



**HANDWASHING KNOWLEDGE AND PRACTICE AMONG NURSES  
AND MIDWIVE FOR INFECTION PREVENTION IN NEONATOLOGY  
AT A SELECTED DISTRICT HOSPITAL**

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FOR INFECTION PREVENTION IN NEONATOLOGY AT A SELECTED DISTRICT  
HOSPITAL**

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**DECLARATIONS**

I declare that this proposal is a presentation of my original research work. Wherever contributions of others were involved, every effort was made to indicate this clearly. The work was done under the guidance of Bazirete Olive RM/MSN, and Prof. Adejumo Oluyinka Lecturers at UNIVESITY OF RWANDA – College of Medicine Health Sciences (UR- CMHS).

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12<sup>th</sup> June, 2017

**DEDICATION**

This project is dedicated to many people that supported me throughout this long exciting period, without their unrelenting confidence and support I couldn't have come up with this product. To my husband Kwitonda Alexis who has been a constant source of support and encouragement during the challenging situations all along my life. I am truly thankful for having you in my life. To my children Ombeni Maxime and Ganza Amani William.

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## ABSTRACT

**Background:** Health care workers' hands are the main route of cross transmission of harmful germs to the patient when they are not clean. The main way to reduce cross transmission is handwashing. That is why nurses and midwives need to have knowledge on handwashing, which will influence their best practice and adherence to infection control measures.

**Aim of the study:** The present study aimed to evaluate handwashing knowledge and practices of nurses and midwives for infection prevention in neonatology at a selected district hospital.

**Research methodology:** Quantitative approach using cross sectional descriptive study was used to describe the level of knowledge and practices of nurses and midwives on handwashing for infection prevention in neonatology. A total sample of 50 nurses and midwives working in maternity and neonatal unit was used. An anonymous self-administered questionnaire was used to collect data and out of 50 questionnaires distributed 50 were returned back completed.

The data analysis was done using SPSS 20. The results demonstrated a mean knowledge of 78.09% and standard deviation ( $SD= 6.9$ ), the mean score for practice was 71.27 ( $SD=19.6$ ). Among 50 nurses and midwives who participate in the study 36 72% of respondents have good knowledge and 23 46% have good practice about handwashing. There was not association between demographic data and handwashing knowledge, the association was between the department of work and the practice of hand washing with the significant level of  $p= 0.012$ . However, the results did not show any relationship between hand washing knowledge and practice of nurses and midwives.

**Conclusion:** This study recommends improvement in services training that may help to increase knowledge and practice among nurses and midwives on handwashing and future research.

**Keywords:** Knowledge, practice, handwashing, Health care associated infection, neonate

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**LIST OF SYMBOLS AND ABBREVIATIONS/ACRONYMS**

BSI: Blood stream infection

CDC: Central of disease control

HBM: Health belief model

HCAI: Health care acquired infection

HCW: Health care workers

NS: Nosocomial infection

ICUs: Intensive care units

MOH: Minister of health

MRSA: Methicillin-resistance staphylococcus aureus

NICU: Neonatal intensive care unit

SD: standard deviation

TPS: Total sampling technic

WHO: World health Organization

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## CHAPTER.1. INTRODUCTION

### 1.1. Introduction and background to the study

This chapter provides the background of the study, showing the prevalence of healthcare associated infection and the data on the role of handwashing as important component of infection prevention to reduce HCIs in neonatology. In this study handwashing and hand hygiene were used interchangeably.

Health care-associated infections (HAIs) are one of the most common adverse events in care delivery and a major public health problem with an impact on morbidity, mortality and quality of life (WHO, 2016, p. 9). At any given time, up to 7% of patients in developed and 10% in developing countries will acquire at least one HAI (WHO, 2016, p. 9).

In sub-Saharan Africa, the data available show that the incidence of nosocomial infections ranges from 2-49% with patients in intensive care units having the highest rate ranging from 21.2 to 35.6% (Elizabeth, 2016, p. 1).

Globally, serious neonatal infections cause an estimated 36% of neonatal deaths. In some settings where mortality rates >45% per 1000 live births, neonatal infections are estimated to cause 40% to 50% of all neonatal deaths (Darmstadt, Zaidi and Stoll, 2011, p. 1). About 30-40% of infections resulting in neonatal sepsis deaths are transmitted at the time of childbirth (Blencowe et al., 2011, p. 2). In developed countries incidence of neonatal infections in NICUs range from 6% to 25% (Uwaezuoke and Obu, 2013, p. 1).

According to the Report on the Burden of Endemic Health Care-Associated Infection Worldwide Clean Care is Safer Care (2011, p. 18), neonatal infection rates in developing countries are 3 to 20 times higher than in industrialized countries and among hospital-born babies these infections are responsible for 4% to 56% of all causes of death in the neonatal period, with the ¾ occurring in the South-East Asia Region and Sub-Saharan Africa.

In Rwanda among the causes of neonatal mortality in 2010 sepsis was 29% (Surveys, 2010, p. 3). In 2012 neonatal mortality due to infection was 16% (MOH, 2012, p. 41), in 2013 neonatal

mortality due to neonatal infection was 11% (Statistics booklet, 2013, p. 43) and in 2014 neonatal mortality was 9% , due to infections among others causes.(Statistics, 2014, p. 39).

Hand hygiene is the primary measure proven to be effective in preventing HCAI and the spread of antimicrobial resistance (WHO, 2009b, p. 5). In addition, proper hand hygiene is the single most important, simplest, and least expensive means of reducing the prevalence of HAIs and the spread of antimicrobial resistance in health care setting (Mathur, 2011, p. 3). A study done by, (Lam et al., 2004, p. 1) show an increase in hand hygiene compliance from 40% to 53% before patient contact and 39% to 59% after patient contact. More marked improvement was observed for high-risk procedures 35%–60%, that compliance with hand hygiene reduces the health care-associated infection rate from 11.3 to 6.2 per 1000 patient-days.

However, Lack of knowledge on infection prevention among nurses and midwives can increase the rate of HCAs. This is supported by a study done by, Mohesh (2014), showed different level of knowledge on some elements where hand hygiene can prevent infection, 50% of them accepted that, hand hygiene practices before and after handling a patient will prevent health care associated infections. Although 94% agreed, 6% refused that hand hygiene as an important preventive measure for cross infections. 95% of them washed their hands before and after their food intake.70% of them used soap and water whereas only 6.36% used alcohol based agents (Mohesh, 2014, p. 2).

In addition, nurses and midwives are engaged in direct contact with the newborn while delivering care, so they have an important role in infection control. Ensuring that nurses and midwives recognize the importance of handwashing in prevention of HCAs, know when and how handwashing should be performed, and fellow recommended practice is important. In this context, the present research aimed to evaluate handwashing' knowledge and practice of nurses and midwives for infection prevention in neonatology at selected district hospital. The findings from this study should be added to the existing literature and may be used to develop interventions to reduce the spread of infection in neonatology.

### **1.3 Problem statement**

In the hospital settings, infections are one of the causes of neonatal mortality. Rwanda demographic and health survey 2014-2015 reported that neonatal mortality was 20/1000 live birth (RDHS, 2015, p. 15). Neonatal mortality due to infections was 16% reported in Rwanda annual health statistics 2012(Ministry of health, 2012, p. 41). In 2014 neonatal mortality due to infection was decreased to 9% (RDHS, 2014, p. 48). Even though, there is a decrease but the problem still exists. In Ruhengeri hospital among 2142 neonates admitted in neonatology in 2016, 514 (24%) were reported to have neonatal infections during hospitalization (Ruhengeri hospital annual report, 2016). According to MOH (2012), neonatology clinical treatment guideline insist on hand washing (Minister of health, 2012, p. 6). The critical role of nurses in patient care emphasizes on the role of the control hospital acquired infections, but good knowledge and skills are required for infection control (Fashafsheh *et al.*, 2016, p. 2). However, health care staff's Knowledge and practice on handwashing are important in the prevention of infections. In the selected district hospital in Rwanda, it is not known how nurses and midwives' knowledge and practice on handwashing is. This study intended to evaluate nurses and midwives' knowledge and practices on handwashing for infection prevention in neonatology at Ruhengeri Hospital.

### **1.4 Objectives**

#### **1.4.1 Main objective**

To evaluate the knowledge and practices of nurses and midwives on handwashing and infection prevention in neonatology at selected district hospital.

#### **1.4.2 Specific objectives**

Assess the level of knowledge of nurses and midwives on handwashing and infection prevention in neonatology at selected district hospital.

Identify the practices of nurses and midwives on hand washing and infection prevention in neonatology at selected district hospital.

Identify the barriers to handwashing practices and infection prevention in neonatology at selected district hospital.

### **1.5 Research questions**

What level of knowledge of nurses and midwives on handwashing and infection prevention in neonatology at a selected district hospital?

What are practices of nurses and midwives on handwashing and infection prevention in neonatology at selected district hospital?

What are the barriers to handwashing practice and infection prevention in neonatology at a selected district hospital?

### **1.6 Significance of the study**

The study of knowledge and practices of nurses and midwives on hand washing and infection prevention in neonatology at a selected district hospital will boost the nurses to expand their therapeutic strategies and initiate appropriate programs in order to improve the life of neonates by covering the gap that already has been existing in follow up or management of neonates and narrow the burden of infections in general and more specifically health care acquired infection in neonatology at selected district hospital. In addition, the study will motivate other researchers to conduct further researches on health care acquired infections in neonatology in order to improve the lives of the community.

### **1.7. Definition of concept**

**Handwashing:** according to WHO ( 2009, p. 2) hand washing is a hand hygiene practice that requires washing hands with plain or antimicrobial soap and water as is the case in this study.

**Knowledge:** according to Colour Oxford English Dictionary (2011, p. 384) knowledge is defined as information and awareness gained through experience or education. In this study project knowledge refers to information and skills of nurses and midwives about hand washing for infection prevention in neonatology at selected district hospital.

**Practice:** according to Colour Oxford English Dictionary (2011, p.536) practice refers to do something regularly as part of your normal behavior. The way nurses and midwives in neonatology and maternity incorporate handwashing when delivering care.

**Health care associated infection:** according to WHO (2011, p, 10), health care associated infection is an infection occurring in a patient during the process of care in a hospital or other health-care facility which was not present or incubating at the time of admission. In this study HCAs is considered as an infection that a newborn baby contracted when he/she is hospitalized for other problems.

**Neonate:** according to Stanford a newborn is a baby aged from 0 to 28 days. In this a neonate is every baby this age may a term, preterm, or post term.

## **1.8. Subdivision of the project**

This thesis is divided into five chapters. The first chapter is introduction and it includes background to the study, problem statement, and objectives of the study, research questions, and significance of the study. Chapter two includes introduction, theoretical literature, critical review and research gap identification, conceptual framework and summary. Chapter three is composed of introduction, research design, target population, sample design which includes simple size and simple technique, data collections methods which includes instrument, reliability and validity, data analysis procedure and ethical consideration. Chapter four presents results and findings; chapter five deals with discussion of the findings whereas the last chapter presents conclusion and recommendations.

## **CHAPTER 2. LITERATURE REVIEW**

### **2.1. INTRODUCTION**

In this chapter, an overview of different literature on healthcare associated infections and the knowledge and practices of nurses and midwives about hand hygiene were discussed. HCAs are not only a problem of Africa but also it is a delicate issue in developed countries. Up to 7% of patients in developed and 10% in developing countries will acquire at least one HAI (WHO 2009, p. 9). That is the reason why the research presented information from different countries Worldwide. In this study the main three components were discussed, the first component was nurses and midwives' knowledge about hand hygiene and infection prevention. The second was the practices of nurses and midwives on infection prevention, and the third was concerned with barriers to the practice of hand hygiene and infection prevention in neonatology.

### **2.2 Nurses and midwives' knowledge about hand washing and infection prevention in neonatology.**

Nosocomial infections are also known as hospital-acquired or associated infections (Khan, Ahmad and Mehboob, 2015, p. 509). Health-care-associated infection is a major global safety concern for both patients and health-care professionals. HAI is defined as an infection occurring in a patient during the process of care in a hospital or other health-care facility that was not manifest or incubating at the time of admission (Nejad *et al.*, 2011, p. 757). Health-care associated infections are major challenge for low and middle income countries which have limited resources in healthcare (Shahida *et al.*, 2016, p. 28).

Healthcare-associated infections are caused by a wide range of microorganisms. These are often carried by the patients themselves (NICE, 2012, p. 5). Organisms that are frequently involved in hospital-acquired infections include Streptococcus, Acinetobacter, enterococci, Pseudomonas, Aeruginosa, Coagulase-negative staphylococci, Staphylococcus aureus, Bacillus cereus, Legionella and Enterobacteria family members. These micro-organisms can be transferred from person to person, environment and contaminated water and food, infected individuals, contaminated health care personnel's skin or contact via shared items and surfaces (Khan, Ahmad and Mehboob, 2015, p. 509-513).

Healthcare associated infections arise across a wide range of clinical conditions and can affect patients of all ages. Healthcare-associated infections can develop from health care interventions especially if invasive procedures or devices was used (bloodstream infections are associated with vascular access devices). They can exacerbate existing or underlying conditions, delay recovery and adversely affect quality of life (NICE, 2012, p. 5).

Therefore, nurses are required to have strong knowledge on essential component regarding infection prevention and control measures which must be used to all patient including adults, children and neonates. Those measures include the hospital environment hygiene, good hand hygiene, and proper use of personal protective equipment, respect of principles regarding asepsis also safe use sharps disposal (Loveday *et al.*, 2014, p. 3). According to WHO (2009, p. 9), main way to transmit germ is the health care' hands during health care. Health care workers hands are contaminated in the following situation, auscultation and palpation or while touching contaminated surfaces, devices or materials such as changing of dressing (Shinde and Mohite, 2014, p. 2).

The process of transmission of health care-associated infection may be by direct and indirect contact, through contaminated HCWs' hands require five sequential steps, those steps are the flowing ,organisms are present on the patient's skin, have been shed onto inanimate objects immediately surrounding the patient, organisms must be transferred to the hands of HCWs when delivering care, organisms must be capable of surviving for at least several minutes on health care workers' hands, handwashing or hand antisepsis by the HCWs must be inadequate or omitted entirely, or the agent used for hand hygiene inappropriate; the contaminated hand or hands of the caregiver must come into direct contact with another patient or with an inanimate object that will come into direct contact with the patient (WHO, 2009).

Handwashing is a technique of using soap and water, and hand rubbing as a method of using alcohol (WHO, 2009c, p. 9). Hand washing with soap and water is indicated when there was visible dirty ,blood, or other body fluids (Mathur, 2011, p. 3).While Alcohol based hand-rub is recommended for hand decontamination in all clinical settings apart from visibly soiled hands (Shinde and Mohite, 2014, p. 3).

In handwashing technic some elements are associated with increased likelihood of colonisation of hands with harmful germs. According to CDC, HCWs who wear artificial nails are more likely to harbor gram-negative pathogens on their fingertips than are those who have natural nails, both before and after handwashing. Jewelry's also increase the colonization of germs, 40% of nurse's harbored gram-negative bacilli on skin under rings and that certain nurses carried the same organism under their rings for several months, (CDC, 2002, pp. 31–32).

To conclude, a special consideration must be set in the work place regarding training courses so as to improve the knowledge of healthcare personnel (Tanwir, 2012, p. 2).

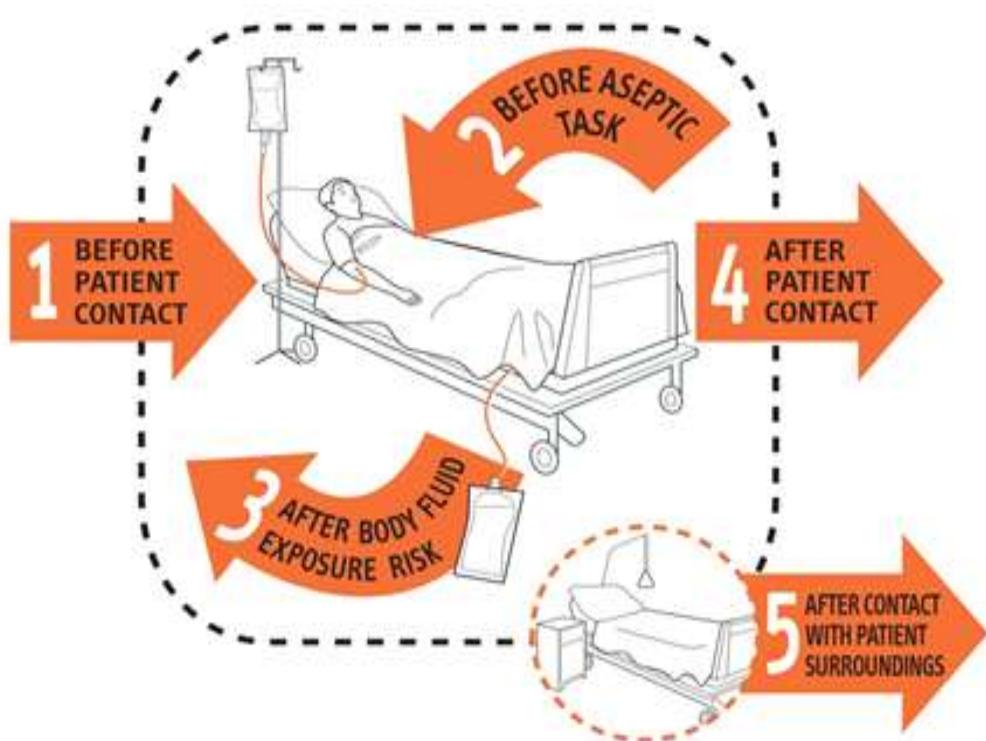
### **2.3. Hand washing practice**

Evidence shows that improving hand hygiene contributes significantly to the reduction of HCAIs ,that the performance of hand hygiene by many health care professionals, including nursing staff, is not often as is required or use the correct technique (Evans *et al.*, 2012, p. 8).

Due to the number of times health care workers have contact with patient or patient environment, they have the greatest potential role to spread micro-organisms that may result in infection. Hands are therefore a very efficient vehicle for transferring micro-organisms (Evans *et al.*, 2012, p. 8).

The spread of infection may be preventable if nurses and midwives respect the times where handwashing is indicated, in both the CDC and WHO guidelines handwashing is indicated, before patient contact, before starting an invasive procedure, after contact with blood, body fluids or excretions, mucous membranes, non-intact skin, and wound dressings, after removing gloves, when moving from a contaminated patient body site to a clean site during care , after contact with inanimate objects or medical equipment close to the patient, after patient contact (WHO, 2009a, p. 31).

Figure 1 : 2.1 FIVE MOMENT FOR HAND HYGIENE



(WHO, 2009c, p. 9)

In Rwanda, the minister of health, based on who guidelines, develop neonatology clinical treatment guidelines for health facilities, the following are guidelines related to hand hygiene during the care of newborn in NICUs of Rwanda. Handwashing is recommended, when entering the neonatal unit, before clinical exam of the baby, after removing gloves when finishing examination, after contact with blood or other bodily fluids even if wearing gloves. Before any aseptic procedure, after touching any medical equipment including stethoscope .After contact with the newborn environment, incubator, clothes finally before leaving the ward.

According to (Who, 2014, p. 2) in a study on evidence of hand hygiene to reduce transmission and infections by multidrug resistant organisms in health-care settings revealed that , when hand hygiene compliance increased from poor 60% to excellent 90%, each level of improvement was associated with a 24% reduction in the risk of MRSA acquisition. This risk decreased significantly by 48% with hand hygiene compliance levels above 80%.

#### **2.4. Barriers for hand washing practice**

Many factors lie behind poor hand hygiene adherence among HCWs. Among nurses a lack of awareness and scientific knowledge regarding hand hygiene is considered significant claim that lack of proper infection control during training programmers (Shinde and Mohite, 2014, p. 4). According to (Mathur, 2011, p. 616), Some of the observed/self-reported factors including healthcare staff related factors like not having a role model among the group, clinical factors like shortage of staff, insufficient time, environment, institution and behavior affecting hand hygiene behaviors.

## **2.5 EMPIRICAL RITERATURE**

Different studies on nurses and midwives handwashing' knowledge and practice about infection control have been conducted in different countries and different results were found.

### **2.5.1 Studies on knowledge**

A Study done to assess Knowledge, Attitude and Practices of Five Moments of Hand Hygiene among Nursing Staff and Students at a Tertiary Care Hospital at Karad, found moderate knowledge on hand hygiene where 144 out of 200, 74% among the total study population. Only 9% of participants 18 out of 200 had good knowledge regarding hand hygiene (Shinde and Mohite, 2014, pp. 318–319).

In the cross-sectional study aimed to assess the knowledge and practice of hand hygiene among graduate medical students in Asir governmental hospitals in Asir region, results regarding the knowledge assessment indicated different level of knowledge, moderate knowledge was found on the main route of transmission of potentially harmful germs between patients, where 68% of the sample answered correctly that the health care workers hands when not clean is the main route. In the same study high knowledge was found on the items concerning before touching a patient and immediately before a clean / aseptic procedure, indicated a very high level of knowledge with a percentage of 96% and 90%, respectively was the hand hygiene actions that prevent transmission of germs to the patients (Res *et al.*, 2017, p. 2672).

Findings of a study aimed to evaluate knowledge of healthcare workers (HCWs) about hand hygiene and to assess practice of hand hygiene and identify obstacles among them at Armed Forces Military Hospitals in Taif, only 28% of them recognized correctly that germs already present on or within the patient is the most frequent source of germs responsible for HCAIs (Alsofiani, Alomari and Alqarny, 2016, p. 1286).

Most of HCWs (82.1%) recognized correctly that alcohol-based hand rubbing is more rapid for hand cleansing than handwashing with soap and water, while majority of them (97.1%) reported correctly that alcohol-based hand rubbing does not cause skin dryness more than handwashing with soap and water and that handwashing with soap and water and alcohol-based hand rubbing

are not recommended to be performed in sequence (94.2%). Most of HCWs (82.1%) recognized correctly that 20 s is the minimal time needed for alcohol-based hand rub to kill most germs on your hands (Alsofiani, Alomari and Alqarny, 2016, p. 1286).

Another study, on knowledge of hand hygiene among health care personnel in selected primary health care centers in Lucknow, revealed variation in knowledge about hand hygiene practice among the different categories of primary healthcare personnel. Suboptimal knowledge was seen with respect to practice of hand hygiene immediately after risk of body fluid exposure (71.8%) and after exposure to immediate surroundings of patient (75.0%) among paramedical staff. Only 27.3% of class IV and 62.5% of paramedical staff were aware that hand washing is more effective against germs than hand rubbing. Only 43.7% of paramedical staff and 27.3% class IV workers were aware that hand rubbing is required before palpation of abdomen. Less than half of paramedical staff and class IV workers (46.8% and 22.7% respectively) were aware that hand rubbing was required before giving injection (Shukla, Tyagi and Gupta, 2016, p. 1).

## **2.5.2 Studies on practice**

A study done in Palestine showed that, (75.8%) had intermediate level of performance in this field, approximately half (53.9%) of the studied sample had fair knowledge level (>80%). However, the majority (91.1%) of the studied sample had Good practice (>80%) on infection prevention (Fashafsheh, 2015, p. 1). Moreover, a study done in Italy whose aim was to investigate the nurses' knowledge about hand hygiene showed that nurse's knowledge was at a good level and good positive attitudes, but the compliance was low rate regarding standard precautions about HAIs (Parmeggiani *et al.*, 2010, p. 1).

In addition, a study was done on Knowledge of Hand Hygiene among Health Care Personnel in Selected Primary Health Care Centres in Lucknow Study revealed variation in knowledge about hand hygiene practice among the different categories of primary healthcare personnel. Suboptimal knowledge was seen with respect to practice of hand hygiene immediately after risk of body fluid exposure (71.8%) and after exposure to immediate surroundings of patient (75.0%) among paramedical staff. Only 27.3% of class IV and 62.5% of paramedical staff were aware that hand washing is more effective against germs than hand rubbing. Only 43.7% of

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However, a study aimed to assess hand hygiene practice after education program revealed that, the incidence of nosocomial bloodstream infection showed a significant reduction after the education program 191 of 429 (44.5%) versus 99 of 274 (36.1%).The proportion of infants having two or more 38 of 429 (8.9%) versus 12 of 274 (4.4%).The rate of nosocomial infections before the intervention was 17.3 per 1000 patient and decreased to 13.5 per 1000 patients (Helder *et al.*, 2010, p. 6).

### **2.5.3 Studies on barriers**

In clinical setting the practices of hand hygiene may be limited by different barriers or being influenced by many factors, a study done by Marthur (2011, p. 616), found three types of factors that affect compliance to hand hygiene. Among them, there are health care staff related factors such as, physician status, nursing assistant status, and male sex, lack of role models among colleagues or superiors, not thinking about it/forgetfulness. Clinical factors (working in an intensive-care unit, working during the week, if involved in activities with high risk of cross-transmission, understaffing, patient overcrowding, insufficient time, patient needs take priority, hand hygiene interferes with health-care worker relationships with patients (Mathur, 2011, p. 616).

Finally environmental/institutional/behavioral/ other factors which are, wearing gowns/gloves (beliefs that glove use obviates the need for hand hygiene), hand washing agents causing irritation and dryness, sinks are inconveniently located/shortage of sinks Lack of soap and paper towels, belief of low risk of acquiring infection from patients Lack of knowledge of guidelines/protocols, Skepticism regarding the value of hand hygiene, disagreement with the recommendations Lack of institutional priority, lack of active participation in hand-hygiene promotion at individual or institutional level, lack of administrative sanction of non-compliers/rewarding compliers (Mathur, 2011, p. 616).

## **2.6 CONCLUSION**

Many studies have been conducted on knowledge and practices of nurses about HCAs and hand hygiene for infection prevention using study designs and the results were different from study to study and from country to country however there is few studies conducted in the context of Rwanda and more specifically in Musanze district while the problems of HCAI'S have been identified. So this study comes to show and provide more information about handwashing knowledge and practices of nurses and midwives for infection prevention.

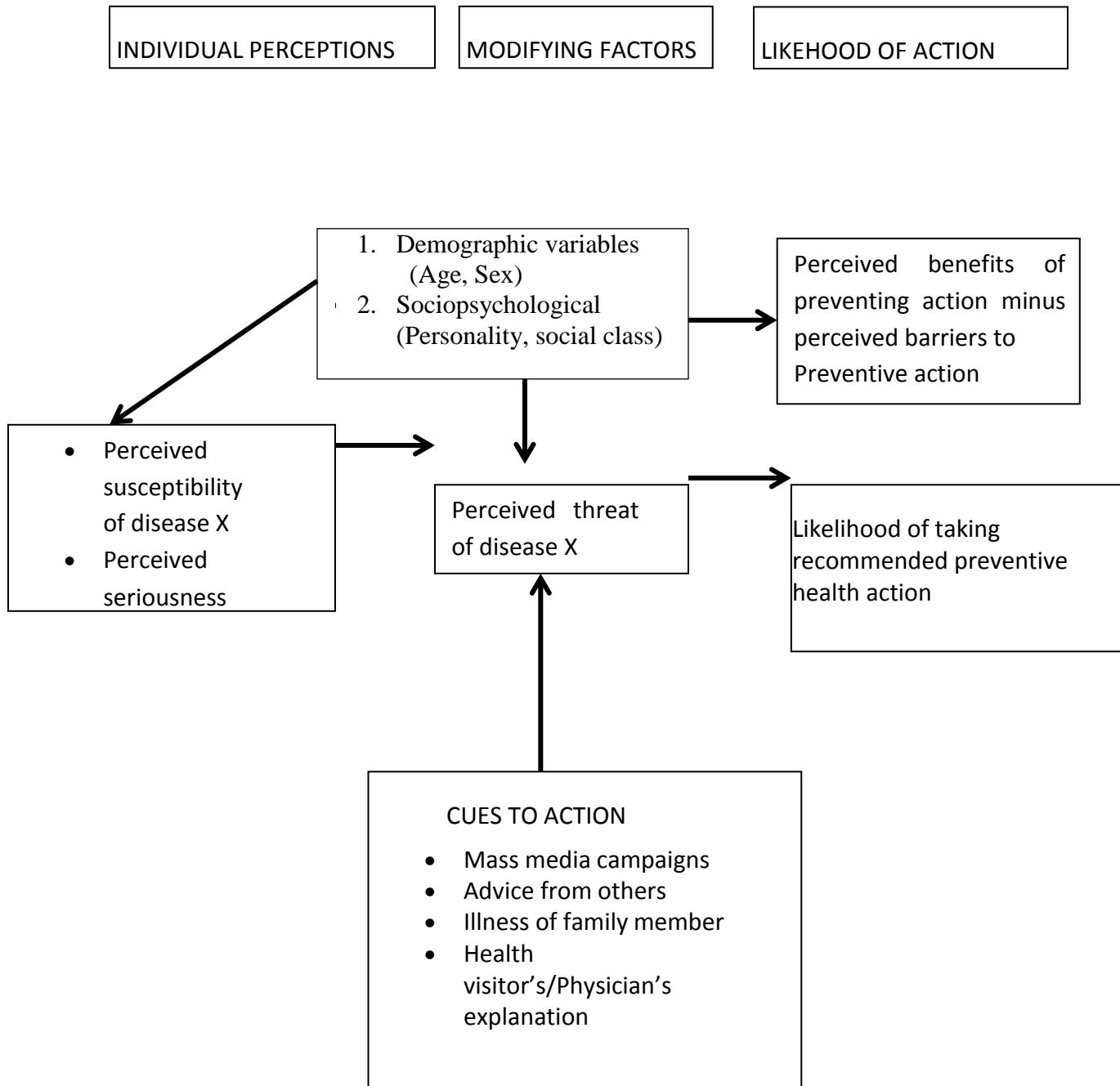
### **2.3.6 Conceptual framework**

Health Believe Model was used in this study. Health Believe model is a promotion theory that was developed in the 1950s by social psychologists Irwin Rosenstock, in that time the concerns of public health services was the prevention of disease not medical treatment because there was the widespread failure of people to accept disease preventives or screening tests for the early detection of asymptomatic disease, like tuberculosis cervical cancer (Rosenstock, 1974)

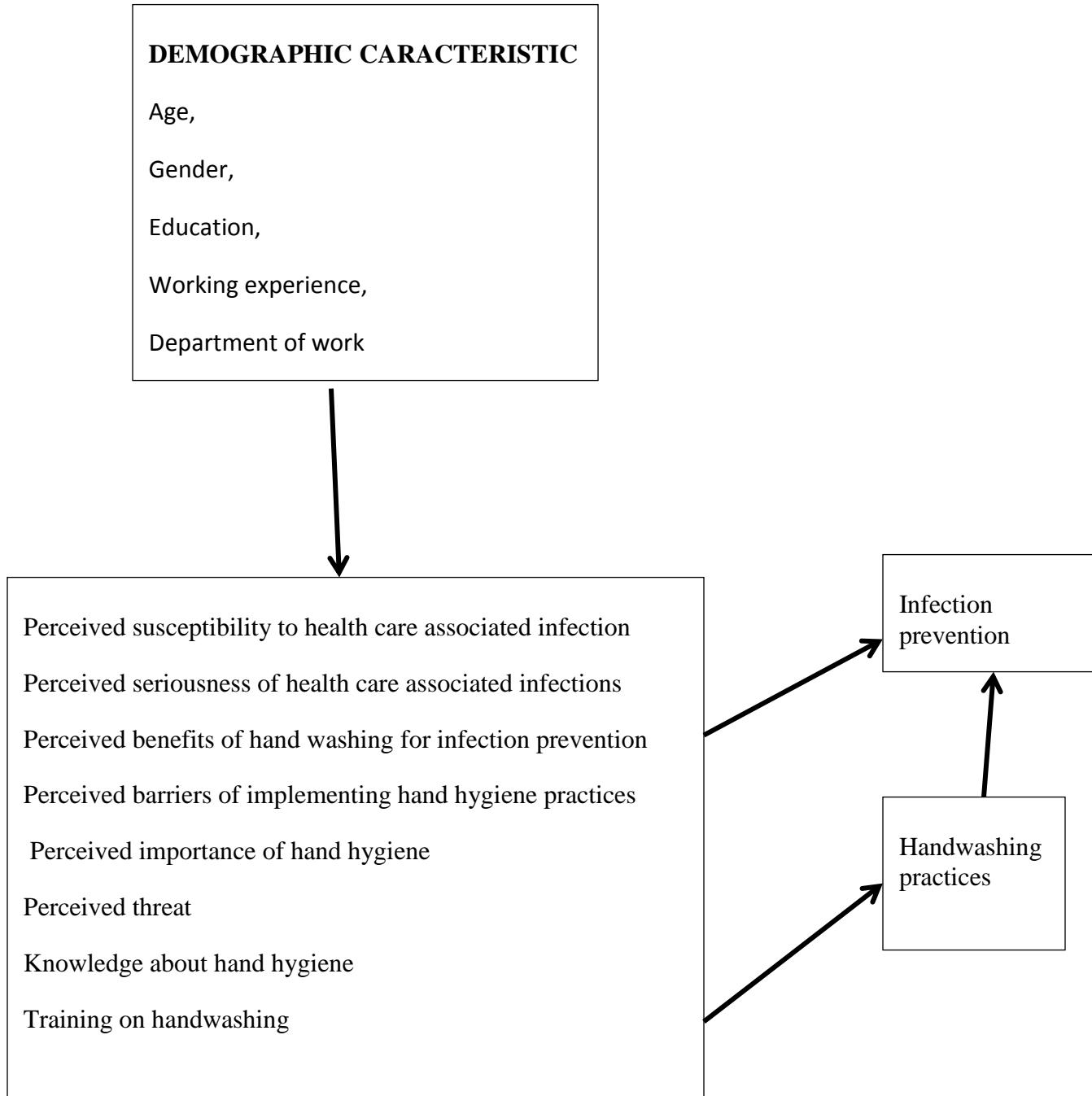
In HBM, we found six concepts as basis element of the model which are, susceptibility, seriousness, benefits and barriers to a behavior, cues to action and self-efficacy, those elements predict why people will take action to prevent, to screen for, or to control illness conditions (Champion & Skinner, 2008).

In the context of this study concerning handwashing' knowledge and practices of nurses and midwives on infection prevention, HBM is most valuable. The concept of Health Belief Model may be applied in the studies that concerning with health behaviors such as health prevention, promotion and compliance with recommended guidelines for infection control. If nurses and midwives were aware that newborn are susceptible to health care associated infection and that infection will have many consequences to the newborn they may adhere on infection control mesures like handwashing practices because, the literature highlight that hand hygiene is the most simplest and effective measure to prevent infections (Abdella, et al.; 2014). An study done on hand hygiene in reducing transient flora on the hands of healthcare workers , demonstrates that proper hand hygiene remove the majority of transient bacteria which may be present on the hands of HCWs (Kapil, Bhavsar & Madan ,2015).

**Figure 2: 2.2 THEOREICAL PROPOSITIONS OF HEALTH BELIEF MODEL**



Burke, (2011)

**Figure 3: 2.3: ADAPTED FRAMEWORK**

In this study the following concepts was applied, to link nurses and midwives' handwashing knowledge and practice for health care associated infection prevention. Perceived susceptibility, perceived seriousness of HCAs, perceived benefits and perceived barriers to preventive actions.

For nurses and midwives to be able to control infection, if they understand that newborns were susceptible for healthcare associated infection.

That healthcare associated infection has serious consequences on the life of newborn like prolonged the length of hospitalization, increasing in cost and also morbidity and mortality.

That the perception of the benefit of proper handwashing as prevention measure may reduce the susceptibility of HCAs.

Therefore, a course of action that is preventive may be beneficial for nurses and midwives on infection prevention. Nurse and midwives have to anticipate barriers to act by outweighing its benefits for infection prevention.

Health care associated infections, will be prevented if nurses and midwives belief in their own ability to do something by translating their knowledge into practice for infection prevention during care.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1. Introduction**

Research methodology is a systematic way to reach and solving the research problem. It is the way the research is done scientifically. In research methodology a discussion of various steps that are generally adopted by a researcher in studying his/her research problem is presented (Kothari, 2004, p. 4).

This chapter includes the research methodology that was applied to determine the handwashing' knowledge, and practices among nurses and midwives for infection prevention in neonatology at selected district hospital. Research design, research approach, research setting, population, sampling, data collection, data analysis, ethical considerations, data management, data dissemination, limitations and challenges are also discussed.

### **3.2. Research design**

A research design is a plan structure, developed to help the researcher to obtain answers to research questions or problems (Kumar, 2011, pp. 95–96). A research design serves two important functions. First, it outlines the logistical details of the whole process of the research journey , to ensure that, in the case of causality, the independent variable has the maximum opportunity to have its effect on the dependent variable while the effect of extraneous and chance variables is minimized (Kumar, 2011, pp. 95–96). Descriptive cross-sectional study design was applied for this study. A descriptive cross- sectional design is used where more information required in a particular field through the provision of a picture of the phenomenon as it occur naturally and the information gathered once in time (Polit and Beck, 2001). The research design enabled the researcher to describe the data gathered. The research design was applied by aiming gathering information about handwashing 'knowledge, and practices among nurses and midwives for infection prevention, as well as identifying barriers to the practices of handwashing. Hence the recommendations for future practice.

### **3.3. Research approach**

Research approach is a plan and procedure for research that span the steps from broad assumption to detailed method of data collection, analysis and interpretation (Creswell, 2013, p.

31). A quantitative, descriptive study was conducted to determine the level of knowledge, and practices among nurses and midwives regarding handwashing for infection prevention within Ruhengeri hospital in neonatology and maternity departments. Quantitative method involves the process of collecting, analyzing, interpreting and writing the results of the study (Creswell, 2013, p. 32).

### **3.4. Research setting**

The study was conducted Ruhengeri district hospital located in Musanze district North province in Rwanda. Ruhengeri hospital is a district hospital currently has following services: Internal medicine, Pediatric, Emergency, Gynecology and obstetrics, Surgery, Stomatology, Intensive care unit, Neonatology, Ophthalmology, Mental health, Physiotherapy, Anesthesiology.

### **3.5. Population**

According to Polit and Beck, (2010) the study population include the entire aggregation of cases in which a researcher is interested in. The population for the study was nurses and midwives working in neonatology and maternity, at Ruhengeri hospital. The total population was 56 nurses and midwives working in neonatology and maternity. Nurses and midwives working in maternity were involved because they are the first to receive the newborn just after delivery and they are required to do clean delivery. Once the newborn is admitted in neonatology nurses and midwives in the neonatology service, are required to do hand washing when giving care to the newborn. Neonatology service has 15 nurses and midwives and maternity service has 41 nurses and midwives. Therefore 56 nurses and midwives were taken as population of the study.

### **3.6. Study Sample**

A sample is a subgroup of the researcher is interested in (Kumar, 2011, pp. 177).The sample for this study was taken from 56 nurses and midwives working in maternity and neonatology services.

### **3.6.1. Sample size**

Yamane simplified formula will be used to calculate the sample size (Ajay and Micah, 2014)

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

n= sample size, N= population, e= marginal error equal to 0.05 at Confidence interval of 95%.

$$n = \frac{56}{1 + 56(0.05)^2} = 50$$

N = 56 nurses and midwives

n = 50 Nurses and midwives

### **3.6.2. Sampling strategy**

Convenient sampling method was used where the available nurses or midwife who sign the consent were taken to participate in the study until a sample of 50 participant was obtained.

Convenience sampling is a type of nonprobability where members of the target population that meet certain practical criteria, such as easy accessibility, availability at a given time, or the willingness to participate are included for the purpose of the study (Fouka and Mantzorou 2011, p. 2).

## **3.7. Data collection**

### **3.7.1. Data Collection instruments**

Data collection for this study was conducted through structured questionnaire to gather information responding to research objectives. Knowledge was assessed using WHO's hand hygiene questionnaire for health care workers. This proforma of 25 questions includes multiple choice and "yes" or "no" questions.

Practice was evaluated using 11 questions that were adopted from questions developed by CDC to address hand hygiene practices in the clinical areas of health facility.

The barriers were assessed using 4 questions that were structured based on WHO factors that affect adherence to hand hygiene practice (SIAPS, 2013, WHO, 2009). The questionnaire used to collect data contained four sections. The First section was socio-demographic data (Age, Gender, Education level, Working experience and department of work). The second section nurses and midwives' knowledge. The third nurses and midwives practices on infection prevention the fourth section barriers to practice of handwashing for infection prevention.

### **3.7.2 Validity and Reliability**

#### **3.7.2.1. Validity**

According to Kumar (2011, pp. 166) Validity is the ability of an instrument to measure what it is designed to measure. Questions to assess Knowledge were taken from WHO Hand Hygiene Knowledge Questionnaire for Health-Care Worker 2009. To ensure the validity in context of Rwanda, the content validity of questionnaire was approved in consultation with infection control committee of Ruhengeri hospital and the supervisor and co-supervisor as well as the statistician who supervised the application of statistics. According to the experts' comments, the questions were approved to be used.

#### **3.7.2.2. Reliability**

According to Kumar (2011, pp. 169) if research tool is consistent and stable, hence predictable and accurate, it is said to be reliable and the greater the degree of consistency and stability in an instrument, the greater its reliability

To ensure reliability of the tool a pilot study was conducted on 5 participants. After completing questionnaire the data had entered into computer and using SPSS and internal consistency reliability was computed where 0.86 Cornbrash's alpha coefficient was obtained.

### **3.7.3. Data collection procedure**

Data collection is defined as the identification of subject and the precise, systemic gathering of information or data related to the research purpose or the specific objectives, or hypothesis of the study ( Burns and Grove 2011, p. 535). A structured questionnaire with close-ended questions was used to collect data. The timeline for collecting data was from 12<sup>th</sup> march to 6<sup>th</sup> April 2017. About 4 questionnaires were completed every day and the services were visited three times a week. Questionnaires distributed in morning after staff meeting and when participant finished completing the requested information he /she submitted the questionnaire to the in charge of service to be collected by researcher at the end of day. A total of 50 questionnaires that were distributed and 50 were completely returned. Therefore the response rate was 100%.

### **3.8. Data analysis**

The data collected was analyzed using computer software statistical package of social science (SPSS) version 20. Each completed questionnaire was checked for completeness before fed to the computer. Descriptive statistics was used to calculate percentages for each of the responses given. Respondents were given the options to give yes or no to each question. A score of 0 was given for negative responses for knowledge and practices. 1 point was given for each correct answer for good knowledge and practices so that maximum for knowledge was 25 and 11 for practice. Like other study conducted Knowledge, Attitude, and Practice of Hand Hygiene among Medical and Nursing Students at a Tertiary Health Care Centre in Raichur, India (Res *et al.*, 2017). On the basis of this formula  $\text{score\%}=(\text{total correct responses}/25)*100$ , a score of more than 75% was considered good, 50-74% moderate and less than 50% poor. Descriptive data were analyzed and presented in graphs, tables, and percentages so that the readers should draw the meanings from the findings. The inferential statistics the Chi square test was used to determine the association between demographic data and handwashing' knowledge and practice of nurses and midwives and significant level was set at 0.05.

### **3.9. Ethical considerations**

Research ethics involve requirements on daily work, the protection of dignity of subjects and the publication of the information in the research, the important element in ethical issues when

conducting research are: informed consent, beneficence as do not harm, respect for anonymity and confidentiality, Respect for privacy (Fouka and Mantzorou, 2011, pp. 3–5). Permission letter to conduct this study was obtained from the Research Committee of University of Rwanda. And then was given to the Ruhengeri Hospital Administration to get permission for conducting research. Participation in the study was voluntary and the participants signed consent before participating in the study after explanations. Questionnaire was coded and no name of participant was requested on the questionnaire to ensure confidentiality and participant had right to refuse or withdrawal.

### **3.10. Data management**

Research data management is part of the research process, aims to make the research process as Efficient as possible and met expectations and requirements of the university. It concerns how you create data and plan for its use, organizes structure, and name data, keeps it, make it secure, provide access, store and back it up (Burnham, 2013). In this study, data collected was containing hard copies completed by nurses and midwives they was stored in closed keyboard to insure confidentiality however, the soft copy was kept in the computer closed with password and data should be discarded after 10 years. The data was organized and displayed using tables, figures according the objectives of this study.

### **3.11. Data dissemination**

The data will be communicated to Ruhengeri hospital administration and more particular in maternity and neonatology department for the use in decision-making

### **3.12. Limitations and challenges**

The study was done in one hospital therefore the result can only be applied to particular hospital. Again the data was collected in maternity and neonatology services so that the data cannot be generalized to the nurses of others department neither. One more important limitation is that the sample size in this study was small and therefore may not be a representative distribution of the population of the Ruhengeri hospital.

### **3.13 Conclusion**

This chapter included the research methodology that was applied to determine the knowledge, and practices of nurses and midwives on handwashing for infection prevention, within Ruhengeri District hospital. The research design, population and sampling procedures, data collection and data analysis methods were discussed.

## CHAPTER 4: RESULTS

### 4.0. INTRODUCTION

In this chapter the data corrected and analyzed was presented, data was presented by tables and graph. The data was analyzed to determine the level of knowledge and practices of nurse and midwives on hand hygiene infection prevention in neonatology. The statistical package (IBM SPSS version 20) was used to analyze data and Excel for graph.

#### 4. 1.Demographic characteristics of respondents

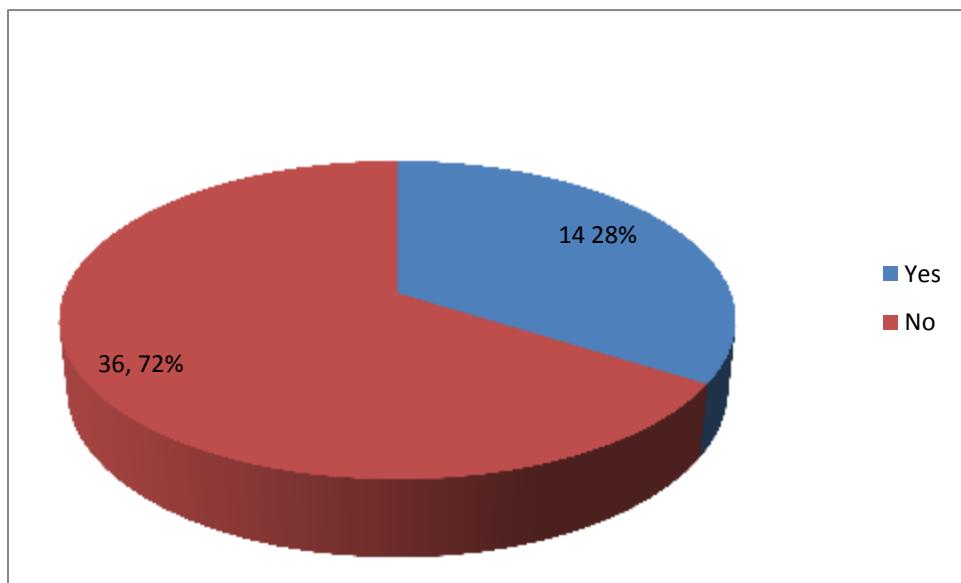
In this section aimed to correct participant information contain 5 questions regarding age, gender, education level, working experiences and department of work.

**Table 4.1. 1: Demographic variables (n =50)**

Variables	Characteristic	Frequency	Percent
Age	20-30	16	32
	31-40	29	58
	41-50	4	8
	>50	1	2
Sex	Female	40	80
	Male	10	20
Education	Nursing Diploma	48	96
	Bachelor	2	4
Working experience	Less than 5 years	30	60
	5-10 years	11	22
	11-15 years	6	12
	Above 15 years	3	6
Department of work	Neonatology ward	14	28
	Maternity ward	36	72

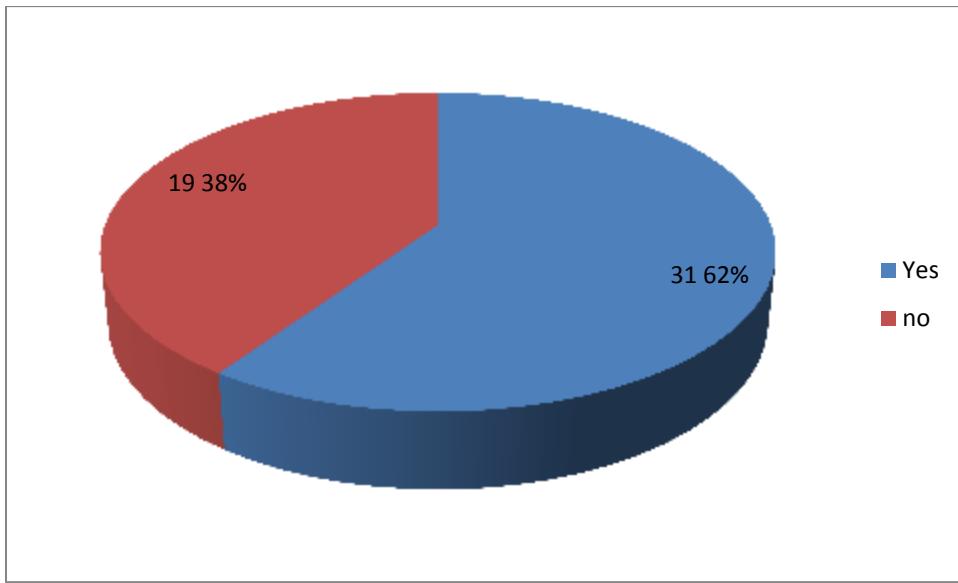
In the above demographic table 4.1.1 indicate that in 50 participants the majority 34(68) were above 30 years and 16(32) were between 20-30 of ages. It is thus evident that most of these nurses were chronologically mature. Concerning the level of education and experiences of work 48(96) had nursing diploma 2(4.0) had bachelor in nursing. According to the experience of work 30(60.0) were less than 5 years of experience while 20(28) were over 5 years of experience. This was important as understanding of the knowledge varies according to the level of education and experience of work.

## **SECTION II: NURSES AND MIDWIVES'S KNOWLEDGE ABOUT HAND HYGIENE**



**Figure 4: 4.2.4: Distribution of respondents who have received formal training**

Figure4: 4.2.4 shows the opposition of respondents according to the training on hand hygiene in the last three years. The majority 36(72%) indicated that they did not receive training in hand hygiene.



**Figure 5 5.2.5: Distribution of Respondent on use of Alcohol-Based Hand Rub for Hand Hygiene (n=50)**

Figure 5: 4.2.5 the majority 31(62) indicated that they routinely use an alcohol-based hand rub for hand hygiene while 19 (38) do not use it.

**Table4.2.2: Respondent's Knowledge on the main route of cross transmission of potentially harmful germs between patients in a health-care facility.**

ITEMS	Yes (%)	No (%)
Health-care workers' hands when not clean	42(84%)	8(16%)
Air circulating in the hospital	49(98%)	1(2%)
Patients' exposure to colonized surfaces (i.e., beds, chairs, tables, floors)	44(88%)	6(12%)
Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients	49(98%)	1(2%)

The above table 4.2.2 only 42 (84%) new that the main route of cross transmission of potentially harmful germs between patients in a health-care facility. Is health care workers' when not clean.

**Table 4.2. 3: Knowledge on the most frequent source of germs responsible for health care-associated infections**

ITEMS	YES (%)	NO(%)
The hospital's water system	41(82)	9(18)
The hospital air	45(90)	5(10)
Germs already present on or with the patient	32(64)	18(36)
The hospital environment	46(92)	4(8)

In table 4.2.3 the respondents had to show the most frequent source of germs responsible for health care associated infections, only 32(64) indicated that the germs already present on or within the patient as the correct answer.

**Table 4.2.4: Respondents knowledge on the hand hygiene actions that prevent transmission of germs to the patient n=50**

ITEMS	Yes n (%)	No ,n(%)
Before touching a patient	48(96)	2(4)
Immediately after a risk of body fluid exposure	27(54)	23(46)
After exposure to the immediate surroundings of a patient	17(34)	33(66)
Immediately before a clean/aseptic procedure	44(88)	6(12)

In the table4.2. 4 the majority 48(96) indicated that hand hygiene before touching a patient is the actions that can prevent infection, 44(88) indicate immediately before clean/aseptic procedure, 27(54) immediately after a risk of body fluid exposure.

**Table 4.2. 5: Knowledge on hand hygiene actions that prevents transmission of germs to the health-care worker**

ITEMS	YES (n %)	None (n %)
After touching a patient	46(92)	4(8)
Immediately after a risk of body fluid exposure	47(94)	3(6)
Immediately before a clean/aseptic procedure	45(90)	5(10)
After exposure to the immediate surroundings of a patient	49(98)	1(2)

In the above table 4.2.5 the majority 49(98) indicated that hand hygiene after exposure to the immediate surroundings of a patient, 47(94) immediately after a risk of body fluid exposure, 46(92) after touching a patient, those are hand hygiene action prevent transmission of germs to the health care workers.

**Table4.2. 6: Knowledge on alcohol based hand rub and hand washing with soap and water (yes and no ).**

ITEMS	Yes; (n %)	No(n %)
Handrubbing is more rapid for hand cleansing than hand washing	41(82)	9(18)
Handrubbing causes skin dryness more than hand washing	31(62)	19(38)
Handrubbing is more effective against germs than hand washing	29(58)	21(42)
Hand washing and handrubbing are recommended to be performed in sequence	27(54)	23(46)

In the above statements in table 4.2.6 where the respondents had to show which is true 41(82%) indicated that handrubbing is more rapid for hand cleansing than hand washing, 31(62) indicated that Handrubbing causes skin dryness hand washing.

**Table 4.2. 7: Knowledge on the minimal time needed for alcohol-based handrub to kill most germs on the hands? (Tick one answer only)**

ITEMS	Frequency	Percent
20 seconds	28	56
3 Seconds	17	34
1 minute	13	26

For the question in table 4.2.7, where the respondents had to indicate the minimal time needed for alcohol-based handrub the majority 28(56) indicated that 20 seconds is the minimum time needed ,17(34) 3seconds and minor 9(18) indicated 1 minute

**Table 4.2. 8: Which type of hand hygiene method is required in the following situations?**

ITEMS	Rubbing(%)	Washing(%)	None(%)
Before palpation of abdomen	34(68)	11(22)	5(10)
Before giving an injection	33(66)	16(32)	1(2)
After emptying bedpan		50 (100)	
After removing examination gloves	21(42)	29(58)	1(2)
After visible exposure to blood	17(34)	31(62)	1(2)
After making patient's bed	46(92)	4(8)	

In table 4.2.8 indicated the hand washing actions required in different situation. In the situation of before palpation of the abdomen 34(68) indicated Rubbing while 11(22) indicated washing and 5(10) said none action is required. On the situation of before giving an injection, 33(66) indicated Rubbing, 16(32) indicated washing and 1(2) indicated none action. On the situation of after removing gloves 21(42) indicated rubbing, 29(58) indicated washing while 1(2) indicated none action. After emptying bedpan 100% agreed hand washing, On the situation of after visible exposure to blood 17(34) indicated rubbing while 31(62) ,After making patient 'bed 46(92) indicated rubbing and 4(8) washing

**Table4.2.9: Knowledge on the conditions or items that is associated with increased likelihood of colonisation of hands with harmful germs**

ITEMS	YES (n %)	NO ( n%)
Wearing jewellery	47(94)	3(6)
Damaged skin	37(74)	13(26)
Artificial fingernails	45(90)	5(10)
Regular use of a hand cream	39(78)	11(22)

The above table 4.2.9 shows the items that are associated to the colonization of hands with harmful germ. 47(94) indicated wearing jewellery, 45(90) indicated artificial fingernail, 37(74) indicated Damaged skin and 39(78) said regular use of hand cream as the factors that are associated with increased likelihood of colonization of hands with harmful germs

**Table4.2. 10: Participants ‘level of knowledge**

LEVEL	Frequency	Percent	Mean	Standard deviation
god knowledge	36	72.0	78.09%	6.9
moderate knowledge	14	28.0		
Total	50	100		

Cut off point: poor knowledge < 50 score, 50-74 Moderate,>75 Good knowledge.

The above table 4.2.10 shows that the majority 72% has good level of knowledge, and the minority 28% has moderate knowledge.

### **SECTION III.QUESTIONS ON NURSES AND MIDWIVES PRACTICE**

**Table 4.3. 11: Respondents Practice of hand washing**

ITEMS	Yes(n%)	NO(n%)
Before contact with patients	45(90)	5(10)
After contact with individual patients or their immediate environment	23(46)	27(54)
Before manipulating medical devices such as intravenous catheters	16(32)	34(68)
before handling wound dressing	25(50)	25(50)
After touching potentially contaminated objects or surfaces	25(50)	25(50)
After removing gloves	45(90)	5(10)
After using bathroom, toilet, latrine	34(68)	16(32)

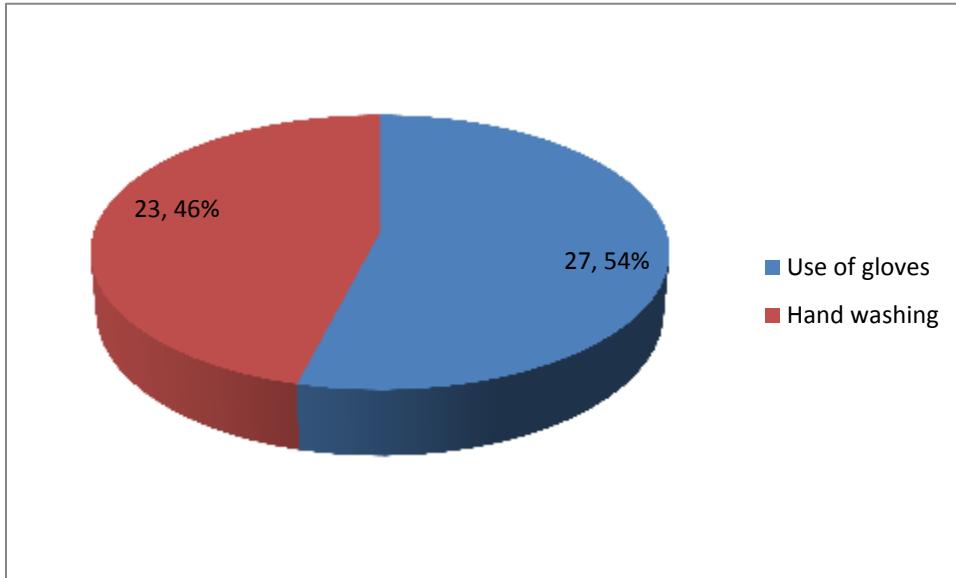
**In the above table 4.3.11** the respondents had to indicate the situation the health care personal routinely wash their hands with soap and water or a waterless, alcohol-based hand antiseptic 45(90) indicated before contact with patient,23(46) indicated after contact with individual

patients or their immediate environment, 16(32) indicated before manipulating medical devices such as intravenous, 25(50) indicated before handling wound dress, 25(50) indicated after touching potentially contaminated objects or surfaces, 45(90) indicated after removing gloves and 34( 68)said after using bathroom, toilet, and latrine

**Table 4.3. 12: Written Policies or Guide on Hand Hygiene in the Unit.**

ITEMS	Frequency (%)
Written a policy on keeping finger nails short and/ or not using artificial nails or nails extenders	32 (64)
Is there a written policy or guide on hand hygiene on this unit	48(96)
Posters oh hand hygiene in the unity	49(98)

According to **the above table 4.3.12;** The majority 48(96) indicated that there is a written policy/guide on hand hygiene and are posted on walls in clinical 49(98).The minority indicated there a policy on keeping finger nails short or not using artificial nails.



**Figure 6: 4.3. 6: The use of gloves versus hand washing practice**

**Figure6: 4.3.6** indicated that majority 27(54) showed that it is usual practice to wear gloves instead of washing hands for contact with patients or potentially contaminated environmental surfaces.

**Tabl4.3. 13: Level of practice**

	Frequency	Percent	Mean	Standard deviation
poor practice	9	18.0		
moderate practice	18	36.0	71.27%	16.64
good practice	23	46.0		
Total	50	100.0		

The above table 4.3.13 shows that the majority of respondents have good practice which were 23 (46), and 18 (36) have moderate practice the minority 9 (18) have poor practice. The mean score of practice was 71.27% and the standard deviation 16.64.

## SECTION 4: CHALLENGES

**Table 4.4.14: Distribution of respondents according to the challenges they face in the prevention of cross infections (n=50)**

VARIABLES	Yes (%)	No (%)
Often too busy/insufficient time	22(44)	28(56)
Understaffing/overcrowding	23(46)	27(54)
Wearing of gloves/beliefs that glove use obviates the need for hand hygiene	25(50)	25(50)
Lack of knowledge on guidelines/protocols	25(50)	25(50)

In the table 4.4.14 the respondents had to indicate which challenges they face in the prevention of infections. The majority 50(100%) indicated that the beliefs that glove use obviates the need for hand hygiene and the lack of knowledge on guidelines or protocols are the challenges in practice of the infection control measures. 23(46) indicated that overcrowding is a challenge while minority 22(44) indicated insufficient time or often too busy as the challenges to adhere to the practice of infection control measures

**Table 4.4 15. Associations between demographic data and level of knowledge**

Variables	Statistical test	Value	P.value
Ages	Fisher's Exact Test	1.941	.647
Sex	Pearson Chi-Square	.893	.345
Education	Fisher's Exact Test		.486
Working experience	Fisher's Exact Test	1.780	.639
Training on Infection control	Pearson Chi-Square	.019	.891
Department of work	Pearson Chi-Square	.003	.955
Marital status	Pearson Chi-Square	1.053	.305

Statistical tests in Table 4.4.15 Show that there is no significance association between Demographic data knowledge about handwashing.

**Table 4.4 .16.Associations between demographic data and level of practice**

Variables	Statistical test	Value	P.value
Ages	Fisher's Exact Test	4.949	.151
Sex	Pearson Chi-Square	.500	.480
Education	Fisher's Exact Test		.490
Working experience	Fisher's Exact Test	2.007	.561
Training on Infection control	Pearson Chi-Square	.095	.758
Department of work	Pearson Chi-Square	6.349	.012
Marital status	Pearson Chi-Square	.000	1.000

Statistical tests in Table 4.4.16 Show that among demographic data only department of work shows a significance association with practice of hand washing

#### **4.5. Summary of findings**

According to the study finding the nurses and midwives have a good level of knowledge about hand washing as one of the standard of infection prevention where 36 (72%) had good knowledge. The mean score of nurses and midwives' knowledge was 78.09% and the standard deviation was 6.9. The level of practice of nurses and midwives was 23 (46%) have good practice and 18(36) have moderate practice 9 (18) have poor practice; the mean score was 71.27% and standard deviation was 19.64 prevention. The findings of the study showed also the association between the department of work and hand washing practice P- value= 0.012 at 95% of CI and level of significance of 0.05. The study results will be discussed in deep in the chapter five.

## **CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATION**

### **5.1 Introduction**

In this chapter the study finding will be discussed according to the aim of the study and objectives. We will found out the limitation, future recommendation to the study and the conclusion to the study.

### **5.2 Discussion**

A sample of 50 nurses and midwives working in maternity and neonatology were selected to participate in the study. According to table 4.1.1, the key demographic data were age, sex, education, working experience and department of work. The most of the study participants 40 (80%) were female, the second demographic data was age, the majority 29(58%) were between 31- 40 of age. The high number 48(96%) of participant was having Nursing diploma and the majority 30(60%) was less than 5 years of experiences and high number 36(72%) were working in Maternity.

### **5.3 Nurses and midwives knowledge about hand washing**

The second part of the questionnaire was about the determination of the level of knowledge of nurses and midwives about hand washing and infection prevention. In health care setting infection prevention of HCAs is determined by knowledge and practice in association with the commitment of health care organizations to bring health care acquired infection under control (Khamis,Wambura &Verma.; 2014). Nurses and midwives knowledge is important for infection prevention. Considering the research objective related to the level of knowledge about hand washing, respondents in current study showed good knowledge, among them 27 (54%) have a good level of knowledge about hand washing, this is supported with a study on knowledge, attitude, and practice of hand hygiene among medical and nursing students at a tertiary health Care Centre in Raichur India ,only 9% of participants had good knowledge regarding hand hygiene (Nair *et al.*, 2014).Study carried out, to assess physicians knowledge about hand hygiene at king fahad hospital of university, Dammam, it was found that 15% of the physicians possessed good knowledge and 68% fair knowledge about hand hygiene (Alamer *et al.*, 2015).

In neonatology, a study on nurses` knowledge about universal precautions in neonatal intensive

care unit at pediatric teaching hospitals in Baghdad city on the principle concerning hand hygiene, 45.7% of nurses working in patient resuscitation room have good level of knowledge (Obaid, 2014, p. 6).

From the data presented in table 4.2.2 where the respondent's knowledge on the main route of cross transmission of potentially harmful germs between patients in a health-care facility 42(84%) knew that the main route of cross transmission is health care workers' hands when not clean. This is similar to findings reported in study compare the knowledge of hand hygiene among nurses in a public tertiary-care and a private corporate hospital in Amritsar, where highly significant knowledge variations was found concerning the main route of cross transmission 28% and 77% (Vardeep Singh Dhillon, 2016). A survey was conducted to assess aseptic-clinical hand hygiene knowledge amongst health care workers in a tertiary care hospital in Western India, indicate that 68.45% knew that the main route of cross-transmission of potentially harmful germs between patients in a health-care facility is HCWs hands when not clean (Vaishnav *et al.*, 2016, p. 2). Moreover, findings from a study conducted by (Res *et al.*, 2017) 68% knew that the health care workers hands when not clean is the main route of cross transmission.

Knowing that failing to wash hands is the main route of cross transmission, is a key point that require to know also the hand hygiene action that prevent transmission of germs to the patient. According to the current study, table 4.2.4. Respondent's knowledge on the hand hygiene actions that prevent transmission of germs to the patient, the items representing the action, before touching a patient and immediately, before a clean / aseptic procedure, indicated a good level of knowledge with a percentage of 48 (96%) and 44 (88%), compare to the study done by (Res *et al.*, 2017) their results shows a high level on knowledge to items before touching the patient, before a clean/aseptic procedure of 96% and 90%, respectively. In hand hygiene method, handrubbing can be used because is more rapid for hand cleansing than hand washing, findings in the current study, the item knowledge of on the minimal time needed for alcohol-based handrub to kill most germs on the hands table 4.2.7, the majority 28(56%) have good knowledge on the minimal time needed to germs. A study done by (Alamer *et al.*, 2015), they founded defect in their knowledge was about the minimal time needed for alcohol-based hand rubbing to kill most of the hand germs. Another study on Knowledge, Attitude and Practice of nursing

students regarding hand hygiene in Western region of Nepal Knowledge regarding the minimum time needed for alcohol based hand rub 20 sec, was known correctly by only 24 % of the participants (Paudel, Ghosh and Adhikari, 2016).In hand hygiene technique there some elements that are items that are associated with increased likelihood of colonisation of hands with harmful germs according to the current study, Table 4.2.9 the first statement, wearing jewellery nurses and midwives have a good knowledge of 46(92) that it associated with increased likelihood of colonisation of the hands with harmful germs, for artificial fingernails 45(90) of the correct answers .To support that , a study done by (Maheshwari and Ramnani, 2014), significant difference of knowledge was observed regarding use of jewellery 62(77.5%) against 77(96.3%) and artificial nails 64(80%) against 72(90%) amongst residents and nurses respectively.

A another study shows that Wearing jewellery, damaged skins, and artificial fingernails, were detected to be the highest associated factors in germs colonization on hands with a percentage of 98%, 96%, and 93%, respectively (Res *et al.*, 2017).However, even though 27 54% of nurses in the current study have good knowledge ,in figure 4.2.4 indicated that they do not attend in service training regarding infection prevention.

#### **5.4 Nurses and midwives hand hygiene practices**

According to the current study nurses and midwives responses to the practice questions for the question asking where to wash hand in practice table 4.3.12 the majority wash their hand, before contact with patients 45(90%), After removing gloves 45(90%) and After using bathroom, toilet, latrine 34(68), before handling wound dressing and after touching potentially contaminated objects or surfaces 25(50%). After contact with individual patient or their immediate environment 23(46).Before manipulating medical devices such as intravenous catheters 19(38).

To support that, a cross sectional study was done to assess the knowledge, the attitude and practice on hand hygiene among health science students in Aden University In hand hygiene practice, 95% of participants wash their hands before and after food intake, 85% of participants use soap and water, but 8% of participants use only water and very few use alcohol base cleansing agent. 84% of participants wash their hands after handling patient. There was no significant difference between males and females in hand hygiene practice.(Sallami, 2016, p. 1)

### **5.5 Distribution of respondents according to the challenges**

Hand washing may not be performed due to some barriers, according to the current study table 4.4.14 the two barriers were reported, wearing of gloves, beliefs that glove use obviates the need for hand hygiene, lack of knowledge on guidelines protocols, contrary to a survey of US and Canadian health care workers' knowledge, attitudes, and practice where, the most frequent barriers were dispenser locations(41%) which were not in convenient location, being busy was another barrier 36%, empty product dispensers 33%,and the last was that product drying out hands (32%) (Kirk *et al.*, 2016, p. 2).

### **5.6 Conclusion**

The aim of this study was to determine knowledge and practice of hand-washing among nurses and midwives working in maternity and neonatology services in Ruhengeri District Hospital.

HW is considered to be an important measure to prevent the spread of HCAIs among neonates

The current study is therefore a significant contribution to assessing HW compliance rates and its predictors among nurse and midwives in Ruhengeri District hospital. The study used a descriptive quantitative design with fifty (50) participants composed of 80% of female and 20% of male.

In this study the health belief model was helpful because it explain how perceived susceptibility and perceived threat will help nurses to adhere to hand washing as a measure to prevent infection.

The results of this study indicated that the mean of knowledge was 78.09%, and the mean of practice was 71.27% and there no influence between knowledge and practice of hand washing. Therefore, improvement in training may increase nurses and midwives knowledge and practice.

### **5.7 Recommendations**

#### **For the hospital**

- Regular monitoring and evaluation of hand washing practice among HCWs especially in neonatology and maternity for neonatal infection prevention
- In service training on hand washing guidelines and its crucial rational in patient care.

#### **For the education**

- Emphasize on hand washing in the curriculum especially during clinical practice

#### **For further research**

- Similar study to be conducted for other services of the hospital
- Comparative and cohort study on the adherence for hand washing to be done in all services
- Assessment of knowledge of protocol and guidelines
- Study on the type of health care associated infection more frequent in the NCUs in different hospital.

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**APPENDIX I****COLLEGE OF MEDICINE AND HEALTH SCIENCES**

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 16/01/2017

Ref: CMHS/IRB/058/2017

**MUKASINE Anne Marie**  
**School of Nursing and Midwifery, CMHS, UR**

Dear MUKASINE Anne Marie

**RE: ETHICAL CLEARANCE**

Reference is made to your application for ethical clearance for the study entitled "*Knowledge And Practices Of Nurses And Midwives On Infection Prevention In Neonatology At A Selected District Hospital*".

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

We wish you success in this important study.

R. ANO



*For* Professor Kato J. NJUNWA  
**Chairperson Institutional Review**  
**College of Medicine and Health**

**Board,  
 Sciences, UR**

Cc:

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

**APPANDEX II****COLLEGE OF MEDICINE AND HEALTH SCIENCES****SCHOOL OF NURSING AND MIDWIFERY***Kigali, on 30 / 01 /2017*Ref. No: *47*/UR-CMHS/SoNM/17**TO WHOM IT MAY CONCERN**

Dear Sir/Madam,

**Re: Request to collect data**

Referring to the above subject, I am requesting for permission for **MUKASINE ANNE MARIE**, a final year student in the Masters of Science in Nursing at the University of Rwanda/College of Medicine and Health Science to collect data for her research dissertation entitled **Knowledge and practices of nurses on infection prevention in neonatology at a selected district hospital.**

This exercise that is going to take a period of 2 months starting from 13<sup>th</sup> February 2017 to 12<sup>th</sup> April 2017 will be done at RUHENERI DISTRICT HOSPITAL.

We are looking forward for your usual cooperation.

Sincerely,

  
Dr. Donatilla MUKAMANA, RN, PhD

Dean, School of Nursing and Midwifery

College of Medicine and Health Sciences

**Anne Marie MUKASINE**

**Musanze-Muhiza**

**E-mail:mukasineannmarie@yahoo.fr**

**Phone: 250 788 21 23 05**

**Date: December 21, 2016**

To: The IRB Chairperson/CMHS/UR

Through Dissertation Supervisor: Olive BAZIRETE, MScN

Re: Application for protocol review fee waiver

I humbly request for fee waiver of protocol review in UR/CMHS Institutional Review Board (IRB). I am a student in the MScN program in the Neonatal Track at UR/CMHS/ SNM/ Nyarugenge Campus.I would like to conduct research in Ruhengeri district hospital in Rwanda, on Knowledge and practices of nurses and midwives on infection prevention in neonatology.I really need the fee waiver for protocol review as my research is not granted and is hard for me as student to pay the fee. I am unable to provide the submission fee due to my limited financial status. Completing my dissertation is a requirement for completion of the program.I believe this research will be add to the existing literature and will be significant to promote best practices in nursing care for preterm and high-risk newborns in our country.

Thank you for considering this fee waiver request.

Respectfully submitted,

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Anne Marie MUKASINE

Signature

---

Supervisor Olive BAZIRETE

Signature



**APPENDIX:III**

REPUBLIC OF RWANDA



NORTHERN PROVINCE  
MUSANZE DISTRICT  
RUHENERI HOSPITAL  
P.O BOX 57 MUSANZE  
[ruhengerihospital@gmail.com](mailto:ruhengerihospital@gmail.com)

Musanze, February 9<sup>th</sup>, 2017

Ref 0129 /HDR/HR/2017

Mrs. Mukasine Anne Marie  
University of Rwanda/CMHS

RE: Authorization to conduct a study

Mrs.,

We acknowledge receipt of your letter requesting for conducting a study entitled "knowledge and practices of nurses and midwives on infection prevention in neonatology at a selected district hospital."(case of Ruhengeri hospital)

We have the pleasure to inform you that you are allowed to conduct the above mentioned study. However you are requested the guaranty of confidentiality of medical data.

Best regards,

Dr AYINGENEYE Violette

The Director of Ruhengeri Hospital

P. O Dr Leo Niyonziva

**APPENDIX:IV****Information sheet**

I am **Anne Marie MUKASINE**, student in University of Rwanda / College of Medicine and Health Sciences. I am doing research on knowledge and practice of nurses and midwives on infection prevention in neonatology at a selected district hospital. This information sheet and consent form is prepared to explain the study you are being asked to join. You may ask any questions about the study before you agree to join, and at any time after joining the study.

**The purpose**

The purpose of this research is to evaluate the level on knowledge and practice on infection prevention in neonatology. This is not to criticize you; the results of the study will be very helpful in improvement on infection control in neonatology at selected district hospital also for the country.

**Procedure**

I invite you to take part in this study. If you are willing to participate in this study, you need to understand and give us your written consent. Then after, you will be given the questionnaire by the data collector to fill your response. You do not need to write your name to the questionnaire and all your response and the results obtained will be kept confidential by using coding system where no one will have access to your response.

**Risk/ discomfort**

By participating in this research, you may feel that it has some discomfort especially on wasting time about 20min to one hour. We hope you will participate in this study for the sake of the benefit. There is no risk in participating in this project.

**Benefits**

Participants in this study will receive no direct benefit from the study and they are voluntarily participating; there will be no inducement. However, the outcomes of the study will be indirectly beneficial in improving the knowledge and practice on infection prevention in neonatology.

**Incentives**

You will not be provided any incentive or payment to take part in this project.

**Confidentiality**

The information collected from this research study will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it, and it will not be revealed to anyone except the investigators and will be kept locked with a key.

**Right to refuse or withdrawal**

You have full right from participating in this research. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

**Person to contact**

At any time you have concerns you may contact the address:

1. Researcher Anne Marie MUKASINE, Tel:0788212305,
2. Email: mukasineannemarie@yahoo.fr

This proposal has been reviewed and approved by UR/CMHS/IRB, which is a committee whose task it is to make sure that research participants are protected from harm.

**APPENDIX: V****Consent form**

I have been invited to participate in research on knowledge and practice of nurses and midwives on infection prevention in neonatology at a selected district hospital. I understand the purpose of the study and I have been informed that there is no risk to participate in the study. I am aware that there may be no benefit to me personally, and that I will not receive any incentive to participate in the study. I have been provided with the name of a researcher who can be easily contacted using the number and address I was given for that person. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research and understand that I have the right to withdraw from the research at any time.

Name of Participant.....

Signature of Participant .....

Date.....

**1. QUESTIONNAIRE****UNIVERSITY OF RWANDA****DATE:****COLLEGE OF MEDICINE AND HEALTH SCIENCES****MASTER'S PROGRAM****QUESTIONNAIRE FOR DATA CORRECTION****CODE** 

This questionnaire is prepared to assess the knowledge, and practice of nurses and midwives on infection prevention in neonatology at selected district hospital. The assessment is made for the partial fulfillment of Master's Degree in Neonatology. The questionnaire contains closed ended questions and will be provided in self-administered form. You are therefore kindly requested to provide genuine answers to the questions. The information you provide is confidential and is used only for the purpose of this study. Your cooperation and participation until the completion of the questionnaire is very necessary for the successful completion of the assessment.

**INSTRUCTION**

The instructions for participating are the following:

- Do not put your name on the questionnaire (Anonymity)
- Answer all questions
- Questions are in form of multiple choices (YES or NO) and for some question you will have choose the correct answers.
- Provide the answer where indicated (tick in the box)
- Only nurses and midwives working in Maternity and Neonatology are allowed to complete the questionnaire.

-After the completion of the questionnaire you are humbly requested to return back the questionnaire.

### **Section I: Demographical characteristics**

#### **Age**

- 20-30
- 31-40
- 41-50
- >50

#### **Sex:**

- Female
- Male

#### **Education**

- Nursing Diploma
- Bachelor
- Master

#### **Working experience**

- Less than 5 years
- 5-10 years
- 11-15 years
- Above 15 years

**Department of work**

- Neonatology ward
- Maternity ward

**Marital status**

- Single
- Married
- Divorced

**SECTION II. QUESTIONS ON NURSES AND MIDWIVES KNOWLEDGE**

**1. Did you receive formal training in hand hygiene in the last three years?**

YES  NO

**2. Do you routinely use an alcohol-based hand rub for hand hygiene?**

YES  NO

**3. Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility? (Tick one answer only)**

- a. Health-care workers' hands when not clean
- b. Air circulating in the hospital
- c. Patients' exposure to colonized surfaces (i.e., beds, chairs, tables, floors)
- d. Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients

**4. What is the most frequent source of germs responsible for health care-associated infections? (tick one answer only)**

- a. The hospital's water system
- b. The hospital air
- c. Germs already present on or within the patient
- d. The hospital environment (surfaces)

**5. Which of the following hand hygiene actions prevents transmission of germs to the patient?**

- a. Before touching a patient YES  NO
- b. Immediately after a risk of body fluid exposure YES  NO
- c. After exposure to the immediate surroundings of a patient YES  NO
- d. Immediately before a clean/aseptic procedure YES  NO

**6. Which of the following hand hygiene actions prevents transmission of germs to the health-care worker?**

- a. After touching a patient YES  NO
- b. Immediately after a risk of body fluid exposure YES  NO
- c. Immediately before a clean/aseptic procedure YES  NO
- d. After exposure to the immediate surroundings of a patient YES  NO

**7. Which of the following statements on alcohol-based hand rub and hand washing with soap and water are true?**

- a. Handrubbing is more rapid for hand cleansing than hand washing  
YES  NO
- b. Handrubbing causes skin dryness more than hand washing  
YES  NO
- c. Handrubbing is more effective against germs than hand washing  
YES  NO
- d. Hand washing and handrubbing are recommended to be performed in sequence  
YES  NO

**8. What is the minimal time needed for alcohol-based handrub to kill most germs on your hands? (tick one answer only)**

- a. 20 seconds
- b. 3 seconds
- c. 1 minute
- d. 10 seconds

**9. Which type of hand hygiene method is required in the following situations?**

- a. Before palpation of the abdomen Rubbing  Washing  None
- b. Before giving an injection Rubbing  Washing  None
- c. After emptying a bedpan Rubbing  Washing  None
- d. After removing examination gloves Rubbing  Washing  None
- e. After making a patient's bed Rubbing  Washing  None
- f. After visible exposure to blood Rubbing  Washing  None

**10. Which of the following should be avoided, as associated with increased likelihood of colonisation of hands with harmful germs?**

- a. Wearing jewellery YES  NO
- b. Damaged skin YES  NO
- c. Artificial fingernails YES  NO
- d. Regular use of a hand cream YES  NO

**SECTION III. QUESTIONS ON PRACTICES OF NURSES AND MIDWIVES****1. In which of the following situations do health care personnel routinely wash their hands with soap and water or a waterless, alcohol-based hand antiseptic? (Read the situations and mark all answers that apply)**

- a. Before contact with patients
- b. After contact with individual patients or their immediate environment
- c. Before manipulating medical devices such as intravenous catheters
- d. before handling wound dressing
- e. After touching potentially contaminated objects or surfaces
- f. After removing gloves
- g. After using bathroom, toilet, latrine

**2. Is there a policy on keeping finger nails short and/or not using artificial nails?**YES NO **3. Is it usual practice to wear gloves instead of washing hands for contact with patients or potentially contaminated environmental surfaces?**YES NO **4. Is there a written policy or guide on hand hygiene on this unit?**YES NO **5. Does the health facility have at least one poster on hand washing?**YES NO **SECTION IV.FACTORS INFLUENCING ADHERENCE TO INFECTION CONTROL**Often too busy/insufficient time YES  NO Understaffing/overcrowding YES  NO 

Wearing of gloves/beliefs that glove use obviates the need for hand hygiene

YES NO Lack of knowledge of guidelines/protocols YES  NO **THANK YOU**