

**FACTORS CONTRIBUTING TO OCCUPATIONAL
INJURIES AND ILL HEALTH AMONG HEALTHCARE
WORKERS IN SELECTED HOSPITALS IN NAIROBI
CITY COUNTY**

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**Factors Contributing to Occupational Injuries and Ill Health among
Healthcare Workers in Selected Hospitals in Nairobi City County**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for
the Degree of Master of Science in Occupational Safety of the Jomo
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2024

DECLARATION

This thesis is my original work and has not been submitted for a degree in any other University.

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This research thesis has been submitted for examination with our approval as University Supervisors

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DEDICATION

I dedicate this thesis to my children and my husband.

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I would like to thank the Almighty God for his guidance, divine protection and direction during this entire journey of learning.

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ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
EU	European Union
HCWs	Healthcare Workers
HIV	Human Immunodeficiency Virus
ILO	International Labor Organization
KAP	Knowledge attitudes and Practices
KEMRI	Kenya Medical Research Institute
KMTC	Kenya Medical Training College
KNH	Kenyatta National Hospital
LMIC	Low-and Medium Income Countries
MLKH	Mama Lucy Kibaki Hospital
NBTS	National Blood Transfusion Services
NIOSH	National Institute of Safety and Health
NSIs	Needle Stick Injuries
OHSN	Occupational Health and Safety Network
OSHA	Occupational Safety and Health Act
PMH	Pumwani Maternity Hospital
PPE	Personal Protective Equipment

SARS	Severe Acute Respiratory Syndrome
TB	Tuberculosis
WHO	World Health Organization
WRMDs	Work-Related Musculoskeletal Disorders

ABSTRACT

Non-fatal occupational injuries and illnesses among healthcare workers are ranked among the highest in any industry sector. In the context of the highly complex and hazardous work environment, particular challenges arise in pursuing protections for healthcare workers in this unique employment sector. Biases within the healthcare industry and the safety and health community itself collude to limit both the awareness of hazards that do exist and the successful application of classical approaches used to assure safe jobs. The objective of this study was to investigate factors influencing occupational injuries and hazards among healthcare workers in selected hospitals in Nairobi County. Descriptive cross-sectional study design was used. The study was done at Kenyatta National Hospital, Mama Lucy, and Pumwani Maternity Hospitals. Approval was sought from KNH/UON ERC and permission from the respective hospitals was sought. A structured questionnaire was used to collect information on the proportion of healthcare workers with occupational injuries, hazards awareness among the healthcare workers, and the individual level factors influencing occupational injuries. An observational checklist was used by the researcher to assess hospital-level factors. A sample size of 304 was recruited for the study using stratified sample technique. Data was analyzed using Statistical Package for Social Studies (SPSS) version 25. Univariate and multivariate analysis was carried out to assess the association of study variables. Findings are presented in tables, graphs and written narratives. Information on the factors contributing to occupational injuries among health workers is the probable outcome of the study. Results showed that there was a statistically significant association at 0.05 level of significance between awareness of occupational health hazards and age, cadre and work experience respectively ($p < .05$). Almost a third of the respondents knew three types of hazards namely: physical hazards (32.9%, $n=100$), chemical (28%, $n=85$) and biological hazards (17.1%, $n=52$). The study found 32.6% had been trained on OSH annually. KNH had a higher number 45.5%. With 54% trained in the past 3 years, 29.3% in 4 to 6 years and 16.2% 6 years ago. Respondents who were not trained on occupational health hazards were 1.89 times more likely to experience work-related injury/illness/trauma than those who were trained, $\chi^2 = 5.6$, $p = .018$, $OR = 1.89$ (95% CI). Similarly, the respondents who were trained on occupational health hazards more than 3 years ago were 0.09 times more likely to experience work-related injury/illness/trauma than those who were trained less than three years ago, $\chi^2 = 11.703$, $p = .001$, $OR = .091$ (95% CI: .021, .394). 71.4% had received BCG vaccine, 67.1% Hepatitis B vaccine and 19.1% Hepatitis A vaccine. The study reports that occupational injuries and hazards were associated significantly with pressure at work place, workload, poor working environment, lack of supplies and experience of work-related injury/illness/trauma. The study recommends that relevant stakeholders should focus on creating awareness of occupational health hazards at the hospitals, develop the best strategies in minimizing injuries which will in turn help in reducing such occupational-related injuries, illness and fatalities among healthcare workers.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Annually, about 340 million and 160 million occupational accidents and victims of work-related illnesses occur globally respectively; this corresponds to over 6000 deaths every single day (Hamalainen *et al.*, 2017). The World Health Organization (WHO) recently estimated that 20-50% of the workers are exposed to various hazards at work worldwide, and this proportion is likely to be higher in the developing and newly industrialized countries (WHO, 2016). It has been estimated that 960,000 or even more workers get injured and 5,330 die on daily basis because of work-related diseases (Mekkoathil *et al.*, 2016). Moreover, the International Labor Organization (ILO) and sporadic studies reported that the economic costs of work-related diseases and injury are ranging from 1.8% to 6% of GDP (Takala *et al.*, 2012). Healthcare workers continue to experience injuries and illnesses at the workplace despite the existence of control measures to prevent or reduce their exposure to work-related occupational health hazards (Ndejjo *et al.*, 2015). Non-fatal occupational injuries and illnesses among healthcare workers are ranked among the highest in any industry sector (Kuhar *et al.*, 2013). Prevention measures against occupational illnesses include immunization, implementation of Universal Precautions, use of personal protective equipment, post exposure prophylaxis and training workers on the risks and prevention of transmission (Kuhar *et al.*, 2013).

More than 59 million workers are exposed to a complex variety of health and safety hazards every day (Tang *et al.*, 2019). These include biological hazards, chemical hazards, physical hazards, ergonomic hazards, psychosocial hazards, violence, and stress; fire and explosion hazards such as using oxygen, alcohol sanitizing gels; and electrical hazards such as frayed electrical cords (Tang *et al.*, 2019).

It is counter-intuitive that the healthcare industry, whose mission is the care of the sick, is itself a “high-hazard” industry for the workers it employs (Miller *et al.*, 2010). This

industry sector consistently demonstrates poor workforce injury and illness statistics, among the highest in the United States and the European Union (EU), about 30% higher than the average work-related accident rate (Miller *et al.*, 2010). In both the United States and the EU, about 10% of all workers are employed in the healthcare sector. With such a large portion of the global workforce being employed in this high-hazard sector and with forecasts for the increasing need for health workers in the future, the magnitude of the health threat is considerable and demands address (WHO, 2018; Rennie and Karkada, 2017). Optimizing their health is a priority as they need to take care of the sick people. Identification of hazardous environments and exposure to injuries influence service delivery. There was an average of 6.8 work-related injuries among 100 full-time workers in the USA. Risk identification and prioritization are key to improving the integrity of any organization (Rennie and Karkada, 2017). Workplace injuries and illnesses not only inflict physical harm and disability to the worker but also in many other ways. Injuries can prevent hospital workers from doing the job they love: caring for patients. Their lives are disrupted. In the case of irreversible serious injury or illness, workers are required to change careers, which affect their role in society, their identity, and the income their families may depend on. Workers' compensation claims include medical costs to treat or recover from the illness or injury, compensation for wages lost, indemnity, and administrative costs (OSHA, 2013; Moreau & Neis, 2009).

These affect quality of service delivery and HCWs safety is compromised. This leads to fear, anxiety and emotional stress that will bring change to workers' behavior. Out of 35 million HCWs globally, it is estimated that 90% of three million percutaneous exposures occurring annually are in the developing countries. A further 2.5% are exposed to HIV, 40% are HBV and HCV. Annually, it is estimated that 66,000 HBV, 16,000 HCV, and 1,000 HIV infections affect the HCWs. Only proper prevention of infections can reduce these kinds of exposures (Mbaisi *et al.*, 2020). According to Smith, Karsh, Carayon and Conway (2003) the human element is the most crucial factor in ensuring a healthy, safe and productive work environment. These injuries and illnesses are influenced by human and institutional factors. According to Smith, Karsh, Carayon and Conway (2003) the human element is the most crucial factor in ensuring a healthy, safe and productive work environment. Human factors comprise all those

characteristics that affect an employee's capacity to perform tasks; According to WHO these factors include, education, training, interests, gender, age, social behaviour, motivation, and preferences, among others (WHO, 2018). While institutional factors are found within the health care environment and constitute infections from patients, medication overdose and side effects of drug treatment as well as their administration, adequate resources, and access to necessary equipment and supplies in preventing work-related injuries (Ndejjo *et al.*, 2015).

In Kenya about 6796 workers are injured annually representing 58% of health workers who are at risk of injuries (GoK, 2018; Taegtmeier, *et al.*, 2018). Nairobi County has the highest number of health facilities and health workers who are exposed to injuries and illnesses (KNBS, 2022). Yet, no studies on occupational injuries on health care workers have been done in Kenya and Nairobi. The only available studies on occupational injuries and associated factors have focused on Jua Kali industry (Simiyu and Cholo 2017), construction industries (Kimei *et al.*, 2020), solid waste collectors (Kaluu *et al.*, 2021). There is paucity of data on occupational injuries and illness and associated factors among health care workers in Nairobi County. Therefore, the study assessed the factors contributing to occupational injuries and ill health amongst healthcare workers in selected hospitals in Nairobi City County.

1.2 Statement of the Problem

Occupational infections and injuries subject the healthcare worker and family to economic, physical and psychological damage. Exposing healthcare workers (HCWs) to hazardous waste results in disease or injury. The annual prevalence of infections and sharps injuries among HCWs in Kenya are approximately 6,000 Hepatitis B Virus (HBV) followed by 1,000 and 100 Hepatitis C Virus (HCV) and human immunodeficiency virus (HIV) infections respectively (Taegtmeier, *et al.*, 2018). In Kenya 58% of health workers at the risk of injuries. Occupational infections and injuries subject healthcare worker and family to economic, physical and psychological damage. Exposing healthcare workers (HCWs) to hazardous waste results in disease or injury. Nairobi County has the highest number of health facilities and health workers (KNBS, 2022). Yet, no studies on occupational injuries on health

care workers have been done in Kenya and Nairobi. The only available studies on occupational injuries and associated factors have focused on Jua Kali industry (Simiyu and Cholo 2017), construction industries (Kimei *et al.*, 2020), solid waste collectors (Kaluu *et al.*, 2021). There is paucity of data on occupational injuries and illness and associated factors among health care workers in Nairobi City County.

Further, compliance environmental audits conducted in different healthcare settings dictate that there exist several challenges associated with managing medical wastes. Despite the high prevalence of occupational injuries among health care workers, the associated risk factors have not been exhaustively identified which creates a gap in occupational health risk management. This research is therefore aimed at assessing the factors contributing to occupational injuries and ill health amongst healthcare workers in selected hospitals in Nairobi County.

1.3 Justification

Evidence from sub-Saharan Africa indicates that healthcare workers are frequently exposed to various hazards and occupational injuries. Their constant contact with patients exposes them to infections. Wearing of proper protective measures could reduce the risk of acquisition of disease or injury.

Data on occupational hazards among healthcare workers and their mitigation measures remain scarce in most of sub-Saharan Africa and Kenya in particular. Therefore, there is need to understand the predisposing factors for occupational hazards among healthcare workers which will help in developing/reviewing occupational health and safety policies and programs for healthcare workers in various hospitals in Nairobi County.

This study was to assess the factors contributing to occupational injuries among healthcare workers in selected health facilities in Nairobi County and to identify the common health hazards to develop strategies for their control. Further, the study was important in developing recommendations regarding ways of addressing the health and safety challenges affecting the healthcare workers and prevents suffering arising from the injuries and the hazardous materials. The results of the study will also provide the

policymakers with evidence to improve strategies of integrating proper measures on prevention. Finally, the study will add to existing knowledge about the impact of occupational injuries and can serve as reference material for further research. Nairobi County, being the most densely populated in the country has large healthcare personnel with various departments and represents all the variables for the study.

1.4 Objectives

1.4.1 Main Objective

To assess the factors contributing to occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County.

1.4.2 Specific Objectives

1. To identify types of occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County.
2. To determine human factors contributing to occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County.
3. To establish institutional factors contributing to occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County.

1.4.3 Study Questions

1. What are the types of occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County?
2. What are the human factors contributing to occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County?
3. What are the institutional factors contributing to occupational injuries and ill health among healthcare workers in selected hospitals in Nairobi County?

1.5 Conceptual Framework

Independent Variables Intervening Variables Dependent variables

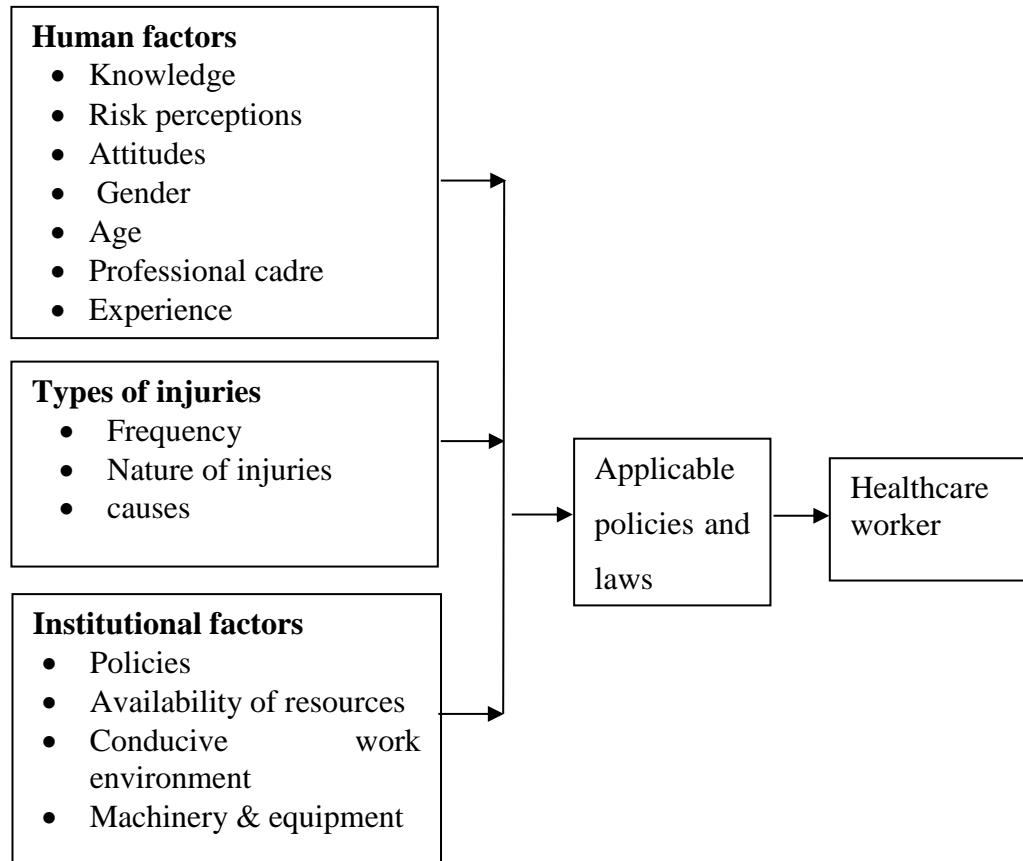


Figure 1.1: Conceptual Framework

1.6 Scope of the Study

The study was restricted to all the healthcare workers in Nairobi City County working in various hospitals and are predisposed to healthcare hazards during the course of their work. The study sampled healthcare workers in the three main hospitals in Nairobi County namely Mama Lucy Kibaki Hospital, and Pumwani Maternity Hospital. In addition, all healthcare workers in Kenyatta National Hospital, which is the national referral hospital, were sampled.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Principles

2.1.1 The burden of Occupational Injuries

Annually, about 340 million and 160 million occupational accidents and victims of work-related illnesses occur globally respectively; this corresponds to over 6000 deaths every single day (Hamalainen *et al.*, 2017). The World Health Organization (WHO) recently estimated that 20-50% of the workers are exposed to various hazards at work worldwide, and this proportion is likely to be higher in the developing and newly industrialized countries (WHO, 2016). It has been estimated that 960,000 or even more workers get injured and 5,330 die on daily basis because of work-related diseases (Mekodathil *et al.*, 2016). Moreover, the International Labor Organization (ILO) and sporadic studies reported that the economic costs of work-related diseases and injury are ranging from 1.8% to 6% of GDP (Takala *et al.*, 2012).

This problem is high in developing countries, (Machilda and Bachoo, 2016) where 80% of workers are employed in unsafe work environments and only 5% to 15% have access to occupational health services. (Hamalainen *et al.*, 2017). Because waste management procedures in developing countries majorly involve manual handling of the waste (Eskezia *et al.*, 2016). In sub-Saharan Africa, 54 000 workers die, and 42 million work-related accidents annually (Bleck and Wettberg 2012). However, the problems might be higher because of low levels of reporting injuries in most developing countries.

Workers performing patient care handling activities have greater risks for work related injuries than workers in other industries performing manual handling tasks. Healthcare workers (HCWs) represent 11.2 million people with 5 million employed in hospital systems (Khuder, Schaub, Bisesi, and Krabil, 1999). The occupational risk factors associated with LBP require discussion. Efforts to prevent work related injuries demand knowledge on associated risk factors (WHO 2018). In Kenya about 6796

workers are injured annually (GoK, 2018). In Kenya 58% of health workers are at the risk of injuries. Occupational infections and injuries subject healthcare worker and family to economic, physical and psychological damage. Exposing healthcare workers (HCWs) to hazardous waste results in disease or injury. Nairobi County has the highest number of health facilities and health workers (KNBS, 2022). Yet, no studies on occupational injuries on health care workers have been done in Kenya and Nairobi. The only available studies on occupational injuries and associated factors have focused on Jua Kali industry (Simiyu and Cholo 2017), construction industries (Kimei et al., 2020), solid waste collectors (Kaluu *et al.*, 2021). There is paucity of data on occupational injuries and illness and associated factors among health care workers in Nairobi County.

2.2 Human Factors and Occupational Health and Safety

Human factors refers to all those characteristics that impact an employee's ability to perform tasks. It includes, education, training, interests, differences, gender, age, social behaviour, motivation, and preferences, among others (WHO, 2018). According to Smith, Karsh, Carayon and Conway (2003) the human element is the most crucial factor in ensuring a healthy, safe and productive work environment. According to Göbel and Zwick (2009) worker' awareness of their work place safety is affected by individual characteristics such as physical ability (strength, dexterity, and endurance), education and experience. All of these individual characteristics depend on age.

2.2.1 Training and Development

Khawaja and Nadeem (2013) define training as a systematic approach of learning and development that improves an individual's, groups and organization's knowledge and skills. According to the duo development refers to any activities leading to the acquisition of new knowledge or skills by employees for purposes of growing. Muhammad and Fard (2013) reported that training and development is invaluable in enhancing employee's resourcefulness, and provides an opportunity to learn and perform competently. The ripple effect of the same is increased health and safe work environments as well as employee and organisational productivity. Training increases

skill and competence and improves knowledge concerning their environment, morale and productivity (Sheeba 2011).

2.3 Institutional Factors

The healthcare environment has a significant number of hazards of which biological hazards are widely present. They include infections from patients, medication overdose and side effects of drug treatment as well as their administration (Ndejjo *et al.*, 2015).

Although preventing exposure to infectious agents and musculoskeletal injuries resulting from patient lifting have been the primary focus of employee safety programs, chemical hazards which include cleaning and pharmaceutical agents such as anticancer drugs are slowly gaining recognition (McDiarmid, 2014). These include novel agents, some of which are unique to healthcare such as sterilants, germicidal agents, and pharmaceuticals including the highly toxic anticancer drugs. Many of these drugs are themselves cancer-causing or toxic to human reproduction and have been the subject of environmental monitoring campaigns in recent years after showing widespread work-area contamination (Kuhar, 2013).

In the context of this highly complex and hazardous work environment, particular challenges arise in pursuing protection for healthcare workers in this unique employment sector. Bias within the healthcare industry and the safety of the health community itself collude to limit both the awareness of existing hazards and the successful application of classical approaches used to assure safe jobs (Wiszniewska & Walusiak-Skorupa, 2018).

Healthcare being a nontraditional employment setting is imagined by the public to be clean and safe. However, hazard awareness is often lacking (Portell *et al.*, 2019). Also, due to its unique mission of caring for the sick, self-preservation behaviors, which normally aid in protecting workers, are suspended in a culture of self-less commitment to patient care. There is an erroneous “either/or” mentality historically present that sometimes forces a false choice to be made by a worker between providing good care and protecting oneself (Ford & Tetrick, 2021).

Importantly, these threats to healthcare givers have been named as critical factors in the US nursing shortage according to the American Nurses Association (ANA), which published in a recent study that health and safety of the work environment impacts nurses' decision to stay in the profession. Internationally as well, conditions of work and health threats have been found to contribute to the current global shortage of health workers (Fox *et al.*, 2019).

In a recent document from the World Health Organization (WHO), “Monitoring the Building Blocks of Health Systems,” the health workforce is described as one of the essential 6 pillars of a strong and sustainable health system. Although enlarging capacity through skills building and training is emphasized to bolster the health workforce, also discussed in the prevention of workforce shortages is mitigation of losses caused by death, retirement, career change or out-migration. Clearly, failing to address health threats in the work environment will be a barrier to retaining and sustaining caregiver ranks, which in turn, threaten the delivery of healthcare globally (WHO, 2018). However, studies on focused on determinant of occupational injuries among health care workers are rare. The only available studies have assessed determinant of occupational injuries among Jua Kali industry (Simiyu and Cholo 2017), construction industries (Kimei *et al.*, 2020), solid waste collectors(Kaluu *et al.*, 2021).

2.3.1 Hazard Classes in Workplaces

Nearly every hazard class can be found in the health care sector where healthcare workers meet health threats also encountered by workers in other sectors in addition to hazards specific to the care of ill patients. These classes include physical, chemical, biological, mechanical and psychosocial hazards as presented in Table 2.1 below (McDiarmid, 2014).

Table 2.1: Summary of Hazards Found in the Healthcare Sector

Hazard Category	Examples	Health Effects
<p>Physical Agents or physical forms of energy</p>	Radiation, lasers, noise, extreme temperatures, electrical energy	Thermal or chemical burns, hearing loss, cancer, physical and psychological trauma
<p>Chemical Potentially toxic chemical substances, including medications, solutions, and gases</p>	Disinfectants, cleaning products and sterilants such as ethylene oxide, formaldehyde, and glutaraldehyde; drugs, waste anesthetic gases; hazardous anticancer drugs	Eye and skin irritation, asthma, allergy, dermatitis, other end-organ damage, cancer, spontaneous abortion and other reproductive effects
<p>Biological Infectious agents, such as bacteria, viruses, fungi, or parasites, which may be transmitted by blood contacts, contaminated body secretions/fluids, needle-stick injuries, or via airborne spread</p>	HIV, Hepatitis B and C, Influenza, Vancomycin-Resistant Enterococcus (VRE), Methicillin-Resistant Staphylococcus Aureus (MRSA); SARS, and Middle East Respiratory Syndrome (MERS)	HIV and AIDS, TB, hepatitis, liver cancer, and other diseases
<p>Mechanical/Biomechanical Factors in the work environment that cause or lead to musculoskeletal injuries, strain, or discomfort. Awkward postures, lifting excessive weight, and other factors causing musculoskeletal strains</p>	Lifting and moving patients, tripping/slipping and fall hazards	Musculoskeletal disorders, back and upper extremity injuries, repetitive strain injury
<p>Psychosocial Stressors Stressful work climates, threats of physical violence, work organization, shift work</p>	Unsafe staffing, workplace threats, bullying, physical violence, unsafe unit design	Physical injury, psychological stress

(Adapted from MacDiarmid, 2014)

2.3.1.1 Physical Hazards

As reported by the Centers for Disease Control and Prevention, more than 40% of needle stick injuries (NSIs) suffered by nursing personnel are mostly due to

manipulating a needle (26%), improper sharps disposal (21%), collision with a colleague or sharp (10%), clean-up (9%), and recapping needles (5%) various injuries are also caused by Computer workstations, hand held devices, laboratories, minimally invasive surgery, patient handling, slips, trips, and falls due to wet floors of stairways, ramps or due to cables and cords, poor lighting, and spills (Chhabra, 2016).

The common occupational health hazards reported among health-care workers in an obstetrics and gynecology unit were work-related stress (83.3%), needle-stick injuries (75.6%), bloodstains on skin (73.1%), sleep disturbance (42.3%), skin reactions (37.2%) assault from patients (24.3%), and hepatitis (8.9%) (Orji *et al.*, 2020).

2.3.1.2 Chemical Hazards

Chemical agents are associated with laboratory reagents and chemicals used in diagnostic or therapeutic procedures. They also include Pharmaceuticals, especially the highly toxic anticancer chemotherapy drugs requiring caution in their administration and handling. Exposure to these hazardous drugs may cause acute conditions such as skin disorders, allergic reactions, hair loss and possibly cancer. Workers are exposed during preparation of the patient dose which could be minimized by training of workers, use of PPEs and meticulous work practices.

2.3.1.3 Biological Hazards

Biological hazards include airborne and blood borne pathogens such as tuberculosis (TB), HIV, severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome, are present in all health care settings (McDiarmid, 2014).. In 2011, the WHO in conjunction with International Labor Organization (ILO), and UNAIDS issued policy guidelines aimed at prevention and management of HIV and TB infections among healthcare workers. This was to limit the worrying but avoidable loss of life among health workers by promoting worker education regarding TB exposure risk and provision of prevention and treatment services at points of care.

Blood borne pathogens, including viruses that cause hepatitis or HIV infections are a constant threat to healthcare workers worldwide. In developing countries, 40% to 65%

of hepatitis B (HBV) and C (HCV) infections among healthcare workers were attributed to contaminated body secretions/fluids, needle-stick injuries, or are spread through the airborne route. These rates were found to be lower in industrialized countries where HCV accounted for between 8% to 27% and around 10% for HBV while HIV infections ranged from 0.5% to 11%. The lower rates could be attributed to immunization and post-exposure prophylaxis (PEP).

A study by Ndejjo *et al.*, (2015) found that 50.0% of respondents experienced an occupational health hazard. Of these, 39.5% experienced biological hazards while 31.5% experienced non-biological hazards. In biological hazards, sharp related injuries (such as needle sticks) accounted for 21.5%, cuts and wounds 17%, direct contact with contaminated specimens/bio-hazardous materials 10.5%, airborne diseases 19.0%, infectious diseases were 7.5%, and others (blood borne pathogens, vector borne diseases, and bioterrorism) were 7.5%.

2.3.1.4 Mechanical/Biomechanical Hazards

Mechanical and/ or Biomechanical hazards are described as work-related risks likely to cause musculoskeletal injuries, strain, or discomfort which include awkward postures and lifting excessive weight. Musculoskeletal disorders (MSDs) are more prevalent in nurses due to patient handling, positioning, lifting, bed making in awkward postures, transferring patients to bed, chair, toilet, for diagnostics and therapy. In Ergonomic exposures, the most common illnesses experienced among medical, dental, and nursing personnel are back, neck, shoulder, and knee problems due to the use of excessive force, during lifting, pushing, or pulling in awkward, constrained postures (Tinubu *et al.*, 2019). Another study on nursing professionals in Uganda reported that 20% of the nurses abandon patient care positions due to risks of work-related MSDs. Sprains and strains are reported most while shoulders, low back, calf and hand muscles are the most affected body parts (Munabi *et al.*, 2014).

2.3.1.5 Psychosocial Stressors

These are stressful work environments, threats of physical violence, work organization and shift work. A study by Gorman *et al.* (2018) reported workplace stress as a

condition which if left unmanaged could lead to various disorders and even death. Emotional exhaustion (Burn-out Syndrome) leads to depersonalization toward patients, and reduced sense of personal accomplishment. Burn-out is in fact considered by psychiatrists as a clinical form of depression. Martin et al. (2019) found the prevalence of depression and burn out very close, at 17.1% and 15.7% among women and 19.4% and 22% among men, and that 6.5% of the women and 9.4% of the men were both depressive and burn out. Other Psychosocial Stressors include stalking of health professionals, professional exhaustion due to aggression and deterioration relationships among the healthcare workers themselves. Increased workload and arbitrary shift changes also lead to stress.

2.4 Legal Framework of Occupational Safety and Health

The right for every citizen to fair labor practices, reasonable working conditions, and a clean and healthy environment are provided for in the Bill of Rights, envisaged in the Constitution of the Republic of Kenya 2010. Its scope was enlarged when it was amended in 1990 to become the Factories and Other Places of Work Act. Currently, the Occupational Safety and Health Act (OSHA) and the Work Injury Benefits Act (WIBA) enacted in 2007, are now the principal laws that govern Occupational Safety and Health (OSH) in Kenya.

The blood borne pathogen act of 1991 is to limit the exposure of the healthcare worker to blood and body fluids that could potentially cause occupational disease. The standards cover all employees who could reasonably be expected to come into contact with blood or other body fluids during the course of their job activities OSHA (2007).

There are currently several institutions and policies in Kenya, that deal with healthcare waste management and the related occupational risks. The National Policy on Injection Safety and Medical Waste Management was put in place to guide health professionals in providing safe injections and proper waste management to protect healthcare workers from medical sharps injuries (MoH, 2007). The Waste Management Regulations 2006, under the EMCA 1999, mandates the occupier of premises that handled medical waste to take measures to ensure it is handled without adverse effects on human health, the environment and natural resources (GoK, 2016). Also, part Of

OSHA 2007 standards are measures to prevent needle sticks and blood splashing, and to ensure the appropriate packaging and handling of body fluid specimens and to label the specimens and waste with bio-hazardous labeling before shipping or waste removal.

The Ministry of Labor is mandated to implement the Occupational, Safety and Health Act, 2007, covering health, safety and welfare of workers in various places (GoK, 2007) while the Public Health Act Cap. 242(IX) charges local authorities to keep their areas clean and in good sanitary condition.

MoH has put in place various safety programs such as infection prevention and control program (IPC), injection safety and waste management programs. The programs are aimed at addressing the gaps that still remain in the provision of safe and healthy work environment within the healthcare sector (GOK – MOH, 2012). The MoH is committed to creating health and safety practices in an effort to prevent the occurrence of hazards associated with work and the work environment, reduce exposure and mitigate effects of hazards. The implementation of OSHA 2007 should therefore be supported by both the manager within the health sector and other employees.

Further, the Biosafety Act No. 2 of 2009 was operationalized on 12th February 2009 to take care of workers in Morgues and Laboratory in biosafety and biosecurity in mitigating various risks and protecting the personnel and environment, keeping Valuable Biological Materials (VBM) safely, securely inside the areas where they are used and stored. Good laboratory biosafety practices reinforce and strengthen laboratory biosecurity systems (Kingiri & Hall 2020).

The Labor Laws about Health and Safety Act 2007 states that compensation is payable in accordance with the provisions of the WIBA Act 2007. It clearly states that it is the responsibility of every employer to obtain an insurance policy for safety, health, and wellbeing of their employees, working at the organization or business premises.

2.5 Previous Works Related to the Study

A study in China (Tung *et al.*, 2019) on occupational health hazards education for nursing staff through web-based learning showed that most of the healthcare workers do not have a better understanding on occupational health hazards. This is because the healthcare workers lacked motivation to complete the web-based learning programs since the education website lacked an online discussion forum which could offer more knowledge on occupational health hazards. A study in Canada (Mitchelle *et al.*, 2017) on selection and removal of PPEs in acute care hospitals found that only 37% healthcare workers had put on eye protection equipment. Working in a pediatric unit was significantly associated with not wearing eye protection (7%), gown (70%), gloves (77%), or mask (79%).

A study in Southern India on perception and prevalence of work-related health hazards among healthcare workers in public health facilities Senthil *et al* (2015) indicated that 39% were not trained on health-related hazards but reported at least one exposure to health hazard in the previous three months and despite training in handling infectious materials, HCWs reported direct skin contact with infectious materials and needle stick injuries. The longer staffs stay after training on any field the more likely they are to forget. A study in Uganda Ziraba *et al.*, (2020) on Sero-prevalence and risk factors of Hepatitis B virus infection among healthcare workers in a tertiary hospital showed that only 6.9% of the respondents were vaccinated against Hepatitis B virus infection and that 48.9% were susceptible and could potentially be protected through vaccination.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Design

Descriptive cross-sectional design using both qualitative and quantitative methods was used to assess factors contributing to occupational injuries and to identify the common health hazards affecting healthcare workers in selected hospitals in Nairobi City County. Cross-sectional designs provide estimates of the prevalence of the health outcome under study at a particular point in time while also describing factors influencing the occurrence of health outcomes and individual characteristics of the population under study (Setia, 2016). Because data are gathered at a single point in time, cross-sectional studies are relatively cheap, less time-consuming and easy to use than other types of research. Both qualitative and quantitative data were triangulated to provide a comprehensive analysis to the research problem (Creswell, 2014).

3.2 Study Areas and Population

The study focused on the three hospitals in Nairobi City County, namely, Kenyatta National Hospital, Mama Lucy Kibaki Hospital and The Pumwani Maternity Hospital. These are all public hospitals run by the National and County Government of Nairobi City respectively. These hospitals were purposively selected for this study based on the fact that they all have active Emergency Departments that provide occupational health care to the injured patients and operate on 24-hour basis. These facilities provide comprehensive medical, surgical and rehabilitative care services in the County and neighboring Counties (MOH, 2014).

3.2.1 Kenyatta National Hospital

Kenyatta National Hospital is at the apex of the referral system in Kenya. The hospital has always been guided in its planning, development and provision of healthcare services by government policies on the health situation in Kenya and within the East and Central Africa region. Prevailing social and economic conditions in Kenya have adversely impacted the delivery of health services in the hospital.

Kenyatta National Hospital currently covers an area of 45.7 hectares. The hospital provides facilities and resources for training, teaching and research to students from Universities and colleges training health professionals both locally and internationally (GoK, 2018). Its prime charge is the provision of comprehensive medical, surgical, curative, and rehabilitative health services (MOH, 2014). The hospital also provide care for occupational injury patients (MOH, 2014).

3.2.2 Mama Lucy Kibaki Hospital

Mama Lucy Kibaki Hospital is a County hospital located along Spine Road in Umoja Estate in the Embakasi Division of Nairobi County. Mama Lucy Kibaki Hospital is run by the Nairobi City County Government and is principally meant to serve the highly populated Eastland's Estates of Umoja, Kayole, Dandora and Buruburu among others (Mbaka et al., 2018). It is a level 5 Public Hospital with a bed capacity of 137. The hospital is well-equipped to provide comprehensive medical care, ranging from primary healthcare to specialized treatments and surgical operations. The list of services and facilities offered by the hospital includes: Emergency and Trauma Care, Surgical Services, Diagnostic Services, Outpatient Services, HIV/AIDS Care, Tuberculosis, and Hepatitis B Treatment, Mental Health Services at Mama Lucy Hospital Pharmacy Services, Community Outreach Programs and occupational health care services on a 24 hour basis (MOH, 2014).

3.2.3 The Pumwani Maternity Hospital

Pumwani Maternity Hospital is a referral maternity hospital located in Pumwani Estate in the Kamukunji Division East of Nairobi City. The Division is subdivided into five locations namely; Bahati, Eastleigh South and Kamukunji. It is the largest public maternity hospital in Kenya. The hospital has the vision to be an autonomous, efficient maternity hospital where all mothers receive comprehensive essential maternity care. This is to be achieved by a mission to provide leadership in maternity services, training and development of Clinical and Nursing services. The Hospital was founded in 1926 by a Charitable Organization called Lady Grigg Welfare League and was named Lady Grigg Maternity. Under the management of the Nairobi City County, Hospital services grew rapidly with bed capacity nearly tripled from 27 to 75 while

during the same period deliveries increased from 3000 to 8000 yearly. The old building that comprised the initial maternity was converted into a School of Midwifery Studies and a Nurses Hostel (Mochache et al., 2018). Additionally, they provide care for occupational injury patients (MOH, 2014).

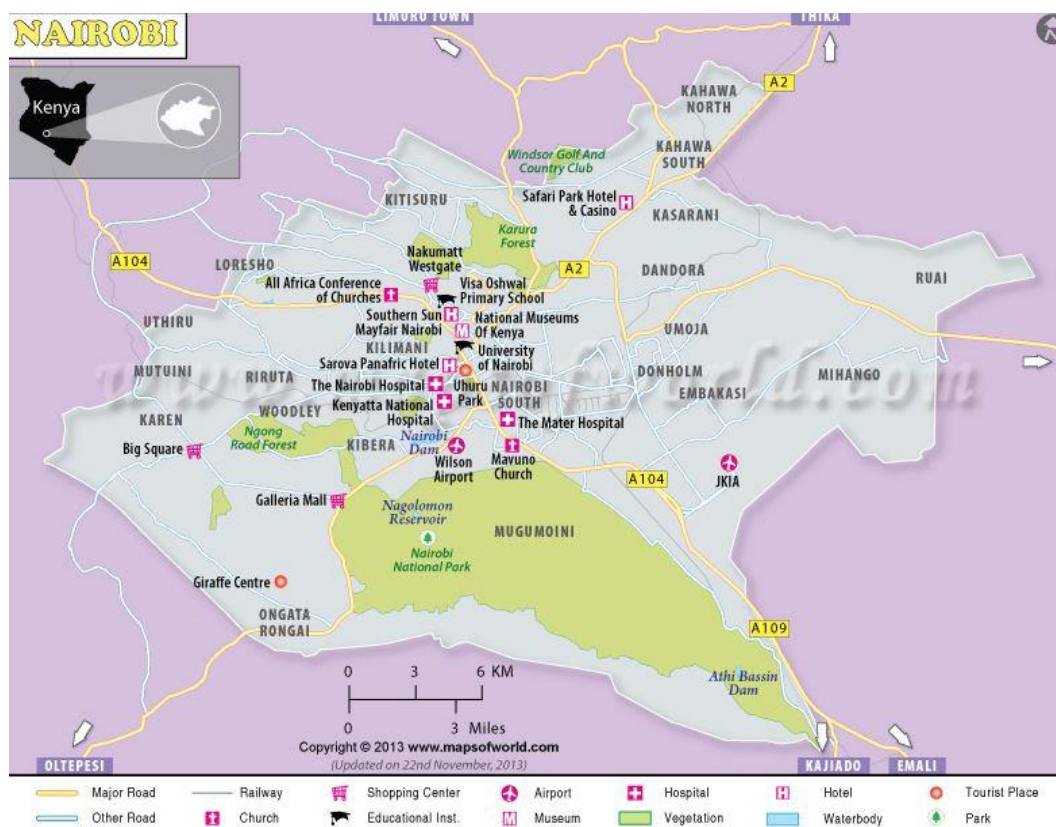


Figure 3.1: Map of Nairobi County

3.2.4 Study Population

The study population consisted of all categories of healthcare workers who included clinicians, dentists, nurses, rehabilitation staff, medical laboratory technicians, and medical health records officers, administration staff, medical imaging, security staff, and hospital cleaning staff, mortuary attendants and pharmacists. The total exposed population was 5,333 respondents derived from the three hospitals (4,500 from Kenyatta National Hospital, 441 from Mama Lucy Kibaki Hospital and 392 from Pumwani Maternity Hospital).

3.3 Sampling Method

3.3.1 Inclusion Criteria

All categories of healthcare workers who were permanent employees and had worked for more than 2 years in Kenyatta National Hospital, Pumwani Maternity Hospital and Mama Lucy Kibaki Hospital who were willing to participate in the study by signing an informed consent form were included.

3.3.2 Exclusion Criteria

Healthcare workers who had not worked for less than 2 years in the selected hospitals and were not willing to participate in the study and/or were not on duty during the study period were excluded

3.4 Sample Size Determination

The sample size was calculated using the formula by Cochran, (2007). (Mugenda & Mugenda, 2003) as follows:

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n = is the minimum sample size for a statistically significant survey

Z = is the standard normal deviate set at 1.96 at 95% Confidence Interval=1.96

p= is the proportion of the population at risk of work related injuries was 30% (Appiagyei et al., 2021; Mbaisi et al., 2010, Mbaisi et al., 2014).

q = is the proportion of the population not at risk (q = 1 – p)

d = is the degree of accuracy at 0.05

Thus:

$$n = \frac{(1.96)^2(0.3)(0.7)}{(0.05)^2}$$

$$n = \frac{3.8416 \times 0.21}{0.0025} = \frac{0.8067}{0.0025}$$

$$n = 323$$

For our population of 5333, the sample size determined was as follows:

$$nf = \frac{n}{1 + \left(\frac{n}{N}\right)}$$

Hence;

$$nf = \frac{323}{1 + \left(\frac{323}{5333}\right)}$$

$$nf = \frac{323}{1 + 0.0606} = \frac{323}{1.0606} = 304$$

Therefore, the desired sample size was 304.

3.4.1 Sampling Methods and Procedures

A stratified sampling technique was used in this study. Each profession of healthcare workers represented a stratum. Simple random sampling was then applied within each stratum to improve the representation of health workers within their professions and reduce sampling error. Proportionate to size allocation was used in the sampling fraction in each of the professions i.e. proportional to that of the total population (see Table 3.1 below).

Table 3.1: Distribution of the Sample

Profession	Facility						Total	
	Kenyatta National Hospital		Mama Lucy Kibaki Hospital		Pumwani Maternity Hospital			
	N	Sample	N	Sample	N	Sample	N	Sample
Administrators	516	29	84	3	133	6	733	38
Nurses	1966	113	170	8	173	8	2309	129
Rehabilitation staff	112	6	15	1	3	1	130	8
Health records	209	12	4	1	2	1	215	14
Support staff	1268	72	9	1	25	1	1302	74
Mortuary attendants	14	1	3	1	4	1	21	3
Pharmacists	40	2	15	1	6	1	61	4
Medical imaging	40	2	11	1	4	1	55	4
Laboratory	223	13	24	1	9	1	256	15
Clinicians (Doctors, Dentists & COs)	112	7	106	7	33	1	251	15
Totals	4500	257	441	25	392	22	5333	304

3.5 Research Instruments

3.5.1 Structured Questionnaire

A structured questionnaire was used to obtain quantitative information. The questions were adopted and modified from similar studies to improve comprehension (Babaji *et al.*, 2011; Etim *et al.*, 2015; Ganesh *et al.*, 2017; Goma *et al.*, 2015; Gupta *et al.*, 2017). The instrument had three sections corresponding to the demographic characteristic and study objectives respectively (Appendix 2) namely, A, B, and C. Section A, gathered information on demographic characteristics including; sex, marital status, professional qualification, Section B gathered information on human factors influencing occurrence of occupational injuries constituting training, hours of work, personal protective equipment, hours of sleep, taking vaccines. Section B gathered information on types of hazards in the health care facilities as shown in appendix C.

3.5.2 Observational Checklist for Institutional Factors

An observational checklist was used as a standard guideline to assess the institutional risk factors contributing to occupational injuries and ill health among healthcare

workers and the facility's preparedness in the prevention of occupational health hazards as illustrated in appendix D. This captured information on work environment, facility for disinfection or sterilization, availability of colour coded waste disposal bins and provision and use of protective equipment.

3.5.3 Data Collection Procedure

The structured questionnaire was interviewer administered and was administered by the field assistants to all the sampled health care workers who consented. Once recruited, the respondents were taken to a private room or place where the purpose of the study and the benefits of participation were explained to them by the research assistants. In addition, a consent form with detailed information about the study was availed to the selected respondents for more information. The respondents were then given time to ask questions or clarification if any concerning the study. Once all their questions were answered, they were asked to give consent by signing the consent certificate to confirm agreement to participate.

The facility's preparedness in the prevention of occupational health hazards was discretely assessed each day of the study period. Consent to do the assessment was sought from the hospital administration without informing the respondents. Once the respondents filled their questionnaires, they were clearly labeled with a code number and date. Filled questionnaires were safely stored in a zipped folder until the sample size was achieved.

3.6 Pretesting

Pretesting was carried out in the Mbagathi County Hospital where 30 healthcare workers (10% of the sample size) were asked to participate in the pretest. The participants were recruited into the pretest on the day of the pretest. The study objectives were explained and consenting done. The findings of the pre-test were used to evaluate and moderate the final instrument used in the actual study.

3.7 Data Processing and Analysis

Quantitative data from the structured questionnaire were cleaned to check for completeness, coded and entered in Statistical Package for Social Science (SPSS) Version 26. Descriptive statistics generating Frequencies, Percentages, Mean and Standard Deviation were used to summarize and describe the data. Inferential statistics; Chi-square was used to show relationships between dichotomous variables and further logistic regression was used to estimate the multivariate predictive value of independent covariates for occupational injuries. The predictive value for each covariant was expressed as Odd ratio (OR) and 95% confidence interval. A p-value of <0.05 was considered significant.

3.8 Ethical Considerations

Ethical approval and permission to conduct the study were sought and obtained from the University of Nairobi, Institutional Research Ethics Committee (IREC) and the National Commission for Science, Technology & Innovation (NACOSTI) in Kenya respectively. Other permission were sought from the hospital administrators in all the four hospitals. Verbal and Informed consent was obtained from all the participants before recruitment into the study. All relevant information about the study were communicated to all respondents before the study was carried out. The purpose, nature and research techniques involved in the study and its advantages were explained to the subjects/respondents and their care givers in a language that they understood to obtain their consent. This was important for the respondents to give consent without coercion, pressure or undue enticement. The participants were assured that there were no risks by participating in the study; they were not be exposed to adverse outcomes or harm. They were also informed that their participation to participate was purely voluntary and that they could opt out if they so wish to at any time. They were assured of confidentiality; no identifying information were collected or analyzed.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Response Rate

Out of the 304 Health care workers sampled and recruited for the study, all completed the questionnaire with a response rate of 100%. This is due to clear inclusion criteria where only those willing to participate in the study were consented and ease of contact with the participants.

4.2 Socio-Demographic Characteristics of the Respondents per Hospital

The study sample was drawn from healthcare workers in selected hospitals in Nairobi County namely Kenyatta National Hospital (KNH), Mama Lucy Kibaki Hospital (MLKH) and Pumwani Maternity Hospital (PMH). The majority of the respondents came from KNH (84.5%) while 8.2% and 7.2% were from MLKH and PMH respectively.

Of the 304 healthcare workers sampled, half were aged 30 years and below with an overall mean age of 34.1 years, $SD=10.2$. The mean age for KNH was 34.9 ± 10.3 compared to that of MLKH with 29.1 ± 9.8 and PMH 30.9 ± 6.4 . Female respondents constituted more than half (59.5%) of the study sample. 56.3% of the sampled healthcare workers were married. Nurses comprised 42.4% of the sample while slightly more than half (56.2%) of the respondents had worked for up to 5 years. Details are as shown in Table 4.1.

Forty two percent ($n =129$) of the respondents were nurses while 24.3% ($n=79$) were support staff. These findings are comparable to Goma et al. (2015) in a study conducted in United assessing occupational traumatic injuries among workers in healthcare facilities. The finding from the study revealed that, nurses and nurse assistants had the highest injury rates of all cadres examined in the study. Similarly, Tankha (2020) asserted that nurses were more likely to be affected by occupational injuries due to their high numbers and direct interaction with patients.

A half of the respondents (50%) aged up to 30 years and 43.1% of the respondents aged between 31 to 50 years indicating a sample balance between the young and old employees with an average age of 34.1 years. The aging work force pose a high risk of increased exposure to work-related injuries. The study showed that 61.9% (n=13) had experienced work-related injuries in the last three months were aged above 50 years. Females were the majority (59.5%) compared to 40.5% of males. Most of the respondents were (56.3%) were married while more than half were in professions that made them come into direct contact with patients. Similarly, about three-quarters of the respondents had work experience of more than one year. On the other hand, married health workers were seemingly more affected because they were the majority in the study population. Similar results were obtained in a study done in Canada (Smith & Mustard, 2017).

Table 4.1: Socio-Demographic Characteristics of the Respondents Per Hospital

Characteristic	Hospital			Total n (%)
	KNH n (%)	MLKH n (%)	PMH n (%)	
Age group				
20 - 30 years	120(39.5)	18(5.9)	14(4.6)	152(50.0)
31 - 40 years	59(19.4)	4(1.3)	6(2.0)	69(22.7)
41 - 50 years	59(19.4)	1(0.3)	2(0.7)	62(20.4)
51 and above	19(6.3)	2(0.7)	0(0.0)	21(6.9)
Total	257(84.5)	25(8.2)	22(7.2)	304(100)
Mean (SD)	34.9(10.3)	29.1(9.8)	30.9(6.4)	34.1(10.2)
Marital status				
Single	104(34.2)	18(5.9)	8(2.6)	130(42.8)
Married	151(49.7)	7(2.3)	13(4.3)	171(56.3)
Divorced	1(0.3)	0(0.0)	0(0.0)	1(0.3)
Widowed	1(0.3)	0(0.0)	1(0.3)	2(0.7)
Total	257(84.5)	25(8.2)	22(7.2)	304(100)
Profession				
Nurses	113(37.2)	8(2.6)	8(2.6)	129(42.4)
Support staff	72(23.7)	1(0.3)	1(0.3)	74(24.3)
Administration	29(9.5)	3(1.0)	6(2.0)	38(12.5)
Laboratory	13(4.3)	1(0.3)	1(0.3)	15(4.9)
Health Records	12(3.9)	1(0.3)	1(0.3)	14(4.6)
Clinicians	6(2.0)	6(2.0)	1(0.3)	13(4.3)
Other Professions	12 (3.9)	5(1.6)	4(1.3)	21(6.9)
Total	257(84.5)	25(8.2)	22(7.2)	304(100)

Characteristic	Hospital			Total n (%)
	KNH n (%)	MLKH n (%)	PMH n (%)	
Work experience				
< 1 year	63(20.7)	14(4.6)	4(1.3)	81(26.6)
1-5 years	73(24.0)	6(2.0)	11(3.6)	90(29.6)
6-10 years	32(10.5)	2(0.7)	2(0.7)	36(11.8)
> 10 years	89(29.3)	3(1.0)	5(1.6)	97(31.9)
Total	257(84.5)	25(8.2)	22(7.2)	304(100)

Most of the nurses were females; KNH had 56.4% (n=145), MLKH (72.0%, n=18) and PMH had (81.8%, n=18). Female health workers were more likely to get work-related injury/illness/trauma than their male counterparts. This is due to their superior numbers in clinical services..

Gender of Respondents

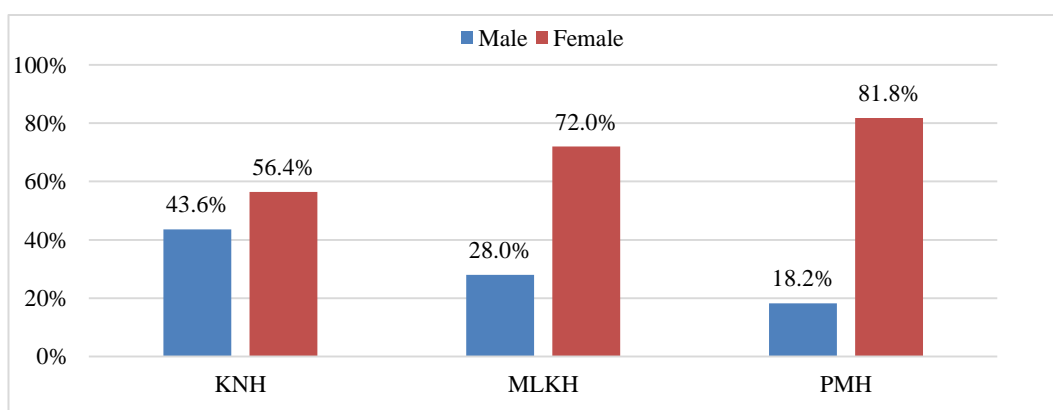


Figure 4.1: Crosstabulation of Gender by Hospital

4.3 Types of Occupational Injuries and Ill Health among Healthcare Workers in Selected Hospitals in Nairobi County

4.3.1 Understanding and Classification of Occupational Health Hazards

Table 4.2 below shows that 37.2% of the respondents cited 'occupational dangers' at the workplace' as the meaning of the term 'Occupational Health Hazards' followed by 'work-related injuries' with 13.5% and 'risks faced at the workplace' 13.2%. 30.9% did

not respond to the question. Health hazards were classified as physical (32.9%), chemical (28%) and biological (17.1%).

The study also sought to investigate whether respondents understood the definition of the term occupational health hazards, 37.2% (n =113) of the respondents correctly occupational health hazard as an occupational danger at the workplace. Thus, 62.8% of the respondents were unable to correctly define occupational health hazard. These findings are consistent to Tung et al. (2019) who found that most of healthcare providers do not have a better understanding on occupational health hazards hence there is need for improved focus on occupational health hazards at workplace through training and workshops to enhance knowledge on the subject among healthcare providers.

Almost a third of the respondents knew that physical hazards (32.9%, n=100) are classes of occupational health hazards followed by chemical (28%, n=85) and biological hazards (17.1%, n=52). Much emphasize is to be made on health hazards awareness. These findings are comparable to a study conducted in Egypt by Sabra and Morsy (2016) which found that the most common type of hazards among nurses was physical hazards. The study further revealed that most of the nurses were able to identify different types of physical hazards.

Table 4.2: Chi-Square Test of Association between Awareness of ‘Occupational Health Hazards’ and Socio-Demographics

	Definition of ‘Occupational Health Hazards		X ² - Statistic	p-value
	Correct definition	Incorrect		
Age in years				
20 -30 years	55	35	61.71	.043
31 – 40	40	41		
41 – 50	10	63		
≥ 50	7	52		
Cadre				
Nurses	85	44	112.50	.039
Laboratory	10	5		
Clinicians	8	5		
Others	10	137		
Work experience				
< 1 year	45	36	40.51	.012
1 – 5 years	35	55		
6 – 10 years	20	16		
> 10 years	13	84		

4.3.2 Types of Work-Related Injury/Illness/Trauma at the Workplace

Results from this study depicted that 65.5% (n=199) of the respondents experienced work-related injuries/illness. Out of the respondents who experienced work related injuries (n=199), 83.9% were exposed to up to 3 times. MLKH had the highest prevalence of related-work injuries (88%), KNH (63.8%) and PMH (59.1%). The overall prevalence (65.5%) is however lower compared to a study done in Kampala, Uganda which found a prevalence of 71% (Ndejjo et al., 2015) and one done in Wolaita zone, Southern Ethiopia recorded a prevalence of 74% (Tadesse et al., 2016). More than a half (53.8%) of those who experienced work -related injuries sought treatment, 16.6% reported the incidence to seniors and only 10.6% commenced PEP. In addition, 46.3% of the healthcare workers who experienced injury/illness/trauma at the workplace did nothing about it or took other actions besides seeking treatment.

In this study, some of the most common causes of work-related injury/illness/trauma at the workplace recorded included cuts, wounds & lacerations, work-related pressure/burnout, airborne diseases, psychosocial stress, and direct contact with

contaminated specimens, musculoskeletal sprains/strains and aches, cross-contamination from solid materials and noise, among others. The results can be compared with the findings from a study done in Ghana (Ndejjo et al 2015) where the biological hazards mainly experienced by healthcare workers were sharp related injuries (21.5%) cuts and wounds (17.0%).

Table 4.3: Work-Related Injury/Illness/Trauma Experienced at the Workplace

Variable	KNH		MLKH		PMH		Total	
	n	%	n	%	n	%	n	%
Experience of work-related injury/illness/trauma at the workplace								
Yes	164	63.8	22	88.0	13	59.1	199	65.5
No	93	36.2	3	12.8	9	40.9	105	34.5
Total	257	100	25	100	22	100	304	100
Frequency of work-related injury/illness/trauma in the last 3 months (n=199)								
1-3 times	139	69.8	16	8.0	12	6.0	167	83.9
4-6 times	13	6.5	2	1.0	0	0.0	15	7.5
> 6 times	12	6.0	4	2.0	1	0.5	17	8.5
Total	164	82.4	22	11.1	13	6.5	199	100
Action taken after exposure to injury/illness/trauma in the workplace (n=199)								
Sought treatment	91	45.7	14	7.0	2	1.0	107	53.8
Reported the incident to seniors	24	12.1	6	3.0	3	1.5	33	16.6
Took no action/Self medication	28	14.1	0	0.0	1	0.5	29	14.6
Commenced PEP	17	8.5	0	0.0	4	2.0	21	10.6
Other actions taken	4	2.0	2	1.0	3	1.5	9	4.5
Total	164	82.4	22	11.1	13	6.5	199	100
Cause of the work-related injury/illness/trauma experienced (n=199)								
Cuts, wounds, lacerations	60	30.2	5	2.5	3	1.5	68	34.2
Work related pressure/burnout	49	24.6	7	3.5	4	2	60	30.2
Airborne diseases	40	20.1	10	5	1	0.5	51	25.6
Psychosocial stress	36	18.1	3	1.5	1	0.5	40	20.1
Musculoskeletal sprains/strains and aches	34	17.1	4	2	2	1	40	20.1
Noise	28	14.1	4	2	3	1.5	35	17.6
Cross contamination from soiled materials	31	15.6	4	2	0	0	35	17.6
Direct contact with contaminated specimen	29	14.6	3	1.5	2	1	34	17.1
Slips and falls	22	11.1	2	1	1	0.5	25	12.6
Infectious diseases	18	9.0	3	1.5	1	0.5	22	11.1
Verbal abuse	14	7.0	3	1.5	1	0.5	18	9.05
Blood borne pathogens	17	8.5	0	0	0	0	17	8.54
Chemical spills	13	6.5	1	0.5	1	0.5	15	7.54
Other Causes	20	10.1	12	6	1	0.5	33	16.6

4.4 Human Factors Contributing to Occupational Injuries

4.4.1 Occupational Safety and Health Trainings

The study sought to investigate occupational health training. 32.6% of the respondents had received training on occupational safety and health. The overall ratio of training in the sampled healthcare workers was 1:2. Only 32.6% of the respondents had received training on occupational safety and health. Fifty-four per cent (54%) trained in the past three years, 29.3% between 4 to 6 years and 16.2% over 6 years. The results of this study are comparable to those of a study conducted among health care workers in an obstetrics and gynecology unit of a Nigerian teaching hospital (Orji et al., 2020). The indication is that the 54% respondents trained in the last three years were just from school and the training was fairly fresh in their minds and therefore could be applied at the place of work to enhance individual safety.

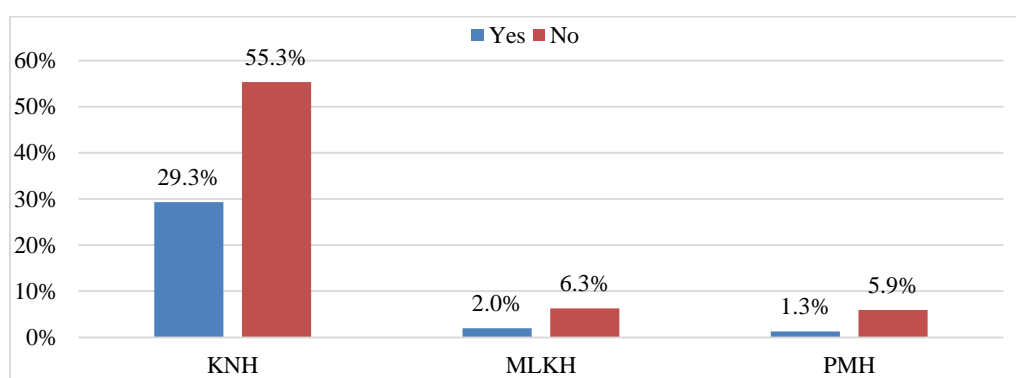


Figure 4.2: Training on Occupational Health Hazards

4.4.2 Effects of Training on Occupational Health Hazards

As shown in table 4.4, Fifty-four percent of the respondents were trained in the past three years with 45.5% having come from KNH. 29.3% were trained from between 4 and 6 years while 16.2% were trained more than 6 years ago. The table below shows that respondents from MLKH and PMH were trained more recently (3 years ago) compared to respondents from KNH where training is seemingly a continuous process. The results established that health workers who were not trained on occupational health hazards were more vulnerable to work-related injury/illness/trauma compared

to those who were trained. Respondents who were trained more than three years ago were equally vulnerable due to having forgotten what they learned during training. These findings are similar to those from a study in Southern India on perception and prevalence of work-related health hazards among healthcare workers in public health facilities Senthil et al (2015) where 39% did not recognize work related hazards but reported at least one exposure to health hazard in the previous three months and despite training in handling infectious materials, HCWs reported direct skin contact with infectious materials and needle stick injuries. The longer staffs stay after training on any field the more likely they are to forget.

Table 4.4: Past Years since Training on Occupational Health Hazards

No of years	KNH		MLKH		PMH		TOTAL	
	n	%	N	%	n	%	n	%
1 - 3 years	45	45.5	5	5.1	4	4.0	54	54.5
4 - 6 years	28	28.3	1	1.0	0	0.0	29	29.3
> 6 years	16	16.2	0	0.0	0	0.0	16	16.2
Total	89	89.9	6	6.1	4	4.0	99	100

4.4.3 Hours Worked in a Week

Most of the respondents (73%) worked for up to 40 hours a week while 22.1% worked for more than 40 hours. Fatigue as a result of working for long hours and less sleep was not associated with occupational injuries and hazards. There was no significant relationship between hours worked per week and experience of work-related injury/illness/trauma.

Table 4.5: Hours Worked in a Week

No of hours	KNH		MLKH		PMH		TOTAL	
	n	%	N	%	n	%	n	%
≤ 40 hours	187	61.5	21	6.9	14	4.6	222	73.0
41 - 50 hours	53	17.4	3	1.0	5	1.6	61	20.1
> 50 hours	5	1.6	0	0.0	1	0.3	6	2.0
No response	12	3.9	1	0.3	2	0.7	15	4.9
Total	257	84.5	25	8.2	22	7.2	304	100

4.4.4 PPEs Utilization

Figure 4.3 shows that most (87.5%) of the respondents wore personal protective equipment whenever necessary while 12.5% did not. Respondents who did not wear personal protective equipment were more likely to experience work-related injury.

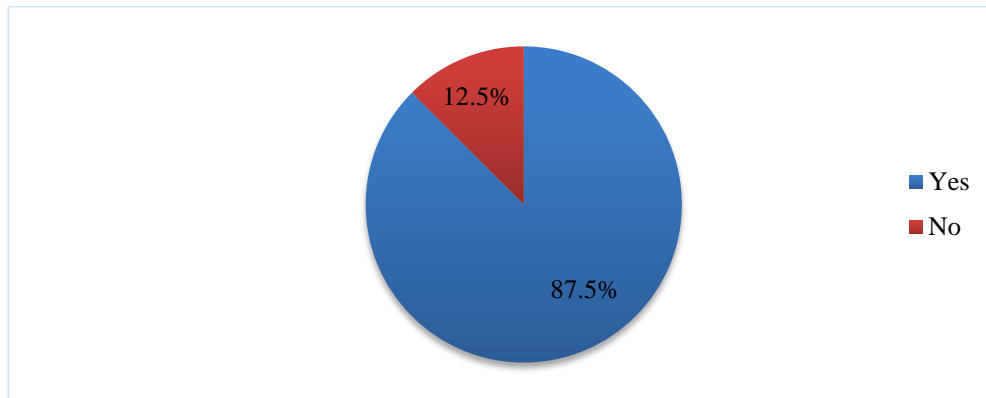


Figure 4.3: Wearing Personal Protective Equipment Whenever Necessary

4.4.5 Hours Slept per Day

More than half (52.3%) of the respondents slept for more than 6 hours while 45.7% slept for between 4 and 6 hours as shown in Hours slept per day. A big number of the health-care workers slept for less than the required 8 hours (45.7%) per day and hence a high risk of occupational health hazard since lack of enough sleep can result to high anxiety levels and impaired psychomotor performance. Respondents who did not get enough sleep were likely to experience work-related injury because inadequate sleep led to fatigue and inefficiency at work which can be compared to a study done in England on fatigue among clinicians and the safety of patients Gaba, & Howard, (2002) which indicated that deprivation of sleep leads to fatigue which causes impaired human performance.

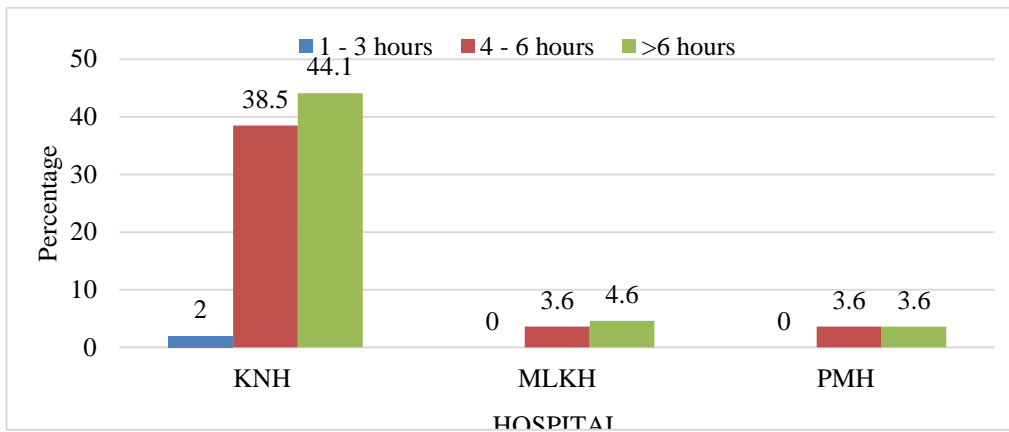


Figure 4.4: Hours Slept per Day

4.4.6 Alcoholism at Work

Most of the respondents (93.4%) never took alcohol when going to work while 6.6% occasionally did. There was no significant relationship between alcohol intake to work and experience of work-related injury/illness/trauma.

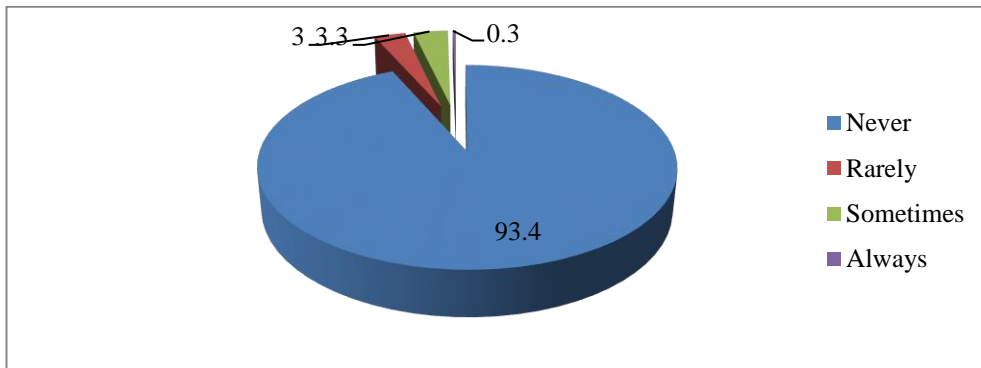


Figure 4.5: Alcohol Intake When Going to Work

4.4.7 Heavy Workload Workplace

Table 4.6 shows that majority (67.4%) of the respondents experienced pressure at the workplace mainly caused by heavy workload (83.9%) followed by lack of many supplies and materials (37.6%), and poor working environment (30.2%). There is need for clear performance structures as a way of reducing pressure at the work place which may result to losses caused by death, enough staffing, improved systems, and modern equipment and sufficient supplies. Failure to address this threat is in itself a barrier to

retaining and sustaining caregiver ranks, which in turn, threaten the delivery of healthcare globally (WHO, 2018).

Table 4.6: Experience and Cause of Pressure at Workplace

Variable	KNH		MLKH		PMH		TOTAL	
	n	%	N	%	n	%	n	%
Experience of pressure at workplace								
Yes	173	56.9	18	5.9	14	4.6	205	67.4
No	84	27.6	7	2.3	8	2.6	99	32.6
Total	257	84.5	25	8.2	22	7.2	304	100
Causes of pressure at the workplace								
	n=173		n=18		n=14		n=205	
Workload	147	71.7	13	6.3	12	5.9	172	83.9
Lack of many supplies and materials	67	32.7	6	2.9	4	2.0	77	37.6
Poor working environment	49	23.9	10	4.9	3	1.5	62	30.2
Bad relationship with my boss	10	4.9	2	1.0	0	0.0	12	5.9
Bad relationship with my colleagues	7	3.4	4	2.0	1	0.5	12	5.9
Other causes	4	2.0	1	0.5	0	0.0	5	2.4

4.4.8 Vaccination among Respondents

Majority (71.4%) of the respondents received BCG vaccine, 67.1% Hepatitis B vaccine and 19.1% Hepatitis A vaccine. The health-care system should advocate for 100% vaccine uptake. Most of the health-care workers are not protected from the deadly viruses that ought to be transmitted in the process of trying to save lives. These results are comparable to those of a study conducted in a tertiary hospital in Uganda (Ziraba et al., 2010) which showed that only 6.9% of the respondents were vaccinated against Hepatitis B virus infection and that 48.9% were susceptible and could potentially be protected through vaccination.

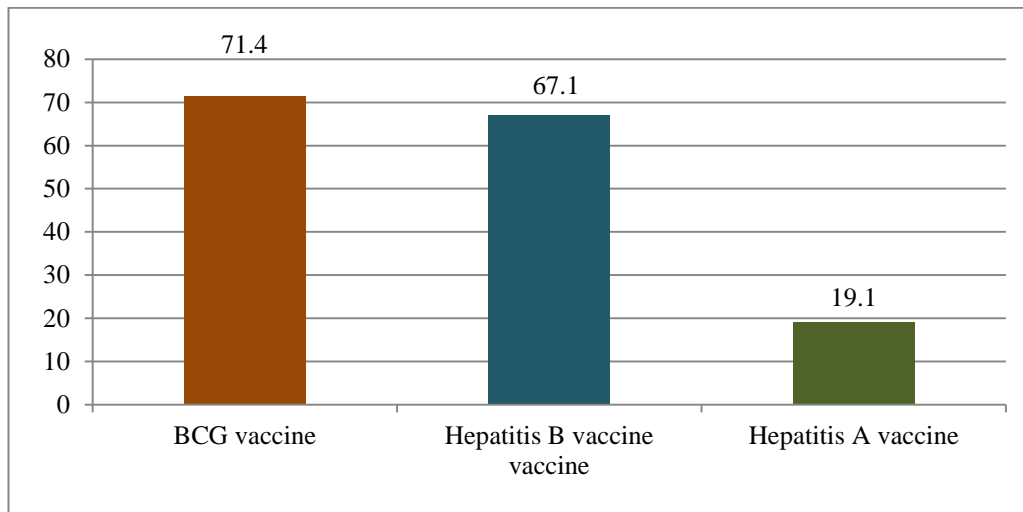


Figure 4.6: Vaccines Administered

4.4.9 Relationship between Health Hazards and Social Demographics

Respondents who were not trained on occupational health hazards were 1.89 times more likely to experience work-related injury/illness/trauma than those who were trained, $\chi^2 = 5.6, p = .018, OR = 1.89$ (95% CI: 1.111, 3.229). Similarly, the respondents who trained on occupational health hazards more than 3 years ago were .09 more likely to experience work-related injury/illness/trauma than those who were trained less than three years ago (Senthil et al 2015), $\chi^2 = 11.703, p = .001, OR = .091$ (95% CI: .021, .394). Females were 0.23 less likely to experience work-related injury/illness/trauma $\chi^2 = 4.38, p = .036, OR = .225$ (0.073 - 0.699). Details are shown in Table 4.7.

Table 4.7: Relationship between Health Hazards and Social Demographics

Socio-Demographic characteristics		Experience of work-related injury/illness/trauma at the workplace		Total n (%)	$\chi^2(p)$	OR (95% CI)
		Yes n (%)	No n (%)			
Age groups	≤ 34 years	110(36.2)	70(23.0)	180(59.2)	3.692(0.055)	1.351(0.370 - 4.930)
	> 34 years	89(29.3)	35(11.5)	124(40.8)		
Gender	Male	72(23.7)	51(16.8)	123(40.5)	4.38(0.036)	0.225(0.073 - 0.699)
	Female	127(41.8)	54(17.8)	181(59.5)		
Marital status	Married	115(37.8)	55(18.1)	170(55.9)	0.816(0.366)	0.438(0.119 - 1.617)
	Single	84(27.6)	50(16.4)	134(44.1)		
Training on OSH	Yes	74(24.3)	25(8.2)	99(32.6)	5.600(0.018)	1.894(1.111 - 3.229)
	No	125(41.1)	80(26.3)	205(67.4)		
Past years after training on OSH	≤ 3 years ago	33(33.3)	21(21.2)	54(54.5)	11.703(0.001)	0.091(0.021 - 0.394)
	> 3 years ago	41(41.4)	4(4.0)	45(45.5)		
Hours worked per week	≤ 40 hours	148(51.2)	74(25.6)	222(76.8)	0.142(0.706)	0.736(0.140 - 3.867)
	> 40 hours	43(14.9)	24(8.3)	67(23.2)		
Wearing PPE as necessary	Yes	178(58.6)	88(28.9)	266(87.5)	1.997(0.158)	1.637(0.822 - 3.260)
	No	21(6.9)	17(5.6)	38(12.5)		
Hours slept per day	< 8 hours	143(47.0)	71(23.4)	214(70.4)	0.593(0.441)	1.220(0.340 - 4.373)
	≥ 8 hours	56(18.4)	34(11.2)	90(29.6)		
Alcohol intake to work	Yes	15(4.9)	5(1.6)	20(6.6)	0.862(0.353)	1.630(0.576 - 4.617)
	No	184(60.5)	100(32.9)	284(93.4)		

4.5 Institutional Factors Contributing to Occupational Injuries and Ill Health among Healthcare Workers in Selected Hospitals in Nairobi County

The study aimed at establishing the provisions by the institutions. It captured the following issues: availability and use of PPEs, Availability of color-coded waste disposal bins, Hand hygiene, Disinfectants/Sterilization, Working environment, Resources, Immunizations and post-exposure preventive services.

4.5.1 Availability of PPEs

Table 4.8 shows that all health care workers (100%) in the three hospitals used gloves. This is due to the hazardous medical work by all professions. Aprons were available to 70% in KNH, 80% in Mama Lucy and 100% in Pumwani. Facemasks were used in

PMH more (80%) as compared to KNH (40%) and MLKH (40%). On the other hand, goggles in KNH were used by 10% of the healthcare workers while at PMH 20% of the HCWs used and at MLKH it was not used. Head gears was largely used at the theatre and specialized units like ICU and maternity wards at KNH (50%) PMH (20%) and not used at MLKH. Helmets basically worn by subordinate staff was used by 10% of the HCWs in KNH, 20% at PMH, no HCW used helmet at MLKH. Gumboots were used more in PMH (60%) while in both KNH and MLKH it was used at 20% in each facility. 40% of the HCWs used the N95 mask in KNH and PMH while at MLKH 20% of the HCWs used the N95 mask. Face masks and goggle for eye protection must be worn where there is a risk of blood, body fluids, secretions or excretions splashing into the face and eyes (NCGC, 2012). Facemasks serve as barriers during invasive procedures to protect the mucous membranes of the nose and mouth from splash. Personal eyeglasses and contact lenses are not considered adequate eye protection. NIOSH states that, eye protection must be comfortable, allow for sufficient peripheral vision, and must be adjustable to ensure a secure fit (NCGC, 2012). NIOSH states that, eye protection must be comfortable, allow for sufficient peripheral vision, and must be adjustable to ensure a secure fit (Mutuma et al., 2011). It is a requirement that waste handlers, lab technicians, maternity personnel, and incinerator operators be provided with protective footwear to protect from falling debris, potential blood-borne pathogens contained in medical waste, and occupational heat exposure (PATH et al., 2010). However, according to HPS, (2012). There is very limited evidence regarding the use of footwear as PPE for standard infection control purposes in non-theatre healthcare settings.

Table 4.8: Availability of PPEs

Variable	KNH (N=10)		MLKH (N=5)		PMH (N=5)		Total (N=20)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Gloves	10(100.0)	0(0.0)	5(100.0)	0(0.0)	5(100.0)	0(0.0)	20(100.0)	0(0.0)
Aprons	7(70.0)	3(30.0)	4(80.0)	1(20.0)	5(100.0)	0(0.0)	16(80.0)	4(20.0)
Facemasks	4(40.0)	6(60.0)	2(40.0)	3(60.0)	4(80.0)	1(20.0)	10(50.0)	10(50.0)
Goggles	1(10.0)	9(90.0)	0(0.0)	5(100.0)	1(20.0)	4(80.0)	2(10.0)	18(90.0)
Gumboots	2(20.0)	8(80.0)	1 (20.0)	4(80.0)	3(60.0)	2(40.0)	6(30.0)	14(70.0)
Heavy Duty Gloves	5(50.0)	5(50.0)	1(20.0)	4(80.0)	2(40.0)	3(60.0)	8(40.0)	12(60.0)
Helmet	1(10.0)	9(90.0)	0(0.0)	5(100.0)	1(20.0)	4(80.0)	2(10.0)	18(90.0)
Headgears	5(50.0)	5(50.0)	0(0.0)	5(100.0)	1(20.0)	4(80.0)	6(30.0)	14(70.0)
N95Mask	4(40.0)	6(60.0)	1(20.0)	4(80.0)	2(40.0)	3(60.0)	7(35.0)	13(65.0)

4.5.2 Availability of Color-Coded Waste Disposal Bins

Table 4. 9 shows the provision of color-coded bins. Yellow coded bin was largely available MLKH(100%) and PMH (100%), while at KNH it was at 90%. White coded bin were available in PMH (60%0, KNH(50%) MLKH(40%). KNH and PMH availed the black coded bins (100%) while MLKH had 80%. Red coded bins were not available at MLKH. KNH (60%), PMH (80%) KNH (60%). Although there was provision of color-coded bins; it was noted that purple coded bins were hardly available and thus proper management of waste and its disposal was not assured, this was thus an emerging line of source of risks. Purple color-coded waste disposal bins were largely unavailable.

An average of 85% of the respondents indicated that black coded bins were available in the hospitals. While 50% of the respondents indicated that both red and white coded bin were present respectively. With the right colors in the right places, one can easily keep workers on the right path and identify equipment, storage areas, and hazardous areas. Black, and yellow coded bins were hardly available in all the hospitals and thus proper management of waste and its disposal was not assured, this was thus an emerging line of source of risks. This therefore contravenes WHO guidelines on waste segregation and disposal that hospitals should provide color-coded waste disposal bins and plastic bags for infectious wastes (Pru'ss et al., (1999) (WHO, 2011). The health facilities are in charge of providing facilities such bags and containers for infectious wastes identified by color-codes and marked with biohazard symbol.

Table 4.9: Availability of Color-Coded Waste Disposal Bins

	KNH (N=10)		MLKH (N=5)		PMH (N=5)		Total (N=20)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	No n (%)	
Yellow	9(90.0)	1(10.0)	5(100.0)	0(0.0)	5(100.0)	0(0.0)	19(95.0)	1(5.0)
White	5(50.0)	5(50.0)	2(40.0)	3(60.0)	3(60.0)	2(40.0)	10(50.0)	10(50.0)
Black	10(100.0)	0(0.0)	4(80.0)	1(20.0)	5(100.0)	0(0.0)	19(95.0)	1(5.0)
Red	6(60.0)	4(40.0)	0(0.0)	5(100.0)	4(80.0)	1(20.0)	10(50.0)	10(50.0)
Purple	1(10.0)	9(90.0)	1(20.0)	4(80.0)	1(20.0)	4(80.0)	3(15.0)	17(85.0)

4.5.3 Hand Hygiene

Table 4.10 shows hand washing practice using water or alcohol based gels as a major way of disease prevention across the three hospitals. Tap running water was 100% available in KNH and Mama Lucy while at Pumwani it was 80%. Soap was largely available in all the facilities. Alcohol based gel was 100% available in Mama Lucy ,80% in both KNH and Pumwani. Disposable hand drying tissue was available in PMH at 80% while KNH and MLKH was at 60%. Unfortunately, there were no hand driers in KNH only at Pumwani and Mama Lucy. These results compares to a study in Ethiopia by Adelaid (2016), which reported high utilization of hand washing facilities for preventing diseases.

Table 4.10: Hand Hygiene

	KNH (N=10)		MLKH (N=5)		PMH (N=5)		Total (N=20)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Taps with running water	10(100.0)	0(0.0)	4(80.0)	1(20.0)	5(100.0)	0(0.0)	19(95.0)	1(5.0)
Soap	10(100.0)	0(0.0)	5(100.0)	0(0.0)	5(100.0)	0(0.0)	20(100.0)	0(0.0)
Alcohol based hand gel	8(80.0)	2(20.0)	1(20.0)	4(80.0)	5(100.0)	0(0.0)	14(70.0)	6(30.0)
Disposable hand drying tissue	6(60.0)	4(40.0)	3(60.0)	2(40.0)	4(80.0)	1(20.0)	13(65.0)	7(35.0)
Hand driers	0(0.0)	10(100.0)	1(20.0)	4(80.0)	2(40.0)	3(60.0)	3(15.0)	17(85.0)

4.5.4 Disinfectant/Sterilization

Results in Table 4.11 indicate that there was considerable level of use of disinfectants across all hospitals under study. This included provision of JIK, which indicates 80% at KNH, 70% at Pumwani and 30% at Mama Lucy. Daily changing of disinfectants, sterilization of containers, trays and packs was practiced in all the hospitals. This correlates well with a similar study in Namibia.(Apoji 2018). This practice was observed as one of the key determinants of lowering nosocomial infections.

Table 4.11: Disinfectant/ Sterilization

	KNH (N=10) Yes n (%)	MLKH (N=5) No n (%)	PMH (N=5) Yes n (%)	Total (N=20) No n (%)	KNH (N=10) Yes n (%)	MLKH (N=5) No n (%)	PMH (N=5) Yes n (%)	Total (N=20) No n (%)
Jik	7(70.0)	3(30.0)	3(60.0)	2(40.0)	4(80.0)	1(20.0)	14(70.0)	6(30.0)
Daily changing disinfectants	8(80.0)	2(20.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	13(65.0)	7(35.0)
Sterilized containers	9(90.0)	1(10.0)	4(80.0)	1(20.0)	4(80.0)	1(20.0)	17(85.0)	3(15.0)
Sterilized trays and packs	9(90.0)	1(10.0)	2(40.0)	3(60.0)	4(80.0)	1(20.0)	15(75.0)	5(25.0)

4.5.5 Policies

Table 4.12 shows the available policies utilized by the health care workers in the sampled hospitals. Although there were laid policies, either from the management or regulatory authorities, compliance was wanting, this was a recurrent phenomenon across all the three facilities under study. This under compliance was observed as a major threat to a safe working environment. A similar study in Uganda (Terrek et al 2016) observed a similar result in municipal hospitals of Jinja.

Table 4.12: Policies

	KNH (N=10) Yes n (%)	MLKH (N=5) No n (%)	PMH (N=5) Yes n (%)	Total (N=20) No n (%)	KNH (N=10) Yes n (%)	MLKH (N=5) No n (%)	PMH (N=5) Yes n (%)	Total (N=20) No n (%)
Infection Prevention and Control Policy	8(80.0)	2(20.0)	3(60.0)	2(40.0)	4(80.0)	1(20.0)	15(75.0)	5(25.0)
Infection Prevention and Control Guidelines	8(80.0)	2(20.0)	2(40.0)	3(60.0)	4(80.0)	1(20.0)	14(70.0)	6(30.0)
Waste management policy	7(70.0)	3(30.0)	5(100.0)	0(0.0)	4(80.0)	1(20.0)	16(80.0)	4(20.0)
Hand hygiene policy	7(70.0)	3(30.0)	5(100.0)	0(0.0)	4(80.0)	1(20.0)	16(80.0)	4(20.0)
OSHE Policy	3(30.0)	7(70.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	8(40.0)	12(60.0)
Permit to work	3(30.0)	7(70.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	8(40.0)	12(60.0)

4.5.6 Working Environment

Table 4.13 shows that most facilities had conducive working environment though with scarce resources. One commendable aspect of this study was the structural aspect of natural lighting, working space and storage. The study also revealed that there was sufficient spacing area and ventilation in KNH and PMH and very insufficient in MLKH. This could be attributed to insufficient funds and budget allocation.

Table 4.13: Working Environment

Variable	KNH (N=10)		MLKH (N=5)		PMH (N=5)		Total (N=20)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Good Ventilation	8(80.0)	2(20.0)	0(0.0)	5(100.0)	3(60.0)	2(40.0)	11(55.0)	9(45.0)
Good Lighting systems	10(100.0)	0(0.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	15(75.0)	5(25.0)
Spacious working area	9(90.0)	1(10.0)	0(0.0)	5(100.0)	2(40.0)	3(60.0)	11(55.0)	9(45.0)
Comfortable Seats	6(60.0)	4(40.0)	0(0.0)	5(100.0)	2(40.0)	3(60.0)	8(40.0)	12(60.0)
Enough working space	8(80.0)	2(20.0)	0(0.0)	5(100.0)	3(60.0)	2(40.0)	11(55.0)	9(45.0)
Storage area	9(90.0)	1(10.0)	0(0.0)	5(100.0)	4(80.0)	1(20.0)	13(65.0)	7(35.0)

4.5.6 Resources

Under the period of study there was inadequate equipment and staffing across all hospitals as shown in Table 4.15, coupled with supply chain challenges. This in turn affects the working capacity of health care workers. Staffing, regular equipment service and availability of machines were generally insufficient.

Table 4.14: Resource

Variable	KNH (N=10)		MLKH (N=5)		PMH (N=5)		Total (N=20)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Adequate Staffing	2(20.0)	8(80.0)	2(40.0)	3(60.0)	2(40.0)	3(60.0)	6(30.0)	14(70.0)
Regularly serviced Machines/Equipment	7(70.0)	3(30.0)	0(0.0)	5(100.0)	3(60.0)	2(40.0)	10(50.0)	10(50.0)
Availability of necessary Equipment and Supplies	4(40.0)	6(60.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	9(45.0)	11(55.0)

4.5.7 Immunizations and Post-Exposure Preventive Services

Table 4.16 indicates that there was observed utilization of vaccines across all cadres of staff as a preventive measure against infections, this compares with a similar study in India (Shah 2018) where a high vaccination rate was observed. Guidelines for infection control and prevention coupled with waste management policy were available and utilized in all the hospitals. Only half the healthcare workers had undergone staff vaccination program and post-exposure prophylaxis services

Table 4.15: Immunizations and Post-Exposure Preventive Services

Variable	KNH (N=10)		MLKH (N=5)		PMH (N=5)		Total (N=20)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Infection Prevention and Control Guidelines	8(80.0)	2(20.0)	2(40.0)	3(60.0)	4(80.0)	1(20.0)	14(70.0)	6(30.0)
Waste management policy	7(70.0)	3(30.0)	5(100.0)	0(0.0)	4(80.0)	1(20.0)	16(80.0)	4(20.0)
Hand hygiene policy	7(70.0)	3(30.0)	5(100.0)	0(0.0)	4(80.0)	1(20.0)	16(80.0)	4(20.0)
OSHE Policy	3(30.0)	7(70.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	8(40.0)	12(60.0)
Permit to work	3(30.0)	7(70.0)	1(20.0)	4(80.0)	4(80.0)	1(20.0)	8(40.0)	12(60.0)

4.5.8 Relationship between Work Related Injury/Illness/Trauma and Working Environment

Table 4.17 shows that the relationship between pressure at work place, workload, poor working environment, lack of supplies and experience of work related injury/illness/trauma, were statistically significant $\chi^2 = 62.872, p = .000, OR = 7.456$ (95% CI: 1.621, 34.304); $\chi^2 = 29.736, p = .000, OR = .663$ (95% CI: 0.157 - 2.787); $\chi^2 = 33.777, p = .000, OR = 9.268$ (95% CI: 2.076 - 41.376), $\chi^2 = 23.816, p = .000, OR = 2.463$ (95% CI: 1.300 - 4.666 and $\chi^2 = 11.945, p = .001, OR = 2.463$ (95% CI: 1.300 - 4.666 respectively. Working under pressure and heavy workload increased the likelihood of sustaining work-related injury/illness/trauma. The tiredness and fatigue caused by the work pressure and workload can lead to high anxiety levels and stress hence laxity at the workplace and high chances of making mistakes. The results in our study could be compared to those of a study conducted in Cross River State Nigeria (Etim et al., 2015) which indicated that 95% of the respondents felt stressed due to work-related strain. The researcher noted no relationship between bad relations with their in-charges, bad relationship with colleagues and having had Hepatitis A or B vaccines. The opposite was, however, true of BCG vaccine and poor working environment.

Table 4.16: Relationship between Work-Related Injury/Illness/Trauma and Working Environment

Experience of pressure at workplace		Experience of work-related injury/illness/trauma at the workplace		Total n (%)	$\chi^2(p)$	OR (95% CI)
		Yes	No			
		n (%)	n (%)			
Experience of pressure at workplace	Yes	165(54.3)	40(13.2)	205(67.4)	62.872(0.000)	7.456(1.621 - 34.304)
	No	34(11.2)	65(21.4)	99(32.6)		
Workload	Yes	135(44.4)	37(12.2)	172(56.6)	29.736(0.000)	0.663(0.157 - 2.787)
	No	64(21.1)	68(22.4)	132(43.4)		
Bad relationship with my boss	Yes	10(3.3)	2(0.7)	12(3.9)	1.765(0.184)	0.433(0.059 - 3.191)
	No	189(62.2)	103(33.9)	292(96.1)		
Bad relationship with my colleagues	Yes	11(3.6)	1(0.3)	12(3.9)	3.795(0.051)	1.966(0.168 - 22.983)
	No	188(61.8)	34.2)	292(96.1)		
Poor working environment	Yes	60(19.7)	2(0.7)	62(20.4)	33.777(0.000)	9.268(2.076 - 41.376)
	No	39(45.7)	33.9)	242(79.6)		
Lack of many supplies and materials	Yes	68(22.4)	9(3.0)	77(25.3)	23.816(0.000)	2.463(1.300 - 4.666)
	No	131(43.1)	96(31.6)	227(74.7)		
BCG vaccine	Yes	155(51.0)	62(20.4)	217(71.4)	11.945(0.001)	2.463(1.300 - 4.666)
	No	44(14.5)	3(14.1)	87(28.6)		
Hepatitis B vaccine	Yes	138(45.4)	66(21.7)	204(67.1)	1.311(0.252)	1.008(0.535 - 1.899)
	No	61(20.1)	9(12.8)	100(32.9)		
Hepatitis A vaccine	Yes	37(12.2)	21(6.9)	58(19.1)	.088(0.767)	1.367(0.639 - 2.924)
	No	62(53.3)	27.6)	246(80.9)		

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In conclusion, the findings of this study highlight several crucial aspects related to occupational health hazards among healthcare workers. The present study has reinforced the fact that Occupational injuries and illness are a noteworthy concern among Health care workers. A significant portion of the respondents demonstrated a correct understanding of the term 'Occupational Health Hazards,' particularly citing 'occupational dangers at the workplace.' However, a notable gap exists in the identification of specific classes of health hazards, with physical hazards being recognized by only about one-third of the participants.

The study reveals that a substantial majority of healthcare workers are exposed to health hazards, predominantly facing risks such as cuts, wounds, and lacerations. Job-related pressure and inadequate use of personal protective equipment emerge as leading human factors to health hazards. Insufficient training on health hazards is identified as a significant human factor contributing to occupational health hazards, with a relatively low percentage of workers having received training.

Work-related pressure, primarily attributed to a heavy workload, is prevalent among respondents, potentially impacting their overall well-being. The study also sheds light on vaccine utilization patterns, indicating room for improvement in ensuring comprehensive immunization coverage among healthcare workers.

Institutional factors, such as the availability of PPEs, color-coded waste disposal bins, and hand hygiene facilities, play a role in occupational injuries. The study emphasizes the importance of a good working environment, adequate resources, and access to necessary equipment and supplies in preventing work-related injuries. The statistically significant relationship between work-related injuries and factors like insufficient supplies/materials and poor working environments underscores the need for organizational interventions to enhance safety measures.

The study underscores the complexity of occupational health hazards in the healthcare sector, calling for a comprehensive approach that addresses individual, organizational, and systemic factors to ensure the well-being of healthcare workers and mitigate occupational risks effectively.

5.2 Recommendations

1. The study recommends that there should be much focus on creating awareness of occupational health hazards at the hospitals by the relevant stakeholders, preventive measures that will incorporate manageable workloads to reduce work-related pressure on the healthcare workers.
2. The study recommends that the hospitals should adequately train staff on occupational dangers through continuous CMEs, workshops and refresher courses to ensure that healthcare workers are well informed about dangers in the work place and how to possibly avoid them.
3. The study also recommends provision of adequate resources, PPEs, disinfectants/sterilizers to enable implementation of good practices as well as enforcing safety policies and guidelines in order to avoid work-related injury/illness/trauma.

5.3 Further Research

1. Study to be done in a representative sample of hospitals in the country in order to provide a more representative burden of occupational injuries and illnesses
2. A longitudinal study of occupational injury survivors to assess the long-term effect of injuries and illnesses in the society and family

REFERENCES

- Alli BO (2008). *Fundamental Principles of Occupational Health and Safety/International Labour Office*. ILO
- Appiagyei Helena, Emmanuel Kweku Nakua, Peter Donkor, Charles Mock (2021). Occupational injuries among health care workers at a public hospital in Ghana. *Pan African Medical Journal*, 39(103). 10.11604/pamj.2021.39.103.23542
- Awini AB, Opoku DA, Ayisi-Boateng NK, Osarfo J, Sulemana A, Yankson IK, Osei-Ampofo M, Zackaria AN, Newton S. (2023) Prevalence and determinants of occupational injuries among emergency medical technicians in Northern Ghana. *PLoS One*. 18(4):e0284943. doi: 10.1371/journal.pone.0284943. PMID: 37098096; PMCID: PMC10129006.
- Babaji, P., Samadi, F., Jaiswal, J. N., & Bansal, A. (2011). Occupational hazards among dentists: A review of literature. *Journal of International Dental and Medical Research*, 4(2), 87.
- Bleck D, Wettberg W. (2012). Waste collection in developing countries—tackling occupational safety and health hazards at their source. *Waste Manag*, 32, 2009-2017
- Chhabra, Shakuntala, (2016). "Health hazards among health care personnel." *Journal of Mahatma Gandhi Institute of Medical Sciences*, 21(1), 19. *Gale OneFile: Health and Medicine*,
- Cochran, W. G. (2007). *Sampling techniques*. John Wiley & Sons.
- Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches*. (4th ed). Thousand Oaks, California, SAGE Publications
- De Castro, A. B., Cabrera, S. L., Gee, G. C., Fujishiro, K., & Tagalog, E. A. (2009). Occupational health and safety issues among nurses in the Philippines. *Aaohn Journal*, 57(4), 149-157.

- Eskezia D, Aderaw Z, Ahmed KY, Tadese F (2016). Prevalence and associated factors of occupational injuries among municipal solid waste collectors in four zones of Amhara region, Northwest Ethiopia. *BMC Public Health*, 16, 862.
- Etim, J. J., Basse, P. E., Ndep, A. O., Iyam, M. A., & Nwikekii, C. N. (2015). Work-Related stress among healthcare workers in Ugep, Yakurr Local Government Area, Cross River State, Nigeria: A study of sources, effects, and coping strategies. *International Journal of Public Health, Pharmacy and Pharmacology*, 1(1), 23-34.
- Ford, M. T., & Tetrick, L. E. (2011). Relations among occupational hazards, attitudes, and safety performance. *Journal of Occupational Health Psychology*, 16(1), 48-66.
- Fox, R. L., & Abrahamson, K. (2009). A critical examination of the US nursing shortage: Contributing factors, public policy implications. In *Nursing Forum* (Vol. 44, No. 4, pp. 235-244). Malden, USA: Blackwell Publishing Inc.
- Ganesh, C. S., Masita A., & Saraswathy, S. (2017). Knowledge and risk perceptions of occupational infections among health-care workers in Malaysia. In *Safety and Health at Work* (Vol. 8, Issue 3, pp. 246-249)
- Gerberich, S. G., Church, T. R., McGovern, P. M., Hansen, H., Nachreiner, N. M., Geisser, M. S., ... & Jurek, A. (2005). Risk factors for work-related assaults on nurses. *Epidemiology*, 704-709.
- Gaba, D. M., & Howard, S. K. (2002). Fatigue among clinicians and the safety of patients. *New England Journal of Medicine*, 347(16), 1249-1255.
- GoK – MOH (2012). Health Facility (OSH) Risk Assessment report.
- GoK, 2006. Environmental Management and Coordination (Waste Management Regulations, 2006. Government Printer, Nairobi, Kenya.
- GoK, 2007. Occupational Safety and Health Act, 2007. Government Printer, Nairobi, Kenya.
- GoK, 2018. Nairobi West District Development Plan 2008-2012. Government printer, Nairobi, Kenya.

- GoK, 2018. Performance audit report on Protection of safety and health of workers at work place.
- Gomaa, A. E., Tapp, L. C., Luckhaupt, S. E., Vanoli, K., Sarmiento, R. F., Raudabaugh, W. M., ... & Sprigg, S. M. (2015). Occupational traumatic injuries among workers in health care facilities—United States, 2012–2014. *MMWR. Morbidity and mortality weekly report*, *64*(15), 405.
- Gopal, K., Thomas, M., & Sreedharan, J. (2012). Work-related musculoskeletal disorders (WMSD) in hospital nurses: Prevalence and coping strategies. *Gulf Medical Journal*, *1*(S1), S159-63.
- Gorman, E., Ashe, M. C., Dunstan, D. W., Hanson, H. M., Madden, K., Winkler, E. A., ... & Healy, G. N. (2018). Does an ‘activity-permissive ’workplace change office workers’ sitting and activity time?. *PloS one*, *8*(10), e76723.
- Gupta, P., Rakshit, P., Gupta, R. K., Bhatt, N., Dutta, R., & Sherwal, B. L. (2017). Assessment of knowledge, attitude, and practices towards occupational injuries infections of healthcare workers at tertiary care hospital. *International Journal of Medical Research & Health Sciences*, *6*(5), 102-107
- Hamalainen P, Leena Saarela, Takala J. (2009). Global trend according to estimated number of occupational accidents and fatal work-related diseases at region and country level. *Journal of Safety Research.* ; *40*, 125 - 39. <http://dx.doi.org/10.1016/j.jsr.2008.12.010> PMID: [PubMed] [Google Scholar]
- Hämäläinen P, Takala J, Kiat TB (2017). *Global Estimates of Occupational Accidents and Work-Related Illnesses*. Workplace Safety and Health Institute; *Journal of Safety Research.* *2*, 7-9
- Khawaja, & Nadeem (2013). Training and Development Program and its Benefits to Employee and Organization: A Conceptual Study Training and Development Program and its Benefits to Employee and Organization: A Conceptual Study. Conceptual Study”. *European Journal of Business and Management*, *5*(2), 2222-2839 .

- Kaluu Jane Kenario, Osero Justus, Warutere Peterson (2021). Occupational Injuries and Associated Factors among Solid Waste Collectors in Nairobi City County, Kenya. Kenyatta university repository- unpublished
- Kingiri, A. N., & Hall, A. (2020). The role of policy brokers: The case of biotechnology in Kenya. *Review of Policy Research*, 29(4), 492-522.
- Kuhar, D. T., Henderson, D. K., Struble, K. A., Heneine, W., Thomas, V., Cheever, L. W., ... Panlilio, A. L. (2013). Updated US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Postexposure Prophylaxis. *Infection Control & Hospital Epidemiology*, 34(09), 875–892.
- KNBS. (2022). Economic survey. Nairobi: Government Printer
- Machida S, Bachoo P. (2001). Guidelines on occupational safety & health management systems. *Africa News/ Occupational Health Safety*, 11, 68-69.
- Martin, A., Sanderson, K., & Cocker, F. (2019). Meta-analysis of the effects of health promotion intervention in the workplace on depression and anxiety symptoms. *Scandinavian journal of work, environment & health*, 7-18
- Mbaisi EM, Ng'ang'a Z, Wanzala P, Omolo J. (2010). Prevalence and factors associated with percutaneous injuries and splash exposures among health-care workers in a provincial hospital, Kenya. *Pan African medical journal.*, 14, 10. doi: 10.11604/pamj.2013.14.10.1373. Epub 2013 Jan 6. PMID: 23504245; PMCID: PMC3597860.
- Mbaisi, E. M. (2014). Prevalence and Factors Associated with Percutaneous Injuries and Splash Exposures among Health-Care Workers in Rift Valley Provincial and War Memorial Hospitals, Kenya. *EAMJ* 43 (6) 362-4.
- Mbaka, P., Waihenya, R., Oisebe, C., & Lihana, R. (2018). Factors Affecting the Uptake of Cervical Cancer Screening in Mama Lucy Kibaki Hospital, Nairobi, Kenya. *Cancer Research Journal*, 6(3), 106.

- Muhammad, M., & Fard, R. Y. (2013). The Impact of Employee Training and Development on Employee. *Global Journal of Commerce and Management Perspective*, 2(6), 91-93, 92-94.
- McDiarmid, M. A. (2014). Hazards of the healthcare sector: Looking beyond infectious disease. *Annals of global health*, 80(4), 315-319.
- Mekkodathil A, El-Menyar A, Al-Thani H. Occupational injuries in workers from different ethnicities (2016). *International Journal of Critical Illness and Injury Science*. 6 (1): 25 - 32. <http://dx.doi.org/10.4103/2229-5151.177365>
- Mitchell, R., Roth, V., Gravel, D., Astrakianakis, G., Bryce, E., Forgie, S., ... & Canadian Nosocomial Infection Surveillance Program. (2017). Are health care workers protected? An observational study of selection and removal of personal protective equipment in Canadian acute care hospitals. *American journal of infection control*, 41(3), 240-244.
- Miller, D. L., Klein, L. W., Balter, S., Norbash, A., Haines, D., Fairbent, L., ... & Multispecialty Occupational Health Group. (2010). Occupational health hazards in the interventional laboratory: progress report of the Multispecialty Occupational Health Group. *Journal of neurointerventional surgery*, 2(3), 245-248.
- Ministry of Health, Kenya (2014). The Kenya Health Policy, 2014–2030.
- Mochache, K., Mathai, M., Gachuno, O., Vander Stoep, A., & Kumar, M. (2018). Depression during pregnancy and preterm delivery: a prospective cohort study among women attending antenatal clinic at Pumwani Maternity Hospital. *Annals of general psychiatry*, 17(1), 31.
- MoH, (2007b). National Standards and Guidelines on injection safety and medical waste management. MOH, Nairobi, Kenya.
- MoH, 2007 (a). National Policy on injection safety and medical waste management. MOH, Nairobi, Kenya.

- Moreau, D. T. R., & Neis, B. (2009). Occupational health and safety hazards in Atlantic Canadian aquaculture: Laying the groundwork for prevention. *Marine Policy*, 33(2), 401–411.
- Mugenda, O. M., & Mugenda, G. A.(2003). *Research methods*.
- Munabi, I. G., Buwembo, W., Kitara, D. L., Ochieng, J., & Mwaka, E. S. (2014). Musculoskeletal disorder risk factors among nursing professionals in low resource settings: a cross-sectional study in Uganda. *BMC nursing*, 13(1), 1-8.
- Ndejjo, R., Musinguzi, G., Yu, X., Buregyeya, E., Musoke, D., Wang, J. S., ... Ssempebwa, J. (2015). Occupational Health Hazards among Healthcare Workers in Kampala, Uganda. *Journal of Environmental and Public Health*, 2015.
- Olunga Juma, Oburu Ezekiel, Mutiso Vincent, (2022). Incidence and Pattern of Non-fatal Occupational Injuries among Construction Workers at Three Public Health Facilities in Nairobi. Kenyatta university repository, unpublished
- Occupational Safety and Health Administration. (2013). Facts about hospital worker safety. OSHA: Washington, DC, USA.
- Orji, E. O., Fasubaa, O. B., Onwudiegwu, U., Dare, F. O., & Ogunniyi, S. O. (2020). Occupational health hazards among health care workers in an obstetrics and gynaecology unit of a Nigerian teaching hospital. *Journal of obstetrics and gynaecology*, 22(1), 75-78.
- Portell, M., Gil, R. M., Losilla, J. M., & Vives, J. (2019). Characterizing occupational risk perception: the case of biological, ergonomic and organizational hazards in Spanish healthcare workers. *The Spanish journal of psychology*, 17.
- Rennie Joshua and Karkada S (2017). A Review on Occupational Health Hazards and its Consequences among Nurses. *International Journal of Nursing Research and Practice* 4(2), 2350-1324;

- Sabra, E. H., & Morsy, M. S. (2016). Occupational health hazards among nurses at Quena University Hospital. *Journal of Nursing and Health Science*, 5(3), 28-34.
- Senthil, A., Anandh, B., Jayachandran, P., Thangavel, G., Josephin, D., Yamini, R., & Kalpana, B. (2015). Perception and prevalence of work-related health hazards among health care workers in public health facilities in southern India. *International journal of occupational and environmental health*, 21(1), 74-81.
- Shah ,Parth D. , Shelley D. Golden, Carol E. Golin, Macary Weck Marciniak, Noel T. Brewer (2018). Impact of Pharmacists on Access to Vaccine Providers: A Geospatial Analysis. *The Milbank Quarterly A Multidisciplinary Journal of Population Health and Health Policy*. 96(3); 568-592
- Sheeba , H. (2011). A Study of Effectiveness of Training and Development Programmes of UPSTDC, India – An analysis”, *South Asian . Journal of Tourism and Heritage*, 4(1), 1.
- Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, 61(3), 261–264. <https://doi.org/10.4103/0019-5154.182410>
- Simiyu and Cholo (2017). Determinants of occupational injuries among metal workers in Kamukunji Jua Kali market, Nairobi. *International Journal of Medicine Research*. 2(3), 21-27
- Smith, P. M., & Mustard, C. A. (2017). The unequal distribution of occupational health and safety risks among immigrants to Canada compared to Canadian-born labour market participants: 1993–2005. *Safety Science*, 48(10), 1296-1303.
- Tadesse, M., Meskele, M., & Tadesse, A. (2016). Occupational exposure to blood and body fluids among health care workers in wolaita zone, southern Ethiopia. *Developing Countries Studies*, 6(7), 70-77.
- Taegtmeier M, Suckling RM, Nguku PM. (2018). Working with Risk: Occupational Safety Issues among healthcare workers in Kenya. *AIDS Care*, 20(3), 304-310.

- Takala J, Hamalainen P, Saarela KL, (2012). Global estimates of the burden of injury and illness at work. *Journal of Occupational and Environmental Hygiene*. 11(5), 326 - 37.
- Tang, P. F., Jamulitrat, S., Chongsuvivatwong, V., & McNeil, E. (2019). Incidence and Risk Factors for Sharps Injury among Healthcare Workers in Three Hospitals in Kunming, China. *Journal of Nursing Sciences*, 27(3).
- Thirunavukkarasu A, Alrawaili KAH, Al-Hazmi AH, Dar UF, ALruwaili B, Mallick A, Wani FA, Alsirhani AIE (2021). Prevalence and Risk Factors of Occupational Health Hazards among Health Care Workers of Northern Saudi Arabia: A Multicenter Study. *International Journal of Environmental research and Public Health*.18(21), 11489. doi: 10.3390/ijerph182111489. PMID: 34770004; PMCID: PMC8583691
- Tinubu, B. M., Mbada, C. E., Oyeyemi, A. L., & Fabunmi, A. A. (2019). Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musculoskeletal disorders*, 11(1), 12.
- Tung, C. Y., Chang, C. C., Ming, J. L., & Chao, K. P. (2019). Occupational hazards education for nursing staff through web-based learning. *International journal of environmental research and public health*, 11(12), 13035-13046.
- Vaz, K., McGrowder, D., Crawford, T., Alexander-Lindo, R. L., & Irving, R. (2010). Prevalence of injuries and reporting of accidents among healthcare workers at the University Hospital of the West Indies. *International journal of occupational medicine and environmental health*, 23(2), 133.
- Wiszniewska, M., & Walusiak-Skorupa, J. (2018). Occupational allergy: Respiratory hazards in healthcare workers. *Current Opinion in Allergy and Clinical Immunology*, 14(2), 113–118.
- World Health Organization. (2018). Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. Geneva, Switzerland: WHO Library Cataloguing-in-Publication Data; 2010.

World Health Organization (WHO, 2014) Global strategy on occupational health for all: *The way to health at work*, WHO. 2014

Ziraba, A. K., Bwogi, J., Namale, A., Wainaina, C. W., & Mayanja-Kizza, H. (2010). Seroprevalence and risk factors for hepatitis B virus infection among health care workers in a tertiary hospital in Uganda. *BMC infectious diseases*, 10(1), 191.

APPENDICES

Appendix I: Consent Information Form

Study Title: Assessment of factors contributing to occupational Injuries and ill health among Healthcare Workers in Selected Hospitals in Nairobi County.

Study site: Kenyatta National Hospital, Pumwani Maternity Hospital, and Mama Lucy Kibaki Hospital.

Dear Participant

My name is Emily Koskei, a Candidate at Jomo Kenyatta University of Agriculture and Technology studying a Master's Degree in Occupational Health and Safety. I would like to carry out this research on Factors Influencing Occupational Injuries and Hazards among Healthcare Workers in Selected Hospitals in Nairobi County

This research is part of the requirement for the award of the mentioned degree. As a participant, you are kindly requested to participate by either:

Filling the questionnaire

All information you provide will be for purposes of research only. Participating in this study will not expose you to any physical or psychological harm whatsoever. Throughout this study, your identity will be concealed, and any information you provide will be confidential, and your privacy will be respected. Your participation is purely voluntary and you are free to withdraw at any point without any penalty. You may wish to seek clarification now (Give participant time to ask or comment for clarification)

In case you need any more information kindly enquire at any time.

Thank you!

Purpose and benefits of the study

The study is important both in policy formulation regarding occupational health hazards in healthcare facilities. Little has been done regarding occupational health hazards in major hospitals in the country and this study will provide evidence to that effect

Procedure

If you are willing to participate in the study, you will meet with a research assistant who will give you a questionnaire to fill/ or interview you. You are free not to answer any question that you may feel uncomfortable with. If you need any assistance to answer the questionnaire, the researcher will be available. Please do not hesitate to contact me (The principal investigator) or my supervisor on the telephone numbers provided below for further clarification. No invasive procedure will be employed.

Visits

Participants will be visited at their place of work and the study will be conducted when the participants is free and is not in the process of offering any service.

Consent

Prior to participation in either filling the questionnaires, consent will be sought. This will be done by explaining to the participants all the information about the study and reading through the Consent information form. They will then be asked to give informed consent by signing the consent certificate before the start of the study.

Benefits of taking part in the study

There may be no direct benefit to you for taking part in the study. The information we will gather from this exercise will help us in understanding, common occupational health hazards in selected Kenyan hospitals. This will help in policy formulation and in finding ways of ensuring that occupational health hazards in hospitals among healthcare workers is reduced.

Confidentiality

All questionnaires are to be completed anonymously. No personal identification information will be collected on the questionnaire. Data access will be controlled and only the data entry clerk, the statistician and the principal investigator will access the information which will be password protected. Uncontrolled copying of data to removable disks will be prohibited. All hard copies from the field or draft reports will be under lock and key. Furthermore, the results of this study will be presented in aggregate form, so no individual responses will be able to be traced back to individual responses.

Risk, stress and discomfort

The questionnaire used to interview you will not have your name or personal number, which can identify you. You will receive no money for participating in this exercise. The only discomfort is when you will be taking a few minutes of your time to complete the questionnaire or participate in the focused group discussion.

Appendix II: Consent Certificate

Participants Declaration

I confirm that I have understood the information provided for the above study and have had the opportunity to ask questions. I also understand that my participation is voluntary and that I am free to withdraw at any time, without giving reasons. I agree to take part in the above study.

My signature below means that I voluntarily agree to participate in this research study

.....
Signature Date

.....
Name of Research assistant Signature Date

If you have any questions about this study you can contact:

1. EMILY KOSKEI (**Principal Investigator**). School of Occupational Health and Safety JKUAT. P.O Box 20723, 00202 Tel. 0712 711 681 NAIROBI
2. DR. CHARLES MBURU (**The supervisor**). Institute of Energy and Environmental Technology, JKUAT, P.O. Box 62000 – 00200, Tel. 067-5870001-5 NAIROBI
3. DR. DANIEL NYAMONGO (**The supervisor**). College of Health Science, Rehabilitation Department, JKUAT, P.O. Box 62000 – 00200, Tel. 067-5870001-5, NAIROBI
4. THE SECRETARY KNH/UON ERC, P.O Box 20723-00202 Tel. 726300-9 NAIROBI

Appendix III: Questionnaire

Assess the Factors Influencing Occupational Injuries and Ill Health among Healthcare Workers in Selected Hospitals in Nairobi County

CODE.....

Date.....

Instructions

- Do not write your name anywhere on this questionnaire
- Any information you give will be treated withutmost confidence

SECTION A: SOCIO - DEMOGRAPHIC DATA

1. What is your age in complete years

2. What is your gender?

a) Male

b) Female

3. What is your marital status?

a) Single

b) Married

c) Divorced

d) Widowed

4. What is your professional qualification?

a) Doctor

b) Nurse

c) Pharmacist

d) Clinical officer

e) Laboratory technician

f) Medical health records

g) Hospital cleaning staffs

h) Mortuary attendants

- i) Security officer
- j) Others specify.....

5. How long have you worked in your respective capacity as a health worker?

- a) Less than 1 year
- b) 1-5 years
- c) 6-10 years
- d) Over 10 years

SECTION B: HUMAN FACTORS

6. What do you understand by the term occupational health hazards?

.....

7. What classes of Occupational Health Hazards are you aware of?

.....

8. Have you had any training in occupational health hazards?

- a) Yes
- b) No

9. If yes in the above Q9, when was the last time in complete years you had the training?..... years ago

10. How many hours do you work in a week?.....hrs

11. Do you wear personal protective equipment whenever necessary?

- a) Yes
- b) No

12. How many hours do you sleep per day?.....hrs

13. Do you take alcohol when going to work

- a) Never
- b) rarely
- c) Sometimes
- d) Always

14. Do you experience pressure at workplace

- a) Yes
- b) No

15. If yes in the above, what are the causes?

- a) Workload
- b) Bad relationship with my boss
- c) Bad working relationship with my colleagues
- d) Poor working environment
- e) Lack of many supplies and materials
- f) Others specify

16. Have you received any of the following vaccines? (Tick Yes or No in the boxes provided)

- a) BCG vaccine YES NO
- b) Hepatitis B vaccine YES NO
- c) Hepatitis A vaccine YES NO

17. Please indicate with a tick whether you Strongly Agree (SA), Agree (A), Not Sure (NS), Disagree (D) Or Strongly Disagree (SD) with the following statements

STATEMENT	SA	A	NS	D	SD
I rarely get exposed to occupational hazards at my workplace					
I do not fall sick from exposure to occupational hazards					
I always wear protective outfits at my workplace					
I have adequate knowledge of universal precautions					
Pressure of work exposes me to workplace hazards					
I feel I am not at risk of any infection as a result of occupational hazards					
I feel I need more training on health hazards					

SECTION C: TYPES OF HAZARDS

18. Have you ever experienced any type of work-related injury/illness/injury/ trauma at your workplace?

- a) Yes
- b) No

19. If yes, how many times in the last 3 months?

- a) 1-3 times
- b) 4-6 times
- c) More than 6 times

20. What action did you take after exposure?

.....

21. What was the cause of the injuries/illnesses/ traumas in question 15 above?

- a) Slips and falls
- b) Physical fights
- c) Psychosocial stress
- d) Sexual abuse
- e) verbal abuse
- f) Cuts, wounds, lacerations
- g) Burns
- h) Radiations
- i) Chemical spills
- j) Noise
- k) Direct contact with a contaminated specimen
- l) Bioterrorism
- m) Musculoskeletal sprains/ strains and aches
- n) Blood borne pathogens
- o) Infectious diseases
- p) Airborne diseases
- q) Vector-borne diseases
- r) Work-related pressure/burnout
- s) Cross-contamination from soiled materials
- t) Others please specify.....

22. What predisposes you to occupational health hazards at your workplace?

- a) Not wearing all the necessary PPEs
- b) Working extra hours
- c) Shortage of staffs
- d) Emergencies
- e) Job-related pressures
- f) Others specify.....

Appendix IV: Checklist for The Assessment of Institutional Factors

Assessment of the Factors Influencing Occupational Injuries and Ill Health among Healthcare Workers in Selected Hospitals in Nairobi County

CODE.....Date.....

Instructions

1. Tick yes when an Item is available
2. Tick no when an item is not available

	ITEMS	YES	NO	REMARKS
1	Availability of PPES - Gloves - Aprons - Facemasks - Goggles - Gumboots - Heavy duty hand gloves - Helmet - Headgears - N95 Mask			
2	Availability of color-coded waste disposal beans - Yellow - White - Black			

	ITEMS	YES	NO	REMARKS
	<ul style="list-style-type: none"> - Red - Purple 			
3	Hand hygiene <ul style="list-style-type: none"> - Taps with running water - Soap - Alcohol based hand gel - Disposable hand drying tissues - Hand driers 			
4	Disinfectants/ Sterilizations <ul style="list-style-type: none"> - Jik/ precept - Daily changing of disinfectants - Sterilizations containers - Sterilized trays and packs 			
5	Policies <ul style="list-style-type: none"> - Infection Prevention and Control policy - Infection Prevention and Control guidelines - Waste management policy - Hand hygiene policy - OSHE Policy - Permit to work 			
6	Working Environment <ul style="list-style-type: none"> - Good ventilation - Good lighting systems - Spacious work area - Comfortable seats - Enough working space - Storage area 			
7	Resources <ul style="list-style-type: none"> - Adequate staffing - Regularly serviced machines/equipment - Availability of necessary equipment and supplies 			
8	Immunizations and Post Exposure Preventive services <ul style="list-style-type: none"> - Staffs vaccination program against Hepatitis ABC, Tuberculosis - Post Exposure Prophylaxis services 			

Appendix V: Introduction Letter from JKUAT



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

INSTITUTE OF ENERGY AND ENVIRONMENTAL TECHNOLOGY

P.O. BOX 62000, NAIROBI, KENYA. Tel: (067) 52251/52711/52181-4, Fax: (067) 52164 Thika, Email:director@leet.jkuat.ac.ke

11th September, 2017

TO WHOM IT MAY CONCERN

SUBJECT: EMILY C. KOSKEI – EET32-5997/2014

The above named person is a Master of Science in Occupational Safety and Health (OSH) student in this Institute. She has completed her course work and is currently involved in her research project entitled, "***Factors Influencing Occupational Injuries and Hazards among Health Care Workers in Selected Hospitals in Nairobi County.***"

This is therefore to request you to offer her any assistance that she may require in data collection.

Thank you.

PROF. ROBERT KINYUA,
DIRECTOR, INSTITUTE OF ENERGY & ENVIRONMENTAL TECHNOLOGY



JKUAT is ISO 9001:2008 & 14001:2004 CERTIFIED
Setting Trends in Higher Education, Research and Innovation

Appendix VI: Approval from KNH-UON ERC



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



KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: <http://www.erc.uonbi.ac.ke>
Facebook: <https://www.facebook.com/uonknh.erc>
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC



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

Ref: KNH-ERC/A/146

24th April 2018

Emily C. Koskei
EET 32-5997/2014
Institute of Environmental Health and Energy (IEET)
JKUAT

Dear Emily

RESEARCH PROPOSAL- FACTORS CONTRIBUTING TO OCCUPATIONAL INJURIES AND HAZARDS AMONG HEALTHCARE WORKERS IN SELECTED HOSPITALS IN NAIROBI COUNTY (P589/10/2017)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is from 24th April 2018 – 23rd April 2019.

This approval is subject to compliance with the following requirements:

- Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH-UoN ERC before implementation.
- Death and life threatening problems and serious 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.
- 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.
- 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*).
- 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.

Protect to discover

You are hereby advised to adhere to renewal timelines as per clause (e) above in the conduct of your study.

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



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

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director CS, KNH
The Chairperson, KNH-UoN ERC

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Appendix VII: KNH Authority to Extend Data Collection Period



KENYATTA NATIONAL HOSPITAL
P.O. BOX 20723, 00202, Nairobi

Tel.: 726300/2726450/2726550
Fax: 2725272
Email: knhadmin@knh.or.ke

Ref: KNH/533662/230

Date: 24th July, 2018

Mrs. Emily Cheronno Koskei
KNH

RE: AUTHORITY TO EXTEND DATA COLLECTION PERIOD.

Please refer to your letter dated 23rd July, 2018 on the captioned subject.

We note that your application for authority to extend the previously approved one month data collection period on factors contributing to injuries among healthcare workers by three months.

In this regard you are hereby granted further authority to extend the data collection period among the hospital staff, for a period of three (3) months w.e.f 11th July, 2018 to 10th October, 2018.

We take this opportunity to congratulate you on your efforts to broaden the horizons of knowledge.


WINNIE MWANGI

FOR: DEPUTY DIRECTOR, HR

Appendix VIII: Research Authorization – NACOSTI



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/19/77064/25808**

Date: **25th January, 2019**

Emily Cherono Koskei
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “*Factors influencing occupational injuries and hazards among health care workers in selected hospitals in Nairobi County*” I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **25th January, 2020**.

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

**GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

Appendix IX: Research License – NACOSTI

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and Innovation

P.O. Box 30623 - 00100, Nairobi, Kenya

TEL: 020 400 7000, 0713 788787, 0735 404245

Email: dg@nacosti.go.ke, registry@nacosti.go.ke

Website: www.nacosti.go.ke



REPUBLIC OF KENYA



National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 22835

CONDITIONS: see back page

**THIS IS TO CERTIFY THAT:
MS. EMILY CHERONO KOSKEI
of JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY,
20768-202 NAIROBI, has been permitted
to conduct research in Nairobi County**

Permit No : NACOSTI/P/19/77064/25808

Date Of Issue : 25th January,2019

Fee Received :Ksh 1000

**on the topic: FACTORS INFLUENCING
OCCUPATIONAL INJURIES AND HAZARDS
AMONG HEALTH CARE WORKERS IN
SELECTED HOSPITALS IN NAIROBI
COUNTY**

for the period ending:

25th January,2020



.....
**Applicant's
Signature**


.....
**Director General
National Commission for Science,
Technology & Innovation**

Appendix X: Research Authorization – Nairobi City County

NAIROBI CITY COUNTY

Telephone 020 344194
web: www.nairobi.go.ke



City Hall,
P. O. Box 30075-00100,
Nairobi,
KENYA.

COUNTY HEALTH SERVICES

REF: CHS/1/13/ (1) - 019

Emily Cheron
Jomo Kenyatta University of Agriculture & Technology
P.O Box 62000-00200
NAIROBI
KENYA

DATE: 18th MARCH ,2019

RE: RESEARCH AUTHORIZATION

Reference is made to a letter from the Chief Advisor to Schools, Nairobi County

Ref. GL/NC/141/VOL.VI/100 dated 15th March, 2019.

Authority is hereby granted to you to carry a research on "**Factors influencing occupational injuries and hazards among health care workers in selected hospitals in Nairobi County.** You will carry out the study in Pumwani Maternity Hospital and Mama Lucy Kibaki Hospital

Please note that your research runs for (8) months w.e.f 1st April 2019, 2019 to 31st January, 2019

During the course of your research, you will be expected to adhere to the rules and regulations governing the Nairobi City County.

During your study there will be no costs devolving on the County.

That you undertake to indemnify the County against any claims that may arise from your data collection.

By a copy of this letter, the respective Medical Superintendents are requested to accord you the necessary assistance.

CAO - HEALTH SERVICES
Nairobi City County Government
Eunice Musau
EUNICE MUSAU
Date: 18/03/2019
CHIEF ADMINISTRATIVE OFFICER – (CHS)

Cc: - Med Supt – Mama Lucy Kibaki Hospital
Pumwani Maternity Hospital



Appendix XI: Temporary Permission to Collect Data - MLKH



REPUBLIC OF KENYA
MINISTRY OF HEALTH
NAIROBI CITY COUNTY

MAMA LUCY KIBAKI HOSPITAL-EMBAKI
P.O. Box 1278-00515
NAIROBI

Telephone: Nairobi
020 - 2297000

E-mail: medsupnedh@yahoo.com

When replying please quote

OUR REF: MLKH/ADM/RES/1/4/()

DATE: 11th June , 2019

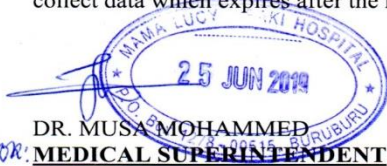
Emily cherono
Jomo Kenyatta University of Agriculture and Technology
P. O. BOX 62000- 00200,
NAIROBI

RE: TEMPORARY PERMISSION TO COLLECT DATA

**TITLE: "FACTORS INFLUENCING OCCUPATIONAL INJURIES AND HAZARDS AMONG
HEALTH CARE WORKERS IN SELECTED HOSPITALS IN NAIROBI COUNTY."**

Refer to your application to collect data on the above research in this institution.

This is to inform you that the hospital has given you temporary permission to allow you collect data which expires after the next Research Committee Meeting.


DR. MUSA MOHAMMED
FOR: **MEDICAL SUPERINTENDENT**

Appendix XII: Annual Extension Approval – KNH-UON ERC



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

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: <http://www.erc.uonbi.ac.ke>
Facebook: https://www.facebook.com/uonknh_erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC



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

Ref. No.KNH/ERC/R/130

9th July, 2019

Emily C. Koskei
Reg. No.EET 32-5997/2014
Institute of Environmental health and Energy (EET)
JKUAT

Dear Emily

Re: Approval of Annual Renewal – Factors contributing to occupational injuries and hazards among healthcare workers in selected hospitals in Nairobi county (P589/10/2017)

Refer to your communication received on 3rd July 2019.

This is to acknowledge receipt of your study progress report and hereby grant you annual extension approval for ethics research protocol P589/10/2017.

The approval dates are 24th April 2019 – 23rd April 2020.

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.

Protect to discover

You are hereby advised to adhere to renewal timelines as per clause (e) above in the conduct of your study.

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



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

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director CS, KNH
The Chairperson, KNH-UoN ERC

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Appendix XIII: Approval of Research Proposal – PMH - Nairobi City County

NAIROBI CITY COUNTY

Telephone: +254 218 2114
Website: www.nairobi.go.ke



City Hall
P. O. Box 30075-00100
Nairobi
KENYA

COUNTY HEALTH SERVICES:
PUMWANI MATERNITY HOSPITAL:

PMH/DMOH/75/0906/2019

27TH SEPTEMBER 2019

To:
EMILY C. KOSKEY
EET 32-5997/2014
INSTITUTE OF ENVIRONMENTAL HEALTH AND ENERGY
JKUAT.

RE: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that the research entitled “**Factor Influencing Occupational Injuries and Hazards among Health Workers in Selected Hospitals in Nairobi County**” has been approved.

You are expected to pay Kshs. 6000/- only.

You are hereby allowed to collect data. We look forward to receiving a summary of the research findings upon completion of the study.

Yours sincerely,

MA
Dr



DR. FARHIA A. AFFI
AG. MEDICAL SUPERINTENDENT

The County Director of Health Services
Nairobi County.