AKENTEN APPIAH-MENKA UNIVERSITY
of Skills Training *and* Entrepreneurial Development

AKENTEN APPIAH- MENKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT

ASANTE MAMPONG

MPHIL THESIS

PREVALENCE AND RISK FACTORS OF OCCUPATIONAL HEALTH HAZARDS AMONG HEALTH CARE WORKERS IN HEALTH FACILITIES IN THE ATWIMA NWABIAGYA MUNICIPALITY

BENJAMIN ADDAI

(MASTER OF PHILOSOPHY)

MAY, 2025

AKENTEN APPIAH-MENKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT

MAMPOMG – ASHANTI

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(8201930015)

A Thesis in the Department of Public Health,
Faculty of Environment and Health Education, Submitted to the School of Graduate Studies in Partial Fulfilment
of the Requirements for the Award of the Degree of
Master of Philosophy
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In the Akenten-Appiah Menka University of Skills Training and Entrepreneurial Development

MAY, 2025

DECLARATION

STUDENT'S DECLARATION

I, Benjamin Addai, declare that, except for references to authors who have been duly acknowledged, this dissertation is the outcome of my original research under supervision and that this dissertation has neither in whole nor in part been presented in this University or elsewhere.

Candidate's Name: **BENJAMIN ADDAI**

Signature: …….

Date: …….

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work were supervised in accordance with the guidelines for thesis supervision laid down by the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development.

Principal Supervisor's Name: PROF. RICHARD. A KUFFOUR

Signature: ……

Date: ……

Co-Supervisor's Name: REV. DR. DENIS DEKUGMEN YAR

Signature: ……..……..

Date: ……...

ACKNOWLEDGEMENT

Nothing could have been possible or completed without the Almighty God. Therefore, I thank God for protecting and guiding me through this project. I am most indebted to my supervisors, Prof. Richard A. Kuffour and Rev. Dr. Denis Dekugmen Yar, for their guidance, ideas, and suggestions, which contributed in no small way to the success of this dissertation. Their professional and academic suggestions were very useful. God richly bless them.

DEDICATION

I dedicate this research book to my beloved parents for all the financial support and the love they have given me throughout my studies. May the Almighty God richly reward them abundantly.

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OPERATIONAL DEFINITION OF TERMS

Term	Definition
Accident	Any unplanned, sudden event that causes or is liable to cause injury to people or damage to buildings, plants, materials, or the environment.
Health facility	A place that provides health care
Factors	Is the fact or characteristic of interest that the researcher would like to handle, observe or manipulate in the research.
Health worker	A person who undergoes training for some time so that they acquire skills and knowledge in handling clients/patients during health care delivery.
Hazards	These are dangerous objects, events, behaviour, conditions, or situations that could interfere with an activity's accepted normal orderly progress or pathway to activities.
Incident	The occurrence of an event that interrupts standard procedure(s).
Knowledge	The facts or experience known by a person or group of people, a state of knowing, or specific information about the subject.
Occupational Health	Occupational health entails measures to promote and maintain workers' optimum physical, mental, and social well-being in various workplaces**.**
Occupational Hazard	A danger to workers that is inherent in a particular occupation
Occupational Disease	Any disease caused by exposures in the workplace.

Health effect	Exposure to hazards and risks in the workplace might result in distortion of the body's standard physiological and anatomic structure, disturbances in mental condition, and a reduction in life span.
Patient	A person who requires medical care or a person under a physician's care for a particular disease or condition
Prevalence	In epidemiology, the proportion of a population with a disease or a particular condition at a specific time (point prevalence) or over a specified period (period prevalence).
Risks	The probability that damage to life,health,and /or the environment will occur due to a given hazard such as exposure to a toxic chemical). Some risks can be measured or estimated in numerical terms.
Riskassessment matrix	It is an analytical tool used to define the risk level by plotting the risk's likelihood against the severity of the consequence.
Workplace	Any place where one or more employees carry out their assigned tasks.
Work Environment	Physical location, equipment, materials, processes used, and the operations performed during an employee's work.

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COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/682/22

5th October 2022

Mr. Benjamin Addai
Akenten Appiah-Menka University of Skills
Training and Entrepreneurial Development
KUMASI.

Dear Sir,

LETTER OF APPROVAL

Protocol Title: ***"Prevalence and Risk Factors of Occupational Health Hazards among Health Care Workers in some Selected Hospitals in the Atwima Nwabiagya Municipal."***

Proposed Site: ***Atwima Nwabiagya Municipal District Hospital, Nkawie.***

Sponsor: ***Self Sponsored.***

Your submission to the Committee on Human Research, Publications, and Ethics on the above-named protocol refer.

The Committee reviewed the following documents:

- A notification letter of 1st August 2022 from the Atwima Nwabiagya Municipal Health Directorate (study site) indicating approval for the conduct of the study at the Municipality.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning **5th October 2022** to **4th October 2023** renewable thereafter. The Committee may, however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Thank you for your application.

Yours faithfully,

Rev. Prof. John Appiah-Poku.
Honorary Secretary
FOR: CHAIRMAN

Room 7, Block I, School of Medicine and Dentistry, KNUST, University Post Office, Kumasi, Ghana

ABSTRACT

This study assessed the prevalence, pattern, and risk factors of occupational health hazards among healthcare workers in the Atwima Nwabiagya South of the Ashanti Region. The study adopted a cross-sectional design to assess the prevalence, pattern, and risk factors of occupational health hazards faced by health care workers in health facilities. A simple random technique was used to recruit 385 participants, who were surveyed using a structured questionnaire by self-administration. The data was summarized using descriptive and inferential statistics to investigate relationships between variables. The majority (60.3%) of the participants were females. Medical and dental practitioners made up 9.4%, laboratory scientists 3.4%, and other allied health professionals 31.4%. Mortuary staff accounted for 1.3%. Of their academic qualification, 46.2% of participants were diploma holders, 30.1% had bachelor's degrees, 11.4% earned postgraduate degrees, 6.2% had certificates, and 6.0% had other qualifications. All participants (100%)-participants had been exposed to dangerous pathogens, of which 7.0% acquired Respiratory Tract Infection, 8.1% acquired influenza, 70.9% had COVID-19, while 14.4% acquired other infectious diseases. The risk matrix scores indicate that 18.7%, 15.8%, 13.2%, 13.0%, and 11.2% occurred in the laboratory, mortuary, isolation unit, medical imaging, and emergency departments, respectively. Furthermore, 10.4%, 9.6%, and 8.1% occurred at Out patient department, Theatre/ Intensive care unit, and Antenatal clinic, respectively. In respect of Health facility related factors leading to occupational hazards, most of them 141(36.6%) said, absence of safety guidelines by management, 113(29.4) said workload and stress due to inadequate staff strengths, 68(17.7%) said poor working environment, 34(8.8%) indicated that they lack supervision from OHS managers and 29(7.5%) said lack of proper safety gears from management also accounted for health facility related factors leading to occupational health hazards.

Periodic training and follow-up assessments regarding bio-safety measures for the health care workers should be implemented. Finally, future explorative studies are warranted on the feasibility of implementing rotation-based postings for the Health care workers in different health care settings.

Keywords: Knowledge, occupational health hazard, health injuries, Prevalence, Risks, risk assessment matrix score, perception.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

An Occupational hazard or injury is defined as any injury or hazard, disease, or death that springs from an occupational accident (Stanaway et al., 2018). Globally, occupational hazards have been identified as the leading cause of industrial indisposition, accounting for over 11% of disability (Gyedu et al., 2015).

Healthcare workers are confronted with numerous occupational hazards during the discharge of their duties (Opoku et al., 2023), and their occupational environment is associated with various hazards, making employees prone to various workplace injuries (Khairallah et al., 2025). Health is a fundamental human right that significantly influences well-being and economic prosperity. Health systems are essential in safeguarding and maintaining the health of populations, with a capable and supported workforce as their foundation. Health workers serve on the front lines in combating diseases and preserving lives, often at great personal risk (WHO,2020). Occupational exposure to health hazards occurs every day in developing countries, particularly due to work overload, lack of task control, and role ambiguity. Between 44% and 83% of nurses in clinical settings in Africa have chronic lower back pain, compared to 18% among office workers (WHO.,2022).

Findings from the International Labour Organization(ILO) revealed that work-related injuries and accidents that account for economic losses are as high as 4% of the global GDP(ILO,2013). Sharps and needle stick injuries are occupational hazards to healthcare workers. Healthcare workers are exposed to deadly bloodborne pathogens through contaminated needles and other sharp objects (Bekele et al., 2015).

Poor working conditions for health workers heighten the risk of occupational diseases and injuries, compromising patient safety, care quality, and health system resilience. A safe environment for health workers is essential to ensure patient safety, as infections among Pstaff can lead to a reduced workforce when they are most critical.

The pandemic has highlighted the extent to which protecting health workers is key to ensuring a functioning health system and a functioning society (WHO.,2020)

During the coronavirus disease (COVID-19) pandemic, 23% of front-line healthcare workers worldwide suffered depression and anxiety, and 39% suffered insomnia. Furthermore, medical professionals are at a higher risk of suicide in all parts of the world. (WHO.,2022). The coronavirus disease (COVID-19) pandemic has highlighted significant gaps in healthcare worker protection, and ensuring the safety and health of healthcare workers is a top priority (WHO,2020). This is essential for them to do their jobs efficiently, protect their health, and protect the health of patients and the public. Research primarily focuses on infectious agents like hepatitis B, HIV, influenza, and tuberculosis, with 54% of healthcare workers in low- and middle-income countries having latent tuberculosis, a rate 25 times higher than the general population (WHO,2022). Additionally, healthcare professionals face hazards from chemicals associated with various health risks, including cancer and asthma, as well as musculoskeletal disorders and psychosocial issues like burnout and workplace violence, which affects 63% of workers globally (WHO,2021). While these risks are acknowledged in both developed and developing countries, safety measures have been more comprehensively implemented in high-income nations to protect workers from these occupational hazards.

In low- and middle-income countries like Ghana, occupational health and safety (OHS) issues continue to be neglected due to fragmented regulations, limited resources, and weak policy enforcement (Opoku et al., 2023; Ghana News Agency, 2025). Nevertheless, the rise of occupational health hazards among healthcare professionals can partly be attributed to their inconsistencies in practicing universal safety precautions: handwashing, wearing gloves, and using other personal protective equipment (PPE) (WHO, 2022). Several other factors, including personal behavioral factors and organizational managerial factors, were primarily responsible for some reasons people suffer health hazards (Opoku et al., 2023; Ghana News Agency, 2025). In Ghana, the occupational health and safety of healthcare workers mirrors challenges faced by other developing nations. Ghana Health Service revealed a lack of mechanisms to track disease incidence and occupational exposures among staff (OHS,2021). The Ministry of Health has since established a uniform policy for public and private health facilities to ensure a safe environment for healthcare workers and patients. Regular assessments of occupational risks are crucial for enhancing the public health system by identifying current exposure prevalence and risk factors.

1.2 Statement of the Research Problem

Healthcare workers are frequently exposed to occupational hazards and are at risk of injuries, given that they are constantly in contact with patients (Langenhan et al.,2013). These exposures not only affect the quality of care delivered by healthcare workers but also their safety and well-being. Unsafe and injurious working environments affect service delivery quality and productivity, and retention of health workers (Jaju et al., 2018)

Data on occupational injuries and other occupational health issues are problematic in many low- and middle-income countries (LMICs), with considerable under-reporting in

official statistics. Moreover, there is a greater risk of infection due to higher disease prevalence, low-level awareness of the risks associated with occupational exposure to both biological and non-biological hazards, inadequate supply of personal protective equipment and limited organizational support for safe practices. Furthermore, healthcare workers' knowledge and perception are significant in health safety adherence. In Ghana, most healthcare workers are nonchalant about risk factors associated with occupational health hazards and fail to adhere to safety measures and initiatives, rendering them ineffective. The Ministry of Health, through the Ghana Health Services, has an occupational health and safety policy to safeguard healthcare workers from occupational hazards. However, there is a paucity of literature and data on the prevalence and risk factors associated with occupational health hazards among healthcare workers in this study setting. The study, therefore, sought to evaluate the prevalence and risk factors associated with occupational health hazards in the Atwima Nwabiagya Municipal of the Ashanti Region, Ghana.

1.3 Study Objective

This study assessed the prevalence, pattern, and risk factors of occupational health hazards among health workers in the Atwima Nwabiagya Municipal of the Ashanti Region.

Specifically, the study sought to:

1.3.1 Specific Objectives

1. Evaluate health care workers' perceptions and knowledge of risk factors for occupational health injury.

2. Assess the prevalence and types of occupational injuries linked to healthcare practice.
3. Examine the associated risk factors of occupational injuries among healthcare workers.
4. Compare occupational risk exposure levels at different departments/units using the risk matrix score at health facilities.

1.4 Research Questions

1. What socio-demographic characteristics of healthcare workers predisposed them to occupational health hazards and injuries?
2. What is the knowledge on occupational health hazards and exposure risk among healthcare workers?
3. What are the human and institutional factors that influence occupational health hazards exposures among healthcare workers in health facilities?
4. What are the occupational risk exposure levels at different departments/units using the risk matrix score at health facilities?

1.5 Justification for Study

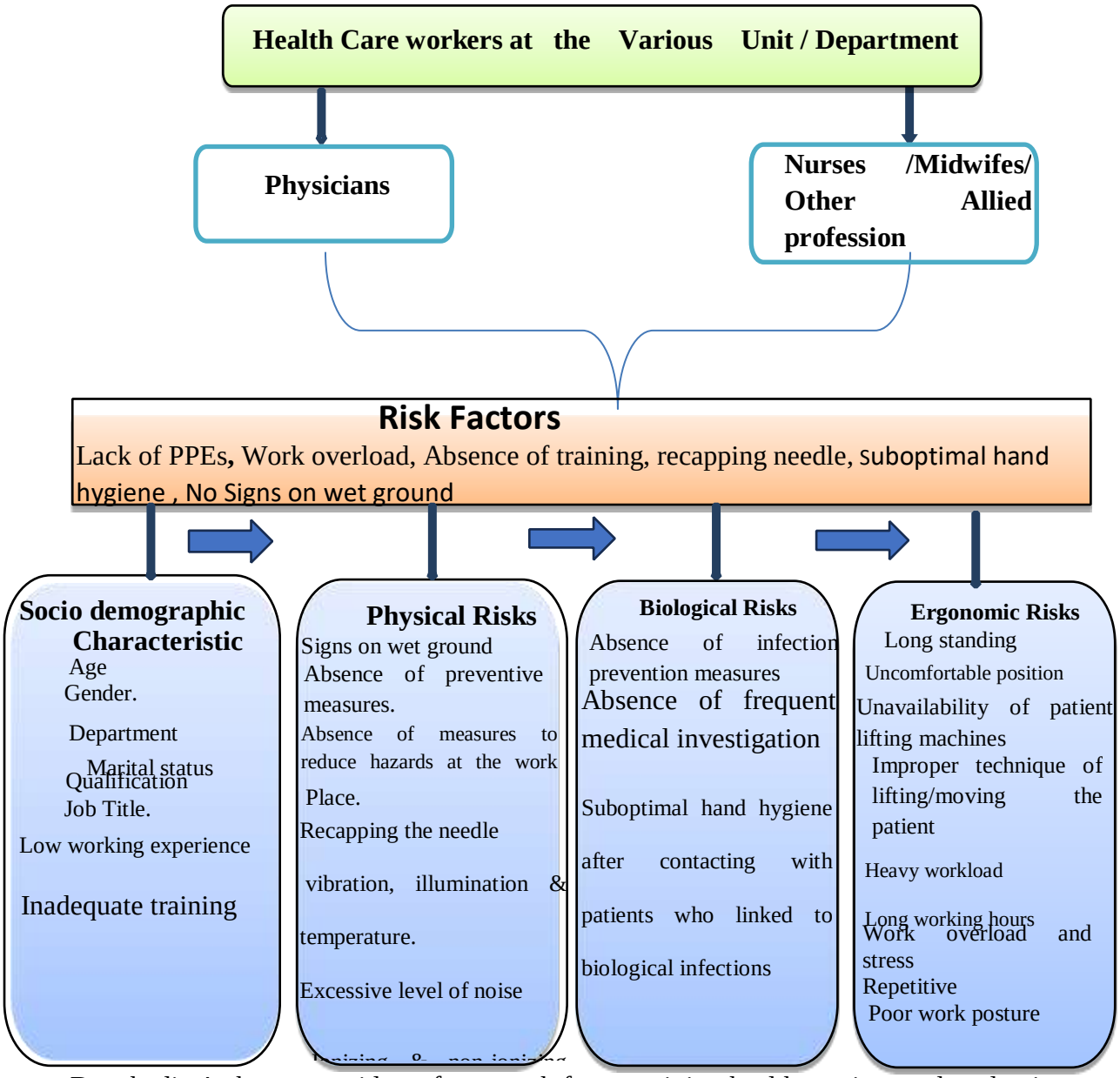
Occupational injuries have been increasing over the years in the health sector among healthcare workers (HCWs), evidenced by the increasing number of occupationally acquired injuries (Ndejjo et al.,2015). However, data on hazards and injuries faced by healthcare workers during the discharge of duties is scant, especially in less developed countries where the load of occupational injuries and diseases continues to wax (Agbana et al., 2016).

According to occupational health and safety policy guidelines developed for the health sector in 2010, the Ghana Health Service was not in a position to describe the incidence of diseases and exposures among its staff since there was no system to gather and compile information on hospital attendance, illness and occupational exposures suffered by its employees. (Tawia et al,2023).

Occupational health hazards in the work environment are of critical public health concern in Ghana. Despite the occupational injuries among HCWs in Ghana, data on the prevalence of these injuries, practices, and perceptions of HCWs towards risk factors of occupational injuries in the municipal area remain limited. Little is mentioned about occupational health hazards and injuries confronting healthcare practitioners and other health facility workers. The Atwima Nwabiagya Municipal facilities, especially the Nkawie-Toase Government Hospital, the busiest health facility in the Municipality, and serving as the main referral health center, do not report any occupational injuries and hazards affecting them in the course of discharging their duties.

Limited studies have estimated the incidence rate of all injuries to workers in hospitals in Ghana or evaluated the risk factors for occupational health hazards in Ghana. Therefore, conducting such a study would provide hospital-based data that could help plan public health interventions to control occupational health hazards among healthcare workers. Thus, this study sought to address this deficiency, estimate the prevalence rate of occupational injuries among healthcare workers, and identify risk factors for occupational injuries. The study would also contribute to the existing literature to guide future research on risk factors of occupational health hazards among healthcare workers in Ghana.

1.6 Conceptual Framework



Donabedian's theory provides a framework for examining health services and evaluating healthcare quality. The author identified a three-component approach for evaluating the quality of care, including structure, process, and outcomes. Donabedian (**1988**) believed that structural measures affect process measures, affecting outcome measures. This model implies that the structural characteristics of where care takes place may influence the care process to decrease or increase its quality. Changes in the care process will, in

turn, affect patients' health. In this study, the structure includes resources and infrastructure, the process involves occupational health and safety policy and procedures, and the outcomes are the results of safety measures in the workplace. Donabedian's framework is used in decision-making during data collection, analysis, and review. The researcher designed the conceptual framework based on a review of the available literature (**Figure 1.1).** The conceptual framework guides the study's design, implementation, and effect mechanism for illustrating and summarizing the study variables.

1.7 Description of the Conceptual Framework

The conceptual framework (Figure 1.1) shows the relationship among the study variables. The first domain is concerned with socio-demographic characteristics, which consist of several variables related to age, gender, working department, qualification, job title, working experience, marital status, and inadequate training. The second domain, concerned with physical hazard, consists of several variables related to the floor, signs on wet ground, recapping the needle, ionizing and non-ionizing electromagnetic radiation, illumination, and temperature.

The third domain concerns biological hazards, which consist of several variables related to the absence of infection prevention measures, frequent medical investigations, ignorance of immunizations, suboptimal hand hygiene after contact with patients linked to biological infections, and other factors. The fourth domain is concerned with ergonomic hazards, which consist of several variables related to standing for prolonged periods, uncomfortable positions, or poor work posture, the unavailability of patient lifting machines, and patient handling procedures, manual lifting of other mechanical devices, and repetitive, or monotonous work.

1.8 Study Hypothesis

The following are the hypotheses that govern the research work.

I Hypothesis – 1

Ho: There is no significant association between healthcare workers' knowledge and perception scores and their exposure to occupational health hazards.

H1: There is a significant association between healthcare workers' knowledge and perception scores and their exposure to occupational health hazards.

ii Hypothesis – 2

Ho: There is no significant difference in the healthcare workers' knowledge and perception of Occupational health hazards across socio-demographic and lifestyle characteristics.

H1: There is a significant difference in the healthcare workers knowledge and perception of Occupational health hazards across socio-demographic and lifestyle characteristics.

iii Hypothesis – 3

Ho: There is no significant association between healthcare workers socio-demographic and lifestyle characteristics and their level of exposure to occupational hazards domains (biological, physical, and ergonomic)

H1: There is a significant association between healthcare workers socio-demographic and lifestyle characteristics and their level of exposure to occupational hazards domains.

Iv Hypothesis - 4

Ho: There is no significant difference in the level of occupational hazard among exposure among healthcare workers across different departments or units.

H1: There is a significant difference in the level of occupational hazard among exposure among healthcare workers across different departments or units.

1.9 Study Limitations

This study was conducted in primary health facilities, which may limit its generalizability to larger health facilities, such as regional and teaching hospitals. Generally, the limitations of the study were due to difficulties in obtaining related local studies and literature, as well as in getting health workers to respond to the questionnaires. It took some time for the staff to return the questionnaire to Unit Heads. Similarly, since the three facilities were located in different towns, the study's budget increased. Additionally, since only three hospitals were used for the study, the results and findings may not accurately represent the overall performance of health facilities in terms of risk factors for occupational health hazards in the Region and nationwide. Therefore, interpreting these data should be done with little caution. However, the findings could serve as the basis for further assessment, investigation, and interrogation of occupational health and safety systems, structures, and processes

CHAPTER TWO

LITERATURE REVIEW

2.1 Concept of Occupational Health Hazard

This section explores a critical review of the issues connected to occupational health hazards through conceptual, theoretical, and empirical approaches in line with the specific study objectives to identify the knowledge gaps in the existing research studies. Occupational and safety health constitutes an area of lively discourse across disciplines, but complementarities in the methodological or empirical findings have not yet been brought together. The determinants of occupational health are multifaceted. There is a great need for further collaboration among researchers of different disciplines on prevalence and occupational health risk factors. Occupational hazards issues from a global perspective and sub-regional levels were reviewed. The healthcare environment and the categories of occupational hazards that may affect the workers at healthcare facilities are also reviewed.

2.2 Hazard

Hazards are an inherent or integral property of a substance, agent, or energy source or situation that can potentially cause undesirable consequences (Australia, 2012). For example, chemical inhalation, slippery floor, and working while standing on a ladder can constitute a hazard. Hazard may also be defined as any source of possible impairment, harm, or untoward health consequence on something or someone (Gillen *et al.,* 2003). The World Health Organization (WHO, 2009) defines a health hazard as property damage, loss of livelihoods and services, social, environmental, or economic disruption caused by any dangerous phenomenon, substance, human activity, or condition. Working conditions strongly impact the health and well-being of workers in hospitals. Hospitals that lack a supportive working environment and those that do not consider occupational

health and safety expose healthcare workers to occupational health and safety hazards. In this respect, occupational hazards refer to all the activities that can cause or increase the risk of accident or illness in the work environment (MOH/GHS, 2010; Tziaferi *et al.*, 2011).

Maier (2009) defines occupational health hazards as the potential risks to health and safety for workers who work outside the home. Employees can develop health conditions or sustain injuries if exposed to these risks at the workplace. Studies conducted by Aremo (2001) show that healthcare workers who do not get occupational health and safety training are susceptible to sharp injuries that give rise to blood-borne diseases. Sakai et al. (2010) indicate that symptoms of acute mental fatigue are often seen in healthcare workers, particularly nurses who take on additional responsibilities. It is stated that healthcare workers who handle chemotherapeutic agents report an increased incidence of severe health signs like nausea, vomiting, headaches, and hair loss (Martin, 2005).

Martin (2005) further stated that there was an association between exposure to the drugs and adverse effects on reproductive health among female staff members, including infertility, pre-term deliveries, spontaneous abortions, foetal abnormalities, and small-for-gestational-age births. Healthcare workers are at a high risk of hazards such as needle stick injuries and blood-borne pathogens as they perform their daily duties (Phillips *et al.*, 2012). As a result of sharp injuries and daily contact with blood and other bodily fluids, healthcare workers are vulnerable to blood-borne infections such as Human Immunodeficiency Virus (HIV), Hepatitis B and Hepatitis C viruses (Ferrari *et al.*, 2015). Recapping disassembly and inappropriate disposal of hospital waste increase the risk of needle stick injury (Prüss-Üstün *et al.*, 2005), especially in developing countries, where the prevalence of HIV infection is very high. Needle stick injuries were also

reported as the most common occupational health hazard in a Nigerian teaching hospital (Iliyasu *et al.,* 2016).

2.3 Occupational Hazard

The World Health Organization (WHO**, 2012**) estimated the global burden of diseases from occupational exposure to be 40% worldwide. Each year, there are thousands of non-fatal occupational injuries, which are estimated to affect 374 million workers every year (Hamalainen, Takala & Kait **2017**). It is estimated that yearly, over two million people worldwide die of occupational injuries and work-related diseases. The magnitudes of these hazards necessitate exploring the prevalence of health care workers' exposure to occupational health hazards, risk factors and mitigation measures in the municipal setting. Occupational hazard refers to the endangerments, jeopardy or danger due to a specific job type or working conditions (Chopra & Pandey, 2017). It also means a work, equipment, substance, process, or condition that predisposes, or can cause injury or disease by itself in the work environment (Fasunloro & Owotade, 2014).

Occupational hazards refer to risks an individual usually faces when working (Muchiri, 2013). It can also refer to a work, material, substance, process, or situation that predisposes or causes accidents or disease in the workplace (Corrao *et al.,* 2014). In the 1950s, the first session of the joint International Labour Organisation (ILO) and the World Health Organisation (WHO) Committee on Occupational Health adopted the definition of occupational health. The definition was subsequently revised in 1995 and states, “Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations”. This means the protection of workers from hazards resulting from factors adverse to health and maintaining a safe working environment to meet their physiological and

psychological capabilities (Guidotti, 2011). Occupational health should target promoting and maintaining employees' highest level of physical, mental, and social well-being in all professions; the divergence from health among workers caused by their working conditions; and their protection from risks resulting from factors antipathetical to health (Park, 2009). Healthy healthcare workers are particularly important for a successful healthcare practice and the patient's well-being (Leggat *et al.,* 2001).

Presently, occupational health and safety is seen by the World Health Organization (WHO) as a topmost agenda for health promotion in the 21st century (Hämäläinen *et al.,* 2007; WHO, 2010). The International Labour Organization (ILO) and the World Health Organization (WHO) reports showed that, in the manufacturing sector, many employees suffer from work-related injuries and property loss, resulting in economic loss (ILO, 2010; WHO, 2010). Some studies have argued that the hazards can never be eliminated but minimized. However, minimizing occupational health and safety practices is challenging when focusing on less than 1% of organizational and national research issues (Jagger *et al.,* 1998).

2.4 Occupational Health and Safety Hazards in Ghana

Occupational health and safety are essential challenges due to high rates of morbidity and mortality that affect workers. It is estimated that about 100,000 workers lost their lives as a result of occupational accidents and illnesses in the world, and over 400,000 new cases of occupational illness or diseases are diagnosed annually in Africa (Ajayi *et al.,* 2006; Bell *et al.,* 2013). This impacts employees' lives in several professions due to their exposure to various hazards at different levels in the workplace. However, research shows that employees in the farming, steel, automobile, truck driving and nursing industries record higher exposure to high-risk occupational and safety hazards (Bell *et*

al., 2013). Occupational health and safety should be handled holistically to ensure workers' well-being. The World Health Organization (WHO, 1995) defined occupational health as the activities of occupational medicine, occupational hygiene, occupational psychology, the security of people from physical injury (Hughes & Ferrelt, 2008).

The International Occupational Hygiene Association (IOHA) broadly defines occupational health and safety (OHS) as the science of anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment (Rebman, 2009). Hence, occupational health and safety must be perceived as concentrating on promoting and maintaining employees' highest level of physical, mental and social welfare in all professions (WHO, 1995). Ghana is becoming a middle-income country, and this transition is leading to the exposure of many in the workforce to different health and safety hazards in the work environment. The Annual Report of Ghana Labour Commission (Amponsah-Tawiah, 2013) stated that 8,692 work-related disorders were reported to the Department for compensation claims. However, in the year 1999, the rate of work-related disorders stood at 4,088. This figure excludes informal sector workers (Amponsah-Tawiah, 2013).

The constitution of the International Labour Organization (ILO) highlights the protection of the workforce against sickness, diseases and injury arising from the job as a fundamental element for social justice. Safety and health are human rights, and decent work promotes safe work (WHO, 2010). People at work face a variety of hazards owing to chemicals, biological agents, physical factors, adverse ergonomic conditions, allergens, a complex network of safety risks, and many and varied psychosocial factors" (Cox & Griffiths, 2005). Occupational injuries or accidents may have tremendous

consequences on the mental health of employees and those present at the scene of the accident (Costa, 2003). The safety and health of workers in the work environment are expensive for individual workers, their families, employers, and the country at large. In addition, there is fiscal significance for the injured workers and the employer (Marmot & Wilkinson, 2005). The Ghana Workmen's Compensation Law 1987 (PNDC 187), Adei and Kunfaa (2007), requires that the employer pay all medical expenses related to any accident and compensate the accident victim. Workplace accidents can also profoundly affect the organization's profile (Awino, 2011).

2.5 Occupational Health Hazards in the Healthcare Environment

According to the International Labour Organization (**2016**), the most common accidents prevailing in health settings include blood spillage, falling, needle pricks, infections and psychosocial hazards. In Nigeria (Ghahremani *et al.,* **2018**), four main reasons regarding hospital incidents were introduced. These incidents included the lack of access to appropriate protective equipment, staff behaviour, inadequacy of tools and excessive tendency towards high-speed performance. Hundreds of millions of people throughout the world are working under circumstances that foster ill health and are unsafe. The hazards in HCFs are grouped by WHO into biological, physical, ergonomic, mechanical, chemical and psycho-social (WHO, 2002). Various studies have proven that occupational injuries and sicknesses among HCWs are the highest of any organization, though they could be reduced. The prominent hazards to HCWs include blood-borne infections (Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV), back pain, assault from patients, stress, exposure to hazardous chemicals, radiation exposure, allergic reactions to latex materials, and so on. (Aluko *et al.,* 2016). These hazards can be grouped as follows: physical, chemical, biological, ergonomic factors, psychosocial and organizational problems (Niu, 2010).

2.6 The Work Environment of Hospital Workers

Working environment and professional responsibilities put them on the front line of numerous occupational health hazards, leading to acute or chronic health problems. Walton and Rogers (**2017**) identified biological, physical, chemical and psychosocial hazards as common occupational health hazards in the health setting. The work environment in hospitals varies from one setting to another, which makes hazards inherent in the healthcare industry (Wagner, 2015). Comparatively, hazards in work settings also varied depending on the activities done in a specific work environment. Hospitals are workplaces where healthcare is rendered to patients, including treatment, diagnosis, antenatal care, prenatal care, family planning services, and many other primary healthcare services. Healthcare settings have been recognized as the most hazardous occupational settings due to the activities carried out and the various hazards encountered in these environments (Triolo, 2014; Moore & Kaczmarek, 2015; Rogers *et al.*, 2014).

Healthcare settings are unique from other work environments. This is because healthcare workers are more vulnerable to occupational health and safety hazards similar to those in other work environments; for instance, manual handling of patients, loads, and noise are some hazards that cut across most occupations. In addition, some hazards are regarded as unique to the healthcare industry. For example, biological hazards transmitted through exposure to infectious pathogens and inhalation of poisonous chemicals are common hazards in the healthcare sector (Wafula, 2016).

2.7 Health-Facility Related Factors Leading to Occupational Hazards

A study conducted in South Africa revealed the potential risk of infections (for example, from needle prick injury), body and blood spillages, especially among health workers in

labour wards (Geiger-Brown , 2017). A poor working environment also predisposes health workers to occupational hazards. For instance, a study in Southern India established that most health workers rated their working environment as poor, affecting service delivery and putting them at a high risk (Vegso, , 2016). Health care workers surveyed at two regional hospitals in India reported eating in their workplace due to a lack of a separate dining area, which may increase exposure to biological and chemical hazards through ingestion (Dinges, 2014).

Workplace violence and aggression were high at rural health care facilities in South Africa. For health workers, abuse typically occurred in high-stress or emotional situations such as deaths, trauma care, and/or antenatal care. In particular, female workers recounted incidents of being attacked by patients or persons accompanying the patients, and were particularly at-risk during night shifts. Health care workers attribute this to a lack of security in the workplace (Kruk, 2015). According to a study by Goniewicz *et al.* (2017), many health care providers, especially midwives in developing countries, lack proper safety gear and sometimes attend to mothers with bare hands. As a result, they come into contact with bacteria, viruses, fungi or parasites when handling mothers, contaminated objects, body secretions, tissues or fluids. Concerning the above, a study in Kenya concluded that the lack of safety gear by health workers makes them afraid to touch clients, reducing the quality-of-care clients receive. This is because health workers often come into contact with bacteria, viruses, fungi, or parasites when handling mothers, contaminated objects, body secretions, tissues or fluids (Chankova, 2015). Another risk factor for occupational hazards was the association between working in a government health facility and experiencing occupational hazards compared to private health facilities.

For instance, in Uganda, it was established that health workers in Government health care facilities stand a high risk of occupational hazards due to work overload, stress and often lack the necessary protective gear as compared to their counterparts in private health care facilities (Ziraba *et al.*, 2010). Bloom, H (2012) conducted a study at three hospitals in South Africa to determine some factors responsible for the increasing cases of occupational hazards among health care workers. His study established that the absence of proper safety guidelines in many hospitals significantly increased the chances of health care workers suffering from occupational hazards. Similarly, a study by Gorter., *et al*. (2012) also reported that a lack of supervision significantly contributed to improper medical waste management in hospitals. His findings revealed that health workers who were always supervised were more likely to adhere to medical waste handling guidelines than those who were not regularly supervised.

2.8 Health Worker Related Factors Leading to High Risk of Occupational Hazards

Although many health facilities provided waste disposal facilities for medical waste and safety tools and equipment as control measures for occupational health hazards, the proportion of health workers who utilized them was lower, mainly due to a heavy workload (Gershon *et al.*, 2016). According to a survey conducted by the Health Promotion and Social Development (HEPS, 2014) in Uganda, lack of training among health workers is also a significant factor contributing to occupational hazards among health workers, as they are more prone to needle pricks due to negligence. At the same time, health workers in maternity wards also stand a higher risk of splashes when conducting deliveries. Berland, Natvig & Gundersen (2015) reported in their study that health care workers who worked overtime had an increased likelihood of experiencing both biological and non-biological hazards. Long working hours result in prolonged exposure to hazards and limited recovery time, translating into physiologic depletion that

continues to the next workday. Negligence is another factor leading to occupational hazards among health workers.

For instance, a study at two hospitals revealed that negligence among health workers was responsible for 23% and 26% of occupational hazards (Lindquist, 2014). Lockley *et al.* (2014), in their study on quality and safety in health care conducted in the United States, established that low working experience predisposed health workers to various occupational hazards while on duty. Furthermore, Orji et al, (2014) in their study report that the nature of work also determines the risk of hazards faced by an individual. For instance, health workers in certain departments like surgical wards, labour, and TB wards, among others, might stand at a higher risk of occupational hazards than their counterparts working in other departments.

2.9 The Health Care System in Ghana

Ghana's healthcare system aims to provide basic and specialized clinical services to a population of over 30 million. The Ministry of Health oversees healthcare organizations with public, private, or traditional ownership. Since 1996, the Ghana Health Service has supervised public healthcare by implementing health policies and improving accessibility. Introduced in 2003, the National Health Insurance Scheme (NHIS) eases the financial burdens that otherwise restrict residents' access to quality healthcare. It is primarily funded by the national health insurance levy, the Social Security and National Insurance Trust (SSNIT), and premiums paid by members from the informal sector.

Health service facilities in Ghana encompass teaching hospitals, psychiatric hospitals, regional and district hospitals, polyclinics, health centres, and community-based health planning centres. As of 2022, the country was forecast to have nearly 370 hospitals.

Basic healthcare facilities, especially clinics and health centres, are concentrated in urban areas.

As of May 2020, 1,625 health facilities in Ghana were mainly government hospitals. Private hospitals and health facilities from the Christian Health Association of Ghana (CHAG) reached 928 and 220, respectively (MOH/GHS/, 2022).

2.10 The Role of the Health Sector in Health Delivery

The government is improving the healthcare industry in Ghana. This is because the sector plays a vital role in any economy and its activities are also important to the success of the country's socio-economic growth. Among the social and economic priorities, the health sector is one of the major concerns confronting the government and policymakers. The health sector was at the forefront of the Millennium Development Goals (MDGs) and achieved attainment in 2015 (Rhule, 2012). The public health system, however, is experiencing a variety of challenges that include staff shortages, funding, and inadequate distribution of health personnel in the country's regions (Van den Boom *et al.,* 2008).

2.11 Health Care Workers as High-Risk Employees

Healthcare workers, according to WHO (2012), refer to all people engaged in actions whose primary intent is to enhance health. They make important contributions and are critical to the functioning of most health systems (Ghosh, 2013). Healthcare workers are at high risk of exposure to occupational health and safety illnesses or diseases if they are not adequately protected from exposure to hazards. Healthcare workers have been recognized as among the most neglected in monitoring their occupational health status. It has also been proven that the safety of the health workforce does not receive the necessary recognition it deserves (Mitchell, 2000).

Below are the reasons attributed to that: The first reason is the misconception that healthcare workers know the dangers associated with performing their duties at work and thus can prevent themselves from those hazards. This misconception has, however, been proven to be false. The second reason is that healthcare training generally excludes an understanding of occupational health, making health workers mostly uncertain of their hazards. An unpublished work by Mitchell (2000), nineteen (19) hospital hazards were identified as present. However, professional nurses could only identify 4 hazards (range 0-9). This finding agrees with the international research findings, which state that healthcare workers were asked to identify three chemicals which enter the body through the respiratory tract. 1.9% of respondents selected ethylene oxide, 11.8% selected glutaraldehyde and 44% selected waste anaesthetic gases.

2.12 Risk Management and Risk Assessment

Health care workers in hospital settings may be exposed to various degrees of occupational hazards in the process of performing their duties. The most essential way of addressing occupational hazards in the hospital setting is to ensure a healthy work environment that requires an effective assessment of the hazards at the workplace. Risks are unavoidable in any complex workplace. Risk management has gradually become an important part of occupational health and safety. For effective control of hazards at the workplace, one needs to carry out Hazard Identification Risk Assessment (HIRA) (Rout & Sikdar, 2017). HIRA is a process of defining and describing hazards by characterizing their probability, frequency, and severity and evaluating adverse consequences, including potential losses and injuries (SMDHU, 2017). In the hospital setting, proper assessment must be conducted to reveal hazards and risks.

This might help to recognize healthcare workers who might be at risk, and determine where control measures are needed to prevent illness and injury (Safesite, 2020). Risks at the workplace are unavoidable. The management of risk has gradually become an important part of the occupational health and safety of organizations (Arimbi *et al.*, 2019). Risk management attempts to assess hazards (as experienced by various target groups, like experts, decision makers, employers, and employees), forecast their occurrence, magnitude, and injury, and reduce or control potential consequences. Controlling hazards in the hospital setting must be done with a purpose. This will help to determine what hazard to control at a particular point in time (Society, 2015). Controlling exposures to occupational hazards in the hospital setting is the essential method of protecting healthcare workers.

Figure 2.1 The risk management steps as developed by the Australian Capital Territory in 2004

The risk management steps, as developed by the Australian Capital Territory (2004), are:

1. Establishing our Goals and context (i.e. the risk environment);

2. Identifying our risks;

3. Analyzing the identified risks;

4. Assessing or evaluating the risks;

5. Treating or managing the risks;

6. Monitoring and reviewing the risks and the risk environment regularly; and

7. Continuously communicating and consulting with stakeholders.

The Establish Goals and Context planning stage aims to understand the environment in which the work operates. Identifying the risks focuses on using the information gained from the context, particularly as categorized, to identify the risks likely to affect achieving the goals of work, activity or initiative. The analysis risk step requires that for each risk, the worker should identify the current controls and their effectiveness in preventing the risk from eventuating or minimizing its impact should it occur. Once a control has been noted, assessment of its effectiveness should be implemented as (I) = Inadequate, (M) = Moderate, and (A) = Adequate. Likelihood and Consequence: Each risk's profile must be defined using likelihood and consequence criteria. Evaluation of the risks step requires the assessment of the level of risk as acceptable or unacceptable (Badenhorst, 2006).

Risk treatment aims to develop cost-effective options for treating the risks. Treatment options are driven by outcomes that include: 1) Avoiding the risk, 2) Reducing the risk, 3) Transferring the risk, and 4) Retaining the risk (Australian Capital Territory, 2004). Risks and their priorities do not remain constant. The currency of identified risks needs to be regularly monitored. New risks and their impact on the work need to be established. This stage of the treatment planning requires the description of how the outcomes of the treatment will be measured. Milestones or benchmarks for success and 'warning signs' for failure must be identified. This process stage also requires identifying

who will review the treatment progress and the frequency of the review (Australian Capital Territory, 2004).

2.13 Risk in the Workplace

Many potential risks to a person's health and safety at work can vary greatly depending on the work environment. The following points summarize the significant potential risks at work.

2.13.1 Shift Work and Long Work Hours

The relationship between work schedules and health and safety is complex. It is influenced by work schedule characteristics (time of shift, direction and speed of rotation, pattern of days off, shift length, rest breaks), the job, the worker, and the work environment (Monk, 2000). While the focus is on potential negative aspects, some workers experience benefits. Researchers theorize that shift work exerts adverse effects by disturbing circadian rhythms, sleep, and family and social life (Monk, 2000). Disturbances in circadian rhythms may lead to reductions in the length and quality of sleep and may increase fatigue and sleepiness, as well as gastrointestinal, psychological, and cardiovascular symptoms.

In addition, working at unusual times may make it difficult to interact with family and maintain other social contacts. Also, Long work hours may reduce the time available for sleep, leading to sleep deprivation or disturbed sleep and incomplete recovery from work (Van der Hulst, 2003). This may adversely affect nervous, cardiovascular, metabolic, and immune functioning. Family and social contacts may also be reduced, leading to stress-related physiological responses. Extended hours may also increase exposure times to workplace hazards such as chemicals, infectious agents, and physical, mental, and emotional demands. Extended hours also may reduce time available for exercise or

nutritious meals, and added job stress can increase smoking, alcohol consumption, and caffeine use (Van der Hulst, 2003).

2.13.2 Needle sticks

Health care workers continue to be exposed to the serious and sometimes life-threatening risk of blood-borne infections in a wide variety of occupations and health care settings. An estimated 600,000 to 800,000 needle stick injuries occur annually, about half of which go unreported (Sepkowitz & Eisenburg, 2005). It is estimated that each year, more than 1,000 health care workers will contract a serious infection, such as the hepatitis B or C virus or HIV, from a needle stick injury. An estimated 50 to 247 health care workers are infected with the hepatitis C virus (HCV) each year from work-related needle sticks (Sepkowitz & Eisenberg, 2005).

At an average hospital, workers incur approximately 30 needle stick injuries per 100 beds per year. 133 Nursing staff incur most needle stick- 54% of reported needle stick and sharp object injuries involve nurses (Sepkowitz & Eisenberg, 2005). WHO (1999) defines safe injection practice as an injection that does not harm the recipient, does not expose the provider to any avoidable risks and does not result in waste that is dangerous for the community.

A cross-sectional survey was performed to estimate the magnitude and predictors of needle-stick injury (NSI) in nurses of Fars province hospitals in Iran (Askarian, Shaghaghian, and McLaws, 2007). Questionnaires were distributed in 52 hospitals to a stratified random sample of 2118 (46.3%) nurses between April and September 2005 to collect self-reported NSI in the past 12 months. Just over one-fourth of respondents sustained at least one NSI, 75.6% recalled having sustained between 1 and 4 injuries in the past 12 months, of which 72.2% involved a hollow-bore needle, and 95.1% of

injuries involved fingers. Predictors of NSI included being a registered nurse or midwife compared with nurse managers, and being employed in a hospital in a city smaller than Shiraz. The study concluded that the prevalence of NSI in Iranian nurses is high, with the majority of injured staff having sustained up to 4 NSIs in 12 months. Nearly all NSIs were high-risk injuries involving a hollow-bore needle. Providing nursing staff with safety-engineered devices, including retractable syringes when hollow-bore needles are to be used, will be an important step toward reducing our NSI epidemic (Askarian, Shaghaghian, and McLaws, 2007).

2.13.3 Musculoskeletal Injuries

Health care workers are at an extremely high risk of musculoskeletal injuries and disorders, especially for back injuries. Health care workers are also overrepresented for upper extremity musculoskeletal injuries and disorders among workers (Silverstein, Viikari-Juntura, Kalat, 2002). In 2001, U.S. registered nurses (RNs) had 108,000 work-related MSDs involving lost work time, a rate similar to construction workers. In 2003, the incidence rate for nonfatal occupational injuries was 7.9 per 100 full-time equivalents for hospital workers (United States Department of Labour, 2003).

2.13.4 Mental health effect

Working in nursing increased the risk of experiencing both minor and major psychiatric morbidity (Wieclaw *et al.*, 2005), with job strain contributing to this outcome (Yang, Pan, Yang, 2004). Minor psychiatric morbidities include feelings of tension, anger, anxiety, depressed mood, mental fatigue, and sleep disturbance (Van der Klink *et al.*, 2001); these are classified variously as burnout, sub-threshold depression, or adjustment disorders. Extended work schedules have been associated with a variety of mental health indicators in nursing and in other occupations where these schedules are standard.

Proctor and colleagues 195 found that both the number of overtime hours and the number of cumulative days worked by automotive workers were associated with changes in mood States such as depression and tension (Sepkowitz & Eisenburg, 2005). Emergency department personnel also face a significant risk of injuries from assaults by patients or their families. Those carrying weapons in emergency departments create the opportunity for severe or fatal injuries. California and Washington State have enacted standards requiring safeguards for emergency department workers. Although mental health and emergency departments have been the focus of attention and research on the subject, no department within a health care setting is immune to workplace violence. Consequently, violence prevention programs would be helpful for all departments (Sepkowitz & Eisenburg, 2005).

2.14 Occupational Hazards of Health Care Workers

Hundreds of millions of workers in both developed and developing countries are at risk from exposure to ergonomic, physical, chemical, biological, or psychosocial hazards in the workplace. The health care sector is complex and covers a variety of professions and workplaces facing different occupational health hazards and associated health problems (Froneberg, 2006). Nurses' practice environments often contain biological, chemical, physical and psychological hazards. These factors put nurses at risk for job burnout, stress, work-related illnesses and injuries, blood-borne pathogen exposure, infectious disease exposure and musculoskeletal disorders (Lundstrom *et al.,* 2005; Yassi and Hancock, 2005; and McGrath and Boore, 2003).

2.14.1 Ergonomic hazards

Approximately 30% of the workforce in developed countries and between 50 and 70% in developing countries may be exposed to heavy physical workloads or ergonomically

poor working conditions, leading to injuries and musculoskeletal disorders (WHO, 1999). Health care workers are amongst those most affected by musculoskeletal disorders, especially occupational back and neck pain from lifting or prolonged static postures (Sepkowitz & Eisenburg, 2005). Ergonomic risks and associated musculoskeletal problems have been mentioned as the leading occupational health problem affecting the nursing workforce (de Castro, 2004).

Health care providers consistently rank among the top occupations with disabling back injuries primarily from manual handling of patients (Fochsen *et al.*, 2006). The risk of back problems due to manual handling of clients affects all specialties. Engkvist *et al.* (2001) conducted an extensive Swedish study that found that regular client handling and the absence of assistive devices were associated with back problems among nursing personnel. Back injuries and other musculoskeletal problems may simultaneously be an important contributor to the current and increasing workforce shortage within the health sector. In the United States, Moses (1992) suggested that 12% of nursing personnel each year will consider a job transfer to decrease risk, and another 12%-18% will leave the nursing profession due to chronic back pain. Similar estimates have been made in Europe, and a recent Swedish study conducted by Fochsen *et al.* (2006) showed that nursing personnel reporting musculoskeletal injuries and those who experienced limited use of transfer devices were more likely to leave the nursing profession.

2.14.2 Physical hazards

Amongst physical hazards, the well-being of health care providers may be adversely affected by noise, vibration, ionizing and non-ionizing radiation, heat and other unhealthy microclimatic conditions. In addition, the risk of cancer also exists from exposure to physical hazards, such as ionizing and non-ionizing radiation from

diagnostic and therapeutic medical and dental equipment. There are several good examples, such as ionising radiation in X-rays associated with leukaemia in humans and the link between ultraviolet radiation and skin cancer (Waldron, 1990). In a recent study, Awad (2009) assessed adherence to infection prevention and control protocols in the Neonatal Intensive Care Units (NICUs) in the Ministry of Health hospitals in Gaza. Of 128 subject physicians and nurses, 73% did not know about the existence of the Palestinian infection prevention and control protocol, and 78% had been exposed to sharp instrument injuries. The study revealed that hospitals do not provide training to the health care workers, and lack continuous updated information and instructions about infection prevention and control. A shortage of appropriate physical environment and control in NICUs was also revealed.

2.14.3 Biological hazards

Health care workers are exposed to many biological agents, such as viruses, bacteria, parasites and fungi. These may be found particularly amongst bio aerosols generated from procedures and the environment, including air conditioning systems. The hepatitis B (HBV) and C (HCV) viruses, HIV/AIDS infection and tuberculosis pose a particular concern among health care workers, mainly from percutaneous injuries and from bio-aerosols in the case of tuberculosis (Fochsen *et al.*, 2006).

2.14.5 Chemical hazards

Thousands of toxic chemicals, particularly in dental and medical materials, may pose serious health threats, potentially causing cancer, respiratory and skin diseases, as well as possible adverse effects on reproductive function. The risk of cancer from workplace exposure is also of particular concern. Around 350 chemical substances have been identified as occupational carcinogens (WHO, 1992). Exposure to thousands of

allergenic agents is a growing cause of work-related illness. Many allergens have been catalogued, which can cause skin and respiratory diseases (eg, asthma). The number of these disorders, registered in several industrialised countries, is increasing steadily.

2.14.6 Psychosocial hazards

The psychosocial conditions of health care workers may also lead to problems such as occupational stress. Stress at work has been associated with elevated risks of cardiovascular diseases, particularly hypertension, job dissatisfaction, and mental disorders. Significant changes are taking place in the length of time workers are called upon to spend at work and in the organization of their work hours. Increased pressure for greater flexibility in enterprises and efforts to adapt working time to the needs and expectations of workers are leading to the diversification of working time schedules and the reconsideration of limits and regulations respecting working time (Thomas *et al.*, 2006).

2.15 Factors Associated with Work-Related Injury

Many factors at work can potentially lead to injury. These factors can vary greatly, depending on the setting and individuality of the work. The following points summarize the major factors associated with injury in the workplace of healthcare workers.

2.15.1 Gender

Thomas *et al.* (2006) conducted a case-control study to examine select risk factors for work-related injuries among Central Arkansas Veterans Healthcare Hospital employees. The result found that fewer men (21.7%) than women (27.1%) were injured (p 0.006). The Wald chi-square statistic provided strong evidence of a relationship between work-related injuries and gender ($p < 0.0001$), with the risk of work-related injuries

significantly greater among women. The study recommended that female employees may need educational interventions, like personal safety. Ergonomics training and musculoskeletal strengthening exercises also help female employees to reduce or prevent injuries involving cumulative musculoskeletal trauma (Thomas *et al.,* 2006). Also, women have a much higher incidence of assaults from clients, low back pain, repetitive motion disorders, and high-cost injury claims, especially among hospital workers (United States Department of Labour, 2000).

2.15.2 Age

The increased risk of injury with ageing has important implications for occupational health care providers. Older workers should be carefully screened during replacement examinations to match the employee's fitness for duty to the functional requirements of the job (Kashima, 2003). Employees aged 25 and 54 account for more than 73% of work-related injuries. Those younger than 25 account for approximately 16%, and those older than 54 account for approximately 8% (United States Department of Labour, 2011). Advancing age, in a statistically linear distribution (e.g., increasing age = increasing risk; therefore, those older than 54 are at higher risk than those younger than 54 years (U.S. Department of Labour, 2011).

A retrospective case-control study by Thomas et al. (2006) examined select risk factors for work-related injuries among Central Arkansas Veterans Healthcare Hospital employees. The researcher reviewed of employee health charts and computer and manual databases from 1997 to 2002. The study aims to examine select risk factors for work-related injuries among Central Arkansas Veterans Healthcare Hospital employees. The researcher found that the average ages of injured and uninjured employees differed significantly using a two-sample t-test. The average age of the uninjured employees was

approximately 2 years less than that of the injured employees. Work-related injuries and age were slightly, but significantly, related (p=.0012). The risk of work-related injuries increased with age (Thomas *et al.*, 2006).

2.15.3 Employment Type and Status

The type of health care providers working is another factor affecting work-related injuries. Direct caregivers are especially vulnerable to overexertion from lifting and falls, the cause of 69% of nonfatal events requiring lost workdays (Myers *et al.*, 2010). However, needle stick and sharps injuries remain most prevalent, least reported, and most preventable of serious work-related injuries among direct caregivers (United States Department of Labour, 2000). Also, full-time health care providers may be at higher risk for work-related injuries than part-time employees, especially for back injuries (Brown & Thomas, 2003). Thomas *et al.* (2006) conducted a case-control study to examine select risk factors for work-related injuries among Central Arkansas Veterans Healthcare Hospital employees. The result describes that of those injured, more than one quarter (25.6%) were direct caregivers, 43.5% were maintenance employees, 17.6% were clerical employees, and 40.2% were custodial employees. The Wald chi-square statistic demonstrated a significant relationship between Work-related injury and employee type. Work-related injury was more likely among maintenance and custodial staff than direct caregivers and less likely among clerical staff than direct caregivers. Also, the study informed that (28.2%) of the full-time employees were injured, whereas only 8.2% of the part-time employees were injured.

The Wald chi-square statistic indicated a significant relationship between work-related injury and employment status (Thomas *et al.*, 2016). Important determinants of work-related injuries and their severity include working rotating shifts, working more than four

night shifts in a row, working more than eight hours per shift, having reduced time between shifts, and working several consecutive workdays. Staff working night shifts and varying shifts, or workers beginning or ending shifts, are more likely to be injured secondary to fatigue, decreased alertness, and sleep deprivation (Akerstedt & Knutsson, 2015).

Thomas et al. (2016) conducted a retrospective case-control study to examine select risk factors for work-related injuries among Central Arkansas Veterans Healthcare Hospital employees. The researcher reviewed of employee health charts and computer and manual databases from 1997 to 2002. The study found that 24.0% of the 8-hour employees were injured, whereas 30.4% of the 12-hour employees were injured. The risk of work-related injury was greater for 12-hour workers. Ramsay *et al.* (2006) conducted a study to review the nature and scope of occupational nursing hazards and the degree to which current nursing education and position descriptions (or functional statements) equip nurses to recognise and address the hazards inherent in their jobs. The study had three parts. First, a literature review was performed to summarize the nature and scope of occupational nursing hazards.

Second, an expert panel of occupational health nurses obtained and evaluated the safety components of position descriptions from 29 Veterans Affairs (VA) hospitals across the United States. Finally, an expert panel of occupational health nurses evaluated the degree to which nursing accreditation standards are integrated with Occupational Safety and Health Administration (OSHA) list of known emergency department hazards; and a separate expert panel of occupational health nurses evaluated the degree to which current VA emergency department nursing position descriptions incorporated hazard recognition and control strategies. The study concluded that prevention of job-related injuries for nurses, and subsequently their patients, will depend directly on how nurses can identify

and control the varied occupational hazards specific to their jobs. A study by Shimizu et al. (2010) analyzed occupational health hazards for Intensive Care Unit (ICU) nurses and nursing technicians, comparing differences in the number and types of hazards which occur at the beginning and end of their careers. A descriptive cross-sectional study was conducted with 26 nurses and 96 nursing technicians from a public hospital in the Federal District, Brazil.

A Likert-type work-related symptom scale was used to evaluate the presence of physical, psychological, and social risks. The results showed that ICUs can cause work health hazards, mostly physical, to nurses and nursing technicians due to the frequent use of physical energy and strength to provide care. In contrast, psychological and social hazards occur to a lesser degree. Amosu *et al.* (2011) conducted a descriptive survey to investigate the level of knowledge on the predisposing factors to occupational hazards among nurses in health facilities in Abeokuta, Ogun State, Nigeria. The study population consisted of nurses of varying categories working in ten public and two privately owned health facilities in five local government areas of the state. A validated structured questionnaire was used in their study. The results revealed that 96.2% of the respondents knew that the profession is prone to occupational hazards. As expressed by 88.6%, back injury is the commonest hazard, followed by neck and back pain, as attested by 84.8% of the nurses.

The most prominent predisposing factor is prolonged standing, as viewed by 84.5% of the sample. Among others, avoiding lifting patients and heavy equipment is the most notable way of avoiding occupational hazards, as attested to by 90.5% of respondents. They concluded that nursing professionals should therefore make conscious and concerted efforts to minimize avoidable occupational hazards in the course of discharging their duties, so that their health would not be jeopardized. Juibari *et al.*

(2010) investigated the relationship between knowledge of ergonomics and occupational health among the nursing staff affiliated with Golestan University of Medical Sciences.

Their study was a cross-sectional analytical study on 423 nursing staff working in various medical centres affiliated with Golestan University of Medical Sciences in 2008, selected by quota randomized sampling. The data collection instrument was the Ergonomics Questionnaire, which comprised 72 questions. The study results revealed that 61.9% had a good knowledge of ergonomic principles, and 83% were exposed to a mild level of occupational hazards. There was no significant relationship between knowledge of ergonomics and occupational health ($p = 0.08$). The relationships between knowledge of ergonomics and age, gender, marital status, work experience, the type, and the service location were significant ($p < 0.05$). The relationship between occupational health and age, work experience, employment type, and service location was also statistically significant ($p < 0.05$). The study concluded that training staff to do their job best, taking breaks between long working hours, using appropriate tools and facilities and paying attention to ergonomics can provide a healthier work environment for nurses and optimize human resource efficiency. Orji *et al.* (2002) investigated the occupational health hazards among health care workers in a Nigerian teaching hospital's obstetrics and gynaecology unit using 78 questionnaires administered to the doctors, nurses and ward orderlies.

The typical occupational health hazards were work-related stress (83.3%), needle-stick injuries (75.6%), bloodstains on skin (73.1%), sleep disturbance (42.3%), skin reactions (37.2%), assault from patients (24.3%) and hepatitis (8.9%). More doctors than nurses and ward orderlies used safety precautions such as gloves, facemasks and aprons. All the staff employed regular hand washing after various procedures. However, no staff

category adopted regular, proper disposal of needles and sharps into separate puncture-resistant containers. About 59% of the staff used needles.

2.15.4 Shift System

Many biological functions in the human body follow circadian rhythms. Jobs involving the night shift require people to work and sleep at times contrary to this rhythm. This can lead to disruption of circadian rhythms and sleep disturbances, which have been suggested as a possible cause of shiftwork-related health problems.

Problems. Shift work is now associated with increased cardiovascular, metabolic and communicable disease risk. The physiological

Mechanisms linking shift work and these diseases are not yet fully understood. Shift work can affect the immune system, which is subsequently linked to cardiovascular disease and infections. For example, activation of the immune system's pro-inflammatory response due to disturbances in circadian rhythms and sleep may be associated with the risk of cardiovascular disease. Important determinants of work-related injuries and their severity include working rotating shifts, working more than four-night shifts in a row, working more than eight hours per shift, having reduced time between shifts, and working several consecutive workdays. Staff working night shifts and varying shifts, or workers beginning or ending shifts, are more likely to be injured secondary to fatigue, decreased alertness, and sleep deprivation (Akerstedt & Knutsson, 2017).

2.16 Knowledge About Health Risk

It’s always good for every employee to have an idea or knowledge of the occupational health risk that comes with his/her job. This normally helps both the employee and the employer on what best preventive measures to apply. By so doing, injuries and exposures

are reduced, thereby promoting good occupational health and safety. A descriptive cross-sectional study conducted among two hundred and ninety health care workers in Nigeria reported that 89% of the respondents were knowledgeable about hazards at health care facilities (Olufemi *et al.,* 2016). The report concluded that this could be due to pre-placement and routine training of staff on safety practices and adequate reinforcement of staff capacity. Another descriptive survey that assessed the level of knowledge on predisposing factors to occupational hazards among nurses at health facilities showed that 96.2% of nurses knew about occupational health work. The researcher attributed the high awareness of occupational hazards among the study participants to be the result of their educational status (Amosu *et al.,* 2011).

2.17 Health Risk Perceptions

It is always best for every employee to ascertain what they believe when it comes to occupational health and safety at their workplace. This helps in the implementation of preventive measures at the workplace and educating the employees. A descriptive cross sectional study conducted by Olufemi (2016) among 290 healthcare professionals found that most respondents 96.2% believed they were at risk of occupational hazards while about two-thirds perceived the risk as high, the researcher concluded that measures aimed at promoting safety practices and, minimizing exposure to hazards such as; provision of safety equipment, pre-placement and routine training of staff on safety practices and adequate reinforcement of staff capacity and capability through drills in all health care facilities should be institutionalized and made mandatory (Olufemi *et al.,* 2016).

Another descriptive cross-sectional study conducted in Nigeria on the topic Assessment of the Knowledge, Attitudes, and Perception of Potential Occupational Hazards by

Healthcare Workers in a Tertiary Healthcare Facility in Lagos found high perceptions to potential health hazards, no statistically significant association was observed between socio-demographic characteristics and perception of occupational hazards, the researcher recommended regular training on safety guidelines and enforcement of standard/universal safety practices by healthcare workers to reduce incidences of occupational injuries (Obono *et al.,* 2019).

2.18 Impact of Health Risk Exposure

Facing this critical situation, health care workers on the front line who were directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing psychological distress and other mental health symptoms. The ever-increasing number of confirmed and suspected cases, overwhelming workload, depletion of personal protection equipment, widespread media coverage, lack of specific drugs, and feelings of being inadequately supported may all contribute to the mental burden of these health care workers (Lai *et al.,* 2020). In addition, repetitive overexposure to other occupational hazards such as physical hazards, violence, and situations that increase the risk of burnout may also have important health and well-being consequences in Emergency Physicians. Post-traumatic stress symptoms and post-traumatic stress disorders are common among rescue and ambulance personnel. It is well known that exposure to traumatic events and/or occupational hazards may have a whole range of psychological consequences, such as nightmares, recurrent thoughts, flashbacks, sleeping problems, irritability, depression, lack of interest in daily life, anger, loss of concentration, restlessness, burnout, and clinical levels of depression. Lack of adequate social support may contribute to the aggravation and persistence of these consequences.

These stress consequences may also cause reduced job satisfaction and commitment, absenteeism, and turnover in emergency care personnel and negatively influence the quality of care (Somville *et al.,* 2016). A cross-sectional study conducted among emergency medical service workers recorded body motion injuries as 90%, which was attributed to lifting, carrying, or transferring of a patient or equipment. Exposure to harmful substances and radiation was the second leading event (24,900, 95% CI 11,700 – 37,100) (Reichard *et al.,* 2018). Another cross-sectional study conducted in Nigeria among 119 participants found that respondents (92.0%) believed that the occupation is hazardous. Among those that ever-had injuries (26.6%), cuts and bruises accounted for (66.0%), followed closely by needle pricks (64.2%) and skin irritation/allergy (22.6%). Only 50.8% and 10.1% of respondents always wear hand gloves and protective boots, respectively. A significant association ($P < 0.05$) was found as those that have had training sustained fewer injuries than those who have not had training; also, awareness about hazards is more among respondents with high educational status; those that have had training and those that have spent more years at work.

2.19 Occupational Health and Safety Policy and Guidelines for the Health Sector

This policy and technical guidelines apply primarily to:

i. all employees within the health sector (government, quasi-government, private as well as NGO's)
ii. prospective employees of the health sector;
iii. clients, patients and visitors to all health facilities.
iv. Health institutions including students on practical attachments.

The provisions of this policy and technical guidelines apply to all health institutions and administrative units within the health sector. The provisions are meant to aid managers of health sector facilities in the implementation of the

OHS policy which have been written with the laws of the country and other international OHS protocols in full view. Implementation of the policy and guidelines therefore should result in compliance with the requirements of the health and safety laws of the country. Health and safety inspectors and practitioners seeking to secure compliance with the Labour Act 2003, (Act 651), may refer to this guidance as illustrating good practice. They are also intended to serve as a reference guide to the health worker in the field.(MOH2021).

CHAPTER THREE

METHODOLOGY

3.1 Study Area

Atwima Nwabiagya Municipal is one of the districts in the Ashanti Region**,** Ghana. It was initially created as district assembly in 1988, known as Atwima District. Later, part of the district was split off by a decree of President John Agyekum Kufuor on 12 November 2003 (effectively 17 February 2004) to create Atwima Mponua District; thus, the remaining part was renamed to become Atwima Nwabiagya District. However, on 15 March 2018, the northern part of the district was later split off to create Atwima Nwabiagya North District, while the remaining part was elevated to municipal assembly status in the same year to become Atwima Nwabiagya Municipal. The municipality is located in the western part of the Ashanti Region and has Nkawie as its capital town. It experiences more inflows of people from the surrounding communities than people moving out the Municipal.

The Atwima Nwabiagya Municipal Assembly within Ashanti Coordinates: 6°40′N 1°49′W / 6.667°N 1.817°W / 6.667; -1.817. It is situated in the western part of the Ashanti Region. It shares common boundaries with Ahafo-Ano South and Atwima Mponua Districts (to the West), Atwima Nwabiagya North District (to the North), Amansie-West and Atwima Kwanwoma District (to the South) and Kwadaso Municipal Assembly (to the East). It covers an estimated area of 184 sq km (*Ghana Statistical Service, GIS 2020)*

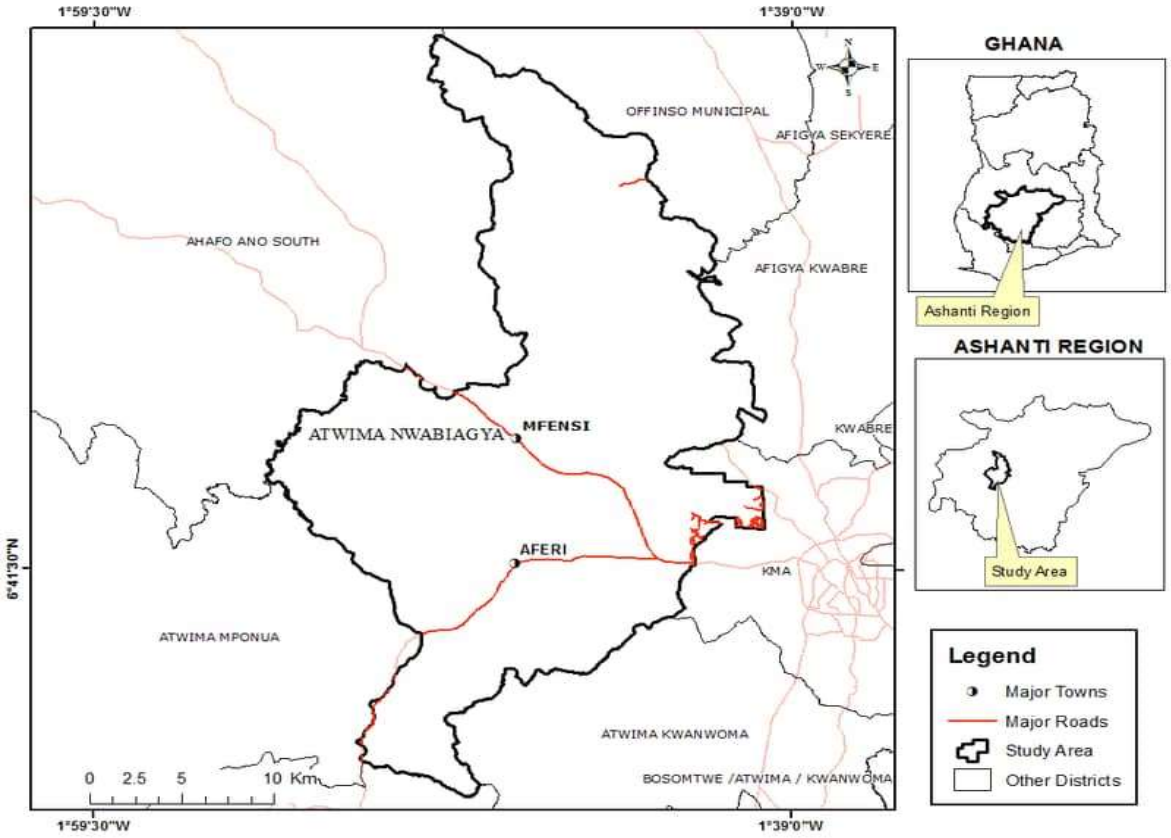


Figure 3.1 Map of Atwima Nwabiagya Municipal and the selected hospital

Source: Ghana Statistical Service, GIS 2020

3.1.1 Demography of Study Area

According to the 2010 Population and Housing Census, the total population of the Atwima Nwabiagya Municipal was 149,025, with an annual growth rate of 2.6%. However, carving out the Atwima Nwabiagya Municipality has given the Municipality a population of 103,698. The population of the Municipality has been grouped into age and sex cohorts. Thus, the 0-14 age group constitutes 40,266 (38.83%), the 15-64 age group is 59,657 (57.53%), and the 64 age group is also 3,775 (3.64%) (Municipal population and housing census report, 2020).

3.1.2 Health care facilities within the study Area

The Municipal Assembly has 6 hospitals, both Government and private, one polyclinic, four Health Centres, six Private Maternity Homes, and four private clinics, which are located at Abuakwa, Makro, Sepaase, Nkawie, Toase, Afari Mim and Neberhi. The hospitals are located at Nkawie-Toase, Maakro, and Abuakwa respectively. Rural communities such as Kobeng, Seidi, Wioso, Amankyea and others have been provided with Community Health Planning Services (CHPS) compounds (Municipal Health Directorate data, 2022)

3.1.3 Study Population

The Study Population consisted of 598 health care workers in the three health facilities selected in the Atwima Nwabiagya municipal area who were present at the time of the study. The participants eligible for the study were Health care workers directly involved in clinical work or who otherwise interacted directly with patients in their day-to-day activities. Health care workers in this study included nurses (Nurses, Midwives and Healthcare assistants), Doctors (Doctors and Physician assistants), Laboratory staff (Biomedical scientists and laboratory technicians), Pharmacists (Pharmacists and dispensing technicians), Radiologists, Physiotherapists, Orderlies, and Mortuary staff. Out of the 598, the municipal hospital had 274 health care workers, followed by Frimpong Boateng Medical Centre, which had 183 health care workers. Lastly, 141 health care workers were from Afari Community Hospital (Municipal Health Directorate data, 2022)

3.2 Study Design

This is a hospital based cross-sectional study design employed to collect data from 385 respondents. A cross-sectional study is specifically suitable for approximating a

population's prevalence of a behaviour or disease, which is the proportion of the population with that behaviour or disease.

3.3 Sampling

3.3.1 Sampling Techniques

The Ghana Ministry of Health operates a three-tier health care delivery system (primary, secondary, and tertiary). Three health facilities were selected for the study, using stratified, simple random and purposive sampling methods. The facilities were stratified into private and public based on the ownership of the hospitals. This approach ensured that the various categories of hospitals operating within the municipality were included. The municipal public hospital was selected, and two private hospitals were selected out of five private hospitals using convenience sampling methods. The hospitals were coded A, B and C, where A represent Frimpong Boateng Hospital, B represents Nkawie-Toase Hospital, and C represents Afari-Community Hospital. The study participants were selected using the cluster sampling technique, with each class of health care workers regarded as a primary sampling unit. Three clusters were formed and randomly selected from each cluster for data from all members of the selected groups until the sample size was exhausted.

3.3.2 Sampling size

A sample size of 385 was estimated based on Leslie Fisher's sample size formula, as shown below.

$$n = \frac{Z^2 \times P(1-P)}{D^2}$$

Where:

n= minimum sample size

Z =Standard normal deviation corresponding to 95% CI given as 1.96.

P = Estimated prevalence of Occupational Hazards occurrence (50%)

D = desired margin of error 5% (expressed as a proportion of 0.05) or level of precision or maximum tolerable error (5%).

$$n = \frac{Z^2 \times P(1-P)}{D^2}$$

$$\mathbf{n = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} = \approx 384.16}$$

3.4 Data Collection

3.4.1 Study instrument

The study employed a structured questionnaire to collect data from the study participants. The questionnaire included socio-demographic characteristics, the Level of knowledge relating to the risk of exposure to occupational health hazards, exposure levels in the various departments using a risk score matrix, and the human and institutional factors influencing occupational health hazards exposures. The questionnaire was developed first by capturing workers' personal and social characteristics. Secondly, healthcare workers' knowledge of health and safety risks is specific to their job. Thirdly, the risk assessment includes biological, physical and ergonomic risks by computing the score matrix.

After obtaining approval from the Faculty of Environment and Health Education, a letter was taken to the ethical and review Committee on Human Research, Publications and Ethics, School of Medical Sciences, KNUST, Kumasi and the Municipal Health Directorate of Atwima Nwabiagya Municipal. Informed consent was sought from individuals selected to take part in this study. Having obtained the consent, the

participants were subjected to the study tools for their responses from 385 respondents. The study employed the quantitative approach to data collection, for which a questionnaire was available in English.

3.4.2 Training of Research Assistants

The research assistants were trained a day before the pre-testing. They were oriented on the questionnaire to enable them to give the same interpretations to the questions and ensure they were posed similarly to avoid interviewer bias. They also practiced administering the questionnaire, collecting information, and examining completed questionnaires for inconsistency and completeness.

3.4.3 Pretesting of Questionnaire/Procedures

Questionnaires were pre-tested among 10 health workers at Abuakwa Polyclinic to eliminate ambiguity and difficulties in answering questions. Some of the questions were dropped and revised after pre-testing. The pre-testing of the questionnaire helped recognize and identify defects that would compromise the integrity of the research. The pre-test allowed the researcher to assess the feasibility of the research, determine if the sample size and sampling technique were suitable, and evaluate the adequacy of the study instruments. The pre-test revealed that some questions were unclear, undefined, and vague; as a result, those questions were clarified. Other questions were revised to shorten the time frame for answering the questionnaire to less than 30 minutes. The pre-test also made it possible to polish the questionnaire by removing equivocal questions and shortening the completion time from 40 to 30 minutes. After the pre-test, the questionnaire was finalized and administered to healthcare workers within the three selected hospitals.

3.4.4 Questionnaire Administration

Data was collected using structured questionnaires with closed-ended self-administered questions from 400 respondents. The respondents used 20-25 minutes to complete each questionnaire, which contained predetermined answers. The respondents selected the answers that best expressed their views regarding occupational health and safety hazards in the hospital. The questionnaire consisted of three sections. Part I consisted of twenty questions on demographic characteristics such as age, gender, marital status, educational level, place of work, duration of work or years of experience, department at work and occupation. Part II consisted of fifteen questions on knowledge of occupational health and safety hazard the person responsible for ultimate responsibility of occupational health and safety hazards, the rights, responsibilities of employers and employees in occupational health and safety, the description of maintenance culture, the benefits of occupational health and safety to the hospital, Part III consisted of fourteen questions on perception about health risk exposure associated with healthcare workers

and Part IV is the Risk score matrix. The questionnaire also captured questions on the health hazards encountered by the health workers while at their workplace. All these took the form of a list of questions given to respondents to answer, with the rationale of getting data on the topic under study.

3.5 Data Processing and Statistical Analysis

3.5.1 Data Management

The data collected were checked and cleaned by the researchers for completeness and accuracy. The questions in the structured questionnaire were pre-coded and the responses from respondents were thus coded, entered, and analyzed using IBM SPSS version 26, but 15(3.75%), which was poorly filled out, was rejected. The data in the entered

questionnaires were tested for internal consistency and had a very high Cronbach's α value of 0.850, which indicates a high level of internal consistency for our scale that comprised 106 study items.

Each section of the questionnaire was pre-coded, and each variable was given a numeric code. There were twenty questions on socio-demographic characteristics, fifteen questions on knowledge level about occupational health risk, fourteen questions on health risk perceptions, thirty-seven questions on the risk of occupational hazard by score matrix.

3.5.2 Data Analysis

Data from the questionnaire were analyzed using the Statistical Package for the Social Science (SPSS) version 26 software, and the results were presented in a frequency table and descriptive analyses. The descriptive statistics were used to describe the personal and social characteristics of the sample, to ascertain information about the prevalence of risk factors, and to compare variables between the biological and non-biological groups for the study. Additionally, they were used to assess the major risk factors that influenced Occupational Health injuries among the respondents. A test of association and correlation between explanatory variables and the outcomes of interest was done using an independent sample t-test. The logistic regression analysis was performed to identify the association between occupational health injuries and socio-demographic characteristics. The significant associated factors were considered as risk factors.

The outcome variable of the present study was measured by the exposure to occupational health risk (yes/no). Initially, the univariate analysis was executed to compare each independent variable with the outcome variable, followed by binomial logistic regression through the "enter" method. In this regression analysis, adjusted independent variables

were age, gender, marital status, job title, work per day and hours, work experience, smoking status, and sleep hours per day. In the logistic regression analysis, odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. A confidence interval that did not include a null value of one and a p-value of less than 0.05 was considered statistically significant. A frequency table and an independent sample test were used to compare the knowledge level of study participants. A one-way ANOVA was used to compare the covariates among the groups. The risk score matrix was used to analyze the greatest concern threat and detect the risk level. The risk score matrix is a risk assessment calculator that uses the horizontal axis to describe risk consequences, ranging from insignificant to catastrophic, and the vertical axis to describe risk likelihood, ranging from almost certain to rare. The intersection of consequence projection from the horizontal axis and likelihood projection from the vertical axis indicates the risk level.

3.6 Study Variables

A variable is a property that can assume different values. The variables considered in this study included the following:

Independent variables—age group of respondents, sex, level of formal education, marital status, duration of work, religion, occupation, perception and knowledge level, potential hazards, risk factors, working departments or units.

Dependent variables include biological and non-biological hazards, health facilities, and health worker-related factors that lead to occupational hazards among healthcare workers.

3.7 Response Rate

At the end of the data collection, it was observed that out of 385 (100%) study respondents, 385 survey questionnaires were completed correctly and returned by the

study respondents from the three selected health facilities, as shown in Table 3.1. This represented a 96.25% response rate and a 3.75% non-response rate, which the study considered sufficient for analysis. The researcher's hand-delivered and collected questionnaires increased the response rate.

Table 3.1: Distribution of the number of respondents and the selected health facility

Variables	Male (%)	Female (%)	Total (%)
Frimpong Boateng Hospital	63(49.6)	64(50.4)	127(100.0)
Nkawie-Toase Hospital	81(42.6)	109(57.4)	190(100.0)
Afari-Community Hospital	9(13.2)	59(86.8)	68(100.0)
Total	153(39.7)	232(60.3)	385(96.25
Rejected	6(1.5)	9(2.25)	15 (3.75)

3.8 Reliability of the instrument

The reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to measure. Cronbach's alpha is a test that assesses the stability and consistency of questionnaires that measure latent variables. The instrument's reliability was determined by computing the Cronbach's Alpha coefficient (Click Analyze > Scale > Reliability Analysis) by dividing the average covariance by the average total variance. For most purposes, a reliability coefficient of 0.7 or higher is considered satisfactory.

3.8.1 Cronbach's Alpha Coefficient

This method was used to measure the reliability of the questionnaire between each field and the overall mean. The normal range value ranges between 0.0 and + 1.0. The higher values reflect a higher degree of internal consistency. As shown in Table 3.2 below, the

results range from 0.731 to 0.968, indicating good general reliability for all items. This range is considered very good; the result ensures the reliability of the questionnaire.

Table 3.2: Cronbach's Alpha for reliability for all domains

Cronbach's Alpha	No. of Items	Domain
0.890	15	Knowledge and Perception
0.731	19	Physical Risk
0.954	11	Biological Risk
0.9 68	6	Ergonomic Risk
	Total= 51	

3.9 Risk Score Matrix

Figure 3.2: Risk score matrix (Severity and Likelihood) for determining the risk level. (South Australia, 2011)

Key:

The different colours show the different risk ratings (severity):

1. **Green** – Low risk (L): The risks here are insignificant.

2. **Yellow**—Medium (M): This risk requires reasonable steps to be taken against it. It is not mostly urgent and resource-intensive.
3. **Orange**—High risk (H): Risks in this category require immediate action. If resolving them immediately is impossible, a strict timeline must be set.
4. **Red**—Extreme (E): The risks here are critical and require immediate action **(South Australia, 2011).**

Explanation of Definition and Terms used.

a) **Severity terms**

- Not significant: Dealt with by in-house first aid,
- Minor: Medical help is needed, treatment by a medical professional/hospital outpatient, etc.
- Moderate: Significant non-permanent injury, overnight hospitalization (inpatient)
- Major: Extensive permanent injury (example: loss of finger/s). Extended hospitalization
- Catastrophic: Death. Permanent disabling injury (example: blindness, loss of hand/s, quadriplegia)

b) Likelihood terms

- Almost certain: The risk is almost certain to occur in most circumstances
- Likely to occur frequently
- Possible and likely to occur at some time
- Unlikely: The risk is unlikely but not impossible to occur
- Rare: May occur but only in rare and exceptional circumstances

3.10 Ethical consideration

Ethical clearance was obtained from the Ethical and Review Committee on Human Research, Publications and Ethics, School of Medical Sciences, KNUST, Kumasi, and the Municipal Health Directorate of Atwima Nwabiagya (Ref: CHRPE/AP/682/22 at Appendix 2). Verbal and written consent were obtained from each participant. Information collected was treated with strict confidentiality.

CHAPTER FOUR

RESULTS

This chapter presents the findings from the analysis of the data collected from study respondents.

4.1 Socio-Demographic Characteristics of Study Respondents

Table 4.2 Socio-demographic and lifestyle characteristics of the study population

Study variable	Frequency (n=385)	Percentage (%)
Age in groups (years)		
20-25	70	18.2
26-30	118	30.6
31-35	61	15.8
36-40	71	18.4
41-45	31	8.1
>45	34	8.8
Sex		
Male	153	39.7
Female	232	60.3
Marital Status		
Single	291	75.6
Married	94	24.4
Educational level		
Post-Secondary certificate	24	6.2
Diploma	178	46.2
Degree	116	30.1
Postgraduate	44	11.4
Junior/Senior High levers	23	6.0
Job title (profession)		
Nurse/midwife	210	54.5
Lab scientist	13	3.4
Mortician	5	1.3
Medical Practitioner	36	9.4
Others (Allied Health)	121	31.4
Religion		
Christianity	249	64.7
Muslim	127	33.0
Traditional	9	2.3

The majority (60.3%) of study respondents were female, 30.6% were between the ages of 26 and 30 years, 18.4% were between 36 and 40 years old, whereas 8.8% were over 45 years old. Most respondents (75.6%) were single, 64.7% identified as Christians, 54.5% were Nurses and Midwives, while 1.3% were Morticians. Based on their academic qualifications, 46.2% held a diploma, 30.1% a bachelor's degree, whereas 11.4%, 6.2%, and 6.0% held a postgraduate degree, a post-secondary certificate, and other qualifications, respectively (**Table 4.1).**

4.2.1 Perception of Risks Associated with Occupational Injuries

The data analysis showed that the majority of the respondents appear to have high perception relating to occupational health risk exposure to Needle prick, exposure to body contact, unavailability of PPEs to reduce medical radiation, exposure to assault patients and coworker, exposure to direct contact to patient's body fluids, exposure to routine night shifts, exposure to extreme pressure and stress condition, exposure to much noise during procedures, exposure to unavailability wet floor signs, exposure to unsafe doors and trolley equipment, exposure to unavailability of air conditioning in your unit, exposure to unavailability of patient mechanical devices, exposure to prolong standing during work and lastly respondent has high level of perception relating to the types of injuries related to the nature of their work. Surprisingly, all the respondent has a very high perception about the use of how to use fire extinguishers. **(Table 4.2)**

- **Low Perception** - minimal awareness of risks or dangers.
- **High Perception** - Strong recognition of potential hazards.
- **Very High Perception** - Heightened sensitivity to even subtle or indirect risk.

4.2 Perceived Exposure To Risk Among Healthcare Workers Associated with Injuries.

Table 4.3 Perceived Exposure to Risks Associated with Injuries (Clinical staff)

Variable	**Non**	**Low**	**High**	**very High**	**Mean**	**ó**	**Decision**
Exposure to a Needle prick	10 (2.6)	54 (14.0)	119 (30.9)	202 (52.5)	3.3325	.81241	High Perception
Exposure to Body contact	13(3.4)	61(15.8)	143 (37.1)	168 (43.6)	3.2104	.82909	High Perception
Unavailability of PPEs to reduce medical radiation.	18(4.7)	56(14.5)	144 (37.4)	167(43.4)	3.1948	.85451	Low Perception
Exposure to assault (patients & coworkers)	22(5.7)	61(15.8)	147 (38.2)	155(40.3)	3.1299	.88020	Low Perception
Exposure to direct contact with the patient's body fluids	9(2.3)	51(13.2)	154(40.0)	171(44.4)	3.2649	.77557	High Perception
Exposure to routine night shifts	15(3.9)	56(14.5)	146(37.9)	168(43.6)	3.2130	.83313	High Perception
Exposure to extreme pressure and stress conditions	14(3.6)	53(13.8)	156(40.5)	162(42.1)	3.2104	.81323	High Perception
Exposure to much noise during Procedures	19(4.9)	63(16.4)	146(37.9)	157(40.8)	3.1455	.86581	Low Perception
Exposure to the unavailability of Wet floor signs	17(4.4)	57(14.8)	144 (37.4)	167(43.4)	3.1974	.84932	Low Perception
Exposure to unsafe doors and trolley equipment	11(2.9)	55(14.3)	130(33.8)	189(49.1)	3.2909	.81557	High Perception
Exposure to the unavailability of Air conditioning in your unit	23(6.0)	54(14.0)	135(35.1)	173(44.9)	3.1896	.89145	Low Perception
Unavailability of Fire extinguishers at your unit	20(5.2)	36(9.4)	242(62.9)	87(22.6)	3.0286	.72652	Low Perception
Exposure to the unavailability of patient Mechanical devices	6(1.6)	35(9.1)	187(48.6)	157(40.8)	3.2857	.69329	High Perception
Exposure to prolonged standing during work	8(2.1)	28(7.3)	207(53.8)	142(36.9)	3.2545	.67903	High Perception

Decision= weighted average =44.9481/14 =3.2105

Table 4.3 Descriptive Statistics on Knowledge on health risks associated with occupational Injuries.

Variable	Poor	Average	High	Mean	Std. Deviation	Decision
Knowledge of OH risk at the facility	35(9.1)	61(15.8)	150 (75.1)	4.9792	1.01529	High knowledge
level of risk in the workplace	43 (11.2)	58 (15.1)	284(73.7)	4.7052	1.18364	High knowledge
Vi sit from the OHS department	20(5.2)	92(23.9)	273(70.9)	4.6442	1.06342	High knowledge
Signage explains the risk	32(8.3)	54(14.0)	299(78.2)	4.5747	1.09689	High knowledge
Training from the OH department	31 (8.0)	103(26.8)	251(65.2)	4.8416	1.04997	High knowledge
Rights of OH hazard	36 (9.4)	97(25.2)	252(65.5)	4.7922	1.10559	High knowledge
Safety equipment wearing	28 (7.3)	126(32.7)	231(60.0)	4.7429	1.00977	High knowledge
Ability to identify risk	29(7.5)	120(31.2)	236 (61.3)	4.7870	1.05640	High knowledge
Qualification of OH staff	23 (6.0)	129(33.5)	233(60.5)	4.8026	.98292	High knowledge
Safety procedures at the hospital	22 (5.7)	123(31.9)	240(62.3)	4.7922	.94287	High knowledge
Corrected body mechanism	22 (5.7)	109(28.3)	254(63.6)	4.8416	.94005	High Knowledge
Biological infection control	33(8.6)	107(27.8)	245 (63.6)	3.7299	1.04322	Poor knowledge
The use of fire extinguishers	260(67.5)	108(28.1)	17(4.4)	2.2468	.84094	Poor Knowledge
Wet floor signs	139(36.1)	92(23.8)	154(40.0)	3.859	.94450	Poor knowledge
Decision=	**weighted**		**average**		**=62.0701/14**	**=4.4335**

Scoring Guide: Knowledge of health risks associated with occupational Injuries

- 0–3 points: Poor knowledge – needs comprehensive training on occupational health hazards
- 4–6 points: Average knowledge – some gaps to address
- 7–9 points: High knowledge – well-informed on occupational health risks injuries linked to the health sector

4.2.2 Knowledge on Health Risks Associated with Occupational Injuries

majority of the respondents appear to have high knowledge relating to occupational hazard at the facility, level of risk around work place, periodic fellow up from OHS department, sign boards explain the risk surrounding their work, Training from occupational health department, rights of occupational health hazard, wearing of PPEs, Ability to identify risk, qualification of occupational health staff, safety procedure at the hospital, corrected body mechanism, biological infection contamination, Knowledge level relating to wet floor signs and lastly respondent has high level of perception relating to the types of injuries related to the nature of your work. Surprisingly, all the respondents had low-level knowledge about the use of fire extinguishers **(Table 4.3).**

The study showed a significant association between Age, Gender, Educational level, and job title (profession**)** on knowledge of occupational risk linked to health injuries. ($\chi2$=134.228, P< 0.000, $\chi2$= 41.409[a] P<0.000, $\chi2$= 50.590[a] < 0.000, $\chi2$= 26.760[a] <0.000). However, the chi-square test shows that there was no significant association between Marital status and Religion (X^2 =1.133[a] P< 0.287, $\chi2$= 5.653a P< 0.059) **(Table 4.5).**

Table 4.5: Socio-demographic characteristics of Health Professionals and their knowledge on health risks associated with occupational Injuries

Study variable	Good[N=239] n (%)	Poor [N=146] N (%)	(x2) (p-value)	OR (95% CI)	AOR (95%C. I)	(P-value) **
Age(years)						
20-25	69(98.6)	1(1.4)	134.22 (.000)	1.141(0.952-1.368)	49.0 (6.580-364.89)	0.000
26-30	69(58.5)	49(41.5)			13.53(1.678-109.08)	0.000
31-35	51(83.6)	10(16.4)			126.96(16.61-969.87)	0. 0 14
36-40	25(35.2)	46(64.8)			16.56(1.899-144.44)	0.000
41-45	25(80.6)	6(19.4)			17.78(3.12-184.22)	0.011
>45	0(0.0)	34(100.0)				0 .097
Sex				**Ref**	**Ref**	
Male	174(75.0)	58(25.0)	41.40 (0.000)	0.246 (0.159-.381)	0.246 (1.159-1.381)	0.000
Female	65(42.5)	88(57.5)				
Marital Status				Ref	Ref	
Single	185(63.6)	106(36.4)	1.133 (0.287)	1.293(0.805-2.076)	1.743 (1.042-2.914)	0.034
Married	54(57.4)	40(42.6)				
Educational level				**Ref**	**Ref**	
Certificate	24(100.0)	0(0.0)	50.590 (0.000)			
Diploma	116(65.2)	62(34.8)		2.245 (1.557-3.237)	0.06 (0.02-0.20)	0.000
Degree	68(58.6)	68(58.6)			8.63 (0.000)	0.998
Postgraduate	28(63.6)	16(36.4)			2.28 (0.000)	0. 998
Others	23(100.0)	0(0.0)			9.23 (0.000)	0. 784
Job title (profession)				**Ref**	**Ref**	
Nurse/midwife	147(70.0)	63(30.0)	26.760[a] (0.000)	1.062(0.903- 1.249)	11.818(2.506-55.723)	0.010

Lab scientist	2(15.4)	11(84.6)				14.76 (1.92-113.34)	0.000
Mortician	5(100.0)	0(0.0)				1.320 (0.603-2.888)	0.999
Medical Practitioner	69(57.0)	52(43.0)				1.358 (1.346-1.670)	0.000
Others (Allied Health)	16(44.4)	20(55.6)				.760 (0.346-1.670)	0.495
Religion					**Ref**	**Ref**	
Christianity	153(61.4)	96(38.6)	5.653[a]	(0 .059)	0.410 (0.259-0.649)	.375 (0 .166-.843)	0.041
Muslim	77(60.6)	50(39.4)				.069 .000	0.999
Traditional	9 (100.0)	0(0.0)				.000 .000	0.017

4.3.2 Knowledge and Perception of Health Risks Associated with Injuries against Profession

Figure 4.1 shows the analysis of a one-way ANOVA between groups which was performed to compare the knowledge of occupational health risk against profession by respondent. Study respondents were divided into five groups (**group 1** nurse/midwife, group 2 lab scientist, **group 3** mortician, group 4 practitioner (medical & dental) and **group 5** others. The results suggested that the knowledge of the group differed significantly ($F_{4, 380}$= 24.712, P< 0.001) and there was a significant association between the groups.

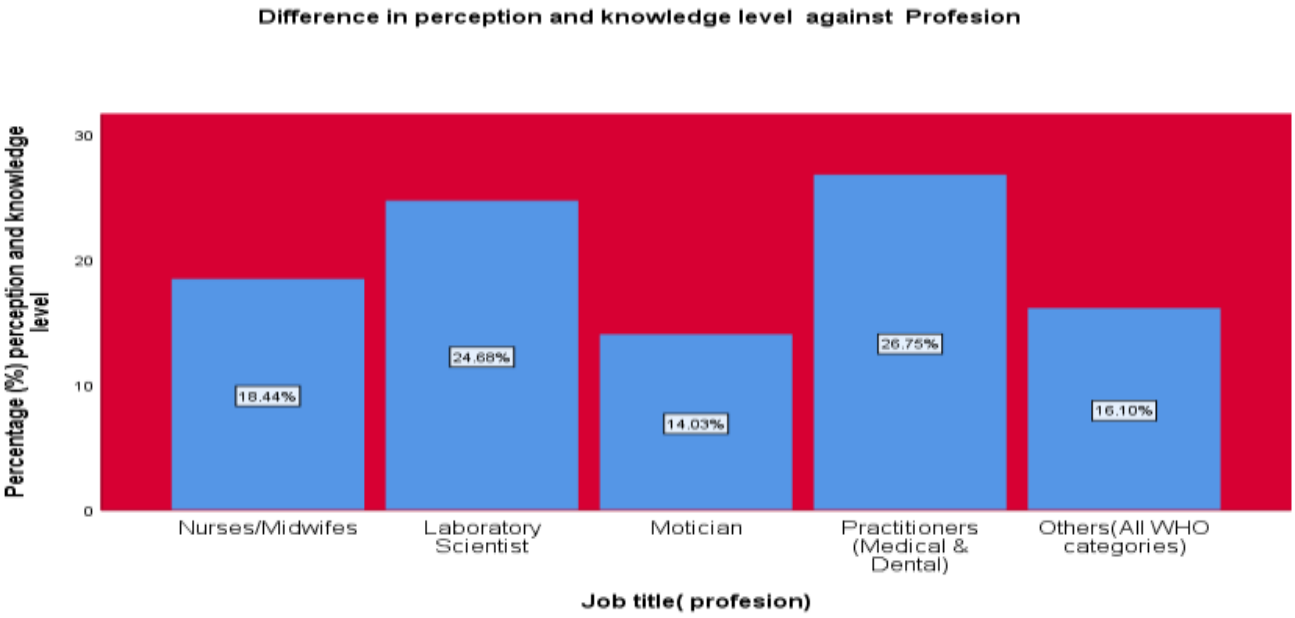


Figure 4.1 Differences in Perception and Knowledge on Health Risk Associated with Injuries across Professions

4.3.4 Knowledge and Perception of Health Risk Associated with Occupational Injuries by Gender

An Independent Samples Test was conducted to compare knowledge and perception of occupational health risk associated with gender. Study respondents were divided into two groups (**group 1 male** and group **2 female.** There was a significant difference between

the two groups (t (383) =5.284, P≤ 0.001). **[Male] (Mean =** 62.5490, SD = 6.35148**) was higher than [Female] (Mean = 58.7759,** SD = 7.16966). The magnitude of the differences in the means (mean difference 3.77316, 95% CL: 2.36913 to 5.17718) was significant. Hence, H1 was supported.

4.4: Types of Occupational Injuries Sustained by Health Professionals

This section shows various injuries sustained by the respondents while attending to their duties at the hospital.

Table 4.5: Prevalence and types of Occupational Health Injuries associated with Healthcare Professionals (n=385)

Types of Occupational Injuries	Frequency	Percentage (%)	P- Value
Non-biological exposure types of injuries			
Lower back & neck pain	57	14.8	
Physical, psychological, sexual/ verbal abuse	28	7.3	
Slips & falls	69	17.9	
Needle Prick	103	26.8	P<001
Irritation from disinfectants	23	6.0	
Musculoskeletal injuries (strains, sprains.)	29	7.5	
Others (noise, burns and chemical spills	24	6.2	
Work-related stress	52	13.5	
Biological exposure types of infection			
TB	19	4.9	
Direct contact with biohazardous materials	22	5.7	
RTI	18	4.7	
Influenza	33	8.6	
Covid-19	209	54.3	
Others (HIV, Hepatitis, etc.)	36	9.4	
Direct contact with Cuts/lacerations	20	5.2	
Cross-contamination from soiled materials	28	7.3	

The study showed that in terms of injuries sustained, (26.8%) had sustained needle prick injury, (17.9%) had sustained slip & fall resulting into leg injuries, (14.8%) having experienced ergonomic injuries low back & neck pain, (13.5%) having work-related

stress, (7.5%) having musculoskeletal injuries such as muscle aches/strains/sprains during work hours in the hospital, (7.3%) having Physical, psychological, sexual, and verbal abuse, (6.2%) having sustained others (noise, burns and chemical spills) and (6.0%) is irritation from disinfectant been the least injury having sustained by respondent.

In terms of biological injuries linked to exposure or with infectious diseases such as *Mycobacterium tuberculosis*, respiratory tract infection (RTI), influenza, HIV, Hepatitis B, and COVID-19. Of the sample studied, (54.3%) had acquired COVID-19, (4.7%) had acquired a respiratory tract infection (RTI), (8.6%) had acquired influenza, (4.9) had acquired mycobacterium tuberculosis, (7.3%) had infection from Cross-contamination of soiled materials, (5.7%) had direct body contact with contaminated specimens/biohazardous materials and lastly (9.4%) having other forms of infection like (Hepatitis etc.). The study revealed statistically significant associations between both biological and non-biological injuries associated with health care practice (P = 0.000) (**Table 4.5).**

Table 4.6 Occupational health risks linked to injuries in health care practice

Variables	**Frequency**	**Percentage (%)**
Recapping of the used needle	76	19.7
Giving injection	89	23.1
Breaking an injection Ampoule	62	16.1
Setting an intravenous line	18	4.7
Collecting a blood sample	22	5.7
Checking patient blood glucose Level	48	12.5
Surgical Procedures	10	2.6
Cleaning the patient's bedside	29	7.5
Bending of the needle	31	8.1

The study showed**,** the common circumstances under which occupational health injuries linked to health care practice occur. In terms of injuries sustained, the highest was giving an injection 89(23.1%), followed by recapping of needle 76(19.7%), and the least common circumstances under which occupational injury occurred is surgical procedure 10 (2.6%).

4. 5 Socio-demographic and lifestyle characteristics

This section shows various associations of socio-demographic characteristics and lifestyle factors with Occupational Injuries by the respondents while attending to their duties at the hospital.

Table 4.7a: Socio-demographic and lifestyle-related factors of occupational health injuries

Variables	Total (*n* =385)	Health Injuries Status		OR (95% CI) No vs. Yes	*p*-Value**	Adjusted OR (95%CI) No vs. Yes	*p*-Value**
		No *n*=97 (%)	Yes (*n* =288 (%)				
Age (mean)		≈32.6 years		1.06 (1.03–1.08)	0.001	1.02 (0.98–1.07)	0.03
Gender		72 (27.4)	191 (72.6)	**Ref**	**0.023**	**Ref**	0.73
Male	153						
Female	232	66 (37.7)	109 (62.3)	0.62 (0.44–0.94)		1.10 (0.63–1.91)	
Marital status				Ref		Ref	
Single	94	96 (34.4)	183 (65.6)	0.72 (0.45–1.12)	0.17	0.57 (0.34–1.24)	0.39
Married	291	10 (23.8)	32 (76.2)	1.21 (0.53–2.73)	0.56	0.76 (0.61–1.15)	0.55
Shift System No	168	15(8.9)	153(91.1)	**Ref**	**0.09**	**Ref**	0.29
Yes	217	82(37.8)	135(62.2)	1.45 (0.95–2.23)	0.001	1.22 (1.04–1.43)	0.01
Locum (Part-time)				Ref	0.002	20.43((3.19-130.61)	0.001
Yes	184	79(42.93)	105(57.07)	6.196 (3.41-11.25)			
No	201	18(8.96)	183(91.04)	1.52 (0.83–2.20)	0.89	1.93 (0.90–3.14)	0.084
Work days/Week		1(100.0)	0(0.0)	**Ref**		**Ref**	
4days	1						
5days	314	94(29.9)	220(70.1)	1.03 (0.63–1.68)	0.012	2.00 (1.10–3.65)	0.023
>5days	70	2(2.9)	68 (97.1)	1.12 (0.63–2.13)	0.01	2.24 (1.37–3.64)	0.023

Work hours/Day				Ref			
< 5 hours	39	0(0.0)	39 (100.0)	1.27 (0.69–2.35)	0.03	0.147 (0.017-1.297)	0.024
6-7 hours	117	15(12.8)	102(87.2)	1.09 (0.69–1.71)	0.72	0.97 (0.59–1.58)	0.089
8 hours	128	44(34.4)	84(65.6)	1.34 (0.78–2.3)	0.3	1.55 (0.86–2.80)	0.019
>9hours	101	63(62.4)	38(37.6)	1.69 (1.12–2.56)	0.01	1.73 (1.03–2.91)	0.001
Job tile(profession)				**Ref**		**Ref**	
Practitioner (Med & Dent)	36	34(94.4)	2(5.6)	1.44 (0.69–2.02)	0.001	1.19 (0.67–2.13)	0.002
Nursing and Midwifery	210	44 (21.0)	166 (79.0)	1.03 (0.63–1.68)	0.000	1.19 (1.67–2.13)	0.001
Lab scientist	13	3(23.1)	10(76.9)	1.12 (0.63–2.13)	0.000	1.28 (1.66–2.50)	0.001
Mortician	5	0(0.00)	5(100)	1.27 (0.69–2.35)	0.000	1.13 (1.58–2.23)	0.000
Others (all remaining WHO categories)	121	16(13.2)	105(86.8)	1.27 (0.69–2.35)	0.023	1.13 (0.58–2.23)	0.001
Department/ unit						Ref	
Emergency/ward	216	69(31.9)	147(68.1)	1.86(2.17-3.15)	0.000	0.188(1.021-1.665)	0.133
Laboratory	13	0(0.0)	13(100.0)	1.45 (1.95–	0.000	1.36 (1.82–2.26)	.0001

Table 4.7b: Socio-demographic and lifestyle-related factors of occupational health injuries *11*

Theatre/ICU						.00 (1.10–3.65)	.0001
ANC/labour	45	16 (35.6)	29(64.4)	2.24 (1.37–3.64)	0.001	2.81 (1.21–4.59)	0.023
Imaging	9	7(77.8)	2(22.2)	3.45 (2.04–	0.000	0.188(0.021-1.665)	0.017

				4.82)			
Others	77	5 (6.5)	72 (93.5)	1.45 (1.05–2.23)	0.000	0.234(1.031-1.845)	0.133
WorkExperience		17(13.7)	107(86.3)	**Ref**		**Ref**	
1-5 Years	124						
6-11 Years	150	19(12.7)	131(87.3)	1.09 (0.69–1.71)	0.000	0.97 (0.59–1.58)	0.089
>12 Years	111	61(55.0)	50(45.0)	1.34 (0.78–2.3)	0.01	1.55 (0.86–2.80)	0.019
smoking status	0	0 (0.00)	153 (63.5)	**Ref**	0.013	**Ref**	0.039
Yes							
No	385	385 (100.00)	147 (49.5)	1.69(1.12–2.56)		1.73 (1.03–2.91)	
Sleeping hours per day (mean)		≈ 7.63 Hours		1.20(1.04–1.40)	0.001	1.22 (1.04–1.43)	0.014
Alcohol Intake status				**Ref**		**Ref**	
Every day	5	1(20.0)	4(80.0	0.605(0.395-.927)	0.000	0.90 (1.003-2.775)	0.001
1-2times a week	28	11(39.3)	17(60.7)	0.090(0.0032.775)	0.001	0.74(1.002-2.696)	0.169
3-4times a week	15	10(66.7)	5(33.3)	0.074(0.0022.696)	0.017	0.473(0.023-9.894)	0.156
1-2times a month	242	65(26.9)	177(73.1)	0.473(0.0239.894)	498	2.902(1.133-2.379)	0.629
Never	28	7(8.0)	80(92.0)	3.45 (2.04–4.82)	0.64	2.81 (1.21–4.59)	0.857

[*] *Variable(s) entered for logistic regression analysis: age, gender, marital status, work/day, work/hours, part time, job title, department, alcoholic status, work experience, smoking status, sleep hours per day.* [**] *p-value less than 0.05 was considered statistically significant.*

4.6 Association of Socio-Demographic Characteristics and Lifestyle Factors with Occupational Injuries

The study presents occupational health injuries and their association with socio-demographic and lifestyle-related characteristics. In the bivariate analysis, the characteristics that were significantly associated with occupational injuries were age (OR = 1.09, 95% CI = (1.06–2.03), $p < 0.01$), Profession (OR = 2.141, 95%CI = (1.429-10.676), $p < 0.01$), work days/week >5 days (OR = 1.12, 95%CI = (1.63–2.13), $p < 0.01$), Work hours/Day >9hours (ref: OR = 1.69, 95%CI = (1.12–2.56 $p < 0.01$), work experience (ref: OR = 1.34, 95%CI = (1.78–2.3)$p < 0.01$), working area (OR = 1.45, 95%CI = (0.95–2.23) $p < 0.01$), Alcohol Intake status (every day,1-2times a week) (ref: OR = 0.605, 95%CI = (1.395-1.927)$p < 0.01$) and mean sleeping duration per day (OR = 1.20, 95%CI = (1.04–1.40), $p = 0.001$). The multivariate analysis revealed only the following four characteristics were significantly associated after being adjusted with other independent variables: Part-time work (Part-time: Adjusted OR (AOR) = 20.43, 95%CI = (3.19-130.61), $p = 0.001$), Profession (Profession: AOR = 1.28, 95%CI = (0.66–2.50), $p = 0.001$), working area (AOR = 1.36, 95%CI = (1.82–2.26), $p = 0.001$) and Shift system (AOR = 1.22, 95%CI = 1.04–1.43, $p = 0.014$). **(Table 4.7)**

Table 4.8: Occupational Health Practices among Study Respondent

Variable	Frequency(n=385)	Percentage(%)
Trained in Occupational Health & Safety		
Yes	288	74.8
No	97	25.2
Adherence to infection control Technique		
Yes	256	66.5
No	129	33.5
Properly dispose of Sharps		
Yes	144	37.4
No	241	62.6
Use personal protective equipment (PPE)		
Yes	325	84.4
No	60	15.6

4.7 Occupational health practices among study participants

The study showed that most respondents, 325(84.4%), believed they used personal protective equipment at the hospital, while 60(15.6%) did not. On the method of proper disposal of sharp objects, most respondents, 241(62.6%), said they did not have proper disposal of sharps at the hospital, while 144(37.4%) said they had proper methods of sharps disposal. Most respondents, 288(74.8%), indicated that they trained in occupational Health and Safety practices, while 97(25.2%) did not have training in occupational Health and Safety practices. Most respondents, 256(65.5%), practice good adherence to infection control techniques, while 129(33.5%) do not practice good adherence to infection control techniques (Table 4.8).

Table 4.9: Institutional factors influencing Potential Risk factors related to occupational health injuries among health care workers

Variable	Frequency	Percentage	P- value
Poor working environment	68	17.7	**P <.001**
Lack of proper safety gear	29	7.5	
Heavy workload and long working hours	113	29.4	
Absence of safety guidelines	141	36.6	
Lack of supervision/ training	34	8.8	

4.8 Institutional factors influencing Potential Risk factors related to Occupational Health injuries among healthcare workers.

The study showed that 141 (36.60%) said, absence of safety guidelines by management, 113(29.4) said heavy workload and long working hours due to inadequate staff strengths, 68(17.7%) said poor working environment, again 34(8.8%) indicated that they lacked supervision and training from OHS managers while 29(7.5%) said, lack of proper safety gears from management also accounts for health facility related factors leading to occupational health hazards **(Table 4.10).**

Table 4.10: Human factors influencing Potential Risk factors related to occupational health injuries among health care workers

Variable	Frequency	Percentage	P- value
Lack of job motivation	53	13.8	**p <.001**
Poor job training skills	65	16.9	
Multiple job places to earn more	136	35.3	
Negligence and carelessness	40	10.4	
Low working experience	41	10.6	
Nature of work	50	13.0	

4.9: Human factors influencing Potential Risk factors related to occupational health injuries among health care workers

The study showed that 136(35.3%) said multiple job place to earn more including other part-time job, 53(13.8%) said lack of job motivation, 65(16.9%) said poor job training and skills, again 50(13.0%) indicated nature of work, 41(10.6%) said low working experience, and negligence and carelessness 40(10.4%) also accounted for health worker related factors leading to occupational health hazard (**Table 4.10).**

4.10 Perceived Risk of Exposure Level

A risk score matrix was used to do a comparative assessment of exposure levels of healthcare workers within the various units/departments by the respondent**.** Out of the 385 study participants the perceived risk results suggest that the Laboratory Department has the highest score of exposure level 72(18.7%) while 61(15.8%) represent mortuary department, 51(13.2%) was Isolation Unit, 50(13.0%) represent Medical Imaging Department(X-ray) followed by 43(11.2%) Emergency Department (E R). Again, 40 (10.4%) represent the Outpatient Department (OPD), and 37(9.6%) represent the Theatre/ICU. Meanwhile, the least department with the lowest exposure level was the ANC/ Labour Unit staff, accounting for 31 (8.1%).

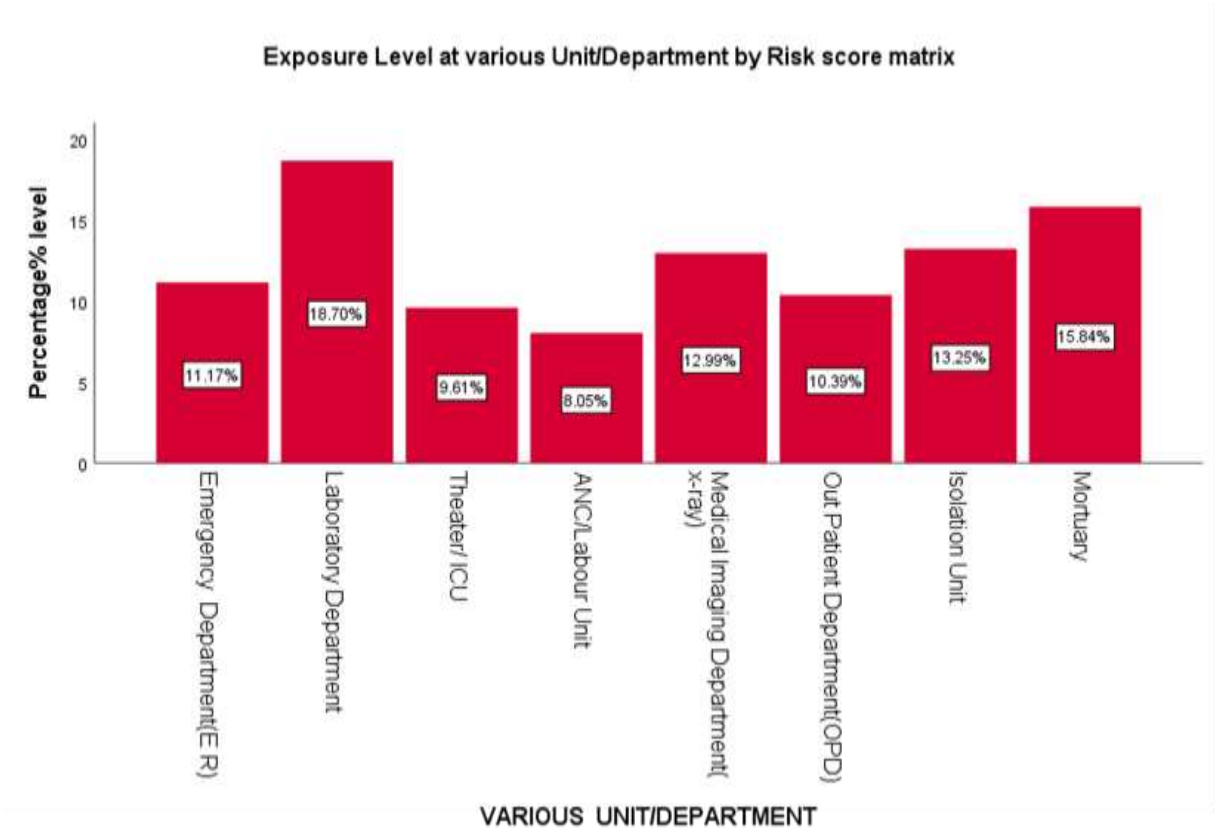


Figure 4.2: Perceived Exposure levels of healthcare workers within the various departments/units

Table 4.11 Perceived Ergonomic Risk by Respondent Related to their work

Variable	Insignificant Risk N/(%)	minor risk N/(%)	moderate risk N/(%)	Major risk N /(%)	High risk N/(%)	Mean	ó	Decision
Unavailability of mechanical devices to carry the patient	12(3.1)	75(19.5)	118(30.6)	80(20.8)	100(26.0)	3.47	1.16	High risk
No rest after each shift	5(1.3)	63(16.4)	72(18.7)	112(29.1)	133(34.5)	3.79	1.12	High risk
Free of MSK disease	22(5.7)	33(8.6)	91(23.6)	109(28.3)	130(33.8)	3.76	1.17	High risk
Prolong-standing	14(3.6)	42(10.9)	89(23.1)	129(33.5)	111(28.8)	3.73	1.10	High risk
Duties not done in comfortable position, neck and back	15(3.9)	45(11.7)	91(23.6)	126(32.7)	108(28.1)	3.70	1.11	High risk
Carrying tools and equipment during Working	11(2.9)	44(11.4)	87(22.6)	108(28.1)	135(35.1)	3.81	1.12	High risk

N=385 %= percentage Decision= weighted average=18.4961/6 =3.0826

The study showed that respondents appear to feel that mechanical devices that are not available to carry patients pose a high ergonomic risk. Again, the majority of the respondents reported that they don't work in a comfortable position, especially neck and back injuries, and this constitutes a high ergonomic risk. Also, the majority of respondents reported that the mechanical devices that were used for patient lifting put them at high risk, which can lead to muscular and nervous system disease. Furthermore, the unavailability of tools and equipment lifting machines, and prolong-standing, puts them at high musculoskeletal disease (MSK). and this constituted a major ergonomic risk. Lastly, lack of rest in between shift systems and more working hours of respondents put them at high ergonomic risk **(Table 4.11).**

4.11 Percentage of Potential Ergonomic Risk against Profession

Figure 4.3 showed that 54.55% of nurses had the highest ergonomic risk since they are involved in pushing and carrying heavy objects, including patients,31.43% of other allied health professionals had moderate ergonomics risk, while 9.35% of practitioners had low ergonomic risk, and 3.38%. of laboratory scientists and 1.03% of morticians had no ergonomics risk. There was a significant association between the level of ergonomics risk and the profession of the study respondent ($p \leq 0.05$).

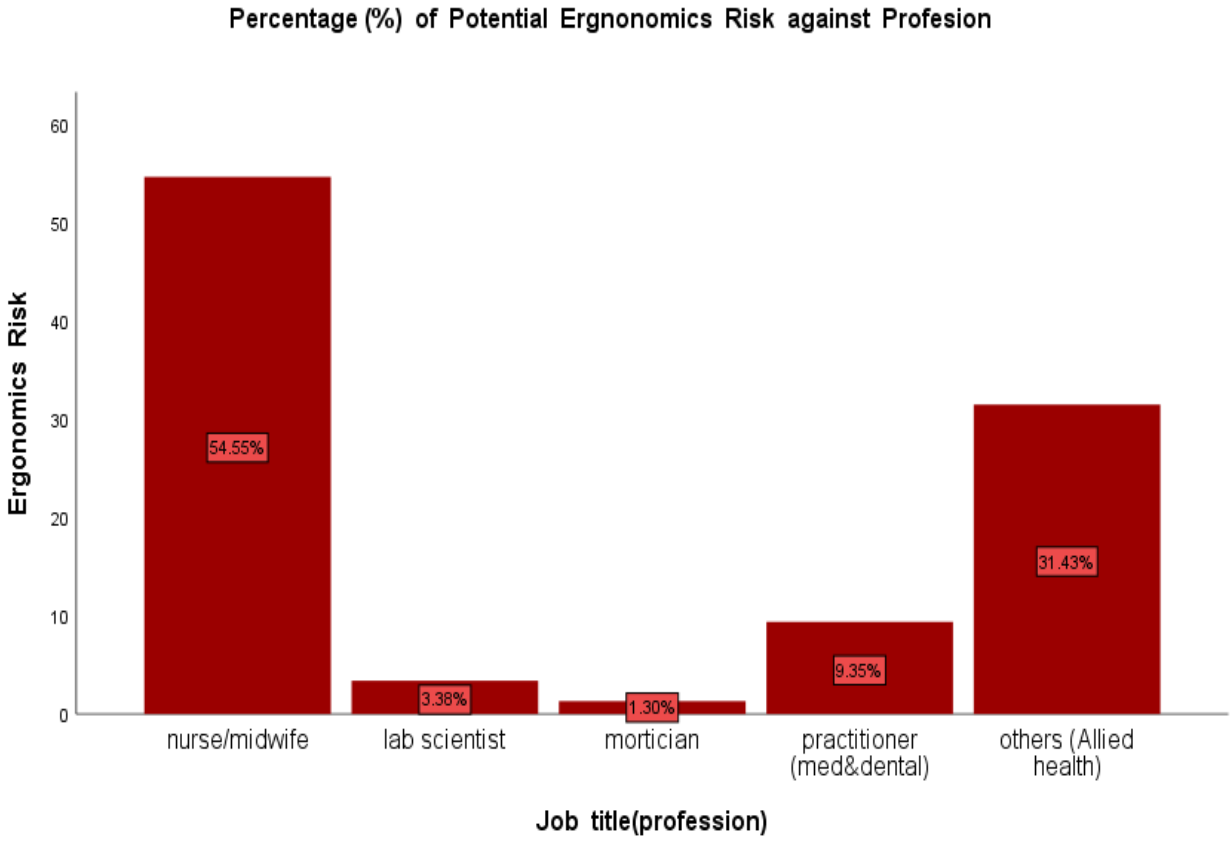


Figure 4.3 Ergonomic Risk Against Profession

Table 4.13: Physical risk factors related to their work by Risk Score Matrix.

Variable	Insignificant risk	minor risk	moderate risk	major risk	High risk	Mean	Ó	Decision
unavailability of signage	0(0.0)	73(19.0)	44(11.4)	170(44.2)	98(25.5)	3.81	1.03	High risk
Unsafe electrical equipment	1(0.3)	203(52.7)	19(4.9)	137(35.6)	25(6.5)	3.01	1.07	High risk
The doors and trolley are not in a safe condition	1(0.3)	216(56.1)	38(9.9)	104(27.0)	26(6.8)	3.02	1.04	High risk
unavailability of a fire extinguisher and unable to use	1(0.3)	201(52.2)	49(12.7)	102(26.5)	32(8.3)	3.26	1.06	High risk
The temperature in your workplace is adequate	76(19.7)	99(25.7)	39(10.1)	118(30.6)	53(13.8)	2.93	1.38	Low risk
Availability of air conditioning	37(9.6)	90(23.4)	30(7.8)	175(45.5)	53(13.8)	3.31	1.24	High risk
unavailability of PPEs to reduce radiation	18(4.7)	41(10.6)	111(28.8)	153(39.7)	62(16.1)	3.52	1.03	High risk

N/% N=385 %= Percentage Decision= weighted average =22.86/7 =3.2657

4.12: Physical Risk factors related to their work by Risk Score Matrix

The figure analysis showed that the majority of the respondents appear to feel that the Floor, not made of rough material to prevent slipping, puts them at high risk. Again, the majority of the respondents reported that Entrances, stairs, ramps, Internal floors, and exits are not in a safe condition, and this constitutes a high physical risk. Also, the majority of respondents reported that Wet floor signs, which are not available, put them at high physical risk. Furthermore, outlets and other electrical equipment used in department which are not suitable and safely to used, Doors and trolley used in the department which are not in safe condition, the lighting system which is not adequate, poor ventilation system, unavailability of air-conditioning, poor maintenance and lack of services for departmental devices and exposure to radiation without protection put them into major physical risk. Lastly the majority said that the unavailability of fire extinguishers put them at moderate risk.

Table 4.13 Perceived Biological Risk

Variable	In-Risk N/(%)	Minor Risk N/ (%)	Moderate Risk N/ (%)	Major Risk N/ (%)	High Risk N/ (%)	Mean	(ó)	Decision
Unavailability of PPEs	21(5.5)	65(16.9)	152 (39.5)	89(23.1)	58(15.1)	3.25	1.07	High risk
Unavailability of Sharp boxes	34(8.8)	113(29.4)	101(26.2)	89(23.1)	48(12.5)	3.01	1.17	High risk
Not wearing gloves when dealing with the patient.	20(5.2)	146(37.9)	149(38.7)	57(14.8)	13(3.4)	3.52	1.03	high risk
Unavailability Disinfectants	20(5.2)	146(37.9)	149(38.7)	57(14.8)	13(3.4)	3.01	1.07	Low risk
Unavailability of medical waste disposal	20(5.2)	116(30.1)	171(44.4)	65(16.9)	13(3.4)	3.76	1.03	High risk
Hand washing before and after contact with the patient	19(4.9)	126(32.7)	177(46.0)	50(13.0)	13(3.4)	3.28	1.08	High risk
Medical tests (HCV, HBV, and HIV) are done regularly for health workers	19(4.9)	13(3.4)	170(44.2)	36(9.4)	147(38.2)	2.68	0.84	Low risk
Vaccinations against infectious diseases	17(4.4)	106(27.5)	144(37.4)	105(27.3)	13(3.4)	2.90	1.06	High risk

N=385 IR =insignificant risk %= percentage Decision= weighted average=25.41/8 =3.176

4.13: Perceived Biological Risk of Respondents

The data analysis below showed that the majority of the respondents appear to feel that the unavailability of PPE for use at the workplace puts them at high biological risk. Again, unavailability of infection preventive measures such as gloves, a head cap, closed shoes, and a work suit constitutes a high level of biological risk. Also, the absence of frequent medical investigation for infectious diseases such as Tuberculosis, COVID-19 and hepatitis constitutes a high biological risk. Lastly the absence of a Sharp box, which is not available in the workplace, especially in the laboratory and the nursing/ midwifery department, where injection is administered more often, constitutes a high level of biological risk. **(Table 4.13)**.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter presents a discussion of the findings regarding relevant literature on the subject. The current study assessed the prevalence, pattern, and risk factors of occupational health hazards among health workers in the Atwima Nwabiagya Municipal of the Ashanti Region. Key findings of the specific objectives are discussed in these thematic areas: Evaluation of health care workers' perceptions and knowledge of risk factors on occupational health injury. Assess the prevalence and types of occupational injuries linked to healthcare practice. Examine the associated risk factors of occupational injuries among healthcare workers. Compare occupational risk exposure levels at different departments/units using the risk matrix score at health facilities, and an association between the socio-demographic characteristics of health care workers with the occupational health injuries variable.

5.2 Evaluation of health care workers' perceptions and knowledge of risk factors on occupational health injury (Specific objective 1)

The study found perception and knowledge level on Potential risk factors related to occupational health injury to be almost universal among respondents, with 62.07% of them reporting knowledge on Potential risk factors. The knowledge level found in this study was high compared to findings of a study in Malaysia that assessed the level of occupational hazards, knowledge and awareness among hospital workers, which found a general occupational health hazards awareness among health professionals to be 58.0% (Lugah ***et al.,*** 2010). Hospital workers need to have good knowledge about occupational hazards and safety practices. Overall, (84.4%) of people who responded had good

knowledge about occupational hazards and safety practices in the workplace by the use of PPEs, consistent with a finding in Nigeria, which identified that 89% of healthcare workers surveyed knew hazards existing in their healthcare facilities (Aluko ***et al.,*** 2016). Also, a study in Malaysia reported 97.3% knowledge level among health professionals (Lugah *et al.,* 2010).In contrast to the high knowledge and perception level of occupational health hazards found in this study, Anisha (2009) and Viragi et al. (2013) found low knowledge and perception levels in their study among healthcare workers in Malaysia. These differences in findings could due to the fact that Nurses and Dentists were respondents in Anisha and Viragi et al 2013. studies focused on all clinical healthcare workers. It could also be that the low level of knowledge of occupational health risk of respondents in their study could be due to non-exposure to training on occupational health risk, and this may constitute a stumbling block in that regard.

A regression analysis between background characteristics of respondents of knowledge, educational level, profession, gender, and Age of healthcare workers was significantly associated with knowledge, consistent with findings by Aluko *et al.* (2016). An Independent Samples Test was conducted to compare knowledge of occupational health risk for males and females; the knowledge level for males was higher than that of females. The magnitude of the differences in the means (mean difference 3.77316, 95% CL: 2.36913 to 5.17718) was significant. Most respondents believed that occupational health risk issues concerned them, thus suggesting that most respondents had a sense of shared responsibility as far as occupational health hazards issues of the hospital were concerned. They probably acknowledged the fact that they stood the greatest risk of the consequences of poor occupational health hazards and safety measures or practices. However, the total mean percentage of the knowledge of health care workers was

62.07% which is considered a low level of knowledge. This low level of knowledge may be likened to the inadequate provision of enough training courses regarding dealing with risks at work. The absence of continuous follow-up from the directorate of health in charge of occupational health and safety in the workplace itself creates a major problem and exposes the healthcare workers to such risks. In this study, most healthcare workers perceived exposure to occupational health as a high risk, similar to nurses in Taiwanese hospitals (Chiou *et al.,* 2013) who indicated most occupational exposures as direct contact with fluid, needle prick injury, routine night shifts, and body contact.

5.2.1 Perceptions of Health care workers towards Occupational Health injuries

Perceptions on Occupational Health risk, the study took concerted efforts to analyze the perceptions on the occupational Health risk. In a nutshell, the findings of this present study revealed a high perception of occupational health risk. The risk of exposure was high in my study since most respondents are at risk of exposure to occupational health injuries, and about 2/3 of respondents perceived the risk of exposure as high. Generally, almost all the HCWs in this study believed that they are at risk of occupational injuries, with the majority of them rating the level of risk to be "high risk". Similarly, a study done in Nigeria reveals that 96.2% of respondents in the Health Care Facility (HCF) believed that they are at risk of exposure to hazards in the workplace with about two-thirds perceiving the risk of exposure to be high (Aluko, Adebayo *et al.* 2016). This was also in agreement with the findings of previous studies by Orji *et al. (*2016). These findings imply that the HCWs are most likely to be knowledgeable about being susceptible to occupational injuries and aware that their exposures in the work place can expose them to contracting occupational injuries.

Furthermore, according to the HCWs in this study, the occurrence of these injuries was driven by; Health care worker carelessness, lack of PPE, uncooperative patients and poorly disposed health care waste. Even though most of the health workers are informed and familiar with universal standards and guidelines the prevalence of occupational injuries is still high. Similarly, the study by Ndejjo et al. (2015),established the perception that the increase of occupational hazards is highly associated with not wearing PPE among hospital workers. A study by Yazie et al. (2019) and that by Senthil et al. (2015) revealed that, the majority of HCWs were very cautious with needle prick injuries and perceived high rates of injuries resulting from needle pricks.

5.3 Types of occupational injuries linked to healthcare practice in a healthcare setting.

The common occupational injury among respondent was Work-related stress 13.5%, neck and low back pain (14.8%), slips and fall 17.9%, irritation from disinfectants 6.0%, Physical, psychological, sexual, and/or verbal abuse 7.3%, others (noise, burns and chemical spills) 6.2%, Musculoskeletal injuries such as muscle aches/strains/sprains 7.5% and the highest injury been needling prick injury (26.8%). A study conducted by Alenzi et al. (2020) also found findings similar to those of the current study. In their study, self-reported stress and anxiety were present among 68.5% of health care workers.

In contrast, a study by Makhaita *et al 2022*) reported a relatively lower level (45.5%) of work-related stress. The higher prevalence of stress in the present study and the study done by Alenzy is mainly due to the COVID-19 pandemic, as both studies were conducted during the COVID-19 pandemic. Globally, the increase in stress, burnout and anxiety among the HCWs during the COVID-19 pandemic is a noted fact. This is also similar to a study conducted in Uganda, which reported the common occupational diseases to be stress (21.5%) and needle prick injury (21.5%).

In a similar study conducted in Bida, the following common occupational diseases reported among clinical departments include: needle prick injury 23.2%, stress13.2%, hepatitis B&C 13.9%, Back pain 4.2% and violence 3.2%. The present study found that (26.8%) of participants experienced a needle prick injury during their work time. A study completed by Samia G et al. among health care workers in a university hospital, Jeddah, in 2018 found results similar to the present study. In contrast, some other studies performed by Omar et al. in Al-Medina City and Buraidah City have found a lower prevalence of needle prick injuries. In their studies, the prevalence of needle stick injury was 24% and 22.5%, respectively. Interestingly, a study conducted in Alexandria, Egypt, found a remarkably high prevalence (67.9%) of needle stick injuries among the HCWs. These differences in prevalence could be explained due to study settings, such as the types of inclusion of health care facilities and the types of HCWs. This study sampled all the HCWs of different types of health care facilities. Needle prick injury is more common among nurses in this study, 20.3%. It is statistically significant, $P \leq 0.001$. This is consistent with a study conducted in Ethiopia, which shows that it is more common among nurses, 66%.

However, it is contrary to the study conducted in Bida, where needle prick injury is more common among doctors. It may be that there is a task shifting of some procedure, which the doctors usually conduct the nurses. In Ghana, a preliminary assessment of 'injection safety and health care waste management' conducted in 2003(MOH), showed that despite the use of auto-disable syringes in the administration of immunizations, a considerable number of immunization staff reported having sustained needle prick injuries, which mostly occurred when a child moved suddenly during an immunization. Staff are therefore considered to be at a higher risk of needle stick injuries.

In Uganda and South Africa, needle stick injuries were found to be around 44-55% and 91% respectively, among junior doctors over 6 months. This could also be attributable to the accidental needle prick injuries reported as the second-highest occupational injury among study respondents. Sharp-related injuries and stress were the major health-related hazards experienced by healthcare workers (Nsubuga & Jaakkloka, 2005; Ziraba *et al.,* 2010; de Castro *et al.,* 2009). Concerning muscle aches (Strains, sprains), emerged prominently among respondents. This finding points to improper ergonomic practices during working periods, and this is corroborated by a study in Malaysia, which revealed that awareness of ergonomics and its definition among the hospital workers is quite low (7.5%). It is worrying as musculoskeletal diseases are a significant source of work absenteeism and disability among healthcare workers (Lugah *et al.,* 2010).

5.3.1 Institutional factors influencing Potential Risk factors related to occupational health injuries among health care workers

The results on institutions level associated factors influencing potential risk factors related to occupational health injuries among health care workers was assessed using regression analysis which showed five variables to be positively statistically associated with the institutions factors as follows: 141 absence of safety guidelines by management with (p- value = 0.003< 0.05), 113 heavy workload and long working hours due to inadequate staff strengths with (p- value = 0.000 < 0.05), 68 poor working environment with (p- value = 0.047 < 0.05), 34 indicated that they lacked supervision and training from OHS managers with (p- value = 0.034 < 0.05), while 29 lack of proper safety gears from management (PPEs) with (p- value = 0.002< 0.05).

This is similar to a study conducted by Vegso and Slade (2012) in Southern India, which established that most health workers rated their working environment as being poor,

affecting service delivery and putting them at a high risk. This is also in agreement with a study by Goniewicz *et al.* (2012), who also noted that many health care workers, especially midwives in developing countries, lack proper safety gear, hence attend to mothers sometimes with bare hands. As a result, they come into contact with bacteria, viruses, fungi or parasites when handling mothers, contaminated objects, body secretions, tissues or fluids. This implies that health workers are easily exposed to both body fluids and blood. This is also supported by a study conducted by Chankova *et al.* (2013), on occupational hazards in Kenya, which concluded that, the lack of safety gear (PPEs) by health workers made them afraid to touch clients, leading to a reduction in the quality of care clients receive. This is because contact with bacteria, viruses, fungi, or parasites when handling mothers, contaminated objects, body secretions, tissues, or fluids.

5.3.2 Human factors influencing Potential Risk factors related to occupational health injuries among health care workers.

The results on the human level associated factors influencing potential risk factors related to occupational health injuries among health care workers, regression analysis was done at the level of 0.05 level of significant, showed that the following variables have strong positive association: human associated factors with (p- value = 0.00 < 0.05), 136 multiple job place to earn more and including other part-time job with (p- value = 0.021 < 0.05), 53 lack of job motivation with (p- value = 0.047 < 0.05), 65 poor job training and skills with (p- value = 0.005 < 0.05), 50 indicated nature of work with (p- value = 0.037 < 0.05), 41 low working experience with (p- value = 0.005 < 0.05), and 40 Negligence and carelessness with (p- value = 0.000 < 0.05).

This is similar to a study conducted in Nigeria by Orji et al (2014), which found that the nature of work predisposes health workers to occupational hazards. Their study report, pointed out that the nature of work also determines the risk of hazards faced by an individual. For instance, health workers in certain departments like surgical wards, labour, TB wards, among others, might stand at a higher risk of occupational hazards than compared to their counterparts working in other departments. This is also in agreement with a similar survey conducted by the Health Promotion and Social Development (HEPS, 2011) in Uganda, which stated that lack of training among health workers is also a major factor contributing to occupational hazards among health workers as they are more prone to needle pricks due to negligence, which accounted for 40(10.4%) of respondents. This is also in line with a study by Lindquist (2014), which stated that negligence, low working experience, and lack of coordination are another factor that predisposes health workers to occupational hazards.

5.3.3 The Prevalence of the most Common types of Ergonomic injuries

The common ergonomics injury among study respondents was neck and low back pain (14.8%), slips and falls 17.9%, musculoskeletal injuries such as muscle aches/strains/sprains 7.5%. A study completed by Samia G et al. among health care workers in a university hospital, Jeddah, in 2018 found results higher (38.9%) than the present study. Similarly, some other studies performed in KSA by (Omar et al.2022) in Al-Medina City have found a lower prevalence of needle prick injuries. In their studies, the prevalence of needle prick injury was 24% and 22.5%, respectively. Interestingly, a study conducted in Alexandria, Egypt, found a remarkably high prevalence (67.9%) of needle prick injuries among the HCWs. Study settings, such as the types of inclusion of

health care facilities and the types of HCWs could explain these differences in prevalence. This study sampled all the HCWs of different types of health care facilities

5.3.4 The Prevalence of the most Common types of Physical injuries

The study findings on the most prevalent physical injuries as was indicated by the respondent based on diagnosis and treatment in the years 2021 to 2022 showed that in terms of injuries sustained, irritation from disinfectants 6.0%, and the highest injury been needle prick injury (26.8%), slips and fall 17.9% as a result of no signs on wet ground, others 6.2%, reported of having experienced noise, ionizing and non- ionizing electromagnetic radiation. The majority of respondents had experienced an occupational health hazard, mostly sharp-related injuries, lower back pain and extreme pressure at work. These findings are consistent with previous studies by Ndejjo *et al.* (2015) in Uganda, Nsubuga Fredrich (2005) in Uganda and Orji *et al.* (2002) in Nigeria, who reported that sharp-related injuries, stress and extreme pressure at work were the major health-related hazards experienced by health workers.

5.3.5 Prevalence of Biological injuries linked to healthcare practice in a healthcare setting

The HCWs were exposed to several bacterial and viral respiratory infections, including serious illnesses like tuberculosis, and this scenario has worsened due to the COVID-19 pandemic. In the COVID-19 pandemic context, the HCWs are considered a high-risk and vulnerable population to get active infections and act as a carrier of these infections to other patients, locations, and families. Hence, it is essential to protect the HCWs from getting COVID-19 and other serious airborne infections. A systematic review conducted

by Kent *et al.* (2021) also found that the prevalence of airborne infections among health care workers ranges from 15% to 41%.

A study conducted in Ethiopia has shown that more than one-third of the HCWs were positive for latent tuberculosis. Another study performed in Northern Saudi Arabia (2021) revealed that COVID-19 infections among the HCWs were higher than in the general population. A survey conducted by Ndejjo *et al.* in 2015 also found that biological health hazards are significantly associated with the type of health care facilities (AOR = 2.21, 95% CI = 1.02–4.78, p = 0.043). Similar to the present study, Macintyre et al. also stated that the HCWs performing high-risk procedures had a significantly higher rate of developing respiratory infections and other laboratory-associated bacterial and viral infections.

5.3.6 Circumstances under which the most common types of Occupational injuries occurred.

Circumstances under which various risk factors linked to occupational health injuries among the study respondents occur while attending to their duties at the hospital . Of the sample studied, in terms of risk factors leading to the occupational injuries sustained, the study showed that the highest circumstances under which occupational injury occurred were giving Injection 89 (23.1%), followed by recapping of needle 76 (19.7%), and the least circumstances under which occupational injury occurred were surgical procedure 10 (2.6%).

5.4 Socio-demographic and lifestyle-related risk factors of occupational injuries

The mean age of the respondent was approximately ≈ 32.8. The modal age group was 26-30years (30.6%), which was approximately 28years. This is in contrast to a study conducted in Osun state, Nigeria, which reported a model age group of 20-39 years (80.7%) with a mean age of 33.4± 7.4years. This may be since, at the time of the study, their Ministry of Health had not conducted a recruitment process for a long time. Therefore, the respondents are those who have been in service for a long time.

The majority of the respondents were female. This is consistent with a similar study carried out in Minna General Hospital, Niger state, Nigeria by Idris M. Sheshi (2023), which showed a high number of respondents to be female - 67.6%. It is also consistent with a similar study carried out in Osun state, which showed a high number of female respondents (55.5%). This is also consistent with studies carried out among female nurses in two public health institutions in the Ablekuma sub-metro of Accra, namely, Korle Bu Teaching Hospital and Mamprobi Polyclinic, which showed a high number of respondents to be female, 62.74% (MOH,2021). This is because the nursing profession is the most frequent among the respondents and has a large proportion of women as its workforce.

The present study revealed that more than half of the respondents are nurses (54.5%). This is consistent with a similar study carried out in Minna General Hospital, Niger state, Nigeria by (Sheshi et al,2023), which showed a high number of respondents to be nurses - 58.8%. It is also consistent with a similar study carried out in Osun state, which showed a high number of respondents to be nurses, 52.4%. This is also consistent with other

studies conducted by Manuel *et al. (*2015) and Osungbemiro *et al.* (2016), who both reported that females were the majority in all the hospitals that they studied.

This is also in conformity with a similar study carried out in Malaysia, which showed 48.2% of nurses, due to the fact that nurses constitute the majority of the working force. The implication is that nurses must be involved in any safety committee that may be instituted in the hospital. One or two nurses may be affected by any occupational disease that may occur in the hospital. For this reason, any planning initiative that may be carried out in the hospital, considering occupational disease control and employee safety, must involve.

5.4.1 Socio-demographic Characteristics Stratified by Education and Profession

In the bivariate analysis, the characteristics that were significantly associated with occupational injuries were age, profession, number of days work per week >5 days, number of hours work per day >9hours, work experience, working area, Alcohol Intake status but the multivariate analysis revealed only four characteristics that were significantly associated after being adjusted with other independent variables and these were Part-time work, Profession, working area and Shift system. The majority of the respondents have attained tertiary education, and this is comparable to the study conducted by Manyele *et al.* (2008), who said the majority of their respondents had tertiary education and that they are abreast with occupational hazards in hospitals. Years of experience (duration of work) had a significant association with the level of risk of health workers. This is consistent with studies by Iliyasu *et al. (*2016) and Osung *et al. (*2016), who reported a significant association between levels of risk of health workers and year of practice.

The reason may be that all health workers, irrespective of their years of experience, are exposed to a similar grade of risk in the course of performing their professional duties. This could be because health workers in hospitals use similar safety personal protective equipment (PPE) irrespective of their years of experience. Clinical staff were the only inclusion for this study, and this is consistent with the studies conducted by Osungbemiro *et al.* (2016) in Nigeria and Ndejjo *et al.* (2015), who both established in their studies that clinical staff were more than non-clinical staff. Nurses the study comprised the vast majority, which is normal in many health settings, particularly in hospitals. The majority of the respondents' years of practice were less than 10 years. This is consistent with a study conducted by Iliyasu *et al.* (2016), who reported that most of their respondents had less than 10 years of working experience. The study established that the majority of the clinical staff were females and married, and this is consistent with a study conducted by Ndejjo *et al.* (2015), who reported that females were the majority in their study, of which many were married.

5.5 Comparing perceived occupational risk exposure levels at different departments/units

5. 5.1 Biological risk

Regarding biological risk by the risk score matrix the study showed that 44.2% said unavailability of PPEs constitute a high biological risk, 38.2% absence of frequent medical investigations for infectious diseases such as Tuberculosis, Covid 19 and hepatitis constitute a moderate biological risk, 3.4% ignorance of immunizations against infectious disease and epidemics constitute high biological risk,13.0% suboptimal hand hygiene after contacting with patients who linked to biological infections, and other

items also constitute extreme biological risk. The absence of this practice creates a very important risk, as the risks are cumulative; the health care worker may be infected, but they continue working without knowing they are infected. Biological hazards represent a significant occupational risk for healthcare workers due to their consistent exposure to infectious agents and potentially harmful microorganisms (Innocent *et al.,* 2022).

5.5.2 Physical Risk

Regarding physical risk, according to the risk score matrix, the study showed that 44.2% said unavailability of signs on wet ground put them into high risk, while 19.7% reported that recapping of the needle constitute a moderate physical risk, 16.1% breaking the injection ampoule also constitute a high physical risk, 23% illumination and hot temperature in most units due to unavailability of air conditions also constitute a major physical risk, 27.2% absence of preventive measures regarding x-ray due to ionizing and non- ionizing electromagnetic radiation also constitute vary high physical risk among respondent, and lastly 7.3% Outlets and other electrical equipment used in department at the workplace also constitute an high level of physical risk.

Other physical hazards by the respondent include light, high or low pressure, high or low temperature, compressed gases, vibrations, etc. These hazards result in health problems such as burns, heat stroke, heat cramps, eyestrain, hearing effects, visual fatigue, etc. Work-related musculoskeletal disorders (WMSDs) occur at some point in their careers, with low back injuries being the most common (Tinubu *et al.*, 2010). Slips, trips, and falls on wet floors are constant concerns among respondents. Operating rooms and emergency departments expose workers to high levels of noise, which can lead to hearing impairment over time (Park, 2009).

5.5.3 Ergonomics risk

Regarding ergonomic risks the study showed that the majority (38.4%) of health care workers reported that they didn't work in a comfortable position or poor work posture especially neck and back and this constitute a high ergonomic risk, while 30.1% reported that unavailability of patient lifting machines and patient handling procedures, manual lifting of other mechanical devices constitutes a major ergonomic risk. 9.6 % Standing for prolonged periods is also considered a high risk of ergonomics, because these positions can expose healthcare workers to high ergonomic risks and diseases such as low back and neck pain, nervous and muscular system, which can affect their work. Moreover, 44.4% reported that repetitive or monotonous work and lack of rest after shift system constitute a very high ergonomic risk. This is consistent with the risk factors well associated with the development and aggravation of Work-related musculoskeletal disorders (WMSDs), which are primarily biomechanically stressful, such as awkward postures, high muscular load, repetitive movements Punnett, 2014), and vibrations (Charles *et al.*, 2018).

5.5.4 Department with higher exposure level perceived by respondent

The risk score matrix analysis of the pattern of exposure with the occupational health injury status. Regarding the pattern of exposure, the major place of exposure in the various departments of the hospital by the risk matrix score, the study found that, out of the 385 respondents the risk score matrix results suggested that the Laboratory Department has the highest score of exposure level. These results are inconsistent with the current literature. Since workers in the laboratory, mortuary department, isolation unit, and emergency need to act quickly in many cases because of the Covid 19, it may be assumed that the risks of injuries are higher in these departments. Besides, the HCWs

in the laboratory may engage in more work in a short period of time because of the Covid 19. Exposure to infectious specimens, infectious aerosols during processing or sample container breakage in the centrifuge, Poor work practices, e.g., eating or drinking in the laboratory, poor hygiene, unsuitable specimen packaging and transport, and lastly inappropriate or inadequate PPE can increase their risk of exposure at the laboratory. Exposure to bloodborne pathogens (BBP) through needle pricks and contact with blood and other body fluids was found to be severe compared to other injury mechanisms. However, such injuries are known to carry a substantial psychological burden and serious emotional distress among HCWs who experience a needle-prick by fear due transmission of the Covid 19 virus. However, this finding is consistent with a study conducted in Oman by (Maskari ZA et al.2022), where 35% of hospital-acquired infections were as result of contact with another infected patient, particularly during sample taking, 'break' times, as the HCWs were unable to practice social distancing and universal masking when eating. In fact, HCWs who turned positive following exposure to COVID-19 pose a serious threat to other HCWs working with them and sharing a common environment.

Again, a majority of the exposure happened in the Mortuary department following embalming and washing the body. Also, a majority of the exposure happened in the Isolation Unit, followed by chest and tuberculosis infection. This suggests that a majority of exposure occurred during the handling of emergency cases of COVID-19, including casualties. In studies conducted by (Goenka et al.2020) in India and Ethiopia, Isolation Units are the majority of exposure. Furthermore, a majority of the exposure happened in the Medical Imaging Department(X-ray), where exposure to radiation from portable or mobile X-ray machines occurred by assisting trauma or Covid 19 patients and also

providing emergency care to patients who have received therapeutic amounts of radiotherapy. The department with the lowest exposure level was the ANC/ Labour Unit.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

6.1 Overview

This chapter presents a summary of the major findings of the study, which assessed the prevalence, pattern, and risk factors of occupational health hazards faced by healthcare workers in three selected hospitals in the Atwima Nwabiagya Municipal, Ghana. The chapter includes a summary of the research findings, conclusions from the results obtained, and recommendations for further studies.

6.2 Summary of the Key Findings

The study found knowledge of occupational hazards to be almost universal among respondents, with 62.07% of them reporting knowledge of potential risk factors.

Overall, (84.4%) of people who responded had good knowledge about occupational hazards and safety practices in the workplace by the use of PPEs. An -independent samples test was conducted to compare knowledge of occupational health hazards for males and females, with a mean difference of 3.77316 at a 95% confidence interval: (mean 2.36913 - 5.17718). There was a significant difference, in males having higher rates than females. There could be gender disparities in access to occupational health and safety training. Men might have more opportunities or encouragement to participate in such training, leading to a broader understanding of occupational hazards.

The most common occupational injuries suffered by the study respondents include the following: stress and exhaustion, needle prick injuries, neck and back pain, slips & fall, irritation from disinfectant, muscle aches (strains & pains), respiratory tract infection, influenza, COVID-19 and others. The study also found several risk factors for both

biological and non-biological health hazards such as increase number of hours of service per day and history of having another job outside the present commitment, shift system, absence of safety guidelines, heavy workload and long working hours due to inadequate staff strengths, poor working environment, lack of supervision and training from OHS managers, alcoholic intake and lack of proper safety gears. Health care workers reported that they didn't work in a comfortable position, thus experienced neck and back injuries, and this constitutes a high ergonomic risk. Unavailability of mechanical devices for patient lifting and oxygen cylinders constitutes a major ergonomic risk. Heavy workload, long working hours, and prolonged standing are considered high risk.

6.3 Conclusion

The study found:

The study found perception and knowledge level on potential risk factors related to occupational health injury to be almost universal among respondents, with 62.07% of them having good knowledge of potential risk factors. The study took concerted efforts to analyze the perceptions on the occupational health risk. In a nutshell, the findings of this present study revealed a high perception of occupational health risk the null hypothesis was rejected.

Socio-demographic characteristics (gender, age, profession, department, shift system, part-time, and educational level) were significantly associated with healthcare workers' knowledge and perception towards occupational health risk. Some of the perceived risk factors by the HCWs that exacerbate these occupational injuries were reported to be a lack of PPE, uncooperative patients, health care workers' negligence, working overtime, shift system, and institutional factors, among others. In addition, the safety practices of the HCWs were not entirely in accordance with the Universal standards, even though

most of them positively perceived the relevance of executing the universal safety precautions. **(Objective 1).**

Occupational health injuries for biological health risk linked to health care practice by health professionals being exposed to or infected with was infectious diseases such as *Mycobacterium tuberculosis*, respiratory tract infection (RTI), influenza, HIV, Hepatitis B, and COVID-19, whereas non-biological injuries sustained were needle prick injury, slip and fall resulting into leg injuries low back & neck pain, work-related stress, musculoskeletal injuries such as muscle aches/strains/sprains during work hours in the hospital, Physical, psychological, sexual, and verbal abuse, others (noise, burns and chemical spills) and the least was irritation from disinfectant **(Objective 2).**

The department with a higher exposure level perceived by respondent was found that Laboratory department was the highest , followed by the mortuary department, Isolation Unit, Medical Imaging department(X-ray), and Emergency department in that order. Outpatient Department (OPD), Theatre- ICU and the least department with the lowest exposure level was the ANC/ Labour Unit staff. **(Objective 4).**

Novelty of the study

This study has contributed to the following findings:

- ✓ This research is novel because prior studies on occupational health hazards in the healthcare industry often identify the hazards, while leaving the risk factors out. This study established for the first time that ergonomic hazards exceed biological hazards at primary -secondary level within the health facilities in the municipality.
- ✓ This study revealed major underlying employee and employers' risk factors like, lack of workers proper safety gear, and non-motivation of workers by the

management members, Negligence and carelessness, Multiple job places to earn more, Heavy workload and long working hours by health professionals.

6.4 Recommendations

The flaws identified by this study has far reaching consequences on the health of healthcare workers, and consequently on the quality of healthcare delivered to patients. Therefore, this required concerted efforts by all stakeholders, especially the hospital management, as well as the government, to adequately neutralize work-related hazards across the healthcare industry in Ghana.

1. **Health care workers**

- There should be training and education on safe injection procedures to guide against needle prick injury, especially among nurses. Short-term education on ergonomic principles, safe lifting techniques, and stress management among healthcare workers on the dangers associated with occupational accidents/injuries in the healthcare setting to improve their knowledge, practice, and adherence to standard precautions and the use of the necessary PPEs.
- Some staff, especially the nurses and doctors, who take an increased number of hours of service per day and have a history of having another job outside their present commitment, should be avoided to reduce long-term musculoskeletal problems.

2. **Ghana Health Service and Health Service Administrators**

- Ghana health service should increase the number of staff to reduce short-term stress, provide ergonomic equipment such as adjustable chairs and desks,

keyboard trays, lifting aids such as a black belt, and mechanical lifts to reduce manual lifting of oxygen cylinders and other heavy object by nurses.

- Health service Administrators should provide anti-fatigue mats to reduce standing fatigue, and provision of radiation dosimeters to control radiation by radiographers and radiologists to avoid long-term health effect.
- Ghana health Service should allow nurses to be involved in any safety committee that may be instituted in the hospital. One or two nurses may be affected for any occupational disease that may occur in the hospital. For this reason, any planning initiative that may be carried out in the hospital, considering occupational disease control and employee safety, should involve nurses since they are the majority of the long-term working force.
- Health Administrators should make provision of infection preventive measures such as gloves, a head cap, closed shoes, a work suit, and also frequent medical investigation should be conducted for infectious diseases such as COVID-19 and others to avoid long-term health effects.

Future Research

Future explorative studies regarding health and safety risks among different healthcare workers in other departments, taking into consideration the assessment of chemical risks.

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APPENDICES

APPENDIX 1

CONSENT FORM

Consent form for respondents Statement of person obtaining informed consent: I have fully explained this research to _____ and have given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant make an informed decision to or not to participate.

DATE: _____ NAME: _____

Statement of person giving consent:

I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction. I understand that my participation is voluntary (not compulsory). I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it. I understand that I may freely stop being part of this study at any time without having to explain myself. I have received a copy of this information leaflet and consent form to keep for myself.

NAME:_____

DATE: _____ SIGNATURE/THUMB PRINT: _____

APPENDIX 2

Kwame Nkrumah
University of Science
and Technology, Kumasi

College of Health Sciences
SCHOOL OF MEDICINE AND DENTISTRY

COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/682/22

5th October 2022

Mr. Benjamin Addai
Akenten Appiah-Menka University of Skills
Training and Entrepreneurial Development
KUMASI.

Dear Sir,

LETTER OF APPROVAL

Protocol Title: ***"Prevalence and Risk Factors of Occupational Health Hazards among Health Care Workers in some Selected Hospitals in the Atwima Nwabiagya Municipal."***

Proposed Site: ***Atwima Nwabiagya Municipal District Hospital, Nkawie.***

Sponsor: ***Self Sponsored.***

Your submission to the Committee on Human Research, Publications, and Ethics on the above-named protocol refer.

The Committee reviewed the following documents:

- A notification letter of 1st August 2022 from the Atwima Nwabiagya Municipal Health Directorate (study site) indicating approval for the conduct of the study at the Municipality.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning **5th October 2022** to **4th October 2023** renewable thereafter. The Committee may, however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Thank you for your application.

Yours faithfully,

Rev. Prof. John Appiah-Poku.
Honorary Secretary
FOR: CHAIRMAN

Room 7, Block I, School of Medicine and Dentistry, KNUST, University Post Office, Kumasi, Ghana

ATWIMA NWABIAGYA MUNICIPAL HEALTH DIRECTORATE

In case of reply the number and the date of this letter should be quoted

My Ref: GHS/DHD/Students/2022/2
Your Ref. No:
Cell: 233-024 3482 920
E-mail: *atnhealthdirectorate@gmail.com*

GHANA HEALTH SERVICE
MUNICIPAL HEALTH DIRECTORATE
POST OFFICE BOX 26
NKAWIE – ASHANTI

1st August, 2022

THE MEDICAL SUPREINTENDENT
NKAWIE-TOASE HOSPITAL
NKAWIE

Dear Sir,

LETTER OF INTRODUCTION – PREVALENCE AND RISK FACTORS OF OCCUPATIONAL HEALTH HAZARDS AMONG HEALTHCARE WORKERS IN SOME SELECTED HOSPITALS IN THE ATWIMA NWABIAGYA MUNICIPALITY IN THE ASHANTI REGION OF GHANA

MR. BENJAMIN ADDAI – MPhil STUDENT (82019330015)

This is to introduce to you **Mr Bejamin Addai,** a student of the Department of Public Health Education of the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, Manpong Campus who is investigating the above phenomenon by research in your hospital.

This is in partial fulfilment of the requirements of the University for the award of a MPhil in Environmental and Occupational Health Education. For his research, he will engage staff of the hospital that will constitute the participants group of the study. All ethical issues shall be adhered to and the study will not do anything that will affect the rights and privacy of the staff and the reputation of the participating health facility.

I would therefore be grateful if you grant the student researcher aceess and provide the necessary assistance to enable him carry out the study.

Many thanks and kind regards

DR. JUSTICE THOMAS SEVUGU
MUNICIPAL DIRECTOR OF HEALTH SERVICES
NKAWIE

cc Mr. Benjamin Addai

Quantitative Study Questionnaire:

May I use this opportunity to plead to you that you supply the necessary information concerning what you know about risk factors of occupational health hazards among health care workers . This information will help the government to improve on occupational health and safety measures and improved working condition in the country, the answer you give here will be respected. Your name will not be required, thanks for the assistance.

Name of the health facility: _____ Date:

Answer these questions as it applied to you: You can opt for more than one response from these questions.

No.	QUESTIONS AND FILTERS	TICK THE BOX					
1	Age (years)	20-25 ☐	26 -30 ☐	31- 35 ☐	36-40 ☐	41 -45 ☐	>45 ☐
2	Gender	Male ☐	Female ☐	Other ☐			
3	Marital status	Single ☐	Married (civil, traditional, religious) ☐	Divorce ☐	Widowed ☐		
4	Department (Working area)	Emergency / Ward ☐	Laboratory ☐	Theater / ICU ☐	ANC & Labour ☐	IMAGING ☐	others Specify ☐

5	Years of working experience	1-5 years	6- 11 years			>12 years	
6	Educational level	Certificate	Diploma		Degree	Postgraduate	Others (specify) …… …… …
7	Job title (Profession)	Nurse/ Midwife	Laboratory Scientist	Mortician	Practitioner (Medical and Dental)		OTHERS specify
8	What is your religion?	Christian	Muslim	Traditional	Other Specify……		
9	Number of	4 days		5 days		6 days & Above	

	days' work per week				
10	**Number of hours work per day**	**< 5 hours**	**6 hours - 7 hours**	**8 hours**	**> 9 h**
11	**Sleeping hours/ day**	**< 5 hours**	**6 -7hours**	**8 hours**	**>9hours**
12	**Have you ever smoked?**	**Yes**	NO	Don't remem	
13	**Do you smoke at the present time?**	**Yes**	**NO**		
14	**Do you do night shift**	**Yes**	**No**		
		Yes	**No**		
15					

	Occupational health and safety officer in the facility	☐ **Yes**			**No**		
16	**How often do you use alcoholic beverages**	**Practically every day** ☐	**1-2 times a week** ☐	**3-4 times a week** ☐	**1-2 times a month** ☐	**Never** ☐	Don't remember ☐

Tick the departments within the hospital where health workers stand a high risk of occupational hazards.

You are restricted to only one

☐ Emergency Ward ☐ Laboratory ☐ Theater/ICU ☐ ANC/Laboure ward

☐ Imaging (x-ray) ☐ OPD ☐ Isolation ☐ Mortuary

17

Health-worker related factors leading to risk factors of occupational health hazard

Do you agree that the nature of your work predisposes health workers to occupational hazards?

Yes ☐ No ☐

18

If yes tick the most applicable one . You are restricted to only one

☐ heavy workload ☐ lack of training ☐ long working hours

☐ Negligence ☐ low working experience ☐ nature of work

Tick the most applicable one. You are restricted to only one

Circumstances under which most common types of occupational injuries occur.

☐ Recap of needles ☐ Giving injection ☐ Breaking injection Ampoule

☐ Setting IV lines ☐ Taking blood samples ☐ Checking RBS/FBS

☐ Surgical Procedures ☐ cleaning of patient be ☐ Bending of needles

PART TWO

KNOWLEDGE ON OCCUPATIONAL HEALTH HAZARDS

No	Question	Very bad	bad	good	Very good	excellent
1	You have knowledge of matters relating to occupational health and safety.					
2	You are aware of the level of risk surrounding your workplace.					
3	There is periodic follow-up from the Department of Occupational Health and					

	Safety your in workplace.					
4	Signboards explain the nature of the risks surrounding your workplace and how to avoid and reduce the impact on you					
5	You receive adequate training from the Department of Occupational Health and Safety in how to deal with occupational risk that affect you during your work.					
6	You are aware of your rights if you are exposed to any risk during working.					
7	How you are committed to wear safety equipment (such as gloves, facemask, head cover and shoes Closed) during working.					
8	You have the full ability to identify risks surrounding your workplace.					
9	The authorities of occupational of health and safety in your place are qualified.					
10	You are committed to safety procedures in your work career at the hospital.					
11	During the transfer of the patient, Do you use corrected body mechanism.					
12	Biological infections transmitted only					

	through contact with the patient.					
13	Do you have adequate information on how to use the fire extinguisher in your workplace?					
14	You know the big risks resulted from exposing to radiation during your work.					
15	You have information on the types of injuries related to the nature of your work.					

	PART THREE PERCEPTIONS ABOUT RISK OF EXPOSURE	**Very .LOW**	**LOW**	**HIGH**	**Very HIGH**
1	Do you perceive the risk of exposure to Needle prick injury?				
2	Do you perceive the risk of exposure to Body contact. with HBV, HVC, TB, and Retroviral patients?				
3	Do you perceive the risk of exposure when there is no protective equipment to reduce exposure of medical radiation.				
4	Do you perceive the risk of exposure to assault from Patients & coworkers?				
5	Do you perceive the risk of exposure to direct contact with a patient's body fluids?				
6	Do you perceive the risk of exposure to routine night shifts?				
7	Do you perceive the risk of exposure when you work under extreme pressure and stress condition				
8	Do you perceive the risk of exposure when there is too much noise when Procedures are taken at your workplace.				

9	Do you perceive the risk of exposure when Wet floor signs are not available
10	Do you perceive the risk of exposure when Doors and trolley used in the department are not in safe condition.
11	Do you perceive the risk of exposure when there are no Air conditioning in your unit
12	Do you perceive the risk of exposure when Fire extinguishers are not available at your unit
13	Do you perceive the risk of exposure when Mechanical devices are not available to carry Patient
14	Do you perceive the risk of exposure when Your work require long standing

PART FOUR

				IF NO									
No.	**Question**	**Yes**	**No**	**Likelihood**					**Consequences**				
PHYSICAL RISK				**Almost certain**	**Likely**	**Possible**	**Unlikely**	**Rare**	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
1	Floor made of rough to prevent slipping.												
2	Entrances, stairs, ramps Internal floors and exits are in												

	a safe condition.												
3	Wet floor signs are available if required.												
4	Outlets and other electrical equipment used in department are suitable and safely used.												
5	Doors and trolley used in the department are in safe												

	condition.												
6	Fire extinguishers are available and able to use if necessary.												
7	The lighting in your workplace is adequate.												
8	The window in your workplace let good lighting for you.												

9	The temperature in your workplace is adequate.												
10	Air conditioning in your workplace is available.												
11	Recycling air in your workplace is available.												
12	Daily checked for devices in												

	your department before used.												
13	There is protective equipment to reduce exposure of medical radiation in your workplace.												
14	There is adequate workspace around equipment and it												

	is on a stable foundation to prevent it moving during operation.												
15	Procedures are taken to limit noise in your workplace.												
16	Do you work under extreme pressure and stress condition	YES ☐			NO ☐								

17	How will you rate your stress level	Fairly low ☐		Moderate ☐			Severe ☐						
18	Have you been injured at the facility before?			YES ☐			NO ☐						
19	What type of injury	Back pain ☐		Leg injury ☐	Slips & falls ☐	Needle prick ☐	Irritation from disinfectants ☐	Muscle aches(strains, sprains) ☐	Others Specify----- ☐				
No.	**Question**	**Yes**	**No**	**Likelihood**					**Consequences**				
Biological Risk				**Almost certain**	**Likely**	**Possible**	**Unlikely**	**Rare**	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
1	Prevention and	N											

	safety equipment (Gloves, mask, head and shoes cover) are available for use in the workplace.												
2	Sharp box are available in the workplace.												
3	Insect and pets are fought in your workplace to prevent												

	infection.												
4	You always wear gloves when dealing with patient and medical tools.												
5	Disinfectants are used after cleaning with soap and water.												
6	Blood and medical waste are disposed in a safe and secure												

	way.												
7	Hand washing before and after contact with patient.												
8	Medical test (HCV, HBV, and HIV) was done regularly for health worker.												
9	Taking vaccinations												

	against infectious diseases and epidemics.												
10	Have you ever acquired any infection from the facility before?	YES				NO							
11	Which type of infection?	Tuberculosis		Hepatitis		RTI	Influenza		COVID-19		Others specify……		
12	How did you treat the infection?	Self-medication		Medical attention			Others Specify ----------						

NO	Question	Yes	No	Likelihood					Consequences				
Ergonomic Risk				**Almost certain**	**Likely**	**Possible**	**Unlikely**	**Rare**	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
1	Mechanical devices are available to help in carrying the Patient in your workplace.												
2	You always take enough rest after each shift.												
3	You are free of any disease in												

	the nervous and muscular system that can affect your work.												
4	Your work does not require long standing.												
5	You perform your duties in a comfortable position (neck and back).												
6	You do not have to carry the tools												

	and medical supplies and equipment during working.												