

THESIS ABSTRACT

Master of Public Health

Adventist University of Africa

School of Postgraduate Studies

Title: OCCUPATIONAL HAZARDS AND MITIGATING MEASURES
AMONG HEALTHCARE WORKERS IN SHINYANGA
REGIONAL REFERRAL HOSPITAL, TANZANIA

Researcher: Joel James Muhoja

Primary Advisor: Janet Odhiambo, DrPH

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This study sought to identify occupational hazards and mitigating measures among Healthcare Workers in Shinyanga Regional Referral Hospital. The objective of the study was to assess risks associated with occupational health, identify factors (causes) of occupational health hazards among HCWs, and build the capacity of healthcare workers on measures to mitigate health hazards in their workplace. The study engaged 105 HCWs all from Shinyanga regional hospital.

The study project imparted knowledge through lectures, discussions, questions and answers, and one-on-one consultations. Data were gathered through questionnaires and observation. The project's data were analyzed about planned target objectives. All data were analyzed by using descriptive statistics comprising frequencies and percentages. This was done to examine participants' knowledge of occupational health hazards and mitigating measures.

The study found that HCWs in Shinyanga are at higher risk of being exposed to health risk factors due to insufficient and uneven provision of personal protective equipment. In addition, poor hospital waste management and disposal might accelerate needle-stick injuries by that Hepatitis B, Hepatitis C, and HIV to mention a few are spread from patients to HCWs. Moreover, the reporting on OHHs and new infections was too low. HCWs are the potential for national development and are well educated but not protected to play their roles effectively to constitute national economic development. Some HWCs including health facility in-charge, heads of departments, and specialists are more exposed to health risk factors than others due to overworking. Besides, the study found that the knowledge of HCWs on health risk factors is too low. This calls for external health development stakeholders to intervene in improving safety, health, and well-being.

Keywords: Occupational health, Healthcare Workers, health hazards

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A thesis

presented in partial fulfillment
of the requirements for the degree
Master of Public Health

by

Joel James Muhoja

April 2023

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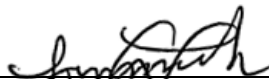
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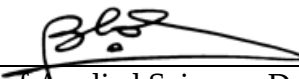
Primary Adviser
Janet Odhiambo, DrPH



Program Coordinator, MPH
Janet Odhiambo, DrPH



Secondary Adviser
Daniel Ganu, DrPH



Head of Applied Sciences Department
Lossan Bonde, PhD

Dean, School of Postgraduate Studies
Lossan Bonde, PhD

Date: April 2023

Dedicated to my family for their support throughout my studies.

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LIST OF ACRONYMS

BBFs	Blood and other Body Fluids
COVID-19	Coronavirus Disease of 2019
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCWs	Healthcare Workers
HIV	Human Immunodeficiency Virus
NIOSH	National Institute for Occupational Safety and Health
OHH	Occupational Health Hazards
SARS	Severe Acute Respiratory Syndrome
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

This chapter in highlights introduces the subject matter under study. It includes a background of the study, the statement of the problem, project goal and objectives, the significance of the study, and operational definition of terms respectively. Objectives of the study summarized, drove, and provided the scope of direction and depth of the study of what the study intended to achieve. The significance of the study entailed the contribution and impacts of the study on the research field and necessary stakeholders who might benefit from the study. Statement of the problem put clear what the study was after. Moreover, the Definition of terms is intended to make it easy for readers by providing the meaning of used terms.

Background of the Study

Healthcare workers provide medical care in environments that are acknowledged to be the most dangerous and insecure occupational settings (Mossburg, Agore, Nkimbeng, and Commodore-Mensah, 2019). In a report by World Health Organization (WHO), healthcare facilities employ about 59.8 million healthcare workers (HCWs) in the globe with two-thirds providing health services whilst the remaining are administrative and supporting staff (Poz, Kinfu, Dräger, and Kunjumen, 2007, cited by Adamu and Abdullahi, 2017). This 59.8 million HCWs account for about 12% of the global workforce (Huei et al., 2020).

Internationally, it is approximated that ten percent of healthcare providers experience harm from sharp objects used in healthcare settings every year (WHO, 2002, cited by Mossburg et al., 2019). In the year 2000, sharp injuries to health providers impacted 16,000 Hepatitis C Virus (HCV) infections, 66,000 Hepatitis B Virus (HBV) infections, and 1,000 Human Immunodeficiency Virus (HIV) diseases (Rapiti, Pruss-Ustun, and Hutin, 2014, cited by Mossburg et al., 2019). This means that Healthcare providers are subjected to numerous biological, chemical, physical, and psychosocial risks during their daily undertakings that may in some instances be life-threatening (Fingerhut et al., 2006, as cited by Adamu and Abdullahi, 2017). The WHO global relative risk assessment of the morbidity and mortality of some chosen work-related risks accounted that around 24 million years of healthy life are lost resulting in 850,000 deaths globally (Fingerhut et al., 2006, as cited by Adamu and Abdullahi, 2017). Moreover, 3 million percutaneous subjections occur yearly among 35 million healthcare providers worldwide, while more than 90% of these happen in developing economies (Prüss-Ustün, Rapiti, and Hutin, 2005, cited by Adamu and Abdullahi, 2017).

Healthcare workers (HCWs) are at risk of Occupational Health Hazards (OHH) in their workplace settings like other workers in manufacturing plus maintenance, counting heavy metals, and solvents as well as caring for ill patients (McDiarmid, 2014, cited by Adamu and Abdullahi, 2017). The probability of subjection to these risk agents by healthcare workers relies on the occupational category and the workplace conditions (McDiarmid, 2014; Orme et al., 2015, cited by Adamu and Abdullahi, 2017). Though all healthcare workers are subjected to work-related risks, health providers in sub-Saharan Africa are further subjected to infectious diseases than health providers in advanced economies (Mossburg et al., 2019).

Moreover, the few pieces of research done in sub-Saharan Africa have confirmed that healthcare providers are commonly subjected to biological, chemical, and physical work-related risks (Bekele, Gebremariam, Kaso, and Ahmed, 2015 and Nsubuga and Jaakkola, 2005 as cited by Mossburg et al., 2019).

HBV, HCV, and HIV frequency among healthcare takers who experience sharp injuries emphasize the unequal workload that sub-Saharan Africa bear compared to advanced economies. For example, in the Africa Sub-region (counting Botswana, Congo, Malawi, South Africa, etc.), 11.8% of HBV, 2.8 of HCV, and 5.1% of HIV diseases are related to work-related subjection (Rapiti et al., 2014, cited by Mossburg et al., 2019). HCWs should be secured from work-related risks as mining or construction workforces do. Hazardous workplace settings facilitate health service providers' sustained attacks in many countries because of work-related disease, injury, and the consequential fright of health providers of work-related diseases, counting HIV and Tuberculosis (Ghosh, 2013). Acknowledging a number of these work-related health risks and the communication trend of those infected is critical to conceding the degree of the crisis and may be functional in proposing deliberate strategic programs that would facilitate support and sustain better health and safety standards (Adamu and Abdullahi, 2017).

In sub-Saharan Africa, the shortage of professionals in the health sector is illustrated as a humanitarian resource disaster because of the elevated emigration of skilled experts. The emigration impacted complicated working conditions, poor income, little motivation, and a huge workload of infectious illnesses, especially Hepatitis and HIV/AIDS. In addition, facts from sub-Saharan Africa point out that healthcare providers are often subjected to chemical, biological, physical, and psychosocial work-related risks (Dovlo, 2004, 2005; WHO, 2006, as cited in Ndejjo

et al., 2015). Health providers in areas like operating, delivery, and emergency units and laboratories have a high possibility of subjection. Hospital waste collectors, cleaners, and workers whose responsibilities entail managing blood-stained substances are too at the great possibility of being exposed to risks (Markovic-Denic et al., 2015).

The morbidity and mortality of HCWs associated with occupational subjections have an impact on the labor force and as a consequence on access to better healthcare. In sub-Saharan Africa, the shortage of professionals in the health sector is termed a humanitarian resource crisis because of the high emigration of skilled experts, inappropriate work environment, insufficient income, few incentives, and elevated risks of infectious illnesses, especially HIV/AIDS and hepatitis (Dovlo, 2004, 2005; WHO, 2006, cited by Ndejjo et al., 2015). Study findings from sub-Saharan Africa point out that healthcare providers are repeatedly subjected to chemical, biological, physical, and psychosocial work-related risks (Nsubuga and Jaakkola, 2005; Tinubu, Mbada, Oyeyemi, and Fabunmi, 2010, cited by Ndejjo et al., 2015).

Statement of the Problem

The WHO asserts that all health service providers, counting healthcare experts, are subjected to work-related risks (WHO, 2019 cited by Huei et al., 2020). Healthcare experts providing health services in hospitals and healthcare amenities are more prone to subjection to these risks than their counterparts working in different sectors. Moreover, The International Labor Organization (ILO) affirmed that millions of health service providers experience work-related infections and accidents, and several give in to work-related risks (ILO, 2018, cited by Huei et al., 2020).

Occupational health is an uncared-for community health matter among health service providers in low-resource countries and this personnel may subject themselves to diverse types of hazards, that may have negative outcomes for their health, safety, and work achievement (Bin-Ghouth et al., 2021). HCWs in different healthcare amenities are subjected to several risks, particularly during the COVID-19 disaster (Thirunavukkarasu et al., 2021).

Studies on work-related subjections to dangerous chemicals amid HCWs have identified dangers, and safety interventions and principles have been put in place to promote their safety (National Institute of Occupational Health and Safety, 2009, as cited in Rai, El-Zaemey, Dorji, and Fritschi, 2020). However, many of these researches were carried out in high-income countries (McDiarmid, 2014, cited by Rai et al., 2020). Limited interventions have been carried out in assessing these risks in low and middle-income countries (LMICs) (Tipayamongkhogul, Luksamijarulkul, Mawn, Kongtip, and Woskie, 2016, cited by Rai et al., 2020). The limited studies on occupational health hazards from LMICs have mostly assessed the subjection to latex (Amarasekera, Rathnamalala, Samaraweera, and Jinadasa, 2010, cited by Rai et al., 2020).

This situation calls for immediate strategic intervention programs. If no intervention program is made, the shortage of healthcare workers owing to emigration would escalate poor working conditions, and subjection to deadly infectious agents would reign in health facilities. The strategic intervention program should promote remuneration benefits for HCWs. The emigration to developed economies would increase the workload of the remaining staff, which would facilitate contribute to further illness, injury, job dissatisfaction, and the need to migrate (Wilburn & Eijkemans, 2004).

This project sought to examine work-related health hazards among healthcare workers and structure an intervention to diminish risks that threaten the health of this working group. The project sought to identify the health hazards, and causes, and build the capacity of HCWs on appropriate strategic measures to mitigate them. The intervention provided sought to reduce risks and minimize the hazards threatening HCWs' safety in Shinyanga District.

Project Goal and Objectives

The goal of this study was to assess occupational health hazards among healthcare workers in Shinyanga. The project specifically sought to achieve three objectives highlighted below upon execution.

1. To assess risks associated with occupational health
2. To identify factors (causes) of occupational health hazards among HCWs
3. To build the capacity of healthcare workers on measures to mitigate health hazards

Study Project Indicators

Health Outcomes

1. By the end of the program, 60% of the participants (HCWs) would be able to identify the health risk factors in their health facility and propose appropriate mitigation measures.
2. By the end of the program, at least 80% of the participants would be able to apply appropriate best practices in reducing health hazards in their working environment.

Behavioral Outcomes

1. By the end of the program, at least 60% of health facility administrators would be active in communicating and reporting on OHHs and new infections.
2. By the end of the program, new infections among HCWs would be reduced by 60%.

3. By the end of the program, at least 60% of HCWs would be capacitated on occupational health hazards.

Social-Environmental Outcomes

1. At the end of the program, at least 90% of the HCWs would avoid careless proximity in attending to patients.

Significance of the Study

To participants (HCWs), the study in its undertaking of raising awareness of HCWs on OHH enhanced the decline in exposure to health hazards in the workplace. The study besides organized a platform for HCWs to advocate their interests consistently. The study besides advocated the voice of HCWs to improve their working conditions.

To the Municipal Council, improving and safeguarding the safety, health, and welfare of HCWs impacted better health service delivery and strengthened the health system in Shinyanga Municipal Council. The Municipal got it easy to reach HCWs through their platform.

To other researchers, work-related health is an ignored public health concern among healthcare workers in developing economies. In Tanzania, Less is documented on occupational health. The last available online literature on occupational health was made in 2008. This study report will help contribute to reducing the gap in the existing pool of literature on the topic. The study will bridge the gap by disclosing true, relevant up-to-date data, facts, and information on the study. Disclosing the up-to-date facts will call health development stakeholders to advocate on the matter in question to make it of priority.

To the Ministry of Health, the study would contribute to the commitment of the government, and political leaders, to make policies and pass regulations to ensure the safety, health, and welfare of HCWs in their workplaces. The ministry

would besides find it easier to organize adopt and enlarge the platform HCWs in the platform to ease the training and dissemination of information and new technology and precautions on the outbreak of diseases.

Scope and Limitations of the Study

The scope of this study project was defined in Shinyanga Municipal health facilities. The study integrated health workers in Shinyanga regional referral hospital which was a public health facility. The study engaged both females and males at work at their ages. The project engaged HCWs from all departments in health facilities including managing and supporting staff.

This study project was susceptible to limitations. For instance, the Covid-19 protocols and regulations need to put on surgical masks to get into public health facilities. The study participants used recommended surgical masks to ensure smoothen the undertakings. The study sought a permit from responsible government authorities for the smooth undertaking of its activities.

Operational Definition of Terms

Healthcare Facility is a workplace that targets providing medical care to patients in terms of diagnosis, treatment, and prevention activities.

Healthcare Workers refer to all people who are involved in undertakings in actions whose primary target is to promote and or improve health. They make significant support and are vital to the performance of all health systems.

Occupational Hazard- Schulte, Pandalai, Wulsin, and Chun, 2012, (cited by Huei et al., 2020) referred to an occupational hazard as the short-term and long-term dangers or risks linked with detrimental workplace settings.

Occupational Safety and Health (OSH) is a multidisciplinary field dealing with the safety, health, and well-being of people at work (Faller, Bin Miskam, and Pereira, 2018).

Sharp Injury is an occurrence, that brings on a needle, blade (such as a scalpel), or other medical instruments to break in the skin. This is at times termed as a percutaneous injury.

CHAPTER 2

LITERATURE REVIEW

This chapter entails the subject matter under study by a wide spectrum of other researchers on the topic in question. It includes an analysis of literature on theoretical and empirical reviews, and theoretical and conceptual frameworks. It provides an indication of the scope of the topic under study.

Theoretical Review

Healthcare service is a vital sector that may adversely affect the health and safety of its workers (Mollaoğlu, Fertelli, and Özkan, 2010, cited by Ulutasdemir, Tanir, and Korhan, 2017). The work settings of health experts are more demanding in various regions of the globe (Ulutasdemir et al., 2017).

Work-related health hazards pose health risks to the health and welfare of healthcare workers. Work-related hazards have an adverse crash on the universal economy estimated to lead to about a 4% loss in the universal yearly gross domestic product each year (ILO, 2018, cited by Huei et al., 2020). The safety measures for work-related safety are inadequate in hospitals and health teaching institutions. Expertise advancement and learning windows of health experts are few, and health professional associations are inadequate (İzgia and Öztürk, 2012 cited by Ulutasdemir et al., 2017).

As a result, the health sector places its service providers, and supporting staff in danger of subjection to various types of risks (Crutcher, Lamm, and Hall, 1991; Moore and Kaczmarek, 1990; WHO, 2019, cited by, Tawiah, Baffour-Awuah,

Appiah-Brempong, and Afriyie-Gyawu, 2022). The work health-related dangers allied with health professionals are categorized into psychosocial, physical, biological, chemical, and ergonomic factors (Meydanlioğlu, 2013, cited by Ulutasdemir et al., 2017).

The healthcare segment is regarded to be one of the industries that present the most dangerous work-related environment (Tawiah et al., 2022). The health sector situates healthcare providers and supporting staff under the threat of hazards that jeopardize their safety, well-being, and eventually their life (Crutcher et al., 1991; Moore and Kaczmarek, 1990; WHO, 2019, cited by Tawiah et al., 2022). The latest COVID-19 plague unveiled the susceptibility of health experts and the entire healthcare system (The Lancet, 2020, cited by Tawiah et al., 2022). The health hazard encountered by healthcare providers attributable to pathogens respiratory diseases (biological hazard), counting COVID-19, are elevated compared to the general public (Atnafie, Anteneh, Yimenu, and Kifle, 2021; MacIntyre et al., 2014, cited by Thirunavukkarasu et al., 2021). Amnesty International affirmed that in the globe more than 7,000 HCWs passed away as a result of COVID-19 (Shiferaw et al., 2021, cited by Thirunavukkarasu et al., 2021).

Globally, the healthcare labor force represents 12% of the productive population (Goniewicz et al., 2012, cited by, Ndejjo et al., 2015). The healthcare sector's workforce is at underlying danger of suffering due to subjection to several dangerous agents stumbled upon within their working environment (Vecchio, Sasco, and Cann, 2003 cited by Rai et al., 2020). The latest and observable instance of the COVID-19 plague revealed the susceptibility of health service providers and confirmed the significance of promoting their well-being (The Lancet, 2020, cited by Rai et al., 2020). In previous years, occupational health has turned into the subject

matter of particular consideration. The health of HCWs in the working areas has turned into a major concern in our community and precedence in public health (Roland-Lévy, Lemoine, and Jeoffrion, 2014, cited by Giurgiu et al., 2016).

Healthcare providers offer medical services to sick people in workplace settings that are regarded as being among the most dangerous workplace environment (Crutcher et al., 1991; Moore and Kaczmarek, 1990, cited by Mossburg et al., 2019). These most common occupational hazards are classified as biological, chemical, physical, ergonomic, psychosocial, fire and explosion, and electrical dangers that endanger healthcare providers' lives, safety, and well-being (WHO, 2019, cited by Mossburg et al., 2019).

Healthcare workers (HCWs) should be protected from unfavorable and dangerous working environments the same as mining or construction staff are protected. The responsibilities of HCWs are to provide curative services to patients and the injured. Healthcare workers are usually perceived as “resistant” to harm or diseases. Their clients (patients) are given priority. They are usually anticipated to forgo by risking their welfare towards redeeming the sick people. Safeguarding the health of healthcare providers has the additional advantages of promoting better service in caring for patients and strengthening the medical service system (Ghosh, 2013).

The leading areas in that healthcare workers perform hazardous day-to-day tasks include injection administration, nursing, bed making, cleaning and dressing of wounds, medication administration, and supporting surgery. In undertaking the fore mentioned duties, health workers are subjected to several forms of dangerous risks counting physical, chemical, mechanical, and biological hazards. In medical service delivery, Nursing and Midwifery trainees are more subjected to dangerous work-

related risks when assuming activities of supporting baby deliveries, administering, and managing diverse forms of fluids and medicine, and various treatment expertise as well as a wound dressing (Atulomah and Oladepo, 2002, cited by Amare, Tesfaye, Girmay, and Gebreagziabher, 2021).

Acknowledging these hazards promoted designing and instituting deliberate and strategic programs for safety protocols and principles to safeguard workers in the health sector in developed nations and have managed to alleviate these risks (National Institute of Occupational Health and Safety, 2009, cited by Rai et al., 2020).

Conversely, in several developing economies Countries (LMICs), work-related health and security are usually ignored (Nuwayhid, 2004, cited by Rai et al., 2020).

The insufficiencies in work-related health are usually accredited due to a shortage of political engagement, inadequate funds, deprived data collection systems, and feeble imposition of governing laws, rules, and acts. Work-related health studies have revealed that the provision of secure working conditions promotes managerial obligation and retaining employees (Ingersoll, Olsan, Drew-Cates, DeVinney, and Davies, 2002, cited by Rai et al., 2020). On the other hand, inappropriate workplace settings and health hazards are affirmed to facilitate challenges in employment and retaining of employees in the health sector in LMICs, enlarging the problem of health service providers' deficiency in these economies (Liese and Dussault, 2004, cited by Rai et al., 2020).

The operational environments of health service providers are associated with the standard of medical care issued to the sick. The conducive workplace environments, counting shift of duties, psycho-social factors, team administration, working hours, and culture are related to the quality of their health and security results (Henker et al., 2018; McLinton et al., 2018; Weerd & Baratta, 2015, cited by

Thirunavukkarasu et al., 2021). In toting up, healthcare workers are regarded as resistant to contracting diseases by a wide-range of the population. Conversely, in the real world, the situation is completely diverse as affirmed by preceding research (Abdulmageed et al., 2018; Hashmi, Abu, Reesh, and Indah, 2013; Joseph and Joseph, 2016; Khabour, Al Ali, and Mahallawi, 2018; Moore and Kaczmarek, 1990; Ndejjo et al., 2015, cited by Thirunavukkarasu et al., 2021). The safeguarding of the well-being of the health service providers has vital advantages in promoting community health as they support about 10 to 18% of the labor force of several nations (Albejaidi and Nair, 2019; Al-Hanawi, Khan, and Al-Borie, 2019, cited by Thirunavukkarasu et al., 2021). Nevertheless, it's possible to reduce work-related risks amongst health service providers who keep facing, biological and non-biological health dangers at their place of work globally (Senthil et al., 2015; Wilburn & Eijkemans, 2004, cited by Thirunavukkarasu et al., 2021).

Among the most common work-related threats include needle-stick and sharp injury. These hazards arise usually when performing nursing events including the direct application of prescribed medicine or blood transfusion, plus assuming other treatment tasks that engage sharp-edged equipment. The main sources of needle-stick and pointed injuries are inappropriate knowledge of health workers on how to safely handle sharp edges equipment, their dangers, control of a needle-stick injury, and appropriate hospital waste management and discarding. Besides, needle-stick injury in addition causes a burden of threat for patients if the hurt health workers are infected with hepatitis B or C and Human Immune Deficiency Virus (HIV) (Amare et al., 2021).

Needle-stick harm is more common in workplaces of healthcare professionals especially nursing students encounter it (Trivedi et al., 2013, cited by Amare et al.,

2021). Research done at Dammam Medical University in Ethiopia affirmed that above 75% of the nursing, trainees had had no earlier teaching on physical work-related threats (El-Hay and Mezayen, 2015, cited Amare et al., 2021). In addition, communities in low-resource nations have a high number of people infected by the human immune deficiency virus globally (Hutin, Hauri, and Armstrong, 2003, cited by Amare et al., 2021). This depicts the climax prevalence of subjection to work-related dangers of HCWs in low-income countries (Amare et al., 2021).

The study carried out in the United Kingdom in 4 teaching health institutions revealed that 175 incidences of blood and other body fluids subjections among physicians were affirmed over three years of studies. About 81 (46%) of them were cases that arose among experienced physicians while 94 (54.5%) occurred in junior physicians. The study report shows that junior physicians had an advanced pace of blood and other body fluids subjections in contrast to experienced physicians. The main common environment for blood and other body fluids subjection among experienced physicians was in the surgery unit (59%) (Naghavi and Sanati, 2009, cited by Tesfay and Habtewold, 2014).

Occupational Risk Factors in Healthcare Settings

Occupational hazards are largely classified as biological, chemical, physical, ergonomic, psychosocial, fire and explosion, and electrical dangers that endanger the lives of healthcare workers, security, and welfare (WHO, 2019, cited by Mossburg et al., 2019). These categories are discussed below.

Physical Hazards

Probable physical exposures in health facilities comprise extreme noise in the sterilization unit, surgery unit, areas for serving foods, the engineering unit, extreme

temperatures, particularly in kitchen amenities, boiler unit, and clothes washing unit; ionizing and non-ionizing emissions like laser and radio-frequency (Rosenstock, 2005, cited by Izadi and Piruznia, 2017). For instance, in utilizing laser in treatments, laser emission integration may affect thermal injury if the laser emission elevates the normal temperature of body tissues, which can impact eye injuries, plus skin burns and electric shock.

Medical assessment with a focus on visual sharpness and fundoscopic examination is suggested to be conducted before or during the recruitment process, after industrial accidents, and end of employment. Radiation subjection can take place in the diagnostic imaging processes, oncology treatment locale, and clients treated with radioactive isotope agents (Walton and Rogers, 2017, cited by Izadi and Piruznia, 2017). Physical protection by using aprons containing lead is effective (Izadi and Piruznia, 2017). Moreover, physical hazards integrate elevated subjection to sunshine/ ultraviolet emissions and excessive temperature that is either hot or cold (Asumeng, Asamani, Afful, and Agyemang, 2015).

Physical hazards originate from energy and matter and their interrelationships flanked the two. Theoretically, physical dangers in the working environment are categorized into worker-equipment interfaces, physical workplace settings, and energy and electromagnetic radiations. The outcomes of subjection to these dangers can be adapted by protecting healthcare workers and by diverse forms of human factors (Wald, 2016). Physical hazards are eminent in the general workplace setting.

These risks in healthcare facilities comprise subjection to ionizing and non-ionizing emissions, excessive sound, elevated temperature, lighting, electrical injuries, and fire (El-Sallamy, Kabbash, El-Fatah, and El-Feky, 2018). In addition, physical hazards also take in slimy floors, electrical dangers, noise, inadequate lighting, and

insufficient air circulation (Triolo, 1989, cited by Nankongnab et al., 2021). The adequate and reasonable intensity of light should be organized to give in conducive workplace conditions for employees in the health sector (Beyzadeoğlu and Cengiz, 2013, cited by Ulutasdemir et al., 2017).

Chemical Risk Factors

Diverse chemicals are core-functional agents employed in making diagnoses along with curing illnesses, undertaking preventive measures and hygienic precautions are necessary for they are dangerous to the health status of health experts (Öcek, 2011, cited by Ulutasdemir et al., 2017). The application of chemicals substances is extensive in health service provision settings counting cleaning and anesthetic agents, cytotoxic drugs and pharmaceutical materials, sanitizing and sterilizing agents, and laboratory chemicals (Gestal, 1987; Health and Safety Authority, 2020, cited by Nankongnab et al., 2021).

At times, health professionals are subjected to chemicals (drugs and some heavy metals including mercury and latex) constantly and from time to time in saturated quantity. Correspondingly, their results depict a wide spectrum of varieties depending on the level of concentration, contact duration, mode, the existence of some dangerous agents and personal skin texture, etc (Öcek, 2011, cited by Ulutasdemir et al., 2017). Acidity and alkalinity, salts, dyes, evaporative organic solvents, and diverse drugs counting mostly anticancer drugs in pathology, biochemistry, hematology, and some laboratories are impending risk factors for a sequence of sicknesses from hypersensitivity to tumors (American Society of Health-System Pharmacist, 2006; Meydanlioğlu, 2013, cited by (Ulutasdemir et al., 2017).

Chemicals that severely intoxicate an organ and cause other toxic impacts and drugs that portray mutagenic, carcinogenic, teratogenic outcomes or any disorders

based on the reproductive system are termed “hazardous drugs.” Persistent subjection to these antineoplastic/ cytotoxic drugs applied in chemotherapy impacts major threats among health employees. In the preparatory process, waste management and disposal, severe health indicators may be realized owing to the breathing-in of tiny particles and droplets, the dermal incorporation, and the ingestion of infected edible substances particularly teratogenic, carcinogenic, and genotoxic effects that might interfere with the ability to reproduce in gestation (Beşer, 2012; Connor and McDiarmid, 2006; Emiroğlu, 2012; Öcek, 2011, cited by Ulutasdemir et al., 2017).

Moreover, chemical danger agents are prominent whenever a healthcare provider is subjected to any practical pharmaceutical arrangements in the place of work of type (solid, liquid, or gas). Some chemicals are more harmless than others, however to several HCWs who are more sensitive to some chemical substances, still normal solutions can impact health problems that as dermal frustration, or breathing difficulties. These chemicals include Liquids like cleaning products, paints, acids, solvents especially if chemicals are packed or stored in unlabeled containers, vapors and fumes that emerge from metal joinery work or subjection to solvents; gases like acetylene, propane, carbon monoxide, and helium; flammable materials like gasoline, solvents, and volatile chemicals, pest killer chemicals (Asumeng et al., 2015).

Administration of chemical dangers requires collective and joint efforts of Occupational Health and Safety (OHS) experts, counting generalist OHS professionals, work-related hygienists, and work-related health experts (Pisaniello and Tepe, 2012). The International Labour Organization (ILO) has extensively documented that the act of safeguarding healthcare workers from dangerous chemicals is vital to protecting and promoting healthy populations and ensuring environmental sustainability (International Labour Organization, 2021).

Work-related dermal illness is ranked to be the most second frequent work-related infection among healthcare providers (Ngajilo, 2014; Ozgur, 2018, cited by Mekonnen, Yenealem, and Tolosa, 2019). About the Health and Safety Executive (HSE) study, about 16,000 new risk exposures occur annually in the UK (Union of Shop, Distributive and Allied Workers, 2010, cited by Mekonnen et al., 2019). In 2010, it was reported that there had been approximately 850,000 medical cases of work-related skin inflammation among healthcare providers in the USA by Public Health Ontario (2018, cited by Mekonnen et al., 2019). It's estimated that 25% of working days lost is due to work-related skin illness by Peate (2002, cited by Mekonnen et al., 2019).

Occupational contact dermatitis (OCD) quantify for 70–90% of all work-related skin inflammations, which erodes practical capability and the life standard by Malik and English (2015, cited by Mekonnen et al., 2019). Exposure of healthcare workers in the workplace to some chemical substances leads to inflammation of the skin (Public Health Ontario, 2018; Union of Shop, Distributive and Allied Workers, 2010, cited by Mekonnen et al., 2019). The main evident symptoms of skin diseases comprise inflammation, irritation, flaking or cracking of the skin, bleb, and weeping eczema of the skin Union of Shop, Distributive and Allied Workers (2010, cited by Mekonnen et al., 2019).

Work-related contact skin inflammation is the main frequent type of work-related dermatitis typically that infect healthcare providers (Meyer, Chen, Holt, Beck, and Cherry, 2000; NHS Foundation Trust, 2018, cited by Mekonnen et al., 2019). Doing work in healthcare settings is considered a source of the escalating likelihood of developing a disease for occupational-related skin sickness (Kadivar and Belsito,

2015, 2015; Kurpiewska, Liwkowicz, Benczek, and Padlewska, 2011; Ozgur, 2018; Prodi, Rui, Fortina, Corradin, and Filon, 2016, cited by Mekonnen et al., 2019).

Healthcare workers are frequently subjected to cleaning materials, like disinfectants, soaps, detergents, and latex through regular hand-washing (Meyer et al., 2000; Prodi et al., 2016, cited by Mekonnen et al., 2019). The usage of alcohol clots, contact with allergens, and the occlusive consequence of datagloves also lead to contacting skin inflammations among health service providers by Malik and English (2015, cited by Mekonnen et al., 2019). A conducted research revealed that the usage of latex gloves can influence the development of contact skin inflammations in health service providers Kurpiewska et al. (2011, cited by Mekonnen et al., 2019).

Biological Risk Factors

This form of hazard emerges when healthcare workers deal with animals, people, or infectious biological plant substances. Working in learning institutions, daycare centers, colleges and universities, health facilities, laboratories, emergency response, home treatments, outside jobs, etc. may subject service providers to biological dangers. Factors that might contribute to biological exposures count subjection to Blood and other body fluids, fungi/mold, bacteria and viruses, plants, insect bites, and animal and bird droppings. The mentioned agents can impact infections of different types, and parasitic infestations, among others (Asumeng et al., 2015).

Biological hazards are organic in nature or carried and spread through biological vectors, counting disease-causing microorganisms, toxins, and bioactive body materials. Good examples of these agents are bacteria, viruses, or parasites, like poisonous wildlife and insects, poisonous plants, and anopheles mosquitoes that harbor disease-causing agents (Newman-Martin, 2012). Biological hazards are

categorized into three groups based on modes of transmission that are by respiration and droplets, direct contact, and bloody body fluids as discussed below.

Exposure to blood and other body fluids (BBFs). Work-related subjection to blood and other body fluids (BBFs) is unintentional exposure to blood and body fluids when performing medical interventions for clients by health service providers. The accidental subjection to BBFs transmits the danger of illness through a range of blood-borne viruses. This mode of transmission comprises a main threat to the transmission of diseases such as Human Immune deficiency Virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV). These viral diseases are among the most severe community health problems that HCWs contract WHO (2013 cited by Yasin, Fisseha, Mekonnen, and Yirdaw, 2019).

Healthcare providers are at great risk of contracting various diseases transmitted through blood and body fluids as a result of frequent subjection to biological substances and clients' body fluids. Needle injuries and harm attributable to wounding, biting, or splashing accidents comprise some of the customs that HCWs interact with in performing their daily activities by Ngatu et al. (2012 as cited in Yasin et al., 2019). The degree of recurrence of needle-stick injuries and the great incidence of blood-borne infections in the entire population contains a large effect on the subjection of diverse agents of risk infections among HCWs by Wicker et al. (2008 cited by Yasin et al., 2019). Complications of infections linked with needle-stick injury may impact a range of severe and tension outcomes ranging from gentle to severe anxiety among HCWs by Yimechew, Tiruneh, and Ejigu (2013, cited by Yasin et al., 2019). It is very essential that HCWs experience follow-up examinations after being subjected to blood and body fluids for the discovery and early treatment of

severe infections, for instance, HCV by Behrman, Shofer, and Green-McKenzie (2001, cited by Yasin et al., 2019).

The blood of patients infected with HBV carries a great amount of HBV than other body fluids and is the main functional basis of transmission in healthcare facilities. Exposure to cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluids is regarded to be greatly communicable by US Public Health Service (2001, cited by Yasin et al., 2019). Presently, of the three deadly viral infections (HBV, HCV, and HIV), HBV is the single viral infection with a vaccine for control by Prevention Control (2003, cited by Yasin et al., 2019). Healthcare providers who have received a vaccine against hepatitis B are almost not at risk of infection (Prevention Control, 2003, as cited in Yasin et al., 2019).

WHO projected that about 3 million Healthcare workers are subjected to blood-borne viruses annually and about 90% of the subjections take place in low-resource states by WHO (2010, cited by Yasin et al., 2019). HCWs in low-income countries are at serious threat of being infected with blood-borne pathogens primarily HBV, HCV, and HIV of the reason of high occurrence of such disease-causing agents in the entire population, especially sub-Saharan Africa (Belyhun, Maier, Mulu, Diro, and Liebert (2016, cited by Yasin et al., 2019).

With the fast spread of the new coronavirus around the globe, by March 23, 2021, the collective figure of confirmed cases globally had got to 124,287,980. WHO termed this virus as ‘Severe Acute Respiratory Syndrome Coronavirus 2’ (SARS-CoV-2), while the infection that was caused by this virus was called ‘Coronavirus Disease’ (COVID-19) by Huang et al. (2020, cited by Jin, Chen, Fu, & Qu, 2021). The abrupt and widespread of the pandemic, SARS-CoV-2 virus outweighed medical systems’ ability to manage it effectively due to a deficit of medical provisions, and

inadequate means of controlling the infection positioned HCWs increasingly at risk of being infected by Wang et al. (2020, cited by Jin et al., 2021). Healthcare providers in workplaces were at higher risk of contracting the deadly disease but were at the frontlines in combating the pandemic. HCWs needed special protection to be safe and healthy by Alajmi et al. (2020 cited by (Jin et al., 2021). Studies conducted on the deadly infection revealed that in Spain and Italy, about 26% and 9% of health providers who were tested employing the polymerase chain reaction technique were confirmed to have contracted COVID-19 respectively (Iversen et al., 2020; Remuzzi and Remuzzi, 2020, cited by Jin et al., 2021).

The rate of infection of the viral disease, COVID-19 among health providers was huge, spanning from 3% to 17% to Alajmi et al. (2020, cited by Jin et al., 2021). On 13th of January 2021, the WHO affirmed that concerning the wide spread of COVID-19, more than ever as further transmissible mutant viruses spilled over through the northern hemisphere at a higher pace, the second year of the new coronavirus deadly disease may be more severe than the first year by Lapid (2021, cited by Jin et al., 2021). Moreover, the transmutation of the virus increased further the furious risk of infection. Recent study findings have documented that the new variety of coronavirus strains found in the United Kingdom was 35% higher risky and more deadly than the initial strain. This information hastened the level of threat to the world pandemic prevention and control condition by TASS (2021, cited by Jin et al., 2021). Therefore, HCWs were at a higher risk of contracting the infection that singling out and examining their own possibilities of infection was principally vital to safeguard them.

Agents transmitted by respiration and droplets. Infections that spread employing air (airborne infections) count measles, tuberculosis, chicken pox, and

severe acute respiratory syndrome to mention but a few (Sacadura-Leite, Sousa-Uva, Ferreira, Costa, and Passos, 2020). Diverse studies that were conducted in Turkey revealed that HCWs who provided nursing services were at high risk of being infected especially those used to work in pulmonary disease units. Studies from Turkey have affirmed that tuberculosis infection danger was 7.4 times great in pulmonary disease health facilities about other health facilities with no pulmonary disease clinics for the reason of the higher subjection to tuberculosis (Ergönül, 2013; Evyapan, 2013 cited by Ulutasdemir et al., 2017). Deliberate and strategic administrative measures are vital to reducing risks of subjection to individuals with supposed or confirmed disease transmitted by air, (airborne infection) (Zuckerman, 2011, cited by Gorman et al., 2014).

Studies conducted regarding the spread of respiratory viral pathogens in the prevalence of COVID-19 plague have revealed that the condition of the environment can considerably impact the transmission of droplets, e.g. temperature, air moisture, and airflow can as well significantly impact the length of space that droplets can travel. Human elements as well can impact the transmission of droplets, these elements include activities being undertaken for instance, running or singing can facilitate the spread of droplets, just as coughing and sneezing can do (Newman-Martin, 2012).

The recent deadly viral disease; Coronavirus Disease of 2019 (COVID-19) plague has had overwhelming outcomes on the global community and has instituted a considerable workload on health service providers (Bandyopadhyay et al., 2020; Mehta et al., 2021, cited by Howard-Anderson et al., 2022). Health service providers have reported health discomfort counting mental health distress and burnout, often declaring fright of SARS-CoV-2 infection (Asghar et al., 2021; Card, 2021; Mehta et

al., 2021, as cited in Howard-Anderson et al., 2022). Moreover, the observational study design has denoted that the possibility of SARS-CoV-2 disease may be severe to HCWs who undertake specific and direct, patient-care duties, (Shepard et al., 2021; Wilkins et al., 2021, cited by Howard-Anderson et al., 2022) or those who work in great risk settings including COVID-19 departments (Eyre et al., 2020; Iversen et al., 2020; Purswani et al., 2021; Sydney et al., 2020; Vahidy et al., 2020, cited by Howard-Anderson et al., 2022).

However, the possibility of contracting the infection has been variably confirmed in issued studies (Baker et al., 2020; Fukuda et al., 2021; Jacob et al., 2021; Moscola et al., 2020; Steensels et al., 2020, cited by Howard-Anderson et al., 2022). Undertaking aerosol-generating procedures (AGPs) have to been underlined as prospective risk factors for the spread of SARS-CoV-2, largely constructed on practice with SARSCoV-1 (Chan et al., 2021; Tran, Cimon, Severn, Pessoa-Silva, & Conly, 2012, cited by Howard-Anderson et al., 2022).

Infections being transmitted through direct contact. These are communicable agents that spread infections employing direct contact with a person who is infected by the disease, a patient. It is therefore not advised to get in touch with the skin or mucus plus the damaged skin integrity for the transmission of infections. The repellant variant of bacteria and skin vectors such as scabies are examples of germs that can impact serious diseases of patients (Evyapan, 2013, cited by Ulutasdemir et al., 2017)

Transmission through direct contact involves physical touch linking an infected individual and a vulnerable person and the dissemination of pathogens conveyed through touching, contacts via sexual intercourse, or exposure to body fluids or lesions. Health service providers with a comparatively great risk of direct

contact with one infection transmissions are more ease for those subjected to blood or bodily liquids (e.g. medical and nursing staff, emergency workers). A good example of this is needle stick injury which is a source of percutaneous injection of blood-borne pathogens, counting HIV or hepatitis B (Newman-Martin, 2012).

Biological agents transmitted by blood and bloody body fluids. Biological subjection grounds because of the subjection to blood-borne disease-causing organisms through skin injuries, splashes, and getting into contact with other subjection like communicable microorganisms. In addition, subjection to natural components of surgical burn results from the use of lasers and electrosurgical areas, and subjection to protein allergens in latex gloves and chemicals.

Pathogens imply agents that cause severe harm to an illness and are a serious hazard to the safety, well-being, and lives of health providers; it may represent a high possibility of transmission to the general population; there is generally no successful preventive treatment or accessible medical care in place (European Economic Community, 1993 cited by Ghosh, 2013). Health service providers are a dangerous likelihood of being infected by the blood-borne disease in various workplace settings. The workplace settings include rigorous care units, operation rooms, emergency units, inpatient units, transportation teams, and home care units (Gorman et al., 2014).

Biological mediators can transfer infections via the skin because of its impaired integrity and mucous membranes (mouth, eye, and urogenital mucosa) as an outcome of subjection to blood and or bloody body fluids and some germ-free body liquids. Diverse microorganisms (almost 30) can be transmitted by this means, but the most common ones comprise hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV), and human immunodeficiency virus (HIV) because they can result to general illness due to their high speed of spread. Varieties of the medical

results of these agents differ from asymptomatic diseases to critical and unexpectedly mortal illnesses (Azap et al., 2005; CDC, 2016; Emiroğlu, 2012; Ergönül, 2013; Himmelreich et al., 2013, cited by Ulutasdemir et al., 2017).

The infections' transmission through blood arises mainly by the penetration of sharply pointed substances mainly needles used in patients, injury by unhygienic sharp instruments, or mucosal stain contaminated blood or body liquids. It has been stipulated that about 66.67% of health experts affirmed to be subjected to blood and/or body liquid no less than once. HIV infection was related to the health employees found that 57% of the HIV-positive health-trained workers, and the possibility of developing hepatitis B disease among HCWs is more than 10 times in contrast to the entire population (Emiroğlu, 2012, cited by Ulutasdemir et al., 2017).

For instance, in Turkey, it's common to see Crimean-Congo Hemorrhagic Fever (CCHF) and Margburg which make excessive bleeding and contaminated blood (Ulutasdemir et al., 2017). Diverse risk mitigation strategies have been instituted and suggested to diminish work-related subjections to blood-borne pathogens, as well as typical protection, immunization contra Hepatitis B, and Post-Exposure Prophylaxis (PEP) for Hepatitis B and HIV (WHO, 2006, cited by Rai et al., 2020).

Unintentional work-related bruise to HCWs has posed a major crisis in the health sector due to the related health dangers of contracting diseases like hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency (HIV) viruses (Cheng et al. 2012, Prüss-Ustün et al. 2005, O'Connor 2009, and Memish 2013) cited by (Mengesha and Yirsaw 2014). The global incidence of needle biopsy among health workers is projected that 3 million HCWS annually where a risk of four injuries for every health employee could arise per annum (Deisenhammer, Radon, Nowak, and Reichert, 2006; Reda, Fisseha, Mengistie, and Vandeweerd, 2010, cited by Mengesha

and Yirsaw, 2013). Subjection to getting into contact with risky blood as a result of the injury may increase the chances of infections to human immunodeficiency virus (HIV), hepatitis B (HBV), hepatitis C (HCV) (Bell, 1997; Doebebling et al., 2003; Gerberding, 2003; Talaat et al., 2003, cited by Mengesha and Yirsaw, 2013). Subjection to such risky blood contacts in workplace settings can increase a substantial percentage of contaminations erupting among health workers. For instance, according to the WHO approximation, the worldwide burden of infection from work-related subjection accounted for 40% and 2.5% of hepatitis and HIV illnesses, correspondingly (Prüss-Ustün et al., 2005, cited by Mengesha and Yirsaw, 2013).

The outbreak of certain diseases among HCWs relies on their prevalence in the community, little have reports have documented a comparatively higher zero-positivity for HBV among health service providers in health facilities (Franco et al., 2012, cited by Mengesha and Yirsaw, 2013). Studies reported the high incidence of needle stick injury among health professionals in Ethiopia (Kebede, Molla, and Sharma, 2012; Tadesse and Tadesse, 2010, cited by Mengesha and Yirsaw, 2013). Such job-related injuries have impacted workers' job discontent and mental distress may diminish workers' enthusiasm and after mean while may deteriorate the standard of community healthcare (Feuerstein, Miller, Burrell, and Berger, 1998; Kebede et al., 2012, cited by Mengesha and Yirsaw, 2013).

Ergonomic Hazards

Ergonomic risks come about when the kind of task, body posture, and working conditions exert excessive physical tension on the healthcare worker's body (Asumeng et al., 2015). These may involve the lifting of heavy equipment, persistent and vigorous actions, and uncomfortable postures that arise from unsafe work

techniques plus inappropriately designed work settings and equipment. A good typical case of a task associated with elemental possibility for musculoskeletal injuries includes transporting patients, managing materials, lifting, pushing/ pulling heavy objects frequently, and inadequately designed workplace settings (Dou, 2014, cited by Izadi and Piruznia, 2017). The ergonomic dangers can result in musculoskeletal infection that can influence the dysfunction of nerves, tendons, muscles, and supporting frameworks of the body. Low back ache and carpal tunnel syndrome are among commonly known disorders impacted by work-related musculoskeletal functioning (L. Rosenstock and Cullen, 2005, cited by Izadi and Piruznia, 2017).

Ergonomic hazards are the most difficult to identify because it's not possible to detect instantly the tension on one's body or the impairments that risks exert. Temporary subjection to ergonomic hazards might impact painful muscles the following day or some days after subjection exposure, but persistent subjection can affect serious continuous illnesses (Asumeng et al., 2015). Harmonization and performance efficiency at the workplace is guaranteed between workers and employers through improved working conditions, better working equipment, and safety. In case of any discrepancy flanked by the physical capability of the worker and the physical demands, work-related disorders are likely to erupt. Many healthcare providers are subjected to various ergonomic determinant dangers. Workers employed in building, farming, industrialized, wholesale, and retail businesses, plus human health and social work are more subjected to ergonomic determinant dangers compared to their counterparts in other sectors (Eurofound, 2017 cited by Park and Kim, 2020). In the healthcare industry, nurses are positioned to be in the third rank following employees in heavy industry and drivers of heavy vehicles who may easily

confront musculoskeletal system dysfunctions (Ilhan, Durukan, Aras, Türkçüoğlu, and Aygün, 2006; Meydanlıoğlu, 2013, cited by Ulutasdemir et al., 2017).

The cleaning responsibility in healthcare settings has been linked with various ergonomic dangers, that enhance changes in body posture when working to impact work-related injuries, like musculoskeletal dysfunction. The subjection of cleaning workers to ergonomic dangers is related to the job procedures, illustrated by the energy and speed in undertaking duties, applying physical energy, and lifting heavy equipment. Nevertheless, frequent activities, despite having modern, contemporary tools and procedural means, are not modified to the psycho-physiological desires of working staff subjecting them to occupational injury, declining performance efficiency, and the promotion of work-related disorders (Luz et al., 2021).

Work-related musculoskeletal disorders (WMSDs) are a set of disorders associated with soft tissue distress created or irritated with a workplace setting subjections to ergonomic determinant dangers by (Campo, Weiser, Koenig, and Nordin, 2008, cited by Ganiyu, Olabode, Stanley, and Muhammad, 2015). It is usually associated with aches and distress in the muscles, ligaments, tendons, bursa, combined capsules, and bone enduring for more than 3 days (Campo et al., 2008, cited by Ganiyu et al., 2015). Healthcare provision is termed to be a high-risk job for WMSDs (Campo et al., 2008; Lorusso, Bruno, and L'Abbate, 2007; Ylipää et al., 2002, cited by Ganiyu et al., 2015). It is projected that about 33.333% of all issues of sick leaves amongst health service providers are associated with WMSDs by Meijssen and Knibbe (2007) cited by. Shoulder, neck, back, and knee dysfunctions are the common complaints reported among medical, dental, and nursing trainees (Menzel, 2008; Smith and Leggat, 2004; Smith, Wei, Ishitake, & Wang, 2005; Thornton et al.,

2008, cited by Ganiyu et al., 2015) but it is besides more frequent in other anatomical parts of the body including elbows, wrists, and hands.

Studies of WMSDs in the health sector conducted among healthcare workers have mainly dealt with dentists, physiotherapists, and nurses (Alexopoulos, Stathi, and Charizani, 2004, cited by Ganiyu et al., 2015), while WMSDs arise nearly at a similar frequency among certain healthcare providers. WMSDs are further associated with intensive labor duty, heavy and or tedious manual management, recurring movements, permanent work postures, and adapting an uncomfortable work posture. When working, fixed muscle disorder may arise because of extended uncomfortable postures or the desire to standardize or manipulate tools or work process control. WMSDs may as well be ignited by the great task of work or doing the work rapidly past the comfortable rate (Shokunbi, 2014, cited by Ganiyu et al., 2015). Other inducing determinants of WMSDs count inherent preference, mental strain, physical conditioning, age, obesity, etc.

Diffuse strain and distress have been noted they can be induced from the conditioning of excessive flexion postures, a position comparable to that usually adopted at the workplaces. Static muscle disorders impact further instant fatigue than active tasks because of coinciding constriction of the motion with improved muscle demands for oxygen and essential nutrients plus the desire to diffuse by-products as a consequence of vigorous muscle activities (Shokunbi, 2014, cited by Ganiyu et al., 2015). Finally, these may result in limitation of job duties, loss of working time and changing to a different job, and ultimately total professional change. Studies have been undertaken on the eruption of WMSDs among health service providers (Nordin, Leonard, and Thye, 2011, cited by Ganiyu et al., 2015). The studies have documented a high frequency of WMSDs in physiotherapists and the nursing team. The incidence

of musculoskeletal grievances among physicians was near to the ground and less compared to other healthcare providers, but comparable to publicized facts on the community population (Mehrddad, Dennerlein, and Morshedizadeh, 2012, cited by Ganiyu et al., 2015).

Psychosocial Hazards

Psychosocial risks are described to incorporate the relations among job description, work arrangements, and administration, plus other workplace settings and institutional circumstances, and the employees' work capabilities and actual needs (Asumeng et al., 2015). The level of job contentment portrays the harmony between the employees' anticipation of the organization he/she works for and the career development plus openings offered to them. Job contentment is one of the determinants that influence stress with serious impacts, especially in careers that make direct service delivery to humans. Persistent distress situations can result in challenges like leaving a job, family marriage incompatibility, diminished personal value, concentration difficulties, and loneliness (Ulutasdemir et al., 2017). Violence is among the determinants that negatively control job contentment and result in burnout in workplaces. Aggression that affects the welfare and health of HCWs in recent times, can be practically identified as a problem in almost each health facility (Meydanlioğlu, 2013, cited by Ulutasdemir et al., 2017).

Violence by both clients and coworkers is one of the most significant factors that induce and expose healthcare workers to psychosocial hazards. Verbal violence is a regular type of violence, this might be due to a shortage of employees, ease of entry to the health facility, availability of financial resources and drugs, and irritated members of the family. Psychosocial determinants do not harm the health of employees but, instead, can either promote or decline the probability that they

undergo tension in the place of work and, consequently, display a deprived health condition (Pujol-Cols and Lazzaro-Salazar, 2021).

Shift work has psychosocial risks in the healthcare environment, with diverse health consequences counting sleep disturbance, psychological chaos, gastrointestinal problems, cardiovascular diseases, and intensified underlying diseases (epilepsy, diabetes, asthma) (Walton and Rogers, 2017, cited by Izadi and Piruznia, 2017). High, consistent, and chronic subjection to psychosocial risks is most expected to result in the experience of work-related discomfort, that, consecutively is related to diverse signs demonstrating deprived health condition, counting psychiatric symptoms and cardiovascular disorders (Pujol-Cols and Lazzaro-Salazar, 2021).

In most situations, hazards do not arise alone, but collectively with a wide spectrum of psychosocial and physical risks. As part of the risk examination procedures the frequency and extent of subjection to psychosocial hazards will have to be taken into account (NSW government, 2021). The more psychosocial hazards arise, the more room for inducing harm in healthcare workers (HCWs) increases. Managing psychosocial hazards and threats may require resolution that may be thought of as promoting stress and therefore a work health and safety regulation risk (SafeWork NSW, 2022). Public Health England (2017) explicitly inculcates employers to promote psychosocial working conditions by better improving the quality of work and employment conditions. The directors of health facilities and or employers can support managers to promote psychosocial working conditions for healthcare workers and thus improve the quality of healthcare.

ILO has documented that there is an annual average loss of 1.25 trillion dollars due to occupational health and safety (OHS) difficulties. It has been reported that Turkey incurs an estimated annual loss of 4 million Turkish Liras only in social

security systems. Healthcare providers experience work-related stress, and they undergo awkward plans and the risks available in their working environment. The quality of health and welfare of health service providers ultimately influence the quality of health service and community health. It is thus critical to decline the subjection of healthcare providers to work-related dangers and deliberately resolve this issue (Ulutasdemir et al., 2017). Although biological risks for instance, diseases are generally acknowledged globally, the non-biological risks and related consequences are normally neglected (Magnavita and Heponiemi, 2011; McDiarmid, 2014, cited by Thirunavukkarasu et al., 2021).

Literature denotes the number of intervention programs undertaken to ensure the safety of HCWs at the workplace both in low- and high-income countries. For instance, The United States Centers for Disease Control and Prevention (US CDC) had instituted quality operating procedures and safeguarding guidelines that target to decline the possibility of transmission of disease agents starting from the blood or other liquid-like body parts including membranes' secretions and injured skin that can carry them. The intervention programs undertaken to safeguard healthcare providers have significant disparity between high and low-resource countries (Faller et al., 2018).

Requirements on work-related health and safety were rather important in 2003 during the late prevalence of Severe Acute Respiratory Syndrome (SARS). In those moments, no acknowledged medical care was accessible for SARS. Strict compliance with disease control guiding principles, policies, and actions was the only successful standard means to control and prevent the world transmission of the deadly infection. Studies documented a considerable shortage in expertise, procedure, and strategy conformity in healthcare workers (Faller et al., 2018).

Some guidelines of work-related Health and Safety rely on the adaption of best strategies in managing needles and other sharp-edged objects, to control further prevalence, particularly of Hepatitis B and C, which are regularly related to health service providers. A failure to adhere to disease control strategies promotes the spread of illness from sick people to health service providers, other patients, and supporting staff. It's consequently imperative for all health service providers to adopt and starkly hold on to the plans on work-related safety protocols. Besides, managers and or employers need to facilitate the execution of OHS in their particular facilities (Borg, 2010, cited by Faller et al., 2018).

Empirical Review

Studies conducted on the work-related hazard of human immuno-deficiency virus information among developed economies. Health service providers posted in AIDS-endemic regions revealed that of 99 working Dutch medics, 65% affirmed percutaneous subjection within 21 months. Furthermore, the average number of injuries among physicians was reported to be lesser (2.0 against 3.9 per year) and huge among nurses, according to de Graaf, Houweling, and van Zessen (1998, cited by Tesfay and Habtewold, 2014).

Another research conducted to identify risks of healthcare providers in low-resource economies revealed that health service providers in the economies are at severe risk of contracting diseases through blood-borne pathogens. Human Immuno-deficiency Virus, hepatitis B virus, and hepatitis C virus are especially at the high transmission of the virus in diverse parts of the globe. It has been identified that, regardless of the high transmission of blood-borne pathogens in several low-income economies, findings and records of diseases induced by occupational subjection are

insufficient (Ilhan et al., 2006; Rudolph, Deitchman, and Dervin, 2001, cited by Tesfay and Habtewold, 2014).

Another research study conducted on specific categories of health workers found that work-related subjection is a factual risk and is contribute to certain occupational determinates (Ayas et al., 2006; Ilhan et al., 2006, cited by Tesfay and Habtewold, 2014). Some findings specify that occupational injuries were further common among HCWs with extended contracts in contrast to HCWs who had yet retired though the degree of work-related subjection among them was alike. Reducing the workload of certain health service providers was designated as an alternative means of diminishing the incidence of exposure (Batty, Holland-Elliott, and Rosenfeld, 2003; Krishnan, Dick, and Murphy, 2007; Tabak, Shiaabana, and Shasha, 2006, cited by Tesfay and Habtewold, 2014).

The compilation of compelling and consistent occupational history data is of significance in determining work-related exposures and occupational health effects. The best means of achieving this information is by using questionnaires, which can gather information with required details to support occupational exposure assessment (eg, duties done at the workplace, and use of control and prevention measures). The National Institute for Occupational Safety and Health (NIOSH) designed a data collection tool for the Health and Safety Practices Survey of health service providers undertaken in the USA in 2011, that targeted to assess safety operations to diminish subjection to dangerous chemicals in the healthcare settings. The data collection tool, and questionnaire employed in the study may perhaps not directly be appropriate to be applied in LMICs owing to the diversity in legislation, health work settings, and safety standards (Rai et al., 2020).

In a study done among emergency healthcare workers inhabitants of the United States of America, 56.1% affirmed not less than subjection to blood at the time of their guidance. The incidence of individually reported occupational subjections improved with the stage of training. HCWs were regularly subjected to blood more frequently because of pierce of sharp objects, unfortunately, the rate of communication on exposure was too low, this may undermine suitable post-disclosure prevention measures and counseling (Lee et al., 1999, cited by Tesfay and Habtewold, 2014).

Research has made an interrelationship between the implication of the age of HCWs and experiences at work with the extent of infection through work-related hazards. A study done at Dammam Medical teaching institution in Ethiopia discovered that more than 75% of the nursing trainees had had no earlier capacity building related to physical occupational hazards (Amare et al., 2021). Research carried out in the United Kingdom in 4 health education institutions found that 175 issues of blood and other body fluids subjection among physicians were affirmed in three years of their study time. Out of 175 cases, 81 (46%) arose among senior physicians and 94 (54.5%) among junior physicians. The findings showed that junior physicians scored advanced pace of blood and other body fluids subjection about that of senior physicians (Ghosh, 2013).

Moreover, study findings have drawn a direct correlation between the workload and the extent of exposure to work-related hazards and infection. The research conducted on nurses revealed that 79.7% of nurses had experienced needle stick injuries throughout their working period. The pace of needle stick injury in nurses under the research was high among nurses aged below 24 years and with a nursing experience of fewer than 4 years (Ayas et al., 2006, cited by Tesfay and

Habtewold, 2014). In addition, studies have drawn a direct correlation between persistent high workload and the extent of exposure to work-related hazards' infections. The heavy and persistent workload (total working hours per week, number of patients attended) is likely to result in higher exposure to job-related hazards and infections. A study carried out by Abdulmageed et al. (2018) on examining the risk determinants for biological dangers in tertiary health institutions showed that major risk determinants for needle stick injuries were persistent and prolonged workload and shift duties (Thirunavukkarasu et al., 2021).

Studies have besides raised awareness among HCWs on work-related hazards exposure. The main source of a needle-stick and sharp injuries is known to be inadequate awareness of healthcare providers on how best to handle and use sharp objects, their associated dangers, plus the control of needle-stick injuries and appropriate management and discarding of hospital wastes (Amare et al., 2021). The study findings from Ethiopia by Tesfay and Habtewold (2014) portrayed that about 21% of health professional employees affirmed that they were not in danger of subjection to blood-borne viruses though they were persistently subjected. The study vetted the understanding of medical doctors on the work-related danger of human immunodeficiency virus disease and showed that 83.3% of individual persons under the study did not acknowledge the true professional risk of human immunodeficiency virus illness while 31% knew not if needle stick injury is the most general form of work-related acquisition (Morris, Wilkinson, Stein, and Cheevers, 2001 cited by Tesfay and Habtewold, 2014).

The subjection of HCWs to occupational health hazards is known in both low-income countries and high-income countries. Studies have denoted differences in the response to work-related hazards to promote the safety, health, and welfare of HCWs

in both low- and high-economies. Safety, plus preventive measures and values have been undertaken in developed economies to protect health service workers and alleviate the incidence of these subjections (CDC, 2016, cited by Tawiah et al., 2022). In contrast to intervention programs undertaken in developed countries, occupational and safety matters in LMICs like Tanzania, are mainly ignored (Liese and Dussault, 2004, cited by Tawiah et al., 2022).

Many study findings appreciate needle and sharp stick injuries as the main physical professional hazard subjection to HCWs. An observational study design research of health service providers by Adamu and Abdullahi (2017) in a southwestern Nigerian health teaching institution had a diverse suggestion. In Adamu and Abdullahi (2017) needle-stick injuries were classified as the second. The study classified work-related stress (83.3%), needle-stick injuries (76%), blood stains on the skin (73.1%), sleep instability, and hepatitis (8.9%) as among the frequently faced OHH (Orji, Fasubaa, Dare, and Ogunniyi, 2002, cited by Adamu and Abdullahi, 2017). The resulting morbidity and death in HCWs regularly impact negatively their performance efficiency. Consequently, safeguarding the health and safety of health service providers cannot be exaggerated. Nevertheless, despite the comprehension of the magnitude of these problems by the administration, the OHS of HCWs is unreliable and, in various cases, absolutely ignored (Orji et al., 2002, cited by Adamu and Abdullahi, 2017).

Although the extent of subjection differs occasionally and from one health facility to another, usually health service providers' work-related subjection to human immunodeficiency virus disease is common. It was as well recognized that, regardless of the distinguished rate of transmission of bloodborne pathogens in various low-income economies, records of diseases ignited by occupational subjection are too

limited. Besides, working experience, number of working hours a week, patients attended, and apparent apprehension of the occupational hazard of human immunodeficiency virus disease promote health hazards exposure to infections (Tesfay and Habtewold, 2014).

Another study that was gender sensitive compared the susceptibleness of female and male HCWs' exposure to occupational health hazards' infection. The findings recognized female HCWs to be more at risk compared to male HCWs in disease management in their place of work settings. This is because females might have a higher possibility for Urinary Tract Infections (UTIs) compared to males due to the fact of having shorter-structured urethra (Friedman and Rhinehart, 1999, cited by Faller et al., 2018). In this incident, females are the most vulnerable group among HCWs and desire to be highly safeguarded (Faller et al., 2018).

In most parts of low-income countries, injuries and OHH are not effectively surveyed and documented for sharing with other healthcare providers. Owing to this, this study sought to identify occupational health hazards of healthcare workers in Tanzania. The OHS measures have been identified as a powerful means to control and prevent related diseases, particularly in health facility settings. The intervention protocols not only safeguard healthcare providers but also accelerate the workplace setting (Faller et al., 2018).

In South Saharan Africa, few pieces of research have confirmed that health service providers are regularly subjected to biological, chemical, and physical work-related risks (Bekele et al., 2015; Nsubuga and Jaakkola, 2005, cited by Mossburg et al., 2019). Data on work-related risks in health service providers and their reduction measures are limited in many South-Saharan African countries, especially in Tanzania. Comprehension of the relying determinants for professional risks in health

service providers is required to enlighten the general public plus occupational health and safety strategy and intervention programs towards safeguarding health service providers (Ndejjo et al., 2015). For instance, in Tanzania, the online available literature on the topic is a study that was made in 2008, invalid for review at the moment.

Shortages of occupational health concerns have been credited to poor political concerns, inadequate funds, insufficient data collection systems, and poor imposition of policy and related directive acts (Rai et al., 2020). The insecure environment in medical care settings, shortage of personal protective equipment (PPEs), and high service provider-to-patient ratio accelerate the likelihood of subjection to blood-borne pathogens and induce preventable contagions. Moreover, improved comprehension of the incidence of work-related risks among health service providers in South Saharan Africa can induce policymakers to support the promotion of a secure and better workplace environment for HCWs (Mossburg et al., 2019). Very few studies have been done on assessing occupational risks in LMICs; occupational health and safety are usually ignored (Nuwayhid, 2004, cited by Rai et al., 2020). This study anticipated increasing the pool of literature on the topic by assessing occupational health hazards among healthcare workers in Shinyanga Municipal Council.

Conceptual Framework

A conceptual framework resides at the heart of the empirical reading. It provides the pavement and ballast to the subject matter of the study (Ravitch and Riggan, 2016), operating like an integrating network that enhances a researcher purposely to convey aspects of the study together. Aspects of the study are blended and networked together through the process that clarifies the correlation between them. The conceptual framework denotes the researcher's perspective on the research

problem. It's a self-explanatory technique designed for the readers (Ravitch and Riggan, 2016). Figure 1 below depicts the conceptual framework of this study.

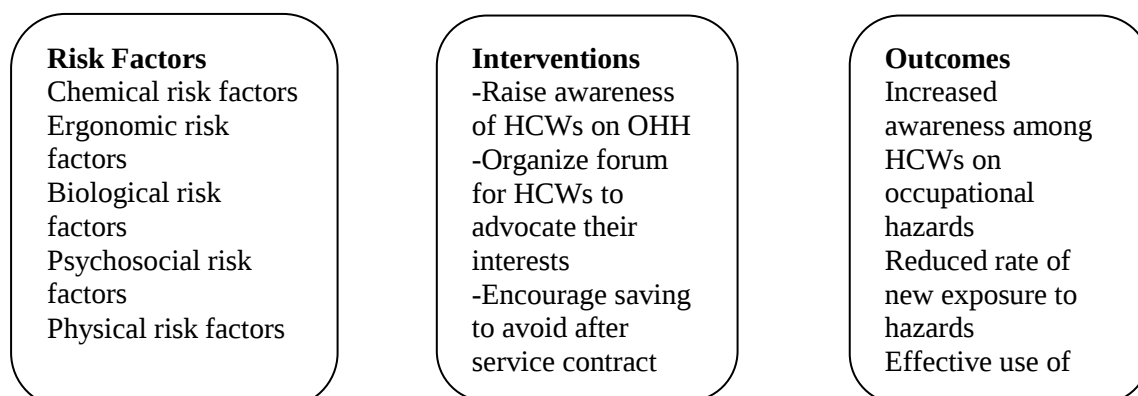


Figure 1. Conceptual Framework

WHO Position on Occupational Health Hazard Prevention

Health service providers are the moral fiber of all performing health systems. While accelerating to ensure the joy of the right and access to better health services for all, employees should benefit from the right to healthy and safe work environments to safeguard their health. The safeguarding of the welfare and safety of health employees must be part of the focal center business of the entire health system: to safeguard and refurbish health without inducing damage to sick people and service providers. Protecting the welfare and safety of health providers can control infections and harms ignited by work-related risks while promoting the safety and quality of care, employees in health plus environmental health sustainability in the health system should be safeguarded too.

The safeguarding of the safety and welfare of health providers accelerates to promoting the production, job contentment, and retention of healthcare providers. It also accelerates the regulatory conformity of health institutions with statutory

regulations and laws on occupational health and safety, bearing in mind the definite workplace settings and work-related risks in the sector. Insecure working conditions impacting job-related illness, harm, and absenteeism symbolize considerable financial expenses for the health system. For example, in 2017 the annual expenses of work-related diseases and harms in the healthcare and social service sectors in Great Britain were the highest ranking among all sectors, approximately US\$ 3.38 billion.

Worldwide, advancing the safety and well-being of health providers diminishes the expenses of job-related harm (estimated to be around 2% of sector expenditure) and accelerates to declining patient harm (estimated to be around 12% of sector expenses). Furthermore, undertaking key program interventions to safeguard the safety and welfare of health providers boost and supports the resilience of health providers during prevalence and public health emergencies and accelerates and strengthens the execution efficiency of the health sector through:

1. safeguarding work-related diseases and harms; and
2. safeguarding and improving the health, safety, and well-being of health employees, thus accelerating the safety and quality of patient care, health human resource administration, and environmental health sustainability.

Employers should collaborate with administration teams to partake in the procedures for safeguarding their safety and welfare to ensure that all compulsory preventive and control measures are complied with and adhered to minimize occupational risks. Health service providers have the right to avoid workplace conditions that they have rational evidence to believe present impending and severe threats to their welfare and health. Exercising this right will keep them safeguarded from any unnecessary consequences.

WHO denotes that out of 195 Member States, only 26 member states have strategy instruments and public programs in place for controlling occupational health

and safety of health providers. WHO as the worldwide managing body on matters about health work on protecting the safety and well-being of health providers through:-

1. designing norms and measures for control of work-related perils in the health system;
2. promoting and networking for intensifying the safeguarding of health, safety, and well-being of health providers; and
3. Helping countries in designing and executing work-related health programs for health service providers at the statutory, sub-national, and health facility levels.

WHO worked effectively to present functional health-safety guidelines on the management of the pandemic and safeguarding emergency and health service providers, civil servants, and the wider workforce (O'Neill, 2020). WHO in ensuring the well-being and protection of healthcare workers calls for national member states among others to support:-

1. professional organizations, committees, regulatory agencies, trade unions, civil society, the private sector, and political leaders to assemble collective action and advocacy for sustaining investments in healthcare and workforce job creation, skills development, education, and training, invest in statutory education centers, counting but not restricted to cooperation with the WHO Academy, safeguarding and to highlight the vital role of health and service providers in enhancing economic recovery, strengthening health systems, societal well-being and social protection (WHO, 2021).
2. with due respect for cooperative negotiation, respectable work, workplace environment, pay equity, and other labor laws, encourage respect for primary values and rights at the workplace, for all health and care workers, and support the control of fury, favoritism, and aggravation, counting sexual pestering against health and care providers, the majority (almost 70%) are female, and create opportunities for women in the health and care workforce, that support their full and meaningful contribution and representation, counting in senior management and managerial roles (WHO, 2021).
3. to enhance the opportunities for career development for health service providers in all economies by promoting the advancement of both laboratory potentials for examination and observation and study interventions that merge local awareness with updated scientific apprehension and methodology (WHO, 2021).

4. to identify and criticize the rising occurrence of assaults against health service providers, counting assaults that are irritated by terror and dishonor related to COVID-19, and completely conform with their responsibilities under international law, counting global human rights law, as appropriate, and international humanitarian law and execute the available global legal structures for safeguarding the access to and provision of healthcare in battlegrounds and other crisis, counting the late COVID-19 disaster (WHO, 2021).
5. to pre-eminence investments and the resourceful and efficient use of perpetuated national and global funding for the staffing and retaining, skills development, education and training, jobs, safeguarding, and protection required to enhance resilient health systems capacities, competencies and capabilities, through health service providers that are equitably disseminated, arranged, used, held, empowered, safeguarded and enabled to deliver statutory priorities and development marlstones for community health, to accelerate to better comprehension and managing of health worker migration through enhanced data and information for the attainment of universal health coverage, and for the successful performance of indispensable community health functions (WHO, 2021).

CHAPTER 3

RESEARCH METHODOLOGY

This chapter entails the place, participants, road map, and techniques used in carrying out the project. It consists of project design, population, and sampling, research setting, methods of implementation and strategies, specific program strategies and activities, the expectant logic model for occupational health hazards, evaluation design, data analysis, and ethical considerations.

The research methodology for this intervention project was designed with the strategic purpose of enhancing the examination of work-related health risks and mitigating measures among healthcare workers in Shinyanga Municipal. The project was specifically carried out at Shinyanga regional referral hospital, a public health institution. The project involved both male and female healthcare workers of their ages from Shinyanga regional referral hospital.

Project Design

The project employed a quantitative approach in that a one-group pretest and posttest design was undertaken using structured and administered questionnaires. This design is often utilized by public health investigators to examine the effects of an intervention under study on a given sample. The research design was characterized by two features to be achieved in the study. First, a group of targeted participants was used. Each targeted participant was given the same assessment.

Secondly, the examiner undertook a linear series to the assessment of a dependent variable (pre-test) before raising awareness of work-related health risks and

mitigating measures in health service providers. Moreover, after raising awareness at the end of the project, data was gathered (post-test) for comparison. The outcomes of raising awareness were spotted by computing the discrepancy between the first and the second assessments.

Population and Sampling

The population of interest is the healthcare setting. Purposive sampling was used. According to Shinyanga Municipal Council (2014), Shinyanga Municipality has 2 Hospitals, 1 Health Centre, and 25 dispensaries of that 7 are owned by the Government and 18 are privately owned. Of the two hospitals located within the Municipality, one is a regional government hospital and the other is a private hospital owned by a religious organization (African Inland Church). These health facilities provide curative and preventive services to the Municipal residents. The project was implemented in Shinyanga Regional Referral Hospital where the office of the District Medical Officer (D.M.O) is also located.

All occupational health hazard cases are gathered from all over the municipality and reported to D.M.O. The project was carried out in Shinyanga Regional Referral Hospital because this is the entry point at the municipal D.M.O office where all cases are reported hence easy to access the records. Implementing the project in Shinyanga Regional Referral Hospital which is a public health institution helped to figure out the concern of the government in safeguarding her healthcare workers.

The project utilized a purposive sampling technique. The project involved healthcare workers in Shinyanga Regional Referral Hospital. Shinyanga Regional Referral Hospital has a total number of 260 employees categorized into 15 departments. The study involved 105 participants from Shinyanga Regional Referral

Hospital including the M.D.O. Purposive sampling was used to select the D.M.O, hospital in-charge, head of departments, and or their representatives. Other participants were other than leaders were selected by simple random sampling where everyone had equal chances of being selected. Healthcare workers were involved regardless of their work experience, religion, sex, and age disparities.

Research Setting

This project was carried out in Shinyanga Regional Referral Hospital located in Shinyanga Municipality. Shinyanga Municipal Council (2018) illustrates that the maternal mortality rate in Shinyanga Municipality is very high as most pregnant women fail to pursue safety procedures and prescriptions given by a healthcare worker. Moreover, most of them get to health facilities when it's too late. Shinyanga regional referral hospital is a government hospital, it receives subsidies from the government to cover some expenses. The provision of subsidies has lowered healthcare expenses, especially among pregnant and newborn babies. Pregnant women have highly taken advantage of this opportunity and that is why there is a high influx of maternal cases irrespective of the fact that there are fewer healthcare providers. Besides, the supply of protective gear is low. The high influx leads to overwhelming hence ineffective health provision.

The municipality is affected by both contagious and non-contagious diseases. The top three reported diseases in Shinyanga Municipality are malaria, intestinal worms, and skin diseases (Shinyanga Municipal Council, 2018). Unfortunately, it's not well known how healthcare workers protect themselves when attending to patients with contagious and non-contagious diseases to ensure their safety and welfare. The project was implemented to determine work-related health risks and mitigating measures for healthcare workers in attending to their clients, and patients.

Methods of Implementation and Strategies

The strategic purpose of the intervention project was to determine occupational health hazards and suggest mitigating measures to protect and improve the well-being of healthcare workers. It ultimately ensured better community-health service delivery in Shinyanga Municipal Council. The project identified sources of health hazards and whether healthcare workers do observe best working practices during service delivery to protect themselves. The project raised awareness amongst healthcare workers on what to be done to keep them safe and protected from all sorts of health hazards in their working place. The project utilized the strategies below to achieve its ultimate goal.

1. To undertake a Pretest exercise to determine the baseline data or information before implementation of the project.
 - a. Administered structured questionnaires among healthcare workers to determine their knowledge and best practices when attending to patients.
 - b. Raised awareness on the type and sources of health hazards plus how and what to be done to ensure their safety and protection.
2. To undertake a Post-test exercise after raising awareness to evaluate initial data and information against current ones and examine project performance by objectives.

The specific strategies and program, activities are shown in Table 1.

Table 1. Strategies and Program Activities

Time (Days)	Strategies	Project Activities
Day 1-5	Seeking assessment permit from Shinyanga Regional offices Getting to the health facility	Seeking Research Permit Took assessment permit request letter to Shinyanga regional offices Made follow-ups for the permit by phone calls and SMS Introduced the project at the healthcare facility and showed an assessment permit Made arrangements with in charge to begin the project after one week after testing data collection tools.
Day 6-7	Testing and redefining data collection tools	Testing Data Collection Tools Introduced the project to participants and asked for their consent Administered questionnaires to the OPD that was selected. Collected dully filled questionnaires from OPD staff Redefined questionnaires to capture necessary data and information
Day 8-12	Preparation, establishing baseline data, assessing participants' knowledge, perception, and attitude on occupational health hazards	Pretest Exercise Administered questionnaires to healthcare workers on health hazards and mitigating measures to hospital staff Collected questionnaires from each department in the hospital Reviewed filled questionnaires to determine the status quo on the degree of exposure to health hazards Identified causes of frequent exposure to health hazards
Day 13-15	Lecture, and one-on-one consultation	To raise awareness of biological risk factors Made arrangements for intensive free and friendly group discussion Took notes during the discussions
Day 16-18	Lecture, focus group discussion, and one-on-one consultation	To raise awareness of chemical and psychosocial risk factors Made arrangements for intensive free and friendly group discussion Took notes during the discussions
Day 19-21	Lecture and one-on-one consultation	To raise awareness of ergonomic and physical risk factors Made arrangements for intensive free and friendly discussion Demonstrated proper wearing of various protective gears Highlighted the consequences of not wearing protective gears
Day 22-24	Collecting post-test data	Post-test Exercise Administered questionnaires to gather data and information after raising awareness Collected duly filled questionnaires Analyzed data gathered in post-test Compared post-test data against pre-test to examine the performance of the project in achieving project objectives Started writing Project report
Day 25-26	Summary overview Feedback from participants Graduation	Together discussion with representatives from each department of the hospital Received testimonies from participants after the intervention Made closing remarks and farewell

The logic model is shown in Table 2.

Table 2. Logic Model for Occupational Health Hazards

Condition/Situation	Inputs/Resources	Outputs		Outcomes		
		Activities	Participations	Short-term	Medium-term	Long-term
Nature of Problem	Required Resources	What to be done	Whom to be involved.	Immediate Changes	Intermediate Changes	Long-term changes
- Prevalence of health hazards in HCWs - A high number of HCWs get infected during service delivery - Heavy workload - Poor supply of personal protective equipment (PPE) - Poor advocacy for healthcare workers	1. People - Healthcare workers - Research Assistant 2. Finance - At 650 dollars - Training facilities - Questionnaires - Pens - Notebook - Computer - Time	- Seeking research permit - Testing tools - Administering questionnaires - Collecting filled questionnaires - Capacity building - One-on-one technical assistance - Focus group discussion - Compiling report - Organizing final discussion (farewell)	- Researcher - In charge of health facilities - Shinyanga regional offices - Healthcare workers in 4 selected health facilities	- Raised awareness of participants on health hazards - Participants practice best protective practices - Participants advocate for their interests	- Reduced new infection cases among healthcare workers in Shinyanga Regional Hospital - Participants practice changes in lifestyle	- Better service delivery to patients and the community at large - Improved welfare of healthcare workers in the selected health facilities - Selected healthcare becomes an appealing role model to other health facilities in Shinyanga Municipality

Evaluation Design

The focal function of the evaluation was to examine project performance by objective and results to make informed decisions. Evaluation entailed carrying out planned and controlled assessments to examine resources and inputs utilized to carry out the project. The evaluation exercise involved measuring and monitoring the progress of the project. It is also intended to measure the impacts and outcomes of the study project. The project entailed three types of evaluation as described below.

Formative Evaluation

Formative evaluation is a kind of evaluation that is analytical in its nature.

Baseline data was collected before project execution to identify possible challenges to be accounted for during the planning and implementation processes. The formative evaluation was used to spot definite community needs to enable the project planning designer during the planning process. The evaluation provided information on needs and progress during the implementation phase. Information enlightened the project leader to acknowledge the importance and feasibility of the project.

Formative evaluation assisted to confirm on the significance of the project as it provided room for its designer to revise and make necessary improvements before execution commenced in testing data collection tools. Besides the project expert had a chance to go around the health facility together with the in charge. The expert observed that infrastructures were available though some required renovation including the incinerator. During the process of testing data collection tools and pre-test exercises, participants were eager to have it as they perceived it to help improve their working environment. The evaluation helped to determine what turned up and what did not and the reasons why. The project had such a perspective but the provision of PPEs was not well organized.

Besides, the evaluation notified the planner to put efforts towards realizing expected positive changes by disclosing the deficit to the hospital in charge and District Medical Officer (DMO) to address it. The project planner used this type of evaluation due to the nature of the area (new area) where it was executed. The evaluation depicted elements of the proposed results desired by participants and the community at large. A formative evaluation was utilized to determine the degree of

project performance to achieving its targets through expert review, one-to-one, small group, and field expert.

Process Evaluation

As the name of this evaluation suggests “process evaluation” intends to assess the project's performance through its implementation process. The process evaluation assessed time, inputs and project implementation strategies, and other elements necessary in carrying out project activities to yield desired results. This evaluation was of paramount importance as it provided the roadmap for project implementation. The modes of delivery, time, and other inputs used were effective and promised positive changes. The process of learning and cooperation between the facilitator and participants was effective and promised that participants will adopt the preventive measures. This type of evaluation was carried out to describe the intervention, define acceptable delivery, prepare questions, identify methodology, organize resources in context, and cement the plan in collaboration with relevant stakeholders.

Outcome or Impact Evaluation

The outcome or impact evaluation was done by going around after the completion of the pre-test and facilitation to assess whether participants adopted the preventive measures in their working operations. Through evaluation, it was identified that participants adopted the preventive measure but encountered the challenge of insufficient provision of PPEs in some departments. This evaluation enhanced to improve the performance efficiency of the project to yield desired positive changes (results). The evaluation appraised the project's results to ensure sustainability by pinpointing and reporting challenges to responsible authorities; the Hospital in charge and D.M.O. for further action. The evaluation was done by comparing the situation before and after implementation to determine its performance by results. This

evaluation was carried out by conducting the evaluability assessment, preparing a research plan, carrying out our field research and analyzing its results, and disseminating the impact assessment findings.

Data Analysis

The project's data was analyzed about planned target objectives. All project objectives were analyzed by using descriptive statistics comprising frequencies and percentages. This was done to examine participants' knowledge of occupational health hazards and mitigating measures. The total score for each participant was computed at both the start and the end of the project intervention. The two data obtained at the start and end of the project were compared against the standard that the project was set up with.

The formula below was used to analyze the pre-test and post-test results

$$\% \text{ of increase} = \frac{\text{post-test} - \text{pre-test}}{\text{pre-test}} \times 100$$

The results expressed the percentage increase or decrease in knowledge of occupational health hazards and mitigating measures. The project went around the hospital to observe the disposition of medical waste plus incinerating chamber twice, before and after project implementation. These results were reported by descriptive statistics to examine the safe disposal of medical waste.

Ethical Considerations

The project tapped a sensitive matter of concern amongst HCWs to secure and or protect their health and well-being. On a wide spectrum, the project triggered the health interest of the community. Taking these into consideration plus the statutory

Research, information, and data act, the project sought a permit from the Shinyanga Regional Offices to allow project implementation and informed the Shinyanga Municipal Council administration because this is where the project was implemented. The project expert introduced the project to the District Medical Officer (D.M.O) and the hospital in charge.

The project expert sought the consent of participants to uphold integrity and confidentiality; none was required to write names to protect their rights. Participants were provided with consent forms for signing and afterward were returned to the project expert. Before implementation, the project was thoroughly reviewed by primary and secondary advisors. After a thorough review, the project expert received approval from The Adventist University of Africa (AUA) to implement the project.

CHAPTER 4

RESULTS AND DISCUSSION

This section entails a discussion of the findings of the study project. The findings are presented according to the objectives of the study proposed in chapter one. HCWs who participated in the study were 105 from Shinyanga Regional Referral Hospital in Tanzania. Details of HCWs who took part in the study including age, sex, and education to mention a few, are tabulated in Table 3 below.

Table 3. Demographic Profile of Respondents

Characteristic	Category	Frequency (n) N=105	Percent (%)
Age (Years)	<35	45	42.8
	35-50	49	46.7
	51+	11	10.5
Gender	Male	44	41.9
	Female	61	58.1
Education	High School	2	1.9
	Graduates	103	98.1
Department	OPD	15	14.3
	Nursing	30	28.6
	Medical	20	19.1
	Sluice	14	13.3
	Cleaning	10	9.5
	Others	16	15.2

Source: Field Data Survey, 2023

The study project engaged a total number of 105 participants as the table above depicts. The project was gender sensitive to engage both males and females. The study engaged males and females at a representation of 41.9% by 58.1% repressively. The age of participants ranged from 35 to 51 years and above. About

42.1% of all participants were energetic young adults aged below 35 years. The study managed to engage participants from diverse departments including nursing, OPD, sluice, Medical personnel, emergence, and cleaning. About 5.3% of all respondents had attained a high school level of education while 94.7% were graduates. The study hereby engaged a wide range of healthcare workers in Shinyanga Regional Referral Hospital. This adds value for the study project to make and draw a conclusion, and assumptions on the matter in question.

Assessment of Risks Associated with Occupational Health

The assessment of risks associated with occupational health at Shinyanga Regional Referral Hospital was carried out. The change in risk assessment between the pretest and posttest was evaluated using the formula below:

$$\% \text{ of increase} = \frac{\text{post-test} - \text{pre-test}}{\text{pre-test}} \times 100$$

Health Outcomes

Related Study Project Indicator: By the end of the program, 60% of the participants (HCWs) would be able to identify the health risk determinants in their health facility and propose appropriate mitigation measures. The change in the risk assessment of safety in the working environment is shown in Table 4.

Table 4. Safety of Working of Environment of HCWs in Shinyanga Hospital

Question	Responses				Changes
	Pre-test		Post-test		Increase
Is your working environment safe?	Agree	Disagree	Agree	Disagree	
	25	70	48	48	92%

Source: Field Data Survey, 2023

The results tabulated in Table 4 above show responses of HCWs on safety in their working environment before and after raising awareness assessments. During the pre-test, 25 participants (23.8%) agreed that their work environment was safe while 70 participants (66.7%) disagreed implying that their work environment was not safe. 10 participants (9.5%) did not attempt the question that regarded the safety of their working environment. After an awareness-raising campaign on occupational health hazards and post-test exercise, new responses were recorded on the safety of the working environment. The tabulated results in Table 2 above show that 48 participants (45.7%) recommended their working environment to be safe. On the other hand, 48 participants (45.7%) disagreed about the safety of their working environment implying that they were not safe. Besides, 9 participants (8.6%) did not attempt the question that probed about the safety of their working environment during the post-test. The mathematical computation above shows the percentage increase (92%) arrived at after the education campaign. The results of the occupational health campaigns excelled the set target indicator of 60% of HWCs to be able to identify the health risk factors in their health facility.

The results in the table above failed to achieve the study project indicator of 60% of HWCs who are capable of identifying health risk factors. The result of the post-test above shows that 50% agreed that the work environment was safe while 50% disagreed. Though the study project did not achieve this indicator, dramatic changes were realized.

The findings of this study on the perception of the safety of healthcare settings coincide with the study made by Tawiah et al. (2022). The study by Tawiah et al. (2022) views the healthcare sector as among the industries that present the most insecure work-related settings. The sector place health service providers and

supporting staff at risk of hazards that endanger their safety, well-being, and eventually the entire life of the healthcare professionals.

Healthcare workers (HCWs) have to be protected from workplace hazards just as much as mining or construction workers are safeguarded. Since they must care for the injured and the sick, HCWs are usually viewed as “resistant” to injury or illness. Their patients are given priority regardless of their workplace settings. HCWs are often anticipated to sacrifice their welfare for the sake of redeeming patients. Indeed, protecting the health of healthcare workers has the added advantage to contribute to quality patient care and health system empowerment (Ghosh, 2013). Moreover, Mossburg et al. (2019) insist that a better understanding of the occurrence of work-related risks in health service providers to inform policymakers to make the health environment safer for workers.

Behavioral Outcomes

Related Study Project Indicator: By the end of the program new infections among HCWs would be reduced by 60%. The results in Table 5 show variations of response among participants on whether they have access to sufficient time for resting after work. The exercise of capacity building had a slight or no effect on the time for resting among HCWs. The results were almost constant before and after the capacity-building campaign as shown in the table.

Through the discussion and one-on-one consultation, it was noted that specialists, heads of departments, and the hospital in charge were among HCWs who reported to have had rarely or sometimes access to time for rest. They lack access to sufficient time for resting due to endless time-to-time duties. This situation is likely to expose them to occupational health hazards due to overworking.

Table 5. Resting Time among HCWs After Work

Question	Responses							
	Pre-test				Post-test			
	Rarely	sometimes	often	Always	Rarely	Sometimes	often	Always
Do you get enough time to rest or refresh after work?	13	16	7	64	12	15	6	64
Frequency	13	16	7	64	12.4	15.5	6.1	66

Source: Field Data Survey, 2023

Excessive working implies a high service provider-to-patient ratio Mossburg et al. (2019) cement that the high workload increases the risk of and causes preventable infections among HCWs. This openly implies that HCWs who overwork; the health facility in-charges, heads of departments, and specialists are at higher risks of being exposed to health risk factors to ruining their safety and lives.

The study project alternatively promised to hit the target of reducing new infections by 60% among HCWs. The tabulated results above show that 72.1% of HCWs had access to sufficient time to refresh increasing the possibility of being careful at the workplace thus decreasing chances for new infections.

Identification of Factors (Causes) of Occupational Health Hazards among HCWs

Health Outcomes

Related Study Project Indicator: By the end of the program, 60% of the participants (HCWs) would be able to identify the health risk factors in their health facility and propose appropriate mitigation measures. Results in Table 6 show variations of responses of participants on their knowledge of risk factors in their workplace. The results above indicate both pre and post-test assessments. In the pre-test, 42 participants (40%) responded to having sufficient knowledge of risk factors in

their workplace while 60 participants (57%) negated and said to have insufficient knowledge of the subject matter.

Moreover, after carrying out the awareness-raising campaign, results obtained through post-test assessment were different compared to those in the pre-test. About 87 participants (82.8%) responded to having sufficient knowledge of health risk factors in their working environment compared to 42 participants (40) in the pre-test. On the other hand, the number of participants who responded to have had no sufficient knowledge of the subject matter was reduced from 60 (57%) in the pre-test to 15 (14%) in the post-test.

Table 6. Knowledge of Health Risk Factors among HCW

Question	Responses				Changes
	Pre-test		Post-test		Increase
Do you have sufficient knowledge about health risk factors in your workplace?	Yes	No	Yes	No	107%
	42	60	87	15	

Source: Field Data Survey, 2023

The mathematical computations above show a significant increment (107%) in the level of knowledge of HCWs on health risk factors in the post-test assessment exercise. The increment is a paramount sign of the performance efficiency of the intervention in imparting knowledge to enhance mitigation measures among HCWs. On the other hand, the significant change implies that less is done both in higher learning institutions and at the workplace to get HCWs to understand and take appropriate measures to keep them free and safe from health risk factors. The achieved change of 107% exceeded the set target indicator of the project (80%).

The increment (107%) in the impartation of knowledge of health risk factors among HCWs is an implication of deficiency understanding in their workplace. The

findings of this study are in line with Faller et al. (2018) which revealed substantial deficiencies in knowledge, practice, and policy compliance among healthcare providers. On the other hand, Tesfay and Habtewold (2014) vetted the understanding of doctors on the work-related risk of human immunodeficiency virus disease dedicated that 83.3% of the individual respondents appreciated not the true work-related risk of human immunodeficiency virus disease and 31% knew not that needle stick injury is the most common form of work-related acquisition.

These findings imply that HCWs are at high risk of being exposed to health risk factors. This alarming situation would in long run ruin their safety, health, and well-being. These will trickle down to affecting the quality of service delivery and thus affecting negatively the health of patients and the community at large. This situation should be addressed to better local sustainable economic development.

The study project successfully achieved and surpassed the target indicator of 60% of HCWs to be can identify the health risk determinants in their health facility. The tabulated results show that 87% had sufficient knowledge of health risk factors in their work environment. Understanding health risk factors is the basic foundation of HCWs to apply appropriate mitigating measures in workplaces.

The results in Table 7 denote constant perceptions of participants on health facilities' waste disposal. About 80 participants (77%) appreciated the hospital to disposal of its waste properly while 24 participants (33%) were not satisfied with how the hospital wastes are managed and disposed of. This might be due to the differences in exposure among HCWs who participated in the study project. About 80% of (24) participants in the study who responded negatively on the hospital waste management have had access to developed countries for studies and or exchange programs. This

group with high exposure held their strong perceptions that waste disposal is not made to the level of satisfaction and international standard.

Table 7. Management and Disposal of Hospital Wastes

Question	Responses				Changes
	Pre-test		Post-test		Increase
Are health facilities' wastes properly disposed of?	Yes	No	Yes	No	
	80	24	80	24	No change

Source: Field Data Survey, 2023

Health facility-produced wastes include mostly unsafe and harmful products to human health. For instance, Ulutasdemir et al. (2017) posed that waste disposal of antineoplastic/ cytotoxic chemicals used in chemotherapy drugs has negative and serious health outcomes that can be experienced due to the inhalation of dusty-particles and droplets, the skin absorption, the in-taking of infected food as well as particularly teratogenic, carcinogenic, and genotoxic effects that endanger the reproduction during pregnancy.

Amare et al. (2021) also emphasize proper hospital waste management and disposal to minimize the health risks of HCWs and that of the community in general. The main causes of a needle-stick and sharp injury are inadequate understanding of healthcare providers about the effective handling of sharp objects, its risks, the prevention of a needle-stick injury, and effective waste management and disposal. In addition, the needle-stick injury also induces a burden for patients if the injured health service providers carry hepatitis B or C and Human Immune Deficiency Virus (HIV).

The study project through this part though in an alternative way managed to surpass the target indicator. The realized target indicator is of achieving 60% of the participants (HCWs) can identify the health risk factors in their health facility and propose appropriate mitigation measures. The tabulated results in the post-test above

show that the majority of HCWs (805) portrayed that hospital wastes were managed and disposed of properly. This implies the ability and knowledge of HCWs on health risk factors in the workplace through injuries.

Table 8 shows diverse results of participants on the provision of Personal Protective Equipment (PPEs) before and after the capacity building campaign. The results denote changes in the response of participants before and after capacity-building assessments. Before capacity building (Pre-test) 22 participants (21%) responded that PPEs were rarely provided at the workplace. This number was reduced to 11 participants (10.5%) after the post-test assessment. Moreover, 33 participants (31.7%) responded that PPEs were sometimes provided. This response was also reduced to 21% after capacity building and undertaking the assessment exercise.

Besides, participants 49 (47.1%) responded that PPEs were often provided as constant before and after raising awareness. Moreover, no participant (0%) responded that the health facility always provided PPEs in pre-test assessment. After raising awareness 22 participants (21%) responded that PPEs were always provided by the hospital.

Table 8. Provision of Personal Protective Equipment (PPE) among HCWs

Question	Responses							
	Pre-test				Post-test			
Is personal protective equipment provided at work?	Rarely	sometimes	often	Always	Rarely	sometimes	often	Always
	22	33	49	0	11	22	49	22
Frequency	21	31.7	47.1	0	10.5	21	47.1	21

Source: Field Data Survey, 2023

The changes in responses at different rates were arrived at after capacity building and discussion among HCWs. It was noted through the discussion that the

Hospital provided sufficient PPEs but the distribution was uneven among departments. The nursing department was noted to receive a high favor of PPEs compared to other departments.

The poor or uneven distribution of PPEs in Shinyanga Regional Hospital is a deadly practice to be abandoned in healthcare settings as it risks the health and lives of HCWs. Mossburg et al. (2019) insist that the risky conditions in the health workplace setting, lack and or shortage of personal protective equipment (PPE), and high service provider-to-patient ratio increases risk determinants and cause preventable infections.

The study project managed to hit the target indicator of 60% of the participants (HCWs) being able to identify the health risk factors in their health facility and propose appropriate mitigation measures. The tabulated results show that 68.1% of participants said that the hospital provided PPEs in their workplace. This is an implication that PPEs were used as an alternative and appropriate measure to reducing new infections.

Results in Table 9 indicate the knowledge of participants in determining risk factors before and after the education campaign on health risk factors HCWs are exposed to. Before the capacity building exercise (pre-test), fewer responses, and 30 participants (28.6%) were not in a good position to identify health risk factors in their workplace. Dramatic changes were realized after the capacity-building campaign through the post-test assessment as tabulated in Table 5 of the results above. All participants were able to accurately identify health risk factors as the table shown in the post-test side of the table.

Table 9. Risk Factors that Threaten HCWs in Shinyanga Regional Hospital

Question	Responses			
	Pre-test		Post-test	
What health hazards are you ever exposed to in your working life?	Risk factors	Frequency	Risk factors	Frequency
	Needle sticks	35	Sharp objects	37
	Inadequate light	25	Noise	24
	Coughing	30	Lifting patients	29

Source: Field Data Survey, 2023

The sharp or needle stick injury was reported to be prominent in the nursing department responded by 37 participants (35.2). This is in line with Amare et al. (2021) in that nurses are more exposed to occupational hazards during the injection. The findings are also in line with Adamu and Abdullahi (2017) in that the possibility of subjection to dangerous agents by healthcare providers relies on the type of job category and the workplace setting. The second highest risk factor among Healthcare workers in Shinyanga Hospital was ergonomic that had to with lifting patients among nurses responded 29 participants (27.6%).

In light of this Ulutasdemir et al. (2017) cement that in the health sector, nurses are ranked in the third row after heavy industry employees and heavy automobile drivers who can easily experience musculoskeletal system problems. Finally, noise that falls under physical factors was responded to by 24 participants (22.8%) to be among the risk factors threatening the safety and health of HCWs at Shinyanga Regional Hospital.

Globally, it is approximated that 1 in 10 health service providers experience injuries from sharp objects used in the healthcare setting annually. In the year 2000, sharp harm to health service providers resulted in 16,000 Hepatitis C Virus (HCV) infections, 66,000 Hepatitis B Virus (HBV) diseases, and 1,000 Human Immunodeficiency Virus (HIV) diseases according to Mossburg et al. (2019). This

implies that Health service providers are subjected to various biological, chemical, physical, and psychosocial hazards in performing their daily tasks that may on some occasions be life-threatening (Adamu and Abdullahi, 2017).

The findings of this study demonstrated the domination of needle stick injuries that coincide with the findings of Adamu and Abdullahi (2017) above. This implies that the lives of nurses and other HCWs are floating in a swampy sea; they cannot get out without external interventions. Only a deliberate and strategic intervention to be carried out will out to outweigh the burden of needle-stick injury against the health, safety, and well-being of HCWs in Shinyanga and other parts of Tanzania.

The study project is to the optimum score of the target indicator of 60% of HWCs to be able to identify health risk factors. The tabulated results above in the post-test show that all (100%) participants were able to identify health risk factors. This is the best alternative to suggesting and applying the appropriate mitigating measures to reduce new infections.

Behavioral Outcomes

Related study indicator: By the end of the program, at least 60% of health facility administrators would be active in communicating and reporting on OHHs and new infections.

Table 10 shows the responses of HCWs before and after the capacity-building campaign in reporting OHHs and new infections in Shinyanga Regional Referral Hospital. The question used to gather his information was not attempted by most of the participants. However, those who responded though few enabled the project to figure out the trend and reasons as to why it was absconded. About 10 participants (60%) who responded to the question rarely reported OHHs and new infections in

their workplace and 7 participants (42%) sometimes reported OHHs and new infections in the pre-test.

Table 10. Reporting OHHs and new infections among HCWs in Shinyanga Regional Hospital

Question	Responses							
	Pre-test				Post-test			
	Rarely	sometimes	often	Always	Rarely	sometimes	often	Always
How often do you report on OHHs and new infections?	10	7	0	0	9	9	1	1
Frequency (%)	60	42	0	0	45	45	5	5

Source: Field Data Survey, 2023

After carrying out the awareness-raising campaign, slight improvements were recognized in reporting OHHs and new infections. The slight increment might be significant based on the short study period and the occurrence of OHHs and new infections. In the post-test, 18 participants (90%) who responded to the question said to rarely and sometimes report OHHs and new infections. Results show that the tendency of reporting OHHs and new infections among HCWs is too low. The hospital administrator and DMO take it lightly as something not serious to report and call for intervention. This would undermine the presence of OHHs and new infections among HCWs and as a result, none would intervene to rescue their threatened welfare in their workplace. This implies that HCWs embrace the presence of OHHs that threaten their health and well-being.

These results hampered the project from attaining its target indicator of communicating and reporting on OHHs and new infections by at least 60%. Besides, the target of reducing new infections by 60% by the end of the program among HCWs was also compromised due persistent organizational culture of not reporting OHHs and new infections. The negative organizational culture has been in place for quite a

long, it's a historical phenomenon. The project did much emphasis on the weight of reporting OHHs and new infections during the capacity-building campaign but the turn-up was insignificant, about 10%. The project sought to reduce new infections among HCWs by the end of the program. This target had been difficult to achieve due to the unfavorable and persistent organizational culture of HCWs not reporting OHHs and new infections. This calls for other health development stakeholders to intervene to untie the poor organizational culture of not reporting of OHHs and new infections.

The level of reporting of HCWs in Shinyanga regional hospital coincides with Tesfay and Habtewold (2014). This organizational culture of not reporting OHHS and new infections may compromise their health, safety, and well-being and the community at large. On the other hand, this tendency may ruin the household economy through ill health or the death of the household breadwinners. Adamu and Abdullahi (2017) encourage the culture of reporting new infections that knowing work-related health risks and the reporting behavior of the afflicted is fundamental to understanding the degree of the problem and may be useful in designing strategic intervention programs that would help to promote and sustain better health and safety standards.

The study project highly failed to hit the target of reporting at least 60% of new infections by health administrators. The reporting among HCWs in Shinyanga regional referral hospital is historical. The instructional culture of the hospital for reporting new infections is too low. The tabulated results above in the post-test show that only 10% of participants often or always reported new infections in their workplace.

Reduction of Infections among HCW

Related Study Indicator: By the end of the program new infections among HCWs would be reduced by 60%. Table 11 shows variations of responses made by participants on the use of PPEs during their daily operations. The results were noted before and after the capacity-building campaign on the use of PPE when attending patients or when performing other related tasks. The tabulated results show that initially during the pre-test the number HCWs who rarely or sometimes used PPE accounted for 90 (86.6%) and only 14 (13.4%) used PPEs often.

Besides, after carrying out the awareness-raising campaign, significant changes in results were determined in the post-test assessment. About 20% of HCWs had started using PPEs every time (always), while 33.3% were using them often and 40% were sometimes using PPEs in their service delivery. Only 6.7% of HCWs ragged behind to use PPEs rarely. This is an implication that HCWs were aroused to account for their health and safety in using PPEs in their daily operations.

Table 11. The Use of PPEs among HCWs when Working

Question	Responses							
	Pre-test				Post-test			
	Rarely	sometimes	often	Always	Rarely	Sometimes	often	Always
Do you use PPE when attending to patients or when doing other related tasks?	42	48	14	0	7	42	35	21
Frequency	40.4	46.2	13.4	0	6.7	40	33.3	20

Source: Field Data Survey, 2023

The poor or uneven distribution of PPEs in Shinyanga Regional Hospital is a deadly practice to be abandoned in healthcare settings as it risks the health and lives of HCWs. Mossburg et al. (2019) insist that the risky conditions in the workplace

setting, lack and shortage of personal protective equipment (PPE), and high service provider to patients ratio accelerate risk factors and induce preventable infections.

The study project slightly failed to hit the target of reducing new infections by 60% among HCWs. The tabulated results in the post-test show that 53.3% of participants often or always used PPEs during their operations. This might be due to the uneven distribution of PPEs among departments.

Health Outcomes

Related Study Project Indicators:

1. By the end of the program, 60% of the participants (HCWs) would be able to identify the health risk determinants in their health facility and propose appropriate mitigation measures.
2. By the end of the program, at least 80% of the participants would be able to apply appropriate best practices in reducing health hazards in their working environment.

Table 12 shows occupational health hazards among HCWs of Shinyanga Regional Referral Hospital noted before and after capacity building assessments. The shortage of Personal Protective Equipment (PPEs) was prominent in both pre and post-test exercises with 56% and 50% responses respectively. The decrease in responses on the shortage of PPEs as occupational health hazards was realized through a discussion among HCWs themselves when some of them realized that a sufficient number was provided but distribution was uneven.

This might have led to decreased perception shortage of PPEs as an occupational health hazard from 56% to 50% in pre and post-test. Excessive work as an occupational health hazard scored 21% in the pre-test but increased to 30% in the post-test after the awareness-raising campaign. During the awareness-raising campaign, a question was raised and a discussion was made on the working time (hours) one is required to work a day and in a week. A discussion was intensive and

employment contracts and job descriptions were referred to. The discussion finally with the weight of evidence got a common stand and some of the participants realized to have been overworked impacting the noted increase.

Table 12. Occupational Health Hazards in Shinyanga Regional Referral Hospital

Question	Responses			
	Pre-test		Post-test	
What does affect your health at your workplace?	Things that affect	Frequency %	Things that affect	Frequency %
	Shortage of PPE	56	Shortage of PPE	50
	Excessive Work	21	Excessive Work	30
	Poor waste disposal	14	Poor waste disposal	20
	Dirty environment	14		

Source: Field Data Survey, 2023

Poor waste disposal was one of the occupational health hazards mentioned. In the pre-test poor waste disposal as an occupational health hazard in Shinyanga Regional Hospital scored 14%. After building the capacity of participants through an awareness-raising campaign and recording results through post-test assessment exercises, the score increased to 30%. The increase came about by discussion when participants who have been in developed countries shared their views on how developed economies manage waste.

This might have impacted the increase that poor waste disposal as an occupational health hazard compared to developed economies. A dirty environment was mentioned during the pre-test exercise and scored 14% but was dropped off after the capacity building assessment exercise in the post-test. One of the reasons that impacted dropping dirty environment was a perception, and definition of the terms dirty environment and poor waste management. During the awareness-raising, a contradiction was realized between poor waste disposal and a dirty environment. The contradiction was cleared upon discovering that a dirty environment was an impact of

poor waste management that led to a dropping-off dirty environment in the pre-test assessment exercise.

The study project hit the target indicator of achieving 60% of HCWs being able to identify health risk factors in their health facility. On going around after raising awareness campaigns on health risk factors, the project expert estimated that about 98% of HCWs under the study applied appropriate best practices in reducing health hazards in their working environment. The study project thus managed to hit the second indicator of achieving 80% of HCWs being able to apply appropriate best practices in reducing health hazards in their working environment.

Social-Environmental Outcomes

Study Project Indicators: At the end of the program, at least 90% of the HCWs would avoid careless proximity in attending to patients. Table 13 displays the results of the response of participants on the use of incinerators noted before and after capacity building assessments. The pre-test results show that all 102 participants who attempted the question agreed that the use of incinerators in their workplace was good and reliable. Besides, the post-test results show that 90% of participants agreed while 10% strongly agreed that the use of incinerators in their workplace was good and reliable. This implies that the incinerator is working well but might have minor challenges that need to be fixed or improved. 2 participants did not attempt this question.

Table 13. Status and Use of Hospital Incinerator

Question	Responses			
	Pre-test		Post-test	
	Agree	Disagree	Agree	Disagree
Is the use of incinerators in your workplace good and reliable?	102	0	100	0
Frequency	100	0	100	0

Source: Field Data Survey, 2023

The use of incinerators is not made to the optimum and it might have resulted in poor waste management and disposal. Poor utilization of incinerators is a sign of exposing HCWs to health risk factors and thus ruining their safety, health, and well-being. The problems with the incinerator should be fixed to reduce the rate of ruining the health, safety, and well-being of HCWs and their patients.

The study project successfully managed to achieve the target indicator of achieving at least 90% of the HCWs avoiding careless proximity in attending to patients. This was identified in going around observing whether HCWs adopted best practices in their operations. The study project leader identified that about 98% of participants applied the best practices to the optimum. Table 14 shows the responses of exposure of HCWs to psychosocial hazards attained before and after the awareness-raising campaign on occupational health hazards. The tabulated results above show that only 6.7% of HCWs who were involved in the study had been exposed to psychosocial hazards while 93.3% had not been. These results were obtained during the pre-test assessment exercise.

Table 14. Exposure of HCWs to Psychosocial Health Hazards

Question	Responses			
	Pre-test		Post-test	
	Yes	No	Yes	No
Have you ever been exposed to any psychosocial hazards?	7	98	56	49
Frequency	6.7	93.3	53.3	46.7

Source: Field Data Survey, 2023

Moreover, after carrying out the awareness-raising campaign on occupational health hazards, the number of HCWs who were exposed to psychosocial hazards inscribed to 53.3%. On the other hand, about 80% of HCWs who were exposed to psychosocial hazards were young adults aged below 35 years. The increase of HCWs from 6.7% in the pre-test to 53.3% in the post-test, after carrying out the awareness-raising campaign on OHHs was based on knowledge acquisition. In other words, most participants were not in a position to recognize that they were exposed to psychosocial health hazards till after raising their awareness on the matter in question.

The higher exposure of young adults to psychosocial health hazards coincides with Amare et al. (2021) that young professional nurses are the most common healthcare professionals exposed to occupational hazards. However, this perception coincides with the study made by Ghosh (2013) that junior doctors (young adults) had a higher rate of exposure to health risk factors. On the other hand, Ghosh (2013) is in contrast in that this study found nurses to be highly exposed to risk factors while Ghosh (2013) shows that junior doctors were the ones exposed to health risk factors.

Building the Capacity of Healthcare Workers on Measures to Mitigate Health Hazards

Behavioral Outcomes

Related study project indicator: By the end of the program, at least 60% of HCWs would be capacitated on occupational health hazards. This was the third

objective of the study to enhance learning among HCWs. The study project built the capacity of HCWs and obtained results through post-test exercises. Lectures, discussions, and one-on-one consultations were means of knowledge delivery. Capacity building enabled the study project to realize the difference in results between those of pre-test that showed status quo, and those of post-test assessment impacted by capacity building.

The project achieved the target of at least capacitating 60% of HCWs on occupational health hazards. Most (98%) of HCWs under the study applied the best practices to reduce infections in their workplace environment. Further capacity building is required to untie the rigid institutional culture of not equitably reporting on OHHs and new infections.

Health Outcomes

Related Study Project Indicator: By the end of the program, 60% of the participants (HCWs) would be able to identify the health risk factors in their health facility and propose appropriate mitigation measures. Table 15 shows the variations of responses of participants on their knowledge of risk factors in their workplace. The results above indicate both pre and post-test assessments. In the pre-test, 42 participants (40%) responded to having sufficient knowledge of risk factors in their workplace while 60 participants (57%) negated and said to have not sufficient knowledge of the subject matter.

Moreover, after carrying out the awareness-raising campaign, results obtained through post-test assessment were different compared to those in the pre-test. About 87 participants (82.8%) responded to having sufficient knowledge of health risk factors in their working environment compared to 42 participants (40) in the pre-test. On the other hand, the number of participants who responded to have had no

sufficient knowledge of the subject matter was reduced from 60 (57%) in the pre-test to 15 (14%) in the post-test.

Table 15. Knowledge of HCWs on Health Risk Factors

Question	Responses				Changes
	Pre-test		Post-test		Increase
Do you have sufficient knowledge about health risk factors in your workplace?	Yes	No	Yes	No	
	42	60	87	15	107%

Source: Field Data Survey, 2023

The mathematical computations above show a significant increment (107%) in the level of knowledge of HCWs on health risk factors in the post-test assessment exercise. The increment is a paramount sign of the performance efficiency of the intervention in imparting knowledge to enhance mitigation measures among HCWs. On the other hand, the significant change implies that less is done both in higher learning institutions and at the workplace to get HCWs to understand and take appropriate measures to keep them free and safe from health risk factors. The achieved change of 107% exceeded the set target indicator of the project (80%). Since people live to the most of their knowledge, the results in the table above were much promising that HCWs will adopt the mitigating measures to mitigate health hazards to reduce new infections in their working place.

Table 16 shows the variations of responses made by participants on the use of PPEs during their daily operations. The results were noted before and after the capacity-building campaign on the use of PPEs when attending to patients or when performing other related tasks. The tabulated results show that initially during the pre-test the number HCWs who rarely or sometimes used PPE accounted for 90 (86.6%) and only 14 (13.4%) used PPEs often.

Table 16. The Use of PPEs among HCWs when Working

Question	Responses							
	Pre-test				Post-test			
	Rarely	sometimes	often	Always	Rarely	Sometimes	often	Always
Do you use PPE when attending to patients or when doing other related tasks?	42	48	14	0	7	42	35	21
Frequency	40.4	46.2	13.4	0	6.7	40	33.3	20

Source: Field Data Survey, 2023

Besides, after carrying out the awareness-raising campaign, significant changes in results were determined in the post-test assessment. About 53.3% of HCWs were using PPEs always and often in service delivery. This is an implication that HCWs were aroused to account for their health and safety in using PPEs in their daily operations. The remaining population (46.7%) of HCWs might be won with time by the majority who are using PPEs to ensure their safety and keep their health.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Summary

This paper sought to identify occupational hazards and mitigating measures among Healthcare Workers in Shinyanga Regional Referral Hospital. The objective of the study was to assess risks associated with occupational health, identify factors (causes) of occupational health hazards among HCWs, and build the capacity of healthcare workers on measures to mitigate health hazards in their workplace. The study found that HCWs in Shinyanga are at higher risk of being subjected to health risk determinants due to insufficient and uneven provision of personal protective equipment. In addition, poor hospital waste management and disposal accelerates the needle-stick harms by that Hepatitis B, Hepatitis C, and HIV to mention a few are spread from patients to HCWs.

Moreover, the poor institutional culture or reporting on OHHs and new infections is too low that may not be regarded by management and health development stakeholders. HCWs are the potential for national development and are well educated but not protected to play their roles effectively to constitute national economic development. Some HWCs including health facility in-charge, heads of departments, and specialists are more exposed to health risk factors than others due to overworking. Besides, the study found that the knowledge of HCWs on health risk factors is too low. This calls for external health development stakeholders to intervene in improving safety, health, and well-being.

Conclusion

The study project identified occupational health hazards among HCWs in Shinyanga Regional Referral Hospital to be excessive workload, sharp or needle stick injury, shortage of PPEs that might expose them to biological factors, noise, and frequent lifting of patients to get a few. Even though HCWs are exposed to mentioned dangers that threaten their health, well-being, and work performance, most OHHs and new infections go unnoticed. The persistent organizational culture discourages the reporting of OHHs and new infections among HCWs in the hospital. The study also identified the knowledge of HCWs on OHHs to be wanting, very low.

Recommendations

The HCWs to a large extent (98%) were capacitated and applied best practices in their working environment. This implies that new infections might be reduced optimally. In trickle-down, the best service delivery would be relished in the long run.

Almost all HCWs under the study after the awareness-raising campaign were positioned to identify health risk factors in their working environment. The government and health development stakeholders should organize and carry out awareness among HCWs countrywide to get them informed on OHHs. The campaign should besides include measures to mitigate the OHHs at the workplace. After carrying out the intervention, HCWs should be linked together in a platform where can share and exchange ideas, exchange, and innovations on how to mitigate the OHHs in their workplaces.

The government and health development stakeholders should ensure the sufficient provision and equitable distribution or allocation of Personal Protective Equipment (PPEs) in departments, and health facility levels. The provision of PPEs should be made on time, especially during respiratory disease outbreaks.

The government and health development stakeholders should ensure that all HCWs have ample time to rest for worn cells to be rejuvenated and replaced. This would reduce the risk of their exposure to OHHs. The government should encourage or take more HCWs to study so that the country may have a good number of specialists to be rotated in large health facilities.

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APPENDICES

APPENDIX A
CORRESPONDENCE



UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH.

Telegrams "AFYA" Shinyanga
Phone No: 028 -2763283
Fax No: 028 - 2763283
Email: nshinyangarrh@afya.go.tz.



Regional Referral Hospital,
P.O. BOX 17,
Shinyanga.

Ref. No. EC.290/298/01"A"/35

05 October, 2022.

Joel J. Muhoja

RE: PERMISSION TO CONDUCT RESEARCH AT SHINYANGA RRH

2. Reference is made from your letter requesting for permission to conduct Research.
3. I wish to inform you that an approval has been granted to allow the above mentioned student to conduct research titled " **Occupational Hazards Amongst Health care workers in**" Attending at Shinyanga Regional Referral Hospital at 2022.
4. Kindly note that the student is expected to adhere to all relevant rules and regulations during the conduct of his research.
5. Please accept my profound appreciation for your continued operation.
6. Thank you.

Dr. Luzila J. Boshi.
MEDICAL OFFICER INCHARGE
SHINYANGA REGIONAL REFERRAL HOSPITAL



APPENDIX B
QUESTIONNAIRES

1. What is your age? a) Below 35 b) below 50 c) 51 and above
2. What is your sex? a) Female b) Male
3. How long have you worked in your station?
a) Below 10 years b) below 20 years c) 21-30 years d) more than 31 years
4. What department do you work in?
(for example, nursing, sluice, cleaning, garden, medical personnel, emergence)
5. What is your highest level of education?
Primary-level high school graduate tertiary

Health Outcome

7. The work environment is safe. Strongly disagree Disagree Agree
Strongly Agree
8. Proper disposal facilities (for example, segregated disposal bins, etc) are available at the workplace. Yes No
9. Personal protective equipment is provided at work. Rarely Sometimes Often
Always
10. Do you have proper knowledge about risk factors caused by the work environment?
a) Yes b) No
11. The following are risk factors at my workplace that can expose me to environmental hazards. Needle stick injury
Sharp object injury poor disposal of waste products excessive noise in sterilization/operation room
The long-term exposure to antibiotic/antineoplastic/cytotoxic drugs direct contact with patients infected with transmitted Diseases Violence by both patients and coworkers
12. That injury or health hazard have you ever been exposed to in your working life?

Behavioral outcome

13. Are the PPEs sufficient? Yes No
14. If the answer to No. 13 above is "No", how can it be improved?
a) _____
b) _____
c) _____
15. Do I get enough time to rest/refresh after work hours? Rarely sometimes often
Always
16. I do report to health facility administrators when exposed to new infection or any health hazard(s)/injury at my work?
Rarely Sometimes Often Always
17. List some things you think may affect your health in the work environment/place?

- a) _____
- b) _____
- c) _____

Social - Environmental outcome;

18. The use of an incinerator at your work site is good and reliable.

Agree Strongly agree to disagree strongly disagree

19. I use personal protective equipment while attending patients or other related work?

Rarely sometimes often always

20. Have ever been exposed to any psychosocial hazards?

a) Yes b) No

THANK YOU.

CURRICULUM VITAE

Joel James Muhoja

Phone: +255 752 041 199

muhojoe@yahoo.com alt mujoel6@gmail.com

General information

Date of birth : 27th May 1975

Home Address : P.O. BOX 106, Shinyanga, TANZANIA.

Competencies : Proposal Writing, Research, Public Health Promotion, Bible Knowledge instructions, Salesmanship and Entrepreneurship

Relevant Profession Experience

Dates	Company/Client	Position
November 2022 – Present	Nyanza Gold Belt Field (NGBF) of the Seventh Day Adventist Church – Shinyanga Region	Assistant Director, Chaplaincy Ministries (CM)
January 2021 – October 2022	NGBF – Shinyanga zone	Assistant Publishing Director.
January 2021 – December 2021	NGBF – Shinyanga zone and Shinyanga Adventist Pre and Primary School (SAPPS)	Assistant Publishing Director and Chaplain
January 2017 – December 2020	South Nyanza Conference of the Seventh day Adventist Church (SNC) – Ngulyati Adventist Secondary school	Chaplain and Bible knowledge instructor
April 2012 – December 2016	South Nyanza Conference of the Seventh Day Adventist Church – Mhunze District	District Pastor
October 2010 – March 2012	South Nyanza Conference (SNC) of the seventh Day Adventist Church - Shinyanga	District Pastor
April 2007 – September – 2010	SNC of the Seventh Day Adventist Church - Ngudu	District Pastor

Education

- MPH, Masters' Degree of Public health, Adventist University of Africa (AUA), (2023 – expected).
- BATH in Theology, University of Eastern Africa Baraton (UEAB), 2007.
- Advanced Level Certificate, Sales & Marketing executives (S.M.E), 1999.
- Tanzania Certificate of Secondary Education (CSSE), 1995.
- Tanzania Certificate of Primary School, 1989.