c. A0 tronc-commun primaire

f. Illetre ...

g. Autre précisez.....

5. Qualification

a. Infirmière(e) autorisée

b. Infirmière anesthésiste

c. N h.

d. Nettoyeur

E. Infirmière auxiliaire

6. Expérience

A .6 mois-1 an b.2-5 ans c. 6-10 ans d.11-15 ans

e. > 15 ans

7. Dans quel hôpital vous travaillez?

a. Hôpital militaire du Rwanda b. Hôpital du Roi Faisal

c. Hôpital universitaire de Kigali

SECTION B: CONNAISSANCES CONCERNANT LA GESTION DES DÉCHETS MÉDICAUX

1. Lequel des expressions suivants décrit les déchets médicaux?

Les matériaux qui peuvent être toxiques, toxiques ou inflammables et ne posent pas de risque lié à la maladie.

B. Déchets qui sont contient du sang ou des liquides corporels contaminés avec du sang.

C) Tous les déchets résultant du traitement, du diagnostic, de l'immunisation des humains dans les hôpitaux et dans les établissements de recherche liés à la santé.

2. Savez-vous que votre salle d'opération a des politiques de gestion des déchets médicaux générés lors de vos activités quotidiennes?

A. YES B. NO

3. Quel est la quantité de déchets infectieux qui devraient être jetés dans le conteneur de déchets?

A. Sur 3/4 plein plus de 3/4 plein c. 1/2 plein.

D. Je ne sait pas

4. quelle est l'importance de la gestion des déchets médicaux?

a. Contrôle des infections seulement

b. Uniquement pour l'hygiène

c. prévenir de risques et des maladies associé

d. tout ce qui précède

5. Énumérer les catégories de déchets médicaux que vous connaissez qui sont générés dans votre salle d'opération

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.....

6. Quel des éléments suivants est considéré comme un déchet général dans le bloc opératoire?

a. Papiers, nourriture, compresse sec,

b. Tissus, papiers, aiguilles et lames chirurgicale

C .Le sang, pus et seringues

7. Lequel des éléments suivants Sont considérés comme déchets infectieux dans votre salle d operation? prendre toutes les réponses possibles.

- a. compresse salie, coton et des gants souillés.
- b. partie du corps, le placenta, les seringues
- c. Bandage et dressing enlevés.
- d. compresse et des gants sec non souillés

8. parmi les déchets médicaux suivants, laquelle pouvez-vous class comme des déchets pathologique ou anatomique?

- a. une partie du corps, le placenta, le fœtus
- b. Bandage et pansement retiré de la plaie infectée
- c. compresse et gant non souillé.

9. parmi le type de déchets suivants, .Quel type de déchets est-il disposé dans des boîtes de sécurite?

- a. déchet Pathologique
- b. déchets General
- c. dechet tranchant
- d . déchet infectieuse

10. Selon les règles de gestion des déchets médicaux (et manutention), les déchets ne devraient pas être stockés au point de génération au-delà de la période :

- a. A6- 12 heures
- b. 24- 48 heures
- 60-72 heures
- 6-100 heures

11. Avez-vous été blessé par l'aiguille ou une lame de bistouri lorsque ne sont pas bien disposés?

Oui ou non

Si oui, combien de fois?

- A. 1time
- B. 2-4times
- C. > 5 fois

12. Le piqûre d'aiguille et les autres objet tranchants doivent-elles être signalées?

B. Oui ou Non

Si oui, où? Précisez.....

13. Avez-vous reçu une formation sur la gestion des déchets médicaux?

Oui ou non

Si oui, combien de fois?

a. 1 fois b. 2-3 fois c. 4-5 fois 5 fois

14. Quel est le rôle du symbole du risque biologique dans la gestion des déchets médicaux?

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15. Quel est le code de couleur du sac pour que les déchets médicaux soient autoclaves ou désinfectés avant l'élimination finale?

A. Rouge B. Bleu C. Jaune D. Noir E. Blanche f. je ne sait pas

16. La gestion des déchets médicaux implique combien d'étapes?

A.4 b.7 c.10 d. je ne sait pas

SECTION C: PRATIQUE DU PERSONNEL CONCERNANT LA GESTION DES DÉCHETS MÉDICAUX

17. Séparez-vous les déchets médicaux produits lors de vos activités quotidiennes?

OUI ou NON

18. Quel type d'étiquetage est utilisé pour marquer les déchets ségrégués avant son transport?

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.....

19. Dans votre salle d'opération selon le système de code couleur où vous disposez des déchets généraux?

A. sac rouge b. sac jaune c. Sac noir d. Sac blanc
e. Sac ne sont pas disponibles f. N'importe où

20. Dans votre salle d'opération selon un système codé par couleur, où déposez-vous des déchets pathologiques?

a. Sac rouge b. Sac jaune c. Sac noir d. Sac blanc
e. Sac vert f. Pas de sac spécifique disponible N'importe où

21. Dans votre salle d'opération selon un système codé par couleur, où disposez-vous des déchets infectieux?

- A. Sac rouge b. Sac jaune c. Sac noir d. Sac blanc e. Sac vert
f. Pas de sac spécifique disponible g. N'importe où

22. Dans votre salle d'opération selon un système codé par couleur, où alimentez-vous les déchets alimentaires?

- A. Sac rouge b. Sac jaune c. Sac noir d. Sac blanc e. Sac vert
F. Aucun sac spécifique disponible g. N'importe où

23. Dans votre pratique, quand vous débarrassez-vous d'un conteneur pour objets tranchants?

- A. 100% plein b. ¾ plein c. 1/4 pleine d. À tout moment

24. Dans votre pratique quotidienne, où placez-vous des conteneurs de déchets dans votre salle d'opération ?

- A. Salle de nettoyage des instrument.
B. Près du point de production des déchets
C. Zone de réception
D. N'importe où
E. couloir

25. Qui est responsable de la gestion des déchets médicaux dans votre salle d'opération?

- A. Infirmier(e) b. médecin c. Anesthésiste d. Assistant de soins de santé
E. Quiconque génère les déchets f. nettoyeur g. Autre précisez

26. Les personnes qui manipulent des déchets médicaux portent-elles du matériel de protection à votre salle d'opération?

- OUI OU NON

Si OUI, dans l'équipement de protection individuelle suivant, lesquelles sont disponibles dans votre salle d'opération?

a. Casque, b. Masques faciaux, c. lunette abliers, Bottes

.f Gants jetables

Autres (précisez,.....)

If NON, pourquoi?

27. Dans quels déchets médicaux suivants vous portez un équipement de protection du personnel?

A. Les déchets infectieux b. Déchets pathologiques c. Déchets généraux
d. Tranchants

28. Les affiches de gestion des déchets médicaux sont-elles disponibles dans votre salle d'opération?

Oui ou non

Si oui, où se trouvent les affiches?

a. Sur les récipients de déchets médicaux
b. Dans les couloirs du bloc opératoire
c. Toute zone en salle d'opération où sont situés des récipients de collecte des déchets
d. Je ne sais pas
e. autres préciser

29. Les sacs et contenants pour les déchets infectieux sont-ils marqués d'un symbole international de danger biologique?

a. OUI b. NON

30. Quelle catégorie de déchets médicaux connaissez-vous qui peut être traitée sur place avant l'élimination finale?

A. des déchets infectieux b. Déchets pathologiques c. déchets tranchants
d. je ne sait pas E. Autres (précisez.....)

31. Quelle est la méthode de traitement des déchets médicaux que vous utilisez dans votre salle d'opération?

a. Autoclavage b. Micro-ondes c. Chimique d. Aucune de ces réponses
E. Autres (précisez.....)

SECTION D: FACTEURS ASSO CIEE SUR LA PRATIQUE DE GESTION DES DÉCHETS MÉDICAUX

32. Parmi les facteurs suivants, quels sont, à votre avis, les facteurs qui contribuent à une mauvaise gestion des déchets dans la salle d'opération? Appliquer toutes les réponses possibles.

- a. Les heures supplémentaires de travail en une journée,
- b. Insuffisance de personnel
- c. Manque d'équipement approprié
- d. Manque de coordination,
- e. Manque de comité de gestion des déchets médicaux
- f. Manque de sensibilisation et de formation à la gestion des déchets médicaux
- f .problème financière de l'Institutionnels
- h. Fournisseur qui retarde le fournisseur de l'équipement
- j. négligence

33. Y a-t-il d'autres facteurs? Énumérez-les.

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URUPAPURO RW'IBIBAZO MUKINYARWANDA

IBIBAZO KUBUSHAKASHATSI KU BIJYANYE N,ITUNGANYWA RY,IMYANDA YO MU IBAGIRO MU BITARO BITATU BIKURU BIRI MUMUGI WA KIGALI.

AMABWIRIZA

1. Ibibazo bisubizwa n,umuntu ku giti cye.
2. Gushyiraho amazina ntibyemewe.
3. Soma neza ibibazo hanyuma uhitamo igisubizo cy,ukuri bijyanye.
5. Ushobora guhitamo ibisubizo birenze kimwe igihe ari ngombwa.
6. wemerewe kubaza ahantu hose wagira ikibazo

1.UMWIRONDORO

1. UFITE IMYAKA INGAHE:

a. Imyaka hagati ya 20-29

b. Imyaka hagati 30-39

C. Imyaka hagati ya 40-49y

d. hejuru ya >50

2. igitsina: GABO

GORE

3. IRANGAMIMERERE

a. yarashyingiwe/Barabana

b. ingaragu

c. yatandukanye n, uwo bashakanye

d. umupfakazi

4. wize amashuri angaha?

a. abanza

b. ikiciro cya mbere cy, ayisumbuye

c. ikiciro cya kabiri cy'ayisumbuye

d. kaminuza

1, ikiciro cya mbere

2. ikiciro cya kabiri

3. ikiciro cya gatatu

4. ikindi, sobanura.....

e. sinize narimwe .

5. Ukora uwuhe mwuga?

a. umuforomo b. umusinziriz c. umuganga d. ukora amasuku

e. ufasha mukuvura

6. UMAZE IGIHE KI NGANA IKI UKORA MW,IBAGIRO?

a. hagati y,amezi 6-12

b. hagati y,imyaka 2-5

c. . hagati y,imyaka 6-10

d. . hagati y,imyaka 11-15

e. hejuru y,imyaka15

2.IBIBAZO KU BUMENYI BW,IMYANDA YO MU IBAGIRO

1.Muri izi nteruro zikurikira ,ni iyihe igaragaza ibisobanuro ku myanda yo kwa muganga?

a.imyanda yo kwa muganga ni ibintu byose birimo uburozi cyangwa bishobora gutera inkongi y'umuriro ariko bidashobora gutera uburwayi.

b. Ni imyanda yose irimo amaraso cyangwa andi matembabuzi yo mu mubiri w'umuntu.

c. Ni imyanda yose ishobora guturuka aho basuzumira abarwayi, aho bavurirwa , aho batangira inkingo mu bitaro cyangwa mu bigo bikorerwamo ubushakashatsi.

2.Waba uzi niba ibagiro ukoreramo rifite imirongo ngenderwaho yanditse isobanura uburyo bwo gucunga imyanda ?

a.Yego b. oya c .simbizi

3.Ni kuruhe rugero mutagomba kurenza igihe muyishyira imyanda yo kwa muganga mu gikoresho cya bugenewe?

a) Kugeza muni ya $\frac{3}{4}$ b)hejuru ye $\frac{3}{4}$ c) kuri $\frac{1}{2}$ d. Simbizi

4. Ni akahe kamaro ko gucunga neza umyanda ituruka mu ibagiro ?

a. kurwanya indwara zandura

b. isuku y'aho dukorera

c. kurwanya gukomereka

d. ibyavuzwe haruguru byose

5. Vuga ubwoko bw'imyanda ikunze kugaragara mu ibagiro ukoreramo

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6. Muri iyi myanda ikurikira ni iyihe mufata nk, imyanda isanzwe?

a. impapuro, ibyo kurya, amapamba atakoreshejwe,

b. imyenda, inshinge, impapuro, urwembe

c. amaraso, amashyira

7. Muri iyi myanda ikurikira ni iyihe mufata nk, imyanda yanduza ? uzuzura aho bishoboka hose

a. ibipfuko byakoreshejwe, uturinda ntoki twanduye

b. ibice by, umubiri n' inshinge

c. Ibyo bapfukuye ku gisebe

d. ipamba n' uturinda ntoki bitakoreshejwe

8. Muri iyi myanda ikurikira ni iyihe mufata nk, imyanda ibora vuba ikanuka

a. ibipfuko byakoreshejwe, uturinda ntoki twanduye

b. ibice by, umubiri

c. Ibyo bapfukuye ku gisebe

d. ipamba n' uturinda ntoki bitakoreshejwe

9. ni ubuhe bwoko bw'imyanda mushyira mu gakarito gafunze ?

a. ibice by,umubiri

b. imyanda isanzwe

c. ikomeretsa

d. iyanduza

10.Hakurikijwe amategeko agenga imikurikiranire y,imyanda yo kwa muganga ,imyanda igomba kumara igihe kingana iki ibitse aho yavuye?

a. amasaha6- 12 b. amasaha24- 48 c. amasaha 60 – 72 d. amasaha 96-100.

11.Waba warigeze ukomeretswa n,inshinge cyangwa utwuma dukomeretsa bitewe n,uko bitashyizwe ahabugenewe?

yego oya

Niba ari yego

wakomeretse inshuro zingahe?

a. inshuro 1

b. inshuro 2-4

c. hejuru y, inshuro 5

12.iyo wakomerekejwe n'inshinge ubimenyesha inzego zibishinzwe ?

yego oya

d. niba ari yego mubimenyesha nde ?.....

13.Waba warigeze uhabwa amahugurwa kubijyanye no gukurikirana imyanda yo kwa muganga?

Yego oya

Niba ari yego ,wahuguwe inshuro zingahe?

a. inshuro 1 b. inshuro 2-3 c. inshuro4-5 d. hejuru y, inshuro 5

14.Ni akahe kamaro k,ikimenyetso mpuruza kigaragara kubikoresho byagenewe kubikwamo imyanda?

.....
.....

15.Imyanda ibanza gusukurwa mbere yo kujyanwa ahabugenewe igomba kuba iri mu isashe isa gute ?

A. umutuku B. ubururu C. umuhondo D. umukara E. umweru
f.sinyizi

16.Ni ingingo zingahe zikurikizwa mu gucunga imyanda yo kwamuganga

A.4 b.7 c.10 d.sinzizi

3.IBIBAZO KU ISHYIRWA MU BIKORWA BYO GUTUNGANYA IMYANDA YO MU IBAGIRO

17.Mu kazi kanyu kaburimunsi ,mujya mutandukanya imyanda hakurikijwe ubwoko bwayo ?

Yego ou Oya

18.Ni ayahe magambo mwandika ku masache y,imyanda mbere yo kuyijyana ahabugenewe ?

.....
.....

19.Mu ibagiro ukoreramo ,hakurikijwe uburyo bwo gukoresha amabara y'ibikoreho bibikwamo imyanda ni irihe bara mushyiramo imyanda isanzwe?

a. Umutuku b. umuhondo c. umukara d. umweru

e. nta narimwe tugira f. tuyishyira aho tubonye

20 .Mu ibagiro ukoreramo ,hakurikijwe uburyo bwo gukoresha amabara y'ibikoreho bibikwamo imyanda ni irihe bara mushyiramo imyanda y'ibice by'umubiri?

a. Umutuku b. umuhondo c. umukara d. umweru

e. nta bara ryayigenewe f. tuyishyira aho tubonye

21. Mu ibagiro ukoreramo ,hakurikijwe uburyo bwo gukoresha amabara y'ibikoreho bibikwamo imyanda ni irihe bara mushyiramo imyanda yanduza?

- a. Umutuku b. umuhondo c. umukara d. umweru
e. nta bara ryayigenewe f. tuyishyira aho tubonye

22. Mu ibagiro ukoreramo ,hakurikijwe uburyo bwo gukoresha amabara y'ibikoreho bibikwamo imyanda ni irihe bara mushyiramo imyanda ikomoka ku byo kurya ?

- a. Umutuku b. umuhondo c. umukara d. umweru.
e. nta bara ryayigenewef. f. tuyishyira aho tubonye

23. mu kazi kanyu ka buri munsu ni ryari muhindura ikijyamo imyanda ikomeretsa?

- a. iyo yuzuye 100% full
b. yuzuye kugera kuri $\frac{3}{4}$
c. yuzuye kugera kuri $\frac{2}{4}$
d. buri munsu

24. mu kazi kanyu ka buri munsu ni ni he mutereka indobo zijyamo imyanda?

- a. aho bogereza ibikoresho
b. hafi y, aho imyanda ituruka
c. aho twakirira abantu
d. aho ari ho hose
e. Mubirongozi

25. ni nde ushinze gukurikirana imyanda ituruka mu ibagiro?

- a. umuforomo b. umusinziriza c. umuganga d. ufasha mu kuvura
e. uwo ari we wese wayiteye f. ukora amasuku

26. Abakozi bashinzwe gukurikirana imyanda yo mu ibagiro bambara imyambaro yabugenewe?

YEGO

OYA

Niba ari YEGO, ni iyihe myambaro yabugenewe mwambara muri iyi ikurikira?

- a. Ingofero
- b. udupfuka munwa
- c. amalineti yo kurinda amaso
- d. itaburiya yabugenewe
- e. bote
- f. uturindantoki
- g. niba ari OYA, ni ukubera

iki? sobanura.....
.....

27. Kwambara imyambaro yabugenewe ni ngombwa cyane igihe cyose ari:

- a. imyanda yanduza
- b. imyanda igizwe n'ibice by'umubiri w'umuntu
- c. imyanda isanzwe
- d. imyanda ikomeretsa

28. hari amafoto cyangwa ibishushanyo bigaragaza uko imyanda ikurikiranwa mu nzu y'ibagiro ukoreramo?

yego Oya

Niba ari yego, ayo mafoto agaragara he?

- a. ku ndobo zabugenewe
- b. mu birongozi by'ibagiro
- c. aho ariho hose haterekwa indobo zikusanyirizwamo imyanda
- d. simbizi

e. ahandi, sobanura.....

29. Aho ukorera igikoresho cyagenewe gukusanyirizwamo imyanda yanduza kiba gifite ikimenyetso mpuruza mpuzamahanga kibigaragaza.

- a. YEGO b. OYA c. Sinkizi

30. ku rutonde rw'imyanda yo kwa munganga rukurikira, ni iyihe myanda ikenera kubanza kwica udukoko tuyirimo dutera indwara mbere yo kuyijyana ahabugenewe?

- a. imyanda yanduza
b. ibice by'umubiri
c. Ikomeretsa
d. sinyizi
e. nta numwe
f. iyindi, sobanura.....

31. Muri ubu buryo bukurikira ni ubuhe mukunda gukoresha mu kwica udukoko dutera indwara tuboneka mummyanda yo kwa muganga?

- a. gukoresha icyuma cyabugenewe gukoresha ubushyuhe n'amazi
b. gukoresha icyuma cyabugenewe gukoresha ubushyuhe gusa
c. gukoresha umuti wica udukoko
d. ubu buryo ntabwo dukoresha
e. ubundi buryo mwaba mukoresha

,sobanura.....

**4. MPAMVU ZIBANGAMIRA ISHYIRWA MU BIKORWA RYO GUCUNGA
IMYANDA YO MU IBAGIRO**

32. Mu mpamvu zikurikira ni izihe zibangamira ishyirwa mu bikorwa rya gahunda yo gutunganya no gucunga imyanda yo mu ibagiro uko bikwiriye? shyiraho ibishoboka byose

Gukora amasaha y'ikirenga ku muni

Kuba abakozi ari bake

kubura ibikoresho bya bugenewe

kubura ubuyobozi

kuba nta komite ibishinzwe

kuba nta mahugurwa ahabwa abakozi kuri gahunda yo gucunga imyanda

f. kubera ko ibitaro bidafite ubushobozi

h. ba rwiyeze mirimo batinda kuzana ibikoresho byabugenewe

j. kutabyitaho

33.. hari izindi mpamvu waba uzi muzitavuzwe haruguru ?

zivuge.....
.....
.....
.....

1. INFORMATION SHEET- ENGLISH VERSION

I am UZIKWAMBARA Leoncie a student at the University of Rwanda, College of Medicine and Health Sciences in masters program. One of the requirements in this program is to do a research. My study is *about Knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals in Kigali*. The main aim of this study: To assess the level of knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals of Kigali. My research involves 140 sampled population including nurses ,doctors, anesthetist, health care assistant and cleaners .The information obtained from this study will be helpful in different aspect including knowing the level of knowledge of theatre staff toward medical waste management ,to improve the best practice and to change some behaviors ,and identify staff needs toward medical waste management .this will also help patients, visitors and health care provider to be safe from any hazard which can be originated from unsafe medical waste management.

You are being asked to take part in this study and to respond genuinely. This questionnaire focuses on assessing your knowledge regarding medical waste management, your practice toward medical waste management and factors influencing medical waste management .Your cooperation and willingness is greatly helpful in this study. Your name will not be written in this questionnaire and will never be used in connection with any information you provided. This questionnaire may take 15 to 20 minutes to complete. There is no possible risk associated with participating in this study except the time spent for completing the questionnaire. All information you give will be kept strictly confidential. Your participation is voluntary and you are not obligated to answer any question you do not wish to answer. If you feel discomfort with any of the questions, it is your right to drop it any time you want. If you have questions regarding this study or would like to be informed of the results after its completion, please feel free to contact the principal investigator.

Address of the principal investigator:

Mrs.UZIKWAMBARA Leoncie

Cell phone: +250783156256

E-mail: angeleoncie@gmial.com

In the event of any problem or concerns/questions you may contact the researcher or the CMHS/UR Research ethics Committee .

If you are willing to participate in the study, please proceed to the consent form on the next page.

CONSENT FORM-

In signing this document, I am giving my consent to participate in the study titled: *knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals of Kigali.*

“I have been informed that the purpose of this study is to assess the level of knowledge and practice regarding medical waste management among theatre staff in operating rooms of three referral hospitals of Kigali.

I have understood that participation in this study is entirely voluntarily. I have been told that my responses to the questions will not be given to anyone else and no reports of this study ever identify me in any way. I have also been informed that my participation or non-participation or my refusal to answer questions will have no effect on me. I understood that participation in this study does not involve risks. I understood that Mrs. UZIKWAMBARA Leoncie is the contact person if I have questions about the study or about my rights as a study participant. The following is her contact address.

Address of principal investigator: UZUKWAMBARA Leoncie

Cell phone: +250783156256

E-mail: angeleoncie@gmail.com

After reading and understand the aim of this study, I agree to participate.

Date.....

Signature.....

GUSABA UBUFATANYABIKORWA MU BUSHAKASHATSI

Muraho, Amazina yange nitwa UZIKWAMBARA LEONCIE ndi umunyeshuru muri kaminuza y'urwanda mu kigo cy'ubuzima cya Kigali (KHI),mu cyiciro cya kabiri cya kaminuza mu bijyanye no kwita kubarwayi munzu zibagirwamo.mu byo dusabwa mu masomo yacu ya buri muni harimo no gukora ubushakashatsi.nkaba narifuje gukora ubushakashatsi bwanjye kubirebana no kugenzura ubumenyi n'ishyirwa mubikorwa bikorehwa mugukurikirana imyanda yo mu ibagiro mu bitaro bitatu biherereye mu mujyi wa Kigali,harimo ibitaro bya Kanombe,ibitaro bikuru bya kaminuza bya Kigali ndetse n,ibitaro byitiriwe umwami Fayisali .

Intego y,ubu bushakashatsi ni ugusuzuma ubumenyi n'ubushobozi abakozi bakora mu ibagiro bafite ku bijyanye no gukurikirana imyanda yo mu ibagiro.muri ubu ubushakashatsi hakenewe abantu 150 bazaturuka mu bitaro bitatu bikuru byatoranyijwe harimo abaforomo,abasinziriza,abaganga, abafasha b,abaganga n'abakora amasuku mu ibagiro.

Ukaba wagiriwe ikizere cyo kuba umwe mu bafatanya bikorwa muri ubu ubushakashatsi utanga amakuru usubiza ibibazo biteganyijwe bijyanye nabwo, gusubiza ibibazo bizafata hagati y'iminota 15 na 20.

Ubufatanye n'ubushake bwawe muri ubu ubushakashatsi bizadufashacyane kumenya uburyo imyanda yitabwaho,kumenya aho bigenda neza no kumenya aho bitagenda neza ndetse na zimwe mu mpamvuzibitera bikazafasha mu guhindura ibitagenda neza no gushimangira ibikorwaneza, hakumirwa impanuka n' indwara zishobora guterwa n'uko imyanda itakurikiranywe neza. gutanga amakuru mu ubu ubushakashatsi ni ubushake,igihe cyose ubona ari ngombwa wemerewe kubivamo, kandi nta kintu nakimwe kizakugirira nabi bitewe n'ubu ubushakashatsi.

Muri ubu ubushakashatsi tukwijeje umutekano ku makuru yose uzatanga ,azabikwa mu buryo bw'ibanga kandi azakoreshwa mu bijyanye n'ubu ubushakashatsi gusa .ku kibazo cyose wagira cyerekeranye n'ubu ubushakashatsi wahamagara kuri izi numero UZIKWAMBARA Leoncie :+250783156256 cyangwa ukohereza ubutumwa kuri E-mail: angeleoncie@gmail.com.

Murakoze!!!!!!

AMASEZERANO KU BUSHAKASHATSI

Mugushyira umukono kuri iyi nyandiko,nemeye kuba umufatanyabikorwa mugutanga amakuru mubushakashatsi buzakorwa mu bitaro bitatu bikuru biherereye mu mugi wakigali ,harimo ibitaro bya Kanombe,ibitaro bikuru bya kaminuza bya Kigali ndetse n,ibitaro byitiriwe umwami Fayisali.nasobanuriwe ko ubwo bushakashatsi bugamije gusuzuma ubumenyi n,ibikorwa ku bakozi bakora mu byumba bibagirwamo abarwayi ku bijyanye no gukurikirana no gushyira imyanda yo kwa muganga ahabugenewe. nasobanuriwe ko nimpitamo kuba umufatanyabikorwa nzabazwa ibibazo harimo ibijyanye n’umwirondoro, ubumenyi kubijyanye no gushyira imyanda ahabugenewe ,uko imyanda yo kwa muganga ikurikiranwa ,n,impamvu zigira uruhare mw,ikurikiranwa ry, imyanda . kandi nasobanuriwe ko uburenganzira bwose buzubahirizwa ,harimo gutanga amakuru kubushake, kuba nabivamo igihe cyose mbona ko ari ngombwa bikaba, ntangaruka nimwe bizangiraho. kandi nasobanuriwe ko amakuru yose nzatanga azabikwa mu buryo bw,ibanga ahantu hafunze aho azagerwaho n’ abaskakashatsi gusa akazakoreshwa ibijyanye n’intego y’ubu bushakashatsi gusa. Nta amazina yange azagarara kurupapuro rw’ibibazo kandi ntagihembo giteganyijwe .nkaba igihe cyose nagira ikibazo cyerekeranye n,ubu bushakashatsi nahamagara umushakashatsi kuri numero ikurikirira “0783156256” cyangwa kohereza ubutumwa kuri “**angeleoncie@gmail.com**”.

Maze gusoma no gusobanukirwa impamvu y’ubu bushakashatsi no kunyurwa nibisubizo nahawe kubibazo byose nabajije, no gusobanukirwa umutekano w’ amakuru ndibutange, n’uko nshobora kurekeraho igihe nshakiye ntangaruka ndetse maze gusobanukirwa icyo ubushakashatsi buzamarira nemeye kuba umufatanyabikorwa muri ubu bushakashatsi.

Umukono w’umufatanyabikorwa.

Itariki:.....

.....
.....

FICHE D'INFORMATION

Je suis UZIKWAMBARA Leoncie un étudiant à l'Université du Rwanda, le Collège de médecine et de sciences de la santé dans le programme de maîtrise. Une des exigences de ce programme est de faire une recherche. Mon étude porte sur la connaissance et la pratique concernant la gestion des déchets médicaux chez le personnel qui travaille dans les salles d'opération de trois hôpitaux de référence à Kigali. L'objectif principal de cette étude est d'évaluer le niveau de connaissances et de pratiques en matière de gestion des déchets médicaux chez le personnel travaillant en salle d'opération de trois hôpitaux de référence de Kigali. Les renseignements recueillis dans le cadre de cette étude seront utiles dans différents aspects, notamment en connaissant le niveau de connaissances du personnel de la salle d'opération en matière de gestion des déchets médicaux, en vue d'améliorer les pratiques exemplaires et de changer certains comportements, et d'identifier les besoins du personnel en vue de la gestion des déchets médicaux. Cela aidera également les patients, les visiteurs et les fournisseurs de soins de santé à être à l'abri de tout risque qui peut provenir de la gestion des déchets médicaux dangereux.

On vous demande de participer à cette étude et de répondre sincèrement. Ce questionnaire se concentre sur l'évaluation de vos connaissances en matière de gestion des déchets médicaux, votre pratique en matière de gestion des déchets médicaux et les facteurs qui associe sur la gestion des déchets médicaux. Votre coopération et votre volonté sont très utiles dans cette étude. Votre nom ne sera pas inscrit dans ce questionnaire et ne sera jamais utilisé en relation avec les informations que vous avez fournies. Ce questionnaire peut prendre entre 15 et 20 minutes. Il n'y a aucun risque associé à participer à cette étude.

Toutes les informations que vous donnez seront strictement confidentielles. Votre participation est volontaire et vous n'êtes pas obligé de répondre à une question que vous ne souhaitez pas répondre. Si vous ressentez de l'inconfort avec l'une des questions, il est de votre droit de le laisser tomber quand vous le souhaitez. Si vous avez des questions concernant cette étude ou si vous souhaitez être informé des résultats après son achèvement, n'hésitez pas à communiquer l'investigateur principal. Adresse du chercheur principal: Mme UZIKWAMBARA Leoncie
Portable: +250783156256

E-mail: angeleoncie@gmial.com

FORMULAIRE DE CONSENTEMENT

En signant ce document, je donne mon consentement à participer à l'étude intitulée:
connaissances et pratiques concernant la gestion des déchets médicaux chez le personnel
travaillant dans la salle d'opération de trois hôpitaux de référence de Kigali.

«J'ai été informé que le but de cette étude est d'évaluer le niveau de connaissances et de pratique
concernant la gestion des déchets médicaux chez le personnel travaillant dans les salles
d'opération de trois hôpitaux de référence de Kigali.

J'ai compris que la participation à cette étude est entièrement volontaire. On m'a dit que mes
réponses aux questions ne seraient pas communiquées à quelqu'un d'autre et qu'aucun rapport de
cette étude ne m'a jamais identifié d'aucune façon. J'ai aussi été informé que ma participation ou
non-participation ou mon refus de répondre aux questions n'aura aucun effet sur moi. J'ai
compris que la participation à cette étude n'entraîne pas de risques. J'ai compris que Mme
UZIKWAMBARA Leoncie est la personne de contact si j'ai des questions sur l'étude ou sur mes
droits en tant que participant à l'étude.

Après avoir lu et compris le but de cette étude, j'accepte de participer.

Signature.....

Dean Dr. Donatilla Mukamana
University of Rwanda
College of Medicine and Health Sciences
School of Nursing and Midwifery
Email: donatillamu@gmail.com

YOUR ADDRESS

Object:t To give Permission

Dear Dr. Mukamana:

I give my permission for **Leoncie UZIKWAMBARA** your student in **Masters program in peri operative track**, to use and to adapt my questionnaires used in study done *on knowledge and practice regarding biomedical waste management among staff nurses and nursing students of Rajendra Institute of Medical Sciences, Ranchi*” and associated documents in her Masters of Science program at the University of Rwanda. I wish her well in her work, research, and studies.

Please don't hesitate to contact me should you need additional information.

Your sincerely.....

Your name and address

signature