COMPLIANCE WITH INFECTION PREVENTION GUIDELINES BY HEALTH CARE WORKERS AT RONALD ROSS GENERAL HOSPITAL MUFULIRA DISTRICT.

BY
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A Dissertation submitted to the University of Zambia in Partial fulfillment of the requirements for the Degree of Masters of Science in Nursing

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DECLARATION

I declare that this Dissertation represents my own work and that all the sources I have quoted have been indicated and acknowledged by means of complete references. I further declare that this dissertation has not previously been submitted for a Degree, Diploma or other qualifications at this or another University. It has been prepared in accordance with the guidelines for Master of Science in Nursing Dissertations of the University of Zambia.

Signed..... **Date**.....

Candidate

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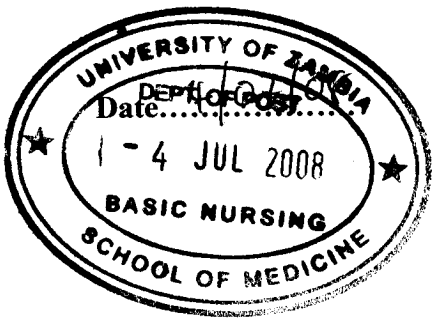

CERTIFICATE OF APPROVAL

The University of Zambia approves this Dissertation of Patricia Mukwato Katowa in Partial Fulfillment for the requirements for the award of Degree of Master of Science in Nursing.

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ABSTRACT

This is a quantitative descriptive case study that was undertaken at Ronald Ross General Hospital in Mufulira District. The General Objective of the study was to determine the level of Health-Care Workers' Compliance with the Infection Prevention (IP) Guidelines and the factors that influence compliance. It was hypothesized that, there was no relationship between the health-care workers' compliance with IP Guidelines and Knowledge of Infection Prevention; Attitude towards Infection Prevention; Availability and access to IP materials and management support towards the implementation of the guidelines.

Convenient sampling method was used to select the sample. A total of 77 health-care workers who included Doctors, Registered Midwives and Nurses, Enrolled Midwives and Nurses, Clinical Officers, Laboratory Scientists and Technologist and Physiotherapist were selected. Data were collected using a self-administered interview schedule. Forty (40) observations of routine infection prevention practices were conducted using a check list. Procedures observed included giving injections, wound dressing, performing deliveries and assisting or conducting surgical operations.

Epi-info version 6 and SPSS software computer packages were used to analyze the data. Chi-square was used to measure association between the dependent variable (Compliance with IP Guidelines) and the independent variables (Knowledge of IP, Attitude towards IP, Availability and access to Infection Prevention materials and Management support towards the implementation of the IP guidelines). The cut off point for statistical significance was set at 5%.

The study findings revealed varied levels of compliance across different components of Infection Prevention. The highest level of compliance (100%) was with the single use of needles and syringes while the lowest (35.1%) was with the decontamination of needles and syringes with 0.5% chlorine solution prior to disposal. Compliance with hand hygiene was moderate (61%).

The most significant factors found to be associated with compliance were knowledge of IP and hospital acquired infections, attitude towards IP, availability of materials for IP and training in IP. Those who had high knowledge of Infection Prevention highly complied with IP guidelines. Corrected Chi Square=51.768, df=4, P-Value=0.000 (95% CI=0.000, 0.038) Linear by linear association 36.009, df=1. A significant association was also found between attitude towards IP and compliance with IP guidelines, for instance, those who had good attitude towards IP highly complied with the Guideline, Corrected Chi-square=6.480, df=2, (95% CI 0.000, 0.062, P-value=0.026. Linear by linear association 8.814, df=1. In addition, availability of IP materials was significantly associated with compliance, those who indicated that IP materials were always available highly complied with the guideline, Corrected Chi-square=18.489, df=6, P-value=0.000, (95% CI 0,000, 0.038). Linear by linear association=15.166, df=1. Similarly, those who had IP as part of their training highly complied with guidelines, Uncorrected Chi-square=9.750, df=2, P-value 0.000 (95%CI=0.000, 0.038). Linear by linear association 9.423, df=1.

The results showed that factors such as number of years in service, management support toward the implementation of IP guidelines and access to IP materials were not significantly associated with compliance.

The results from the observation of routine IP practices were similar to those obtained through the self-administered interview schedules. The highest compliance (100%) was observed with the single use of needles and syringes, while the lowest (25%) was with the decontamination of needles and syringes with 0.5% chlorine solution prior to disposal. Compliance with hand hygiene was moderate (66.8%).

Conclusion The findings suggest a need for inclusion of IP Guidelines in all Health Care workers' curricula, Provision of in-service training on IP guidelines and improvement in the supply of materials for IP.

Key Words Infection Prevention Guidelines, Compliance, Health Care Workers.

DEDICATION

This study is dedicated to my God the Lord Almighty, who guided me in carrying out the study.

To my late Father and Mother Mr. and Mrs. Joseph and Emma Katowa my source of inspiration.

To my Husband Mr. J. K. Sathumba Mukwato who supported me through the process and

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LIST OF ABBREVIATIONS

AIDS	-	Acquired Immunodeficiency Syndrome
CDC	-	Centre for Disease Control
ECSA-HC	-	East, Central, and Southern Africa-Heath Community
HIV	-	Human Immunodeficiency Virus
HBV	-	Hepatitis B Virus
HBC	-	Hepatitis C Virus
IP	-	Infection Prevention
JHPIEGO	-	John Hopkins Information Education on Gynaecology and Obstetrics
PEP	-	Post Exposure Prophylaxis
PPE	-	Personal Protective Equipment
SPSS	-	Statistical Package for Social Scientist
SSI	-	Surgical Site Infection
STI	-	Sexually Transmitted Infection
OR	-	Odds Ratio
WHO	-	World Health Organization

CHAPTER 1

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Nosocomial infections are acquired during hospitalization. They are caused by Candida albicans, Escherichia coli, hepatitis viruses, herpes zoster virus, pseudomonas and staphylococcus (Anderson et al 1995). These pathogens are transmitted from one person to another through direct or indirect contact. At any one time, 10% of in-patients have a Hospital Acquired Infection (HAI) (Taylor et al 2001). Nosocomial infections rates range from 1% in Europe and America to more than 40% in some parts of Asia, Latin America and Sub-Saharan Africa (Lynch 1997). The most frequent nosocomial infections occurring in developing countries are Surgical Site Infections (SSI), urinary tract infections and lower respiratory tract infections such as pneumonia (Emori and Gaynes 1993).

These infections are usually resistant to commonly used drugs such as penicillins and they are difficult to eradicate from the health care environment. They prolong hospitalization thus increasing bed occupancy and consequently consuming scarce hospital and patient resources and proving a major challenge to clinical management (Plowman et al 2000). According to Tietjen et al (2003) on average, having a SSI increases a patient's hospital stay by 7-10 days, with organ/space and deep incision SSI accounting for the longest stays and highest cost.

The strain that these preventable infections put on the health care system in terms of; prolonging patient hospitalization, treatment with expensive drugs and the use of other services such as laboratory tests, X-rays and transfusion is immeasurable yet they can be prevented simply by adhering to simple and cheaper infection prevention and control methods and practices (Didier et al 1999).

The economical burden of hospital acquired infections in England alone is estimated to be one billion pounds per annum, yet 15-30% of these infections are preventable (Plowman et al 2000). In the United States of America (USA) the added expenditure due to nosocomial infection is in excess of $4.5 billion per year http:\\www.emedicine.com/ped/topic 1619.htm.

Considering the economical impact of hospital acquired infections, it becomes clear that prevention and control measures such as the recommended Infection Prevention (IP) practices are cost effective and should be adhered to by all providers in the health care sector.

People receiving health and medical care whether in a hospital, clinic or at home are at risk of becoming infected with nosocomial infections unless precautions are taken to prevent these infections (Alvarado 2000). To address this problem, the Centre for Disease Control (CDC) of the United States public health services developed the Universal Precautions (UP) guidelines in 1985. The guidelines state that, "All patients should be assumed to be infectious with HIV, hepatitis B and other blood borne pathogens" (Chin 1990). This was in response to the emergency of blood borne diseases such as the Acquired Immunodeficiency Syndrome (AIDS) and hepatitis B and C viruses. In hospitals and clinics, Universal Precautions should be followed when health workers come into contact with or might come into contact with blood and other body fluids such vaginal secretions, amniotic fluids, semen, pleural fluids, pericardial fluid synovial fluid, cerebral spinal fluids or any body fluid visibly contaminated with blood (Chin 1990). Universal Precautions were later in 1996 modified by CDC into a two level approach known as Standard Precautions and Transmission- Based Precautions.

The Standard Precautions are guidelines that apply in treating all patients and clients attending health care facilities regardless of their presumed diagnosis. They include; washing of hands with soap and water or using an antiseptic hand rub before and after working with a patient, covering of any sore or cut with water

proof plaster, wearing of barriers such as gloves, gowns, aprons, masks, and protective eye wear to prevent exposure to blood and body fluids containing visible blood. Other measures include not recapping, bending or manipulating used needles and other sharp instruments. All reusable instruments should be decontaminated in 0.5% chlorine solution for 10 minutes, cleaned (washing with soap and clean water till visibly clean) and finally sterilized. Sterilization can be achieved by: high pressure steam (autoclave at 106 kPa 20 minutes for unwrapped items or 30 minutes for wrapped items); dry heat (oven at 170 degrees for 1 hour); or by the use of chemical sterilants (glutaraldehyde 2% for10 hours or 8% formaldehyde solutions for 24 hours. Any spills of blood or body fluids should be immediately cleaned up using sodium hypochlorite solution 0.5%.

Transmission based precautions, apply to hospitalized patients known or highly suspected to be infected or colonized with pathogens transmitted through air borne, droplet or by contact. Patients nursed under transmission based precautions include those with Tuberculosis, Measles and Cholera.

Nosocomial infections are still a major challenge in Zambia as demonstrated by the increase in wound infections among patients with ceaserian section which is 30%. This could be attributed to ineffective infection prevention and control methods (Central Board of Health 2003). In order to address this problem, the Government of Zambia through the Ministry of Health and its Co-operating Partners developed the Zambia Infection Prevention Guidelines in 2003. This was after a realization that infection prevention was a critical component of quality health care. The Zambia Infection Prevention Guidelines (2003) specify the infection prevention principles which are:

- Consider every person (client or staff) infectious.
- Hand Washing-the most practical procedure for preventing cross contamination (person to person).

- Wear gloves before touching any thing wet such as broken skin, mucous membranes, blood, body fluids, secretion or excretion or before touching soiled instruments and other items.
- Use barriers:- Personal Protective Equipments (PPE) such as protective goggles, face mask and aprons if splashes or spills of blood or body fluids secretions or excretions are anticipated.
- Use safe work practices, such as not recapping or bending needles, safely passing sharp instruments, and disposing sharps in a puncture proof container.
- Process instruments and other items that come into contact with blood, body fluids, secretions or excretions.
- Dispose contaminated instruments and contaminated waste thoroughly and properly.
- Isolate patients only if secretions or excretions cannot be contained (Ministry of Health, 2003).

The infection prevention guidelines are essential in guiding the health care workers, the client and the community in preventing hospital acquired infections. One of the co-operating partners that has been spearheading the development and implementation of the infection prevention guidelines is John Hopkins Information Education on Gynaecology and Obstetric (JHPIEGO). JHPIEGO with the Zambian Government facilitated the development of the Infection Prevention (IP) Guidelines and the National Infection Prevention and Control Strategic Plan 2005-2007. The National strategic plan for Infection Prevention is meant to facilitate the implementation of the Guidelines. JHPIEGO has also trained health care workers at both hospital and district levels on the use of the Infection Prevention Guidelines. In addition JHPIEGO has procured essential IP materials and supplies such as buckets for decontamination, colour coded bin liners, gum boots, utility gloves and sodium hypochlorite for the Hospitals and Districts.

Ronald Ross General Hospital in Mufulira District is one of the hospitals that has benefited from JHPIEGO both in terms of training of health workers and as a

recipient of essential IP materials and supplies. Despite the hospital staff being trained on IP and the hospital receiving the essential IP materials and supplies, it is still recording rates as high as 33% of post operative caesarean section wound infections. (Ronald Ross General Hospital 2006).

1.2 STATEMENT OF THE PROBLEM

The Infection Prevention and Control Guidelines have been available in all practicum areas at Ronald Ross General Hospital since 2003. However, it has been observed that health care workers at the Hospital do not comply with the recommended Infection Prevention and control Guidelines such as hand washing, decontamination of instruments and linen, use of sterile materials for wound dressing and random swabbing of instrument and other surfaces within the hospital. This is probably due to erratic supply of IP materials such as sodium hypochlorite (Jik) for decontamination, soap or hand rub for hand hygiene and sterile packs for wound dressing. This resulted in health care workers improvising for example, using non-sterile materials for wound dressing instead of sterile materials. Consequently the non compliance has been attributed to the increase in the number of post operative wound infections especially following caesarean sections. According to Maimbolwa 2000, the World Health Organization (WHO) acceptable post operative infection rate is 5% while Ronald Ross General Hospital has been recording rates as high as 33% as indicated in table 1on page 6.

Table 1: Showing the Number and Percentage of Women with Infected Ceasarean Sections at Ronald Ross General Hospital (2006 and 1st quarter 2007).

MONTH	NUMBER OF WOMEN WITH CEASAREAN SECTION	NUMBER OF CEASAREAN SECTIONS INFECTED	PERCENTAGE INFECTED
JANUARY	12	4	33
FEBRUARY	9	1	11
MARCH	18	5	27.8
APRIL	12	1	8
MAY	14	0	0
JUNE	12	0	0
JULY	14	2	14
AUGUST	12	4	33
SEPTEMBER	12	1	8
OCTOBER	12	1	8
NOVEMBER	14	2	14
DECEMBER	12	1	8
JANUARY	16	1	6
FEBRUARY	17	4	24
MARCH	22	5	22
APRIL	26	4	15
TOTAL	234	36	15.4

Source: Health Management Information System-Ronald Ross General Hospital 2006/7

Table 1 shows that, although the infection rates were fluctuating between 8 and 33% through out the year, the average wound infection rate of 15.4% (36 infected

wounds from a total of 234 caesarean sections performed) is still high considering WHO acceptable post operative infection of rate of 5% .

Pathogens that cause SSIs are staphylococcus aureas, enterococcus species and Escherichia coli Tietjen et al 2003. Two of the above pathogens that is staphylococcus aureas, Escherichia coli and klebseilla were isolated from cultured swabs taken from rooms in the Maternity Department of Ronald Ross General Hospital, (Ronald Ross General Hospital 2006). The sources of these pathogens are the patient's skin, mucous membranes, or bowels. The pathogens could also have come from the hands, or nose of the surgical team members. Contaminated operating rooms or hospital wards as well as contaminated instruments can also be a source of these pathogens (Tietjen et al 2003).

To protect health care workers, the clients and the community at large from these pathogen, it's imperative that recommended infection prevention practices are complied with. However there are several factors that determine this compliance.

1.3 FACTORS INFLUENCING HEALTH CARE-WORKERS' COMPLIANCE WITH INFECTION PREVENTION GUIDELINES.

The factors that influence health workers' compliance with infection prevention guidelines can be classified into three broad categories; disease/client related, service delivery, and service provider related factors.

1.3.1 Disease/Client Related Factors

These include; increased disease burden, high patient turnover, high workload, and insufficient time. These factors are closely related to each other with one factor leading to the other.

Zambia is a country with a high disease burden resulting from the HIV and AIDS pandemic (Ministry of Health 2005). Those who are infected with HIV often fall ill, needing admission and for longer periods of time (East, Central and Southern

Africa Health community, 2004). This is often due to the lowered immunity making them susceptible to common minor illnesses and opportunistic infections. This has resulted into high patient turn over and high bed occupancy with increased workload. This scenario is compounded by the shortage of health care workers to attend to the ever-increasing number of patients as the country is experiencing a human resource crisis. Consequently the few health workers are overwhelmed with direct patient care such that they have insufficient time to strictly follow the recommended IP guidelines especially that there are no obvious indicators of consequences of non compliance.

1.3.2 Service Delivery Factors.

The service delivery factors that influence health care workers' compliance to infection prevention guidelines are varied. They range from poor funding to health institutions, which results in shortage of IP supplies, location of IP supplies/ facilities and nature of work environment (acute/emergency or non-acute care settings). Others are management support, participation in the development and implementation of IP Guideline and protocols, and rewards/sanctions for compliance/non-compliance respectively.

Inadequate funding to health institutions has an implication in service provision. One of the areas that can easily be neglected when there are inadequate funds in an institution is that of infection prevention since its implications are not obvious in the short term. When funding to a health institution is not adequate, management usually sets priorities; prominent on the priority list are usually drugs. Procurement of IP supplies such as Jik (sodium hypochlorite) for decontamination, personal protective equipments such gloves and soap for hand washing is usually postponed in times of poor financial standing. Such circumstances do result in poor compliance as health workers may lack essential supplies necessary to practice good IP practices despite the knowledge they posses (Libetwa 1997; Hamomba 2006). On the other hand, supplies may be available but the existing institutional systems and processes may hinder their utilization due to inconvenient location. For

example, gloves may be located far from the operational area such that the worker cannot easily access them in times of emergency ending up conducting a procedure without wearing the necessary protective clothing. Access to IP supplies may also be hindered by the institution's bureaucratic procedures in obtaining the required supplies. This may result in non-compliance.

The nature of the work environment in terms of emergency or acute setting opposed to non-emergency non-acute setting. Health care workers in emergency or acute setting may be less compliant relative to their colleagues in non-emergency non-acute settings simply due to the nature of the work environment (high intensity of patient care). Increased intensity for patient care and having many opportunities for hand hygiene are major influences to non-compliance (Didier 2004). Those in casualty department for example, are often faced with mass casualty with several patients requiring immediate attention and high intensity of care. In such a situation, an individual may choose to omit an IP practice such as wearing of gloves so as to commence a patient on oxygen (patient need perceived priority). The same may apply to those working in intensive care units where workers are confronted with emergencies at any time. Intensity of patient care and increased demand for IP practice such as hand washing may negatively influence compliance, as individuals in such circumstances get overwhelmed.

The other service related factor that may influence compliance to IP guidelines is the level of management support towards the programme. Where management supports the implementation of the guidelines and make IP a priority, the workers' level of compliance may be good. Management support can include involvement of all categories of workers in coming up with guidelines and protocols for infection prevention. In a situation where the guidelines are already formulated, all workers should be oriented to the new procedures and protocols as a way of imparting a sense of ownership. This may result in improved compliance compared to a situation where management formulated the guidelines and expect workers to

implement. Management support can also be in form of performance assessments and feedback.

In addition, availability/non-availability of a system of rewards/sanctions for compliance and non-compliance respectively can influence the level of compliance by the workers. For example, if management rewards individuals or groups who comply with recommended IP practices, the level of compliance is likely to be improved. The opposite can also be true.

1.3.3 Service Provider Factors

The service provider factors that influence compliance include; attitude, perceived patient status, perceived reduced risk for infection acquisition, ignorance or disagreement with recommended practices, skin irritation from IP material and lack of role models.

According to the Zambia Infection Prevention Guidelines (2006), every person, staff or client should be considered infectious. However, due to the negative attitude of some health workers, they may choose not to wash or to wash their hands due to perceived patient status (not posing a risk for infection acquisition or posing high risk for infection acquisition respectively). A study conducted by Libetwa (1997) on the knowledge, attitude and practices of Midwives on infection control in Lusaka urban clinics revealed that 63.6% of Registered Midwives were motivated to wash their hand by the HIV status of the client.

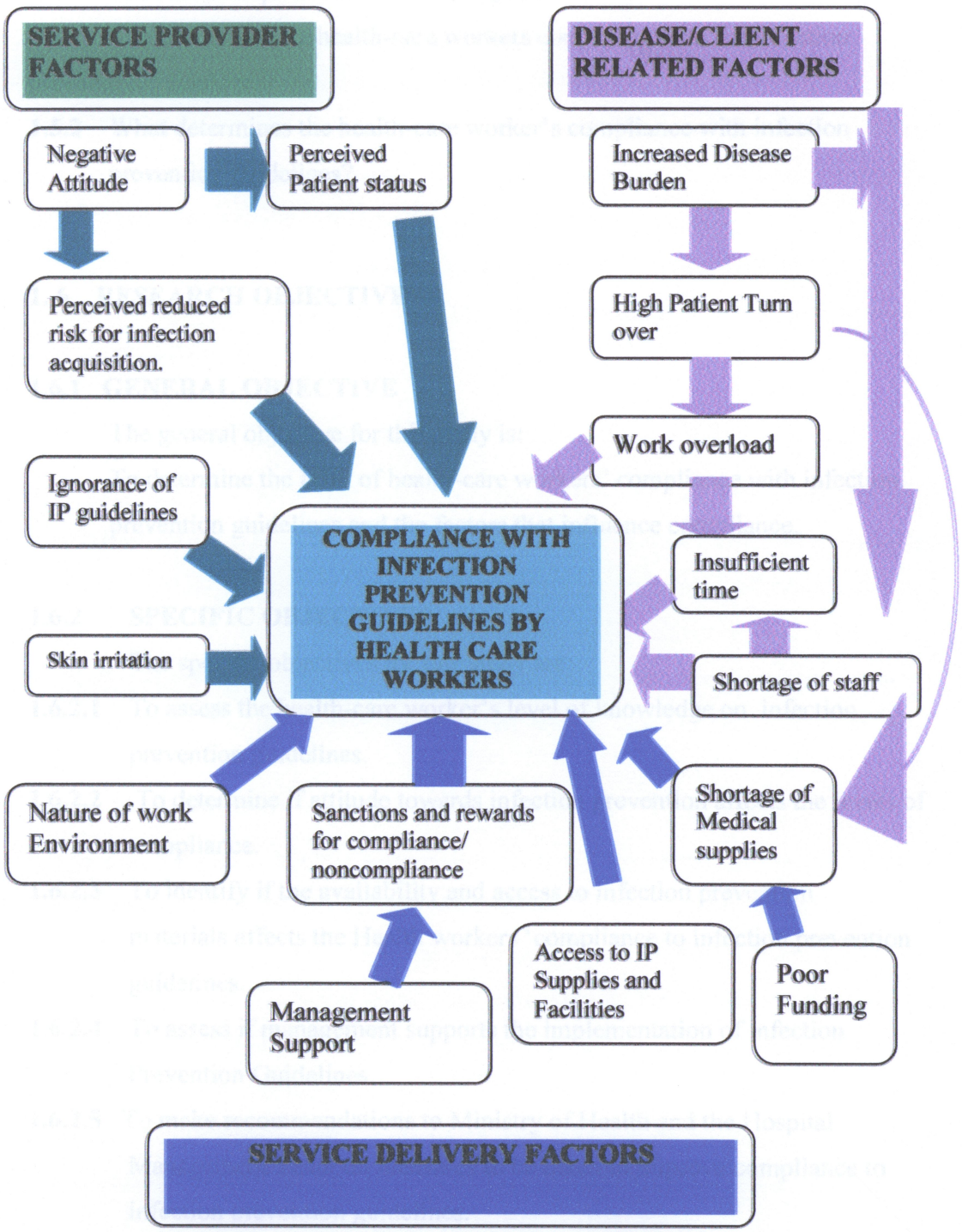
Another socio-cultural factor that influences compliance is ignorance. Individual health workers may not comply with IP guidelines simply due to lack of knowledge of the recommended practices. Some may be ignorant of the levels of efficacy of different IP materials for example, may not wash hands after removing gloves with a belief that gloves are 100% safe and that wearing gloves obviates the need for hand washing (Didier 2004). On the contrary, literature indicates that hands should be washed after removing gloves because gloves may have tiny holes or tears, and

bacteria can rapidly multiply on gloved hands due to moist, warm environment within the gloves (Korniewicz 1990).

The presence or absences of role models play an important part in determining compliance. In a ward where the nurse manager and the consultant in charge strictly comply with IP procedures, it is likely that the junior Nurses and junior Doctors will follow suit. This type of learning is known as observational learning or learning by example .It occurs when an individual acquires new forms of behaviour, attitude or thought simply by observing the actions of others. It can occur whether or not the observed person intends to transmit the behaviour (Bandura 1997).

Additionally, skin irritation may negatively influence compliance. Skin irritation may be due to frequent hand washing with detergents, irritating personal protective equipments such as glove or due to contact with chemicals for decontamination. This negative influence can be minimized by providing alternatives, for example instead of hand washing with detergents, an alcohol based hand rub can be provided to minimize skin irritation. This can result in additional advantages as alcohol based hand rubs require less time, act faster and are easier to use especially in areas with increased intensity of patient care (Didier 2004). This can result in sustained improvement in compliance with decreased infection rates.

1.4 Figure1.0: DIAGRAM OF PROBLEM ANALYSIS



Source: Formulated by the Author, 2007

1. 5 RESEARCH QUESTIONS

The research questions for this study are:

1.5.1 To what extent are health-care workers complying with the infection prevention guidelines?

1.5.2 What determines the health-care worker's compliance with infection prevention guidelines?

1. 6 RESEARCH OBJECTIVES

1.6.1 GENERAL OBJECTIVE

The general objective for this study is:

To determine the level of health-care workers' compliance with infection prevention guidelines and the factors that influence compliance.

1.6.2 SPECIFIC OBJECTIVES

The specific objectives for this study are:

1.6.2.1 To assess the health-care worker's level of knowledge on infection prevention guidelines.

1.6.2.2 To determine if attitude towards infection prevention affects the levels of compliance.

1.6.2.3 To identify if the availability and access to infection prevention materials affects the Health workers 'compliance to infection prevention guidelines.

1.6.2.4 To assess if management supports the implementation of infection Prevention Guidelines.

1.6.2.5 To make recommendations to Ministry of Health and the Hospital Management Team on measures to be taken to improve compliance to infection prevention guidelines.

1.7 HYPOTHESIS

HO: There is no association between the health care worker's compliance to infection prevention guidelines and the following factors:

1. Knowledge of infection prevention guidelines and hospital acquired infections.
2. Attitude of health workers towards infection prevention.
3. Availability and access to infection prevention materials and supplies.
4. Management support towards the implementation of Infection Prevention Guidelines.

1. 8 JUSTIFICATION FOR THE STUDY

The prevalence of HIV and AIDS stands at 16% among the Zambian adult population, while there are more than 40,000 new cases of Tuberculosis reported every year (MoH 2005). In an environment with high prevalence of infectious blood borne diseases coupled with scarce resources, it is necessary that health care workers adhere to infection prevention guidelines to prevent parentral, mucous membrane and non-intact skin exposure of health workers and clients to blood borne pathogens.

It is for this reasons that the investigator wishes to establish the health workers' compliance to infection prevention guidelines and factors that influence the level of compliance. It is hoped that the information obtained through this investigation will be used to provide additional continuing education to health care workers on the importance of adhering to the recommended infection prevention practices as a means to reducing hospital acquired infections for both health care workers and the clients. If health care workers have up to date information on the risk of medical transmission, training in safe injection and other infection prevention practices and adequate supplies to support these practices they have the power to virtually eliminate the risk of transmission of HIV and other life threatening diseases that

pose a threat to themselves, their patients and the surrounding communities (JHPIEGO 2006).

It is also hope that the results of the study will be used by the Mufulira Hospital Management Team particularly its Infection Prevention Teams to develop strategies (encompassing education, motivation and system change) to mitigate the problem of non-compliance since factors determining compliance will be highlighted. The strategies for improving compliance should be multimodal and multidisciplinary.

1. 9 DEFINITION OF TERMS

1.9.1 Compliance: refers to acting according to a set of rules or guidelines.

1.9.2 Infection Prevention: is an act of placing a chemical or mechanical barrier between a microorganism and a susceptible individual.

1.9.3 Zambia Infection prevention guidelines: are a set of guidelines designed to provide standard infection prevention practices applicable at all levels of health care system in Zambia.

1.9.4 Universal Precautions: are a set of procedures and guidelines designed to both protect the health-care worker and the client, and break the chain of transmission.

1.9.5 Personal Protective Equipment: refers to the protective gear won by medical staff to protect clients from microorganisms present on the medical staff and also to protect the staff from microorganisms resent on the client.

1.9.6 Decontamination: is a process that makes inanimate objects safer to be handled before cleaning, it inactivates hepatitis B and C viruses and HIV but does not eliminate other contaminating microorganisms such as bacterial endospores.

1.9.7 High Level Disinfection: is a process that eliminates all microorganisms except bacterial endospores from inanimate objects by boiling, steaming or use of chemical disinfectants.

1.9.8 Resident Flora: are microorganisms that are ever present on the individual's skin surfaces, can cause nosocomial infections.

1.9.9 Transient Flora: refers to microorganisms acquired through contact with patients, other health workers or contaminated surfaces such as examination tables, they can cause nosocomial infections.

1.9.10 Sterilization: is a process that eliminates all microorganisms (bacteria, viruses, fungi and parasites) including bacterial endospores from inanimate objects through autoclaving, dry heat or chemical sterilants or radiation.

1.9.11 Hand hygiene: refers to several actions intended to decrease colonization of hands with transient flora, achieved through hand washing or hand disinfection.

1.9.12 Hand washing: refers to washing hands with an unmedicated detergent and water or water alone.

1.9.13 Hygienic hand wash: refers to washing hands with an antiseptic agent.

1.9.14 Waste Management: refers to all activities both administrative and operational involved in the handling, treatment, conditioning, storage and disposal of waste.

1.9.15 Nosocomial infections: are hospital acquired infections.

1.10 VARIABLES, CUT OFF POINTS AND INDICATORS

Variable

A variable is a characteristic or attribute of a person or object that varies (Polit and Hungler 1997).

In this study two main types of variables were considered namely the dependent and independent variables.

Dependent Variable.

This is the outcome variable of interest, the variable that is hypothesized to depend on or to be caused by another variable (called the independent variable), some times referred to as the criterion variable (Polit and Hungler 1997). The dependent variable for this study was Compliance with Infection Prevention Guidelines.

Independent Variable.

This is a variable that is believed to cause or influence the dependent variable, in experimental research, the manipulated variable, Polit and Hungler (1997). The independent variables for this study were:

1. Knowledge of Infection Prevention Guidelines /Hospital Acquired Infections.
2. Staff attitude towards Infection Prevention and Control
3. Availability of IP materials
4. Access to Infection Prevention Materials
5. Management support in the implementation of Infection Prevention Guidelines.

TABLE 2: VARIABLES, CUT OFF POINTS AND INDICATORS

VARIABLES	CUT OFF POINTS	INDICATORS
INDEPENDENT VARIABLES		
Knowledge of IP Guidelines/Hospital Acquired Infections	High	If one scores 15-18 on Questions of knowledge
	Medium	If one scores 9-14 on Questions of knowledge
	Low	If one scores 0-8 on Questions of knowledge
Availability of IP materials	Always Available	If one scores 3 on questions of IP material availability
	Mostly available	If one scores 2 on questions of IP material availability
	Rarely available	If one scores 1 on questions of material availability
	Not Available	If one scores 0 on questions of IP material availability
Management support In the implementation of IP guidelines	Good	If one scores 4 on questions of management support
	Poor	If one scores 0-3 on Questions of management support

"TABLE 2, CONT"

Staff attitude towards Infection prevention and control	Very Good	If one scores16 on Questions of attitude
	Good	If one scores 11-15 on Questions of attitude
	Poor	If one scores 0- 10 on Questions of attitude
Access to IP supplies and materials	Easily accessible	If one sores 3 on questions of access
	Not easily Accessible	If one scores 0-2 questions of access
	DEPENDENT VARIABLE	
Compliance with Infection Prevention Guidelines	High	If one scores 12-15 questions of IP practice
	Moderate	If one scores 8-11 on questions of IP practice
	Low	If one scores 0-7 on Questions of IP Practice

CHAPTER 2

2.0 LITERATURE REVIEW.

2.1 INTRODUCTION

The literature review focuses on the health care workers' compliance to Infection Prevention and Control Guidelines. Sources of reviewed literature include books, articles, policy papers, professional journals and dissertations both published and unpublished.

Several authors have written on many aspects of Infection Prevention and Control such as Compliance with hand hygiene, knowledge, attitude and practices of health care workers on Infection Prevention and Waste Management. However, most of the studies were conducted in European and American countries whose health settings are different from those in Africa and Zambia in particular therefore, findings from such studies can not be generalized to countries in Africa. Despite such limitations, these studies still give a rough idea about health care workers' practices and compliance with infection Prevention Guidelines. This review therefore, is aimed at establishing what is already known about the topic and to identify gaps in the existing literature.

2.2 GLOBAL PERSPECTIVE

Didier and Boyce (2001) in a review article entitled "Hand Hygiene and Patient Care, Pursuing the Semmelweis Legacy, indicated that Semmelweis observed that mortality rate from puerperal fever was high (16%) before May 1847 in a clinic where doctors and student doctors provided care to women in labour despite washing hands with soap and water before entering the obstetric clinic. Semmelweis (1847) postulated that the high rates of puerperal fever was caused by "cadaverous" particles transmitted from the autopsy room to the obstetric ward via

the hands of students and doctors. In May 1847, Semmelweis insisted that doctors and students scrub their hands in a chlorinated lime solution before every physical examination. Consequently the mortality rate in that clinic dropped from 16% to 3.06% in the remaining 7 months of 1847.

The intervention by Semmelweis, provides evidence that cleansing heavily contaminated hands with an antiseptic before patient contact can reduce nosocomial transmission of contagious diseases more effectively than hand washing. Therefore, hand washing with a hand antiseptic should be practiced in every situation since its the most ideal and quick technique in reducing hand contamination to the lowest level possible while ensuring freedom from notable side effects on the health worker's hands (Didier 1999). In addition, hand washing in general is considered the single most-important infection prevention and control practice (Tietjan et al 2003 and Central Board of Health 2003).

In an observational study conducted by Didier et al (1999) on Compliance with hand hygiene in a Teaching Hospital in Geneva, Switzerland, it was established that compliance was moderate with an average compliance of 48%. Compliance varied across types of health care workers with the highest level of non-compliance being among physicians with an Odds Ratio (OR) of 2.8, Nurse Assistants OR of 1.3 and other health care worker OR of 2.1. Compliance also varied across medical specialty with the highest level of non-compliance being in Intensive Care Units, OR of 2.0, during procedures that carry high risk for contamination OR of 1.8, and when intensity of patient care was high (more than 60 opportunities of hand washing per shift of 6 hours) OR of 3.5. These findings suggest that target education programmes may be useful in tackling the problem of non-compliance. Didier and colleagues suggested that although observational data can not prove causality, the association between non-compliance and the intensity of patient care suggest that understaffing decreases compliance and consequently the quality of patient care.

In 2002, the results of the WHO assessment conducted in 22 developing countries showed that the proportion of health care facilities that do not use proper waste disposal methods ranges from 18% to 64% (WHO 2005) such figures show poor adherence to CDC recommendations. Health care activities lead to the production of both non-contaminated and contaminated waste. Although approximately 80% of the waste is non-contaminated and posses no infection risks to persons who handle it, the remaining 20% is potentially dangerous (WHO 2005). Among the infectious waste are sharps, non- sharps (materials that have been in contact with blood and it's derivatives) and body parts. Sharps waste though produced in small amounts, is highly infectious, if poorly managed it exposes health care workers, waste handlers and the community to infections. Contaminated needles and syringes represents a particular threat as they may be scavenged from waste areas and dump sites and be reused. WHO (2005) estimated that in 2000, injections with contaminated syringes caused:

- 21 million hepatitis B virus (HBV) infections (32% of all new infections);
- 2 million hepatitis C virus (HCV) infections (40% of all new infections);
- 260 000 HIV infections (5% of all new infections)

According to (WHO 2005), a person who experiences one needle stick injury from a needle used on an infected source patient has a risk of 30%, 1.8% and 0.3% to be infected with HBV, HCV and HIV respectively. Considering the risk caused by exposure to infectious medical waste such as accidental needle stick injuries that cause blood borne infections, it calls for the best practices in the management of health care waste.

WHO (2005) in a policy paper entitled "Safe Health-Care Waste Management" recommended that health care waste should be segregated at the point of generation to minimize the potential for injury and the subsequent infection to people who come into contact with the waste, both in health care facilities and in the community. Segregation of waste at the point of generation also helps to reduce the bulk of contaminated waste which is costly to dispose off.

2.3 REGIONAL PERSPECTIVE

A study by Ofili (2000) on occupational accidents among health workers at a central Hospital in Benin City indicated that 60.7% of nurses recapped needles at one point or the other, while 49.1% that is almost half-detached needles from a syringe after use. Detaching and recapping of needles after use are wrong practices since blood and body fluids containing blood can enter the practitioner's body through puncture wounds caused by these practices. On the disposal of needles, the same study revealed that 39.4% of nurses, 30.2% of doctors and 52.9% of laboratory workers put needles in the container immediately after use. Such low levels of compliance to the recommended IP practices on the handling of sharps need to be addresses by all concerned parties. Such mal-practices pose a danger to the health care workers since they cause needle stick injuries that can result in the transmission of infectious blood borne diseases such as HIV and hepatitis B and C viruses. This is more so that Sub-Saharan African has the highest HIV burden in the world.

According to WHO (2003) over 16 billion injections are given every year in developing countries including Zambia. These injections if contaminated with blood can transmit; 8-16 million infections of hepatitis B virus, 2.3 to 4.7 million infections of hepatitis C virus and 80 000- 160 000 infections of HIV.

World Health Organization (2003), also states that in Africa , there is an average of 2 injections per person per year the number of infections being higher for those with chronic illnesses. Table 3 on page 24 indicates that the proportional of infections due to unsafe injections stands at: Hepatitis B virus averages (9.2%); Hepatitis C virus averages (13 %) while HIV averages (2.5%).

Table 3: Injection practices and consequences

Burden of Disease (Hepatitis B and C and HIV/AIDS)			
		Africa group E/ Zambia	**World**
Injections per person per year		2.0	3.4
Proportion of reuse		17%	39.8%
Proportion of infections due unsafe injections	Hepatitis B Virus	9.2% **(6.9- 11.5 %)**	31.9% (9.4- 56.9%)
	Hepatitis C Virus	13.0% **(9.8 – 16.2%)**	39.9% (18.2 – 66.7%)
	HIV	2.5% (1.9 -3.1%)	5.4% (3.9 – 7.0%)

World Health Organisation (WHO) Managing an Injection safety policy- Final Version 14th March, 2003.

Although the medical transmission of the deadly HIV accounts for a smaller percentage of the overall transmission, it's largely preventable through the application of infection prevention guidelines and standard injection safety.

In a study conducted by the East, Central and Southern Africa-Health Community (ECSA-HC) in 2004 on the challenges facing the Malawian Health work force in the era of HIV and AIDS, a focus group participant was quoted as saying "at the moment we are exposed to HIV/AIDS. We always touch patients' blood...we attend to patients who are coughing. We don't know whether the patient has tuberculosis or not. In that way we are exposed "Many focus group participants also reported an inadequate supply of protective equipment such as gloves. Discussions also revealed that fear of HIV/AIDS and other infections have contributed to poor performance, low motivation and morale as well as attrition. This calls for concerted efforts in improving the supplies of IP materials if health workers are to feel safe as they provide health services to the client. With adequate supplies, literature has indicated that compliance improves (JHPIEGO 2006). In this way, the

safety of health care workers and their clients is guaranteed as they are protected from nosocomial infections. Consequently the quality of health care is improved.

The same study revealed, knowledge deficit on Universal Precautions (Ups) among health care workers. For example, the majority of health workers interviewed (78%) were not well versed in UP when asked questions. The majority of staff (96%) knew the first aid for washing needle stick injuries. However, most of them did not know the procedure to follow in order to start Post Exposure Prophylaxis (PEP). As PEP is a major component of infection prevention and control, it is a must that health care workers should be conversant with the existing guidelines should they be exposed to needle stick injury or blood and body fluid. This can be achieved through both pre and in- service training.

2.4 NATIONAL PERSPECTIVE

A study entitled Trails of Improved Practices conducted by the Central Board of Health and the Prevention of Medical Transmission of HIV Project in Ndola and Chipata in 2004, revealed that all (100%) health workers were observed using new sterile injection equipment. However 59% of health providers reported having needle stick injuries in the last 12 months. Further more two-hand recapping was observed in 13% of the observations. This finding of two-hand recapping is extremely dangerous as this practice is the commonest cause of needle stick injuries. It is also an indicator of poor compliance to infection prevention guidelines, which encourage the use of safe work practices such as not recapping or bending needles. Recapping of needles is a major contributing factor to needle stick injuries consequently the transmission of blood and body fluid borne pathogens such as HIV and Hepatitis B and C.

In the same study, it was found that there were a number of gaps in the availability of IP supplies. In Ndola, for example, supply availability was below 50% while in Chipata it was slightly above 50%. This was because procurement and distribution methods were not demand driven. In most health institutions procurement of IP

supplies is reactive rather than proactive largely due to non- availability or quantification lists and procurement plans. Literature has shown that shortage of IP materials is a major contributor to poor compliance in the sense that despite the knowledge health workers may posses and their desire to comply to guidelines it becomes impossible to do so (Didier et at 1999). This calls for advocacy in sourcing for financial resources to procure adequate supplies of IP materials especially in the sight of elevated patient turn over. There is also need for proper guidelines on the procurement and distribution of IP material to prevent frequent stock outs currently being experienced in most of our health institutions.

Maimbolwa et al (1997) in a study entitled "Routine Care of Women Experiencing Normal Deliveries in Zambian Maternity Wards: A Pilot Study", reported that there were inadequate supply of personal protective equipment such as gloves in Lusaka Urban Health Centers and Southern Province based health facilities. In the Southern Province based health facilities gloves were reserved for use in theatre and there was only a limited supply to the labour ward. The inadequate supply of gloves lead to incorrect routines, for example, routine performance of vaginal examination depended on availability of gloves. The average number of vaginal examinations for each woman at the University Teaching Hospital was 3.5 compared to 1.3 in Lusaka Urban Clinics and 2 in Southern Province based health facilities.

In the same study, it was noted that reuse of un-sterile gloves was prevalent in Southern Province based health facilities. This exposed the midwives to the danger of contracting HIV/AIDS as gloves were reused without being sterilized. The reuse of gloves does not only pause a danger of contracting nosocomial infections by the midwives but the clients too as microorganisms can be transferred from one patient to the other via the used gloves. The practice of reusing gloves is against the principles of infection prevention which encourages the use of a separate pair of gloves for each client to avoid cross contamination.

A study conducted by Chanda (1995) entitled "Sharp Injuries among Health Care Providers at the University Teaching Hospital, Lusaka, Zambia", revealed that 14 (82%) out of 18 doctors and 12 (71%) out of 20 nurses who recap needles sustained needle stick injuries. This finding too showed lack of compliance to CDC recommendations which encourages the use of safe work practices such as not recapping needles.

Chanda (1995) in a report entitled "Nosocomial Infection amongst Burns Patients at the University Teaching Hospital, Lusaka, Zambia", indicated that mortality rate secondary to burns infection was lowest in wards that were situated on the top floor probably due to minimal movementsand good ventilation. This report emphasized the importance of regulating traffic flow and activity patterns a component of infection prevention. Controlling of traffic and activity patterns in a ward helps in minimizing the number of microorganisms present in the environment, as the number of microorganisms in a designated area tends to be related to the number of people present and their activity (Russell et al 1982 and Central Board of Health 2003). Health care workers should always bear in mind that an important objective of infection prevention is to minimize the level of microbial contamination in areas where patient care and instrument processing take place (wound dressing and delivery rooms, surgical units where major and minor operations are performed, and work areas where instruments are performed).

Libetwa (1997) in her Dissertation entitled "Knowledge, Attitude and Practices of Midwives on Infection Control in Maternity Units in Lusaka Urban Clinic", revealed that midwives perceived themselves to be at risk in their working environment, because of extreme shortage of gloves, disinfectants, sharp boxes and plastic aprons. The midwives indicated that they would gladly practice infection control if the materials needed were available. The investigator further revealed that, the perceived risk affected the Midwives' work in several ways: refusing to carry out some tasks such as episiotomy (60%); washing or re-using gloves (10%); wearing gloves through out the shift (12.5%); and wearing three to four pairs of

gloves at once (17.5%). If shortage of IP materials and supplies has been identified as deterrent factor in complying with the recommended best practices, then health care managers should find ways and means of ensuring adequate supplies in order to protect both the staff and patients from Hospital Acquired Infections.

Libetwa (1997) also revealed some inconsistence and incorrect use of IP materials as indicated by 12.5% of midwives who wore gloves through out the shift and the 17.5% who wore 3-4 pairs of gloves.This showed lack of knowledge in the use of personal protective equipments. For example, wearing of 3-4 pairs of glove is wastage of scarce resources as WHO (1985) recommends only double gloving for health care workers performing surgeries and deliveries.

Siziya et al (2000) conducted a study on risk of occupational exposure to HIV for Nurse-Midwives and Traditional Birth Attendants. It was observed that general hygienic measures taken in hospitals to reduce the risk of HIV infection were insufficient and that many inadequacies stemmed from lack of supplies. One may presume that if supplies were improved, such inadequacies will reduce.

A study was conducted by Hamomba (2006) on Adherence to Universal Precautions with reference to HIV infection among Midwives and Trained Traditional Birth Attendants during Home and health Centre deliveries in Siavonga and Mazabuka Districts. The study findings reviewed that the proportion of midwives and nurses adhering to (UPs) was 63.5%. The most significant factors related to adherence for nurses and midwives were the availability of medical supplies and the inclusion of UPs in their training. Respondents who were trained in UPs were 24.89 times more likely to adhere. Respondents who received weekly medial supplies were 11.89 times more likely to adhere to UPs compared to respondents who received monthly Supplies.

In the same study, respondents during a focus group discussion were quoted as saying, "we find it difficult to adhere to Universal Precautions due to inadequate

and sometimes lack of medical supplies". The respondents indicate that, they knew they were expected to use protective clothing such as masks, goggles, closed gumboots, gowns and sterile gloves during deliveries to avoid direct contact with blood. However the only protective clothing available for them were clean gloves and shared aprons and their own nurses shoes. According to the midwives and nurses, sodium hypochlorite (JIK) was in short supply because managements were unable to supply them with enough for proper disinfection of instruments and linen as a result "we are forced to rinse instruments in plain water and then soak them in JIK for 10 minutes". Such malpractices due to inadequate supply of IP materials could be contributing to the high levels of nosocomial infections such as SSIs being recorded in the health institutions through out the country.

2.5 CONCLUSION

From the reviewed literature, it has been established that, compliance to several aspects of IP globally is generally low with the average compliance less than 50%. However, few research studies have been done in Zambia on infection prevention and control especially on compliance with the recommended Ministry of Health Infection Prevention and Control Guidelines. The few studies conducted in Zambia have revealed an average compliance of less than 60%. Therefore the investigator thought it would be important to establish the level of compliance in Mufulira District in Particular. The findings will be used to make recommendations to relevant authorities on how to improve compliance, consequently improving the quality of patient care.

CHAPTER 3

3.0 RESEARCH METHODOLOGY

3.1 INTRODUCTION

The study determined the level of compliance of health care workers with Infection Prevention Guidelines at Ronald Ross General Hospital.

3.2 RESEARCH DESIGN

Research Design is the overall plan for addressing a research question including specifications for enhancing the integrity of the study (Polit and Hungler 2000). For the purpose of this study, a descriptive study design was used. A descriptive research is defined as a non-experimental design to discover new meaning when little is known about a phenomenon of interest (Dempsey and Dempsey 2000). This design was chosen to describe in depth the level of health workers' compliance with the components of infection prevention guideline which are; hand hygiene, use of protective clothing, processing instruments (decontamination, cleaning, sterilization or high-level disinfection), and proper disposal of health care waste. In addition this design was chosen because this study was the first of its kind at Ronald Ross Hospital since Zambia introduced the IP Guidelines in 2003. Findings from this study have provided the first clues on the extent to which health workers are complying with the guidelines. The draw back of this design is that it does not test hypotheses instead it is useful in formulation of hypotheses that can be tested by other designs.

3.3 RESEARCH SETTING

Research setting is the physical location and conditions in which data collection takes place (Polit and Hungler 1996). This study was conducted at Ronald Ross General Hospital (Mufulira District) in the Copper Belt Province of Zambia. The Hospital was owned by the Zambia Consolidated Copper Mine (ZCCM) from 1935

to 2000 when the Government took over due to the decline of the copper industry. The decline of the copper prices resulted in poor health service provision due to poor funding. This Hospital is a second level referral Government Hospital and the largest hospital in Mufulira District. It has a catchment population of 182 809 people. The services offered by the hospital are; general medicine, surgery, obstetrics, laboratory and radiographic services. The institution also offers training to Registered Nurses and Registered Midwives. The site was chosen as it was easily accessible and has relatively large number of health care workers compared to other facilities in the District.

3.4 STUDY POPULATION

A study population is the entire set of individuals (or objects) having same common characteristics (Polit and Hungler 1996). In this study, the population comprised of all health care workers (doctors, nurses, clinical officers, physiotherapists, and laboratory technologists) working in medical, surgical, obstetric, theatre and the laboratory departments. The total number was 77.

This population was targeted because they are in contact with patients and are utilizing the guidelines. Their IP practices can either minimize or perpetuate the transmission of nosocomial infections among themselves, their clients and the community at large.

3.5 SAMPLE SELECTION

A sample is a selected subset of a population (Last 2000). Convenient sampling method was used to select the respondents. This method involves the use of all available subjects at the research site. A sample size of 77 was obtained. This method of sampling was chosen despite its draw back of having an unrepresentative sample. This was, due to a limited population. Many qualified health care workers have left the institution for greener pastures within and out side the country.

3.5.1 Inclusion Criteria

All health care workers working in medical, surgical, obstetric, theatre and laboratory departments and had worked for at least 1 month at Ronald Ross General Hospital were included in the sample.

3.5.2 Exclusion Criteria

a) Health care workers who had worked for less than one month at Ronald Ross General Hospital were not included in the study, as such individuals could have just joined the institution and may not have undergone orientation on the infection prevention procedures and protocols of the institution. Assessing their compliance with Infection prevention could have biased the results because they could have not practiced like the rest of the staff who had worked for more than 1 month and have undergone organizational orientation regarding infection prevention and control.

b) All the non-health care workers working at Ronald Ross General Hospital were not included in the study.

3.6 SAMPLE SIZE

The sample size was calculated using the following formula.

$$n = \frac{ZPQ}{D^2}$$

n = Sample size

P = prevalence

Q = 100-P

D = margin of error + _ 5%

Z = 1.96 from normal distribution

$$n = \frac{1.96*1.96*50(100-50)}{5*5}$$

n = 77

With this formula, a sample of 77 was calculated using epi-info6. This sample was adjusted as follows to allow for non-response.

77/0.90 = 85 people

The adjustment was made since a 90% response rate was expected.

3.7 DATA COLLECTION TOOLS

A self administered interview schedule (see appendix IV) with both open and closed ended questions was used to collect data from the respondents. This is a method of gathering self-report information from respondents through administration of questions in a pencil-and-paper format (Polit and Hunger 1997). This tool was chosen since the respondents were literate. A self administered interview schedule also allowed complete anonymity there by eliminating bias in the responses given.

The interview schedule had six sections. Section A elicited information on the demographic characteristics of the respondents. Some of the variables in this section were age, sex, profession, number of years in service and the department the respondent was currently working in. Section B contained questions that assisted in measuring the respondents' knowledge of infection prevention and hospital acquired infections. In Section C the variable that was measured is attitude. In this section, all the questions were designed to measure the health workers' attitude towards infection prevention.

Section D of the questionnaire contained questions that measured the health workers' compliance to different aspects of infection prevention. The questions addressed health workers' compliance to hand washing, use and disposal of sharp

materials, use of protective clothing, and processing of equipment. In section E the variables which were measured are availability and access to infection prevention materials and supplies, while section F obtained information on management's support in the implementation of IP guidelines. Recommendations to improving IP practices at the institution were also covered in section F.

A checklist was also used to observe the routine practices of health care workers. A checklist is an instrument used by the observer to record observed phenomena (Polit and Hunger 1997). The workers' behaviours were observed, recorded and analyzed to establish their practices. The advantage of this method is that it permits collection of accurate information on behaviours of individuals which can not be obtained through a questionnaire and helps to test the reliability of responses in the questionnaire. The only pitfall of this tool is that observational data is subject to observer bias and people who know they are under observation fail to behave normally (participant reactivity). However, the researcher minimized this bias through careful training during the pre-test and through the use of participant observation respectively. The researcher also allowed adaptation time for participants to get used to being observed to reduce the Hawthorne effects.

3.7.1 Validity

To ensure the quality of a data collection tool, it is important to establish its validity. Validity is defined as the degree to which an instrument measures what it is intended to measure (Polit and Hunger 1997). To measure the validity of the data collection tools, experts in Infection Prevention (within the school of medicine and at JHPIEGO) checked the questions in the interview schedule and assessment items in the checklist. Pre-testing of the instruments was done to determine whether they brought out the desired information. Following the pretest adjustments were made on the content and sequencing of questions. The use of open-ended questions in the questionnaire also allowed spontaneous responses, which are more valid than answers suggested in closed ended questions.

3.7.2 Reliability

Reliability is the stability of the measuring instrument over time (Dempsey and Dempsey 2000). Reliability of the interview schedule was measured by Pre-testing it. During the pre-test, respondents were asked if there were any questions they did not understand and why they answered the questions the way they did. This helped the investigator to identify shortcomings, weaknesses and strengths of the instruments. Following the pre-test, changes were made. The open-ended questions in the questionnaire provided an opportunity to clients to add their own ideas there by bringing out issues not thought of when designing the questionnaire. The checklist was also pre-tested to measure its reliability. However, no changes were made on the Checklist.

3.8 DATA COLLECTION TECHNIQUES

Two techniques were used, that is one self report and one observation method. Self-reports are study participants' responses to questions posed by the researcher in this case a self administered interview schedule, while observation involves watching and recording people's behaviours, characteristics and circumstances.

3.8.1 Administering Interview Schedules

Interview Schedules were delivered by hand to all selected participants and collected later on. The distribution of interview schedules was done during working hours from 08:00 to 16:00hours. The interview schedules had written instructions on how to answer the questions.

3.8.2 Observing using a checklist

Participant observation was conducted where the researcher observed the selected candidates perform one procedure requiring compliance to IP guidelines. Procedures which were observed include giving an injection or dressing a wound in medical and surgical wards, performing a delivery in obstetrics (second and third stage of labour) and assisting or conducting an operation in theater. All candidates

who answered an interview schedule and were found performing any of the above specified procedures were observed. Areas which were observed during such procedures included hand hygiene, use of protective clothing, handling of sharps and non-sharp infected materials, decontamination of materials such as linen and used instruments, high level disinfection or sterilization of instruments by boiling, autoclaving or use of chemicals, and disposal of health care waste. Observations were done from 08:00hours to 16:00hours. However, observations were done after working hour at times especially in labour as the investigator had to wait for the delivery to occur. At least 2-3 observations were made per day. Only 40 observations were made as some of the interviewed candidates were never found performing any of the specified procedures during the time of investigations. There was a total of 40 points on the observation checklist.

3.9 PRE-TEST

Pre-testing is a trial run to determine insofar as is possible whether the instrument is clearly worded and free from major biases and whether it solicits the type of information envisioned (Polit and Hunger 1997).

Pre-testing of the data collection tools was done prior to the main study using health care workers at Clinic 1. Clinic 1 is a Government clinic located within Ronald Ross catchment area . This Clinic was chosen because health workers at the clinic attend to similar patients as those attended to at Ronald Ross. The Clinic provides medical-surgical and obstetric services (deliveries) except operation. This means participants for the pre-test worked under similar circumstances as those for the main study.

Participants for the pre-test were selected using convenient sampling. Eight (8) participants were selected and interviewed for the pre-test, which is 10% of the sample. The purpose of the pre-test was to elicit flaws in the data collection tools, such as ambiguity and illogically sequenced questions and make revisions to strengthen the methodology. The pre-test also helped to assess whether the

variables were observable and measurable, and determined the predictability of the data collection. Following the pre-test adjustments were made on the content and sequencing of questions.

3.10 ETHICAL CONSIDERATION

Ethical clearance was obtained from the University of Zambia Research Ethics committee appendix XI. Written Permission to conduct the study was also obtained from the Management of Ronald Ross General Hospital, Heads of Departments and ward managers at the institution appendix XII.

The purpose, procedure, risks and discomforts and the benefits of the study were explained to the study participants. Those who decline to participate were reassured that no privileges were going to be taken away from them as employees of Ronald Ross Hospital. Those who agreed to take part in the study were requested to sign an informed consent form. Those who participate were remunerated in any way.

Study participants were assured of anonymity and confidentiality as no names were written on the interview schedules. In addition no other person apart from the researcher was allowed access to the research data.

Participants were not subjected to any physical harm, as the research did not involve any invasive procedures. Participants were also protected from psychological harm by answering the interview schedule in privacy and at their own time. Observations also took place in a naturalistic setting that is their working environment. Further more, the observer conducted open or unconcealed participant observation to avoid ethical issues concerning privacy. However, intrusion in their working place could have made them uncomfortable. This was nevertheless minimized since time was allowed for adaptation before commencing the observations.

CHAPTER 4

4.0 DATA ANALYSIS AND PRESENTATION OF FINDING

4.1 INTRODUCTION

Data analysis is defined as, "the systematic organization and synthesis of research data, and testing of research hypothesis using those data" Polit and Hungler (1999). Data was collected using semi-structured interview schedules and observation checklists. A total of 82 semi-structured interview schedules were distributed but only 77 were retrieved and analyzed, giving a 93.9% response rate. On the other hand, 40 observations were conducted.

4.2 DATA PROCESSING AND ANALYSIS

The interview schedules and observation checklists were sorted and edited for internal consistence, completeness, legibility and accuracy. Closed ended questions in the interview schedules were assigned numerical codes for easy entry and analysis using the computer.

Open ended questions were processed as follows: The investigator read through the data in its entirety to identify and group answers that belong together. This process is known as categorization (Polit and Hungler 1997). Following categorization, different categories were assigned numerical codes (1, 2, 3, 4, 5 and others). The codes were then entered and analyzed using Epi-info version 6 and SPSS soft ware computer packages.

Using Epi-info and SPSS the following analysis was done. Chi-square was used to test association between qualitative variables and the out come (Compliance to Infection Prevention Guidelines). The qualitative variables being, knowledge of infection prevention, staff attitude towards infection prevention and control, availability and access to IP materials and management support in the implementation of IP guidelines. The cut

off point for statistical significance was set at 5%, only P values of 0.05 or less were considered statistically significant there by rejecting the null hypothesis.

4.3 DATA PRESENTATION

The findings of the study are presented according to the sequence of questions and sections in the interview schedule.they have been grouped together to give an overall picture. The findings have been presented in form of tables, bar charts, pie charts and cross tabulations. The tables are suitable because they summarize the findings in meaningful ways, for easy understanding. The cross tabulations are helpful in showing relationships between variables. The pie charts and bar charts provide a variety of ways in which to present data and thus prevent the monotony of narrative presentations.

The table in Section A represents the demographic characteristic of the respondents, the tables and bar charts in section B represents the respondents' knowledge of Infection Prevention and Hospital Acquired Infections, while the tables in section C represents the attitude of respondents towards Infection Prevention. The respondents' compliance with Infection Prevention Guidelines is represented by the tables and pie charts in section D. Those tables E and F represent the availability and access to IP Materials and management support respectively. The tables and cross tabulations in section G represents findings obtained during the observations.

SECTION A

TABLE 4 SOCIO-DEMOGRAPHIC DATA

	FREQUENCY	PERCENTAGE
Age		
Less than 21	0	0%
21-30	30	39
31-40	26	33.8
41-50	4	5.2
51-60	17	22
Total	**77**	**100**
Sex		
Male	19	26.6
Female	58	73.4
Total	**77**	**100**
Marital Status		
Married	32	41.6
Single	37	48.1
Divorced	2	2.6
Widowed	6	7.8
Total	**77**	**100**
Medical Professional		
Doctor	3	3.9
Registered Midwife	3	3.9
Registered Nurse	15	19.5
Enrolled midwife	13	16.9
Enrolled Nurse	27	35.1
Clinical Officer	11	14.3
Laboratory technologist	2	2.6
Physiotherapist	3	3.9
Total	**77**	**100**
Number of Years in Service		
0-5	38	49.4
6-10	17	22.1
11-15	4	5.2
16-20	3	3.9
More than 20	15	19.5
Total	**77**	**100**
Ward/Department		
Medical	46	59.9
Surgical	11	14.3
Obstetrics	10	13
Laboratory	2	2.6
Physiotherapy	3	3.9
Theater	5	6.5
Total	77	**100**

Most 39% (30) of the respondents interviewed were within the age group 21-30 years while only 5.2% (4) were between the age group 41-50. The majority 73.4% (58) were females with 26.6% (19) males. Most 48.1% (37) of the respondents were single with only 2.6% (2) who were divorced.

The majority 35.1% (27) of the respondents were enrolled nurses with the least 2.6% (2) being laboratory technologists. Almost half 49.4% (38) had worked for only 0-5 years with only 3.9% (3) having worked for 16-20 years. More than half 59.9% (46) were working in medical wards, while only 2.6% (2) were working in the laboratory department.

SECTION B: KNOWLEDGE OF INFECTION PREVENTION/HOSPITAL ACQUIRED INFECTIONS.

FIGURE 2: HEARD OF INFECTION PREVENTION (IP) GUIDELINES OR UNIVERSAL PRECAUTIONS (UP)

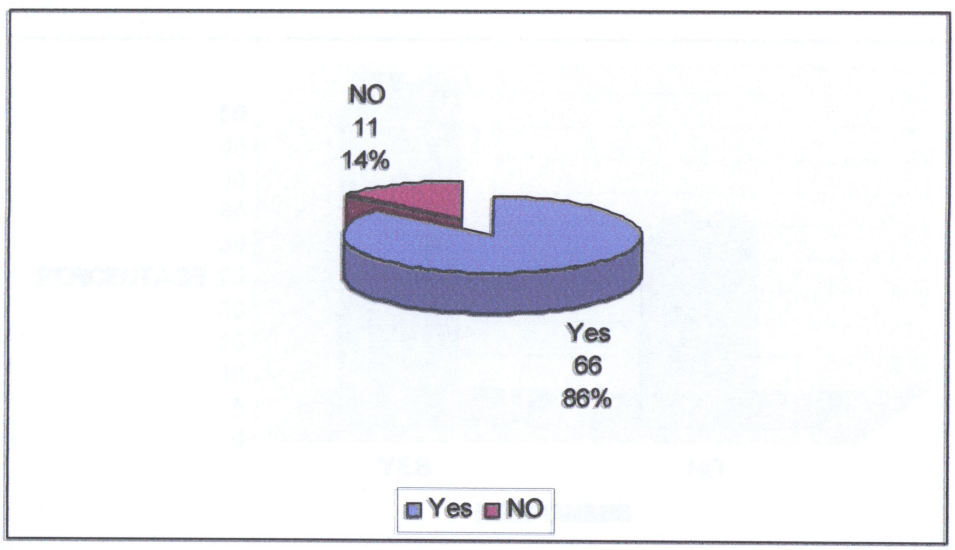


Figure 2 shows that the majority 86% (66) of the respondents had heard of Universal Precautions or Infection Prevention Guidelines with only 14% (11) who had never heard.

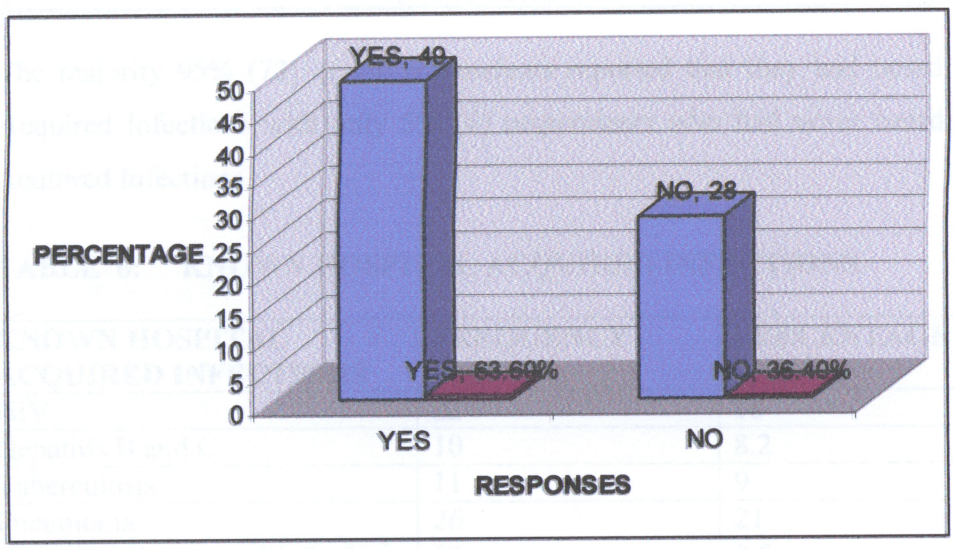
TABLE 5: KNOWN UNIVERSAL PRECAUTION/INFECTION PREVENTION GUIDELINES

KNOWN UP/IP GUIDELINES	FREQUENCY	PERCENTAGE
Hand Hygiene	38	34.5
Decontamination or sterilization /HLD	23	30
Use of Personal Protective Equipment	14	12.7
Proper disposal of contaminated Instruments and waste	27	24.5
Isolation of infectious cases	6	5.5
Others	2	1.8

* Multiple responses-the total does not add up to 66.

The commonest known Universal precaution or Infection prevention guideline was hand hygiene 34.5% (38), while the least known was isolation of infectious cases which was mention only 5.5% (6) respondents.

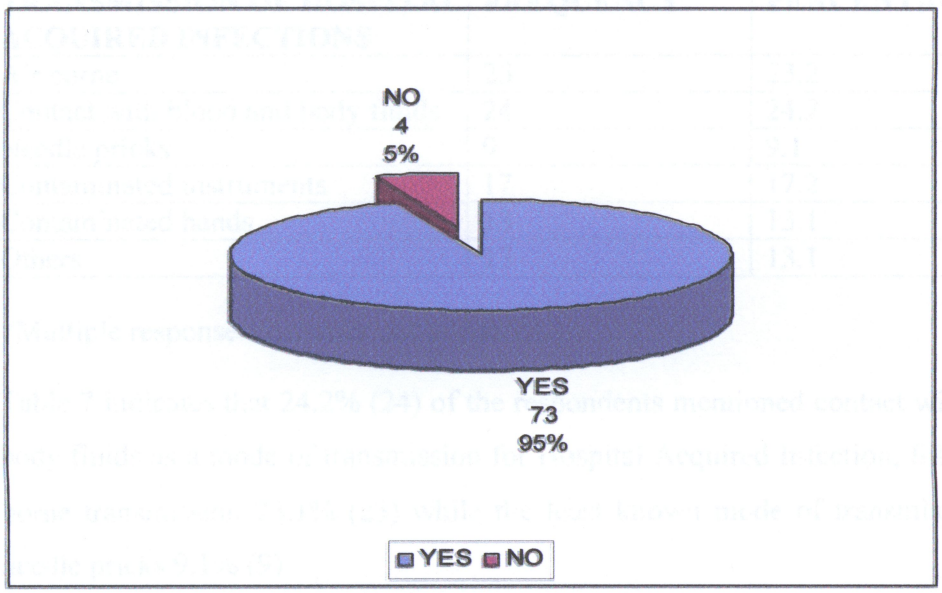
FIGURE 3: UNIVERSAL PRECAUTION/INFECTION PREVENTION GUIDELINES AS PART OF TRAINING.



The above figure shows that the majority 63.6% (49) of the respondents indicated that Universal Precautions or Infection Prevention Guidelines were part of their training,

while 36.4% (28) indicated that Universal Precautions or Infection prevention Guidelines were not part of their training.

FIGURE 4: HEARD OF HOSPITAL ACQUIRED INFECTIONS



The majority 95% (73) of the respondents reported that they had heard of Hospital Acquired Infections with only 5% (4) respondents who had never heard of Hospital Acquired Infections.

TABLE 6: KNOWN HOSPITAL ACQUIRED INFECTIONS

KNOWN HOSPITAL ACQUIRED INFECTIONS	FREQUENCY	PERCENTAGE
HIV	22	18
Hepatitis B and C	10	8.2
Tuberculosis	11	9
Pneumonia	26	21
Post-operative wound infections	12	9.8
Others	41	34

*Multiple response-total does not add to 73

The table above indicates that most 34% (41) of the respondents mentioned other conditions such as scabies, malaria and mumps as Hospital Acquired Infections (HAI).

Among the World Health organization (WHO) classified HAI the commonest known, was pneumonia mentioned by 21% (26) of the respondents while the least known are hepatitis B and C viruses mentioned by 8.2% (10) of the respondents.

TABLE 7: TRANSMISSION OF HOSPITAL ACQUIRED INFECTIONS

TRANSMISSION OF HOSPITAL ACQUIRED INFECTIONS	FREQUENCY	PERCENTAGE
Air borne	23	23.2
Contact with blood and body fluids	24	24.2
Needle pricks	9	9.1
Contaminated instruments	17	17.2
Contaminated hands	13	13.1
Others	13	13.1

*Multiple response-total does not add to 73

Table 7 indicates that 24.2% (24) of the respondents mentioned contact with blood and body fluids as a mode of transmission for Hospital Acquired Infection, followed by air borne transmission 23.1% (23) while the least known mode of transmission was via needle pricks 9.1% (9).

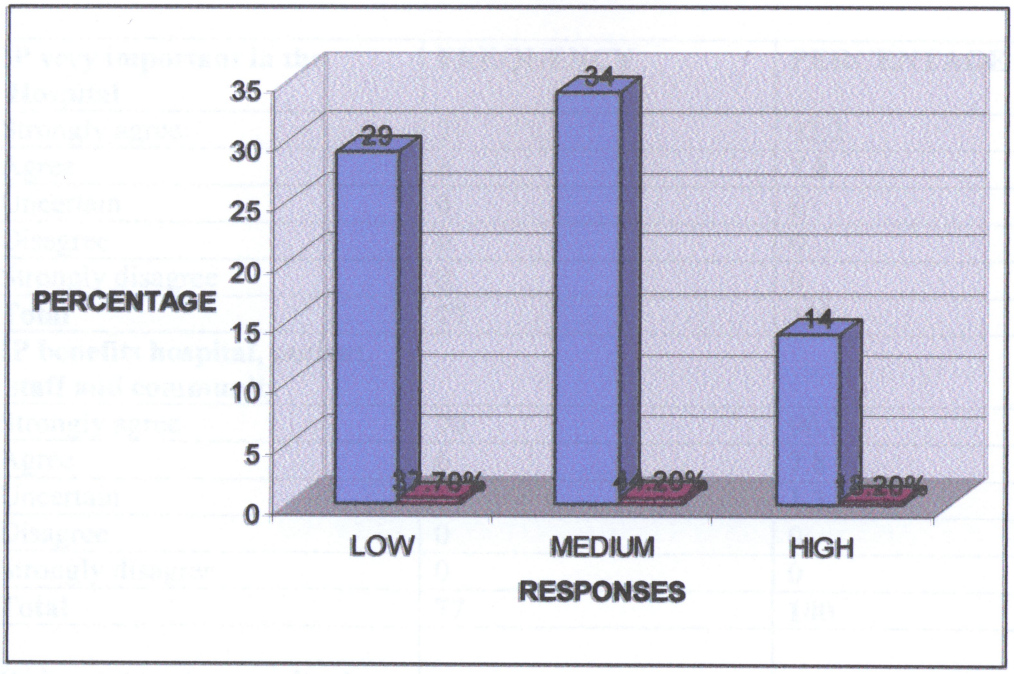
TABLE 8: PREVENTION OF HOSPITAL ACQUIRED INFECTIONS

PREVENTION OF HOSPITAL ACQUIRED INFECTIONS	FREQUENCY	PERCENTAGE
Hand hygiene	22	21.5
Use of Personal Protective Equipment	18	17.6
Proper disposal of medical waste	6	5.7
Processing of instruments (decontamination, sterilization or HLD)	20	19.6
Isolation	19	18.6
Others	18	17.6

*Multiple response-total does not add to 73.

Table 8 indicates that 21.5% (22) of the respondents mentioned hand hygiene as a means of preventing Hospital Acquired Infection with only 5.7% (6) who mentioned proper disposal of medical waste.

FIGURE 5: LEVEL OF KNOWLEDGE ON INFECTION PREVENTION /HOSPITAL ACQUIRED INFECTION



The majority 44.2% (34) of the respondents had medium knowledge of Infection Prevention/Hospital Acquired Infections while only 18.2% (14) had high knowledge.

SECTION C: ATTITUDE TOWARDS INFECTION PREVENTION

TABLE 9: ATTITUDE TOWARDS INFECTION PREVENTION

IP very important in the Hospital	**FREQUENCY**	**PERCENTAGE**
Strongly agree	71	92.2
Agree	6	7.8
Uncertain	0	0
Disagree	0	0
Strongly disagree	0	0
Total	**77**	**100**
IP benefits hospital, patient, staff and community		
Strongly agree	70	90.9
Agree	6	7.8
Uncertain	1	1.3
Disagree	0	0
Strongly disagree	0	0
Total	**77**	**100**
Its important to consult when Not sure of the IP practice		
Strongly agree	51	66.2
Agree	25	32.5
Uncertain	1	1.3
Disagree	0	0
Strongly disagree	0	0
Total	**77**	**100**

The majority 92.2% (71) of the respondents strongly agreed that Infection prevention was very important in the hospital, 90.9% (70) also strongly agreed that Infection Prevention did not only benefit the hospital but also the client, staff and the community as well while only 1.3% (1) respondent was uncertain. More than 2/3, 66.2% (51) also strongly agreed that it was important to consult when not sure of which Infection Prevention Guideline to employee in a given situation compared to only 1.3% (1) who was uncertain.

TABLE 10: PREFERRED INFECTION PREVENTION SUPERVISOR

PREFERRED IP SUPERVISOR	FREQUENCY	PERCENTAGE
Infection Control Officer	31	40.3
Colleague	6	7.8
Immediate supervisor	16	20.8
Knowledgeable infection prevention Officer	7	9.1
Others	17	22.1
Total	**77**	**100**

Table 10 shows that, 40.3% (31) of the health care workers interviewed preferred to be supervised by the infection control Officer with only 7.8% (6) who preferred to be supervised by a colleague.

TABLE 11: LEVEL OF ATTITUDE TOWARDS INFECTION PREVENTION

LEVEL OF ATTITUDE TOWARDS INFECTION PREVENTION	FREQUENCY	PERCENTAGE
Poor	0	0
Good	58	75.3
Very good	19	24.7
Total	77	**100**

Table 11 shows that 75.3% (58) of the health care workers interviewed had good attitude towards Infection Prevention, 24.7% (19) had very good attitude and none had a poor attitude.

SECTION D: COMPLIANCE WITH INFECTION PREVENTION GUIDELINES.

SECTION DI: HAND HYGIENE

TABLE 12: HAND HYGIENE

Frequency of hand hygiene	**FREQUENCY**	**PERCENTAGE**
All the time	47	61
Most of the times	25	32.5
Some times	2	2.6
Rarely	3	3.9
Total	**77**	**100**
What is used for hand hygiene		
Plain water	3	3.9
Water with non-medicated soap	21	27.3
Disinfectant	11	14.3
Hand rub	28	36.4
Others	14	18.2
Total	**77**	**100**
Motivation for hand hygiene		
Patient's HIV status	7	9.1
Appearance of patient	7	9.1
Workload	16	20.8
Presence of water, soap or hand rub	14	18.2
Presence of superior	1	1.3
Prevention of cross infection	31	41.6
Total	**77**	**100**

The majority 61% (47) of the health care workers interviewed reported that they wash their hands all the time before and after every procedure while 2.6% (2) wash their hands only some times. Majority 36.4% (28) of the respondents reported that they used hand rub for their hand hygiene with only 3.9% (3) who reported using plain water. The majority 41.6% (31) of the respondent were motivated to wash hands so as to prevent cross infection while 1.3% (1) was motivated to wash hands by the presence of the superior.

SECTION DII: DISPOSAL OF SHARPS

TABLE 13: DISPOSAL OF SHARPS

RE-USE OF NEEDLES AND SYRINGES	**FREQUENCY**	**PERCENTAGE**
Yes	77	100
No	0	0
Total	**77**	**100**
What is done to the needle and Syringe after use		
Decontaminate three times with JIK 1:6 before disposal	27	35.1
Bend or break needle prior to disposal	0	0
Manually remove needle from syringe	0	0
Recap needle after use	2	2.6
Put needle and syringe in puncture proof box immediately	48	62.3
Total	**77**	**100**
Method of disposing off used sharp instruments		
Incineration	58	75.3
Others	19	24.7
Total	**77**	**100**
Needle stick injuries		
Yes	7	9.1
No	70	90.9
Total	**77**	**100**
Procedure followed after needle stick injury	**FREQUENCY**	**PERCENTAGE**
Squeezed blood and applied an antiseptic	6	85.5
Squeezed blood and applied an antiseptic then went for counseling	1	14.3
Total	**7**	**100**

*Total for procedure following needle stick injury adds up to 7 who had needle stick injuries.

Table 13 on page 49 shows that all 100% (77) of the interviewed health care workers, indicated that they did not re-use needles and syringes at the time of the study. Almost 2/3, 62.3% (48) reported that they put the used needles and syringe in a puncture proof box immediately after use. The majority 75.3% (58) mentioned incineration as a method used for disposing off used sharps materials while 24.7% (19) mentioned other methods.

The majority 90.9% (70) of the respondents never had any needle stick injury in the last 12 months prior to the interview, while 9.1% (7) reported having had needle stick injuries, of the 7 who had needle stick injuries only 14.3% (1) went for post exposure counseling and testing while the rest 85.7% (6) just squeezed blood and applied an antiseptic solution (Table 13).

SECTION D111: USE OF PERSONAL PROTECTIVE CLOTHING

FIGURE 6: USE OF PERSONAL PROTECTIVE CLOTHING

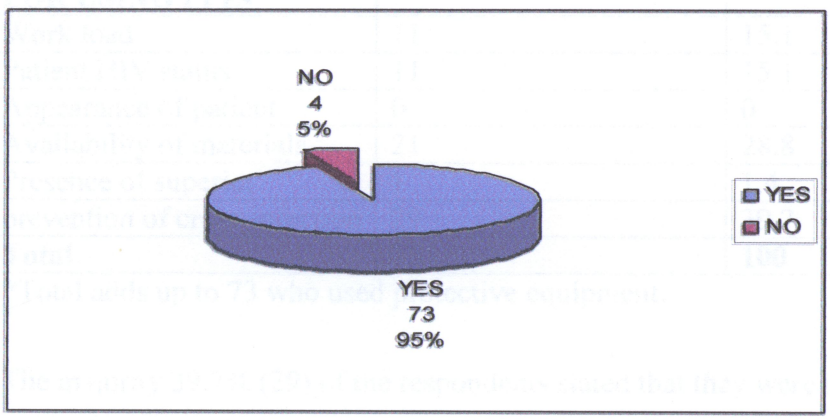


Figure 6 shows that the majority 95.8% (73) of the respondents reported using personal protective clothing while performing deliveries, dressings, surgery and when handling contaminated materials while 5.2% (4) do not use any Personal Protective Equipment.

TABLE 14: EXAMPLES OF COMMONLY USED PERSONAL PROTECTIVE EQUIPMENT (PPEs)

EXAMPLE OF USED PPE	FREQUENCY	PERCENTAGES
Gloves	49	32.4
Apron	41	9.9
Face Masks	15	27.2
Gowns	19	12.6
Boots	7	4.6
Goggles	11	7.3
Others	9	6

*Multiple response-total does not add to 73

Table 14, shows that the commonest used type of Personal Protective Equipment were gloves 32.4% (49), while the least used were boots 4.6% (7).

TABLE 15: MOTIVATION FOR USING PERSONAL PROTECTIVE EQUIPMENT (PPEs)

MOTIVATION FOR USING PPEs	FREQUENCY	PERCENTAGE
Work load	11	15.1
Patient HIV status	11	15.1
Appearance of patient	0	0
Availability of materials	21	28.8
Presence of superior	1	1.4
prevention of cross-infection	29	39.7
Total	**73**	**100**

*Total adds up to 73 who used protective equipment.

The majority 39.7% (29) of the respondents stated that they were motivated to use PPEs in order to prevent cross infection with only 1.4% (1) who was motivated by the presence of a superior.

SECTION D IV: INSTRUMENT PROCESSING

TABLE 16: INSTRUMENT PROCESSING

	FREQUENCY	PERCENTAGE
DECONTAMINATION		
Using JIK 1:6 for 10 minutes	29	37.7
Using JIK 1:6 other than for 10 minutes	23	29.9
Wash in water then boil	11	14.3
Others	5	6.5
No response	9	11.7
Total	**77**	**100**
CLEANING		
Using soapy water	44	57.1
Soaking in JIK	12	15.6
Others	12	15.6
Non response	9	11.7
Total	**77**	**100**
STERILIZATION or HID		
Boil in sterilizer for 20 minutes	14	18.2
Boil in a sterilizer other than for 20 minutes	19	24.7
Send instrument for autoclaving	26	33.8
Others	2	2.6
Non response	16	20.8

Table 16 shows that 37.7% (29) of the respondents reported having used Sodium hypochlorite (JIK) 1:6 for 10 minutes for decontaminating used instruments, while 5 6.5% (5) reported having had used other methods such as soaking or wiping in savlon or methylated spirit . 11.7% (9) did not respond to this question. More than half 57.1% (44) stated that they used soapy water for cleaning decontaminated instruments while those who soaked in JIK or used other methods were both 15.6% (12). Most 33.4% (26) of the respondents reported having had used an autoclave for sterilization while 2.6% (2) used other methods apart from autoclaving and boiling.

FIGURE 7: LEVEL OF COMPLIANCE WITH IP GUIDELINES

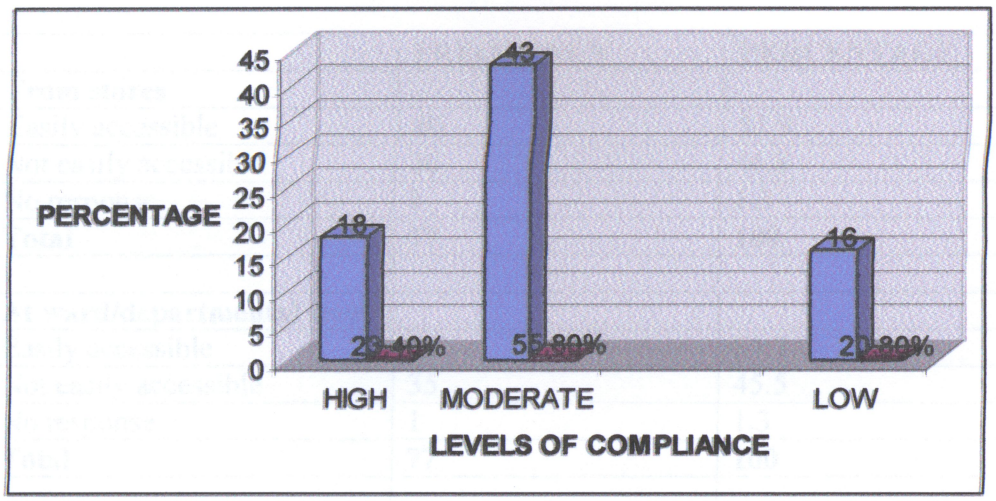


Figure 7 shows that the majority 55.8% (43) of the respondents moderately complied with then Infection Prevention Guidelines while 20.8% (16) had low compliance with guidelines.

TABLE 17: AVAILABILITY OF IP MATERIALS

AVAILABILITY OF IP MATERIALS	FREQUENCY	PERCENTAGE
Always available	9	11.7
Mostly available	49	63.6
Rarely available	15	19.5
Not available	4	5.2
Total	**77**	**100**

Table 17 shows that the majority 63.6% (49) of the respondents indicated that Infection Prevention materials were mostly available while only 5.2% (4) indicated that they were not available.

TABLE 18: ACCESS TO IP MATERIALS

	FREQUENCY	PERCENTAGE
From stores		
Easily accessible	40	51.9
Not easily accessible	36	46.8
No response	1	1.3
Total	**77**	**100**
At ward/departmental level		
Easily accessible	41	53.2
Not easily accessible	35	45.5
No response	1	1.3
Total	**77**	**100**
IP guidelines displayed within workplace		
Yes	65	84.4
No	12	15.6
Total	**77**	**100**

Table 18 shows that more than half 51.9% (40) of the respondents reviewed that IP materials were easily accessible from stores with only 1.3% (1) who was uncertain. 41 (53.2%) also reviewed that IP materials were easily accessible at ward/departmental level. The table also shows that the majority 84.4% (65) had IP guidelines displayed in their work place while 15.6% (12) did not have any IP guidelines displayed within their work place.

TABLE 19: LEVEL OF ACCESS TO IP MATERIALS

LEVEL OF ACCESS TO IP MATERIALS	FREQUENCY	PERCENTAGE
Easily Accessible	30	39
Not Easily Accessible	47	61
Total	**77**	**100**

Table 19 shows that, the majority 61% (47) of the respondents indicated that IP materials were not easily accessible, while 39% (30) said they were easily accessible.

TABLE 20 : MANAGEMENT SUPPORT TOWARDS INFECTION PREVENTION.

	FREQUENCY	PERCENTAGE
Management prioritizing purchase of IP materials		
Yes	43	55.8
No	34	44.2
Total	**77**	**100**
Reward/sanctions for compliance/non-compliance		
Yes	8	10.6
No	69	89.6
Total	**77**	**100**
Carrying out random checks on IP practices		
Yes	43	55.8
No	34	44.2
Total	**77**	**100**
Organizing in-service IP training		
Yes	16	20.8
No	61	79.2
Total	**77**	**100**

Table 20 indicates that more than half 55.8% (43) of the respondents stated management prioritized the purchase of IP materials while 44.2% (34) stated that management did not prioritize the purchase of IP materials. The majority 89.6% (69) indicated that management did not reward/sanction compliance/noncompliance towards IP practices with only 10.6% (8) who stated that management did reward/sanction compliance/non-compliance. The table further indicates that 79.2% (61) denied management organizing any in-service IP training with only 20.8% (16) who accepted that management did organize in-service IP training.

TABLE 21: LEVEL OF MANAGEMENT SUPPORT

LEVELOF MANAGEMENT SUPPORT TOWARDS IP	FREQUENCY	PERCENTAGE
Good	2	2.6
Poor	75	97.4
Total	**77**	**100**

The majority 97.4% (75) of the respondents indicated that management had poor support towards IP activities with only 2.6% (2) indicating that the level of management support towards IP activities was good.

TABLE 22: RECOMMENDATIONS TOWARDS IMPROVING INFECTION PREVENTION PRACTICES

RECOMMENDATIONS	FREQUENCY	PERCENTAGE
Make IP materials available to all	35	39.3
Make IP materials accessible to all	10	11.2
Organize IP in-service workshops	22	24.7
Conducting random checks on IP practices	8	9
Others	11	12.3
No response	3	3.4

*Multiple response-total does not add to 74

The majority 39.3% (35) of the respondents recommended that management should make IP materials available in order to improve the IP practices at the institution, while 3.4% (3) never responded to the question.

TABLE 23: MEDICAL PROFESSIONAL BY COMPLIANCE

MEDICAL PROFFESSION	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Doctor	0 (0%)	3 (100%)	0 0%)	3 (3.9%)
Registered Midwife	2 (66.7)	1 (33.3%)	0 (0%)	3 (3.9%)
Registered Nurse	9 (50%)	7 (38.9%)	2 (11.1%)	18 (23.4%)
Enrolled Midwife	4(26.7%)	9 (60%)	2 (13.3%)	15 (19.5%)
Enrolled Nurse	3 (12%)	11 (44%)	11 (44%)	25 (32.5%)
Clinical Officer	0 (0%)	8 (100%)	0(0%)	8 (10.4%)
Laboratory Technologists	0 (0%)	2 (100%)	0 (0%)	2 (2.6%)
Physiotherapist	0 (0%)	2 (66.7%)	1 (33.3%)	3 (3.9%)
Total	18 (23.4)	43 (55.8%)	16 (20%)	77 (100%)

Table 23 shows that 66.7% (2) of the Registered Midwives interviewed had high compliance to IP guidelines compared to 3 (12%) 0f the Enrolled Nurses. Corrected Chi-square=24.354, P-value=0.000, df=14, (95% CI=0.000, 0.038). Linear by linear association 5.637 df=1, (Significant).

TABLE 24: NUMBER OF YEARS IN SERVICE BY COMPLIANCE

NUMBER OF YEARS IN SERVICE	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
0-5	8 (44.4%)	23 (53.5%)	4 (25%)	35 (45.5%)
6-10	5 (27.8%)	5 (11.6%)	8 (50%)	18 (23.4%)
11-15	0 (0%0	2 (4.7%)	2 (12.5%)	4 (5.3%)
16-20	1 (5.6%)	3 (7.0%)	1 (6.3%)	5 (6.5%)
More than 20	4 (22.2%)	10 (23.3%)	1 (6.3%)	15 (19.5%)
Total	**18 (23.4)**	**43 (55.8%)**	**16 (20%)**	**77 (100%)**

Table 24 shows that most 44.4% (8) of the respondents who had high compliance to the IP guidelines had worked for 0-5 compared to 5.6% (1) who had worked for 16- 20 year. Corrected Chi-square=13.310, df=8 P-value=0.416, (95% CI= 0.306, 0.526), Association 0.068, (Not significant)

TABLE 25: HEARD OF UNIVERSAL PRECAUTION OR INFECTION PREVENTION GUIDELINES BY COMPLIANCE

HEARD OF UP/IP	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Yes	18 (26.8%)	37 (55.2%)	12 (17.9%)	67 (87%)
No	0 (0%)	6 (60%)	4 (40%)	10 (13%)
Total	**18 (23.4%)**	**43 (55.8%)**	**16 (20.8%)**	**77 (100%)**

Table 25 shows that the majority 55.2% (37) of the respondents who had heard about Universal Precautions/Infection Prevention Guidelines had moderate compliance and 60% (6) who had never heard about UP/IP guidelines also had moderate compliance. Corrected Chi-square= 2.792, df=2 P-value=0.143 (95% CI = 0.065, 0.221). Linear by linear association 4.669, (Not significant).

TABLE 26: UP/IP INCLUDED IN TRAINING BY COMPLIANCE

UP/IP INCLUDED IN TRAINING	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Yes	16 (88.9%)	58 (58.1%)	6 (37.5%)	47 (61%)
No	2 (11.1%)	18 (41.9%)	10 (62.5%)	30 (39%)
Total	**18(23.4%)**	**43 (55.8%)**	**16 (20.8%)**	**77 (100%)**

The majority 88.9% (16) of the respondents who highly complied to Infection Prevention Guidelines had UP/IP included in their training compared to 11.1% (2) who did not have UP/IP included in their training. Uncorrected Chi-square=9.750 df=2, P-value=0.000, (95% CI=0.000 –0.038). Linear by linear association 9.423, df=1, (Significant.).

TABLE 27: KNOWLEDGE OF INFECTION PREVENTION/HOSPITAL ACQUIRED INFECTIONS BY COMPLIANCE

KNOWLEDGE OF IP/HAI	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
High	12 (85.7%)	2 (14.3%)	0 (0%)	14 (18.2%)
Medium	4 (11.8%)	30 (88.2%)	0 (0%)	34 (44.2)
Low	2 (16.9%)	11 (37.9%)	16 (55.2%)	29 (37.7%)
Total	**18 (23.4)**	**43 (55.8%)**	**16 (20.8%)**	**77 (100%)**

The majority 85.7% (12) of respondents who had good knowledge of Infection Prevention/Hospital Acquired Infections had high compliance to guidelines compared to 14.3% (2) who had good knowledge but with moderate compliance. Corrected Chi-square=51.768, df4 (95%CI= 0.000, 0.038) P-value=0.000 and Association=36.009.

TABLE 28: ATTITUDE TOWARDS IP BY COMPLIANCE

ATTITUDE TOWARDS IP	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Very Good	9 (50%)	9 (20.9%)	1 (6.3%)	19 (24.7%)
Good	9 (50%)	34 (79.1%)	15 (93.8%)	58 (75.3%)
Poor	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	**18 (23.4)**	**43 (55.8%)**	**16 (20.8%)**	**77 (100%)**

Table 28 shows that half 50% (9) of the respondents who were highly compliant to IP guidelines had very good attitude towards Infection Prevention with the other half 50% (9) having good attitude. Corrected Chi-square=6.480, df=2, (95% CI 0.000, 0.062) P-value=0.026 and Association=8.814.

TABLE 29: AVAILABILITY OF IP MATERIALS BY COMPLIANCE

AVAILABILITY OF 1P MATERIALS	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Always available	5 (83.3%)	1 (16.7%)	0 (0%)	6 (7.6%)
Mostly available	13 (25%)	31 (59.6%)	8 (15.4%)	52 (67.5%)
Rarely available	0 (0%)	9 (56.3%)	7 (43.8%)	16 (20.8%)
Not available	0 (0%)	2 (66.7%)	1 (33.3%)	3 (3.9%)
Total	**18 (23.4)**	**43 (55.8%)**	**16 (20.8%)**	**77 (100%)**

The cross tabulations in table 29 shows that the majority 83.3% (5) of the respondents who indicated that IP materials were always available highly complied with IP guidelines while non of those who indicated that IP materials were rarely available or not available had high compliance. Corrected Chi-square =18.489, df=6 P-value=0.000, (95% C I 0.000, 0.038), linear by linear association=15.166, df=1, (Significant)

TABLE 30: ACCESS TO IP MATERIALS BY COMPLIANCE

ACCESS TO IP MATERIALS	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Easily Accessible	10 (33.3%)	14 (46.7%)	6 (20%)	30 (39%)
Not Easily Accessible	8 (17%)	29 (61.7%)	10 (21.2%)	47 (61%)
Total	18 (23.4%)	43 (55.8%)	16 (20.8%)	77 (100%)

The cross tabulation in table 30 shows that the majority 46.7% (14) of health care worker who indicated that IP materials were easily accessible had moderate compliance with guidelines and the majority 61.7% (29) who stated that IP materials were not easily accessible also had moderate compliance with Guidelines. Chi-square=2.840, df=2, P-value=0.169, (95% CI=0.085, 0.253,Linear by Linear association 2.178, df=1, (Not significant)

TABLE 31: MANAGEMENT SUPPORT TOWARDS IP ACTIVITIES BY COMPLIANCE

MANAGEMENT SUPPORT	LEVEL OF COMPLIANCE			TOTAL
	HIGH	MODERATE	LOW	
Good	2 (11.1%)	0 (0%)	0 (0%)	2 (2.6%)
Poor	16 (88.9%)	43 (100%)	16 (100%)	75 (97.4%)
Total	18 (23.4%)	43 (55.8%)	16 (20.8%)	77 (100%)

Table 31 shows that the majority 88.9% (16) of the respondents who highly complied with IP guidelines had poor management support compared to only 11.1% (2) who had good management support. Corrected Chi-square=4.500, df=2, (95% CI=0.10, 0.120), P-value=0.065. Linear by linear association 4.361, df=1, (not significant).

SECTION G: OBSERVATION OF ROUTINE INFECTION PREVENTION PRACTICES

TABLE 32: PROCEDURES OBSERVED

PROCEDURE	FREQUENCY	PERCENTAGE
Injection	13	32.5
Wound Dressing	5	12.5
Surgical Operations	10	25
Deliveries	5	12.5
Others	7	17.5
Total	**40**	**100**

Table 32 shows that 32.5% (13) of the procedures observed were Injections while the least 12.5% (5) were wound dressings and deliveries respectively.

TABLE 33: CATEGORIES OF PROFESSIONALS OBSERVED

PROFESSION	FREQUENCY	PERCENTAGE
Doctors	4	10
Registered Midwives	2	5
Registered Nurses	8	20
Enrolled Midwives	8	20
Enrolled Nurse	14	35
Clinical Officers	2	5
Physiotherapists	2	5
Total	**40**	**100**

Most 35% (14) of the health care workers observed were Enrolled Nurses while Registered Nurses, Clinical Officer and Physiotherapists were each 5% (2).

TABLE 34: DEPARTMENTS WHERE OBSERVATIONS WERE CONDUCTED

PROFESSION	FREQUENCY	PERCENTAGE
Medical	9	22.5
Surgical	9	22.5
Theatre	10	25
Obstetrics	10	25
Physiotherapy	2	5
Total	**40**	**100**

Table 34 shows that quarter 25% (10) of the observations were done in theatre with the other quarter in Obstetrics department with only (5%) 2 done in the physiotherapy department.

TABLE 35: COMPLIANCE ON OBSERVATIONS

COMPLIANCE	FREQUENCY	PERCENTAGE
Yes	22	55
No	18	45
Total	40	100

More than half 55% (22) of the observed health care workers were compliant to IP guidelines, while 45% (18) were not.

TABLE 36: MEDICAL PROFESSION BY COMPLIANCE

MEDICAL PROFESSION	COMPLIANCE		TOTAL
	YES	NO	
Doctors	3 (75%)	1 (25%)	4 (10%)
Registered Midwives	2 (100%)	0 (0%)	2 (5%)
Registered Nurses	2(25%)	6 (75%)	8 (20%)
Enrolled Midwives	7 (87%)	1 (12.5%)	8 (20%)
Enrolled nurses	6 (42.9%)	8 (57.1%)	14 (35%)
Clinical Officers	1 (50%)	1 (50%)	2 (5%)
Physiotherapists	1 (50%)	1(50%)	2 (5%)
Total	**22(55%)**	**18 (45%)**	**40 (100%)**

The cross tabulation in table 36 shows that the majority 75% (6) Registered Nurses never complied with IP guidelines while none of the Registered Midwives never complied. Corrected Chi-Square=9.301, df=6, P-value=0.275, (95% CI=0.275, 0.137. Linear by linear association=0.277 df=1, (Not significant)

TABLE 37: OBSERVED PROCEDURES BY COMPLIANCE

OBSERVED PROCEDURES	COMPLIANCE		TOTAL
	YES	NO	
Injection	2 (15.4%)	11 (84.6%)	13 (32.5%)
Wound dressing	3 (60%)	2 (40%)	5 (12.5%)
Surgical operations	9 (90%)	1 (10%)	10 (25%)
Deliveries	4 (80%)	1 (20%)	5 (12.5%)
Others	4 (57.1%)	3 (42.9%)	7 (17.7%)
Total	**22(55%)**	**18 (45%)**	**40 (100%)**

The cross tabulations in table 37 shows that, the majority 90% (9) of the health care workers observed conducting surgical operations complied with the IP guidelines compared with (15.4%) 2 who complied while giving injections.

Corrected CHI-Square=14.543, df4, P-value 0.025. (95% CI 0.000-0.073). Linear by linear association 6.135 df=1 (Significant).

TABLE 38: HOSPITAL DEPARTMENTS BY COMPLIANCE

HOSPITAL DEPARTMENT	COMPLIANCE		TOTAL
	YES	NO	
Medical	0 (0%)	9 (100%)	9 (22.5%)
Surgical	4 (44.4%)	5 (55.6%	9 (22.5%)
Theatre	9 (90%)	1 (10%)	10 (25%)
Obstetrics	8 (80%)	2 (20%)	10 (25%)
Physiotherapy	1 (50%)	1 (50%)	5 (12.5%)
Total	**22(55%)**	**18 (45%)**	**40 (100%)**

Table 38 shows that the highest 40.9% (9) compliance with IP Guidelines was observed in theatre while in none of the procedures done in the medical department were IP Guidelines complied with. Corrected Chi-Square=19.861, df4, P-value 0.000, (95% CI=0.000, 0.073). Linear by linear association 11.590, df=1, (Significant).

CHAPTER 5

5.0 DISCUSSION OF FINDINGS

5.1 INTRODUCTION

The main objective of the study was to determine the level of compliance of health care workers s' with the Infection Prevention Guidelines and the factors that influence compliance. Data was collected using a self administered interview schedule. Observation of routine procedures was also done using a checklist. The observed procedures included deliveries, conducting or assisting surgical operations, giving intramuscular or intravenous injections and wound dressing.

5.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

The socio-demographic characteristics of the study population are shown in table 4. Most (39%) of the respondents interviewed were within the age group 21-30 followed by 33.8% in the age group 31- 40, while the least 5.2% fell within the age range 41-50. Those within the age group 51- 60 were 22% while none was below 21. The explanation could be that, most of the Zambian school going children especially in Government schools complete their higher education at or after the age of 18 such that by the time they complete their health related courses which take at least 2 years, they are above 21years. This finding is in line with the finding by Munganga (2007) in her study of Knowledge Attitude and Practices of Medical Doctors on Infection Prevention at Ndola Central Hospital, where the majority (60%) of her respondents were aged between 25-34 years.

Having most 39% of the respondents falling within the age group 21-30 is common in most of our Government health institutions which attract mostly new graduates before they gain experience. The limited numbers (5.2%) of those within the age group 41-50, could be due to the brain drain that has affected mostly the experienced health personnel in that age group. According to Churches Health Association of Zambia (CHAZ 2007), increasing numbers of qualified and

experienced health professionals are joining the brain drain as they migrate to better paid jobs in richer countries. The same explanation could be given to the small percentage 5.2% seen among those who had worked for 11-15 years and 3.9% of those who had worked for 16-20 years. The numbers slightly go up 22% of those who were aged 51- 60 years, who are mostly retired and being employed on part time or contract basis as this age group is aging and is less attracted towards the greener pastures.

The sample was predominantly female (73.4%) with 26.6% males, table 4. This is because the majority (73.4%) in the sample were nurses with the nursing profession being female dominated, Pittman (2006).

The marital status of the study population was as follows, almost half (48.6%) were single followed by those who were married (41.6%). The explanation could probably lay in the age range where the majority (39%) were aged between 21-30, who could mostly be single followed by those aged 31- 40 who could mostly be married. The other explanation for the majority being single could be from the number of years in service, where almost half (49.4%) had worked for 0-5 years probably not yet financially ready for marriage.

On the number of years in service, (49.4%) had worked for only 0-5 years. This finding is similar to that by Hamomba (2006) in her study of Adherence to Universal Precaution with Reference to HIV among Midwives and Trained Traditional Birth Attendants during Home and Health Centre Deliveries in Siavonga and Mazabuka Districts where (39%) of her respondents had worked for 0-5 years.

The study population catered across all medical professions with the majority (35.1%) being Enrolled Nurses. This is common in Zambian Government institutions. In Zambia, there are more schools (11) for Enrolled Nurses compared to 8 schools for Registered Nurses this implies that more graduates are getting

employed with Enrolled Nursing qualifications than those with Registered Nursing qualification, General Nursing Council (2004). Additionally, Enrolled Nurses have lesser chances of migrating compared to other nurses and other health workers with higher qualification. Enrolled nurses are also largely in contact with patients which was the inclusion criteria for this study.

The distribution of the sample according to areas of work was as follows; (59.9%) were from medical wards followed by those from surgical wards (14.2%) and obstetrics (13%). Ronald Ross General Hospital being a Second Level Referral Hospital, offers mainly general medicine, surgery and obstetrics services thus the large number of its workforce being found in these Departments. Ronald Ross General Hospital (2006) and Ministry of Health (2005).

5.3 KNOWLEDGE OF INFECTION PREVENTION/HOSPITAL ACQUIRED INFECTIONS.

The study findings showed that the majority (86%) of the respondents interviewed had heard of Infection Prevention Guidelines or Universal Precautions; 63.6% because the guidelines were part of their training while the rest knew the guidelines either from the orientation workshop held by JHPIEGO at the institution in 2006, or from the Zambia Infection Prevention Guideline (2003) booklets that were distributed. This finding is in agreement with the findings by Hamomba (2006) in the study quoted above where 88% of her respondents had heard of Universal Precautions. The finding is very high when compared to the findings by Ofili (2000) in a study entitled Occupational Accidents among Hospital Workers at the Central Hospital Benin city in which only 34.7% of the Health Workers had heard of Universal Precautions.

According to the findings of this study, the commonest Known Universal Precaution or Infection Prevention Guideline is hand hygiene which was mentioned by 34.5% of the respondents (table 4). This is probably the reason why most (21.5%) of the respondents mentioned hand hygiene as a means of

preventing Hospital Acquired Infections (HAI), see table 8. When asked on whether they had heard of HAIs, the majority (95%) of the respondents reported that they had heard about them. However, despite such a response, when asked to give examples of HAIs, most (34%) mentioned conditions such as malaria, scabies and mumps. Among the WHO classified HAIs, pneumonia was the commonest known mentioned by 21% of the respondents while the least known were Hepatitis B and C viruses mentioned by only 8.2% of the respondents,(table 6). Post operative wound infections which are common at the Institution averaging 15.4% per year as shown in table 1, were mention by only 9.8% of the respondents. This implies that a very small percentage (9.8%) of the workers knew that post operative wound infections are nosocomial in natureprobably the reason they are not putting much effort in preventing them.

The knowledge of HAIs in terms of the mode of transmission was good since all (100%) of those who had heard about them were able to mention at least one correct mode as shown in table 7. About 24.2% of respondents mentioned contact with blood followed by air borne 23.2% while the least known was needle pricks 9.1%.

The overall level of knowledge on IP/HAIs was as follows: the majority (44.2%) had medium knowledge, followed by 37.7% who had low knowledge and 18.2% who had high knowledge (see figure 5). This finding is consistent with that by Munganga (2007) in her study quoted above where the majority (78%) of her respondents had medium level of Knowledge, followed by 14% who had low knowledge and the least (8%) who had high knowledge.

Knowledge of Infection Prevention/Hospital Acquired Infections is an important determinant of compliance as seen from the findings of this study that, 85.7% of those who had high Knowledge of IP/HAIs highly complied with the IP guidelines, Corrected Chi Square=51.768, df=4, P-Value=0.000 (95% CI=0.000, 0.038) linear by Linear association 36.009 df=1, (significant) there by rejecting

the null hypothesis which stated that there was no association between the health workers' compliance to IP guidelines and their Knowledge of IP/HAIs table 27. Further more, the majority (88.9%) of the respondents who highly complied with the IP guideline had UP/IP as part of their training compared to 11.1% who though they highly complied with guidelines, they did not have UP/IP guidelines included in their training. Uncorrected Chi-square=9.750, df=2, P-value 0.000 (95%CI=0.000, 0.038). Linear by Linear association 9.423 df=1 (Significant), see table 24.

5.4 ATTITUDE TOWARDS INFECTION PREVENTION

The attitude towards Infection Prevention was positive since none of the respondents had poor attitude. The majority (75.3%) had good attitude while the remaining 24.7% had very good attitude (table 11). This finding is in line with the findings by Muchemwa (1996) in her study of Nurses' Practices towards Infection Control at Kitwe Central Hospital, Zambia where, 74% of the nurses had a positive attitude towards IP. These findings are however, contrally to the findings by Munganga (2007) where the majority (74%) of her respondents had negative attitude towards IP.

The study further revealed that 92.2% of the health workers interviewed strongly agreed that IP was very important, while 90.9% also strongly agreed that IP does not only benefit the hospital but also the client, staff and community at large. Similarly, slightly more than two thirds of the respondents 2/3, 66.2% strongly agreed that it was important to consult when not sure of the IP guidelines to employee in a given situation compared to 1.3% who was uncertain. This implies that the relatively low (55%) level of compliance established at the institution during the observation of routine IP practices is not due to negative attitude.

The study findings have revealed that attitude is associated with compliance, as shown in table 28, where (50%) of the respondents who were highly compliant with Guidelines had very good attitude towards infection prevention with the

other half (50%) having good attitude. Corrected Chi-square=6.489, df=2, (95% CI 0.000, 0.062, P-value=0.026. Linear by linear association 8.814, df=1, (significant) table 28, rejecting the null hypothesis which stated that there was no association between health workers' compliance with guidelines and their attitude towards infection prevention.

5.5 COMPLIANCE WITH IP GUIDELINES.

5.5.1 Compliance with Hand Hygiene

Compliance with hand hygiene in terms of washing hands all the time before and after a procedure was 61%. This figure is slightly lower keeping in mind the findings of a study by the Central Board of Health and the Prevention of Medical Transmission of HIV Project (2004) in a study entitles Trails of Improved Practice conducted in Ndola and Chipata districts where hand hygiene was at 66%. However the figure is higher than that reported by Didier et al (1999), in an observation study of compliance with hand hygiene in a Teaching Hospital in Geveva Switzerland where compliance was moderate with an average compliance of 48%.

The findings of this study revealed that most (36.4%) of the respondents used hand rub followed by 27.3% that used plain water (table 12). The majority (90.9%) of those from the Obstetrics Department used hand-rub while the majority, (63.6%) of those who used water with non-medicated soap were from the Medical Department. This could be due to the safe Motherhood project which was supplying IP materials such as hand-rub and Sodium hypochlorite in the Obstetrics Department.

When asked about the motivation for washing hands, most (41.6%) of the respondents indicated that they were motivated to wash hands as a means of preventing cross-infection. This finding is significant when compared to the findings by Libetwa (1997) in her Dissertation entitled Knowledge, Attitude and

Practices of Midwives on Infection Control in Lusaka Urban clinic where the majority (63.3%) of Registered Midwives were motivated to wash hands by the HIV status of the client.

The negative finding revealed in this study was that 9.1% of the respondents were motivated to wash hand by the patient's HIV status and another 9.1% by the appearance of the patient. The percentage of the respondents was even higher regarding motivation for using Personal Protective Equipment (PPEs) where 15.1% were motivated to use PPEs by the HIV status of the patient (Table 15). This indicates that such respondents have not fully understood the fact that many infected people look and feel normal, neither they nor the health worker will have any idea that they are infected. Therefore, WHO and CDC recommend that health workers apply standard precautions in treating all patients regardless of their presumed diagnosis. Hand hygiene is one of the basic precautions to be taken by the health workers in preventing HAIs. It should also be noted that 18.2% of the respondents were motivated to wash hands by the presence of water, soap or hand-rub, implying that the practice can improve with continuous supply of hand hygiene products.

5.5.2 Compliance with Regard to Disposal of used Sharps Materials

The positive finding revealed by this study was that all (100%) of the health care workers interviewed indicated that they did not reuse needles and syringes (table 13). Similarly, none of the health workers observed was seen reusing needles or syringes. This is consistent with the findings of the Central Board of Health and the Prevention of Medical Transmission of HIV Project (2004) which revealed that all (100%) of the health workers were observed using new sterile injection equipment on every patient.

Decontamination of syringes and needle with 0.5% chlorine solution is recommended in the Zambia National Infection Prevention Guidelines (CBoH, 2003). The study findings further revealed that only 35.1% of the respondents

decontaminated their used syringes and needles with chlorine solution while the majority (62.3%) just put the needle and syringe in the puncture proof box immediately after use (table 13). During the observations, the practice of decontaminating used needles and syringes was lower (25%). All the participants who did not decontaminate the instruments stated that they did not have enough chlorine solution otherwise they would have done so. However, the findings of this study show slight improvement when compared to the 14% compliance established by Central Board of Health and the Prevention of Medical Transmission of HIV Project (2004). According to the findings of this study, some providers felt that on busy days such immunization days, and when there are many patients, the practice would be hard to follow due to the volume of used needles and syringes.

With regard to needle stick injuries, only 9.1% of the respondents reported having had a needle stick injury in the last 12 months prior to the study as compared to 59% who reported having had needle stick injuries according to the Central Board of Health and the Prevention of Medical Transmission of HIV Project (2004) and the 56% reported by Munganga (2007). Only 14.3% of those who had needle stick injuries went for post exposure counseling and testing while the majority (85.7%) just squeezed the blood and applied an antiseptic. This shows an inadequate knowledge of Post Exposure Prophylaxis (PEP). This study finding are in agreement with the findings of a study by the East, Central and Southern Africa-Health community (ECSA-HC) conducted in 2004 on the challenges facing the Malawian health work-force in the era of HIV and AIDS, where 96% of the staff interviewed knew the first aid for washing needle stick injuries. However, most of them (figure not given) did not know the procedure to follow in order to start Post Exposure Prophylaxis.

PEP is a major component of IP, health care workers should therefore be conversant with the existing guidelines should they become exposed to a needle stick injury or come in contact with blood or body fluids. Despite the low (14.3%)

access to post exposure counseling and testing, Ronald Ross Hospital has a PEP policy, copies of which are stuck in nearly all the Wards and Departments the Hospital. Further more, 23.5% of those who did not have needle stick injuries did not know the PEP procedure. The infection Control Team need to organize in house training on PEP to re-enforce its importance.

5.5.3 Compliance with the use of Personal Protective Equipment (PPEs)

The use of PPEs which include sterile/clean gloves, aprons, gowns, face masks, closed boots and goggles are an important aspect of compliance. Wearing of such protective clothing prevents direct contact with blood and body fluids there by protecting both the health care worker and the client from nosocomial infections. The study findings revealed that compliance to the use of PPEs was very high as (95%) of the respondents reported using personal protective clothing (figure 6). The commonest used type of PPE were gloves reported by 32.4% of the respondents. This could be because gloves were the widely available form of PPE. The least used were boots 4.6% which were only used the operating theatre.

The use of PPEs seem to depend on availability. This view is supported by the findings by Maimbolwa et al (1997) in a study entitled "Routine Care of Women Experiencing Normal Deliveries in Zambian Maternity Wards: A pilot study. Maimbolwa and her colleagues reported that, there were inadequate supply of PPEs such as gloves in Lusaka Urban Health Centre and Southern Province Based Health Facilities; so that, the use of gloves for routine performances of vaginal examination was dictated by their availability. The average number of vaginal examination for each woman at the University Teaching Hospital where glove supply was adequate was 3.5 compared to 1.3 in Lusaka Urban Clinics and 2 in Southern Province based health facilities.

Ofili et al (2003), in a study of Knowledge and Practice of Universal Precautions among Student Nurses at Nigerian Teaching Hospital advanced the same view on glove compliance and availability. In their report, Ofili and colleagues stated that,

the level of glove compliance among respondents was found to be very high (67.7%) when drawing blood, 82.3% when cleaning blood, and 78.5% when handling contaminated linen. According to these investigators, these levels were higher than the levels found in the study carried out among nurses in Central Hospital Benin Ofili (2000). This could be a result of more availability of gloves at Nigerian Teaching Hospital compared to Central Hospital Benin. .

The findings of this study further revealed that most (39.7%) of the respondents were motivated to use PPEs as a means of preventing cross infection, followed by 28.8% who were motivated to use PPEs by the availability of materials (see table 15). This implies that if the availability of PPEs is improved then their use will improve as well thereby improving the safety of both the staff and clients.

5.5.4 Compliance with Regard to the Processing of Used Instruments.

According to the Zambia National Infection Prevention Guiedlines, processing of contaminated instruments pass through three phases; decontamination for 10 minutes with 0.5% chlorine solution or JIK 1:6, cleaning with soap and a soft brush under running water and finally sterilization using an autoclave or high level disinfection by boiling, dry heat or by using chemicals. The findings of the study showed that 37.7% of the respondents knew the correct method of decontamination (using 0.5% chlorine solution for 10 minutes), followed by 29.9% who though knew the chemical and the strength for decontamination but did not know the recommended time for decontamination (see table 16). This shows that a good proportion of respondents had incomplete knowledge on decontamination.

Compliance with regard to cleaning of decontaminated instrument was moderate with (57.1%) of the respondents stating that they used soapy water for cleaning decontaminated instruments. On the sterilization of equipment, the study findings revealed that 49.2% of the health workers interviewed reported having had used a sterilizer followed by 33.8% who had used an autoclave for sterilization.

Although sterilization by autoclave is the WHO recommended method, it was mentioned by only 33.8% of the respondents probably because Ronald Ross does not have an autoclaving machine. The hospital sends equipment for autoclaving to Kitwe Central Hospital. It is the same reason why (49.2%) of the responded had used a sterilizer. These finding differs from those by Hamomba (2006) in which the majority (65.1%) of her respondents used an autoclave for sterilizing contaminated instruments.

5.6 AVAILABILITY AND ACCESS TO INFECTION PREVENTION MATERIALS

5.6.1 Availability of Infection Prevention Materials

The findings of this study have revealed that availability of materials for Infection Prevention does influence the health workers' compliance with the guidelines as shown in table 29. The majority of the respondents who indicated that materials were always available highly complied with the Guidelines (83.3%) while none of those who indicated that IP materials were rarely available or not available had high compliance. Corrected Chi-square=18.489, df=6, P-value=0.000, (95% CI 0,000, 0.038). Linear by linear association=15.166, df=1, (significant).

These findings agree with the findings of a study conducted in India by Kumar et al (2002) entitled Knowledge Attitude and Practices towards HIV among Nurses in a Tertiary Care Teaching Hospital: Two Decades after the Discovery. Kumar and colleagues indicated that lack of necessary equipment to use and protective clothing were the major reasons why nurses did not adhere to Universal Precautions. These findings are further supported by Didier et al (1999) who concluded that inadequate supply of IP materials is a major contributor to poor compliance, in the sense that despite the knowledge health workers may possess, and their desire to comply with guidelines it becomes impossible to do so.

In addition, results of the observation of routine IP practices revealed that compliance was significantly high in those hospital departments like the

Operating Theatre where supplies of IP materials were adequate compared to the Medical Department where supplies were inadequate. Ninety (90%) of participants observed in theatre complied with IP Guidelines while none of those observed in the medical department complied with the guidelines (refer to table 38). Corrected Chi-Square=19.861, df=4, P-value 0.000, (95% CI=0.000, 0.073). Linear by linear association 11.590, df=1, there by rejecting the null hypothesis which stated that there is no association between the health workers' compliance with Guidelines and the availability of IP materials. This implies that if knowledge is coupled with adequate supplies the levels of compliance may improve.

5.6.2 Access to Materials for Infection Prevention

The positive findings from this study were that (51.9%) of the health workers interviewed reported that IP materials were easily accessible from stores when ever available, 53.2% reported that IP materials were easily available at Ward/Departmental level. Further more, the study revealed that 84.4% reported having IP guidelines displayed in their work place. These values are far higher than what was reported by Libetwa (1997) in her study quoted above where 92.9% of her respondents reported hat IP guidelines were rarely displayed in their places of work. Libetwa (1997) also reported that there were no IP posters hanging any where in the institutions during her period of study. This could be due to the fact that the Zambia Infection Prevention Guidelines were not yet produces thus less emphasis was being placed on issues of Infection Prevention.

Despite the above positive findings, when access to IP materials was compared with Compliance the relationship was found not to be statistically significant. Chi-square=5.105, df=2, P-value 0.091, (95% CI=0.027, 0.155). Linear by linear association 2.178, df=1 (table 30).

5.7 MANAGEMENT SUPPORT

On management support, the results showed that (97.4%) of the respondents indicated that management poorly supported IP activities (table 21). The results further show that 88.9% of the respondents who highly complied with the guidelines had poor management support. Corrected Chi-square=4.500, df2, (95% CI=0.10, 0.120), P-value 0.065. This result was not statistically significant, there by failing to reject the null hypothesis which stated that there was no association between Management support and compliance with IP guidelines . Linear by linear association 4.361, df=1(table 31).

5.8 OBSERVATION OF ROUTINE INFECTION PREVENTION PRACTICES.

Observation of routine Infection Prevention practices was conducted using a check list. A total of 40 health workers were observed. The procedures observed included giving injections, dressing wounds, assisting or conducting a surgical operation in Theatre, conducting deliveries and others such as performing Vaginal examinations and conducting manual vacuum extraction and performing passive exercises. Most of those observed gave an explanation of what they would have done if they had the necessary supplies which gave an impression that they were aware of the guidelines despite proceeding the way they did.

The following components of IP were observed;

5.8.1 Hand Washing

More than two thirds (66.8%) of the health care workers observed complied with hand hygiene. The best hand hygiene practice was observed in the Operating Theatre were all (100%) of the health workers observed washed their hands before and after the procedure. All (100%) who washed hands before and after the procedure washed for more than 10 seconds. The lowest hand washing practice was observed in the Medical Department were only 11.1% washed their hands before the procedure and 55.5% washed hands after the procedure. None of those

who washed their hands either before or after the procedure washed for more than 10 seconds.

Figure 8: A Surgeon scrubbing hands prior to an operation (Source: Originated by the author 2007)

In the Obstetrics Department, compliance to hand washing was moderate, 60% of those observed washed their hands before the procedure and all (100%) washed their hands after the procedure. However, none of those who washed their hand before or after the procedure washed for more than 10 seconds. The levels obtained in the Obstetrics Department are similar to those observed by Hamomba (2006) in her dissertation quoted earlier where more Midwives washed hands after than before the procedure. Hamomba reported that 50% of the midwives and nurses observed washed their hands before the procedure while 88.9% washed their hands after the procedure. The Zambia Infection prevention Guidelines (2003) stipulates that hands should be washed before direct contact with a client, before putting on gloves, after any situation where the hand may be contaminated and after removing gloves.

In an observation study conducted by Didier et al (1999) on Compliance with hand hygiene in a Teaching Hospital in Geneva , Switzerland, it is recorded that Doctors had the highest level of non-compliance with an Odds Ratio (OR) of 2.8.

In this particular study Registered Nurses were the worst compliers with hand hygiene where most (30.8%) of those who did not wash their hands before the procedure were Registered Nurses and similarly the majority (60%) of those who did not wash their hands after the procedure were Registered Nurse. Mean while, only 25% of Doctors never washed their hands before the procedure while all (100%) of the Doctors washed their hands after the procedure. This could be because majority (75%) of Doctors were observed in the Operating Theatre where compliance with hand hygiene was highest (100%). On the other hand most (62.5%) of Registered Nurses were observed in the Medical Department where compliance with hand hygiene was lowest (33.4%).

5.8.2 Use of Personal Protective Clothing

The majority (95%) of the health care workers observed wore an apron, coat, or gown depending on the profession, sex and or procedure being conducted. The 95% use of apron, coat or gown is high keeping in mind the 81.4% use of aprons reported by Hamomba (2006). Most (82.5%) of the participants used either sterile or clean gloves. In the Operating Theatre, glove compliance among professionals was good as clean gloves were used for clean procedures while sterile gloves were used for sterile procedures. However, Maids rinsed heavily soiled non-decontaminated linen with a single pair of clean gloves as shown in the picture below. The IP guidelines recommend the use of utility gloves for handling soiled linen during decontamination and cleaning. In Labour Ward, the use of clean gloves for vaginal examination was rampart due to shortage of sterile gloves which were being spared for use during the second and third stage of labour.

Figure 9: A Domestic worker rinsing soiled theatre drapes following ceasarean section (note the use of examination gloves and absence of goggles). Source: Originated by the author 2007.

Goggles were used only in the Operating Theatre and the Obstetrics Department. Compliance to the use of goggles was low (35%). The majority (85.7%) of those who used goggles were from Theatre. In Labour Ward only 14.3% used goggles despite the likely hood of blood and body fluids splashing onto the face during delivery. This figure has shown that compliance with the use of goggles by midwives during deliveries is still low considering the 8.3% reported by Hamomba (2006). In labour ward, goggles were seen laying on trolleys mean while midwives proceeded in conducting deliveries without using them.

Face masks like goggles were also used only in the Operating Theatre and the Obstetrics Department. Compliance with the use of face mask was at 52.4%. However, all 100% of those observed in theatre used face masks while only 10% used face mass in the Obstetrics Department.

The use of boots was observed only in the Operating Theatre, while the rest of the wards including Labour Ward where use of closed boots is recommended, workers were observed using their foot ware.

5.8.3 Processing of used Instruments, Equipments and used Surfaces

5.8.3.1 Decontamination

In the Medical Wards, there was inadequate supply of Sodium Hypochlorite and the sterilizers had broken down all (100%) of the workers observed simply washed the used instruments with soapy water and air dried them. In the Surgical Wards, the majority (88.9%) of the participants complied with the use of 0.5% chlorine solution for the decontamination of used instruments, while all (100%) of the candidates observed in the Operating Theatre and the Obstetrics Department complied with the use of 0.5% chlorine solution. Below is a picture of a nurse decontaminating used instruments following a delivery.

Figure 10: A Midwife decontaminating used instruments following a delivery, (note absence of utility gloves, goggles, boots and plastic apron). Source: Originated by the author 2007.

Similarly, all (100%) participants observed in Theatre and the Obstetrics Department complied with the recommendation that all visibly contaminated surfaces should be wiped with a cloth soaked in 0.5% chlorine solution. On the flooding of large spills of blood with 0.5% chlorine solution, 75% of those

observed in the Operating Theatre complied while only 60% of those observed in the Obstetrics Department complied.

Figure 11: A theatre Nurse wiping a soiled theatre table with a cloth soaked in JIK 1:6. Source: Originated by the author 2007.

Figure 12: A Theatre Nurse flooding a spill of blood with 0.5% chlorine following a ceasarean section, (note the ungloved left hand). Source: Originated by the author 2007.

5.8.3.2 Cleaning of used Instruments

About 68.8% of the health workers observed washed used instruments with soapy water, however, none of them washed under the surface of water there by risking infectious materials becoming air borne through splashes. Less than half (46%) used a soft brush to remove organic mater from instruments. In the Operating Theatre, only 60% of Theatre Nurses used a brush while in Labour Ward the figure was even lower (37.5%). This was despite having soft brushes.

The investigator observed that washing powder was available in all the wards for cleaning used instruments. The majority (78%) of the health workers observed rinsed instruments after washing and 78% air dried instruments prior to High Level Disinfection (HLD) or sterilization. The Zambia Infection Prevention Guidelines (2004) recommends that, after decontamination, soiled instruments be thoroughly washed with soapy water under the surface of water to remove organic and chemical residue. Studies have shown that up to 80% of microorganisms are removed during the cleaning process (Teitjan et al 2003).

5.8.3.3 High Level Disinfection (HLD)

High Level Disinfection (HLD) can be achieved by boiling, use of chemical such as sodium Hypochlorite 0.1% or by dry heat. The boiling method is the commonly used method at Ronald Ross Hospital, followed by the use of chemicals for those instrument such as plastic tubes that can no withstand boiling. Slightly above half (51.8%) of the health care workers observed followed the correct procedure for boiling instruments. In the Operating Theatre, all (100%) followed the correct procedure, in obstetrics 85.3% followed the correct procedure, in Surgical wards 44% followed the correct procedure while in Medical wards none boiled the instrument as the sterilizers were not in working order.

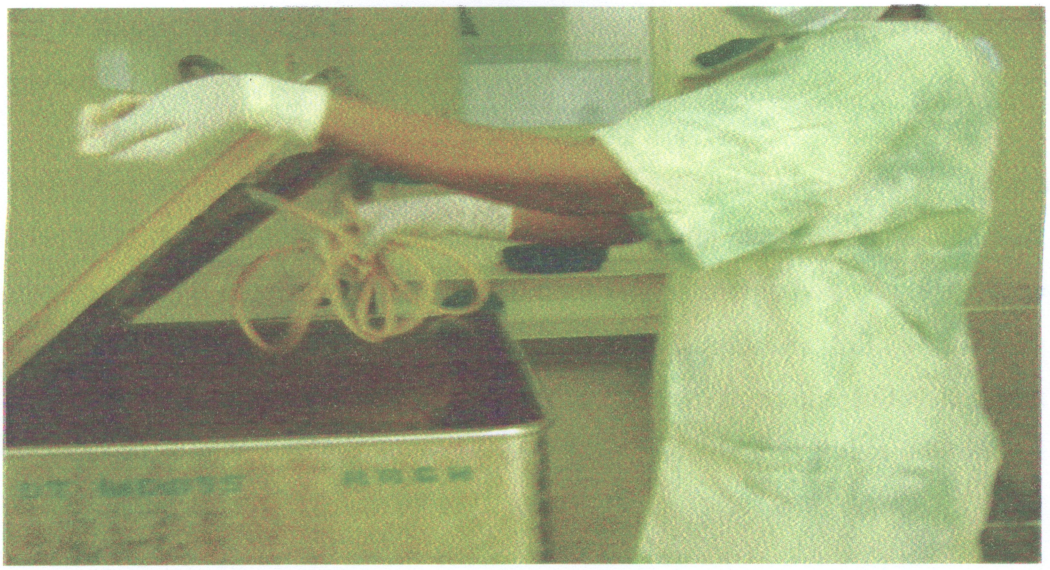


Figure 13: A Theatre Nurse placing tubes in a sterilizer for boiling. Source: Originated by the author 2007.

5.8.3.4 Sterilization of Instrument

With regard to the sterilizations of instruments using an autoclave, no observation was made as earlier explained that the institution had no autoclaving machine instead instruments for autoclaving are sent to Kitwe Central Hospital.

5.8.4 Care of Surgical Wounds

It was observed by the investigator that compliance during care of surgical wounds was moderate (60%). This may explain why the institution is recording an average of 15.4% post-operative wound infection rate per year (table 1) while the WHO acceptable post-operative wound infection rate is 5% (Maimbolwa 2000).

5.8.5 Disposal of Used Sharps Materials

The findings revealed that all (100%) of the health workers observed used sterile needles and syringes for administering drugs or withdrawing blood. This is in agreement with the findings of the Central Board of Health and the Prevention of Medical Transmission of HIV Project (2004) which revealed that all (100%) of

the health workers were observed using new sterile injection equipment on every patient.

Regarding the rinsing of used sharps with 0.5% chlorine solution, compliance was low at (25%). The marjority (96.5%) of the health care workers observed, disposed of the used sharps material immediately in sharps box. None of those observed overfilled sharps boxes to more than ¾ quarters full. This is an improvement from the 25% on the initial visist and 9% on the follow up visit overfilling of sharps boxes observed by CBoH and the Prevention of Medical Transmission of HIV Project (2004).

Figure 14: A Theater Nurse disposing of used sharps materials. Source: Originated by the author 2007.

The investigator observed that apart from theatre which used the recommended yellow labeled bio-hazard puncture proof sharps boxes all the other wards used the improvised sharps boxes made from carton boxes for syringes or Intravenous fluids.

5.8.6 Disposal of Contaminated linen

All (100%) the participants who were observed handling soiled linen never used utility gloves. Similarly, all (100%) never decontaminated linen in 0.5% chlorine solution. Heavily soiled linen from labour ward and from theatre was simply rinsed in plain water before being taken for laundry as shown in figure 9, page 78

The findings of this study based on the observation revealed that, 55% of those observed complied with the Guidelines. The level of compliance varied across Departments, procedures and different components of the Infection Prevention Guidelines. The highest level of compliance (90%) was observed in theatre during surgical operations while the lowest level (15.4%) was observed in medical wards during the administration of injections. In terms of IP components, there was a 100% compliance on the single use of needles and syringes, 100% on not over-filling sharps containers, 66.8% on hand hygiene, 25% on rinsing used sharps in 0.5% chlorine solution and 0% on the decontamination of heavily soiled linen.

5.9 LIMITATIONS OF THE STUDY

The following are the limitations of this study:

1. The small sample size and the convenient sampling method used in this study limits the generalization of findings to other settings.
2. Only 40 out of the 77 interviewed candidates were observed on their infection prevention practices, since some of the interviewed candidates were never found performing any of the specified procedure through out the time of investigation. This could have biased the results since some of the participants who were not observed could have had some peculiar IP practices.

5.10 IMPLICATIONS TO NURSING

The findings of this study have implications on all the four Domains of Nursing:

5.10.1 Nursing Practice

The results of this study based on observation revealed that the majority (75%) of Registered Nurses followed by more than half (57.1%) of Enrolled Nurse never complied with the IP guidelines. Nurses are the largest human resource of the health care system; as a result nearly every client who visits a health institution will come into contact with a nurse. This implies that if nurses do not comply with IP guidelines then the clients, the nurses them selves and the community at large are at risk of acquiring nosocomial infections. Therefore, nurses need to comply with the recommended IP guidelines if the problem of nosocomial infections is to be curtailed.

5.10.2 Nursing Education.

The findings of this study further revealed that the majority (88.9%) of those who highly complied with the IP guidelines had Universal Precaution or Infection Prevention Guidelines included in their training, implying that nurse educators should pay particular attention in teaching the IP components to their students. Further more, the findings of this study have indicated the importance of In-service training for Registered and Enrolled Nurses working in medial and surgical wards on IP as a means of improving compliance with guidelines.

5.10.3 Nursing Research.

The review of literature prior and during the course of this study showed that limited research has been done in the area of IP in Zambia. Nurse researchers therefore, need to investigator more on different aspects of Infection Prevention and make recommendations on how to improve IP practices in our health institutions. This will help in achieving the Government's Vision of "Having an Infection free Health Sector" Ministry of Health (2005).

5.10.4 Nursing Administration.

The results of this study revealed a significant association between compliance with IP Guidelines and availability of IP materials. Compliance was significantly high (90%) in those Hospital Departments such as the Operating Theatre where supplies of IP materials were high compared to the medical ward where supplies were inadequate. The Nurse administrators should therefore, insure that there is adequate provision of required materials for IP. In addition, Nurse Managers should provide support and supervision to nurse practitioners to insure that IP Guidelines are complied with.

5.11 CONCLUSION AND RECOMMENDATIONS

5.11.1 CONCLUSION

The study was carried out to establish the level of health-care workers' compliance with the Infection Prevention Guidelines and the factors that influence compliance.

The study revealed that compliance varied across different components of Infection Prevention, Departments and type of procedure. Factors associated with high compliance were, inclusion of Infection Prevention Guidelines in training 88.9%, high Knowledge of Infection Prevention Guidelines/Hospital Acquired Infections 85.7%, positive attitude towards Infection Prevention 100%, and adequate supply of Infection Prevention materials 83.3%. The results showed that factors such as number of years in service 22.2% , management support toward the implementation of IP guidelines11.1% and access to IP materials 33.3% were not significant in relation to compliance.

5.11.2 RECOMMENDATIONS

Based on the study findings, the following recommendations were made:

5.11.2.1 To the Government

1. The Government through the Ministry of health should increase grants to Health Institutions to enable them purchase necessary equipment and materials for infection Prevention.
2. The Government needs to work with co-operating partners to supplement its efforts in terms of staff training and purchasing of IP materials.
3. Government need to increase funding for research programmes dealing with issues of infection prevention since it has realized that infection prevention is a corner stone in the provision of quality health services.

5.11.2.2 To the Management of Ronald Ross General Hospital

1. The management should provide adequate funds for Purchasing of Infection Prevention materials such as hand-rub, Sodium hypochlorite, puncture roof sharps boxes, Personal Protective Equipment for example gloves, boots, goggles, utility gloves and theatre gowns. Management should also Purchase an autoclaving machine and purchase or repair the sterilizers.
2. The Management Should organize In-service training programmes for its professional Health Staff and the support staff who deal with maintenance and waste collection and disposal to up-date them on the need to comply with IP guidelines for the safety of clients, themselves and the community at large.
3. The Management should carry out random IP checks on Infection Prevention Practices and reward deserving individuals and Departments as away of motivating them.

4. The hospital Management should be evaluating the performance of the Infection Prevention Team at Least Quarterly and make necessary changes.
5. The Biomedical Scientist at the Institution should be part of the Infection Prevention and Control Team, because Biomedical Scientists specializes in the study of Micro-organisms therefore, such a person will help not only in diagnosing the microorganisms but in investigating their source and mode of spread.

5.11.2.3 For further research

1. There is need to replicate the study with a large sample using probability sampling method to warrant generalization of the results.

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APPENDICES

APPENDIX 1

INFORMED CONSENT

COMPLIANCE WITH INFECTION PREVENTION GUIDELINES BY HEALTH CARE WORKERS AT RONALD ROSS GENERAL HOSPITAL, MUFULIRA DISTRICT.

INTRODUCTION

1, Patricia Mukwato Katowa; a student of Masters of Science in Nursing at the University of Zambia is kindly requesting for your participation in the research study mentioned above, because it is important to assess the level of health care workers' compliance to infection prevention. Before you decide whether or not to participate in this study, I would like to explain to you the purpose of the study, the procedure any risks and discomforts, benefits and what is expected of you. Your participation in this study is entirely voluntary. You are under no obligation to participate, you may choose to participate or not to participate. If you decline to participate, no privileges will be taken away from you as an employee of Ronald Ross General Hospital. If you agree to participate, you will be asked to sign this informed consent form in front of some one. Agreement to participate will not result in any immediate benefits.

PURPOSE OF THE STUDY

The study will obtain information on the compliance of health care workers to IP Guidelines and the factors that determine this compliance. This is important, as the data from the study will assist health care managers to find ways and means of improving compliance there by reducing nosocomial infections, and consequently improving the quality of care.

PROCEDURE

After you have signed the informed consent form, and have had a chance to ask questions, you will be requested to answer questions in a self administered interview schedule concerning your Infection Prevention Practices. You will also be given a chance to make suggestion on how you think compliance to Infection Prevention Guidelines can be improved. After filling in the interview schedule, I will be observed you perform any one procedure requiring compliance to IP guidelines such as dressing a surgical wound, giving an injection, conducting a delivery or performing or assisting in performing a surgical procedure, (Procedures to be observed will depend on the ward or departmental routine).

RISKS AND DISCOMFORTS

No risks or discomforts are involved apart from the use of your time in answering questions and the presence of the observer. Answering questions will take approximately 30 minutes while the observation will depend on the length of the procedure you will be under taking.

BENEFITS

By taking part in this study, you will be able to provide information that will help relevant authorities and policy makers to come up with strategies and policies that will help to improve IP practices of health care workers. This will in turn reduce nosocomial infections there by protecting the health care workers, the client and the community at large. No monetary favours will be given in exchange for information obtained, but information on recommended best practices will be give on any aspects of IP.

CONFIDENTIALITY

Your research records and any information you will give will be confidential to the extent permitted by law. You will be identified by a number, and personal information will not be released without your written permission except when required by law. The Ministry of Health, the University of Zambia Research Ethics

Committee or the School of Medicine may review your records again this will be done with confidentiality.

INFORMED CONSENT FORM

The purpose of this study has been explained to me and I understand the purpose, the benefits, risks and discomforts and confidentiality of the study. I further understand that:

If I agree to take part in this study, I can withdraw at any time without having to give an explanation and that taking part in this study is purely voluntary.

I_____(Names)

Agree to take part, both in answering the questionnaire and in the observation.

Signed:_____ Date:_____ (Participant)

Signed:_____ Date:_____ (Witness)

Signed:_____ Date:_____
(Researcher)

PERSONS TO CONTACT FOR PROBLEMS OR QUESTIONS

1. Patricia Mukwato Katowa, University of Zambia, Post Basic Nursing Department, P.O. Box 50110, Lusaka. Cell: 0977564486

2. Mrs. C. Ngoma University of Zambia, Post Basic Nursing Department, P.O. Box 50110, Lusaka.

3. The chairperson, Research Ethics Committee, University of Zambia. P.O. Box 50110. Lusaka.

APPENDIX II: BUDGET

BUDGET CATEGORY	UNIT COST (ZMK)	QUANTITY	TOTAL
1. STATIONERY			
(a) Flash Disc	400,000.00	X 1	400,000.00
(b) Bond Paper	30,000.00	X 10	300,000.00
(c) Pens	1,000.00	X 10	10,000.00
(d) Pencils	500.00	X 10	5,000.00
(e) Rubbers	5,000.00	X 5	25,000.00
(f) Note book	8,000.00	X 1	8,000.00
(g) Tippex	10,000.00	X 1	10,000.00
(h) Bag for interview schedules	150,000.00	X 1	150,000.00
(i) Stapler	50,000.00	1	50,000.00
(j) Staples	10,000.00	1 Box	10,000.00
SUBTOTAL			**968,000.00**
2. PERSONNEL			
(a) Lunch Allowance Researcher	50,000.00	X 1 x 40 days	2,000,000.00
(b) Local Transport Charges Within Mufulira (Researcher)	30,000.00	X 1 x 40 days	1,200,000.00
SUBTOTAL			**3, 200,000.00**
3. TYPING SERVICES			
(a) Research proposal typing and printing	3,000.00	X 60 pages	180,000.00
(b) Research proposal photocopying	200.00	X 60 pages x 3 copies	36,000.00
(c) Research proposal binding	10,000.00	X 3 copies	30,000.00
(d) Typing and printing interview schedules	3,000.00	X 10 pages	30,000.00
(e) Photocopying interview schedule	200.00	X 10 Pages x 90 copies	180,000.00
(f) Research report typing	3,000.00	X 100 pages	300,000.00
(g) Research report photocopying	200.00	X 100 pages x 4 copies	80,000.00
(h) Research Report binding	40,000.00	X 4 copies	160,000.00

SUBTOTAL			**996,000.00**
TOTAL			**5, 164, 000.00**
CONTINGECY FUND 10%			**516, 400.00**
GRAND TOTAL			**5, 680, 400.00**

JUSTIFICATION FOR THE BUDGET

STATIONERY

The 10 reams of bond paper will be used for the research proposal development and the final report. Paper will also be required to make extra copies of the proposal for submission to the Research Ethics committee and the board of graduate studies. In addition the self administered interview schedule which will consist of 10 pages will need to be photocopied.

The bag for self administered interview schedule is for the researcher to ensure that the interview schedules are kept safe.

The flash disc is for copying, storage and safe keeping of research data.

Other accessories such as pens pencils rubbers stapler and staple and note books are required for the routine collection of research data.

PERSONNEL

Data collection will be conducted through out the day as such the researcher will need transport and lunch allowance. The research has been allocated 40 days to allow adequate time for administration and collecting the interview schedules and for observations.

TYPING SERVICES

The research proposal, the interview schedule as well as the report will need to be typed, hence the figure allocated in the budget.

CONTINGENCY FUND

Contingency fund which is 10% of the budget is required for any extra costs due to inflation and for any eventualities.

PROJECT FUNDING

The total budget for the study was K5, 680, 400.00. The study was funded by Ministry of Health and the University of Zambia Staff Development Office.

APPENDIX III: GANNT CHART

			2 0 0 7									2 0 0 8					
NO	**TASK TO BE PERFORMED**	**RESPONSIBLE PERSON**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**
1	Literature Review	Researcher															
2	Proposal Development	Researcher															
3	Presentation to Graduate studies	Researcher															
4	Approval by REC	Researcher															
5	Data collection	Researcher															
6	Data analysis	Researcher															
7	Report writing	Researcher															
8	submission of draft report	Researcher															
9	Submission of final report	Researcher															
10	Dissemination of results	Researcher															

APPENDIX IV

THE UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE

DEPARTMENT OF POST BASIC NURSING

SELF ADMINISTERED INTERVIEW SCHEDULE

TOPIC: COMPLIANCE WITH INFECTION PREVENTION GUIDELINES BY HEALTH CARE WORKERS AT RONALD ROSS GENERAL HOSPITAL

DATE.....

NO. OF INTERVIEW SCHEDULE.....

INSTRUCTIONS TO THE RESPONDENT

1. Do not write your name on the Interview Schedule.
2. Circle the most appropriate response to the question or fill in the answer on the space provided.
3. All the information provided will be kept in strict confidence.

SECTION A: DEMOGRAPHIC DATA

1. Age Years{Age}
   1 = Less than 21
   2 = 21-30
   3 = 31-40
   4 = 41-50
   5 = 51-60
   6 = above 60

2. Sex {Sex}
   1 = Male
   2 = Female

3. Marital Status {Marital}
   1 = Married
   2 = Single
   3 = Divorced
   4 = Widowed

4. Medical Profession {Profess}
   1 = Doctor
   2 = Registered Midwife
   3 = Registered Nurse
   4 = Registered Theatre Nurse
   5 = Enrolled Midwife
   6 = Enrolled Nurse
   7 = Clinical officer
   8 = Laboratory Technologist
   9 = physiotherapist

5. Number of years in service {Year in S}

   1 = 0-5

   2 = 6-10

   3 = 11-15

   4 = 16-20

   5 = more than 20

6. Ward/department {Ward}

   1 = Medical

   2 = Surgical

   3 = Obstetrics

   4 = Laboratory

   5 = Physiotherapy

   6 = Theater

7. How would you Describe the workload in this ward/department {workload}

   1 = Very High

   2 = High

   3 = Moderate

   4 = Low

SECTION B: KNOWLEDGE OF INFECTION PREVENTION/HOSPITAL ACQUIRED INFECTIONS

8. Have you ever heard about Universal Precautions/Infection Prevention {Heard UP}?

   1 = Yes

   2 = No

9. If yes to question 8, what Universal Precaution/Infection Prevention Guidelines do you know{IP Guide}?

_____

_____

_____

_____

_____

10. Were Universal Precautions/Infection Prevention part of your training curriculum {UP curri}?

1 = Yes

2 = No

11. If yes to question 10, what method/s of teaching was used to teach the Universal Precaution or Infection Prevention Guidelines? {Teach M}

_____

_____

12. If yes to question 10, do you think you were adequately Prepared to practice the principles of Universal Infection Control/Zambia infection Prevention Guidelines {Adeq Prep}?

1 = Strongly agree

2 = Agree

3 = Uncertain

4 = Disagree

5 = Strongly disagree

13. Have you ever heard the term Hospital Acquired Infections {Heard HAI}?

1 = Yes

2 = No

14. If yes to question 13, what Hospital Acquired Infections do you know {Eg HAI}?

_____

_____

_____

_____

_____

15. If yes to question 13, how are Hospital Acquired Infections transmitted {HAI trams}

_____

_____

_____

_____

16. If yes to question 13 how can you prevent Hospital Acquired Infections? {Prev HAI}

_____

_____

_____

_____

_____

SECTION C: ATTITUDE TOWARDS INFECTION PREVENTION AND CONTROL

17. Infection prevention is very important in the hospital{ IP import}?

1 = Strongly agree

2 = Agree

3 = Uncertain

4 = Disagree

5 = Strongly disagree

18. Good Infection Prevention Practices benefits not only the hospital but also the staff, patient and the community at large {IP Benef}

1 = Strongly agree

2 = Agree

3 = Uncertain

4 = Disagree

5 = Strongly disagree

19. It is important to consult others when not sure of which Infection Prevention practice to use {consult}?

1 = Strongly agree

2 = Agree

3 = Uncertain

4 = Disagree

5 = Strongly disagree

20. Whom would you be comfortable with to supervise you on Infection Prevention practices {IP superv}

_____

_____

SECTION D: COMPLIANCE WITH INFECTION PREVENTION GUIDELINES.

DI. HAND WASHING

21. How often do you wash hands before and after every procedure{Hand wash }?

1 = All the time

2 = Most of the Times

3 = Some times

4 = Rarely

22. What do you use for hand hygiene {Hand prod}?

1 = Plain water

2 = Water with non medicated soap

3 = Disinfectant

4 = Hand rub

5 = Others specify

23. What motivates you to wash your hands {Motive W}?

1 = Patient's HIV status

2 = Appearance of patient

3 = Work load

4 = presence of water and soap and or handrub

5 = Presence of superior

6 = Others specify

DII DISPOSAL OF SHARPS

24. Do you re-use needles and syringes {Reuse nee}?

1 = Yes

2 = No

25. What do you do to the syringe and needle after use { S-N after}?

1 = Decontaminate three times with JIK 1:6 before disposal

2 = Bend or break needle prior to disposal

3 = Manually remove the used needle from the syringe

4 = Recap needle after use

5 = Put needle and syringe in puncture proof safety box immediately after use

6 = Others Specify

26. Please describe how you dispose off filled Sharp boxes {Dispose}

_____

_____

27. Have you ever had any needle stick injury in the last 12 months {N-stick}?

1 = Yes

2 = No

28. If yes to question 27, describe what you did when you injured yourself {Injury PEP}

_____

_____

_____

_____

29. If no to question 27, do you know the procedure followed before accessing Post Exposure Prophylaxis {PEP Proc}?

1 = Yes

2 = No

DIII USE OF PROTECTIVE CLOTHING

30. Do you use any protective clothing when performing deliveries, dressings, surgery and handling contaminated materials {Protect C}?

1 = Yes

2 = No

31. If yes to question 29, what protective clothing do you use?{Eg pro C}

_____

_____

_____

_____

32. What motivates you to use protective clothing when conducting some procedures {Motiv PEP}

1 = Work load

2 = Patient HIV Status

3 = Appearance of patient

4 = Availability of Materials

5 = Presence of superior

6 = Others specify

DIV INSTRUMENT PROCESSING

33. Briefly describe how you decontaminate used instruments { Decont}

_____

_____

_____

34. Briefly describe how you clean decontaminated instruments { Cleaning}

_____

_____

_____

35. Briefly describe how you sterilize or high level disinfect cleaned Instruments {Steri HLD}

_____

_____

_____

SECTION E: AVAILABILITY AND ACCESS TO INFECTION PREVENTION MATERIALS/SUPPLIES

36. Please score the availability of Infection Prevention materials and supplies in your ward/department {Availab}

    1 = Always available

    2 = Mostly available

    3 = Rarely available

    4 = Not available

37. How easy is it to access/obtain IP materials/supplies from stores {ST Access}?

    1 = Easily accessible

    2 = Not easily accessible

38. How easy is it to access/obtain IP materials/supplies at ward/departmental level {W/D access }?

    1 = Easily accessible

    2 = Not easily accessible

39. Are there any Infection Prevention and Control Guidelines displayed within your workplace {IPDespl}?

    1 = Yes

    2 = No

SECTION F: MANAGEMENT SUPPPORT

40. Does management put purchase of Infection Prevention materials as a priority among its activities {IP prio}?

    1 = Yes

    2 = No

41. Does management offer rewards or sanctions for adherence/non adherence to Infection prevention guideline {Reward/S}?

1 = Yes

2 = No

42. Does management carry out Random Checks on Infection Prevention practices in your ward/department {IP checks}?

1 = Yes

2 = No

43. Does management organize in service Infection Prevention training for members of staff{IP inserv}?

1 = Yes

2 = No

44. What recommendation would you make to management to improve infection Prevention practices at this institution?

_____

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR TIME!

APPENDIX V

MARKING KEY FOR THE STUDY VARIABLES

SECTION B: KNOWLEDGE OF IP GUIDELINES/ HAI			
Question number	Question	Correct answers	Maximum Score
8.	Have you ever head about UP/IP?	Yes	1
9.	If yes to question 8, what UP/IP guidelines do you know?	Hand hygiene, decontamination, sterilization or HLD, use of protective equipment, disposal of waste in designated areas, not recapping or bending needles and isolation	3
10.	Were UP/IP part of your training?	Yes	1
11.	If yes to question 10, what method of teaching was used?	Lecture and demonstration	2
12.	If yes do you think you were adequately prepared to use the guidelines?	Strongly agree	1
13.	Have you ever heard the term HAI?	Yes	1
14.	If yes to question 13, what HAIs do you know?	HIV, hepatitis B, Pneumonia, TB and post-operative wound infections	3

15.	If yes to 13, how are HAIs transmitted?	Air borne, contact with blood and body fluids, needle sticks, contaminated hands, contaminated instruments, transfusion with contaminated blood, not isolating infectious cases, none-sterile invasive procedures and through formites.	3
16.	If yes to question 13, how can you prevent HAIs?	Use of PPE, Hand hygiene, sterilization, HLD and decontamination of instruments, isolation, use of aseptic technique.	3
SECTION C:	**ATTITUDE TOWARDS**	**IP**	
17.	IP is very important in the hospital	Strongly agree 5, agree 4, uncertain 3, disagree 2, and strongly disagree 1.	5
18.	Good IP benefits not only the hospital but the client and community at large	Strongly agree 5, agree 4, uncertain 3, disagree 2, and strongly disagree 1.	5
19.	It is important to consult	Strongly agree 5,	5

	when not sure of which IP practice to use	agree 4, uncertain 3, disagree 2, and strongly disagree 1.	
20.	Whom would you be comfortable to supervise you in IP?	IP Nurse	1
SECTION D:	**COMPLIANCE WITH**	**IP GUIDELINES**	
21.	How often do you wash hands before and every after a procedure?	All the time	1
22.	What do you use for hand hygiene?	Hand rub, disinfectant, water with medicated soap	1
23.	What motivates you to wash your hands?	Prevention of cross infection	1
24.	Do you reuse needles and syringes?	No	1
25.	What do you do to the syringe and needle after use?	Decontaminate three times with JIK 1:6 or dispose immediately in a puncture proof safety box	1
26.	Describe how you dispose off filled sharp boxes	By incineration	1
27.	Have you ever had any needle stick injury in the past 12 months	No	1
28.	If yes to question 27 describe what you did when you injured yourself.	Squeezed out blood, washed with methylated spirit and	1

		sought counseling.	
29.	If no to question 27, do you know the procedure followed before accessing PEP?	Yes	1
30.	Do you use any protective clothing when performing deliveries, surgery, dressings or handling contaminated materials?	Yes	1
31.	If yes what protective clothing do you use?	Gloves, masks, gowns, caps, goggles, boots, lab coat, and aprons.	2
32.	What motivates you to use protective clothing when conducting some procedure?	Prevention of cross infection.	1
33.	Briefly describe how you decontaminate used instruments	Soak in JIK 1:6 for 10 minutes	1
34.	Briefly describe how you clean decontaminated instruments	Wash in running water with a soft brush	1
35.	Briefly describe hw you sterilize or HLD cleaned instruments	Boil in sterilizer for 20 minutes or autoclave for 20 to 30 minute	1
SECTION E:	**AVAILABILITY AND**	**ACCESS TO IP**	**MATERIALS**
36.	Score the availability of IP materials in your	Always available 3, mostly available 2,	3

	ward/department	rarely available 1, not available 0.	
37.	How easy is it to obtain/access IP materials from stores?	Easily accessible	1
38.	How easy is it to obtain/access IP materials at ward or departmental level?	Easily accessible	1
39.	Are there any IP guidelines displayed within your work place?	Yes	1
SECTION F:	**MANAGEMENT IP ACTIVITIES**	**SUPPORT**	**TOWARDS**
40.	Does management put purchase of IP materials as priority among its activities	Yes	1
41.	Does management offer rewards or sanctions for adherence/non adherence to IP guidelines	Yes	1
42.	Does management carry out random checks on IP practices in your ward/department?	Yes	
43.	Does management organize in service IP training for Members of staff?	Yes	1

Key

1. **Section B: Knowledge.**
   - High knowledge of IP/HAI 15-18 scores
   - Medium knowledge of IP/HAI 9-14 scores
   - Low knowledge of IP/HAI 0-8 score

2. **Section C: Attitude towards IP and control.**
   - Very good 16 score
   - Good 10-15 score
   - Poor 0-9 score

3. **Section D: Compliance with IP guidelines.**
   - High 12-15 scores
   - Moderate 8-11 score
   - Low 0-7 scores

4. **Section E:**

   (i) Availability of IP materials/supplies.
   - Always available 3 scores
   - Mostly available 2 scores
   - Rarely available 1 score
   - Not available 0 scores

   (ii) Access to IP materials.
   - Easily accessible 3 scores
   - Not easily accessible 0-2 scores

5. **SECTION F: Management support towards IP activities.**
   - Good 4 scores
   - Poor 0-3 score.

APPENDIX VI

THE UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE
DEPARTMENT OF POST BASIC NURSING

OBSERVATION CHECKLIST

TOPIC: COMPLIANCE WITH INFECTION PREVENTION GUIDELINES BY HEALTH CARE WORKERS AT RONALD ROSS GENERAL HOSPITAL

DATE..... **SERIAL NO.....**

INSTRUCTIONS FOR THE OBSERVER

1. Introduce yourself to the participant and explain the reason for the observation.
2. Do not write the name of the participant on the observation checklist
3. Ask the participant to act as normally as possible during the observation.
4. Assure the participant that no one is being evaluated and that no one's actions will be identified with them as individuals
5. All the observation notes should be kept in strict confidence.
6. Thank the participant at the end of each observation

COMPLIANCE SCORING SYSTEM FOR HEALTH CARE WORKERS

NO	ACTION	STANDARD SCORE
1.	**HAND WASHING** • Before the procedure • After the procedure • Use soap and water/antiseptic /hand rub • Washes for at least 10 seconds	4
2.	**USE OF PROTETVECLOTHING** • Gloves (sterile/clean) • Apron/gown • Goggles or glasses • Face mask • Closed boots or shoes	5
3.	**DECONTAMINATION** • Uses utility gloves for handling instruments for decontamination • Uses a plastic non-corrosive container • Use 0.5% chlorine solution • Decontaminates instruments for 10 minutes • Decontaminates visibly contaminated surfaces by wiping with a cloth soaked in 0.5% chlorine solution. • Decontaminates large spills of blood, body fluids secretions or excretions by flooding with 0.5% chlorine solution for 10 minutes before mopping.	6
4.	**CLEANING USED INSTRUMENTS** • Thoroughly washes instruments with soapy water under the surface of water	

	• Uses a soft brush to clean instruments • Rinses instruments after drying to remove soap • Air dries instruments prior to high level disinfection or sterilization	
5.	**HIGH LEVEL DISINFECTION (HLD) BY:-** **1. Boiling** • Completely immerses instruments to be HLD • Places a lid on boiler and brings water to a gentle rolling boil • Keep at rolling boil for 20 minutes • Removes instrument with HLD forceps • Stores HLD instruments in a HLD container **2. chemicals** • Prepares fresh solution for chemical HLD (2%gluteraldehyde}or 8% formaldehyde or 0.1% chlorine solution • Submerges clean dry instruments in appropriate disinfectant • Covers container and soaks for 20 minutes • Remove all items from chemical using HLD forceps • Rinses items thoroughly with HLD water (water boiled for 20 minutes) • Air dries decontaminated items and • stores decontaminated items in a HLD container	**12**

6.	**STERILIZATION OF INSTRUMENTS** • Sterilizes or uses sterile instruments and materials for sterile procedures • Sterilizes using an autoclave at 106kpa for 30 minutes	**2**
7.	**CARE OF SURGICAL WOUNDS** • Protects wound with a sterile dressing fro 24 to 48 hours postoperatively • Washes hands before and after dressing change • Uses sterile technique when dressing a wound • Educate patient and family regarding care of postoperative wound (avoiding touching wound, practice hand washing before and after every activity)	**4**
8.	**DISPOSAL OF SHARPS** • Flushes used sharps in 0.5 chlorine solution • Disposes off used sharps immediately in a puncture • Does not over fill sharps box to more than ¾ quarters	**3**
	TOTAL SCORE	**40**

APPENDIX VII

DELIVERY ROOM CHECK LIST

NO	ITEM	PRESENT (+) ABSENT (-)	COMMENTS
1.	Gloves • Sterile • Clean		
2	Apron/gown		
3	Masks		
4	Plastic goggles		
5	Sterile needles and syringes		
6	Sharps box		
7	Sterilizer		
8	Disinfectant Jik		
9	• delivery pack (sterile) • forceps • cord scissors • cord clamp • cotton wool/maternity pads		
10	Linen		
11	Running water		
12	Hand washing soap or hand rub		
13	Closed boots or shoes		
14	Personal hand towels		
15	Sterile suturing materials		
16	Bin for decontamination with Jik 0.5%		
17	Bin for bio-hazard waste		

APPENDIX VIII

OPERATING ROOM CHECKLIST

NO	ITEM	PRESENT (+) ABSENT (-)	COMMENTS
1.	Gloves • Sterile • Clean		
2	Sterile Gowns		
3	Masks		
4	Disposable caps		
5	Closed boots or shoes		
6	Plastic goggles		
7	Sterile needles and syringes		
8	Sharps box		
9	Sterilizer		
10	Disinfectant Jik		
11	• Appropriate sterile surgical pack • Extra sterile gauze • Extra sterile cotton wool		
12	Linen		
13	Running water		
14	Hand washing soap/hand rub		
15	Sterile hand towels		
16	Sterile suturing materials		
17	Bin for decontamination with jik 0.5%		
18	Bin for bio-hazard waste		

APPENDIX IX

WOUND DRESSING ROOM CHECKLIST

NO	ITEM	PRESENT (+) ABSENT (-)	COMMENTS
1.	Gloves • Sterile • Clean		
2	Aprons or Gowns		
3	Masks		
4	Disposable caps		
5	Sterile needles and syringes		
6	Sharps box		
7	Sterilizer		
8	Disinfectant Jik		
9	• Appropriate sterile wound dressing pack • Extra sterile gauze • Extra sterile cotton wool • Extra forceps		
10	Linen		
11	Running water		
12	Hand washing soap or hand rub		
13	Sterile hand towels		
14	Leak proof plastic bags		
15	Bin for decontamination with jik 0.5%		
16	Bin for bio-hazard waste		

APPENDIX X

INJECTION ROOM CHECKLIST

NO	ITEM	PRESENT (+) ABSENT (-)	COMMENTS
1	Sterile needles and syringes		
2	Sharps box		
3	Sterilizer		
4	Disinfectant Jlk		
5	• sterile cotton wool • HLD chital forceps • Receivers (HLD and clean)		
6	Running water		
7	Hand washing soap or hand rub		
8	Personal hand towels		
9	Bin for bio-hazard waste		

The University of Zambia
School of Medicine
Department of Post Basic Nursing
P.O Box 50110
Ridgeway
Lusaka.
5th October 2007.

The Executive Director
Ronald Ross General Hospital
P.O Box 40897
Mufulira.

Ufs: The Head of Department
Department of Post Basic Nursing
School of Medicine
P.O Box 50110
Lusaka

Dear Sir,

RE: PERMISSION TO CONDUCT A RESEARCH STUDY

Iam a student pursuing Masters of Science in Nursing at the University of Zambia, Department of Post Basic Nursing. As part of the requirements of the programme, I am required to undertake a research project. The title of my Dissertation is "**Compliance with Infection Prevention Guidelines by Heath Care Workers at Ronald Ross General Hospital, Mufulira District".**

My Research Proposal was Approved by the Board of Graduate Studies, School of Medicine on 8th August, 2007 and by the University of Zambia Research Ethics Committee on 3rd October, 2007. Am therefore, requesting for permission to Collect data from Health Care Workers at Ronald Ross General Hospital through administration of Questionnaires and by observation. I intend to carry out the exercise from the 16th of October 2007.

Attached are photocopies of letters of Approval from the Board of Graduate Studies, School of Medicine and the University of Zambia research Ethics Committee.

Your assistance in this matter will be appreciated.

Yours faithfully,

Patricia Katowa Mukwato (Mrs.)

THE UNIVERSITY OF ZAMBIA

RESEARCH ETHICS COMMITTEE

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Assurance No. FWA00000338
IRB00001131 of IORG0000774

October, 2007
Ref.: 015-08-07

Ms Patricia Mukwato Katowa
Department of Post Basic Nursing
School of Medicine
University of Zambia
LUSAKA

Dear Ms Katowa,

RE: RESEARCH PROPOSAL ENTITLED: **"COMPLIANCE WITH INFECTION PREVENTION GUIDELINES BY HEALTH CARE WORKERS AT RONALD ROSS GENERAL HOSPITAL, MUFULIRA DISTRICT"**

The above-mentioned research proposal was presented to the Research Ethics Committee meeting held
on 5 September, 2007 where changes were recommended. We would like to acknowledge receipt of the corrected version with clarifications. The proposal has now been approved.

CONDITIONS:

This approval is based strictly on your submitted proposal. Should there be need for you to modify or change the study design or methodology, you will need to seek clearance from the Research Ethics Committee.
If you have need for further clarification please consult this office. Please note that it is mandatory that you submit a detailed progress report of your study to this Committee every six months and a final copy of your report at the end of the study.
Any serious adverse events must be reported at once to this Committee.

Yours sincerely,

Dr Esther Munalula-Nkandu
CHAIRMAN

Date of approval: 3 October, 2007 **Date of expiry:** 2 October, 2008