FACTORS INFLUENCING COMPLIANCE WITH INFECTION PREVENTION STANDARDS AMONG HEALTH WORKERS AT RONGO SUB COUNTY, MIGORI COUNTY-KENYA

BY

OCHIENG KHOL HELMUT

REG. NO: H152/4470/2013

THESIS SUBMITTED TO THE SCHOOL OF HEALTH SCIENCES, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (EPIDEMIOLOGY AND DISEASE CONTROL) OF JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY (JOOUST)

@ 2016

DECLARATION

This research thesis is my original work and has not been presented for any award in any other university or college.

OCHIENG KHOL HELMUT

(H152/4470/2013)

Signature: _____   Date: _____

We the undersigned, confirm that this thesis has been submitted for examination with our approval as university supervisor:

PROF. FRED AMIMO, PhD

Department of Public Health,

School of health sciences

Jaramogi Oginga Odinga of University of Science and Technology (JOOUST)

Signature:_____   Date_____

2.PROF. ODADA S. PETER, PhD

KEMRI-Center for Global Health Research, Kisumu

Signature:_____   Date_____

DEDICATION

Dedicated to my beloved family members

ACKNOWLEDGEMENT

ABSTRACT

Health workers (HWs) may acquire infections during the provision of health care because of occupational exposure to microorganisms. Relevant literature reports that, compliance with Standard Precautions is low among the HWs. The aim of the study was to evaluate the factors that influence health workers' compliance with Standard Precaution in order to avoid occupational exposure to pathogens.. A sample was 163 health workers was chosen from a population of 384 through simple random sampling technique. Data was collected using the questionnaire method as well as in-depth study schedules.

The study found that in most cases, health workers were not always putting on their aprons, masks and goggles when on duty and did not know the best way to dispose their used personal protective equipments. Although there were common cases of spillage of bodily fluids such as blood, majority of the health workers were not able to manage these fluids in accordance with the standard precaution measures. Managing of chemical waste was also found to be a challenging issue among the health workers as most of them could not identify the best way of disposing the waste. The study also found that, majority of the health workers were highly exposed to occupational health hazards at their working places, and contact and airborne transmission were the most common mode of occupational health hazard exposure. The study also found that majority of the health workers were most likely to be pricked accidentally by needles or fragments hence exposing them to infectious diseases. High exposure to health hazards was also enhanced by the fact that most of the health workers had insufficient knowledge on best infection control and prevention practices. Finally, it was also found that majority of the health workers were not well conversant with infection control and prevention practices attest to inadequate knowledge on best control and prevention measures. As a recommendation, the government should come up or redesign health policies and programs that target the compliance with infection control and prevention standards among the entire health workers in the country. The health care workers should adhere strictly, to infection control and prevention standards as this will not only ensure their safety but also promote their productivity and service delivery. Health care workers should undergo proper training on infection control and prevention standard precautions to improve their compliance with the same.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Hospital acquired infection (HAI) is a major global safety concern for both patients and health-care professionals. It is defined as an infection occurring in a patient during the process of care in a hospital or other health-care facility that was not manifest or incubating at the time of admission. This includes infections acquired in the hospital and any other setting where patients receive health care and may appear even after discharge. HAI also includes occupational infections among facility staff (WHO, 2011). Healthcare workers (HCWs) are at direct risk of exposure to blood and other body fluids and aerosols during the course of their job. Consequently, they are at risk of infection of-blood borne viruses including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Occupational exposure to blood can result from percutaneous (needle stick or other sharps injury) and muco-cutaneous injury (splash of blood or other body fluids into the eyes, nose, or mouth), or blood contact with non-intact skin. Needle stick injury (NSI) is the most common form of occupational exposure to blood which results in transmission of blood borne infection (Baker 2013).

World Health Organization (2008), reports that healthcare associated infections have been a menace world over, particularly in institutions where provision of healthcare services takes place. These infections are acquired during the provision of health care services. WHO (2008) further reports that the global prevalence of hospital acquired infections among the healthcare workers rise by 12% annually and continue to press on a huge burden in public health arena. Despite this worrying trend, relevant literature reports that, compliance with Standard Precautions (a set of guidelines that can protect health care professionals from being exposed to microorganisms) is low among healthcare workers, leading to high rates of exposure to microorganisms among health care workers via several modes (needlesticks, hand contamination with blood, exposure to air-transmitted microorganisms).

The World Health Organization (WHO) estimates that 3 million percutaneous exposures occur annually among 35 million HCW globally with over 90% occurring in resource constrained countries (WHO, 2005). Health-care workers in Africa suffer two to four needle-stick injuries per year on average with Nigeria, Tanzania and South Africa reporting 2.10 injuries per HCW on average. Worldwide occupational exposure accounts for 2.5% of HIV cases and 40% of

Hepatitis B and C cases among HCWs. In Africa Health-care workers suffer two to four needle-stick injuries per year on average (Mbaisi *et al.,* 2010).

Different nations and health organizations have come up with various standard Precautions that when complied to, can protect health care professionals from being exposed to healthcare associated infections. Measures to prevent the transmission of these infectious microorganisms are therefore a significant component of healthcare delivery at any level (Williamson, et al 2008). For instance, in Cyprus, health care workers are obliged by law (cap 89(I)/96) to implement all components of Standard Precautions during their clinical practice, and take all the appropriate measures to avoid occupational exposure to pathogens. In addition, employers in Cyprus (including hospital managers) are also obliged by the same law to provide to their employees all the necessary means (e.g. gloves, face masks) for protecting their health. Special educated personnel (doctors and nurses) in hospitals, representing the central infection control

Committee of the Ministry of Health within each hospital, is responsible for training health care workers, and monitor the implementation of Standard Precautions. Compliance with these standard precautions has been shown to reduce the risk of exposure to blood and body fluids. The term "standard precautions" is replacing "universal precautions", as it expands the coverage of universal precautions by recognizing that any body fluid may contain contagious and harmful microorganisms. The level of practice of universal precautions by Health Care Workers (HCWs) may differ from one type of HCW to another. The differences in knowledge of universal precautions by HCWs may be influenced by their varying type of training.

1.2 Problem Statement

Occupational exposure to blood or other body fluids in healthcare facilities constitutes a significant risk of transmission of HIV and other blood borne pathogens to healthcare workers. HIV/AIDs in particular is a major threat in the workplace (ILO, 2011). As a consequence of occupational exposure, an estimated 66,000 Hepatitis B, 16,000 Hepatitis C and up to 1,000 HIV infections occur among HCWs each year (Mbaisi *et al.,* 2010). The World Health Organization (WHO) estimates that over 90% percutaneous exposures occur annually among HCWs in resource constrained countries like Kenya. The prevalence of Hospital Acquired Infections (HAIs) has increased globally especially among the health-workers and so, emphasis on strict

implementation and compliance with standard precautions among health care workers is emphasized. Clever& Omenn (2008), documents that compliance on the part of healthcare workers with standard precautions is recognized as an efficient and effective means to prevent and control health care-associated infections in patients and health workers. In Rongo sub-county, Despite the guidelines developed in Rongo sub-county, compliance with these standard precautions is known to be inadequate- "poor and lacking", (DHIS, 2009). Several studies have indicated that better knowledge of standard precautions among health care workers is one of the predictors of better compliance.

1.3 Justification

In developing countries such as Kenya, the magnitude of HAIs remain underestimated or even unknown largely because their diagnosis is complex and surveillance activities to guide interventions require expertise and resources (WHO 2011). Hospital acquired infections are a major health disparity in Africa and Kenya as a nation. Despite intensive research and implementation of standard procedures to control the rapid spread of these infections over the past two decades in Kenya, the percentage of health care workers with no satisfactory knowledge is still high and on the rise. Very little advancements have been made to address and end these problems, particularly due to the rapidly increasing global population. If nothing is done to adequately address this problem, it may worsen in the coming years.

1.3 Purpose of the study

The aim of this was to investigate factors influencing compliance with infection prevention standards among health providers at Rongo Sub County with an ultimate goal of addressing the upsurge of prevalence of the Hospital Acquired Infections among the health providers in Kenya.

1.4 Objective of the study

The study was guided by the following specific objectives;
   i.   To assess the level of health workers' knowledge regarding infection control and prevention at Rongo sub-county

ii. To investigate healthcare workers' practices regarding infection control and prevention at Rongo sub-county

iii. To establish Occupational Hazards health workers Encounter when performing their duties at Rongo sub-county

1.5 Research Questions

The study seeks to answer the following research questions

i. What is the level of health provider's knowledge regarding infection control, prevention and injection safety practices?

ii. What are the health workers' practices regarding infection control, prevention and injection safety practices?

iii. What are some of the Occupational Hazards health providers encounter when performing their duties?

1.6 Significance of the study

This study may be helpful to various stakeholders in both the field of public health and medical health, (ministry of health, health workers) and the academia. To the government, this study may provide a platform upon which policies and programs can be re-designed by policy makers in the health department to help in promoting the implementation and compliance with infection prevention standards among the entire health workers fraternity.

The study may also enlighten the health care workers on the importance of strict adherence and compliance with infection prevention standards as this will not only ensure their safety but also promote their productivity and service delivery. Besides, it may also highlight health care providers on the best practices in health services delivery that ensure safety on both the health service provider and the recipient of the services as practiced by other nations which have made significant advancement on compliance.

To the academia, this study may help the academicians to formulate theories which will help in the describing and understanding of factors affecting compliance with infection prevention standards among the health workers. It may also equip them with the knowledge and information on the various ways in which these factors can be addressed. In view of this, the scholars may be able to come up with academic journals and other literatures materials on infection prevention standards and factors affecting its adherence.

1.7 Scope of the Study

This study focused only on factors influencing compliance with infection prevention standards with respect to health workers. Geographically, it only covered Rongo Sub-County based on the reported prevalence rate of 9%, which is notably significant. Thematically, the study only looked at occupational hazards health workers encounter when performing their duties, the level of health workers' knowledge regarding infection control, prevention and injection safety practices, and the Health workers' practices regarding infection control, prevention and injection safety practices and how limited resources affect compliance with infection prevention standards among health workers.

1.8 Limitation of the Study

The following limitations may influence the findings of the study;

Confidentiality of information; some respondents felt reluctant to give some information to the researcher due to fear of being exposed or feeling apprehensive on the intention of the study. However, this challenge was overcome by assuring the respondents that their identities would remain confidential and also explained to them that the intention of the study is purely academic purposes.

1.9 Theoretical framework

This study is anchored on Health Belief Model (HBM). HBM has been widely used and is considered as one of the most useful models in health care prevention and promotion. It offers the ability to understand the different behaviors or attitudes people may develop under the same condition by following or not following certain guidelines or requirements (Glanz *et al*., 2002). The model was originally developed by four psychologists (Hochbaum *et al.*, 1950) as a way to examine the reasons that prevented people from using free programs, which would detect or prevent diseases. It is based on two axes: the perceived threat for acquiring a disease, which incorporates the perceived susceptibility and perceived severity constructs. This axis creates a pressure to an individual for action; nevertheless this action may not necessarily take place and the enabling factors that trigger the behavior, which include the perceived benefits and perceived barriers.

The additional constructs were supplemented later in order to overcome some limitations the model showed. Therefore, the self-efficacy and cues to action were added. In addition, when using this model, other factor like social and demographics factors must be taken into account. HBM has been used in many health care settings in order to examine many and different health care behaviors and attitudes such as weight management, x-ray screening tests, sexual behaviors, coronary heart disease preventive behaviors, vaccination behaviors, diabetes management perceptions, nutrition, self breast examination perceptions , prescribed medication compliance, and perceptions on the Papanicolaou test. It therefore found as an appropriate theoretical model to use for measuring knowledge, attitudes and practices of nurses towards compliance with infection prevention standards among from occupational exposure to pathogens.

Table 1 Constructs of HBM

- Susceptibility: personal perception on the risk of acquiring a certain disease or condition
- Severity: personal perception of the seriousness of a certain disease, behavior or condition
- Benefits: personal perceptions on the effectiveness and positive consequences when adopting a new behavior
- Barriers: personal perception of the obstacles that may prevent him/her to adopt a new behavior

Added constructs:

- Cues to action: factors that trigger a behavior
- Self efficacy: personal perception on his/her ability to adopt a behavior

1.10 Assumptions of the Study

The study was guided by the following major assumptions

i. That there are several factors affecting health workers' compliance with infection prevention standards

ii. That health workers were willing to provide truthful information on factors affecting their compliance with infection prevention standards

1.11 Operational Definitions of Key Terms

The constructs Investigated in this study are defined as follows:

Compliance: Behavior conforming to the guidelines of prevention standards guidelines

Health Belief: The degree to which the health care workers believes the infection prevention standards guidelines to be an effective measure in reducing the threat of hospital acquired infections from a work related incident

Health care delivery motives: The health workers' motives to give the best quality and most efficient care of which the health workers' is capable.

Health care protection motives: The health workers' motives to avoid putting self at risk to acquiring hospital related infections during the process of health care delivery.

Infection prevention standards: The recommendations given by medical bodies such as CDC to prevent acquisition of hospital related infections by healthcare workers in the workplace.

Knowledge: The health workers' understanding of hospital acquired infections including incidence, transmission and appropriate protective measures as provided in the recommendations of infection prevention standards.

Demographic variables

Age, Gender, Employment status. Socio-economic status

Perceived benefits minus perceived barriers

Healthy living, reduced incidences of HAIs

Perceived susceptibility + severity. (How bad is the outcome of HAIs?**)**

Perceived threat

- Death.

Likelihood of taking recommended healthy action.

Adherence to infection control and prevention

Cues to Acton

Upsurge of HAIs, personal influence, previous infection

*Figure 1.1: The health model of the applied Health belief model (*potter *et.al.2006)*

CHAPTER TWO: LITERATURE REVIEW.

2.1 Occupational hazards Health Care Workers face

In discharging their duties, health workers encounter a variety of occupational health problems which may be categorized into biological hazards, chemical hazards, physical hazards, and psychosocial hazards. The presence of multiple health hazards in some instances may be a persistent threat and could potentially influence the response of the HCW to any individual health risk. Clever and Omenn (2008) stated that the almost seven million HCW in the United States (US) face essentially all of the hazards found throughout the nation's industry, and additional hazards particular to the health care environment. They further stated, "Sixty-five percent of health care personnel work in nursing and personal care facilities and hospitals: 11.6 per 100 full-time nursing and personal care facilities workers and 7.3 per 900 full-time hospital workers are hurt or sickened by work per year and lose 121 and 63 work days per 100 full-time workers, respectively," (Clever & Omenn, 2008, p. 273).

Clever and Omenn (2008) addressed five specific hazards faced by HCW because of their high prevalence, potential severity, widespread current concern, or significant body of scientific study. While AIDS topped the list of hazards, chemical hazards, back injuries, and stress are also of high prevalence in the health care setting. A relatively new health care hazard is manifesting itself with the increased use of video display terminals (VDT). VDT use is being associated with negative visual effects, musculoskeletal symptoms, and stress.

According to a study done by Williamson *et al***.,** (2008) in Bangladesh, the study identified eleven communicable diseases of major concern to healthcare workers. Those diseases included AIDS; acute diarrhea; hepatitis A and B; non-A, non-B hepatitis; herpes simplex viruses I and I**;** tuberculosis, meningococcal disease, cytomegalovirus (CMV), and rubella. However, finding of this study by Williamson *et al.,* (2008) were from the general healthcare personnel perspective and so could not provide detailed information on the occupational acquired diseases faced by healthcare workers.

The HCW's risk of occupationally acquired Infections was also studied by McCray (2006) in South Africa who conducted a surveillance project to quantify prospectively the risk to HCW of

acquiring the AIDS virus, as a result of work related exposures. More than 900 HCW were studied who were exposed to blood or other body fluids of a patient with AIDS or an AIDS related illness as a result of a needle-stick, a cut with a sharp object, contamination of an open wound, or contamination of a mucous membrane.

Upon enrollment each subject completed a confidential questionnaire about non-occupational risk factors for AIDS, received a physical examination, and submitted blood specimens for white-cell count with differential and II platelet count. The investigators also sent serum and whole blood specimens to the CDC. The serum specimens were tested for HIV antibody and phenotypic T-cell subset analyses were performed on the whole blood specimens. According to the study findings, over 56% of the exposures occurred in direct patient care areas. McCray (2006) explained that if recommended precautions had been followed, 40% of the 938 exposures to HIV would probably have been prevented including 16% from recapping a used needle, 13% due to injury from a needle or sharp object improperly disposed, 10% from contamination of open wounds, and I% from using needle-cutting devices. Following the recommended guidelines would have prevented these exposures. However, this study was only concerned with HIV/AIDs as one of the occupationally acquired infections among the health workers but left out other hazards faced by HCW.

Another study was done in Uganda by Weiss *et al.,* (2005) who investigated HIV infections among HCW in association with needle-stick injuries. They studied 361 health care and clinical laboratory personnel in several metropolitan areas with both moderate and high levels of HIV infection among high-risk group members to evaluate routes of exposure to HIV. The study findings indicate that fourteen percent of the HCW reported possible percutaneous exposure to HIV. Most of the injuries were related to needles that had been used on AIDS patients. Only three HIV seropositive subjects who reported possible parenteral exposure to HIV had no recognized AIDS risk factors. Two of the subjects could not be ruled out for heterosexual transmission as the possible source of HIV exposure. One person was seropositive, apparently as a result of a needle-stick injury. The study by Weiss *et al.*, (2005) was also more on HIV infections among the health workers but left out other hazardous and infectious diseases faced by health personnel particularly the nurses, doctors and the medical lab scientists when discharging

their duties. The present study fills this gap by looking into other hospital acquired diseases other than HIV/AIDs faced by health care providers.

In Kenya, Denes *et al*., (2008) studied HBV infections in physicians to define the epidemiologic features of occupationally acquired HBV infections among physicians. Each physician was asked to complete a questionnaire and donate a specimen of venous blood. Results from a national survey of anti-HBV prevalence among 1,542 first-time volunteer blood donors was matched for race and sex then used as a comparison group with the results for the physicians. The number of physicians participating in the study was 1,192. Of those, 18.5% (n = 220) had serologic evidence of prior HBV infections.

The infection rate was also noted to be higher among physicians practicing in metropolitan areas with a population greater than one million. These physicians were more likely to have positive results, 27.2%, than those practicing in smaller communities, 15.6%, (D < .001). It was also noted that infection rates increased with the number of years in practice, and among selected specialty areas with the highest incidences in pathologists, 27%, and surgeons, 28%. Exposure seemed to be accelerated in the early years of clinical activities when the physicians' patient pool is expanding and exposure to new patients is greatest. These investigators called for more effective control measures to prevent occupationally acquired HBV infections among health care professionals. Similarly, just like many studies, this study had only looked at one occupationally acquired infections (HBV infections) and provided no data on other occupationally acquired infections especially among other equally exposed health care providers such as nurses, clinical officers, medical laboratory workers among others. This is one of the gaps to be filled by the current study.

2.2 Health care providers' knowledge on infection control and prevention

A heightened understanding of transmission of blood-borne diseases in the mid-1980s to healthcare workers (HCWs), including surgeons, physicians, and residents in training, and the importance of knowledge and adherence to standard precautions (SP) is well accepted. Knowledge on SP is even more important with the emergence of infectious diseases, such as avian influenza, severe acute respiratory syndrome, and the threat of bioterrorism.

Valenti and Anarella (2004), conducted a survey on hospital personnel's knowledge about AIDS among the nurses in England. The survey consisted of three parts. Part I dealt with the demographic data of the respondents. Part II was a series of true-false questions that measured the respondents' understanding of AIDS. Part III consisted of questions dealing with the subjects' level of concern when caring for persons with AIDS, sources of information on AIDS, and what kinds of additional information employees would like regarding AIDS. In February, 1984, 741 surveys were distributed to hospital personnel working in selected departments within a 750 bed university teaching hospital. These departments were chosen on the likelihood of their employees having contact with persons with AIDS. A total of 36% surveys were returned. It must be noted that surveying only one institution and such a low response rate are substantial limitations to the generalizability of this study. The respondents' knowledge of the disease appeared to increase with their level of medical education with a positive Pearson's correlation (Q <.002). 22% indicated no concerns in caring for AIDS patients, while 76% indicated some form of concern when caring for AIDS patients. When scores were compared with the educational portion of the questionnaire it was found that those who scored more than 80% on the knowledge portion of the questionnaire were more likely to choose a no concern response. The questions missed most frequently on the knowledge section of the questionnaire were related to isolation precautions, and they were answered correctly less than 80% of the time by all groups except medical students. However, all groups were found to have lower scores on the questions concerning infection control precautions. The largest single reported source of information on AIDS was the media. Valentia and Anarella (2004) suggested that by providing information that has not been educational the media has escalated confusion over issues such as contracting AIDS while donating blood and the proper precautions to use when caring for patients with AIDS.

Another study was done by Sreedharan *et al.,* (2009) on knowledge about standard precautions among university hospital nurses in the United Arab Emirates. This study was conducted to assess the awareness and knowledge of standard precautions among nurses in a university teaching hospital in Ajman, United Arab Emirates. All nurses working in the hospital were given a structured, self-administered, anonymous questionnaire: 101 nurses and lab technologists participated (range of experience from < 1 to 22 years). Overall 97.0% of respondents were

familiar with the concept of standard precautions. Of these 61.2% believed that the blood and body fluids of all patients are potentially infectious irrespective of their diagnostic status, while 27.6% thought only diagnosed patients and 11.2% only suspected cases are potentially infectious. Less than half agreed that standard precautions aimed to protect both health care workers as well as patients (45.9%). The study highlights a need to implement a program to improve knowledge on standard precautions among the nurses and other health workers. However, this study was conducted among the nurses in developed countries and so the present study intends to find out whether its findings concur with that of nurses from developing countries.

Prisca and Dada (2013) also conducted a comparative study on knowledge, attitude, and practice of injection safety among nurses in two hospitals in Ibadan, Nigeria. This comparative study was carried out in two hospitals in Nigeria. Participants were selected conveniently while data were collected with the aid of questionnaire. A sum of 385 nurses took part in the study following ethical approval. The mean age of the respondents was 37 years and 92.5% were females. All have heard about injection safety. Their knowledge level was high, 70.4% associated unsafe injection with blood-borne infection, 55.9% had correct information that two handed recapping is not a safe injection practice, 84.4% claimed that contaminated sharps predisposes the community to bio-hazards, and 293 (76.1%) had correct information that used syringes and needles should be discarded in a sharp waste box. However, the high knowledge was not translated to practice. About half of them (50.4%) of the participants recently sustained sharp injury through intramuscular and subcutaneous injections. Only 15.6% of this number reported the injuries to their institution. Out of the total respondents, 62.9% did not know that their hospitals have injection policies, while 53.2% said that nurses are not involved in such policies. Doctors were alleged by 79.5% as health care workers who most frequently leave sharps at the patients' bed side. This study informs the present study in that the current study will find out whether these findings are also valid among the Kenyan nurses.

Rajinder *et al.*, (2007) also conducted a study on knowledge, Attitude and Practice Regarding Universal Precautions among Nursing Students in Botswana and according to the study, the mean knowledge score regarding universal precautions was calculated to be 60.40 and that of practice score was 83.01. These scores were almost directly proportionate to year of the training

of students. However, this study focused on student nurses as its major respondents and so, it findings cannot be used to describe knowledge, Attitude and Practice on standard Precautions among nurses and other health workers in general. The present study will therefore pay attention to nurses and find out their knowledge, Attitude and Practice on standard Precautions.

2.3 Compliance with Infection Control Practices

J. Garner (personal communication, September 20, 1988), of the CDC, stated "the CDC is not aware of any studies on health care compliance with the guidelines protecting them from hospital acquired infections." Crow and Taylor (2013), who examined nurse compliance with aseptic technique in the operating room, suggested that discipline is essential in maintaining appropriate aseptic technique. They indicated that discipline includes a set of complex rules for maintaining a sterile field. This also suggests the importance of active control efforts in reduction of nosocomial infections in ensuring that compliance with these regulations is enforced.

Kaplan and McGuckin (2006) investigated the effects of greater accessibility of sinks on hand-washing compliance. The frequency of hand-washing in one medical and one surgical Intensive care unit (ICU) were observed. The medical ICU contained seven beds and seven sinks in an open unit. The 16 bed surgical ICU Included four Isolation rooms with separate sinks and 12 beds in an open unit with three sinks. The ratio of beds to sinks was thus 1:1 for the medical ICU and 4:1 for the surgical ICU. The HCW were not told the exact purpose of the project, only that Quality Assurance was conducting an audit. The personnel surveyed included physicians, nurses, and technicians. These personnel were observed from the moment of their first interaction with a patient up to and including their first subsequent activity not involving the observed patient.

The number of hand-washes after direct contact with patients or their support equipment was recorded. The numbers of hand-washes were recorded after contacts. The study did not include the number of patients being cared for, or an evaluation of the hand-washing technique. The observation period was from 6:30 a.m. to 9:30 a.m. for six consecutive days. This permitted the observation of two shifts. The medical ICU nurses washed their hands more frequently (76%) compared to the surgical ICU nurses (51 %), (D < .01). The frequency of hand-washing was consistently higher in the medical ICU from day one through day six with no changing trend. These results indicated that greater availability of sinks was associated with a significant increase

in the number of hand-washes per contact by nurses. The investigation did not consider other factors such as the patient's diagnosis and the amount of direct "hands on" contact required by each patient. Kaplan and McGuckin (2006) suggested that to increase compliance, medical personnel should police themselves and each other.

2.3.1 Use of Protective Gear

In reviewing the literature for worker compliance with the use of protective clothing and or equipment to prevent occupational hazards few research studies were found. Although industrial and business literature were reviewed, the studies found related to the use of protective clothing by health workers handling contaminated materials and antineoplastic agents. Kaplan and McGuckin (2006) found that in 25 observations of emptying foley urine bags, gloves were worn 40% of the time, with a hand-washing rate of 88%. Gloves were worn 94% of the time during 18 observations of performing tracheal care. While not the specific intention of the study, results did seem to indicate that health care workers are more likely to utilize gloves when the risk of contact with body fluids or excrement is greater.

Valanis and Browne (2005) studied the use of self-protection by health care workers during occupational handling of antineoplastic drugs. They conducted a survey of 67 health care providers in the greater Cincinnati metropolitan area who handled antineoplastic drugs. The purpose of the investigation was to determine the extent to which they used protective measures while handling antineoplastic agents. The study primarily included workforce from inpatient and outpatient hospital settings, but a few from community settings were also included. Over half of the sample, 58%, reported handling at least six different drugs on a routine basis and 70.2% reported preparing and administering the drugs. The number of preparations per week ranged from I to greater than 50. Only 32% of the subjects reported using gloves at least one half of the time they worked in preparation of chemotherapy. Over 85% reported never wearing a face mask, a disposable lab coat, or a reusable lab coat. None of the subjects used eye goggles. Although a percentage was not given, Valanis and Browne (2005) stated that most nurses indicated the reason they did not use protective clothing was because they did not feel they were at any risk. Health care workers also reported they felt wearing protective clothing would be psychologically threatening to patients. Valanis and Browne (2005) suggested that the

establishment of a reasonable policy in institutions where nurses handle antineoplastic agents will offer some motivation and justification for self-protection. They further suggested these policies should be accompanied by educational programs regarding the potential risk, sources of exposure, and a statement of what reasonably constitutes self protection and protection for others in the environment.

Valanis *et al.,* (2007) investigated the use of protective measures by nurses handling antineoplastic drugs one year after OSHA issued protective guidelines for handling antineoplastic agents. The investigation compared nurses' utilization of protective measures in a variety of work setting and examined the reasons protective measures were not used. The sample contained 632 oncology nurses who currently mixed or administered antineoplastic drugs. The subjects represented a variety of facilities and departments. The majority of the nurses reported handling antineoplastic drugs for more than 3 years, with a range from 2 months to 26 years, and an average of 5 years. Of the 632 nurses, 49% both mixed and administered antineoplastic drugs, 49% only administered and 2% only mixed the drugs. While administering chemotherapy 50% reported wearing gloves, 14% wearing gowns, 51 % wearing lab coats, 6% wearing masks and 1 % wearing goggles, at least three fourths of the time. While mixing chemotherapy 76% reported wearing gloves, 36%, wearing gowns, 58% wearing lab coats, 15% wearing masks, and 5% wearing goggles, at least 3/4 of the time.

These results consistently indicate less use of protective gear when administering the medication to the patient versus mixing the medication. A comparison was also done to assess whether handling of large quantities of antineoplastic drugs or having more years of working with the drug is associated with more frequent use of protection. Spearman's rank-order correlation of these variables with use of gowns, gloves, and lab coats were calculated within categories of handling activities. For the group of nurses who only administered antineoplastics, the use of gowns had a statistically significant Inverse correlation with both the number of doses handled per week ($r = -.250$; $p < .001$) and with the number of years the nurse had handled the drugs ($r -= .198$; $p < .01$) (Valanis & Shortridge, 2007). Similar tendencies toward less protection were observed in the group of nurses who both mixed and administered antineoplastic agents. Glove use during mixing drugs showed a statistically significant inverse correlation with the number of

weekly doses handled by the nurse (r = -0.129; P < .05) and again. In the duration of handling (r = -.23; P_< .05).

Common reasons given for not using protective equipment or clothing included non-availability, convenience and comfort for the nurse, belief that no personal hazard existed, and belief that the use of protective gear was inappropriate. No statistical data were given on reasons for not using protective gear. Both the study by Valanis *et al*., (2007) **i**ndicated the nurses' belief systems and practical factors in the work place strongly effect nursing compliance with the use of protective clothing and equipment when handling antineoplastic drugs.

The prevalence of HCAI in developing countries can become as high as 30-50%. The most important mechanism of spread of these HCAI is via the contaminated hands of the healthcare givers that is doctors, nurses, other staff or relatives/friends of the patients. Contaminated environmental surfaces are another important reservoir for spread of these infections. However, they are often under-recognized. Due to these clinical, ethical and financial factors, healthcare providers are increasingly paying more attention to surveillance and prevention of HCAI.

2.4 Best Practices on prevention of HAI and the prevalence of these infections in Kenya

In Kenya, healthcare-associated infections (HCAI) have been a major set back to most of the health workers in the country. According to *Stein, et al.,* (2008) it is estimated that almost 10% of the health workers in Kenya are prone to healthcare acquired infections. They futher document that the prevalence of HCAI in Kenya among the health workers is as high as 30-50%. Health care workers are at risk of acquiring and transmitting hospital acquired infections in the course of duty. Measures to prevent the transmission of these infectious microorganisms are therefore a significant component of any health care provision (Amadu & Saka, 2012). Health care professionals and particularly clinical care providers are often exposed to microorganisms, many of which can cause serious or even lethal infections.

In 2006, Kenya Medical Research Institute (KEMRI) issued the Standard Precautions, a set of guidelines to prevent exposure, but unfortunately, despite the simplicity and clarity of these guidelines, compliance among health care providers is reported to be low. Although high incidence of occupational exposure to microorganisms is observed among all health care professionals, clinical care givers are among those who are more highly exposed. According to a study conducted by Apisarnthanarak (2006), it was found that knowledge regarding hand hygiene among health workers was 86.8% but the actual compliance was less (75.1%). Apisarnthanarak (2006) found that only 28.5% of the respondents could identify avoiding injury with sharps as a component of SP and only 52% could identify barrier precautions as a component of standard precautions (SP).

Another study was done by Adriana *et al*., (2009) on knowledge and attitude regarding standard precautions in a Kenyan public emergency service, a case study of health workers in public hospitals in Suba District: The purpose of this study was to assess the knowledge and attitude of health care professionals regarding their use of universal precaution measures at a public emergency service. The study also aimed to assess the rates of occupational accidents involving biological substances among those workers. This study was performed with 238 workers, from June to November 2009, using univariate and multivariate analysis. The chance of not adopting precaution measures was 20.7 (95% CI: 5.68 - 75.14) times greater among drivers compared to physicians. No significant association was found between adopting universal precaution

measures. The occupational accident rate was 20.6% (40.8% involving sharp-edged objects). The risk of physicians having an occupational accident was 2.7(95% CI: 1.05 - 7.09) times higher than that of drivers. The fact that a staff member had adequate knowledge about universal precaution measures was insufficient to foster compatible attitudes towards reducing the risk of transmitting infectious agents and causing occupational accidents.

<center>**CHAPTER THREE:** RESEARCH METHODOLOGY</center>

3.1 Research Design

In this study a descriptive research design was adopted. Since the study aims at investigating the factors influencing compliance with infection prevention standards among the health care workers in Rongo Sub-County, the descriptive design was suitable in that it makes it easier to identify and obtain information on the characteristics of this particular problem or issue. It is also appropriate for this study because it involves an in depth description of the phenomena in the study (Mugenda and Mugenda, 2003). The descriptive study was also suitable because it provides a bigger overview by giving a researcher ability to look at the study in many aspects. For instance it uses both qualitative and quantitative data in order to find a solution to the study problem

3.1.1 Variables

The study was conceptualized based on the variables that were used in the study. In this study compliance of the health care workers with the infection prevention standards is affected by a combination of variables, namely knowledge, attitudes and practices on infection precaution standards among the health care workers. The focus was on compliance with infection prevention standards which is the central independent variable. The level of compliance with the infection prevention standards depends on the healthcare workers' knowledge, attitude and practices on these guidelines and eventually affects their health and service delivery.

3.2 Location of the Study

The research was carried out among the health care workers in Rongo Sub-county which is one of the sub-counties of Migori County. It is located in Nyanza provice, about thirty five kilometers from kisii town along kisii- Migori highway

3.3 Target Population

The target population of this study was the health-workers employed at both public and private hospitals found in Rongo Sub-County. A list was obtained of the health care workers employed at these health facilities whose present job description includes direct patient care responsibilities. There are a total of 22 private and public hospitals in Rongo Sub-County with

averagely 15 staffs, translating to 330 staff the health care workers in this region. This therefore formed a sample frame upon which sample size was calculated.

3.4 Sampling Techniques and Sample Size

3.4.1 Sample size

According to Mugenda (2003), if the research design is a descriptive study then ten percent of the accessible population is enough to make a sample size. However, for the sake of this study, the following formula by Fisher et al., (1998) was used to calculate the sample size. Since the population of study is less than 10,000 the two stages of the formula was used to sample the population. The first part of the formula was used with an assumption of a population of 10000 to enable the researcher to get the value of "n" which was then used in the second part of the formula to calculate "fn" which represented the desired sample size when the target population is more than 10000.

Step 1

$n = Z^2pqD/d^2$

Where:

n= is the desired sample size when the study target population is over 10,000

Z= the standard normal deviate, usually set at =1.96 (95% confidence level)

P= the prevalence of the desired characteristics. Since there was no indicated prevalence, the recommended 50% was used.

$q = I - P$

D=Study design effect (usually 1 when it's not a comparison study)

d = is the Degree of Accuracy required

$n = Z^2pqD/d^2 = 1.96^2 \text{ x } 0.50 \text{ x } 0.50 \text{ x } 1/ (0.05)^2 = 196.2$

However,

The target population is less than 10,000 and therefore we use:

nf=n/(1+ (n/N))

Where:

nf=The desired sample size when population is less than 10,000

n = the desired sample size when the population is more than 10,000

N = the estimate of the population size.

nf=196/(1+(384/1000))

=196/1.384=277.456=163

3.4.3 Sampling Techniques

Rongo sub-county was divided into seven strata based on the administrative wards.tis gave a total of seven strata. In every ward, the main referral hospital was purposively picked for sampling of the respondents. Simple random sampling was then employed to acquire the respondents. Simple random sampling helps in taking care of biasness and provides every respondent with equal chance of being selected for the study.

3.5 Construction of Research Instruments

The study used questionnaire as well as interview schedules as the instrument of data collection. The questionnaire consisted of semi-structured questions to collect data from health care workers from both the public and private hospital. The structured questions helped the researcher to get specific information while the non-structured questions helped the respondent express his or her opinion.

3.5.1The questionnaire

This study used closed ended type of questionnaire. The closed ended questionnaire involved pre-set questions that are designed based on the study objectives with a limited number of multiple choices. These questionnaires are expected to collect quantitative data. Multiple choice questions/items written in the format of Linkers scale will also be used, where respondents were asked to make a choice based on their opinion whether they strongly agree, agree, neutral and

disagree and strongly agree on the questions being asked. This format of the instrument was developed for they allow easier and accurate analysis of the data, therefore precise interpretation of the responses. They also make numerical comparisons relatively easy and in addition allow high degree of respondents' objectivity and at the same time reduce the problem of falsification. The questionnaire is chosen as a tool for it is cheaper in terms of finance and time as compared to other tools. Moreover, it covers a large percentage of the population.

3.5.2 Interview Guides

In order to solicit detailed information, interview guide was used to gather more information from the nurses. This gave the researcher an opportunity to meet these people and seek more clarification on issues raised in the questionnaire. An interview schedule is an important tool for gathering data as the interview situation allows much greater depth than other methods of data collection (Kombo and Delno, 2009). It attempts to provide a true picture of opinions and feelings.

3.5.3 Validity of the Questionnaire

Validity is the extent to which the study instruments captured what they purport to measure (Cooper *et al* 2006). Validity of instruments is critical in all forms of researches and the acceptable level is dependent on logical reasoning, experience and professionalism of the researcher. The researcher discussed the contents of qualitative data with the supervisors before conclusions and generalizations are made in order to uphold content validity. The researcher also noted down and interprets the circumstances upon which arguments are made. This ensured that all responses and sentiments are scrutinized before being accepted as valid findings of the study questions in the instruments with respect to the study objectives or research questions of the study.

3.5.4 Reliability of Questionnaires

Reliability refers to how consistent a research procedure or instrument is (Bryman, 2008). It therefore means the degree of consistency demonstrated in a study. The researcher tried to maintain a high level of reliability in this study by ensuring that questions in the interview schedule are designed using simple language that is easy to understand by the respondents. This interactive approach to information collection allowed the researcher to elaborate and clarify questions in order to elicit reliable responses.

3.6 A pilot survey

The questionnaire was piloted to ascertain its validity and reliability, and was done within the selected region. For the sake of this study, the pilot testing was done among the nurses of Uriri Sub-County. This location was ideal given that the area neighbors the study area and hence would easily accessible to the researcher. Simple random sampling method was used to generate a sample size of 5 health workers from all the sub sectors cadres. Questionnaires were administered to the respondents with the help of research assistants and interpretation of the response alternatives and queries was carried out to form items that bear the same meaning but are not identical. Order of response alternatives was similarly changed for questions with normal scale to assess the validity and reliability. Meanwhile, respondents' choices were evaluated for appropriateness. The researcher also verified if the questions are comprehended the same way by the respondents. In addition, average time taken to complete the questionnaires was noted and the overall pilot test results was discussed with the supervisors and adjustments made according to the results of the instruments review and pilot test prior to the production of the final instruments.

3.7 Data Collection Techniques

Data for this study was both quantitative and qualitative and was obtained both from primary and secondary sources. Secondary sources involve review of documented literature while primary sources were through field research. When using field research, data collection is done using self-administered questionnaires and individual interviews. Since the respondents were expected to be literate, they were requested to fill the questionnaires and participate in an interview. The researcher administered 163 questionnaires to randomly selected respondents in public and

private hospitals in Rongo Sub-County. The respondents were given a time frame of 30 minutes to enable them respond.

3.8 Data Analysis

Two types of data were collected in this study namely; qualitative and quantitative data and hence two types of statistical analysis were used. The quantitative data was analyzed by descriptive statistics, which includes frequencies, percentages and inferential statistics such as Ch-square. The analyzed data was presented using tables, bar graphs and pie charts. While qualitative data was analyzed through the use of content analysis techniques such as narratives, explanations and discussions. Interpretation of the data was done and conclusion drawn.

3.9 Ethical Considerations

According to Wolverton (2009), the researcher has to be careful to avoid causing physical or psychological harm to respondents by asking embarrassing and irrelevant questions, threatening language or making respondents nervous. For the purpose of this study, respondents were informed about the nature and purpose of the study, what would take place during the interviewing session and that there were no risks involved. They were guaranteed that all data gathered from them are coded to protect their identity and privacy. In addition, they were informed that the study is basically for academic purposes and not for any future considerations for any form of support and that they are entitled to a summary of the outcome of the study if they so wish. They were also assured of confidentiality.

CHAPTER FOUR: DATA COMPILATION, ANALYSIS AND PRESENTATION

4.1 Respondent Return Rate Analysis

This study had a total number of 163 respondents (health workers) who were administered with the questionnaires. According to the response return rate based on the questionnaires that were returned and duly filled, 156 respondents participated in the study, implying that the response return rate was 82% was achieved. This response return rate was achieved because the researcher organized house to house visit and made call backs to the respondents to ensure that everybody participated.

4.2 Demographic Information of the Respondents

In this section, the background information of the respondents who participated in this study is provided. This information was in terms of Gender, age and years of current job.

Table 4.1 The distribution of demographic details of the respondents

Variables	Frequency	Percentage
Gender of the Respondents		
Male	52	33%
Female	104	67 %
Total	**156**	**100%**
Age of the Respondents		
Less than 30 years	56	36%
30-39 years	52	33%
40-49 years	30	19%
Above 50 years	18	11%
Total	**156**	**100%**
Years of Current job		
Less than 10 years	69	44%
10-19 years	38	24%
20-30 years	27	17%
More than 30	22	14%
Total	**156**	**100%**

According to the study findings, out of the 163 respondents that took part in the study, 67% were females, while 33% were males. This shows that there was more female gender in the health department than their male counter parts. On years of service, majority of the respondents at 69% had taken less than 10 years in the health service and this had a significant effect on their compliance with the infection prevention and control standard precautions. According to chi-square analysis, $p<0.05$ shows that there was a significant relationship between years of service and compliance with infection prevention standard precautions. (Table 4.2)

Table 4.2   **Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	295.713[a]	6	.040
Likelihood Ratio	342.879	6	.000
Linear-by-Linear Association	104.627	1	.000
N of Valid Cases	100		

a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 4.86.

4.3 Healthcare workers' practices regarding infection control and prevention

Objective one sought to find out healthcare workers practices on infection control and prevention. Therefore, respondents were probed on their practices in hand hygiene, personal protective equipment, managing blood and bodily fluids and safe handling and disposal of chemical waste.

4.3.1 Hand hygiene practices

When probed on their hand washing habit, majority of the respondents at 33% revealed that they washed their hands after handling the patient, while only 22% washed their hand before and after handling the patient (Fig. 4.1)s. The study also found that although by small number, there were some healthcare workers who were not washing their hands at all. This shows that most of the healthcare workers do not pay attention to hand washing. This concurs with the results obtained by Apisarnthanarak (2006), who also found that knowledge regarding hand hygiene among health workers was 86.8% but the actual compliance was less (75.1%) as compared to their knowledge.
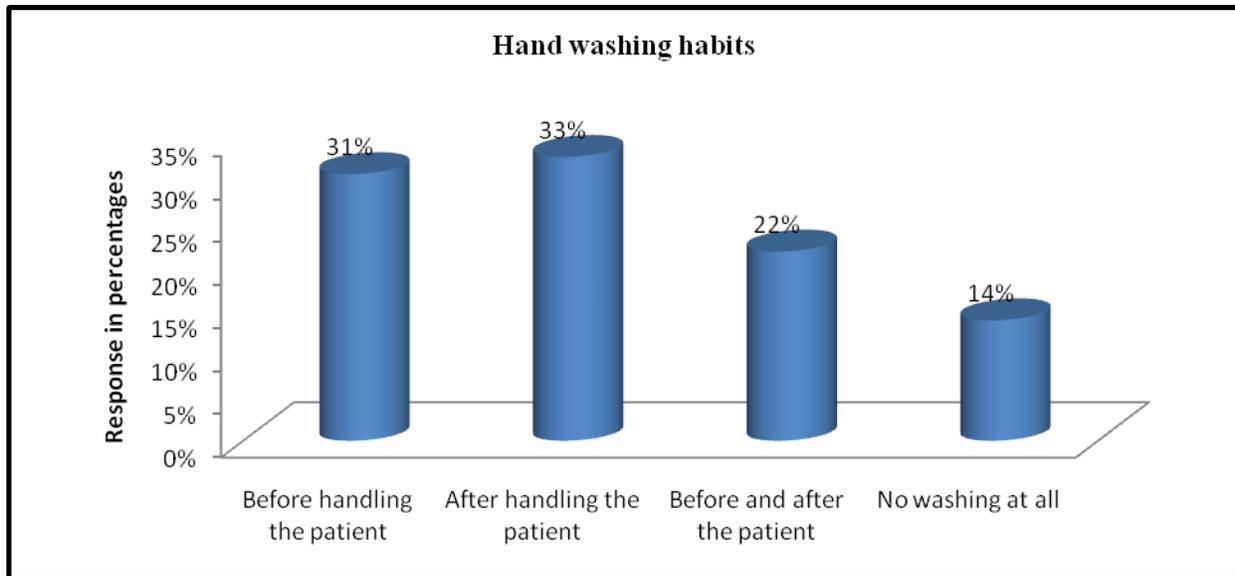
Figure 4.1 Hand washing habits

In one of the interview with the nurses, one of them had to reveal *"some of us don't care washing our hands after handling the patient because we are convinced that the gloves protect us from any germs"*

4.3.1.1 What is used to decontaminate the hands

The study also sought to find out what most of the healthcare workers use to decontaminate their hands before and after attending to a casualty. Table shows 4.2 the response.

Table 4.2 what is used to decontaminate the hands

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Soap	58	51.2	51.2	51.2
	Gels	44	18.6	18.6	69.8
	Rubs	32	19.8	19.8	89.6
	Alcohol	29	10.4	10.4	100.0
	Total	156	100.0	100.0	

According to the study findings, out of the 86 healthcare workers who washed their hands, majority of the respondents at 51.2% indicated that they used ordinary soaps to decontaminate/wash their hands, while only 18.6%, 19.8% and 10.4% used gels, rubs and alcohol respectively. This shows that majority of the healthcare workers relied on ordinary soaps in cleaning their hands as opposed to using other recommended decontaminating soaps such as gels, rubs and alcohols. Hence, making them more vulnerable for infections

29

4.3.1.2 Always using Running water for hand wash

Respondents were also asked to indicate whether they use running water for cleaning their hands. Out of the 86 respondents that answered this question, majority of the respondents at 59% revealed that they did not wash their hands in running water, while only 41% indicated otherwise. This shows that the healthcare workers were more vulnerable for infection as running water carry away disease vectors than stagnant waters. Kaplan and McGuckin (2006) also investigated the effects of greater accessibility of sinks on hand-washing compliance. According to Kaplan and McGuckin study, the medical ICU nurses washed their hands more frequently (76%) compared to the surgical ICU nurses (51 %), (D < .01). The frequency of hand-washing was consistently higher in the medical ICU from day one through day six with no changing trend. These results indicated that greater availability of sinks was associated with a significant increase in the number of hand-washes per contact by nurses.
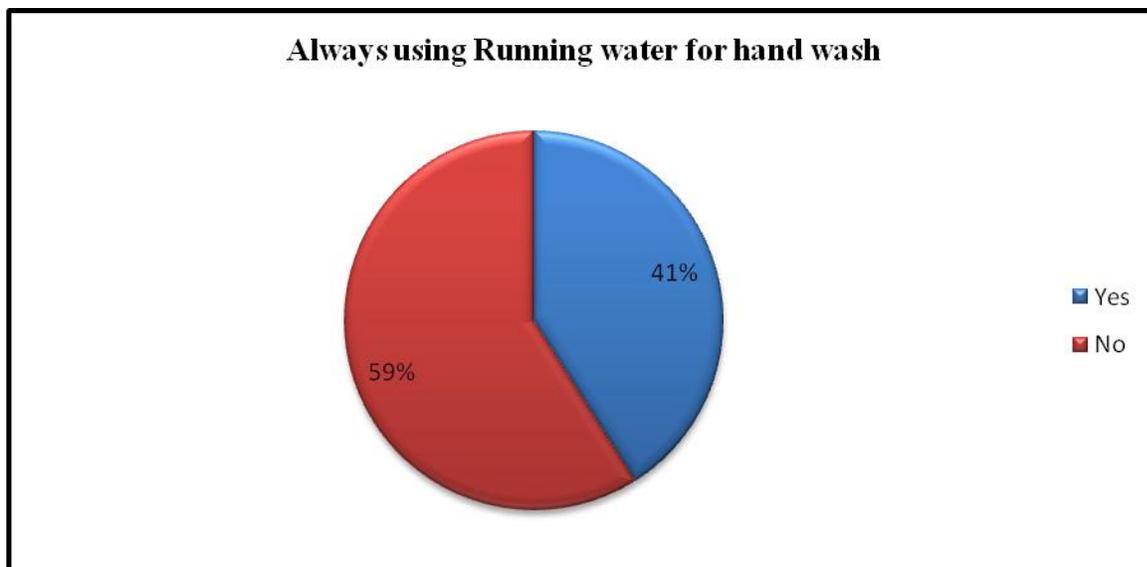
Figure 4.2 Always using Running water for hand wash

4.3.1.3 Hand hygiene practices

In investigating the hand hygiene practices among the health workers, respondents were also asked to indicate whether they agreed or disagreed with the following statements related to hand washing practices. Table 4.3 shows the response.

Table 4.3: Hand hygiene practices

Statement	Yes	No
I keep my nails short clean and polish free	30%	70%
	47	109
I avoid wearing wrist watches and jewellery when on duty	37%	63%
	58	98
Any cuts and abrasions are covered with a waterproof dressing	60.0%	40.0%
	119	37
I remove my wristwatch and any bracelets and roll up long sleeves	33.7%	66.3%
	57	99
I dry my hands proper to prevent recontamination	40.7%	59.3%
	51	105
We are supplied with disposable paper hand towels	22.1%	77.9%
	54	102
Changing gloves before going to another patient	47.7%	52.3%
	41	115

Table 4.3 reveals that majority of the healthcare workers at 70% do not keep their nails short, clean and polish free, it also found that most of the healthcare personnel as represented by 58% wear wrist watches and jewellery while on duty. Moreover, the study revealed that when washing their hands, majority of the respondents at 66.3% do not remove their wrist watches, bracelets and roll up their long sleeves. When asked on whether they dry their hands properly to prevent contamination, majority of the respondents at 59.3% disagreed with the statements, while only 40.7% indicated that they don't make use of the personal protective equipment. The study also found that in majority of healthcare personnel were not supplied with disposable paper hand towels and this could enhance their vulnerability to infection. Based on changing gloves, the study found that majority of the healthcare workers do not change their gloves before going to another patient, which could also enhance spread of diseases between the nurse and the patient or patient to patient disease transfer.

4.4.2 Using personal protective equipment

The study also sought to find out the health workers practices in using protective equipment. In doing so, respondents were first asked on whether they use personal protective equipment every time they were on duty.

Table 4.4: use personal protective equipment every time

		Frequency	Percent	Valid Percent
Valid	Yes	115	73	73
	No	41	27	27
	Total	156	100.0	100.0

According to the study findings (table 4.4), it was revealed that although majority of the respondents at 73% use personal protective equipment every time they were on duty, a significantly large number of respondents indicated otherwise. This shows that although majority of the respondents used protective equipment every time, many of them (health workers) still expose themselves to infectious diseases by not putting on protective equipment such as gloves, aprons and masks. These findings support that of Valanis *et al.,* (2005) who studied the use of self-protection by health care workers during occupational handling of antineoplastic drugs. He further reports that only 27% of the subjects reported using gloves at least one half of the time they worked in preparation of chemotherapy. Over 85% reported never wearing a face mask, a disposable lab coat, or a reusable lab coat. None of the subjects used eye goggles.

Use protective equipment every time

- Yes — 59%
- No — 41%
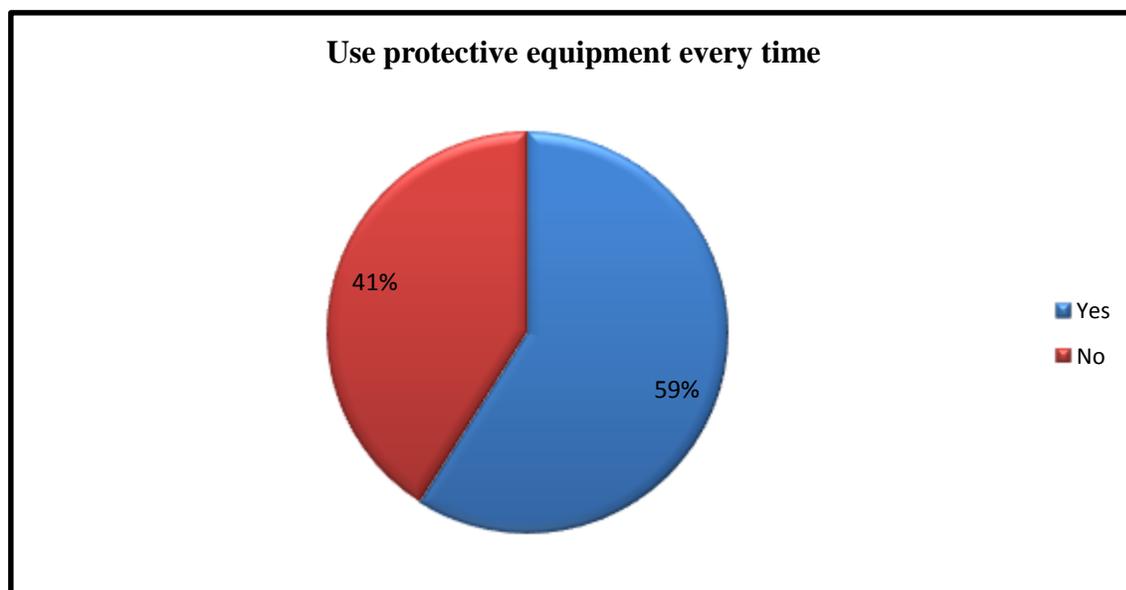
Figure 4.3: Using personal protective equipment

4.4.3 Disposal of the protective equipment after use

When asked on how they disposed their protective equipment such as masks and gloves after use, majority of the respondents at 48% indicated burning/incineration, 31% burying , while 21% indicated dipping in pit latrine.

Table 4.5: Disposal of the equipment after use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Burning	117	48.0	48.0	48.0
	Burying	31	31.0	31.0	79.0
	Dipping in pit latrine	8	21.0	21.0	100
	Total	156	100.0	100.0	

This shows that health workers use various methods of disposing used equipment but the most predominant method is burning/incineration.

4.4.3.1 Supplied with well color corded waste disposal containers

The study also sought to find out whether the respondents were supplied with color coded waste disposal containers. According to the study, majority of the respondents at 68% revealed that they were not being supplied with the coded containers, while only 32% indicated otherwise. Unavailability lack of coded disposal containers could bring about mixed up in disposal of waste hence encouraging poor waste disposal.

4.4.5 Infection control and prevention

In investigating the infection control and prevention practices among the health workers, respondents were also asked to indicate how they manage infection control and prevention.

Table 4.6 Managing infection control and prevention

Statement	Always	Sometime	Rarely	Never	Don't know	Total
I use of gloves when handling body fluids	41%	59%	0%	0%	0%	100%
I put on mask to protect my mouth and eyes when handling causalities	39%	44%	17%	0%	0%	100%
I wear apron when performing my duties	38%	48%	14%	0%	0%	100%
I practice hand wash after attending the patients	20%	51%	26%	3%	0%	100%
We dispose of the personal protective equipment after use	18%	46%	36%	0%	0%	100%
I recap needles after using	78%	18%	4%	0%	0%	100%
I change gloves before going to another patient	13%	21%	47%	19%	0%	100%

According to the table, it was revealed that majority of the respondents were not always using gloves when handling body fluids, putting on masks to protect their mouth and eyes, wearing apron, practicing hand wash after attending the patients, disposing of the personal protective equipment after use and changing gloves before going to another patient.

"Sometimes I don't have time to change gloves when going to another patient, or put on masks when attending the patient because I lack that time especially when am overwhelmed by casualties, or sometimes I just forget to do the necessary" revealed one of the nurses in one of the interviews when probed on infection control and prevention measures.

These results corroborates with that of Valanis and Shortridge, (2007) in their investigation on the use of protective measures by nurses handling antineoplastic drugs one year after OSHA issued protective guidelines for handling antineoplastic agents. Valanis and Shortridge, (2007) found that while administering chemotherapy 50% reported wearing gloves, 14% wearing gowns, 51 % wearing lab coats, 6% wearing masks and 1 % wearing goggles, at least three fourths of the time. While mixing chemotherapy 76% reported wearing gloves, 36%, wearing gowns, 58% wearing lab coats, 15% wearing masks, and 5% wearing goggles, at least three

fourths of the time. These results consistently indicate less use of protective gear when administering the medication to the patient versus mixing the medication.

4.4.6 Managing blood and bodily fluids

In investigating how health workers were managing blood and other bodily fluids, respondents were first asked to indicate whether they had received training on handling blood and bodily fluids. According to the study findings, majority of the respondents at 58% had not received training, while 42% indicated otherwise.
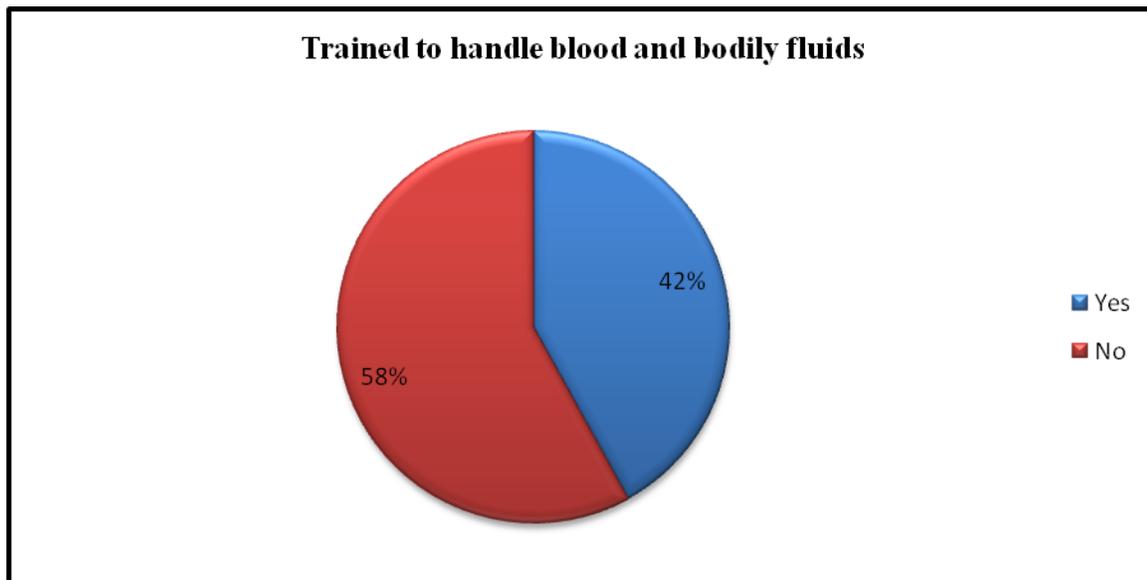
Figure 4.4Trained to handle blood and bodily fluids

These findings reflects that most of the health workers at Rongo sub-county lacks adequate training on better ways of handling blood and bodily fluids hence may compromise their competency and precaution measures in handling the bodily fluids.

4.4.6 Have a copy of workplace's written policy

The study similarly sought to find out whether the respondents had a copy of workplace's written policy. This was vital in order to find out whether the health workers could comply with infection prevention standards.

Table 4.7:Have a copy of workplace's written policy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	65	44	44	44
	No	88	56	56	100.0
	Total	156	100.0	100.0	

According to the study findings, majority of the respondents at 56% had no copy of workplace written policy, while only 44% had the same. This implies that most of the health workers of Rongo Sub-county had no workplace written policy hence could compromise their compliance with the infection prevention standard.

4.4.7 Managing infectious body fluid spillages

Respondents were also asked to indicate how they handle bodily fluids incase of spillage. Out of 156 respondents that took part in the study, majority of the respondents at 49% indicated that they mopped out the spillage, 22% indicated sweeping, 20% disinfected the spillage with chemicals while 9% indicated heating the surface.
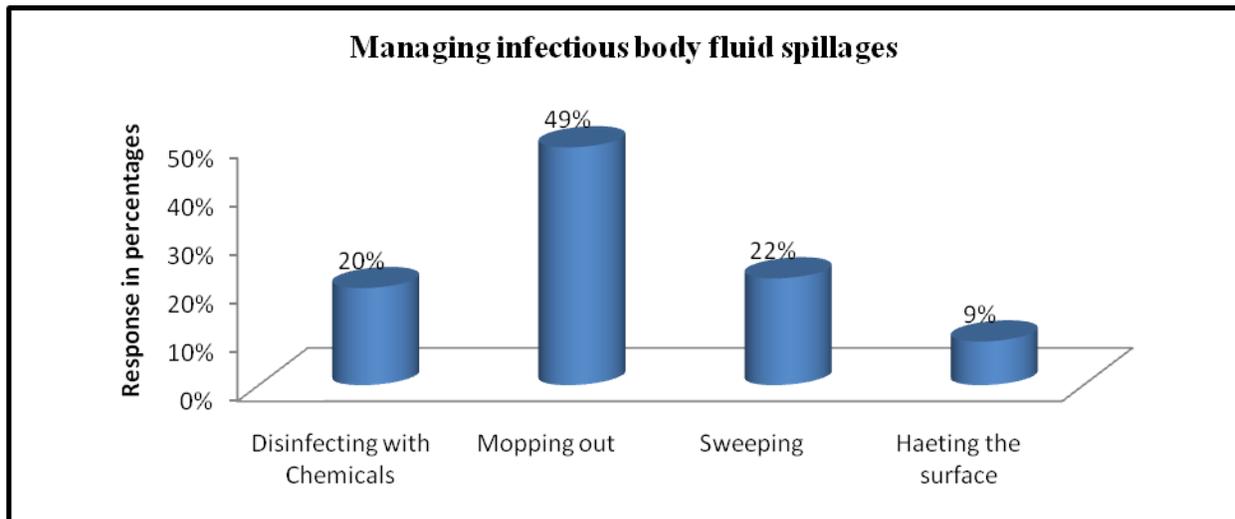
Figure 4.5 Managing infectious body fluid spillages

Based on the findings, it can be deduced that mopping out the fluids were common means of getting rid of the spillage.

4.4.8 Safe handling and disposal of chemical waste

The study sought to investigate how the respondents were handling and disposing chemical waste in their health facilities. Respondents were first asked to indicate whether they had chemical wastes in their facilities. Of all the respondents that answered this question, majority of the respondents at 89% revealed that they generate chemical waste, while 11% indicated otherwise.

Table 4.8:Have chemical wastes

|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	89	57.0	57.0	57
	No	67	33.0	33.0	100.0
	Total	156	100.0	100.0	

This shows that in most health facilities in Rongo sub-county, chemical waste are most common hence their appropriate handling and disposal practices was very crucial for infection prevention.

4.4.8.1 Chemical waste mostly produced

Respondents were probed also on most of the chemical waste mostly produced in their working area. According to the study, most of the chemical wastes produced were pharmaceutical waste as confirmed by majority of the respondents at 77.5%. On the other hand, cytotoxic waste accounted for 22.5% of the chemical waste produced in Rongo sub-county health facilities.

Table 4.9:Chemical waste mostly produced

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pharmaceutical waste	69	77.5	77.5	77.5
	Cytotoxic waste	20	22.5	22.5	100.0
	Total	89	100.0	100.0	

This implies that pharmaceutical wastes are examples of chemical waste that are majorly produced by the health facilities in Rongo sub-county. Therefore, complying with their infection prevention standards was very vital among the health care workers in this region.

4.4.8.2 Have a copy of written policy on chemical waste disposal

The study sought to know whether the each of the respondents had a copy of written policy on chemical waste disposal.
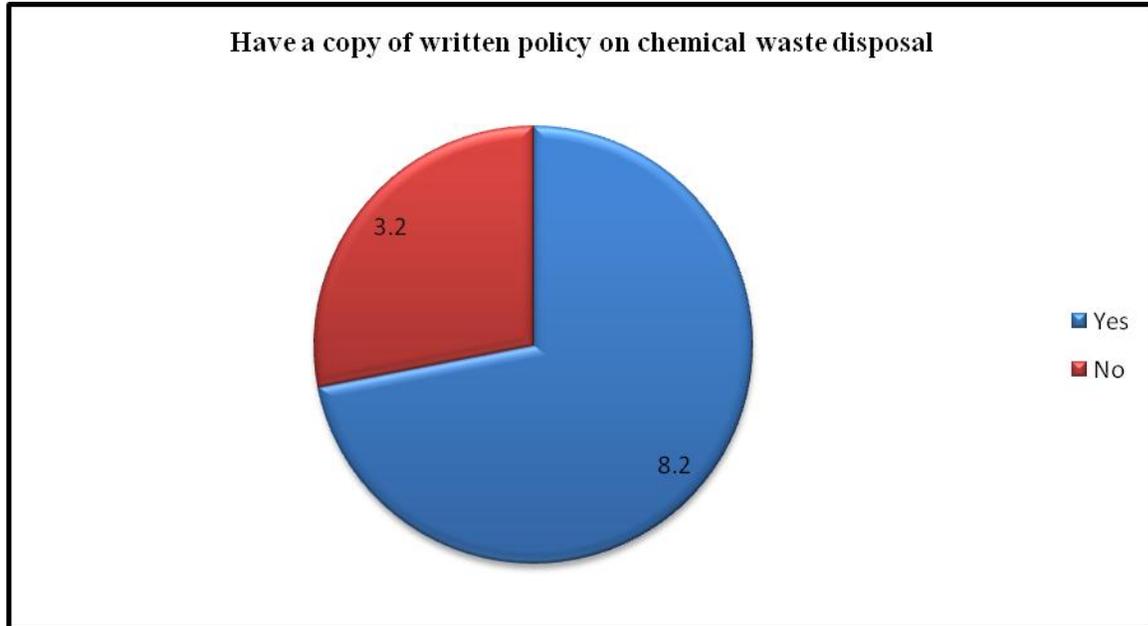
Figure 4.6 Have a copy of written policy on chemical waste disposal

The figure depicts that majority of the respondents at 73% had no written policy and guidelines on chemical waste disposal, while only 27% indicated otherwise. This shows that written policy on chemical waste disposal is not common among the health workers in this area hence could as well influence their compliance with infection prevention standards.

Respondents were also asked to indicate whether the following statement related to safe handling and disposal of chemical waste was true or false.

Table 4.10 safe handling and disposal of chemical waste

Statement	True	False	Don't know	Total
Bags and bins for handling waste are color coded to avoid mix-ups	34%	54%	12%	100%
All health care and support staff are trained on waste disposal	10%	79%	11%	100%
There is segregation of waste that allows for proper and safe disposal	23%	63%	14%	100%

The table depicts that in most cases, bags and bins for handling the chemical waste were not color coded as revealed by majority of the respondent at 54%. This would then promote mix up of waste which was not a good waste management practices. Majority of the respondents at 79% also indicated that not all the health care and support staff were trained on waste disposal. Lack of training on how to handle waste would also influence the compliance with infection prevention standards. The study also found that there was no segregation of waste for proper and safe waste disposal as indicated by majority of the respondents at 63%. This implies that most of the health workers would not categories the waste according to their degree of hazard, hence would compromise their adherence to infection prevention standards.

4.5 Occupational hazards health workers encounter when performing their duties

In objective two, the study sought to investigate the occupational hazards health workers encountered when performing their duties. Respondents were first asked to indicate whether they get exposed to occupational health hazard while performing their duty. Table 4.10 shows the response

4.5.1 Exposed to occupational health hazard while on duty

Table 4.11:Ever exposed to occupational health hazard while on duty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	58.0	58.0	58.0
	No	65	42.0	42.0	100.0
	Total	156	100.0	100.0	

The study reveals that majority of the respondents at 91% were exposed to occupational health hazard, while only 9% indicated otherwise. This shows that majority of the health care workers were vulnerable to occupational acquired infections hence the need to compliance with the infection prevention precautions. These findings supports Clever and Omenn, (2008) who also stated that almost seven million HCW in the United States (US) face essentially all of the hazards found throughout the nation's industry, and additional hazards particular to the health care environment.

In one of the interview, one of the nurses had to say *"owing to the nature of our work, where we deal with various kinds of diseases and casualties, we are highly exposed to health hazards hence making us be more prone to infections"*

4.5.2 Frequency of exposure to occupational health hazard

The study also sought to find out the frequency of exposure to occupational health hazards among the health workers in Rongo sub-county. This was imperative in order to find out the likeliness of the health workers to contact occupational diseases.
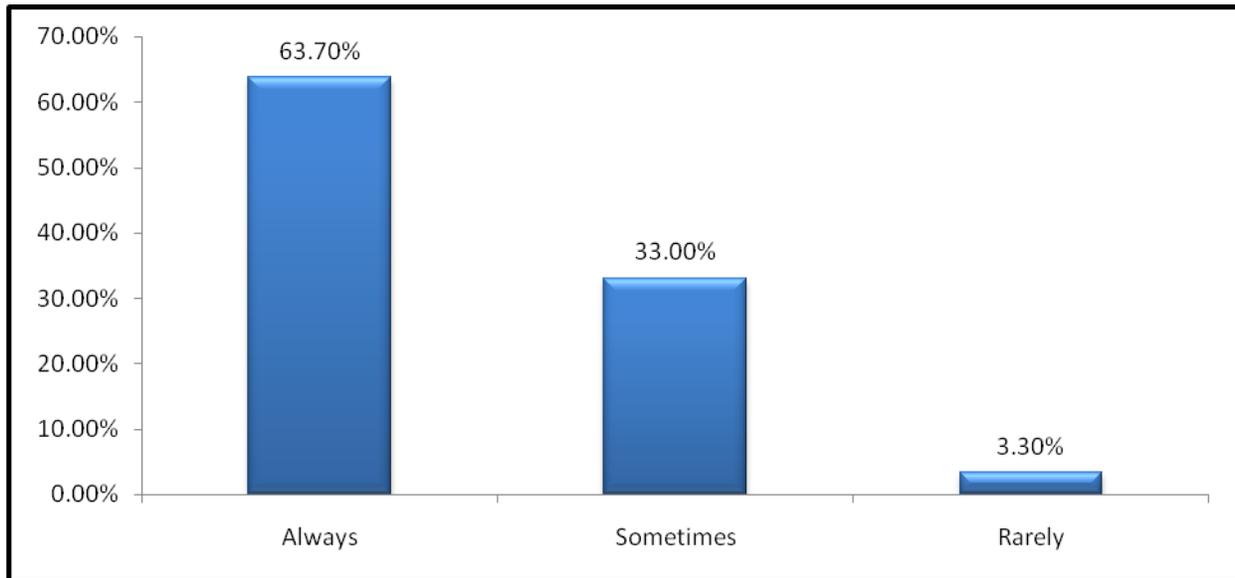
Figure 4.7Frequency of exposure to occupational health hazard

According to the study, majority of the respondents at 63.7% indicated that they were always exposed to occupational health hazards. This reveals that health workers were more likely to get infected when performing their duties, especially when they did not adhere to infection prevention standards.

4.5.3 Rating the working area based on level of risk

In rating the level of risk of their working place, respondents were asked to rank their working area based on high, medium or low. Table 4.12 shows how they responded.

4.12 Rating the working section based on level of risk

		Frequency	Percent	Valid Percent
Valid	High risk area	68	43.0	43.0
	Medium risk area	56	37.0	37.0
	Low risk area	32	30.0	30.0
	Total	156	100.0	100.0

The study reveals that majority of the respondents were working in high risk sections, as indicated by 68% of those interviewed.

"I am highly at risk in getting infection because of where am working" revealed one of the health workers in n interview on the environment of their working place.

Similarly, Clever *et al.,* (2008) in their study addressed five specific hazards faced by HCW because of their high prevalence, potential severity, widespread current concern, or significant body of scientific study. Clever and Omenn found that while AIDS topped the list of hazards, chemical hazards, back injuries, and stress were also of high prevalence in the health care setting.

4.5.4 Most common mode of occupational exposure

The study also investigated the common mode of occupational exposure. Respondents were therefore asked to indicate the mode of exposure they were most likely to get infected through. The table reveals that 42% of the respondents indicated contact transmission, 37% indicated airborne, while 21% indicated droplet. Williamson, *et al.,* (2008) also found that lack of proper adhrernce to infection prevention and control precaution standards, among many of the health workers in Kenya, they have high rates of exposure to microorganisms among health care workers via several modes (needlesticks, hand contamination with blood, exposure to air-transmitted microorganisms).
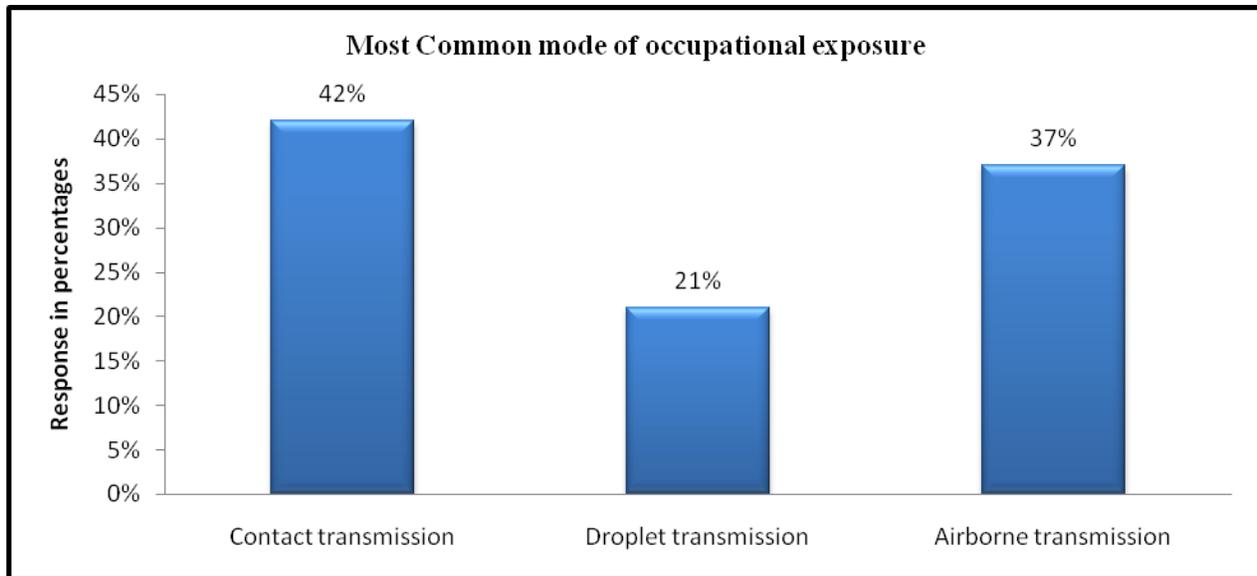
Figure 4.8: Most common mode of occupational exposure

This shows that contact and airborne transmission were the most common mode of occupational health hazard exposure.

4.5.6 Percutaneous injuries accidentally exposed to

When asked on the percutaneous injuries accidentally they were most likely to get exposed to, 40% of the respondents indicated accidental pricked by fragments, 36% indicated pricked by needles, while 24% by significant bite. These findings support those of Weiss *et al.* (2005) who investigated HIV infections among HCW in association with needle-stick injuries in Uganda. The study also found that that majority of the HCW had percutaneous exposure to HIV, with most of the injuries related to needles that had been used on AIDS patients.

Table 4.13 Percutaneous injuries accidentally exposed to

		Frequency	Percent	Valid Percent
Valid	Accidental pricked by needles	76	49.0	49.0
	Accidental pricked by fragments	56	36.0	36.0
	Accidental pricked by significant bite	24	15.0	15.0
	Total	156	100.0	100.0

This implies that majority of the health workers were most likely to be pricked accidentally by needles and fragments hence exposing them to infectious diseases.

4.6 Level of health workers' knowledge on infection control and prevention

In objective three, the study sought to find out the level of health workers' knowledge on infection control and prevention as this would also bring out factors affecting compliance with the infection prevention standards.

4.6.1 Aware of the infection control and prevention practices

Respondents were probed on whether they were aware of infection control and prevention practices and out of the 100 respondents that took part in the study, majority of the respondents at 53% revealed that they were ware of the control and prevention practices, while 47% indicated otherwise. These responses concur with the findings of Sreedharan, Muttappillymyalil and Venkatramana (2009) on their study on knowledge about standard precautions among university hospital nurses in the United Arab Emirates. The study found that overall 97.0% of respondents were familiar with the concept of standard precautions. Of these, 61.2% believed that the blood and body fluids of all patients are potentially infectious irrespective of their diagnostic status, while 27.6% thought only diagnosed patients and 11.2% only suspected cases are potentially infectious.

Table 4.14: Aware of the infection control and prevention practices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	15.0	15.0	15.0
	No	133	85.0	85.0	100.0
	Total	156	100.0	100.0	

This shows that most of the health workers were not aware of the infection and prevention practices, hence their adherence to the infection prevention standards would also be in doubt. Respondents were asked to indicate whether they Agreed (A), Undecided (U) or Disagree (D), with the following statement related to infection control and prevention practices.

Table: 4.15 HWs knowledge on infection control and prevention practices

Statement	A	U	D	Total
Gloves should be worn every time one is attending any patient	89%	2%	9%	100
Gloves are not a substitute for hand washing.	65%	15%	20%	100%
Polythene gloves are not suitable when dealing with body fluids	9%	78%	13%	100%
Chemical disinfection is not as effective as heat disinfection	19%	66%	15%	100%
Hands hygiene after removing gloves is a HAIs control measure	77%	12%	11%	100%

According to the study findings, majority of the health workers at 89% had the knowledge that gloves should be worn every time they were attending any patient. Majority of the respondents at 65% also agreed that gloves were not a substitute for hand washing. The study also found that most of the health workers were not sure whether polythene gloves were suitable or not when dealing with body fluids. This was confirmed by 78% of the respondents who were undecided on this question. On the other hand, majority of the respondents 66% were undecided on the level of effectiveness between chemical disinfection and heat disinfection. However, majority of the respondents at 77% agreed that hands hygiene after removing gloves was HAIs control measure.

4.6.7 Receive Mandatory infection control training

When asked whether they receive mandatory infection control and prevention training, 64% indicated that they were not receiving the training, while only 365 indicated otherwise. Lack of proper continuous training of infection control and prevention among the health workers would also influence their compliance with the infection prevention standards. This response supports that of Valentia and Anarella (2004) who also found that lack of adequate information among the health workers and providing information that has not been educational by the media has escalated confusion among the health workers on proper precautions to use when caring for patients with AIDS.

Table 4.16:Receive Mandatory infection control training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	29	19.0	19.0	19
	No	127	81.0	81.0	100.0
	Total	156	100.0	100.0	

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECCOMENDATIONS

5.1 Summary of the Study

The main purpose of this research study was to investigate factors influencing compliance with infection prevention standards among health providers at Rongo Sub County. The researcher identified this problem because of the growing hospital acquired infections among the health workers in different health facilities. The study therefore, sought to answer the following research questions; what are the health workers' practices regarding infection control, prevention and injection safety practices?; what are some of the Occupational Hazards health providers encounter when performing their duties?, and what is the level of health provider's knowledge regarding infection control, prevention and injection safety practices?.

Data was collected through questionnaires and Interview guides. Questionnaires were self-administered by the researcher to the health personnel from both public and private health facilities in Rongo sub-county. The researcher held a face to face interview with the nurses as key informants to get some qualitative information on the study objectives. Data was analyzed using descriptive statistics and presentations made with the use of frequency tables, pie-charts and bar graphs; this was done according to the research questions and questionnaire items.

Major findings of the study were as follows:

The first research question was to find out how the healthcare workers' infection control and prevention practices. Based on this, the study found that in most cases, the health personnel of different health facilities were not practicing adequate and best hand washing practices. For instance, majority of the respondents were not regularly washing their hands before and after attending the patient, they were also not always putting on gloves, wash their hands with running water using the best disinfectants. The study also found that in most cases, health workers were not always putting on their aprons, masks and goggles when on duty and did not know the best way to dispose their used personal protective equipments. Although there were common cases of spillage of bodily fluids such as blood, majority of the health workers were not able to manage these fluids in accordance with the standard precaution measures. Managing of

chemical waste was also found to be a challenging issue among the health workers as most of them could not identify the best way of disposing the waste.

In the second research question, the study sought to find out what are some of the occupational Hazards, health providers encounter when performing their duties. In the study findings, majority of the health workers were highly exposed to occupational health hazards at their working places, and that contact and airborne transmission were the most common mode of occupational health hazard exposure. The study also found that majority of the health workers were most likely to be pricked accidentally by needles or fragments hence exposing them to infectious diseases. High exposure to health hazards was also enhanced by the fact that most of the health workers had little knowledge on best infection control and prevention practices.

In research question three, the study sought to find out the level of health workers' knowledge on infection control and prevention. The study found that majority of the health workers were not well conversant with infection control and prevention practices attest to inadequate knowledge on best control and prevention measures. This was also justified by the fact that only a few of them underwent infection control and prevention training.

5.3 Conclusion

Based on the study findings, it can be concluded that several factors affect the adherence and compliance with the infection prevention and control standard precautions. Some of these factors were found to be poor practices of hand hygiene, utilization of personal protective equipment, poor management of bodily fluids and blood, lack of proper training on infection control and management, poor working conditions and lack of working guidelines and policies on hospital waste management. Inadequate and lack of regularly scheduled refresher trainings and knowledge among the health workers on infection control and prevention was also found to have significant effects of level of adherence to infection control and prevention standards precautions.

5.4 Recommendations
5.4.1 Recommendation for the Policy Makers

Based on the study findings, the government should come up or redesign health policies and programs that target the compliance with infection control and prevention standards among the entire health workers in the country. The health care workers should adhere strictly, to infection control and prevention standards as this will not only ensure their safety but also promote their productivity and service delivery. Health care workers should undergo proper training on infection control and prevention standard precautions to improve their compliance with the same.

5.4.2 Suggestion for further studies

Other studies should be conducted across the country on the infection control and prevention issues before a general conclusion is made. This would ensure that proper epidemiology of these diseases are well understood and accurate vital statistics such as prevalence of hospital acquired infections well computed so as to enable adequate control measures to be designed. Scholars should also work on measures for promoting adherence to infection control and prevention standard precautions among the health personnel and come up with theories explaining factors favoring non-adherence to these standard precaution measures.

References

Adriana C. O.; Maria H. P. M.; Maria H. R. S. P.; Aline C. S. L. (2009). Knowledge and attitude regarding standard precautions in a Kenya public emergency service: a cross-sectional study; vol.43; No.2

Apisarnthanarak A, Babcock HM, Fraser V.J (2006). Compliance with universal precautions among medical students in a tertiary care center in Kenya. Infect Control Hosp Epidemiol;27:1409-10.

Babbie, E. (2009). *The Practice of Social Research.* Twelfth Edition. USA:Chapman University.

Bryman, A. (2008). *Social Research Methods.* Third Edition. New York: Oxford University Press

Clever, L. H., & Omenn, G. 5. (2008). Hazards for health care workers. Annual Review of Public Health. 9, 273-303.

Crow, S., & Taylor, E. (2013). Nurse's compliance with aseptic technique. AORN Journal 37. 1066-1072.

Denes, A. E., Smith, J. L., Maynard, J. E., Doto, I. L., Berquist, K. R., & Finkel, A. J. (2008). Hepatitis B infection in physicians in Kenya. Journal of the African Medical Association. 210-212.

Kaplan, L. M., & McGuckln, M. (2006). Increasing handwashing compliance with more accessible sinks. Infection control. Z 408-410.

Kombo, D. K., &Delno, L. A. T. (2009). *Proposal and Thesis Writing: An Introduction*. Nairobi: Pauline's publications Africa

McCray, E. (2006). Occupational risk of the acquired immunodeficiency syndrome among health care workers in South Africa. International Journal of Medicine, 31A 1127-1132.

Mugenda, Olive M. &Mugenda, Abel G. (2003). *Research Methods: Quantitative and Qualitative Approaches*, Acts Press, Nairobi-Kenya.

Prisca O. A, Dada F. A. (2013). A comparative study on knowledge, attitude, and practice of injection safety among nurses in two hospitals in Ibadan, Nigeria; Vol 9, No 1.

Potter PA, Perry AG. Fundermentals of nursing.6th edition.St Loius:Elservier Mosby; 2006

Sreedharan J., Muttappillymyalil J.and Venkatramana *M. (2009)* Knowledge about standard precautions among university hospital nurses in the United Arab Emirates; Eastern Mediterranean Health Journal; Vol. 17 No. 4

Stein A.D, Makarawo T.P, Ahmad M.F. (2008). A survey of doctors' and nurses' knowledge attitudes and compliance with infection control guidelines in Kenya teaching and referral hospitals. J Hosp Infect; 54:68-73.

Valanis, B. & Browne, M. (1985). Use of protection by nurses during occupational handling of antineoplastic drugs. NITA. ., 218-222.

Valanis, B. & Shortridge, L. (2007). Self protective practices of nurses handling antineoplastic drugs. Oncology Nursing Forum *IA,* 23-27.

Valenti, W. M., & Anarella, J. P. (2004). Survey of hospital personnel on the understanding of the acquired immunodeficiency syndrome. American Journal of Infection Control. 14, 60-63.

Weiss, S. H., Saxinger, W. C., Rechtman, D., Grieco, M. H., Nadler, J., Holman, S., GInzburg, H. M., Groopman, J. E., Goedart, J. J., Markham, P. D., Gallo, R. C., Blattner, W. A., & Landesman, S. (2005). HTLV-III Infection among health care workers in Uganda. Journal of the African Medical Association. 25. 2089-2093.

WHO (2008). Hazards for health care workers. Annual Review of Public Health. 9, 273-303.

Williamson, K. M., Selleck, C. S., Turner, J. G., Brown, K. C., Newman, K D., & Sirles, A. T. (2008). Occupational health hazards for nurses: Infection. Image: Journal of Nursing Scholarship. Vol.20 (I), 48-53.

Wolverton, M. L. (2009). Research design, hypothesis testing, and sampling. *Appraisal Journal, 77*(4), 370-382

Appendix I: Questionnaire for Health Workers

Dear Respondents

I am Ochieng Khol Helmut, a Master of public health (MPH) student at Jaramogi Oginga Odinga University of Science and Technology, I am carrying out a research on Factors Influencing Compliance with Infection Prevention Standards among Health Workers at Rongo Sub County, Kenya, I humbly request you to spare a portion of your precious moments to complete the attached questionnaire. The responses you provide will be used only for the study and not anywhere else. Be assured that your responses will be treated confidentially and in order to ensure this you may or may not write your name or the name of your institution anywhere in the questionnaire. What is required of you is simply to provide honest and adequate answers according to the instructions given in the questionnaire.

Yours faithfully,

Ochieng Khol Helmut

Section A: Demographic Information

Age

- <30 years   [   ]
- 30-39 years   [   ]
- 40-49 years   [   ]
- ≥50 years   [   ]

Gender

- Male   [   ]
- Female   [   ]

Years on current job

- <10 years   [   ]
- 10-19 years   [   ]
- 20-29 years   [   ]
- ≥30 years   [   ]

Cadre (specialty) _____

Section B: Healthcare workers' practices regarding infection control and prevention

Hand hygiene

Which of the following describe your hand washing habit?

- Decontaminate my hands before handling the patient   [ ]
- Decontaminate my hands after handling the patient   [ ]
- Decontaminate my hands before and after handling the patient [ ]
- No decontamination at all   [ ]

What do you use to decontaminate your hands?

- Soap   [ ]
- Gels   [ ]
- Rubs   [ ]
- Alcohol   [ ]
- Others specify_____

For each of the statement below, please indicate whether you; Strongly Agree (SA), Agree A, Undecided (U) Disagree (D), Strongly Disagree (SD) with the following statement related to hand hygiene practices

Statement	SA	A	U	D	SD
I keep my nails short clean and polish free					
I avoid wearing wrist watches and jewellery when on duty					
Any cuts and abrasions in my hands are covered with a waterproof dressing					
Before washing my hands, I remove my wristwatch and any bracelets and roll up long sleeves					
I dry my hands proper to prevent recontamination					
We are supplied with Disposable paper hand towels of good quality for hand drying					
Changing gloves before going to another patient					

Using personal protective equipment

Do you use personal protective equipment every time you are in duty?

- Yes   [ ]
- No   [ ]

If yes, which of the following personal protective equipment are you supplied with?

- Gloves   [ ]
- Aprons   [ ]
- Masks   [ ]
- Goggles   [ ]
- Visors   [ ]
- Hats   [ ]
- Footwear   [ ]
- Others specify_____

How do you dispose of the protective equipment after use?

- Burning   [ ]
- Burying   [ ]
- Dipping in pit latrine   [ ]
- Incineration   [ ]
- Dumping
- Others specify_____

Are you supplied with well color corded waste disposal containers within the hospital?

- Yes   [ ]
- No   [ ]

Do you understand the colors in relation to medical waste management?

- Yes   [ ]
- No   [ ]

For each of the statement below, please indicate whether you practice; Always, sometimes, rarely or Never with the following statement related to healthcare workers' practices regarding infection control and prevention

Statement	Always	Sometime	Rarely	Never	Don't know
I use of gloves when handling body fluids					
I put on mask to protect my mouth and eyes when handling causalities					
I wear apron when performing my duties					
I avoid recapping the needle after it is used for a patient					
I practice hand wash after attending the patients					
We dispose of the personal protective equipment after use					
I recap needles after using					
I change gloves before going to another patient					

Managing blood and bodily fluids
Are you trained to handle specimen safely?

- Yes   [ ]
- No   [ ]

Do you have workplace's written policy for dealing with spillages?

- Yes   [ ]
- No   [ ]

How do you infectious body fluid spillages?

- Disinfecting with chemicals   [   ]
- Mopping out   [   ]
- Sweeping   [   ]
- Heating the surface   [   ]
- Others specify_____

Safe handling and disposal of chemical waste

Do you have chemical waste emanating from your clinic?

- Yes   [ ]
- No   [ ]

If yes, which of the following waste are mostly produced from your work place?

- Pharmaceutical waste [ ]
- Cytotoxic waste   [ ]
- Others specify_____

Do you have a written policy on waste disposal?

- Yes   [ ]
- No   [ ]
- Don't know   [ ]

Please indicate whether the following statement relating to safe handling and disposal of

chemical waste is true or false

Statement	True	False	Don't know
Bags and bins for handling waste are color coded to avoid mix-ups			
All health care and support staff are instructed on safe handling of waste			
There is segregation of waste that allows for proper and safe disposal depending on the type of the waste			

SECTION C: Occupational hazards health workers encounter when performing their duties

Have you been exposed to occupational health hazard while on duty?
- Yes   [ ]
- No   [ ]

If yes, what is the frequency of exposure to these health hazards?
- Always   [ ]
- Sometimes   [ ]
- Rarely   [ ]

How would you rate your working area based on level of risk?

- High risk area   [ ]
- Medium risk area   [ ]
- Low risk area   [ ]

What is the most common mode of occupational exposure?
- Contact (direct and indirect) transmission   [ ]
- Droplet transmission   [ ]
- Airborne transmission   [ ]
- Percutaneous exposure   [ ]
- Mucus membranes exposure   [ ]

What are some of the percutaneous injuries that you have been accidentally exposed to?

- Accidental pricking by the needles   [ ]
- Accidental pricking bone fragments   [ ]
- Accidental pricking by significant bites   [ ]
- Others specify_____

Which of the following are you highly exposed to as a result of hazards of sharp injury?

- Hepatitis B   [ ]
- Hepatitis C   [ ]
- HIV   [ ]
- Others specify_____

SECTION D: Level of health workers' knowledge on infection control and prevention

Are you aware of the infection control and prevention practices?

- Yes   [ ]
- No   [ ]

If yes, please indicate Strongly Agree (SA), Agree A, Undecided (U) Disagree (D), Strongly Disagree (SD) with the following statement.

Statement	SA	A	U	D	SD
Gloves should be worn whenever there might be contact with blood and body fluids, mucous membranes or non intact skin.					
Gloves are not a substitute for hand washing.					
Nitrile or latex gloves should be worn when handling blood, blood-stained fluids, cytotoxic drugs or other high risk substances.					
Polythene gloves are not suitable for use when dealing with blood and/or blood and body fluids					
Chemical disinfection is not as effective as heat disinfection					
Wearing gloves, mask, and protective eyewear are a HAIs control Measures					
Changing mask before going to another patient is a HAIs control Measure					
HCWs' hands are a vehicle for transmission of nosocomial Pathogens					
Hands hygiene measures reduce the risk of HAIs among patient					
Hands hygiene measures reduce the risk of HAIs among HCWs					
Hands hygiene after removing gloves is a HAIs control measure					

Do you receive mandatory infection control training?

- Yes   [ ]

- No   [ ]

If yes, how frequently

- Every two weeks   [ ]

- Monthly   [ ]

- Every six months   [ ]

- Yearly   [ ]

Appendix II: Interview schedules for health workers

Dear Respondents,

Re: Interview-guides

This is a study on Factors Influencing Compliance with Infection Prevention Standards among Health Workers at Rongo Sub County, Kenya. The purpose of this Interview-guide is to seek information from you on this theme of study. Your knowledge and experience on factors Influencing Compliance with Infection Prevention Standards among Health Workers will be highly appreciated. This guide is divided into two Section A and B. Please complete each section honestly according to the instructions given. Do not write your name and the name of your school to ensure complete confidentiality. Please respond to all questions

SECTION A: Demographic information

What is your gender?

- Male   ( )

- Female ( )

Which one of the following is your age bracket?
- Below 25 years   ( )
- 25 Years to 35 years   ( )
- 36 to 45 years   ( )
- 46 years and above   ( )

Years of service as in your current job
- Less than 1 year   ( )
- 1-5 years   ( )
- More than 5 years   ( )

SECTION B: Factors Influencing Compliance with Infection Prevention Standards among Health Workers

1. How do you and your fellow staff members practice hand hygiene?

   _____
   _____
   _____

2. What is the general view or perception about the hand hygiene among the health workers?

   _____
   _____
   _____

3. How do you manage personal protective equipment?

   _____
   _____
   _____

4. In case of blood or bodily fluids how do you handle the fluids?

   _____
   _____
   _____

5. How do you handle disposal of chemical waste?

   _____
   _____
   _____

6. What are some of the occupational hazard health exposures encountered by the health worker?

   _____
   _____
   _____

7. What are some of the factors affecting compliance with Infection Prevention Standards among Health Workers?

   _____
   _____
   _____

End