FACTORS INFLUENCING COMPLIANCE WITH INFECTION PREVENTION STANDARD PRECAUTIONS AMONG NURSES WORKING AT MBAGATHI DISTRICT HOSPITAL, NAIROBI, KENYA.

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November, 2013.

Declaration

I Gertrude Munthali Moyo declare that this is my original work and has not been submitted to any other institution for similar purposes.

Signature_____Date_____

Certificate of Approval

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Dedication

I dedicate this work to my loving husband Austin Adamson Moyo, for his encouragement and patience, my dear son Joel, daughters Chindikani & Wezi and my caring parents Mr and Mrs Rev M.Y.Y Munthali.

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I am grateful to all my lecturers at the University of Nairobi, School of Nursing Sciences for their advice and guidance throughout the study period.

I also wish to extend my gratitude to the University of Nairobi Kenyatta National Hospital Ethics and research Committee for granting me approval and Mbagathi District Hospital management for granting me permission to conduct this study.

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Last but not least, I wish to thank all the respondents for consenting and participating in this research study.

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Abbreviations and Acronyms

AIDS - Acquired Immune Deficiency Syndrome

CDC - Centre for Disease Control and Prevention

DHMT - District Health Management Team

HAI - Hospital Acquired Infection

HAV - Hepatitis A Virus

HBV - Hepatitis B Virus

HCV - Hepatitis C Virus

IPC - Infection Prevention and Control

KNH - Kenyatta National Hospital

NCK - Nursing Council of Kenya

NSSI - Needle Sticks and Sharps Injury

PPE - Personal Protective Equipment

Ups - Universal Precautions

US -United States

SPs - Standard Precautions

SPSS - Statistical Package on Social Science

WHO -World Health Organization

Operational Definitions

Blood Borne Pathogens: are pathogenic microorganisms that are present in human blood and can cause disease in humans.

Centre for Disease Control and Prevention (CDC): the federal agency which serves as the national focus to improve the health of the people of the United States (U.S); an agency within the U.S. Department of Health and Human Services.

Compliance: is the extent to which certain behaviour is in accordance with the set instructions or health care advice. In this study compliance is the extent to which nurses practices are in accordance with CDC guidelines on infection prevention and control.

Hospital Acquired Infection (HAI): is an infection acquired in a hospital or health care facility by a patient or health care worker during the period of hospitalization and in the course of duty.

Infection: is the entry and multiplication of an infectious agent in the tissue of a host with signs and symptoms.

Infection Prevention: is the practice of putting in place barriers to limit transmission of disease causing microorganisms.

Standard Precautions: are protective measures for all potentially infectious exposures set up by CDC. In this study standard precautions include hand hygiene, use of personal protective equipments, safe handling of sharps, housekeeping and appropriate waste disposal.

Abstract

Introduction: Nurses are at risk of acquiring and transmitting hospital acquired infections in the course of delivering the nursing care. Measures to prevent the transmission of these infectious microorganisms are therefore a significant component of nursing care Amadu & Saka, (2012).

Aim: The aim of this study was to determine the knowledge, practice and factors influencing compliance with infection prevention standard precautions among nurses working at Mbagathi District Hospital, Nairobi, Kenya.

Methods: A cross-sectional survey of 90 nurses working in medical, surgical, paediatric and maternity wards was conducted using self administered questionnaires, observation checklist and key informant interview guide. Purposive sampling was used to select the wards and simple random sampling to select the participants. SPSS version 17 was used to analyze quantitative data and Nvivo version 8 was used to analyse qualitative data.

Results: Out of the 90 participants, 83.3% were females and 16.7% were males. A large proportion of the participants (64.4%) (n=90) were trained at diploma level. Only 17.8% (n=90) of the participants had adequate knowledge on the basic elements of infection prevention standard precautions. The association between knowledge on the elements of standard precautions and having attended formal training on infection prevention was statistically significant (p=0.015). A lower proportion of participants (33.3%) (n=18) performed hand hygiene always when indicated. Gloves were the most utilized personal protective equipment by 88.9% (n=18) of the participants, gowns by 61.1% (n=18) and 5.6%

(n=18) used mouth and eye protection. The practice of recapping used needles was uncommon, 94.4% (n=18) of the participants disposed of the syringe and needle immediately into puncture resistant containers without recapping. Non availability of infection prevention materials and lack of regular continuous medical education on infection prevention were the major reported causes for non compliance with standard precautions.

Conclusion and Recommendations: Majority of nurses had inadequate knowledge on the basic components / elements of IP standard precautions and their compliance was suboptimal. Availability of essential infection prevention resources was inconsistent. Hospital management team should facilitate procurement of all essential infection prevention materials and infection prevention committee in collaboration with hospital management team should be conducting regular continuous medical education on infection and should also develop an induction program for newly recruited nurses.

Chapter One

1.0 Background

Nurses are at risk of acquiring and transmitting hospital acquired infections in the course of delivering the nursing care. Measures to prevent the transmission of these infectious microorganisms are therefore a significant component of nursing care. This prevention is achieved through the practice of infection prevention, including the implementation of infection prevention standard precautions (SPs) Amadu & Saka, (2012).

Preventing and controlling infection in health care facilities involves two levels of approach, standard precautions and additional (transmission-based) precautions. Standard precautions are taken to reduce the risk of transmitting blood-borne microorganisms and other pathogens from both recognized and unrecognized sources. These precautions are used as a minimum, in the care of all patients in health care facilities and settings, regardless of their diagnoses or presumed infection status Ministry of Public health and sanitation and Ministry of medical services. (2010).

SPs guide health care workers (HCWs) to practice regular hand hygiene , use personal protective equipment (PPE) like gloves, masks, eye protection, face shield and gowns when contact with mucus membranes , blood and body fluids of patients is anticipated, correct disposal of sharps and other clinical waste. Since identification of patients infected with different microorganisms cannot be reliably made by medical history and physical examination, the Centre for Disease and Control (CDC) has recommended that standard precautions are used on all patients, regardless of knowledge about their infection status Siegel J.D, et al. (2007).

Percutaneous exposures to blood and body fluids through contaminated needle pricks and other sharps are an important occupational hazard for morbidity and mortality from infections with blood-borne pathogens among health care workers Lahsaeizadeh & Jafari, (2005). It is estimated that 2.5% of HIV cases and 40% of HBV and HCV cases among HCWs worldwide are the result of this form of exposure WHO, (2002).

A study done in Mongolia on needle stick and sharps injuries revealed that one third of the health care workers did not follow universal precautions at the tertiary hospital in Ulaanbaatar. Unsafe injection practices such as reusing and recapping needles after giving injections were still observed among them Mayo & Nayu, (2011).

A study done in Cyprus among nurses indicated that compliance was inadequate concerning hand hygiene, use of gloves when exposure to body fluids was anticipated, eye protection, mouth and nose protection, wearing a gown when required, avoidance of needle recapping after it was used for a patient and provision of care considering all patients as potentially infectious Efstathiou G, et.al, (2011).

1.1 Problem Statement

A qualitative rapid assessment of IP practices in 12 health facilities in five provinces in Kenya revealed significant differences in IP practices among the health care facilities. Health care facilities without active IP committees performed poorly in IP practices at both the institutional and individual provider levels. Where the IP lead person was not part of the hospital management team, IP activities relegated to the back and lost the prominence that is necessary for good practices. The findings also revealed that most IP lead persons in Kenya were nurses and not all of them were members of the hospital management team Ministry of Public health and sanitation and Ministry of medical services, (2010).

The infection prevention committee lead person at Mbagathi is a nurse and is not a member of the hospital management team therefore the study sought to determine the knowledge, practice and factors affecting compliance with infection prevention standard precautions.

1.2 Study Justification

The findings of this study have revealed the actual performance on infection prevention and control practice and the factors that influence compliance with infection prevention standard precautions among nurses. This is a good basis for designing and implementation of effective interventions for sustaining the observed positive behaviours and sealing the identified performance gaps among the nurses working at Mbagathi District Hospital.

1.3 Research Questions

1. What are the factors that influence nurse's compliance with infection prevention standard precautions?
2. What challenges do nurses working at Mbagathi District Hospital encounter in the implementation of infection prevention practices?

1.4 Objectives

1.4.1 Broad Objective

To determine knowledge, practice and factors that influence compliance with infection prevention standard precautions among nurses working at Mbagathi District Hospital.

1.4.2. Specific Objectives

1. Describe the socio-demographic profiles of nurses working at Mbagathi District hospital?
2. Assess the implementation of infection prevention standard precautions among nurses working at Mbagathi District Hospital.

3. Determine factors that promote nurse's compliance with infection prevention standard precautions at Mbagathi District Hospital.
4. Describe the challenges encountered by the nurses at Mbagathi District Hospital in the implementation of infection prevention practices.

1.5 Expected Benefits

The findings of the study are helpful in designing effective programmes that would reinforce compliance with infection prevention standard precautions and therefore reduce hospital acquired infections among nurses and patients.

The findings of this study are also helpful in the reviewing and improvement of policies, protocols and procedures on infection prevention.

1.6 Ethical Considerations

During the study, rights of participants were respected. Before conducting the study, the research proposal was sent to University of Nairobi KNH Research Ethics committee for review and approval and after approval was granted, Permission to conduct this study at Mbagathi District Hospital was sought from the Medical Superintendent of the institution.

An informed consent containing information on purpose of the study, benefits and risks was developed and given to the participants to read before they could consent to participate.

Chapter Two: Literature Review

2.0 Introduction

Infection prevention Standard precautions are guidelines recommended by the Centre for Disease Control and Prevention for reducing the risk of transmission of blood-borne and other pathogens in hospitals. The standard precautions synthesize the major features of universal precautions (designed to reduce the risk of transmission of blood borne pathogens) and body substance isolation (designed to reduce the risk of pathogens from moist body substances) and apply to all patients receiving care in hospitals regardless of their diagnosis or presumed infection status. Standard precautions apply to blood, all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain blood. The precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals CDC, (2010).

Nurses play a key role in infection prevention by demonstrating leadership in infection prevention and control using their knowledge, skill and judgment to initiate appropriate and immediate infection control procedures and therefore keep all patients safe Jenipher O., et.al, (2010).

This chapter will focus on definition of Hospital Acquired Infections, the magnitude of HAIs, risk factors for developing HAIs, common HAIs, the role of infection prevention standard precautions, and the elements of infection prevention standard precautions.

2. 1 Definition of Hospital Acquired Infections

Hospital acquired infections also called Nosocomial infections are infections acquired in the hospital by a patient who was admitted for a reason other than that infection. HAI can be

bacterial, viral, fungal and parasitic in nature. HAI are mainly transmitted through contact, airborne and droplet. HAIs significantly increase the costs of healthcare through extended stays in healthcare facilities, increased disability, increased costs of antibiotics, and prolonged recovery time CDC, (2010).

2.2 Magnitude of Hospital Acquired Infections

Hospital Acquired Infections (HAI) are a major setback to health care institutions. The prevalence of HAIs varies widely across the globe. Worldwide it is estimated that almost 10% of the hospitalized patients acquire at least one HAI. Data on HAIs in Kenya is currently lacking, but the risk for HAIs is high. Data from Kenya AIDS Indicator Survey (KAIS) 2007, demonstrated that approximately 6.6 million people (33.1 percent) received at least one injection, a predisposing factor for HAIs Public health and sanitation and Ministry of medical services, (2010).

Percutaneous exposures to blood and body fluids through contaminated needle pricks and sharps are an important occupational hazard for morbidity and mortality from infections with blood-borne pathogens among health care workers. According to WHO (2002), among the 35 million health care workers worldwide, three million experience needle pricks and sharps injuries every year, with a high incidence of these injuries being reported from health care facilities that vary in terms of their level of economic development. Need pricks and sharp injuries pose a considerable risk for the transmission of more than 20 kinds of blood-borne pathogens, such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Yacoub R, et.al, (2010). Exposure due to sharps injury in the workplace accounts for 40% of infections with HBV and HCV and 2-3% of HIV infections among health care workers WHO, (2002).

2.3 Common Hospital Acquired Infections

The most common pathogens that cause Nosocomial infections are staphylococcus aureus, Pseudomonas aeruginosa, and E. coli. These microorganisms are transmitted through different modes like contaminated hands of health care workers and contaminated instruments for procedures CDC, (2010).

Urinary tract infection (UTI) is the most common type of hospital-acquired infection and has been shown to occur after urinary catheterization. Pneumonia is the second most common type of hospital-acquired infection. Bacteria and other microorganisms are easily introduced into the throat by treatment procedures performed to treat respiratory illnesses. Surgical wounds can also become infected from contaminated dressings or from the hands of health-care workers who change the dressings. Wounds caused by trauma, burns, or pressure sores easily become infected from prolonged bed rest or wheel chair use Custodio & Steele, (2012).

A Study done among surgical patients in two hospitals in Ethiopia indicated that 6.2% and 5.2% 0f the patients had developed HAI respectively. Surgical site infections were the most common infections among these patients Massele & Woldemednin, (2009). Similarly a study done in Burkina Faso on prevalence of HAIs among surgical patients also reported surgical site infection as being the most common HAI followed by urinary tract infection and hospital acquired pneumonia Sanou J, et.al, (2002).

2.4 Risk Factors for Hospital Acquired Infections

All hospitalized patients are at risk of acquiring an infection from their treatment or surgery. Some patients are at greater risk than others, especially young children, the elderly, and persons with compromised immune systems. The National Nosocomial Infection Surveillance System database compiled by the CDC showed that the overall infection rate among children in intensive

care was 6.1%, with the primary causes being venous catheters and ventilator-associated pneumonia. The risk factors for hospital-acquired infections in children include parenteral nutrition (tube or intravenous feeding), the use of antibiotics more than 10 days, use of invasive devices, poor postoperative status, and immune system dysfunction. Other risk factors that increase the opportunity for hospitalized adults and children to acquire infections are: a prolonged hospital stay, severity of underlying illness, compromised nutritional or immune status, use of indwelling catheters, failure of health care workers to wash their hands between patients or before procedures and prevalence of antibiotic-resistant bacteria from the overuse of antibiotics Rizzo & culvert, (2011).

2.5 Background of Standard Precautions

Universal precautions (UP) were developed by the CDC. These guidelines were designed to prevent the transmission of blood borne diseases such as HIV, HBV, HCV and other blood borne pathogens when providing health care. Under these precautions blood and certain body fluids of all patients are considered potentially infectious. These precautions include specific recommendations for use such as gloving, gowning , use of masks and eye protection when contact with blood or body secretions containing blood or blood elements is anticipated**.**

In 1996, the CDC expanded the UP concept and changed it to standard precautions (SPs). SPs are guidelines for reducing the transmission of blood borne and other pathogens in hospitals. SPs synthesize the major features of Ups and body substance isolation designed to reduce the risk of transmission of pathogens from moist body substances. SPs apply to all patients receiving care in hospitals regardless of their diagnosis or presumed infection status. They apply to blood, all body fluids, secretions and excretions except sweat regardless of whether or not they contain blood Siegel & Rhinehart, (2007).

2.6 The Role of Standard Precautions

Standard precautions are a set of basic infection prevention practices intended to prevent transmission of infectious diseases from one person to another. Because it is not always known if a person has an infectious disease or not, standard precautions are applied to every person every time to ensure that transmission of diseases do not occur. They are used to maintain an aseptic field to prevent cross contamination and cross infection between health care providers, health care providers and patients and in between patients Siegel & Rhinehart, (2007).

The wide spread adoption of SPs which include the provision of adequate sharps containers, the training of HCW on the risks and prevention of transmission of blood borne virus and the use of personal protective equipments together with the most recent use of safer devises such as needles that sheath or retract after use has led to a significant reduction in needle stick and other injuries Beekmann &Henderson (2005).

The findings of a study done by Reda A, et.al, (2010) revealed that nurses and doctors had sub optimal practices and unfavourable attitudes related to standard precautions such as needle recapping (46.9%) and discriminatory attitudes (30.5%) towards HIV/AIDS patients. A study done by Jain, et.al, (2012) revealed similar findings.

2.7 Elements of Infection Prevention Standard Precautions

The elements of infection prevention standard precautions include hand hygiene, use of personal protective equipment (PPE), injection safety, instrument processing, waste management, and housekeeping Smeltzer & Bare, (2007).

2.7.1 Hand Hygiene

The most important mechanism of spread of HAIs is via the contaminated hands of HCWs and these include doctors, nurses and other staff Joseph & Sistla, (2010). Hand hygiene entails

cleaning of hands with soap and water or an alcohol-based hand rub to prevent transmission of germs to others. It is the single most important IPC precaution and one of the most effective means to prevent transmission of pathogens associated with health care services. Appropriate hand hygiene must be carried out before and after performing any procedure between patients or on the same patient, before and after examining (coming in direct contact with) a client or patient, before putting on gloves and after removing gloves, handling contaminated objects including used instruments, touching mucous membranes, blood, body fluids, secretions, or excretions, before preparing medication and before feeding a patient Ministry of Public health and sanitation and Ministry of medical services, (2010).

In 2005, WHO launched the first global patient safety challenge “clean care is safe care” to create a global momentum and commitment to reduce HAIs. The intervention consisted of educating staff, posting reminders in the work place, promoting institutional safety climate and introducing a locally produced alcohol based hand rub, monitoring hand hygiene compliance and providing performance feedback Allegranzi, et.al, (2010) reported a successful implementation and adaptation of this strategy in Bamako, Mali.

2.7.2 Use of Personal Protective Equipments

Personal Protective Equipment (PPE) refers to equipment which is worn to protect HCWs from exposure to or contact with infectious agents. PPE provides a physical barrier between microorganisms and the wearer, thereby preventing microorganisms from contaminating hands, eyes, clothing, hair, and shoes. PPE also prevents microorganisms from being transmitted to other patients and staff. PPE reduces, but does not completely eliminate, the risk of acquiring an infection. PPE must be used effectively and correctly and include gloves, gowns, face masks,

respirators, goggles and face shields. The selection of PPE is based on the nature of the patient interaction and potential for exposure to blood, body fluids or infectious agents. Appropriate use of PPE for adherence to Standard Precautions include: use of gloves in situations involving possible contact with blood or body fluids, mucous membranes, non-intact skin or potentially infectious material; use of a gown to protect skin and clothing during procedures or activities where contact with blood or body fluids is anticipated; use of mouth, nose and eye protection during procedures that are likely to generate splashes or sprays of blood or other body fluids Ministry of Public health and sanitation and Ministry of medical services, (2010).

Findings of a study done by Jain &Dogra (2012) indicated that less than half of the participants used caps, masks, and gowns as part of maximal barrier precautions. Nurses used these maximal barrier precautions significantly less in comparison to doctors. The HIV positive status of the patient was an important factor in the implementation of SPs.

A Study done in India revealed that 40% of the HCW wore eye protection when indicated Kermode, et. al, (2005).

A study done by Okechuku, (2012) in Nigeria revealed that HCW always used gloves when they anticipated contact with body fluids, non intact skin and mucus membranes however use of gowns, aprons ,masks and eye protection during procedures likely to generate splashes of blood and body fluids was low.

2.7.3 Safe Injection Practices

A safe injection is one that does not harm the recipient, does not expose the provider to any avoidable risk, and does not result in any waste that is dangerous for other people. WHO estimates that at least 50 percent of all injections are unsafe and this poses serious health risks to recipients, HCWs, and the public. In many developing countries, injection overuse and unsafe

practices account for a substantial proportion of new infections with HBV, HCV, and HIV. For the year 2000, WHO estimated that injections with contaminated needles or syringes accounted for 30 percent of new HBV infections, 41 percent of new HCV infections, and 5 percent of new HIV infections (21 million new HBV infections, 2 million new HCV infections, and 260,000 new HIV infections) WHO, (2002).

In a national cross-sectional survey on injection-safety practices in Kenya in 2003, over-prescription of injections, and improper disposal of injection-related waste were identified as some of the most prominent factors for unsafe injection practices in the country. Injections should be administered safely and only when they are medically indicated. Eliminating unnecessary injections is the best way to prevent injection-associated infections Ministry of Public health and sanitation and Ministry of medical services, (2010). A study done in Mongolia amongst HCWs revealed that unsafe injection practices such as reusing and recapping needles after giving injections were still observed among them. Mayo K, et.al, (2006). A study done in Ogun state Nigeria also revealed similar findings where one third of the participants always recapped used needles Sado, et.al, (2006).

2.7.4 Housekeeping

Housekeeping refers to the general cleaning of hospitals and clinics, including the floors, walls, equipment, furniture, and other surfaces. Cleaning entails removing dust, soil, and contaminants on environmental surfaces. Cleaning helps eliminate microorganisms that could come in contact with patients, visitors, staff, and the community. Cleaning ensures a clean and healthy hospital environment for patients and staff. Patient-care areas should be cleaned by wet mopping. Dry sweeping is not recommended Ministry of Public health and sanitation and Ministry of medical services, (2010).

Cleaning is required prior to any disinfection process to remove dirt, debris, and other materials and should begin from least soiled areas and progress to the most soiled areas and also from highest to lowest areas, so that the dirtiest areas and debris that fall on the floor will be cleaned last. Dry sweeping, mopping, and dusting should be avoided to prevent dust, debris, and microorganisms from getting into the air and landing on clean surfaces. Airborne fungal spores are especially dangerous, because they can cause fatal infections in immunosuppressed patients. Instructions for diluting disinfectant cleaning solution should be followed to ensure effectiveness of disinfectants Tietjen & Bossemeyer (2004).

Areas that are visibly contaminated with blood or body fluids should be decontaminated with 0.5% chlorine for 10 minutes and then cleaned with detergent and water. Isolation rooms and other areas that have patients with known transmissible infectious diseases should be cleaned with a detergent and a disinfectant solution at least daily. Horizontal surfaces should be cleaned at least once daily and as needed. Toilets should be cleaned four times daily and as needed and floors should be cleaned twice daily Tietjen & Bossemeyer (2004).

Cleaning equipment that has been contaminated with blood or body fluids should be decontaminated by soaking in 0.5 % chlorine for 10 minutes followed by cleaning with soapy water and then rinsing with clean water and should then be dried completely before reuse by placing them upside down to avoid using wet mops or cloths which are usually heavily contaminated with microorganisms Ministry of Public health and sanitation and Ministry of medical services, (2010).

Hospital environments act as a reservoir for many potential pathogens and there is documented evidence that environmental cleaning reduces the rates of HAIs, however in practice as a source of transmission it is often overlooked Curtis, (2008).

2.7.5 Waste Disposal

Health care waste is a potential reservoir of pathogenic microorganisms and requires appropriate, safe, and reliable handling. Safe management of health care waste is a key issue in controlling and reducing HAIs. The purpose of proper waste management is to protect people who handle waste items from accidental injury, prevent the spread of infection to patients, clients, and HCWs, and the local community Tietjen & Bossemeyer (2004).

Waste generated from health care facilities can be categorized as non-infectious, infectious, or hazardous. It is estimated that approximately 85 percent of the waste generated in hospitals is non-infectious. Infectious (contaminated) waste is potentially infectious or toxic if it is not disposed of properly. Medicines, medical supplies, or other chemicals might be toxic or hazardous.

Contaminated and noncontaminated wastes should be segregated at the point of generation. Separating wastes minimizes costs by reducing the volume of contaminated waste that must be treated with expensive procedures that are required for managing and disposing of contaminated waste. Colour-coded, separate containers should be used for segregating non-infectious, infectious, and hazardous waste and these containers should not be filled more than three-quarters full before they are disposed of Tietjen & Bossemeyer (2004).

The main risk that is associated with infection comes from sharps contaminated with blood. Sharps include all objects and materials that pose a potential risk of injury and infection because of their puncture or cutting properties and these include syringes with needles, blades, wires, and broken glass. Syringes and needles should be disposed of immediately after use. The needle should not be recapped or removed from the syringe thus the whole combination should be inserted into the safety box directly after use. Sharps should be disposed of in safety boxes that are resistant to punctures and leakage and are designed so that items can be dropped in using one hand and no item can be removed. Sharps should not be handled unnecessarily to prevent needle prick injuries Sado & Fawole (2006).

Solid contaminated and noncontaminated waste should be disposed of separately. Solid contaminated waste should be placed in a plastic or galvanized metal container with a tightly fitting cover and housekeeping staff should wear personal protective equipment when handling contaminated waste. Waste containers for both contaminated and non contaminated waste should be collected on a regular basis and the burnable ones transported to the incinerator or area for burning Tietjen & Bossemeyer (2004).

2.8 Roles of Infection Prevention Committee

Infection prevention and control committee exist to support and monitor the implementation of national Infection prevention and control policies, support infection prevention and control teams in the delivery of infection prevention and control activities, produce an annual report on infection prevention and control within the hospital, prepare an annual work plan , ensure infection control policies and procedures are audited and reviewed annually, endorse the objectives and priorities for the surveillance of infection, provide advice and support to infection prevention and control teams ,ensure that high quality advice and information is made available

for patients and Public as well as clinical teams and to review outcomes of outbreaks Ministry of Public health and sanitation and Ministry of medical services, (2010).

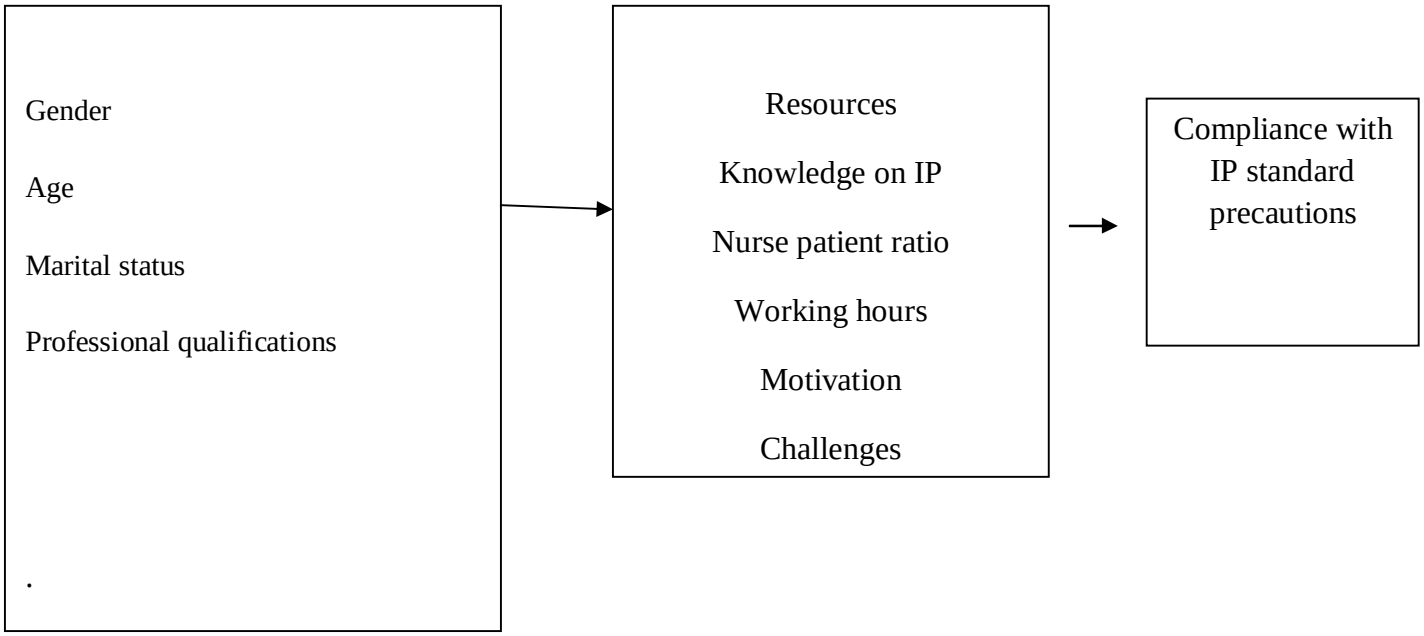
2.9 Theoretical Framework

This study was guided by the health belief model (HBM). This model explains the relationship between individual's beliefs and health behaviours. This theory has been used as a planning tool for promoting adherence with preventive health behaviours and health care recommendations Nutbeam & Harris, (2004).

The HBM has six constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self efficacy. Glanz, et.al, (2008). When nurses recognize that they are susceptible to the risk of HAIs and that they will suffer from serious consequences, they will be interested in conforming to standard precautions in order to prevent themselves from acquiring hospital acquired infections. Further, if they receive supportive cues to action such as posters, enough training to build their self efficacy and the belief that SPs will reduce the risk of getting infected, and that those actions outweigh the costs and barriers, they will be ready to comply.

2.10 Conceptual Framework

Independent variables confounding variables dependent



Chapter Three: Research Methods

3.0 Design

This was a cross sectional descriptive study aimed at determining the knowledge, practice and factors that influence compliance with infection prevention standard precautions among nurses working at Mbagathi District Hospital.

3.1 Setting

Mbagathi District Hospital was purposively selected. It is one of the district hospitals in Nairobi County with a bed capacity of two hundred, eleven wards and seven outpatient clinics. Approximately seven hundred patients are attended to in the outpatient department every day. Average length of stay is seven days for inpatients.

3.2 Study Population

The study population were nurses working in medical, surgical, maternity and paediatric wards, who had worked for a minimum period of six months. The study targeted nurses since they are amongst the healthcare providers who are in majority and are involved in a number of nursing activities which render them at risk of acquiring and transmitting HAIs. These activities include, wound management, initiation of intravenous infusions, administration of injections, management of labour, waste disposal and instrument processing. The medical wards admit patients with various disease conditions some of which are infectious. Patients in surgical wards are at increased risk of acquiring hospital acquired infections because of the nature of surgical interventions they go through most of which are invasive. Midwifes in maternity wards are at increased risk of acquiring hospital acquired infections because the nursing and midwifery activities involve blood and body secretions as well as being invasive in nature. Some of these activities include, vaginal examination, handling of second and third stage of labour, suturing of

episiotomies, and removal of retained placenta. Paediatric ward admits patients with both medical and surgical conditions.

3.3 Sample Size Determination

Fisher's formula, (1998) was used to determine the sample size

$$\mathbf{n= \frac{Z^2 P (1-P)}{d^2}}$$

Where; n=the desired sample

z=95% confidence interval or 1.96

d=degree of precision usually set at 0.05

P= 0.5%

The prevalence of 50% was used

$$n= \frac{1.96^2 \text{ x } 0.5 (0.5)}{0.05^2}$$

$$\frac{1.96^2 \text{ x } 0.25}{0.0025}$$

$$1.96^2 \text{ x } 100$$

$$3.84 \text{ x } 100 = 384$$

But for the population less than 10 000, the following formula was used.

Nf =n/1+ (n/N) (Mugenda &Mugenda, 2003)

Where; nf =desired sample for population less than 10 000

n=desired sample size for population greater than 10 000.

N=estimate of the population size=140

Hence the desired sample size is 384/1 (384/140)

nf= 384/ (1+2.74)

nf =384/3.74

nf =102

The sample size was therefore one hundred and two.

3.4 Sampling Procedure

Purposive sampling was used for selecting the wards and in each selected ward a list of names for the nurses was obtained from the team leader. Simple random sampling was then applied to obtain eligible participants. All the eligible participants were selected and those who consented to participate were recruited into the study

3.5 Study Tools

Quantitative data was collected using a self administered semi structured questionnaire, and an observation checklist. Qualitative data was collected using Key informant interview guide.

3.6 Inclusion Criteria

- Nurses working in medical, surgical, maternity and paediatric wards.
- Nurses who have worked for at least six months.
- Willing and consenting Nurse practitioners were recruited for the study.

3.7 Exclusion Criteria

- Nurses working in Casualty, Maternal and Child Health department, Central sterilizing department and Comprehensive Care Centre.
- Nurses with less than six months working experience.
- Non consenting Nurse practitioners.
- Nurses who were on leave or weekly off.

- Nurses on intern ship program

3.8 Pretesting of Study Tools

The questionnaire was pretested in surgical ward (ward 5A) at Kenyatta National Hospital and 10 nurses were recruited for piloting the study instruments. This enabled the researcher to test the suitability of the data collection tools and therefore allowed the researcher to make necessary corrections.

3.9 Data Collection and Cleaning

Data was collected using self administered semi structured questionnaire. These questionnaires were checked for completeness and consistency upon collection. Data was also collected using a key informant interview guide. Observation of the infection prevention practices was done using a check list.

3.10 Data Analysis

Statistical Package on Social Science (SPSS) version 17 was used to analyze the quantitative data and Nvivo version 8 was used to analyze qualitative data.

Descriptive statistics (mean, mode, median and standard deviation) were used to analyse characteristics of participants.

Chi-square and correlation was used to establish significance and relationship between variables.

3.11 Presentation of Results

The results have been presented in form of frequency tables and bar graphs and a narrative explanation accompanying each form of presentation.

3.12 Dissemination of Results

The report on the findings of the study was written and presented to Mbagathi District Hospital and the University Of Nairobi School Of Nursing Sciences. The report was also submitted to my

sponsor the Ministry of Health Headquarters in Malawi (Nursing department). A manuscript will be submitted for publication in the infection prevention journals. The Abstract of the study will also be presented in nursing conferences.

Chapter Four: Results

4.0 Participants Social Demographic Characteristics

A total of 90 nurses consented and participated in this study, 16.7 % (n=90) were males and 83.3 % (n=90) were females. Out of the 90 participants who were interviewed, 18 of them were observed for IP practice using an observation checklist. Out of the 18 participants observed, 2 were males and 16 were females. The largest proportion (57.8%) (n=90) was within the age group of 30 – 49 years. Less than half (38.9%) (n=90) were within the age group of 18-29 years whilst few of them (3.3%) (n=90) were above 50 years. The mean age of the participants was 32.53, median 33.0 with a standard deviation of 9.337. Minimum age was 20 years and maximum age was 56 years giving an age range of 36 years. Majority of the participants (47.8%) (n=90) were married, 44.4% (n=90) were single never married, 3.3% (n=90) had separated, 2.2% (n=90) had divorced and 2.2% (n=90) were widowed.

Less than half (30%) (n=90) were university graduates with bachelors degree, a large proportion of the participants (64.4%) (n=90) were diploma nurses and a small proportion (5.6%) (n=90) were enrolled nurses as illustrated in **Table 1.**

Table 1: Participants Social Demographic Characteristics

Demographic Characteristic	Frequency	Percentage
Gender		
Male	15	16.7
Female	75	83.3
Aged		
18-29 years	35	38.9
30-49 years	52	57.8
50 and above years	3	3.3
Marital Status		
Single	40	44.4
Married	43	47.8
Separated	3	3.3
Divorced	2	2.2
Widowed	2	2.2
Level of Education		
Enrolled Nurse	5	5.6
Diploma Nurse	58	64.4
Degree Nurse	27	30
Total	90	100%

4.1 Knowledge on Infection Prevention Standard precautions

As illustrated in **Table 2**, only 17.8 % (n=90) of the participants knew the elements of infection prevention standard precautions while the majority (82.2%) (n=90) lacked adequate knowledge on the elements of IP standard precautions. When prompted to mention at least four of the elements of IP standard precautions which includes Hand hygiene, Proper waste disposal, proper use of personal protective equipment, proper handling of sharps, instrument processing and housekeeping, only 17.8% (n=90) mentioned correctly the elements / components of infection prevention standard precautions. More than half of the participants (60 %) (n=90) had attended formal training on infection prevention while the remaining 40% (n=90) were not formally trained. Most of the participants (96.7%) (n=90) perceived that they were susceptible to hospital

acquired infections by virtue of working in the hospital. Majority of the participants (90%) (n=90) mentioned HIV as one of the diseases they feared acquiring most as they work in the hospital. Hepatitis was mentioned by 66.7 % (n=90) of the participants and Tuberculosis was mentioned by 76.7% (n=90) of the participants. Meningitis was mentioned by few participants (7.8%) (n=90) as one of the most feared HAI.

Table 2: Knowledge on Infection Prevention Standard Precautions

	Frequency	Percentage
Knowledge on elements of infection prevention standard precautions		
Yes	16	17.8
No	74	82.2
Attended training on infection prevention		
Yes	54	60
No	36	40
Susceptibility to hospital infections		
Yes	87	96.7
No	3	3.3
Participants fear contracting the following diseases:		
HIV	81	90.0
Tuberculosis	69	76.7
Hepatitis	60	66.7
Meningitis	7	7.8

4.2 Hand Hygiene Practices

All the participants (100%) (n=90) acknowledged that they practised hand hygiene when providing nursing care. Most of the participants (87.8%) (n=90) practise hand hygiene using water and soap. Few of them (12.2%) (n=90) use alcohol based hand rub. More than two thirds of the participants (68.9%) (n=90) stated that they do hand hygiene always when indicated whilst 16.7% (n=90) of the participants perform hand hygiene before and after contact with each patient. Few of the participants (5.6%) (n=90) perform hand hygiene before and after performing

procedures. Another 5.6 % (n=90) of the participants carry out hand hygiene after handling contaminated materials and 3.3% (n=90) of the participants do hand hygiene before putting and after removing gloves as illustrated in **Table 3**.

Table 3: Hand Hygiene Practices

Hand Hygiene	**Frequency**	**%**
Washing hands with water and soap for 10 – 15 seconds	79	87.8
Rubbing hands with about 5 mls of alcohol based hand rub	11	12.2
Indications of hand hygiene		
Before & after contact with each patient	15	16.7
Before & after performing procedures and in between patients	5	5.6
Before putting on gloves and after removing gloves	3	3.3
After handling contaminated objects/ materials	5	5.6
All the above	62	68.9

4.2.1 Observed Hand Hygiene Practices

Out of the 18 participants observed for IP practice; less than half of the participants (33.3%) (n=18) performed hand hygiene before preparing medications and two thirds of the participants (66.7%) (n=18) performed hand hygiene before feeding patients. All the observed participants 100% (n=18) performed hand hygiene after handling contaminated objects as illustrated in **Table 4**.

Table 4: Observed Hand Hygiene Practices

Hand Hygiene	**Frequency**	**%**
Wash hands before performing a procedure	3	16.7
Wash hands after performing a procedure	15	83.3
Wash hands after handling contaminated objects	18	100
Wash hands before preparing medication	6	33.3
Wash hands before feeding patients	12	66.7

4.2.2 Correlation and Significance between Hand Hygiene Practice and Infection Prevention Training

Most of the participants (60.8%) who had attended formal training on infection prevention washed their hands with water and soap when indicated compared to less than half (39.2%) who did not attend formal training on infection prevention. However the difference was not statistically significant p=0.693

Table 5: Correlation and Significance between Hand Hygiene Practices and Infection Prevention Training

	Training on infection prevention			X^2 (df)	R	P-value
Hand Hygiene	**Yes**	**No**	**(N)**			
Washing hands with water and soap for 10 – 15 seconds	48(60.8%)	31(39.2%)	79	0.550 (1)	0.042	0.693
Rubbing hands with about 5 mls of alcohol based hand rub	6(54.5%)	5(45.5%)	11			
Indications of hand hygiene						
Before & after contact with each patient	6(40.0%)	9(60.0%)	15	5.763(4)	0.038	0.067
Before & after performing procedures and in between patients	5(100%)	0	5			
Before putting on gloves and after removing gloves	3(100%)	0	3			
After handling contaminated objects/ materials	4(80.0%)	1(20.0%)	5			
All the above	36(58.1%)	26(41.9%)	62			

4.3 Correlation and Significance between Demographics and Knowledge on the Elements of infection prevention standard precautions

As shown in **Table 6**, there was a statistical significance (p=0.015) between knowledge on the elements of infection prevention standard precautions and having attended formal training on infection prevention. Those who attended formal training on infection prevention had more knowledge compared to those who did not. Notably, the statistical significance between knowledge on the elements of infection prevention standard precautions and perception of susceptibility to hospital acquired infections (p=0.027). Those who perceived the risk had more knowledge on infection prevention than those who did not perceive the risk.

Table 6: Correlation and Significance between Demographics and Knowledge on the Elements of infection prevention standard precautions

	Knowledge on elements			**X^2 (df)**	**R**	**P-value**
	Yes	No	(N)			
Gender						
Male	4 (26.7%)	11 (73.3%)	15	0.973 (1)	0.104	0.324
Female	12 (16.0%)	63 (84.0%)	75			
Training on infection prevention						
Yes	16 (29.6. %)	38 (70.4%)	54	5.882 (1)	0.256	**0.015**
No	3(8.3%)	33 (91.7%)	36			
At risk of infection						
Yes	15 (29.4%)	36 (70.6%)	51	4.869(1)	0.233	**0.027**
No	4 (10.3%)	35(89.7%)	39			
Nursing cadre						
Enrolled nurse	1 (20.0%)	4 (80.0%)	5			
Diploma nurse	11 (19.0%)	47 (81.0%)	58	0.235 (2)	0.049	0.889
Degree nurse	4 (14.8%)	23 (85.2%)	27			
Age group						
18-29	5 (14.3%)	30 (85.7%)	35	0.478 (1)	-0.073	0.489
30 and above	11(25.0%)	44 (75.0%)	55			

4.4 Correlation and Significance between Demographic Characteristics and Perception of Risk of Acquiring Infection

There was a statistical significance between gender of the participants and perception of risk of acquiring infection (p=0.002). Female nurses had a higher perception of being at risk of acquiring disease/ infection by virtue of working in the hospital than their male counterparts as shown in **Table 7**.

Table 7: Correlation and Significance between Demographic Characteristics and Perception of Risk of Acquiring Infections

	At risk of Acquiring Infection			**X^2 (df)**	**R**	**P-value**
	Yes	No	(N)			
Gender						
Male	3 (20.0 %)	12 (80.0%)	15	9.855 (1)	-0.331	**0.002**
Female	48 (64.0 %)	27(36.0%)	75			
Ever been trained						
Yes	31 (57.4%)	23 (42.6%)	54	0.030 (1)	0.862	0.105
No	20 (55.6%)	16 (44.4%)	36			
Nursing cadre						
Enrolled nurse	5 (100%)	0 (0%)	5			
Diploma nurse	56 (96.6%)	2(3.4%)	58	0.186 (2)	0.030	0.611
Degree nurse	26 (96.3%)	1 (3.7%)	27			
Age group						
18-29	34 (97.1%)	1 (2.9%)	35	0.040 (1)	0.021	0.841
30 and above	53 (96.4%)	2 (3.6%)	55			

4.5 Utilization of Personal Protective Equipment

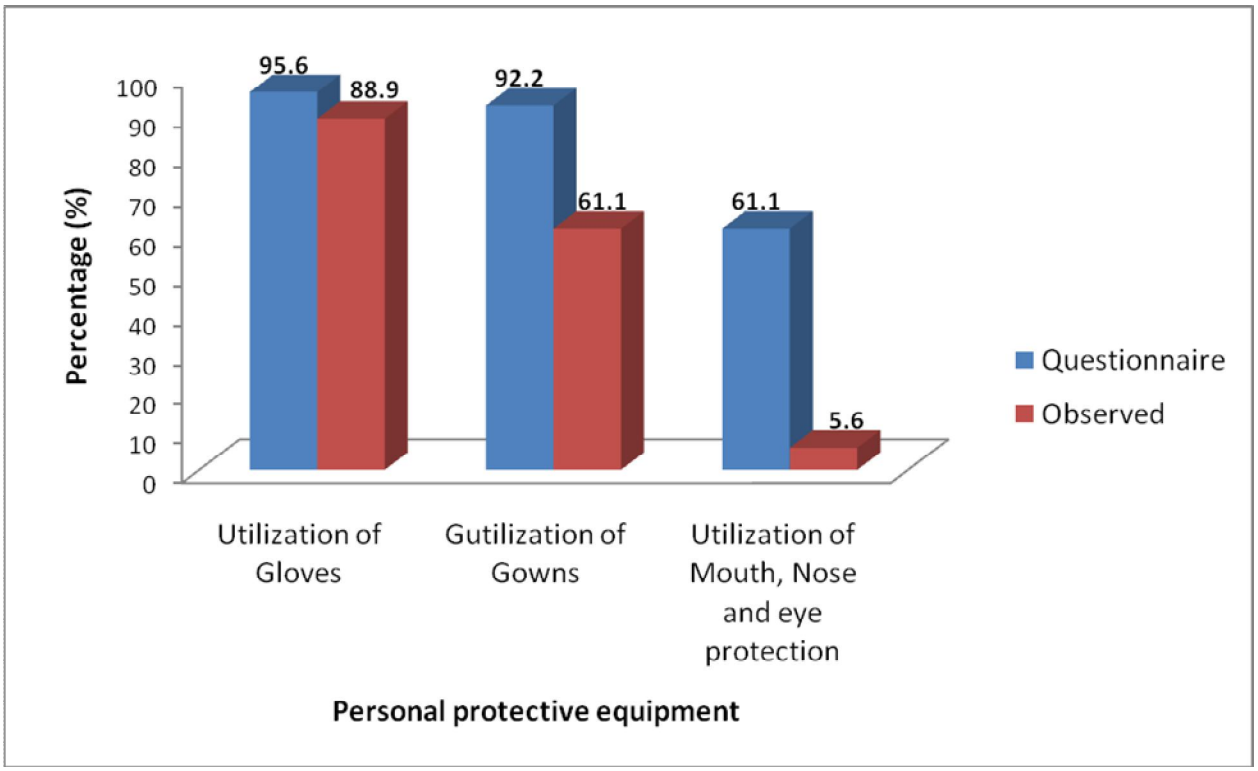


Figure 1: Utilization of Personal Protective Equipment

Most half of the participants (95.6.%) (n=90) admitted that they always used gloves when anticipating contact with body fluids, 92.2% admitted that they always used gowns when performing procedures which were likely to generate splashes and 61.1% of the participants (n=90) stated that they always used mouth, nose and eye protection when doing procedures which were likely to generate splashes. On observation, gloves were the most utilized personal protective equipment by the participants (88.9%) (n=18), gowns (61.1%) (n=18) and few participants (5.6%) (n=18) used eye protection as shown in **Figure 1**

4.5.1 Correlation and Significance between Gender of Participants and Utilization of Personal Protective Equipment.

As shown in **table 8**; more females (89.5%) always used gowns compared to very few (10.5%) male nurses. However this difference was not statistically significant p=0.102. More female nurses (88, 6%) always used masks when indicated compared to their male counter parts (11.4%) however the difference was also not statistically significant p=0.128.

Table 8: Correlation and Significance between Gender of Participants and Utilization of Personal Protective Equipment.

	Gender			X^2 (df)	R	P-value
	Male	Female	(N)			
Use gowns when doing procedure						
Always	6(10.5%)	51(89.5%)	57	6.217(3)	0.254	0.102
Only when gowns are available	6(26.1%)	17(73.9%)	23			
Sometimes	1(16.7%)	5(83.3%)	6			
Rarely	2(50.0%)	2(50.0)	4			
Use of Masks						
Always	4(11.4%)	31(88.6%)	35	5.341(4)	0.328	0.128
When masks are available	9(37.5%)	15(62.5%)	24			
Sometimes	1(6.7%)	14(93.3%)	15			
Rarely	1(11.1%)	8(88.9%)	9			
Does not use masks	0	7(100%)	7			
Use of goggles						
When goggles are available	7(31.8%)	15(68.2%)	22	5.414	0.144	0.238
Sometimes	0	4(100%)	4			
Rarely	3(10.3%)	26(89.7%)	29			
Does not use masks	5(14.3%)	30(85.7%)	35			

4.6 Management of Sharps and Solid Clinical Waste

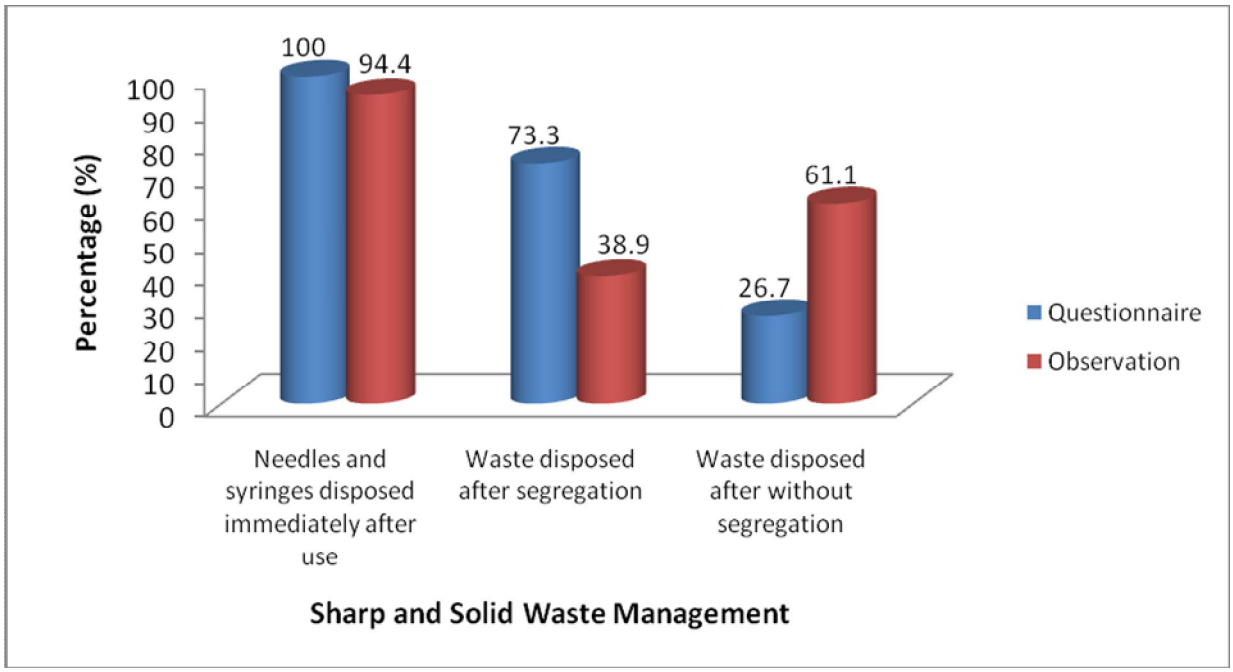


Figure 2: Management of Sharps and Solid Clinical Waste

All the participants (100%) (n=90) stated that they dispose needles and syringes immediately after use. Most of the participants (73.3%) (n=90) stated that they segregate solid clinical waste at the point of production whilst few of them (26.7%) (n=90) acknowledged that they do not segregate solid clinical waste at point of production.

On observation, 94.4% (n=18) of the participants did not recap or bend used needles before disposal and disposed of them immediately, Less than half (38.9%) (n=18) segregated waste at point of production before disposal whilst more than half (61.1%) (n=18) disposed of waste without segregating as illustrated in **figure 2.**

4.7 Key Informant Interviews

A total of 10 key informant interviews involving team leaders and their deputies were conducted on the following key points:

4.7.1 Benefits of Using Infection Prevention Standard Precautions

The benefits of infection prevention standard precautions include protection against infections like HIV and Hepatitis, prevention of injuries and reduction of transmission of infection to patients as R3 said *"Infection prevention standard precautions help everyone working in the hospital from acquiring infections"*. R1 said "*Infection prevention standard precautions promote safety for health care workers and patients"*.

4.7.2 Motivation to Comply with Infection Prevention Standard Precautions

The motivation factors include availability of infection prevention supplies, continuous medical education and the fear of contracting HAIs as R5 said *"continuous medical education on infection prevention empowers me with knowledge and motivates me to comply with infection prevention practices"*

4.7.3 Incidence and Causes of Needle Stick Injuries among the Nurses

Eight out of the ten respondents had not sustained a needle prick injury as R7 said "*I cannot remember pricking myself with a used needle because these days I do not recap used needles and most of the time the safety boxes for the disposal of sharps are available"*. Two out of ten sustained a needle prick injury and attributed the encounter to lack of supplies i.e. suturing packs. R4 said" *yes, I sustained a needle prick injury as I was suturing an episiotomy because there was no suturing pack and was therefore using my hands to manipulate the suture and needle"*

4.7.4 Situations for Not Complying With Infection Prevention Standard Precautions by the Nurses

Increased workload, inadequate time, lack of supplies and lack of knowledge especially by new staff are some of the reasons for lack of compliance. R9 explained *"Increased workload prevents me from doing the right practices for example there are times when I should assist two or three women who are all in second stage of labour, I have to do things really fast even though I know that chances of me contaminating are high when am doing things in a hurry"*.

4.7.5 Suggestions for Improvement from the Key Informants

Management involvement in IP, new employee's orientation and continuous medical education on infection prevention are some of things that should be put in place in order to promote and sustain compliance with infection prevention standard precautions. R10 stated "a*ll first time comers should go through infection prevention induction program to make sure that everybody has the knowledge on infection prevention."*

Chapter Five: Discussion

5.0 Introduction

Standard precautions are a set of basic infection prevention practices intended to prevent transmission of infectious diseases from one person to another. Because it is not always known if a person has an infectious disease or not, standard precautions should be applied to every person every time to ensure that transmission of diseases do not occur Siegel & Rhinehart, (2007).This chapter presents a discussion of the study findings as presented in the preceding chapter. It will focus on characteristics of participants, knowledge of participants on infection prevention standard precautions, hand hygiene practices, utilization of personal protective equipment, motivating factors and challenges encountered in the implementation of infection prevention standard precautions.

5.1 Characteristics of Study Participants

A total of 90 nurses consented and participated in this study, 16.7 %(n=90) were males and 83.3 % (n=90) were females. Nursing is a female dominated profession hence the majority of the participants were females. Female nurses had a higher perception of being at risk by virtue of working in a hospital than their male counterparts and this difference was statistically significant p=0.002.

5.2 Knowledge on Infection Prevention Standard Precautions

Less than half of the participants (30%) were university graduates with a bachelors' degree and a large proportion of the participants (64.4%) were trained at diploma level. Few of them (5.6%) were enrolled nurses. However, there was no statistically significant difference in their

knowledge on the elements / components of IP standard precaution guidelines between graduate nurses and diploma trained nurses (p=0.889).

When prompted to mention at least four of the elements / components of IP standard precautions, only 17.8%(n=90) of the respondents answered correctly and completely on the basic components / elements of infection prevention standard precautions which includes hand hygiene before and after any direct contact with patient, proper waste disposal, proper use of personal protective equipment, proper handling of sharps, instrument processing and housekeeping. The study findings are consistent with those of a similar study done by Okechuku et al (2012) in Ibadan, Nigeria which revealed that 77.5% of the respondents were aware of the universal precautions concept but only 24% had the correct knowledge on the universal precautions. The Ibadan study findings also indicated that participants had inadequate knowledge on the potential sources for transmission of infectious agents and situations requiring hand hygiene. A study done by Jain et al (2012) also revealed that more than half of the participants (55.3%) had suboptimal knowledge regarding standard precautions and 31.8% of the participants lacked knowledge on risks associated with HAIs.

The study findings also indicate that 60% of the participants attended formal training on infection prevention and 40% were not trained. The statistical difference in knowledge between those who were formally trained on IP and those not trained was statistically significant (p=0.015). The difference between Perception of risk of acquiring hospital infections and knowledge on the elements of IP standard precautions was also statistically significant (p=0.027).

Findings from the key informant interviews indicated that there were no regular continuous medical educations on IP. It was also noted that there was no formal induction program on IP for

the newly posted nurses. A significant proportion of the participants felt it was important to have regular CMEs on IP. CMEs are important in sustaining and updating provider's knowledge, skills and attitudes. IP training also helps to build nurses self efficacy Beekmann &Henderson (2005).

Infection prevention is the responsibility of both the health care providers as well as the community (patients and guardians). It was realized from the key informant interviews that the community is not actively involved and that most of the patients lack knowledge on IP because there are no regular health education programs on IP targeting the patients and clients. The patients and clients as the recipient of care have the right to know the expected care from the providers for example; they need to be educated that providers need to conduct hand hygiene before and after doing any procedure on them so that they can claim their rights wherever necessary Tietjen & Bossemeyer (2004).

5.2 Hand Hygiene Practice by the Nurses

All the participants (100%) reported that they practised hand hygiene. 87.8% reported that they used water and soap and 12.2% of the participants stated that they used alcohol based hand rub when performing hand hygiene. However, upon observation of practice a lower proportion (16.7%) of the participants performed hand hygiene before doing a procedure. A larger proportion (100%) performed hand hygiene after coming in contact with contaminated materials i.e. after emptying a catheter bag. This shows that nurses are more concerned with protecting their lives than those of patients. IP should serve to protect the life of both patients and providers. It was noted from the key informant interviews that running water is not always available and there is inconsistent supply/ refilling of alcohol based hand rub. Participants attributed their failure to always perform hand hygiene when indicated to such challenges. Participants therefore

felt there was need for regular refilling / supply of alcohol based hand rub to enhance their hand hygiene practices even when there is no running water. Pressure of work was another barrier. R9 said *"increased workload prevents me from doing the right practices, for example there are times when I should assist two or three women who are all in second stage of labour, I have to do things really fast even though I know that chances of me contaminating are high when am doing things in a hurry"*. A significant proportion of nurses working in maternity ward felt there is need for management to deploy more nurse midwives to labour ward especially now that they are experiencing increase in the numbers of pregnant women accessing maternity services with the introduction of free maternity services in public hospitals in order to facilitate provision of safe and quality nursing and midwifery care. These findings are supported by those of a study done by Hersey et al (2004) which revealed that excessive patient care responsibilities did not allow health care workers sufficient time for them to always follow standard precautions when indicated. Another study done by Rajinder (2008) also revealed that 56.7% of the respondents found hand hygiene as time consuming.

5.3 Use of Personal Protective Equipment

Upon observation of practice, it was noted that gloves were the most utilized PPE by 88.9% of the participants. These findings are supported by the findings of a study done by Okechuku, (2012) in Nigeria which revealed that HCW always used gloves when they anticipated contact with body fluids, non intact skin and mucus membranes.

More than half of the participants (61.1%) used gowns /aprons when performing procedures which are likely to generate splashes whilst very few participants (5.6%) used mouth, nose and eye protection when doing procedures which are likely to generate splashes. It was realized from the key informant interviews that masks and goggles were rarely available. This puts the

providers at risk of acquiring blood borne infections which could be transmitted through splashes of body fluids i.e. Hepatitis and HIV.

These findings are consistent with the findings of a study done by Jain & Dogra (2012) which indicated that less than half of the participants used caps, masks, and gowns as part of maximal barrier precautions. Nurses used these maximal barrier precautions significantly less in comparison to doctors. A Study done in India also revealed that less than half (40%) of the HCW wore eye protection when indicated. Kermode et. al, (2005).

5.4 Management of Sharps and Solid Clinical Waste by the Nurses

Upon observation, all the participants (100%) never recapped or bent used needles prior to disposal. Similar findings were established during the key informant interviews. R7 said "*I cannot remember pricking myself with a used needle because I do not recap used needles and most of the times the safety boxes for the disposal of sharps are available*". Few participants (20%) however, had sustained a needle prick injury and this encounter was attributed to pressure of work and lack of equipment. R4 said "yes, *I sustained a needle prick injury as I was suturing the episiotomy because there was no suturing pack and I therefore was using my hands to manipulate the suture and needle*". The participants who sustained a needle stick injury received a full course of post exposure prophylaxis to prevent transmission of infection secondary to the exposure. The reduced incidence of needle stick injuries supports the earlier finding of no recapping of used needles by the participants. This finding is different from those findings from a study done by Reda et al (2010) which indicated that almost half (46.9%) of the participants recapped used needles. The findings of a study done in Mongolia by Nayu & Ikeda (2006) are also different. They revealed that unsafe injection practices such as reusing and recapping

needles after giving injections were still observed among HCWs and that needle sticks and sharps injuries (NSSIs) were the major risk factors for blood borne infections.

Upon observation of practice, it was noted that in few working areas (38.9%) solid clinical waste was segregated at point of production and in 61.1% of the working areas solid clinical waste was mixed despite having the colour coded waste containers. It was established during the key informant interviews that some of the health care team members especially students are not well informed on IP hence they just mix all categories of waste when they are disposing of it. Failure to segregate waste at point of production puts the life of those who handle waste at increased risk of acquiring HAIs.

5.5 Motivating Factors

Factors that drive nurses to comply with standard precautions included perception of risk of acquiring infections, consistent availability of IP supplies, adequate knowledge on IP, attending regular Medical education on IP and provision of incentives like recognition of positive performance by supervisors. IP committee in collaboration with hospital management team needed to take note of the factors that enhance performance and put in place measures to sustain such factors.

5.6 Barriers

Non-availability of infection prevention supplies and equipment i.e. masks, goggles, alcohol based hand rub, delivery packs and linen were reported as obstacles for implementing Standard Precautions. This finding is not unique for it is consistent with those findings of a study done by Lee (2009) which revealed that lack of supplies and equipment contributed to non adherence with standard precautions. Another study by Reda (2010) also indicated that 44.8% of the health care workers were dissatisfied by the supply of IP materials and perceived their workplace as a

place of high risk. A study done in Chile by Rosina & Lillian (2009) also revealed that lack of IP materials and equipment contributed to failure by HCWs to adhere with IP standard precautions. It is important for HCWs to have all the essential IP supplies and equipment to facilitate provision of safe and quality patient care hence there is need for hospital management to ensure consistent supply. Time restraint was another barrier; Participants reported that due to heavy workload, time to follow the guidelines becomes a challenge, even if they want to.

Conclusion

Awareness on the concept of IP standard precaution was high among the participants however it did not translate into appropriate practice and knowledge. Perception of risk of acquiring infections, adequate knowledge on infection prevention, Consistent availability of IP supplies, and recognition of positive performance by supervisors are some of the factors which promote compliance with IP standard precautions. Increased workload, inconsistent supply of IP supplies, inadequate knowledge on IP and lack of regular CMEs on IP were identified as barriers or factors that hinder positive performance. These findings are useful in planning appropriate measures to improve the knowledge, practice and compliance with IP standard precautions among nurses.

Recommendations

- There is need for hospital management team to facilitate the procurement of all essential infection prevention supplies and equipments and to ensure consistent availability in order to reinforce compliance with infection prevention standard precautions.

- There is need for the IP committee in collaboration with hospital Management to conduct regular CMEs on IP in order to ensure that all nurses receive formal training on the basic infection prevention practices.

- There is also need for IP steering committee in collaboration with hospital management team to develop an IP induction program for all newly posted nurses in order to standardize performance.
- There is need for Management to facilitate repair of broken sinks in some wards and to ensure consistent availability of alcohol based hand rub in order promote hand hygiene practices.
- There is also need for the IP committee to regularly conduct monitoring and evaluation of IP implementation among the nurses to ensure that performance is in accordance to the CDC IP guidelines.

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Appendix 1: Informed Consent

TITLE: FACTORS INFLUENCING COMPLIANCE WITH INFECTION PREVENTION STANDARD PRECAUTIONS AMONG NURSES WORKING AT MBAGATHI DISTRICT HOSPITAL.

RESEARCH INVESTIGATOR: GERTRUDE MUNTHALI MOYO,

MOBILE NO: 0737310470 Email: getrude.munthali@yahoo.com

Purpose

You are invited to participate in this research study. The purpose of this study is to explore the factors influencing compliance with infection prevention standard precautions among nurses working at Mbagathi District Hospital.

You have been invited because you are one of the nurses working at Mbagathi District Hospital.

Procedure

You will be interviewed and specific questions will be asked concerning implementation of infection prevention standard precautions. You will also be requested to fill a semi structured questionnaire. You will be requested to do this during lunch break or after finishing patient care activities to avoid interrupting patient care activities.

Risks

There are no risks associated with your participation in this study because it will not involve any invasive procedure

Benefits and Compensations

You will not be compensated for participating in this study and there are no direct benefits for you as an individual participant, however the findings of this study will help in the designing of effective infection prevention programmes that would reinforce compliance with infection

prevention standard precautions and therefore reduce hospital acquired infections among health care workers and patients. The findings will also help in the reviewing and improvement of policies, protocols and procedures on infection prevention.

Voluntary Participation and Withdrawal

Your participation is entirely voluntary and should you change your mind, you have the right to withdraw from participating in the study at any time without penalty.

Confidentiality

All data will be kept under lock and key and will only be accessible to those involved in the data collection. Electronic files will be saved on Password. There will be no way to identify individual participants. We will not identify you or use any information that would make it possible for anyone to identify you in any presentations or written reports about this study.

Contact Person

Should you have questions about the content of this study or about your rights as a participant, Please contact the chairperson of Ethics, Kenyatta National Hospital, Professor A.N Quantai on 726300-9, Email: uonknh-erc@uonbi.ac.ke.

Confirmation of Consent

Are you willing to participate in this study?

Yes_____ No_____

If yes, please sign

Name: _____Sign:_____Time_____Date_____

Researcher: _____Sign:_____Time_____Date_____

Appendix 2: Research Questionnaire

Factors Influencing Compliance with Infection Prevention Standard Precautions among nurses working at Mbagathi District Hospital

Volunteer ID_____Date_____/____/_____

dd / mm /yyyy

Section 1. Sociodemographics

1.1 How old are you?_____ years

1.2 What is your gender? (tick one)

□ Male

□ Female

1.3 How would you describe your current marital status? (tick one)

□ Single-never married

□ Married

□ Separated

□ Divorced

□ Widowed

1.4What is your nursing cadre? (tick one)

□ Enrolled nurse

□ Diploma nurse

□ Degree nurse

□ Other, please specify _____

1.5 How long have you been working as a nurse?_____ years

Section 2. Knowledge on Infection Prevention

2.1 Have you ever heard about infection prevention standard precautions? (tick one)

□ Yes

□ No

2.2 Do you know the elements of infection prevention standard precautions? (tick one)

□ Yes

□ No

2.3 If yes to Q 2.2, list down the elements / components of infection prevention standard precautions?

_____

_____

_____

_____

2.4 Have you ever had training on infection prevention?

□ Yes

□ No

2.5 If yes to Q2.4, When were you trained? _____ Year

Section 3: Practice

3.1 Do you think you are at risk of acquiring diseases / infections by virtue of working in the hospital?

□ Yes

□ No

3.2 Are there any diseases you fear most contracting when providing nursing care?

□ Yes

□ No

3.3 If yes to Q3.2, list down theses diseases

_____

_____

_____

3.4 Do you perform hand hygiene when providing nursing care?

□ Yes

□ No

3.5 If yes to Q3.4, which method of hand hygiene do you use? (tick one)

□ Washing hands with water and soap for 10-15 seconds

□ Rubbing hands with about 5mls of alcohol based hand rub

3.6 How often do you perform hand hygiene when delivering nursing care? (tick one)

□ Before and after contact with each patient

□ Before and after performing any procedure between patients or on the same patient

□ Before putting on gloves and after removing gloves

□ After handling contaminated objects / materials

□ All the above

□ None of the above

3.7 How often do you use gowns when doing procedures which are likely to generate splashes?(tick one)

□ Always

□ Only when gowns are available

□ Some times

□ Rarely

□ I don’t use gowns

3.8 How often do you use masks when doing procedures which are likely to generate splashes? (tick one)

□ Always

□ Only when masks are available

□ Some times

 Rarely

 I don’t use masks

3.9 How often do you use goggles / eye protection when doing procedures that are likely to generate Splashes?

 Only when goggles are available

 Some times

 Rarely

 I don’t use goggles/ Eye protection

3.10 How do you manage sharps after using on the patient? (tick one)

 The needle and syringe are disposed of immediately after use into a puncture resistant container

 The needle is recapped before disposing of the needle and syringe

 Syringe and needle are disposed of together with other waste into available waste containers

 The needle is bent before disposing of the needle and syringe into a puncture resistant container

3.11 How do you manage solid waste generated during provision of nursing care? (tick one)

 Waste is disposed into available containers after segregating

 Waste is disposed into available containers without segregating

Appendix 3: Key informant Interview Guide

Factors Influencing Compliance with Infection Prevention Standard Precautions among nurses working at Mbagathi District Hospital

Benefits

In your own opinion, what do you think are the benefits of using infection prevention standard precautions?

Motivation

What drives you to comply with infection prevention?

Barriers

In your own opinion, what do you think would hinder a nurse from complying with infection prevention standard precautions?

Practice

In the past three months do you recall having sustained a needle prick injury? What do you think contributed to the injury?

After sustaining the injury, explain the care you received and how soon was the care implemented?

Challenges

Think of an incident in the past three months when you did not comply with infection prevention standard precautions? Describe the situation?

Explain the reasons for not complying?

Are there any challenges you face when implementing infection prevention standard precautions? Explain.

Recommendations

Finally, what do you think should be in place in order to promote and sustain compliance with infection prevention standard precautions?

We have come to the end of our discussion and let me thank you for your time and contributions.

Appendix 4: Observation Checklist

Factors Influencing Compliance with Infection Prevention Standard Precautions among nurses working at Mbagathi District Hospital

ITEM	YES	NO	COMMENT
Nursing practice			
1. Hand hygiene			
Hand hygiene by washing with water and soap or using alcohol based hand rub is done: Before and after performing any procedure			
Before putting on gloves and after removing gloves			
After handling contaminated objects i.e., used instruments			
Before preparing medication			
Before feeding the patient			
2- Use of PPE			
The following PPEs are used as follows:			
Gloves are worn when contact with blood or body fluids , mucus membranes , non intact skin or potentially infectious material is anticipated			
Gowns are worn during procedures when contact with blood or body fluids is anticipated and during procedures which are likely to generate splashes or sprays of blood or other body fluids			

Mouth, nose and eye protection is used when a procedure is likely to generate splashes or sprays of blood or other body fluids			
3-Instrument processing			
Used instruments are immediately decontaminated after use by soaking in 0.5% chlorine for 10 minutes and then washed in soapy water, then rinsed in clean water and dried before sending them for high level disinfection or sterilization			
4- Waste management			
Sharps			
Needles are not recapped or bent after use and both needle and syringe are immediately disposed of into a puncture resistant container			
Puncture resistant containers for sharps are disposed of when ¾ full			
Solid waste Solid waste is segregated at point of use according to category Contaminated waste is disposed of into a container with a plastic liner Waste containers are disposed of when ¾ full			

Appendix 5: Ethics Approval

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-020) 2726300 Ext 44355

KNH/UON-ERC
Email: uonknh_erc@uonbi.ac.ke
Website: www.uonbi.ac.ke
Link:www.uonbi.ac.ke/activities/KNHUoN

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

KENYATTA NATIONAL HOSPITAL APPROVED 10 JUN 2013 ETHICS & RESEARCH COMMITTEE

Ref: KNH-ERC/A/155

6th June 2013

Getrude Munthali Moyo
College of Health Sciences
School of Nursing
University of Nairobi

Dear Gertrude

RESEARCH PROPOSAL: FACTORS INFLUENCING COMPLIANCE WITH STANDARD PRECAUTIONS AMONG NURSES WORKING AT MBAGATHI DISTRICT HOSPITAL (P94/3/2013)

This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above proposal. The approval periods are 6th June 2013 to 5th June 2014.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study
This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH/UoN ERC website **www.uonbi.ac.ke/activities/KNHUoN.**

Yours sincerely

PROF. M. L. CHINDIA
SECRETARY, KNH/UON-ERC

c.c. Prof. A.N. Guantai, Chairperson, KNH/UoN-ERC
The Deputy Director CS, KNH
The HOD, Records, KNH
Principal College of Health Sciences, UON
Supervisors: Dr. Sabina Wakasiaka, Mrs. Angeline Kirui

Appendix 6: Letter of permission from Mbagathi District Hospital

MINISTRY OF HEALTH

Tel: 2724712, 2725791, 0721 311 808
www.mbagathihospital.org
info@mbagathi.org ,
mdhnairobi@yahoo.co.uk

Mbagathi District Hospital
P.O. Box 20725- 00202
Nairobi

13th June 2013

Getrude Munthali Moyo
University of Nairobi

Dear Madam,

RE: RESEARCH AUTHORIZATION

This is in reference to your application for authority to carry out research on "***Factors influencing compliance with infection prevention standard precautions guidelines among nurses working at Mbagathi District Hospital***".

I am pleased to inform you that your request to undertake the research in the hospital has been granted.

On completion of the research you are expected to submit one hard copy and one soft copy of the research report / thesis to this office.

MEDICAL SUPERINTENDENT
MBAGATHI DISTRICT HOSPITAL
P. O. BOX 20725
NAIROBI, KENYA
TEL 2723530 / 2724712

Dr. A. J. Suleh
Medical Superintendent
Mbagathi District Hospital