FACTORS INFLUENCING ADHERENCE TO INFECTION CONTROL MEASURES

AMONG HEALTHCARE WORKERS AT HEALTH

CENTRES IN KOBOKO DISTRICT

BY:

LEMI ROBERT ALBERT

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DECEMBER 2014

DECLARATION

I LEMI Robert Albert reaffirm that the research Report is entirely my sole work; it has never been handed to any university and or college for any academic award. References used in this research Report are complete and acknowledged.

Researcher's name……………………………………………………………………………

Signature…………………………………………………

Date……………………………………………..

APPROVAL

The research topic on "Factors influencing adherence to infection control measures among healthcare workers in Koboko district" was conducted by LEMI Robert Albert under the close supervision of Mr. ALEGE John Bosco in accordance with the guidelines of International Health Sciences University.

Supervisor's name……………………………………………………………………

Signature………………………………………………………….

Date……………………………………………………………

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AHSPR	Annual Health Sector Performance Report
AIDS	Acquired Immuno Deficiency Syndrome
APIC	Association for Professionals in Infection Control and Epidemiology
CDC	Centres for Disease Prevention and Control
DRC	Democratic Republic of Congo
EPTRI	Environmental Protection and Training Research Institute
HAI	Healthcare Acquired Infections
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HCWs	Healthcare workers
HIV	Human Immunodeficiency Virus
IC	Infection Control
IHSU	International Health Sciences University
IV	Intravenous
KAP	Knowledge Attitude and Practice
MoH	Ministry of Health
MRSA	Methicillin Resistant Staphylococcus Aureus
NIOSH	National Institute for Occupational Safety and Health
OHSA	Occupational Health and Safety Act
PEP	Post Exposure Prophylaxis
PPE	Personal Protective Equipment
SSI	Surgical Site Infections
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Adherence

This refers to observance of recommended infection control measures in the process of providing healthcare services in health setting.

Healthcare Workers

These are accredited health professionals which include doctors, clinical officers, nurses, midwives, laboratory technologists among others.

Healthcare Acquired Infections

Infections transmitted to healthcare workers and patients as a result of healthcare delivery in hospitals and other healthcare settings.

Infection Control

Policies and procedures aimed at reducing the transmission of infections in healthcare settings, (Jarvis, 2003).

Personal Protective Equipment

Equipment or clothing used by healthcare workers to prevent and protect them from hazards such as blood, other fluids and formites.

Standard Precautions

These are documented infection control practices applied by healthcare workers when delivering care to patients in healthcare setting

ABSTRACT

According to Jarvis (2003), Infection control refers to the policies and procedures aimed at reducing the transmission of infectious diseases in a healthcare setting.

The study was conducted on factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district.

General objective: The study was to assess factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district

Method: Descriptive cross-sectional study was used to establish the individual, availability of supplies and health system factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district. In this study 114 respondents were interviewed which included different cadres of healthcare workers. 13 health centres were used as the unit of analysis. Both quantitative and qualitative techniques were used. Structured self administered questionnaires were used to obtain quantitative data which was analyzed using SPSS soft ware Version 16.0 at descriptive levels; key informant interviews and observation checklists were administered to obtain qualitative data.

Results

Non adherence to infection control measures stood at 47.5%. Hand washing was found to be the outstanding IC measure known to the respondents. However, lack of water facilities, PPE, medical supplies and other consumables required in the implementation of infection control measures were found to be major hindrances to infection control measures.

Recommendation

There should be a regular supply of materials such as PPE so as to increase adherence to infection control measures, supervision on infection control practices among healthcare workers and recruitment of more human resource for health in accordance with the number of people served.

CHAPTER ONE: INTRODUCTION

This chapter includes; Background to the Study, Statement of the Problem, Research Objectives, Research Questions, Significance of the Study and the Conceptual Framework.

1.1 Background to the Study

Health Care Infections globally affect both developed and poor resourced countries. An anticipated 1.4 million people suffer from HAIs at one point in time. The magnitude of these infections is over 20 times in developing countries than in the western world; indicating that one in ten patients admitted in health facilities is infected; nosocomial infections pose a significant cause of morbidity and mortality in any healthcare system especially in the developing countries. The commonest nosocomial infections include surgical site infections, bloodstream infections, Pneumonia and Tuberculosis among others, (WHO, 2005)

The healthcare acquired infections follow basic epidemiologic patterns that can help direct prevention and control measures. The pathogens that cause HAIs have reservoirs, transmitted by predictable routes and require a susceptible host Weinstein, (2005).

In Australia, a study was conducted on infection control measures and it was found that; 38% of nurses used gloves when handling blood.40% of healthcare workers in India recapped at least some times and only 32% used eye protection gadgets, (The Australian Council on Healthcare Standards, 2006)

In a report published by (WHO,2002); it was approximated that 3 million healthcare workers faced exposure to blood borne viruses annually; 2 million, 900,000 and 300,000 healthcare workers were exposed to HBV, HCV and HIV respectively.90% of the infections results were in sub-Saharan Africa.

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Over half of healthcare workers from Southern Ethiopia recapped needles, one-third of healthcare workers in Nigeria said they seldom recap,(WHO, 2003).

Ducel *et al.*, (2002) asserted that HAIs are those infections admitted patients get while in health facilities. In a related study by Denis W Spelman, (2002) found out that the consequences of healthcare acquired infections were; long duration of hospital stay, increased use of health facilities and community resources, disability or death.

The most cost effective measures to prevent HAI were good hand washing and gloves usage: Ducel G *et al*, (2002). According to Denis W, (2002); limiting patient stay in healthcare facilities, aseptic techniques, adequate staffing and the establishment of an effective infection control programme help reduce HAIs.

(MoH,2005) identified five key standard precautions that enhance infection control in health facilities; hand washing, adequate protective wear, proper sterilization, appropriate sharp disposal and safe waste management;69% of the health facilities had adequate final disposal system for infectious waste. Government facilities were less likely to have adequate waste disposal systems for hazardous waste.

Blood and other body fluids from clients and patients pose a serious risk to healthcare providers. Compliance with standard precautions may help reduce the risk of infection among HCWs Bamigboye *et al*., (2006).

1.2 Statement of the Problem

Seni J *et al.*, (2013) conducted a cross-sectional study in Mulago National Hospital among 314 patients with Surgical Site Infection; staphylococcus aureus accounted for 20.4% whereas MRSA accounted for 37.5% of HAIs. According to Sagoe *et al.*, (2001), infection control measures among healthcare workers are neglected,. According to Greco *et al.*, (2011), the prevalence of hospital acquired infections stood at 28% in Lacor hospital.

(MoH,2005) identified five key standard precautions that enhance infection control in health facilities; hand washing, adequate protective wear, proper sterilization, appropriate sharp disposal and safe waste management but only 69% of the health facilities had adequate final disposal system for infectious waste.

Non adherence to infection control measures among healthcare workers may lead to; HBV, HCV and HIV, Tuberculosis; others being increased disability, increased mortality and increased expenditure on treatment.

It is therefore against this background that the research seeks to assess factors influencing adherence to infection control measures among healthcare workers in Koboko district.

1.3 Research Objectives

1.3.1 General Objectives

To assess factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district.

1.3.2 Specific Objectives

i. To determine the individual factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district.

ii. To establish the availability of supplies required in the implementation of infection control measures by healthcare workers at health centres in Koboko district.

iii. To establish the health system factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district.

1.4 Research Questions

i. What are the individual factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district?

ii. What medical supplies and consumables are used in the implementation of infection control measures by healthcare workers at health centres in Koboko district?

iii. What are the health system factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district?

1.5 Significance of the Study

Findings from this research may help healthcare workers to improve on infection control measures so as to reduce infections from blood and other body fluids.

The district health office and Health-in charges may use findings from this study to develop strategies to strengthen infection control measures among healthcare workers in health centres in Koboko district and Uganda as a whole.

This study provided baseline data for future researches in a similar area.

1.6 Conceptual Framework

Independent variables

Individual factors**;**

- Knowledge on infection control
- Attitude toward infection control
- Work experience
- Professional qualification

Availability of supplies used for IC;

- Waste disposal materials
- PPE (Gloves, Gumboots, masks)
- Water facilities
- Hand washing facilities

Health system factors

- Supervision
- Training on infection control
- Incident and Error reporting
- Motivation

Dependent Variable

Infection control measures

Study Outcome

- Infections
- Morbidity
- Mortality

This conceptual framework shows the relationship between the dependent variable and the independent variables;

The dependent variable was Adherence to Infection Control measures.

The independent variables included: Individual factors such as Knowledge on infection control, attitude toward infection control, experience, qualification and Infection control practices; availability of supplies used for IC such as waste disposal materials, PPE, water facilities and hand washing facilities and Health system factors such as supervision, training on infection control and review of records.

The study outcomes are infections, morbidity and mortality among healthcare workers arising from HAI.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

In this chapter, related literatures were reviewed to identify gaps and lessons learnt from those studies in order to establish the need for the study. It was arranged logically following the objectives of the study: Individual factors, availability of supplies, health system factors and adherence to infection control measures.

2.1: Individual factors

Knowledge on hand washing

Khaled *et al*., (2008) conducted a study in Cairo and found out that in spite of 92% of healthcare workers believed that hand washing lowered the chances of healthcare acquired infections and only 34% of the healthcare workers washed their hands before and after handling patients.

Healthcare knowledge on infection control measures: Infection control measures are a set of guidelines aimed at providing protection for healthcare workers, patients and attendants from contracting infections.

About 10% of admitted patients or more than 2 million patients in the US suffer from HAI annually signifying a death rate of 88,000 per year.

Comprehension of infection control measures has no linkage with adherence. In Thailand, a study was conducted among students by Earl CE, (2010) which found out that: students had substantial knowledge on infection control but lacked confidence in using measures to avert transmissions.

Similarly, Jason B and Terry H, (2004) conducted a study in England and found out that; poor knowledge of guidelines, inaccessibility to hand hygiene facilities and lack of education on infection control were major hindrance to adherence to infection control measures.

Findings from a study conducted by Paudyal P *et al.*, (2008) in Nepal were that HCWs had excellent understanding and affirmative approach towards the majority aspects of IC measures.

Ejilemele AA, (2005) conducted a study in Nigeria on laboratory safety and found a gross deficit in knowledge, attitudes and practice of IC amongst laboratory staff as far as the use of personal protective equipment was concerned.

According to Katowa *et al*., (2007) in their study on adherence to infection prevention guidelines at Ronald General Hospital in Zambia, they found out the following statistics: 11.7% of the participants mentioned infection control measures were available, 47% stated inaccessibility to materials from stores; 45.5% of the participants reported inaccessibility to the materials at departmental level.

Of the 80% of the wards in Cairo with sinks, not any one had sanitary linens. This was a finding from a knowledge, attitude and practice study conducted on hand washing practices in a healthcare setting, Abd Elaiziz *et al*., (2009).

The reservoir and sources of infection could be the inanimate environment such as surgical instrument and the operative theatre; animate environment include infected or colonized healthcare workers, patients and health facility visitors, Rahman *et al*., (2004).

In a knowledge, attitude and practice study on IC principles in Mulago National Referral Hospital, it was found out that 99% of healthcare workers knew hand washing when dealing with patients; 98% reported that hand washing offer protections from infections and 81% did wash their hands so as to protect their patients from infections, Charles W *et al.*, (2010). This therefore, means that for infection control measures to be adhered to, healthcare workers should have adequate knowledge and that the necessary equipment used for infection control implementation be present.

Attitude of healthcare workers towards infection control measures

In a study conducted in Botswana among nurses working in emergency units in reference to infection, majority of healthcare workers reported adherence to infection control measures, Chelenyane *et al.*, (2006).

Experience of healthcare workers

In contrast Vij and Gupta, (2001-07) in his study in Nepal found out that nursing staff who had worked for more than 10 years had a decline in the level of knowledge and practice on prevention of HAIs than those who were recently recruited.

According to Yassi *et al.*, (2004); healthcare workers with more experience adhered easily to infection control practices than their counterparts with less experience. The study further asserted that experience of a healthcare worker played an overarching part in adherence to infection control measures.

Professional qualification

Professional qualification is one of the significant factors influencing adherence to infection control measures. According to Engender Health, (2001); the greatest cause of health worker and patient exposure to blood-borne infections in health facility setting were needle-stick injuries. An estimated 800 healthcare workers had acquired hepatitis and between 1985 and 1999, 55 cases were documented and 136 possible causes of health worker acquiring HIV and AIDS at work place, NIOSH,(1999). According to a study conducted in the United States by Henry and Campbell, (1995): 600,000-800,000 needle-stick injuries happened yearly. Items associated with needle-stick injuries include sharp devices used in the provision of healthcare services such as scalpel blades, razor blades, suture needles, hypodermic needles and IV catheters.

 In a study on knowledge, attitude and practices among healthcare workers (nurses and paramedical staff) in Sharourah, Kindgom of Saudia Arabia, 21% of nurses and 305 of paramedics were unaware that HBV and HIV can be transmitted through needle-stick injury.

According to Chelenyane *et al.*, (2006) in Botswana: nurses practices and perception in regards to infection control was hampered by inadequacy in equipment and other medical supplies, inadequate staffing level and lack of training.

 A similar study conducted in Botswana found out that the majority (74%) of the respondents had a history of needle-stick injury of which only 7% reported the injuries to a doctor for post-exposure prophylaxis. Laboratory personnel were at greater risk for contact and surgeons. Needle pricks occurred in 59.8% of cases while medication vials were responsible for 22.2%. Sharp injuries were commonest among surgeons.

Up to 90.8% of the HCWs had ever heard of IC measures but inadequate fund and equipment hindered them from practicing it; Springer *et al.,*(2005).

2.2: Availability of supplies required in implementation of infection control measures

Medical waste management

Biological waste refers to the undesired substances that are produced in the process of diagnosing, treating, immunization of patients and research activities; Biomedical Waste Management and Handling Rules, (1998). Health facility waste harbour disease-causing pathogens. Therefore, the need for safe handling cannot be underestimated. Sharps contaminated with blood carry the highest risk in the transmission of infections. There should be persons responsible for the management of waste ranging from collection to disposal.

For medical waste to be properly managed, the following should be considered; the generation, identification and segregation. Needles and syringes are burnt at the point of generation. The wastes are put in color-coded bins based on how hazardous they are, (WHO, EPTRI, 2011).

A study conducted in Brazil with the purpose of improving infection control and practice among dentist showed a significant association between availability of medical supplies and consumables in healthcare centres and adherence to infection control, Duffy RE *et al.*,(2004).

In Zambia, Mukwato *et al*, (2009) conducted a study and found out a 100% rate of adherence to infection control practices among healthcare workers where resources are available. He further stated; unavailability and inaccessibility of materials in wards hamper the adherence to infection control practices. Siziya S *et al*., (2002) conducted a study in Zambia and found out a relationship between supply and risk HIV infection.

It is generally believed that general hygienic measures in health facilities help reduce HAIs but the greatest hindrance is lack of Infection Control supplies.

In Morocco, a cross-sectional study among 266 HCWs was conducted on occupational exposure to HIV and AIDS; it was found out that infection control and preventive measures were not in place and over half of the cases had inadequate information, Hosni CH, (2000).

Containers made of metals or plastic with secured lids are best for the storage of sharps and should be kept closed. For clinical waste, it is important that appropriate labels are used.

Hand washing facilities

Although proper hand washing is cost-effective in the prevention of the spread of infections in all settings including hospitals and other health facilities, numerous diseases are spread due to improper hand washing as a result of lack of hand washing facilities such as soap, alcohol-based solutions and absence of water,(CDC, 2012). According to (CDC, 2012); the use of alcohol-based hand sanitizer containing 60% of alcohol is recommended for use in the absence of water and soap.

According to Larson *et al.*,(2011) in Columbia, strict enforcement of sanitary protocols such as hand washing and regular hand washing with hand sanitizers can enormously reduce the number of incidents of healthcare acquired infections.

Much as all healthcare workers are to sluice their hands prior and later when handling a patient, only 30% of them do so which is below the recommendation. According to McKane *et al.*, (1996) in England the greatest contributor to the spread of infections is failure to wash hands

prior to and post- handling a patient. Healthcare acquired infections would be reduced by 25% when hands are washed with soap and antiseptic as opposed to those who wash with soap alone.

According to Zaramba, (2008), only 31% of the health centres and 64% of hospitals in Uganda had constant water supply. The study further asserted that over half of the health facilities lacked soap or disinfectants which put the service providers and clients to a high risk of HAIs.

53% of healthcare workers practiced hand washing, 45% of healthcare workers properly disposed off sharps and needles; 56% carried disinfection and 44% properly disposed waste, in Kayunga District, (2010).

The availability of resources that facilitate the adherence to infection control measures in health facilities is paramount in ensuring compliance. According to WHO,(2002); the available resources should be capable of addressing the local needs like a large and locally made soap to facilitate hand washing in the case of limited resources.

Constant water supply preferably from a tap eases hand washing; where tap water is unavailable, a provision should be made to containers for a tap by the side of pre-filled water container.

Personal protective equipment

Healthcare workers can be protected from contamination with pathogens through the utilization of PPE such as goggles, gowns, gloves, masks, boots and apron.

In instances where there is a possibility of coming into contact with a patient's blood, body fluids or contaminated skin, gloves provide a protective purpose especially in invasive medical processes.

Availability of infection control equipment was found to be an important determinant of adherence to infection control measures, Russels *et al*., (2009). Facial masks are worn when managing patients especially when a healthcare worker sneezes, coughs or speaks. They also protect the healthcare workers from being infected by patients through contaminated blood.

Despite that PPE provide maximum protection against exposure to hazards, they are either not used or used by healthcare workers inappropriately and not in the right time hence offering no protection. According to the National Academics (2008), 89% of safety professionals said they had observed workers not wearing safety equipment when they should have and 29% said this had happened on numerous occasions.

Maimolwa *et al.*, (2004) conducted a study in Nigeria and found out that there was 3.5 times accuracy in vaginal examination findings in health facilities where gloves were adequate compared to those with inadequate supply of gloves.

The reasons cited for non adherence to PPE were; healthcare workers thought that they were not needed, uncomfortable, too hot, ill fitting, unavailability and inaccessibility at work task and unattractive looking. In a study conducted by Zaramba in 2008 in Uganda found out that 42% of the health facilities lacked gloves. They cited inadequate supply of gloves as critical especially in vaginal examination.

CDC,2003); prescribed when conducting invasive medical procedures and the likelihood of coming into contact with patients' body fluids or contaminated skin is high.

Gowns offer a protective shield to healthcare workers especially splash of blood, amniotic fluids especially in the maternity ward and the operating theatre; CDC,(2003).

2.3: Health system factor influencing adherence to infection control measures

Supervision

For patients' safety and infection prevention, it is important that HCWs' adherence to IC system is instituted. This is of importance in that barriers to non compliance are identified, (Patient Safety Tool: Guide to Preventing C. Diff infections from APIC).

Regular feedback of results from supervisions to clinical staff has proven to contribute to reductions in the incidence of HAIs, Haley *et al*., (2000).

Training of healthcare workers on infection control

Training on infection control is a central issue in increasing adherence among healthcare workers. Kretzer *et al*, (1998) found out that training HCWs on infection control is beneficial in the reduction of the prevalence of HAIs. The trainings should aim at ensuring adherence to infection control policies and measures in the healthcare setting. Continuous medical education and refresher trainings help increase adherence to infection control measures.

Motivation

Healthcare workers adhere to infection control measures when there is a support from the administration. Where infection control guidelines are displayed, the level of knowledge of infection control by healthcare workers is increased as they act as reminder.

According to National Academies, (2008), organizations with a functional and healthy safety culture maintain or update safety standards. This is because all the employees exhibit safety concerns within the infrastructure. The study further asserted that a strong culture of safety in the healthcare setting help reduce the incidence of exposure to HAIs as a result of a higher adherence to infection control measures among healthcare workers.

According to National Academies (2008), participation in the decision-making process increases the likelihood of acceptance and utilization of PPE.

According to Charney *et al*., (2005); adherence to infection control measures are strongly associated with a healthier organizational culture that promotes safety. Yassi *et al*.,(2005) found corresponding results in their study on the impact of organizational culture on musculoskeletal injuries.

Gershon (2000) reported that workers who perceive a strong organization-wide commitment to safety have been found to be significantly more likely to have experienced an occupational exposure incident. The researcher further found out senior management support, absence of workplace barriers and orderliness as critical determinants of adherence to infection control measures among healthcare workers. Close collaboration between staff in occupational health and infection control in workers safety issues will be important.

Incident and error reporting

On job training and close supervision by an Infection Control Practitioner increase adherence to compliance with effective surveillance.

There is need to document any incident where occupational exposure has occurred and should be dealt with in accordance with the local policy in line with the incident reporting procedure. It is essential that actions are taken in a timely manner when dealing with these incidents. In cases where PEP or other treatments are to be administered, urgency in reporting is invaluable. The reporting should be effected within an hour or 72 hours following the occurrence of the particular incident.

Standard Infection Control Precautions Clinical Governance, (2010) prescribed that the item that caused the incident be appropriately disposed off to prevent further incidents.

However, many record assistants lack the necessary training pointing to the huge gap in the collection. Limited filing space for the bulky paper based medical records, lack of office supplies and retrieval and analysis of data. Proper record keeping with regards to immunization, exposure status, PEP help in monitoring the state of health of the care providers. The kept records help in the provision of regular and appropriate services to the healthcare workers. Confidentiality should be highly observed when keeping medical records for healthcare professionals and should be kept as prescribed by OSHA, (ISO, 2001).

Work load

Health facilities with more staffing and more intense infection control processes had lower rates of health-care acquired infections, (CDC, 2012).

Griffiths (2008) noted that nurse relation, staffing and workload are essential to both patient rates and clinical outcomes in healthcare setting. Work load is the result of under-staffing and multitasking. According to Yassi *et al*, (2004); the level of health care staffing should match with the number of clients and or patients served. Several studies on the effect of workload indicate that it affects the adherence to infection control precautions among health-care workers.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This section entails the study design, sources of data, study area, study population, sample size calculation, Sampling procedures, study variables, data collection techniques, data collection tools, plan for data analysis, Quality Control Issues, Plan for dissemination, Ethical Issues and Limitations of the study.

3.1 Study Design

Cross sectional study design was used because both exposure and outcome were studied at the same point in time. Both quantitative and qualitative methods were employed to determine factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district.

3.2 Sources of data

Secondary data: Were obtained from previous studies conducted on infection control measures globally, in Uganda and in the study area. The sources of secondary data were central, state; journals, internet, books and magazines were used to obtain information.

Primary data: This was data obtained for the first time. It was obtained from the study population (the healthcare workers) through questionnaires, interviews and observations.

3.3 Study Population

The study population included all healthcare workers in Koboko district.

3.4 Sample Size Calculation

Israel 1992 method

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

n was the sample size

N was the total number of healthcare workers in Koboko district

e was the sampling error estimated at 0.05

By substitution;

$$n = \frac{160}{(1+160*0.05^2)}$$

=114.3 ~ 114

n= 114 respondents

Using the above formula, the estimated sample size was 114 respondents.

3.5 Sampling Procedures

Both non-probability and probability sampling techniques were used.

Purposive sampling: All the 13 public health facilities in Koboko District were considered.

Multistage sampling approach was used; in this method the health centres in Koboko district were categorized into HC IV, HC III and HC II. The study units in each of the health centres were obtained through simple random sampling.

Simple random sampling was used in obtaining the sample size where every member had an equal opportunity of consideration to participate in the study. A list of all the healthcare workers excluding administrative staff in the district was obtained from the district health office. Letters or numbers were written on pieces of papers, shaken in a hat then randomly picked up from the hat without replacement until the desired sample size was reached.

3.6 Selection Criteria

3.6.1 Inclusion criteria:

All healthcare workers based in a health facility in Koboko district who had consented to participate in the study.

3.6.2 Exclusion criteria:

Administrative staff at the health facilities and healthcare workers who did not consent to participate in the study.

3.7 Study Variables

Dependent variable; Infection control measures is the dependent variable and is measured by the percentage of healthcare workers who adhered to infection control measures.

Independent variables: Individual factors such as knowledge of infection control, attitude toward infection control, experience and qualification, availability of supplies required in the implementation of IC measures such as waste disposal materials, PPE, water facilities and hand washing facilities and health system factors such as monitoring and supervision, training on infection control and review of reports.

3.8 Data collection techniques

Questionnaires, Key Informant Interviews and observation.

3.9 Data collection tools

Self administered questionnaires were used to collect data from respondents on factors influencing adherence to IC measures among HCWs at Health Centres in Koboko district,

Key Informant Interview Guide was used to collect information from the key informants in the health centres in the study area that included the district health office, in-charges of the various health centres.

An observation Checklist was used to check on the use of PPE, availability of PPE, medical supplies and other consumables used in the implementation of IC measures.

3.10 Plan for data analysis

Collected questionnaires were checked for completeness. Data editing, manual coding and computation. Similar responses were grouped and then assigned codes for easy analysis, presentation and interpretation. Editing was done to identify mistakes made while interviewing.

SPSS Version 16 and Ms Excel 2007 were used to analyze quantitative data after the completion of data collection. Findings were presented on tables, graphs and pie-charts for easy interpretation.

3.11 Quality control Issues

A pre-test study was conducted to test the relevance of the data collection tools. A pre-test of the data collection tools with a selected number of healthcare workers in Koboko Health Centre IV. The aim of the pre-test study was to test the reliability and validity of the tools.

A two-day training of research assistants was conducted before data collection.

3.12 Plan for dissemination

On completion of the study, findings shall be submitted to the Institute of Health Policy and Management of International Health Sciences University, a copy to the library of International Health Sciences University and the third copy taken to Koboko Health Sub District.

3.13 Ethical issues

Informed consent: The purpose of the study was explained to the respondents; participation in the study was voluntary which meant that respondents were free to withdraw from the study without any consequences.

Confidentiality: The information obtained from one respondent was not divulged to others without permission. No name or any forms of identity was included in the questionnaire for anonymity purpose.

Respect for respondents: There was a need to respect those to participate in the study since they were capable of making decisions regarding the study. Relevant information was only disclosed to all the participants regarding the benefits and the nature of the study.

3.14 The limitations of the study

The study was conducted in Koboko District in the West Nile Region with a small sample size. Therefore, findings from the study are not representative enough and cannot be used to generalize adherence to HAI to all the healthcare workers in Uganda

Recall bias; some healthcare workers were unable to remember when they were supplied with materials that were required for the implementation of IC measures.

CHAPTER FOUR: RESULTS

4.0: Introduction

This chapter presents the data in accordance with the research objectives; individual factors influencing adherence to infection control measures among healthcare workers, supply factors influencing adherence to infection control measures among healthcare workers and health system factors influencing adherence to infection control measures among healthcare workers. A total of 114 healthcare workers were interviewed. Microsoft excel 2007 and SPPS versions 16 were used in the analysis of the data. Pie-charts, frequency distribution tables, bar charts and histograms were used to represent the collected data. Cross-tabulation was done to show the relationship between the dependent and independent variables. Fisher's exact test was used to elicit how significant the independent variables were to the dependent variable.

4.1: Socio-demographic factors

The majority of respondents were from the age bracket of 25-34 years 53(46.49%), followed by those in the age bracket of 35-44 years 25(21.93%) and the least being those in the age category of >44 years which accounted for 12(10.53% of the total respondents.

Enrolled Comprehensive Nurses constituted the majority of the health professionals 26(22.81%) followed by Nursing Assistants 23 (20.18%) and the least being Diploma in Comprehensive Nursing represented by 2(1.75%).

The majority of the respondents were females compared to their male counterparts. This was evidenced by 59% and 41% respectively on the pie-chart.

Out of the 114 respondents interviewed, majority of them had worked for a year and the least being those who had worked for more than 3 years.

Table 1: Univariate analysis showing socio-demographic factors

Variable	Frequency(N)	Percentage(%)
Age of respondent		
15-24 years	24	21.05
25-34 years	53	46.49
35-44 years	25	21.93
>45 years	12	10.53
Total	**114**	**100**
Sex of respondents		
Male	47	41.22
Female	67	58.78
Total	**114**	**100**
Level of professional training		
Clinical Officers	10	8.77
Enrolled Comprehensive Nurses	26	22.81
Diploma in Comprehensive Nursing	2	1.75
Enrolled Midwives	12	10.53
Enrolled Nurse	20	17.54
Lab Technicians	9	7.89
Nursing Assistants	23	20.18
Registered Midwives	7	6.14
Student Nurses	5	4.39
Total	**114**	**100**
Duration of work in a given health facility		
Less than 6 months	17	14.91
1 year	29	25.44
2 years	26	22.81
3 years	22	19.3
Others	20	17.54
Total	**114**	**100**

Source: Primary data

4.2: Bivariate analysis of socio-demographic factors and adherence to infection control measures

There was no statistical significance between age (df 3, p-value 0.13>0.05) and adherence to infection control measures.

Sex was not found to be a determinant of adherence to infection control measures. At 95% confidence interval, (df 1 and p-value of 0.341>0.05), data did not provide sufficient evidence to support a relationship between sex and adherence to infection control measures.

Professional qualification was found to be an important determinant of adherence to infection control measures. Healthcare workers with a higher professional qualification had a better adherence to infection control measures than those in the lower cadres. This was evidenced by a p-value of 0.02<0.05 which showed a statistical significant association between professional qualification and adherence to infection control measures.

Table 2: Bivariate analysis of socio-demographic factors and adherence to IC measures

Variable	Adherence to infection control measures		Total	df	Fisher's exact test (p-value
Age of respondent	**Yes**	**No**		**3**	**0.13**
15-24 years	13(11.40%)	11(9.65%)	24(21.05%)		
25-34 years	41(35.96%)	12(10.53%)	53(46.49%)		
35-44 years	23(20.17%)	2(1.75%)	25(21.93%)		
>45 years	7(6.14%)	5(4.38%)	12		
Total	**84**	**30**	**114**		
Sex of respondent					
Male	39(34.21%)	8(7.02%)	47(41.23%)	**1**	**0.341**
Female	55(48.25%)	12(10.53%)	67(58.77%)		
Total	**94**	**20**	**114**		
Professional qualification					
Clinical Officers	9(7.89%)	1(0.88%)	10(8.77%)	**8**	**0.02***
Enrolled Compr Nurses	20(17.54%)	6(5.26%)	26(22.80%)		
Diploma in Comprehensive Nursing	2(1.75%)	0(0.00%)	2(1.75%)		
Enrolled Midwives	9(7.89%)	3(2.63%)	12(10.53%)		
Enrolled Nurse	17(14.91%)	3(2.63%)	20(17.54%)		
Lab Technicians	7(6.14%)	2(1.75%)	9(7.89%)		
Nursing assistants	9(7.89%)	14(12.28%)	23(20.18%)		
Registered Midwives	7(6.14%)	0(0.00%)	7(6.14%)		
Student nurses	4(3.51%)	1(0.88%)	5(4.39%)		
Total	**84**	**30**	**114**		

Source: Primary data *<0.05 (significant) df (degrees of freedom)

4.3: Individual factors influencing adherence to Infection Control Measures

76(67%) of the respondents reported having heard of infection control measures compared to the

38(33.%) of their counterparts who never heard about infection control.

Figure 1: A pie-chart showing whether respondents heard of infection control
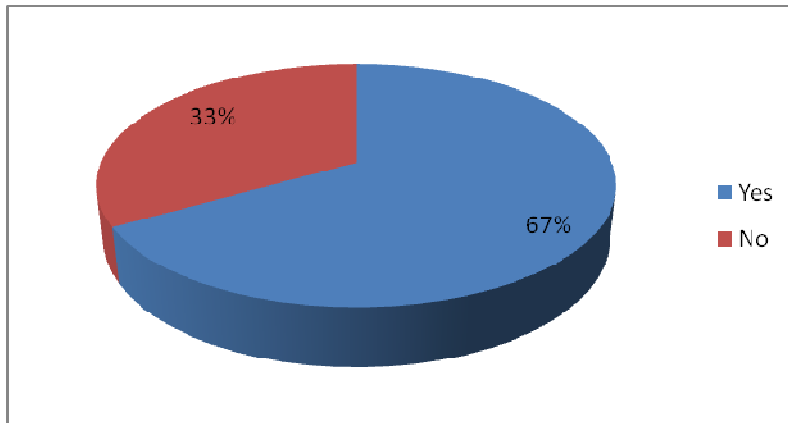
Source: Primary data

Other individual factors influencing adherence to infection control measures

The majority of the respondents defined infection control measures correctly; this accounted for 71.43%, meanwhile a collective 28.57% incorrectly defined it.

HIV was mentioned as one of the diseases transmitted through the use of contaminated needles; it stood at 70.17%, Hepatitis B at 16.67% and the least being other infections which included syphilis.

Table 3: Showing other individual factors influencing adherence to infection control measures.

Variable	Frequency (N)	Percentage (%)
If yes, definition of infection control		
1	82	71.93
2	18	15.79
3	14	12.28
Total	**114**	**100**
Infections transmitted through contaminated needles		
Hepatitis B	19	16.67
HIV	80	70.17
Hepatitis C	12	10.53
Others	3	2.63
Total	**114**	**100**

Note: Response 1: Measures aimed at protecting those at risk of acquiring an infection in the community and while receiving care due to health problems in a range of settings.

Response 2: Measures put to prevent disease transmission from patients to healthcare workers.

Response 3: Preventing the spread of communicable diseases in healthcare systems.

Source: Primary data

Reasons for failure to adhere to Infection Control measures

Over half of the respondents 60(52.63%) reported lack of hand washing facilities as one of the reasons for failure to adhere to infection control measure; followed by understaffing 42(36.84%); others scored lowly. Others included lack of motivation and negligence of healthcare workers.

Figure 2: A histogram showing reasons for failure to adhere to infection control measures
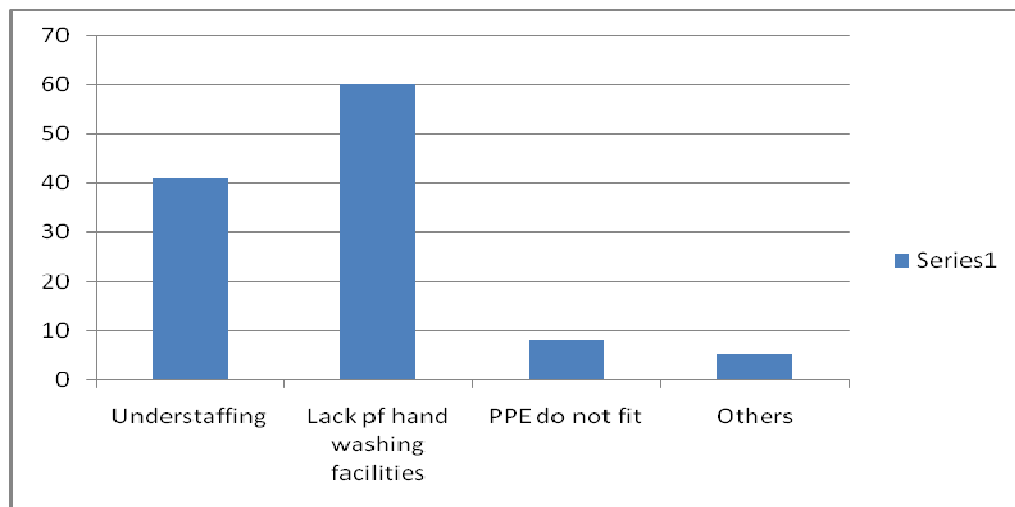
Infection control measures known to respondents

About two-thirds of the respondents 72(63.15%) reported hand washing as a measure of infection control being used by them; followed by the use PPE 20(17.54%) and the least being others which constituted damp dusting, use of masks, disinfection and sterilization represented by 4(3.51%).

Figure 3: A bar graph showing the infection control measures known to respondents
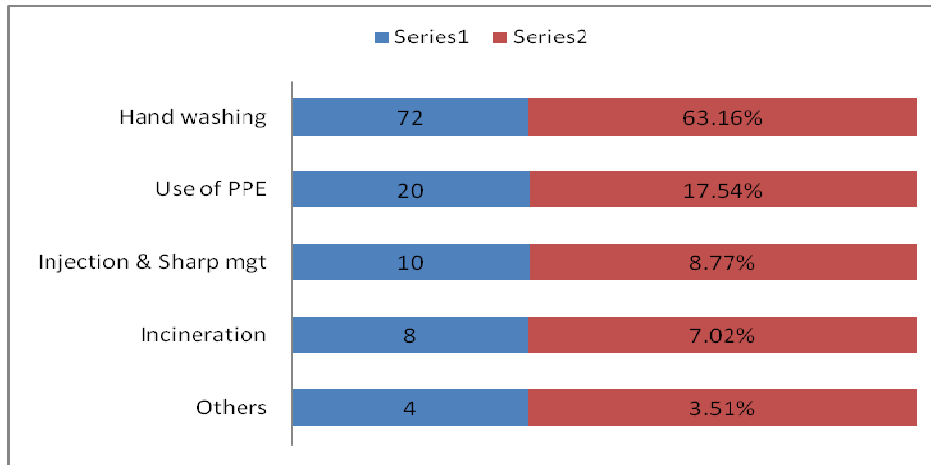
4.3.1: Bivariate analysis showing association between individual factors and adherence to IC measures

Whether a respondent heard of IC or not had no influence on adherence to IC measures.

Health facilities and departments which had had PPE, medical supplies and other consumables required for the implementation of infection control measures adhered to infection control measures. At 95% confidence interval, df 1 and a p-value of 0.041<0.05, data provided statistical relationship between availability of PPE, medical supplies and other consumables and adherence to infection control measures.

Frequency of receipt of PPE, medical supplies and other consumables required for infection control was found to have significance to adherence to infection control measures. At 95% confidence interval, df 3 and a p-value of 0.01<0.05 using fisher's exact test.

Adequacy of PPE, medical supplies and other consumables was found to be an important determinant of adherence to infection control measures among healthcare workers. Data showed

a statistical relationship between adequacy of PPE, medical supplies and other consumables required for infection control (df 1, p-value 0.02<0.05) and adherence to infection control measures among healthcare workers.

Table 4: Bivariate analysis showing association between individual factors and adherence to IC measures

Variable	Adherence to infection control		Total	DF	Fisher's exact test (p-value
Whether respondent heard of infection control	**Yes**	**No**		**1**	**0.297**
Yes	58(50.87%)	18(15.79%)	76(66.67%)		
No	25(21.93%)	13(11.40%)	38(33.33%)		
Total	**83**	**31**	**114**		
Duration of work in a health facility					
Less than 6 months	3(2.63%)	14(12.28%)	17(14.91%)	**4**	**0.000***
1 year	22(19.29%)	7(6.14%)	29(25.44%)		
2 years	20(17.54%)	6(5.26%)	26(22.81%)		
3 years	19(16.67%)	3(4.39%)	22(19.29%)		
Others	20(17.54%)	0(0.00%)	20(17.54%)		
Total	**84**	**30**	**114**		

Source: Primary *<0.05 (Significant), degrees of freedom (df).

4.4: Univariate analysis of availability of supplies influencing adherence to IC measures

4.4.1: Definition of Infection control

66(57.90%) of the respondents interviewed correctly ticked the definition of PPE, medical supply and consumables compared with the 4(842.10%) of their counterpart who incorrectly ticked the definition.

Over three quarter (75.44%) of the health facilities and departments reported having PPE, medical supplies and consumables meanwhile 28(24.56%) of their counterpart reported no PPE, medical supplies and consumables.

The majority of the respondents 55(48.25%) reported that the supply of the PPE, medical supplies and consumables was done on quarterly basis and the least being those who responded that they were supplied on weekly basis.

Out of all the medical supplies and consumables received for infection control, jik scored a record 65(57.02%), methylated spirit 25(21.93%), others 14(12.28). Other medical supplies and consumables include bars of laundry soap, chlorhexidine and hibitane.

Gloves were the most received PPE that were used for infection control-they stood at 84(73.83%), aprons at 12(10.53%) and the least being others which included masks reported at 8(7.02%).

A record 98(87.5%) of the respondents reported inadequacy of medical supplies and consumables used for the implementation of infection control measures.

There has been a problem with the supply of gloves to our health facility. Surgical gloves were in short supply yet more pregnant mothers come here to deliver…. (In-charge Ayipe HC III).

Table 5: Univariate analysis of availability of supplies required for the implementation of IC measures

Variable	Frequency (N)	Percentage (%)
Definition of PPE, medical supplies and consumables		
1	66	57.9
2	35	30.7
3	13	11.4
Total	**114**	**100**
Whether department or health facility has PPE, medical supplies and consumables		
Yes	86	75.44
No	28	24.56
Total	**114**	**100**
If yes, frequency of supply		
Weekly	6	5.26
Monthly	40	35.09
Quarterly	55	48.25
Others	13	11.4
Total	**114**	**100**
Medical supplies and consumables received for infection control		
Jik	65	57.02
Methylated spirit	25	21.93
Alcohol-based solution	10	8.77
Others	14	12.28
Total	**114**	**100**
PPE and other supplies being received for infection control		
Gloves	84	73.68
Gumboots	10	8.77
Aprons	12	10.53
Others	8	7.02
Total	**114**	**100**
Whether medical supplies and consumables are adequate for the implementation of infection control measures		
Yes	16	12.5
No	98	87.5
Total	**114**	**100**

Source: Primary data

Note: 1=Equipment or clothing used for preventing infections as a result of coming into contact with blood and other body fluids in the health setting.
  2=Gloves, aprons and gumboots used in the health setting.
  3=Instruments used in the prevention of Tuberculosis

4.4.2: Bivariate analysis showing association between supply factors and adherence to IC measures

Health facilities and departments which had PPE, medical supplies and other consumables used required for the implementation of IC adhered to IC measures. There is a significant relationship between availability of PPE, medical supplies and consumables required for IC in a given health facility or department and adherence to IC measures: (df 1, p-value 0.041<0.05).

Frequency of receipt of PPE, medical supplies and other consumables required for the implementation of IC measures was found to have significance to adherence to IC measures. There exist a relationship between frequency of receipt of PPE, medical supplies and other consumables required for IC by a health facility or department and adherence to IC measures (df 3, p-value 0.016<0.05).

Adequacy of PPE, medical supplies and other consumables in a given health facility and department was found to be an important determinant of adherence to IC measures. HCWs in departments and HCs which have adequate materials used in IC adhere to IC measures more than their counterpart. There was a significant relationship between adequacy of PPE, medical supplies and other consumables required for IC in a given health facility or department and adherence to IC measures (df 1, p-value 0.024<0.05).

Table 6: Bivariate analysis showing association between availability of supplies and adherence to IC measures

Variable	Adherence to infection control		Total	DF	Fisher's exact test (p-value)
Availability of PPE, medical supplies and other consumables at department or health centre	**Yes**	**No**			
Yes	30(26.32%)	56(49.12%)	86(75.44%)		**0.041***
No	7(6.14%)	21(18.42%)	28(24.56%)		
Total	**37**	**77**	**114**		
Frequency of Supply				**3**	**0.016***
Weekly	2(1.75%)	4(3.51%)	6(5.26%)		
Monthly	31(27.19%)	9(7.89%)	40(35.09%)		
Quarterly	23(20.17%)	32(28.07%)	55(48.25%)		
Others	4(3.51%)	9(7.89%)	13(11.40%)		
Total	**60**	**54**			
Adequacy of medical supplies and consumables used to implement IC measures				**1**	**0.024***
Yes	4 (3.51%)	12 (10.53%)	16(14.04%)		
No	30(26.32%)	68 (59.65%)	98(85.96%)		
Total	**34**	**80**	**114**		

Source: Primary data *<0.05 (significant) degrees of freedom (df)

4.5: Univariate analysis of health system factors influencing adherence to IC measures

Use of PPE in patient care was reported to be the widely used infection control measure both in departments and health facilities 65(57.02%); followed by incineration which stood at 20(17.54%) and the least being use of waste disposal vessels 5(4.39%).

77(67.54%) of the respondents reported that no supervision on infection control was conducted compared to their 37(32.46) counterpart who reported being supervised on infection control measures.

Weekly and quarterly supervision tied at 30(26.32%) which constituted the majority of the respondents. Monthly and biannual supervisions were represented by 28(24.56%) and 16(14.04%) respectively; the least being those who reported being supervised after a year of more (8.76%).

68(59.65%) reported satisfaction with supervision on infection control measures whereas 46(40.35%) of them were dissatisfied with the supervision conducted on infection control.

Over three quarter 88(77.19%) of the respondents said they were trained on infection control meanwhile 26(22.91%) of them reported having not had attended a training on infection control.

Table 7: Univariate analysis of health system factors influencing adherence to IC measures

Variable	Frequency (N)	Percentage (%)
Infection control measures per given department or health centre		
Isolation of patients with infectious diseases	15	13.16
Incineration of medical waste	20	17.54
Use of PPE in patient care	65	57.02
Use of waste disposal vessels	5	4.39
Others	9	7.89
Total	**114**	**100**
Whether respondent was supervised on infection control measures		
Yes	37	32.46
No	77	67.54
Total	**114**	**100**
Frequency of support supervision in a given department or health centre		
Weekly	30	26.32
Monthly	28	24.56
Quarterly	30	26.32
Twice a year	16	14.04
Others	10	8.76
Total	**114**	**100**
Whether respondent was satisfied with supervision on infection control		
Yes	68	59.65
No	46	40.35
Total	**114**	**100**
Whether respondent was trained on infection control		
Yes	88	77.19
No	26	22.81
Total	**114**	**100**

Source: Primary data

4.5.1: Bivariate analysis showing association between health system factors and adherence to IC measures

The majority of the respondents 77(67.54%) revealed that there health facilities and departments were not supervised on IC in comparison with 37(32.46) of them who reported being supervised. There is a statistically significant relationship between supervision on IC (df 1, p-value 0.032) and adherence to IC measures.

Weekly and quarterly supervision of health facilities and departments on IC measures tied at 30 (26.32%), the least being others at 10(8.77%). This therefore, signifies a relationship between frequency of supervision on IC (df 4, p-value 0.021) and adherence to IC measures.

I cannot remember the last time we were supervised on infection control in our health centre yet this is my fourth year of work here. Supervision on infection control increases adherence to infection control measures……………. (Registered Midwife Lobule HC III)

Of the 114 respondents, 88(77.19%) reported being trained on IC measures compared with 26 (22.81%) who said they were not trained on IC measures. There is no association between training on IC (df 1, p-value 0.111) and adherence to IC measures among healthcare workers.

I was trained on infection control three years ago while for my studies; now I have forgotten what was taught because the resources required for infection control are inadequate. We donot have the colour coded bins in our health centre, no autoclaves for sterilizing forceps that we use for conducting deliveries.........................(In-charge Dricile HC III)

75(65.79%) of the respondents reported that there was no motivation given to them at health facilities and departments compared to the 39 (34.21%) of them who said they were motivated in their infection control practices by their in-charges. There is a statistical significance between motivation to HCWs (df 1, p-value 0.000<0.05) and adherence to infection control measures.

On seeing my supervisor usually put on gloves when instituting an IV line, I follow her example. This has helped me improve on techniques of wearing gloves and secondly I feel protected whenever I handle patients……….(Enrolled Comprehensive Nurse Gborokolongo HC III).

Table 8: Bivariate analysis showing association between health system factors and adherence to IC measures

Variable	Adherence to infection control		Total	DF	Fisher exact test (p-value)
Supervision on infection control practice	Yes	No		1	0.032*
Yes	10(8.77%)	27(23.68%)	37(32.46%)		
No	25(21.93%)	52(45.61%)	77(67.54%)		
Total	**35**	**79**	**114**		
Frequency of supervision					
Weekly	8(7.02%)	22(19.29%)	30(26.32%)	4	0.021*
Monthly	7(6.14%)	21(18.42%)	28(24.56%)		
Quarterly	23(20.18%)	7(6.14%)	30(26.32%)		
Twice a year	12(10.53%)	4(3.51%)	16(14.04%)		
Others	2(1.75%)	8(7.02%)	10(8.77%)		
Total	**55**	**59**	**114**		
Whether training was attended by respondent					
Yes	57(50.00%)	31(27.19%)	88(77.19%)	1	0.111
No	23(20.18%)	3(2.63%)	26(22.81%)		
Total	**80**	**34**	**114**		
Motivation being given to respondents					
Yes	25(21.93%)	14(12.28)	39(34.21%)		
No	60(52.63%)	15(13.16%)	75(65.79%)	1	0.000*
Total	**85**	**29**	**114**		

Source: Primary data
*<0.05, df (degree of freedom)

CHAPTER FIVE: DISCUSSION OF FINDINGS

5.0: Introduction

This chapter presents a detailed account of the findings of the research. The discussion was done in accordance with the specific objectives; individual factors, availability of supplies and health system factors influencing adherence to infection control measures among healthcare workers. The responses were compared with other findings from previous studies.

5.1: Socio-demographic factors

The majority of the respondents who participated in the study were females who accounted for 59% of the total respondents. Similarly, there was no relationship between sex of the respondent (df 1, p-value<0.050) and adherence to infection control measures.

The study further found out that healthcare workers were mostly in the age bracket of 25-35 years 53(46.49%), then those in the age bracket of 35-44 years 24(21.93%) and the least being those in the age category of >44 years who accounted for 12(10.53%) of the total respondents. There was no statistical significance between age of respondent and adherence to infection control measures among healthcare workers; this was evidenced by a p-value of 0.13>0.05. This means that age of HCW did not matter in relation to adherence to IC measures.

The majority of the respondents were Enrolled Comprehensive Nurses 26(22.81%), followed by Enrolled Nurses 20(17.54%) and the least being those who had Diploma in Comprehensive Nursing qualification 2(1.75%). Professional qualification was found to be an important determinant of adherence to infection control measures; this was evidenced by a p-value 0.02 using Fisher's exact test.

5.2: Individual factors influencing adherence to infection control measures

The study sought to find out knowledge of HCWs on IC measures. However, whether or not a respondent heard of IC was not a key factor in determining adherence to infection control measures among healthcare workers. This is in line with a study conducted by Springer *et al.,* (2005) which asserted that HCWs had ever heard of standard precautions but inadequate fund and equipment hindered them from practicing it. This therefore meant that even if a HCW heard of IC, it was impracticable to implement IC measures if the required materials used were not in place.

Duration of work at the health facility or department was found to be an important determinant of adherence to infection control measures. This is in line with a study conducted by Gifford *et al.,* (2005) which revealed that adherence to infection control measures was associated with being on job for a longer period of time. There were also similar findings were in a study conducted by Yassi *et al.*, (2004) in which he asserted that healthcare workers with more experience adhered easily to infection control practices than their counterparts with less experience.

Lack of hand washing facilities was mentioned as one of the outstanding reasons for failure to adhere to infection control measures 60(41.67%), followed by understaffing 40(35.09%) and the least being others which scored 5 (4.39%).

72(63.16%) of the total respondents mentioned hand washing as one of the infection control measures, followed by the use of PPE 20(17.54%) and the least was others which scored 4(3.51%). Though hand washing had the highest frequency, it was not possible for healthcare workers to appropriately wash their hands before and after handling patients. This was attributed

to the lack of hand washing facilities within closer distance to the healthcare workers while offering care to patients. The reasons cited for non adherence to PPE were; healthcare workers thought that they were not needed, uncomfortable, too hot, ill fitting, unavailability and inaccessibility at work task and unattractive looking. In a study conducted by Zaramba in 2008, it was found out that 42% of the health facilities lacked gloves-only 31% of the health centres and 64% of hospitals in Uganda have constant water supply. The study further asserted that over half of the health facilities lack soap or disinfectants which put the service providers and clients to a high risk of HAIs. This implies that most healthcare workers have an increased risk of HAI as they are likely to handle patients without hand washing and or use gloves.

5.3: Availability of PPE, medical supplies and other consumables used in the implementation of IC measures

Over three quarter of the respondents 86(75.44%) reported that their health facilities and departments had PPE: gloves, gumboots and aprons: medical supplies which included alcohol-based solution, methylated spirit and other consumables: gauzes, cotton wool and masks used for infection control meanwhile 28(42.10%) of their counterpart reported the lack of PPE, medical supplies and other consumables used for infection control. There was a statistical relationship between availability of PPE, medical supplies and other consumables used for infection control and adherence to infection control measures by healthcare workers being evidenced by df 1, p-value 0.04<0.05. This however, meant that HCWs in health facilities and departments with adequate materials used for IC were more likely to protect themselves from infections compared to those with those who had inadequate materials.

We use our own gumboots, no heavy gloves used for cleaning surfaces and besides no hand washing facilities: the store is far from the health facility……… (Cleaner Dricile HC III). This is

in accordance with a study conducted by Zaramba, (2008) which found out that 42% of health facilities in Uganda lacked gloves and 31% of health centres had constant water supply.

The majority of the respondents 55(48.25%) reported that the supply of the PPE, medical supplies and consumables was done on quarterly basis and the least being those who responded that they were supplied on weekly basis. In view of the above statement, more health facilities and departments had irregularity in the receipt of PPE, medical supplies and other consumables used for IC thereby hampering adherence to IC measures.

Of all the medical supplies and consumables received for infection control, jik scored a record 65(57.02%), methylated spirit 25(21.93%), others 14(12.28). Other medical supplies and consumables include bars of laundry soap, chlorhexidine and hibitane.

Gloves were the most received PPE that were used for infection control-they stood at 84(73.83%), aprons at 12(10.53%) and the least being others which included masks reported at 8(7.02%).

Frequency of receipt of PPE, medical supplies and other consumables used in the implementation of infection control measures was found to have significance to adherence to infection control measures. A record 98(87.5%) of the respondents reported inadequacy of medical supplies and consumables used for the implementation of infection control measures.

This was supported by a df 3, p-value 0.01 using Fisher's exact test which demonstrated a statistical relationship between frequency of receipt of PPE, medical supplies and other consumables and adherence to infection control measures.

In our health facility, we receive a fixed equipment used for the implementation of infection control yet the number of patients we handle is overwhelming……….(In-charge Ludara HC III). This is in agreement with a study conducted by Russels et al.,(2009) which asserted that availability of infection control equipment was found to be an important determinant of adherence to IC measure.

Adequacy of PPE, medical supplies and other consumables was found to be an important determinant of adherence to infection control measures among healthcare workers. HCWs in health facilities and departments which received PPE, medical supplies and other consumables required for the implementation of infection control measures had better adherence to infection control measures compared to their counterparts. There exists a statistical relationship between adequacy of PPE, medical supplies and other consumables required for the implementation of infection control and adherence to infection control measures among HCWs. This therefore means that healthcare workers in health facilities and departments with adequate PPE, medical supplies and other consumables are less likely to suffer from HAI due to better adherence to IC measures.

5.4: Health system factors influencing adherence to infection control measures

Supervision of HCWs on IC measures played a vital role in adherence to IC measures among HCWs. At 95% confidence interval and a p-value of 0.032 on Fisher's exact test data showed statistically significant evidence that an association exists between supervision and adherence to infection control measures.

The frequency of supervision on infection control was another parameter which provided a statistical significance. There is an association that exists between frequency of supervision (df 4, p-value 0.021<0.05) and adherence to infection control measures.

75(65.79%) of the respondents reported that there was no motivation given to them at health facilities and departments compared to the 39(34.21%) of them who said they were motivated in their infection control practices by their in-charges. There is a statistical significance between motivation to HCWs (df 1, p-value 0.000<0.05) and adherence to infection control measures. It can be deduced that motivated HCWs are more likely to adhere to IC measures and protect themselves from HAI.

I feel protected when I use gloves when handling patients, our in-charge always avails gloves to our department………. (Nursing Assistant Lurujo HC II). This is in correspondence with the National Academies, (2008), organizations with a functional and healthy safety culture maintain or update safety standards motivate their workers.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0: Introduction

This chapter presents a summary of the significant findings and conclusions drawn from the study on factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district.

Adherence to infection control among healthcare workers at health centres in Koboko district stood at 47.5%.

6.1: Socio-demographic factors

Professional qualification was an important determinant of adherence to infection control measures. Clinical Officers were found to have better adherence to infection control measures compared to the other cadres of health professionals.

6.2: Individual factors influencing adherence to infection control measures

Duration of work at health facility and departments was an important predictor of adherence to infection control measures. Findings from the study showed a statistical relationship between duration of work and adherence to infection control.

6.3: Availability of PPE, Medical supplies and other consumables used in the implementation of infection control measures

57.90% of the respondents interviewed correctly ticked the definition of PPE, medical supply and consumables compared with 42.10% of their counterpart who incorrectly ticked the definition.

Over three quarter (75.44%) of the departments or HCs reported having PPE, medical supplies and consumables meanwhile 24.66% of their counterpart reported no PPE, medical supplies and consumables.

The majority of the respondents 55(48.25%) reported that the supply of the PPE, medical supplies and consumables was done on quarterly basis and the least being those who responded that they were supplied on weekly basis.

Of all the medical supplies and consumables received for infection control, jik scored a record 57.02%, methylated spirit (21.93%), others (12.28). Other medical supplies and consumables include bars of laundry soap, chlorhexidine and hibitane.

Gloves were the most received PPE that were used for infection control-they stood at 73.83%, aprons at 10.53% and the least being others which included masks reported at 7.02%.

A record 99(87.5% of the respondents reported inadequacy of medical supplies and consumables used for the implementation of infection control measures. Healthcare workers in health facilities and departments which had available PPE, medical supplies and other consumables required for the implementation of infection control measures adhered to infection control measures.

Similarly frequency of receipt of PPE, medical supplies and consumables required for implementation of infection control measures was found to have significance to adherence to infection control measures. This therefore meant that HCWs who work in departments and HCs which received PPE, medical supplies and other consumables were likely to adhere to infection control measures as opposed to those which received irregularly.

Adequacy of PPE, medical supplies and other consumables was an important determinant of adherence to infection control measures among healthcare workers.

6.4: Health system factors influencing adherence to infection control measures

The health system factors found to have influence on adherence to infection control was supervision; health facilities and departments which were supervised had better adherence to infection control measures:

Frequently supervised health facilities and departments had better adherence to IC measures than their counterpart. This was attributed to an increased knowledge amongst HCWs on IC.

Motivation; HCWs who work in health facilities and departments which give them recognition for practicing IC were likely to adhere to IC measures. This is because they (HCWs) were more willing to follow the IC measures so as to win more gifts and praises.

Recommendations

The following were the recommendations that were drawn from the study:

i.   There is need to maintain constant supply chain of materials that are used in the implementation of infection control.

ii.   Recruitment of more healthcare workers in Koboko district to address the human resource for health issues which hampers adherence to infection control measures.

iii.   Provision of guidelines on IC to all departments and health centres in Koboko district which act as a reminder to healthcare workers.

iv.   Frequent supervision on infection control should be conducted in all departments and HCs. This helps increase adherence to infection control measures by healthcare workers.

v.   Protection of healthcare workers against infectious diseases through vaccination example Hepatitis B.

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Introduction

My name is Lemi Robert Albert, a student from International Health Sciences University pursuing Bachelors of Science in Public Health.

Purpose of the study

The purpose of this study is to collect information on "Factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district". Your responses are invaluable as information collected is of relevance to the study.

What participation is expected?

Up on consent, the respondent will sit together with the researcher or research assistant to answer the questionnaire. The interview will take between 20-30 minutes in a confidential setting.

Confidentiality: Information collected from you will be treated with a high level of confidentiality. Only individuals involved in the data collection process will have access to the collected data. Your responses will only be seen in the compiled report but not personal information such as an individual name.

Right to withdraw: Participating in this interview is by choice and no penalty shall be levied for refusal to participate in the interview.

Benefits: The information provided by you is necessary in finding out the factors influencing adherence to infection control measures among healthcare workers at health centres in Koboko district. Communicating these findings to policy makers and other stakeholders will help improve on the situation.

APPENDIX B: STRUCTURED RESEARCH QUESTIONNAIRE

Introduction

This questionnaire is intended to collect data on **"Factors influencing adherence to infection control measures among health care workers at health centres in Koboko district".**

SECTION A: SOCIO-DEMOGRAPHIC DATA

S/No	ITEM/QUESTION	Response option	Code
1.1	Age of respondent	………………	
1.2	Sex of respondent	Male	1
		Female	2
1.3	Level of professional training	……………….	

SECTION B: INDIVIDUAL FACTORS

2.1	Have you ever heard of infection control in this health centre?		**Tick**
	1	Yes	
	2	No	
b	If yes, what does infection control mean?		
	1	Measures aimed at protecting those at risk of acquiring an infection in the community and while receiving care due to health problems in a range of settings.	
	2	Measures put to prevent transmission of infectious diseases from patients to healthcare workers.	
	3	Preventing the spread of infectious diseases in healthcare setting.	
2.2	How long have you worked in this health facility?		**Tick**
	1	Less than 6 months	
	2	1 year	
	3	2 Years	
	4	3 years	
	5	Others (specify)	
2.3	What infection control measures do you know?		**Tick all that apply**
	1	Hand washing	
	2	Use of personal protective gears/equipment (Gloves, aprons & mask)	
	3	Injection safety and sharp instrument management	
	4	Incineration	
	5	Others (specify)	

2.4		What are the reasons for non-adherence to infection control measures?	**Tick all that apply**
	1	Under-staffing	
	2	Lack of hand washing facilities	
	3	Ill-fitting PPE	
	5	Others (specify)	
2.5		What infections are transmitted through contaminated needles?	**Tick all that apply**
	1	Hepatitis B	
	2	HIV	
	3	Hepatitis C	
	4	Others (specify)	

SECTION C: Medical Supplies and Consumables

3.1		What are personal protective equipment, medical supplies and consumables?	**Tick**
	1	Equipment or clothing used for preventing infections as a result of coming into contact with blood and other body fluids in the health setting.	
	2	Gloves, aprons and gumboots used in the health setting.	
	3	Instruments used in the prevention of Tuberculosis	
3.2		Does your ward or health centre have personal protective equipment, medical supplies and other consumables used for infection control?	
	1	Yes	
	2	No	
b		How often do you receive them?	
	1	Weekly	
	2	Monthly	
	3	Quarterly	
	4	Others (specify)	
3.3		What medical supplies and consumables do you receive for infection control?	**Tick all that apply**
	1	Jik	
	2	Methylated spirit	
	3	Alcohol-based solution	

	4	Others (specify)	
3.4	What personal protective equipment and other supplies do you receive for infection control?		
	1	Gloves	
	2	Gumboots	
	3	Aprons	
	4	Others (specify	
3.5	Are the medical supplies and consumables adequate enough to be used in the implementation of infection control measures?		**Tick**
	1	Yes	
	2	No	

SECTION D: Health System Factors

4.1	What infection control measures are in place in your department or health centre?		**Tick all that apply**
	1	Isolation of patients with infectious diseases	
	2	Incineration of medical waste	
	3	Use of personal protective equipment in the care of patients	
	4	Use of waste disposal vessels	
	5	Others (specify)	
4.2	Are you supervised on infection control practice in your ward/ health facility?		
	1	Yes	
	2	No	
B	If yes, how often is the supervision conducted in your department or health centre?		**Tick**
	1	Weekly	
	2	Monthly	
	3	Quarterly	
	4	Twice a year	
	5	Others (specify)	
4.3	Are you satisfied with the infection control supervision?		**Tick**
	1	Yes	
	2	No	
B	If yes in 4.3 above, how useful is the supervision to you?		**Tick all that apply**
	1	It increased my adherence to infection control measures	

	2	Increased my knowledge on infection control	
	3	It increases patient waiting time	
4.4		Have you ever attended training on infection control?	**Tick**
	1	Yes	
	2	No	
B		Is the training helpful in your practice on infection control?	**Tick**
	1	Never	
	2	Somehow	
	3	It increased my knowledge on infection control	
	4	Others (specify)	
4.5		Do you receive incentives, praises for practicing infection control measures?	
	1	Yes	
	2	No	
4.6		Suggest the challenges you face in the provision of infection control measures	**Tick all that apply**
	1	Lack of personal protective gears such as gloves and aprons	
	2	No guidelines on infection control at both departmental and facility level	
	3	Limited healthcare workers	
	4	Healthcare workers are not trained on infection control measures	
	5	Others (specify)	
b		What are the solutions to the challenges identified in 4.6a above?	**Tick all that apply**
	1	Motivation of staff so as to increase adherence to infection control measures	
	2	Routine supervision of healthcare workers on infection control measures	
	3	Adequate and timely supply of personal protective equipment and consumables used for infection control	
	4	Others (specify)	

Thanks for your response

APPENDIX C: OBSERVATION CHECKLIST TO ASSESS ADHERENCE TO INFECTION CONTROL MEASURES

Hand hygiene performed	Yes (Adherence to IC)	No (Non adherence to IC)	Comment
a) Before contact with patient			
b)Leaving the patient			
c) Before performing aseptic technique			
d) After coming into contact with blood and other body fluids			
Use of PPE			
PPE is removed and discarded before leaving the patient			
Hand hygiene is performed immediately after removal of PPE			
Gloves are worn when coming into contact with blood			
A pair of gloves are used per patient			
Gowns are worn to protect skin and clothes during invasive procedures			
Face masks are worn to prevent blood splashes			
A gown is used at a time in patient care			
Hand washing facilities	**Available**	**Not available**	**Comment**
Soap at washing points			
Running water			
Disinfectants e.g alcohol-based solution			
PPE			
Gloves			
Clinical gowns			
Aprons			
Face masks			
Gumboots			
Heavy gloves for cleaning floor			
Sharps management			
Colour-coded plastic/metalic bins			
Secure lid for the containers			
Safety signs for hazardous waste			
Incinerator			
Injection Safety	**Yes**	**No**	**Comment**

Use of auto disable syringes			
Disposal of sharps in secured containers			

APPENDIX D: KEY INFORMANT INTERVIEW GUIDE

Date……/………/2014

Name of researcher/ research assistant……………………………………………………………..

Name of Health Facility………………………………………………………………………….

Sex: Male ☐ Female ☐

1. Title………………………………………………………………………………………..

2. Professional qualification……………………………………………………………………….

3. May you define what infection in a health facility is?

4. May you define what infection control is?

5. What measures are put in place to reduce or control infections in your department or health facility?

6. How often are you supervised on infection control measures?

7. Are there IEC materials (flyers, brochures, notices) in the health facility to educate patients, visitors and or healthcare workers on infection control?

8. How often do you receive medical supplies and consumables that are used for infection control?

9. Have you ever experienced a stock out of supplies required in the implementation of infection control measures?

10. What suggestions do you have to improve on infection control measures in your department or health facility?

11. Are there any challenges that you face in relation to the supply and management of medical supplies and consumables?

Thanks for your responses

APPENDIX E: WORK PLAN

S/NO.		TIME FRAME								Person
	Activities	Apr	May	June	Jul	Aug	Sept	Oct	Nov	responsible
01	Topic Approval									IHPM Faculty office
03	Literature Search and writing of the proposal									Researcher
04	Proposal by Supervisor/IHSU Faculty office									Supervisor and IHPM Faculty office
05	Approval by DHO									Office of the DHO
06	Soliciting/training Research assistants									Researcher
07	Pre-testing questionnaires									Researcher and Research assistants
08	Data Collection									Researcher and Research assistants
09	Data entry									Researcher
10	Data management and analysis									Researcher

| 11 | Report writing | | | | | | | | | | Researcher |
| 12 | Dissemination of results | | | | | | | | | | Researcher |

APPENDIX F: ESTIMATED BUDGET

S/No.	Item specification	Unit cost	Quantity	Amount (UGX)
1	Printing of Research proposal and Binding (3 copies)	30,000	3	90,000
2	Printing and photocopy questionnaires (114)	100	684	68,400
3	Transport to and fro Koboko	40,000	4	160,000
4	Transport within Koboko for data collection	35,000	4 people	140,000
5	Lunch and super for research assistants	30,000	3 people	90,000
6	Incentives for research assistants	50,000	3 people	150,000
7	Printing, photocopying and binding of research report	40,000	3 copies	120,000
8	Printing, photocopying research and binding final report	45,000	3 copies	135,000
9	Accommodation in Koboko	15,000	10 days	150,000
10	Feeding and up keep	15,000	10 days	150,000
11	Communication during data collection			50,000
	Grand total			**1,303,400**

APPENDIX G: INTRODUCTORY LETTER

IHSU — INTERNATIONAL HEALTH SCIENCES UNIVERSITY

PART OF INTERNATIONAL MEDICAL GROUP
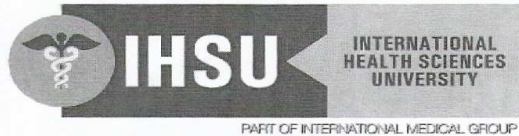
Office of the Dean, Institute of Health Policy & Management

Kampala, 6th June 2014

The   District Health Officer
       Koboko District

Dear Sir/ Madam,

Re: Assistance for Research

Greetings from International Health Sciences University.

This is to introduce to you **Lemi Robert Albert**, **Reg. No. 2011-BSCPH-FT-014** who is a student of our University. As part of the requirements for the award of a Bachelors Degree of Public Health of our University, the student is required to carry out field research for the submission of a Research Project

Lemi would like to carry out research on issues related to: **Factors Influencing Adherence to Infection Control Measures among Health Care Workers at Health centres in Koboko District**

I therefore request you to render the student such assistance as may be necessary for his research

I, and indeed the entire University are thanking you in anticipation for the assistance you will render to the student
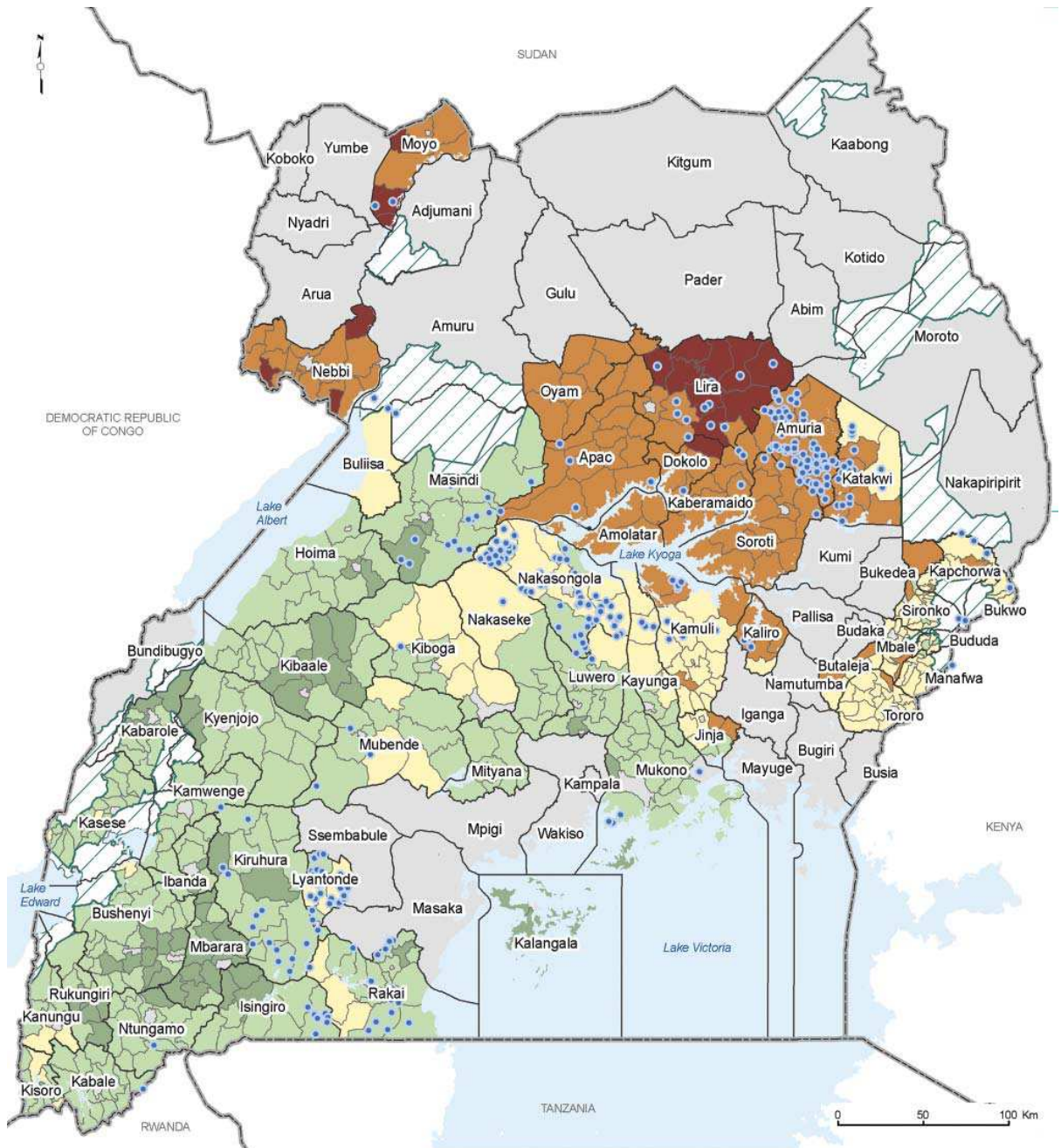
Sincerely Yours,

Prof. David Ndungutse Majwejwe
Dean, Institute of Health Policy & Management

MAKING A DIFFERENCE IN HEALTH CARE

International Health Sciences University
P.O. Box 7782 Kampala | Uganda | East Africa
Tel: (+256) 0312 307 400 | E-mail: info@ihsu.ac.ug | web: www.ihsu.ac.ug

APPENDIX H: MAP OF UGANDA

PRODUCT DIVERSITY IN GRASSLAND WETLANDS
- 0 – 5 different wetland products

OTHER FEATURES
- District boundaries
- Subcounty boundaries
- Major National Parks and Wildlife Reserves (over 50,000 ha)
- Water bodies

POVERTY RATE
(percent of the population below the poverty line)
- <= 15
- 15 – 30
- 30 – 40
- 40 – 60
- > 60
- No data

APPENDIX I: MAP OF KOBOKO DISTRICT