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DETERMINANTS OF OCCUPATIONAL INJURIES AMONG WORKERS AT THE UNIVERSITY OF GHANA HEALTH SERVICES

BY

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DECLARATION

I, Jude Kwabena Nuarko, hereby declare that, with the exception of cited literature, this dissertation is the result of my own original research carried out under the supervision of Dr. Reginald Quansah, School of Public Health. This research has not been presented elsewhere either in part or in whole for purposes of the award of another degree.

06/02/2023

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Jude Kwabena Nuarko Date

(Principal Investigator/Student)

06/02/2023

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Dr. Reginald Quansah Date (Academic supervisor)

DEDICATION

This dissertation is dedicated to the following dear ones: Mrs. Balbina Catherine Gasu my beloved grandmother, Mrs. Angela Emefa Gasu my mother, the Richardson Asiedu and Arko Families, friends and loved ones whose contributions were invaluable to the success of this work.

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My utmost thanks and gratitude go to Almighty God for his strength, wisdom, protection and guidance gave me for the successful completion of this piece of work.

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ABSTRACT

Background

Globally, working in a healthcare setting is associated with high exposure to hazards. Health workers in the sub-Saharan Africa region are at elevated risk for biological, chemical, and physical hazards. In Ghana, there is a growing concern for injuries at the workplace despite constitutional provisions to make the workplace safe for workers.

Objective

This study seeks to assess the occupational hazards and safety practices in hospitals in the Ga West Municipality.

Methods

A cross-sectional survey was adopted for the study. Convenient sampling was used in selecting the 422 study participants. Both printed and online platforms were used in gathering data. Gathered data were entered into Microsoft Excel for cleaning. The cleaned data was transferred to STATA (version 14) statistical software. Descriptive statistics were used to describe the participant characteristics. Also, Chi-square tests and independent t-tests were used for the bivariate analysis. Multivariate logistic regression was used to model the relationship between dependent and independent variables using 95% Confidence intervals.

Results

The study results show that 38% of the healthcare workers (n=273) had experienced some form of work-associated injury in the past 12 months. Back pain alone accounted for 76% of all the injuries

experienced by the participants. The risk factors include being a temporary worker (aOR=3.21; 95% CI=1.25-5.89), work stress (aOR=1.86; 95% CI=1.22-5.82) and being exposed to excessive workload (aOR=3.31; 1.26-9.87). The protective factors include being 36years or more (aOR=0.33; 95% CI=0.52-0.98), job satisfaction (aOR=0.48; 95% CI=0.29-0.94) and training safety (aOR=0.51; 95% CI=0.21-0.96).

Conclusion

The hospital management should consider existing interventions to address the incidence of occupational injuries among healthcare workers in the hospital.

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ABBREVIATION

ABBREVIATION	MEANING
ICU	Intensive Care Unit
ILO	International Labour Organization
IRB	Institution Review Board
MOH	Ministry of Health
MSD	Musculoskeletal Disorders
NSI	Needle Stick Injuries
OSH	Occupational Health and Safety
PI	Principal Investigator
PPE	Personal Protective Equipment
RA	Research Assistant
SN	Staff Nurse

WHO	World Health Organization
MSP	Musculoskeletal Pain
LBP	Low Back Pain
GHS	Ghana Health Service
SARS	Severe Acute Respiratory Syndrome
HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HDV	Hepatitis D Virus
FMC	Federal Medical Centre
OPD	Out-Patient Department
UGHS	University of Ghana Health Services
HCWs	Health Care Workers
NSSI	Needle Stick and Sharp Injury
BBPs	Blood Borne Pathogens

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

An occupational injury is any physical injury sustained by an employee in the performance of his or her work in the workplace. Most workers spend between 8 to 12 hours at the workplace. In all, workers spend approximately a third of their lifetime at their respective workplaces. Hence, safety at the workplace is an issue of global public health importance. The working environment should be safe, free from occupational hazards and injuries so as to ensure the health and safety of each worker. (WHO, 2002). Occupational hazards refer to workplace activities that have the potential to cause or increase the risk of injury or ill health (Ford & Tetrick, 2011). An occupational injury on the other hand refers to any injury or illness that occurs to an individual due to his or her specific occupational requirement (Varacallo & Knoblauch, 2017).

Occupational injuries account for a significant percentage of visits to the emergency department as well as a global financial burden from medical and indirect cost (Groenewald & Baron, 2013; Tompa *et al*., 2021). It also accounts for a significant proportion of the world's mortality and disability (Rushton, 2017). The World Health Organisation (WHO) and the International Labour Organisation (ILO) play essential roles in the estimation of organisational accidents, injuries and deaths (Rushton, 2017). According to reports from both organisations, occupational injuries are responsible for 5% to 7% of all fatalities worldwide (Manickam *et al*., 2014). Statistics from the International Labour Organization (ILO) reported that, annually an estimated 340 million occupational accidents occur. Therefore 2.3 million workers, both males and females die from work-related accidents or injuries. This translated to 6000 deaths per day (Rushton, 2017; Nikfar

& Kharabaf, 2014, ILO, 2006). Furthermore, over 313 million non-fatal occupational injuries that occur results in increased absenteeism at work, (of at least four working days). Financially, occupational injuries cost the world 1.8% to 6.0% (approximately 2.8 trillion dollars) in Global Gross Domestic Product (Takala *et al*., 2014; ILO, 2013).

No country, developed or developing has been able to address the increasing incidence of occupational injuries and its related mortality and disability. Though, Occupational injuries is an issue imparting all countries globally, developing countries are home to majority of occupational injuries incidence and mortality (Takala *et al.,* 2014). The fatality rate of workplace related injuries was estimated at 16.6 per 100,000 representing 12% of the global workplace-related death. Healthcare workers in developing and advanced countries continue to be exposed to increased risk of fatal injuries in the workplace (WHO, 2014).

Sharp injury occurs when sharp instruments such as needle penetrates the skin. If the sharp instrument is contaminated with blood and body fluids, there is potential for transmission of infection. Globally, more than 35 million healthcare workers (HCWs) are suffering from occupational needle sick and sharp injury (NSSI) every year (Deisenhammer *et al*., 2006). While as many as twenty blood borne pathogens (BBPs) can be transmitted by accidental injury, the potential life threatening are Human Immunodeficiency Virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) (Beswick *et al*., 2010). Moreover, HBV is highly contagious and infects one out of three people (Singhal *et al*., 2009).

The health care facilities like any other workplace are not free from workplace hazards thus worker is also equally exposed to occupational injuries and accidents (Aluko *et al*., 2016). Facilities in the health sector are characterized by multidimensional and multifaceted environments that predisposes healthcare workers to several occupational hazards and injuries (Elewa & El Banan,

2016). Nevertheless, hospitals are perceived to be safer than other workplaces. This is because the professionals in the hospitals are seen as individuals who are capable of taking good care of their health on their own. Health care professionals are faced with occupational hazards that range from exposure to infectious agents, needle stick and sharp injuries, musculoskeletal disorders (MSD), exposure to carcinogenic agents, latex allergies, violence and stress (Lugah *et al*., 2010). The hospital setting exposes healthcare workers to a variety of occupational hazard; biological, chemical, physical, and psychological and ergonomically risks (Senthil *et al*., 2015).

Healthcare workers are exposed to overexertion/repetitive stress, musculoskeletal pain from lifting, transferring and repositioning of patient, needle sticks, slips and fall and violence. Others included slipped discs, broken bones from workplace violence and head injuries from slip and falls (Dressner, 2017). In view of the tremendous risk posed to health care workers, the Ministry of Health (MOH)/ the Ghana Health Service (GHS) in partnership with the WHO commissioned the development of occupational health and safety guidelines which was published in June 2010 (Asumeng, Asamani, Afful & Agyemang, 2015; Ministry of Health/Ghana Health Service, 2010).

1.2 Problem statement

Health worker have been tagged as being "immune" to illness and injuries as their job is to care for the sick (Ghosh, 2013). However, evidence suggests otherwise. A systematic review by Mengistu, Tolera and Demmu (2021) found a high prevalence (56.5%) of needle sticks among healthcare workers over their years of clinical practice. Likewise, a similar study estimated the prevalence of musculoskeletal pain to range from 28% to 96% among health care workers with the prevalence relatively higher among nurses (Anderson & Oakman, 2016). Evidence also suggests that, healthcare workers are exposed to and experienced high rates of violence and abuse

in the workplace (Nelson, 2014). A significant proportion (61.9%) of healthcare worker; mostly nurses and physician experience some form of workplace violence (Liu *et al*., 2019). Though health care workers are trained and are knowledgeable on occupational health and safety guidelines, occupational injuries still do occur in the health facilities. This is due to poor staffing, high work demands, and limited/unavailability of Personal Protective Equipment (PPEs). However due to low reporting of such injuries, majority of this injuries go unnoticed.

The workers of the University of Ghana Health Services, like any other health personnel are exposed and do fall victims to occupational accidents. However due to a poor report system and poor reporting of occupational injuries and accidents by staff, the problem has persisted and continues to go unnoticed. Identification of factors that contribute to occupational injuries among the health care workers will thus help in the implementation of measures to minimise the future occurrence of such injuries (Ansomaa, 2019).

Few studies have been carried out in Ghana on occupational injuries, and relatively even fewer among healthcare workers. Most of the studies focused mainly on needle stick injuries and musculoskeletal pains though the health facilities are home to numerous health hazards, and the personnel working in such facilities exposed to greater risks of occupational injuries. This therefore warrants the conduct of the current study which aim to assess the determinants of occupational injuries among workers of the University of Ghana Health Services.

1.3 Explanation of conceptual framework

Figure 1 depicts the conceptual framework prepared for this study in the following manner.

1.3.1 Socio-demographic characteristics

Socio-demographic characteristics such as educational level, job experience, number of years at the workplace, gender, among others. The education level can improve the prevention of injuries. In general, however, training and retraining workers may improve their level of awareness in the identification of workplace hazards and the avoidance of impact mitigation steps.

This knowledge may be gained by the employer during schooling, training, and retraining, or maybe transmitted from colleagues and other outlets, such as newspapers, television channels, to such information.

On the other hand, because of their inability to assess the result of occupational injuries in the company and to recognize dangerous conditions that are likely to cause injuries, people with low educational levels are more fortunate to experience occupational injuries. This will also increase the frequency of injury among employees.

1.3.2 Organizational factors

Organizational factors such as strict adherence to safeguidelines, periodic industrial health checkups, and screening, safeprotocol or workers, plant and equipment are generally well maintained, use of PPEs, injury reporting procedures, adequate OSH policies amongst others. Can influence the occurrence of occupational injuries either negatively or positively. Giving the job to an experienced individual who is knowledgeable especially in accident-prone areas, will reduce occupational injuries. This may however not be enough to control the mechanism but making it a pre-condition for employment may be a dividend. Inexperience workers in a high-risk area are more likely to suffer occupational injuries.

Health and safety policies and guidelines at workplaces can help reduce or divert the trend of injuries at work. The lack of policies concerning injury prevention at the workplace may lead to a high incidence of injury occurrence. Rigorous supervision and enforcement of rules and regulations at work can yield a positive outcome in the reduction of occupational injuries at work. Where these mechanisms are not put in place, the more cases of occupational injuries would be no doubt on the increase.

1.3.3 Work environmental factors

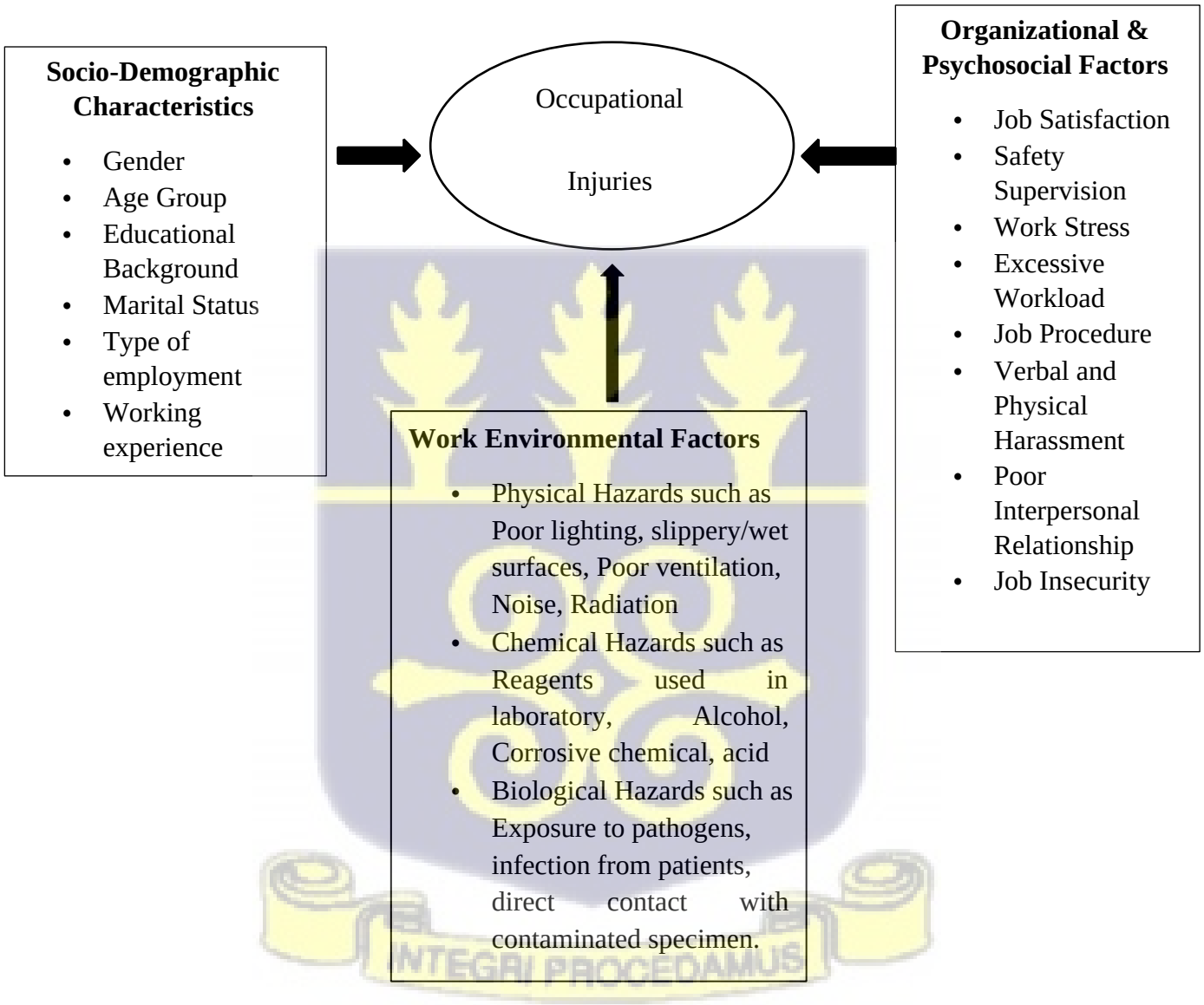
The work environmental factors such as physical hazards (hit by moving vehicles/truck, working in confined spaces, slippery floors, exposure to exposed dangerous electrical wires, exposure to hot surfaces, exposure to steam, exposure excessive noise, amongst others) biological hazard (exposure to pathogens, presence of pests, and others), and chemical hazards (exposure to fumes, exposure to alcohol, etc). The workers need close monitoring to ensure that injuries are reduced.

1.4 Justification

Despite changes in job design, the prevalence of occupational hazards, injuries, and illnesses are still present in the workplace. For the prevention of accidents, injuries, and illnesses in the workplace, compliance with occupational health and safety regulations is critical. Determining the factors that led to occupational injuries, and evaluating compliance with Occupational Health and Safety Requirements among employees in industries will then produce evidence-based knowledge required to formulate policies to reduce the incidence of incidents and injuries in our workplaces.

The conduct of this study among health workers will also help to build the understanding required to enhance the value of adherence to the Occupational Health and Safety Standard as a method to reduce the incidence of workplace accidents, injuries, illnesses, and deaths.

Figure 1: Conceptual framework



1.5 Objectives of the Study

Aim

The aim of the study is to assess the determinants of occupational injuries among workers of the University of Ghana Health Services.

Specific objectives

The specific objectives of the study are;

1. To identify the type and prevalence of occupational injuries among workers of the University of Ghana Health Services.
2. To determine socio-demographic factors contributing to occupational injuries among workers of the University of Ghana Health Services.
3. To assess organizational and psychosocial factors contributing to occupational injuries among workers of the University of Ghana Health Services.
4. To examine work environmental factors contributing to occupational injuries among workers of the University of Ghana Health Services.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the review of literature on the topic under study. The chapter presents a review of the prevalence of occupational injuries among healthcare workers. The review also presents the various determinants of occupational injuries among healthcare workers.

The main sources of the literature search were Google Scholar and other online databases such as PubMed, and Science Direct. Keywords used in retrieving relevant articles include “occupational injuries among healthcare workers”, “Needle Stick Injuries”, “Musculoskeletal disorders”, “healthcare workers” and “determinants”.

The review was organised under the following headings;

- Prevalence of Occupational Injuries in Healthcare Setting
- Factors Contributing to Occupational Injuries
- Socio-demographic factors
- Organizational and psychosocial factors
- Work environmental factors

2.2 Prevalence of occupational injuries in healthcare setting

A systematic review by Mengistu, Tolera and Demmu (2021) discovered a significant rate of needle stick injuries among healthcare professionals, implying the need for improved occupational health and safety services in healthcare systems. Globally, over the period of healthcare

professionals, the review reported a pooled prevalence of needle stick injuries at 56.2%. Furthermore, over the previous year, the prevalence of needle stick injuries was estimated at 32.4%

A Ghanaian hospital-based cross-sectional study Appiagyei and Nakua (2021) among 246 healthcare workers reported an occupational injuries prevalence of 29.7% among healthcare workers studied. The study found cuts from sharps, followed by needle prick injuries and musculoskeletal disorders to be the most prevalent occupational injuries among healthcare workers.

Likewise, Tipayamongkholgul *et al* (2016) opined that Thai healthcare workers, like others around the world, are at risk for injuries from needle sticks and sharp instruments; infectious diseases from exposure to biological hazards such as airborne pathogens and patient secretions; muscle pain from heavy workloads and long shifts; and psychological disorders from stressful working conditions.

Moreover, multicenter descriptive cross-sectional study performed in eight teaching hospitals of Rasht, Iran, Joukar *et al* (2018). Among 57.42% participants showed a positive history of needlestick injury. Needlestick injuries occurred most frequently during recapping and injection 37.10% and 16.10% respectively.

Furthermore, Ishak *et a*l (2019) information on reported needlestick injury over a 1-year period for different healthcare workers subgroups among Malaysian Ministry of Health (MOH). Medical doctors recorded the highest incidence (21.1 per 1000 HCWs) followed by dental staff (7.5), pharmacy staff (4.2), nurses (3.7), medical assistants (3.4) and allied and auxiliary staff (1.0). Doctors had significantly increased risk of needlestick compared with allied and auxiliary staff.

2.3 Factors contributing to occupational injuries

2.3.1 Socio-demographic factors

Appiagyei and Nakua (2021) reported an association between certain sociodemographic characteristics; marital status and job category and the incidence of occupational injuries. Healthcare workers who were married were less likely to suffer an occupational injury and compared those who were single. Likewise, nurses reported an increased incidence of occupational injuries than laboratory assistants and physicians and even more so among non-clinical staff. Of note however, Age, gender, ethnicity, and job experience were all statistically insignificant in predicting the occurrence of injury.

In a report by Asghari *et al* (2019), of all the nurses that participated in the study, the female gender was an independent risk factor for the occurrence of knee symptoms. His results showed that, nurses that worked in gynecology units had more neck symptoms than nurses in other operating room nurses. This could be due to the fact that the participants from the gynecological unit staff in his study were females who were subjected to high levels of physical demands such as patient handling without the use of mechanical aids and in difficult working postures. It was further demonstrated by Choobineh *et al* (2010) that operating room nurses who worked in a shift system were more likely than the day workers to suffer neck, upper back, and knee complications. The female gender is a significant factor for the development of musculoskeletal pain (MSP) among nurses (Asghari *et al* 2019). Comparatively, injuries from wrist/arm, shoulder, low back and ankle/foot, and cervical pains are more likely to occur in operating room female nurses than operating room male nurses (Choobineh *et al.*, 2010).

A study conducted by Abdulmujeeb & Olaniyan (2017) in Uganda showed that 84% (n=100) of the participants had LBP. Female health workers accounted up 54.76% of those with low back

pain, while male health workers made up 45.24%. Moreover, the results of the survey also demonstrated that there was a significant difference with respect to the age and marital status in relation to LBP. According to a report by Wilkins & Mackenzie (2007), men's injury rates dropped as they became older, which could be linked to job experience in some circumstances. Those aged 25 to 34 were much more likely to be injured at work than those aged 18 to 24, while those aged 45 and up were significantly less likely. However, the risk of occupational injury was similar among women of all ages. The findings for men back up prior research that shown a higher risk of occupational injury in younger people than in middle and older adults (Wilkins & Mackenzie, 2007). The results from Wilkins & Mackenzie (2007) further showed that other socio-demographic factors, such as race and household education, were linked to the likelihood of workplace injury where non-white men were less likely than white men to suffer an occupational injury.

In Iran, a systematic review by Hassanipour *et al*. (2021) asserted that, among healthcare workers, young age, lack of job experience, shift work, and female gender are all considered high risk factors for NSI injury. The prevalence of NSI was found to directly correlate with age. Worker with more than 10 years working experiences were 43% less likely to suffer a NSI as compare to those with less than 10 years working experiences. In the same vein, those with more than 5 years working experiences were 35% less likely to suffer an NSI as compared to those with less than 5 years working experiences. Healthcare workers in the surgical department were 83% more likely to have NSI than workers in the medical department. NSI was 36% more prevalent among healthcare workers with severe job stress than in those with moderate stress. Workers who worked rotational shifts were much more likely than those who worked fixed shifts to develop NSI. Likewise, night-shift workers had higher likelihood of experiencing NSI compared with day-shift workers.

A facility-based cross-sectional study by Bahat *et al*. (2021) reported a prevalence of NSIs among 53% the healthcare workers studied, with most of the injuries as a result of needles from besides of patients. NSI were found to be more prevalent among doctors (75%) as compared to others healthcare workers. Also, across the health workers NSI prevalence was higher among those aged 40 and above. Of note, however, NSI were found to be significant even among workers who did not directly worker with needles. Though, the prevalence of NSIs was higher, the practice of reporting was poor. Underreporting was detected in 46% of cases, with the report rate dropping significantly as the number of injuries rose. In furtherance, underreporting was found to be higher among physicians especially senior physicians, workers with no training about NSIs, older age groups (51 years and above) and well as among male health workers. Injury in the operating room had the highest percentage of underreporting, while injuries witnessed when passing a needle had the lowest rate. The authors concluded that HWs from all sectors, including those who do not use needles, are prone to NSIs and underreporting of NSI incidents.

Likewise, in a similar study, Franchi *et al*. (2021) opined that obstetric surgery is the leading source of NSIs in Obstetrics and Gynecology trainees, however they are rarely documented. Though a significant proportion (61.4%) of the trainees experienced NSIs, more than three quarters did not report the NSI. The study revealed this to be due to perceived low risk, self-inflicted NSI and first NSI (Franchi *et al*., 2021).

2.3.2 Organizational and psychosocial factors

The main cause of more than 90% of occupational hazards (and 70% to 90% of work-related accidents) is human error. Previous research has revealed that mental workload and occupational accidents are common among health workers. Mental workload represents the quantity of mental

resources needed to complete a group of concurrent activities, and it is one of the most crucial aspects in psychology, ergonomics, and human factors for understanding performance (Li *et al.*, 2020). Mental workload alludes to the cognitive, mental, or intellectual job requirements (Li *et al.*, 2020).

One of the elements that frequently causes fatigue is mental workload. Tired people are more likely to engage in risky actions, which can lead to injury. Because of the heavy demands of patient care and treatment administration in health care systems, the nursing cadre is in more danger than other groups. Moghadam *et al*. (2020) opined that fatigue and working overload were the main reasons for NSIs. The study revealed the highest prevalence of NSIs among registered nurses followed by doctors. Furthermore, the prevalence of NSIs were more in the during the morning shift than in the afternoon, with the evening shift being recording the least prevalence of NSIs.

Likewise, in a similar study, Bazie (2020), also reported increased work load as a determinant of NSI among health care workers. The author attributed this to a lack of concentration stemming from tiredness and hastiness to win the workload. Bazie (2020) also reported that working in private health institutions, all-time availability of sharp storage and disposal containers were significant predictors of needle stick and sharp injuries. The study attributed this to private health care systems' lack the necessary number of health care workers hence an increased workload on the fee health care workers. Furthermore, workload has been linked to the risk of infection, making infection prevention training less likely.

A similar study by Dong, Zhang, Liu, Shao and Xu (2019) implicated workload and psychological factors; psychological fatigue, mental stress among the significant predictors of Musculoskeletal disorders among healthcare workers. The study reported a high prevalence of musculoskeletal disorders. According to the study finding, 91% of the healthcare workers experience symptoms of

musculoskeletal disorders for a least a day. However, more than 68% actually had to seek health care for their symptoms.

A report by Bahcecik & Ozturk (2009) compared the conditions of a private hospital to a university hospital. The results showed that, 64% of nurses at the university hospital said their working conditions made them feel stressed and fatigued; 61% said they were sleepless and tired, and 60% said their job demanded physical strength (Bahcecik & Ozturk 2009). In the private hospital, 53% of nurses claimed their job required physical strength, 53% said they were under psychological stress and strain, and 48% said their employment caused sleeplessness and exhaustion (Bahcecik & Ozturk 2009). When asked how they described themselves, 59 percent of nurses at the university hospital said they were mentally exhausted, 33 percent said their work was monotonous, and 32 percent said they were dissatisfied with their jobs (Bahcecik & Ozturk 2009).

Mental exhaustion was reported by 46 percent of nurses in the private hospital, along with 28 percent monotonous working conditions and 19 percent job discontent (Bahcecik & Ozturk 2009).

The cognitive process is altered when the mental demand is greater than one's tolerance ability. As a result, the likelihood of engaging in risky activity will rise, as will the exposure to and frequency of accidents. Mental workload is one of the most important elements influencing nurses' behaviour and performance. The mental effort or concentration required during tasks is referred to as mental workload. It's also been characterized as the mental/cognitive necessity or analytical effort to deal with the needs of workers/staff and performance under time-pressured, physical, and environmental constraints. Individual performance deficits will arise if the mental workload exceeds the normal workload. The two main causes of fatigue are a heavy workload and long hours of overtime. Due to fatigue and inconvenient work schedules, studies show that high-workload

employment can cause reduced memory, harm to mental processes, irritation, and decreased learning.

In a study by Sarsangi *et al* (2017) in Iran, although there were no significant differences in mental workload between men and women, the maximum frequency for effort score was 78.61 ± 18.15, according to the subscales of mental workload. This concluded that nurses used a lot of energy in order to perform their duties. Nevertheless, the result further showed that the mean mental effort for the older groups was significantly higher than for the younger groups, which could represent the increased responsibility influencing fatigue and workload for nurses in their 40's and 50's (Sarsangi *et al.,* 2017). Thus, the job concentration and performance may decline as people get older.

2.3.3 Work environmental factors

The environmental conditions in a work place influences the prevalence of occupational injuries. Due to the variety of working conditions at hospitals, there are many different types of dangers. Literature has identified bad physical infrastructure as one of the major contributors to employees' unsatisfactory working conditions. In addition, a shortage of space jeopardizes health workers' privacy rights and hampers movement, resulting in accidents. Bahcecik & Ozturk (2009) further demonstrated the influence of environmental factors by comparing the conditions of a private hospital to a university hospital in their report. The results indicated that, the participants (nurses) in the private hospital had regulations for fire and other natural disasters (88%); had sufficient heat and air conditioning (85%); did not use broken/defective equipment (83%); adequate control of medical and toxic waste (81%); following up the accidents and keeping records of them (81%); adequate control and maintenance of equipment and use of tools (81%); protection from blood and other liquids (79%); the location and safe use of protective equipment in case of need (74%); had

warning and safety posters in hospitals (72%); had security personnel (72%); the design of the working environment for the convenience of the personnel (65%) (Bahcecik & Ozturk 2009).

However, when asked about their working environment at the university hospital, 59 percent of nurses stated the insect protection is effective, and 49 percent felt the lighting is enough. The heating was deemed good by 40% of the participants. 17 percent said the floors were well insulated against noise and falls, and 15% thought the rooms were painted in appropriate colors with good quality paints. 13 percent thought the reception/desk area was well-equipped with high-quality, ergonomic office equipment that would help prevent injuries. 7 percent said that frequent checks for risks such as radiation and electricity were undertaken and that appropriate action was taken; 5 percent stated noise was reduced by isolating the working area and equipment. Unfortunately, 34% claimed that storage was handled incorrectly; broken/defective materials were still being used, according to 31% of the nurses; there were insects in the hospital, according to 24%; the distance between the patients' rooms and the nurses' room/ desk was too far, according to 19%; and the hospital was equipped with broken/neglected machinery, according to 18% of the nurses.

Overall, work environmental factors that affects occupational injuries can be classified into physical, chemical, and biological.

2.3.3.1 Physical factors

The main physical risk factors which affect health professionals are ionizing and nonionizing radiation, noise, lighting, electrical assembly, slippery floors, hot/cold, ventilation, vibration and indoor pollution (Bahcecik & Ozturk 2009). Ionizing radiation is one of the most important physical hazards in hospitals, and it influences various different health professionals in different

units and with different professions (mainly radiotherapy, nuclear medicine and radiology staff) (Bahcecik & Ozturk 2009). It has carcinogenic, teratogenic and mutagenic impacts, and it is fatal in high concentrations (Dong *et al.*, 2019). It leads to burns, cataracts, infertility, genetic and congenital anomalies in moderate concentrations, and it causes cancer (particularly leukemia) during long-term exposure (Dong *et al.*, 2019).

Nonionizing radiation is another physical risk factor for health professionals (Dong *et al.*, 2019). It has been stated that the increment in the use of devices with electromagnetic fields and exposure to these electromagnetic fields deteriorate the body balance and lead to diseases (Bazie, 2020). It has been reported that the exposure to nonionizing radiation particularly during the work time about 8-10 hours leads to feeling of dryness in the throat, eye problems, headaches, allergies, facial flushing, insomnia, sensitivity to sounds, hearing difficulties and fatigue (Bazie, 2020). Loudness is another important factor, which disturbing people, complicates the communication, restricts the relaxation, adversely affects and harms the nervous system, reduces the work efficiency and creates hearing problems (Bazie, 2020). Studies have shown that loudness has increased at a level of discomfort in patients and health professionals in hospitals in the last 50 years (Bazie, 2020).

The ventilation system of the hospitals has importance in the health protection of both patients and health professionals in terms of nosocomial infections (Dong *et al.*, 2019). Therefore, the ventilation systems should be established to prevent the nosocomial infections by paying attention to biological and physical features of related microorganisms (Dong *et al.*, 2019). Another physical factor that can affect the health professionals is the lighting of the work place (Dong *et al.*, 2019). A sufficient and satisfactory level of lighting should be arranged in order to provide a comfortable workplace to the health professionals (Dong *et al.*, 2019).

2.3.3.2 Chemical factors

Various chemicals are key agents which are used in order to diagnose and treat the diseases, perform the preventive applications and take hygienic precautions, whereas they are hazardous for health status of health professionals (Bazie, 2020). Health professionals are exposed to chemicals (disinfectants to anaesthetics agents, cytotoxic agents, drugs and some heavy metals such as mercury and latex) repeatedly and sometimes in very dense amounts (Bazie, 2020). Similarly, their impacts show a wide variety according to the concentrations, contact time and way, the presence of other risky agents and personal features, and so on (Bazie, 2020). Acids and alkalis, salts, dyes, volatile organic solvents, various drugs including primarily anticancer drugs in pathology, biochemistry, haematology and other laboratories are important risk factors for a series of diseases from allergy to cancer (Bahcecik & Ozturk 2009).

The long-term exposure to these antineoplastic/cytotoxic drugs used in chemotherapy leads to potential risks in health professionals (Bahcecik & Ozturk 2009). At the stage of preparation, administration and waste disposal of these drugs, severe health outcomes can be observed due to the inhalation of powder and droplets, the absorption through the skin, the ingestion of contaminated food as well as particularly teratogenic, carcinogenic and genotoxic effects that threaten the reproduction during pregnancy (Bahcecik & Ozturk 2009).

2.3.3.3 Biological factors

Some agents such as droplets and droplet cores can be transmitted via respiratory secretions of patients (Nützi *et al.*, 2015). Tuberculosis, measles, rubella, chicken pox, severe acute respiratory syndrome (SARS), influenza, meningococcal and pneumococcal infections transmit in this way (Nützi *et al.*, 2015). Nevertheless, infections transmitted through direct contact are infectious

agents that transmit through direct contact with the patient (Nützi *et al.,* 2015). There is no need to be in contact with the skin or mucosa as well as the loss of skin integrity for the transmission (Rais *et al.,* 2013). Resistant bacteria and skin parasites such as scabies are examples of microorganisms which can lead to severe infections in inpatients (Rais *et al.,* 2013).

Moreover, biological agents can be transmitted by blood and bloody body fluids. biological agents can transmit through the skin due to its impaired integrity and mucous membranes (mouth, eye and urogenital mucosa) as a result of the exposure to blood and/or bloody body fluids and some sterile body fluids (Rais *et al.,* 2013). Even though there are almost 30 microorganisms which can be transmitted in this way, the most important ones are hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV) and human immunodeficiency virus (HIV) since they can lead to systemic infections because of their current importance (Rais *et al.,* 2013). The diversity of the clinical outcomes of these agents varies from asymptomatic infections to severe and even fatal infections (Rais *et al.,* 2013). The transmission of the infections via blood occurs mostly by the penetration of the needles used in patients, injury with contaminated sharp instruments or mucosal splashes infected blood or body fluids (Bahcecik & Ozturk 2009). It has been specified that the two-third of the health professionals stated that they were exposed to blood and/or body fluids at least once, the HIV infection was related to the profession in the 57% of the HIV-positive health professionals, and the risk of developing hepatitis B infection in health professionals is 10 times more compared to the general population (Bahcecik & Ozturk 2009).

2.3.4 Knowledge on occupational injuries

Lugah *et al.* (2016) conducted a cross sectional study to determine the level of OSH awareness and knowledge among healthcare professional in Malaysia. Out of 311 health care professionals recruited, only 284 accepted and took part in the study. Data was gathered with the use of a self-administered questionnaire. The study findings reported a moderate level of knowledge across all the categories of healthcare workers. Level of knowledge among doctors was highest whiles the administrative staff recorded the lowest level of knowledge. Majority of the participants had good level of knowledge on PPEs, however knowledge on general OSH, OSH legislations and Occupational hazards was above average. The study opined that in the development of strategies to build up on healthcare workers knowledge of OSH, the strategies should be designed to impart more practical knowledge rather to merely increase awareness as though awareness is encourages the incidence of occupational injuries are unacceptable on the rise.

In 2016, Shimizu, Couto, Merchan-Hamann and Broneo conducted a descriptive cross-sectional study with 26 nurses and 96 nursing technicians from a public hospital in the federal district in Brazil. The study aimed at analysing occupational health hazards for Intensive Care Unit (ICU) nurse and nursing technicians. Likert-type work-related symptoms scale was used to evaluate the pressure of physical, psychological and social risks. The study findings reported that the ICUs as any other workplace can cause workplace health related injuries. Occupational health hazard reported among nurses and nursing technicians were mostly physical due to the frequent use of physical energy and strength to promote care and comfort to patient. Psychological and social hazards were also reported but occurred at a lesser degree.

Ollen, Nwaogazie and Douglas (2019) conducted descriptive cross-sectional study to evaluate the occupational hygiene and infections control prevention in Federal Medical Centre (FMC) Oweiri

and FMC Yenajon in southern Nigeria. A total of 379 healthcare workers were recruited disproportionate stratified sampling from the two facilities. Nurses represented the larger group of healthcare works involved in the study. The study findings reported that the overall level of knowledge on occupational hazards and control was good in both facilities. Health workers were reported to have a very high risk to exposure to ergonomic hazards (88.9%) and biological hazards (47.6%). Nurses were 5 times more at risk of ergonomic hazards whiles laboratory scientist were 5 times more at risk of chemical hazards. In furtherance, the high level of knowledge as demonstrated by the healthcare workers did not translate into practice, as the study reported that practice was quite poor.

A similar picture was painted by Alhassan and Poku (2018). The study concluded that the overall state of occupational health and safety was assessed to be deplorable. Despite the fact that the majority of the employees were aware of occupational health and safety, just approximately half of them reported being exposed to workplace health hazards. The study was conducted among nurses in two major psychiatric facility in Ghana reported a high (87%) awareness of occupational hazards at the workplace. According to the nurses, as compared to working in other health facilities, working in psychiatric facilities was riskier. Regarding knowledge of hazards in the workplace, nurses were more knowledgeable of physical health hazards (53%) followed by biological (20%) and psychosocial (17%). Knowledge of nurses were predominant from 2 sources; Seminar/Workshops (30%) and School lectures (25%).

A similar study was carried out by Duodu (2018) among 216 randomly sampled nurses. The study revealed satisfactorily high levels of knowledge of occupational hazards, and personal protective practice among the nurses studied. Nurses were demonstrated overwhelming high levels of knowledge on biological hazards (94%). Nurses demonstrated average awareness of psychosocial

hazards (84%) and ergonomic hazards (82%). Knowledge of physical and chemical hazards were relatively low at 72% and 67% respectively.

Likewise, Cross-Sectional study by Ampaben-Kyereme (2018) assessed the knowledge of healthcare workers at the Ledzokuku Krowor Municipal Hospital. The study found that health care workers possessed sufficient knowledge of occupational hazards. Healthcare workers were aware the occupational health and safety encompasses both employees and employers. Also, majority of the nurses studied demonstrated high knowledge on the use of protective equipment (PPEs) and work place safety. The study reported a high prevalence of occupational injuries among healthcare staff despite the health workers having high knowledge of occupational hazards and safety practices.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Introduction

This chapter consists of the research methods adopted for the study. This includes the study design, setting, population sample size determination, sampling method, data collection and ethical considerations.

3.1 Study design

An institutional based cross–sectional study design, also known as prevalence study was used for this survey. The study design provides a snapshot of the population at a particular time (Grimes & Schulz, 2002). It requires less time and money to conduct, compared to a case control, cohort study or randomized control trial. However, it cannot establish temporality of causation. This design was selected because it enabled me to collect predictor and outcome variables at the same time.

3.2 Study area

The study was conducted at the University of Ghana Hospital among workers in all departments and units. The University of Ghana Health Services, popularly known as the Legon Hospital was built and commissioned in 1957 and is officially owned by the University of Ghana. It was set up almost the same time as the University was found in Achimota School West Compound. It was put under the charge of Dr. A.B. Boyd (a Scottish Doctor) who was assisted by one staff nurse (SN). The hospital started as a clinic sharing all facilities in common with the Achimota Hospital.

In 1959, five (5) personnel consisting of a doctor and four nurses moved from Achimota to start work at the then University College Hospital. The facilities of the hospital grew over time to include Maternity Ward and Staff Quarters. The Hospital is currently situated at an easily accessible area behind the Legon Police Station less than 2 kilometers from the University of Ghana, Legon, main campus. It is generally referred to as a quasi-government hospital with a bed capacity of 130 comprising of General Wards, Maternity Wing, Casualty and Emergency Ward, Paediatric Unit, Dental Unit and Operating Theatre. The hospital has a workforce of about 385, in all departments and units.

3.3 Variables

3.3.1 Outcome variable

The outcome variable is occupational injury define as injury within the last 12 months that prevented the worker from work for at least 6 hours.

3.3.2 Independent variables

The independent variables are, study participant characteristics, psychosocial factors, organizational factors and work environmental factors.

I. Study participant characteristics such as sex, age, educational level, working experience, number o years at the company, gender amongst others.

II. Organizational factors such as strict adherence to safety guidelines, periodic health checkups, and screening, sa ety protocol or workers, plant and equipment are generally well maintained, use of PPEs, injury reporting procedures, adequate OSH policies amongst others.

III. Work environmental actors such as Ergonomics, Workplace arrangement, Visibility, Ventilation, Lightening condition, Work design, Housekeeping, Cleanliness amongst others.

IV. Knowledge such as Occupational Hazards and Injuries, OHS guidelines, Reporting of Injuries, Use of Protocols, Body Mechanics amongst others.

3.4 Study population

The population of interest for this study include all workers at the University of Ghana Hospital. In all, there are 385 workers.

3.4.1 Inclusion criteria

All workers in the University of Ghana hospital, who are eighteen years and above and are working during the study period.

3.4.2 Exclusion criteria

1. Workers who would be on leave of absence.
2. The study excluded workers in administrative positions and others auxiliary works who by virtue of their job description do not come into direct contact with patients as well as their body fluids

3.5 Sample size determination

The sample size was arrived at by using the Yamane (1967) sample size formula: $n = \frac{N}{1+N(e)^2}$

Where n is the sample size?

N is the total number of healthcare workers in

the hospital e, is the precision which is 5%; d

0.0025

n= $\frac{550}{1+550(0.05)^2}$= 232

55 (10% of the 550) was added to the minimum sample size of 550 to provide for non-response, making total sample size of 287.

3.6 Data collection technique/ methods and tools

The field study was implemented in four (4) stages; i) Training Research assistants ii) Stakeholders meeting iii) Enrolment of Study Participants iv) Data collection

Stage I: Training research assistants

There were two research assistants or supportive members who helped in the data collection. They were trained at the University of Ghana hospital before the start of the data collection. The assistants' understanding of the content of the questionnaire was ensured. They were also be equipped with ethical principles and skills required to administer the informed consent process.

The predominant language spoken in the hospital is English language. The research assistants are skilled in the use of the English language and they were able to interpret or clarify the data collection instrument as well as the consent form in the English language. The two research assistants were trained for two days at the hospital for them to understand how to use data collection tools and how to collect adequate data, make corrections, and ensure completeness. They were also trained on the information to be given to respective participants to elicit the required information

Stage II: Stakeholder's meeting

The principal investigator and research assistants (one of whom has extensive knowledge of the hospital) met the management to inform them and sought permission to carry out the project. This meeting was held at the hospital aimed at seeking for permission to conduct this research. The principal investigator and the two research assistants agreed on the timing for the research with the management of the hospital, and hence permission was given to carry out the research, before commencement.

Stage III: Enrolment of study participants

Once the approval was given, a meeting was held with all the workers in the in the hospital, to tell them about the project. The principal investigator and research assistants explained the informed consent principles and process, answer any questions, and arrange for individual administration of informed consent to the workers who agreed to go through the process.

Stage IV: Data collection

Generally, the questionnaires were self-administered by the respondents; the investigator or the research assistants were available for any clarifications or other assistance required. In the case of respondents who cannot complete the instrument by themselves, the questionnaires were administered by the principal investigator and research assistants to each respondent. Demographic information or study participant characteristics such as age, sex, and educational level, was taken. Data was also collected on the prevalence and determinants of occupational injuries.

A well-structured questionnaire was used to collect data from 287 hospital workers. The questionnaires were designed and administered in English. Questionnaires were constructed to reflect the variables of the study. The questionnaires were designed to elicit information regarding determinants of occupational injuries in the University of Ghana hospital. The questionnaire was split into sections covering the research's main goals. Questionnaires were administered by the principal investigator and two research assistants. The purpose of the study in the hospital is (first) clarified to the participants for their consent to be obtained before questionnaires are administered and the respondents were assured of the confidentiality of the information collected during the study. Those who agreed to participate in the study signed or provided a thumb-print on the consent form. Each completed questionnaire was checked for completeness of the information.

Two research assistants were trained for two days at the hospital for them to understand how to use data collection tools and how to collect adequate data, make corrections, and ensure completeness. They were also trained on the information to be given to respective participants to elicit the required information.

3.6.1 Data processing and analysis

The gathered data was entered into Microsoft Excel for cleaning and coding. The cleaned data was exported into Stata version 16 for data analysis. Descriptive statistics including mean, median, and standard deviation were used for continuous variables. Frequency and percentages were calculated for categorical variables.

The study sought to determine the prevalence and types of occupational injuries among University of Ghana Hospital workers This was analysed using frequencies and percentages.

In addition, the study sought to assess the relationship between socio-demographic, psychosocial, physical characters and organizational characteristics and occupational injury. The outcome variable was dichotomous (Yes or No). Given this, the Pearson Chi-square test and Fisher's exact test were adopted for bivariate analysis using an alpha level of 0.05. Multivariate logistic regression was then used to model the relationship between the injury status and the characteristics using a 95% confidence interval.

3.7 Quality control

Quality assurance procedures and precautions were taken to ensure the reliability and validity of the data. Two research assistants who can speak and understand the English language and have been engaged in previous surveys were recruited to become interviewers for the study. Questionnaires returned were checked for mistakes and completeness. Errors and omissions detected were discussed with the respective assistants so they could go back to make the necessary corrections. Data collected were keyed into both Microsoft Access and Microsoft Excel by two different entry clerks to check for data errors and ensure validity.

3.8 Ethical approval/ issues

Ethical approval was sought from the Noguchi Ethical Review Committee and ethical clearance was also obtained. Permission from the management of the University of Ghana hospital was also sought and informed consent was also taken from each participant before the study was carried out.

3.9 Conflict of interest

The research does not have a conflict of interest.

3.10 Funding

The study was sponsored by the principal investigator. Incentives such as lunch and water were given to the research assistants who assisted in the data collection as a form of appreciation. The participants were not given any incentives.

3.11 Risk

This research poses a little risk involving the time spent in answering questionnaires and the provision of answers to some questions about their age, education level, and marital issues might have made some of the participants feel uncomfortable.

3.12 Access and approval of study area

The principal investigator visited the study area personally to notify the management of the intention to conduct the study. Also, permission was obtained before the commencement of the study.

3.13 Privacy and confidentiality

The questionnaire was coded to ensure privacy and confidentiality, and the names of respondents were not needed when filling out the questionnaire. The interview was conducted with individual respondents in isolated locations to guarantee their privacy. The names of the participants were also not indicated in the research report and the data obtained on the participants were kept strictly confidential between the principal investigator and the participants in the study.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter consists of the research results. The study results were displayed using tables and a bar chart. The analysis has been organized according to the participant information and study objectives.

4.1 Socio-demographic characteristics

Approximately 62% (n=168) of the study participants were males. Of the total participants interviewed about 51% (n=140) of them belonged to the age group "26-35" years. Approximately, 46% (n=126) had some form of tertiary level education. Majority of the participants were never married 72% (n=196).

Table 4.1: The socio-demographic characteristics of study participants(n=273)

Characteristics	Frequency	Percentage (%)
Gender		
Male	168	61.5
Female	105	38.5
Transgender	0	0
Others	0	0
Age groups (years)		
≤25	86	31.5
26-35	140	51.3
≥ 36	47	17.2
Education background		
Primary	63	23.1
Secondary	84	30.8
Tertiary	126	46.2
Marital status		
Never Married	196	71.8
Married	64	23.4
Divorced	13	4.8
Type of employment		
Permanent	94	34.4
Temporary	179	65.6
Working experience (years)		
≤ 1	129	47.3
1-5	100	36.6
6+	44	16.1

Figure 1 below shows the distribution of the participants by the department at Legon University Hospital. 26%, 21%, and 9% belonged to the outpatient department (OPD), Children Ward, Administration or Medical records and the Public Health Unit respectively.

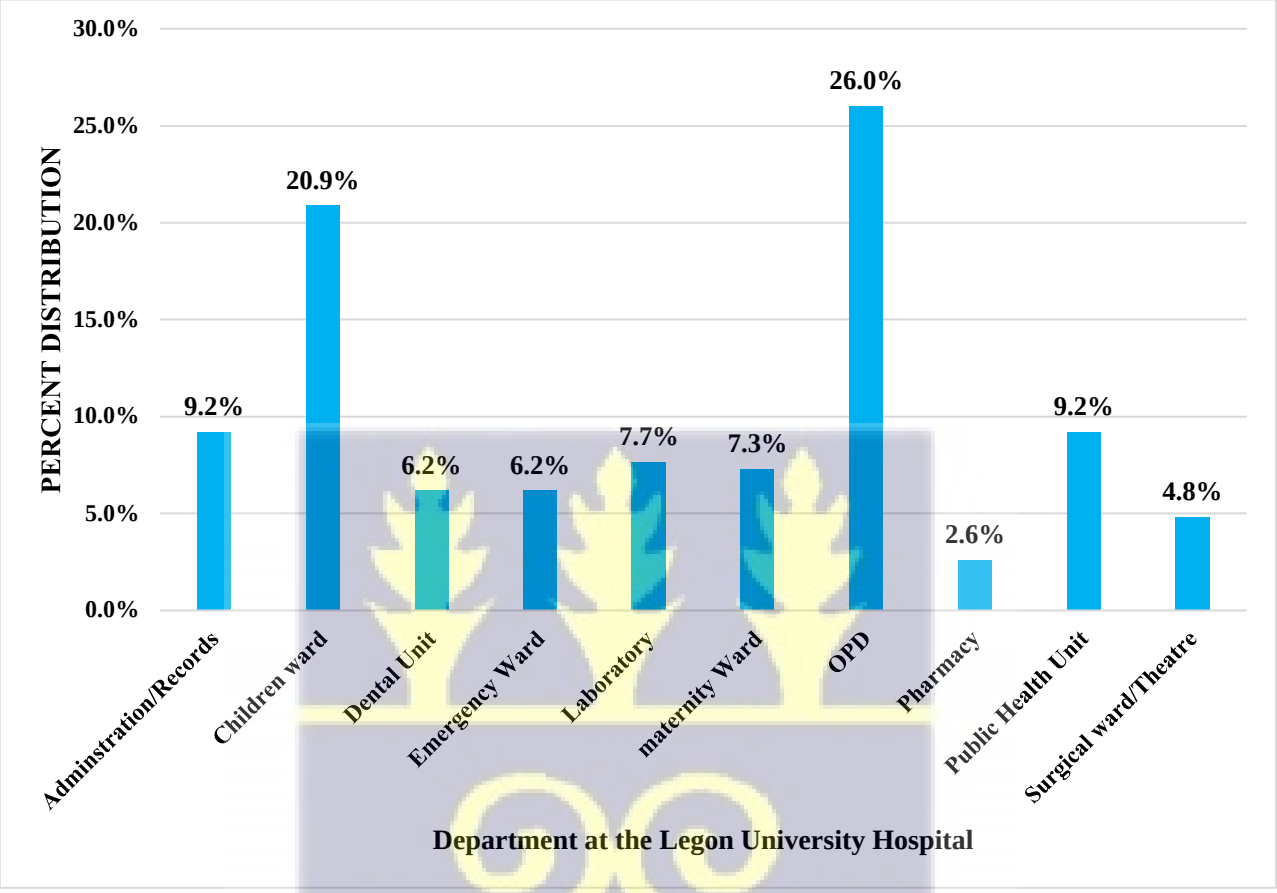


Figure 1: Distribution of study participants according to their department of work

4.2 The Types and Prevalence of Occupational Injuries among workers of the University of Ghana Health Services

4.2.1 Prevalence and Types of occupational injuries

Four participants refused to disclose their injury status. About 27% (n=103/269) of the study participants had experienced some form of injury at work in the last 12 months. About 55% (n=204/269) and 6.5% (n=24/269) mentioned back pain and sharp injury respectively as the major forms of injuries they have experienced. The other forms of injuries included fracture, ankle sprain, cold and musculoskeletal disorder.

Table 4- 2: Prevalence and types of occupational injuries

Prevalence and types of injuries	**Yes n (%)**
Ever experienced an injury in the last 12 months	103 (27.8)
Types of injuries	
Back pain	204 (55.0)
Sharp injury	24 (6.5)
Needlestick/skin cut	27 (7.2)
Other (fracture, ankle sprain, cold and a musculoskeletal disorder)	14 (3.5)

4.3 The association between injury status and participant socio-demographic characteristics

A bivariate analysis was conducted to examine the relationship between injury status and participant socio-demographic characteristics using a Pearson Chi-Square test with an alpha level of 0.05. The results show that participant age ($p<0.001$), type of employment ($p=0.002$), and work experience ($p=0.001$)

Table 4- 3: Bivariate analysis showing the association between Injury Status and Socio-Demographic Characteristics

Socio-demographic characteristics	Injury status		Chi-Square Test (df)	p-Value
	No	Yes		
Gender			0.31(1)	0.571
Male	62(37.4)	42(40.8)		
Female	104(62.6)	61(59.2)		
Age groups (years)			32.8(2)	<0.001
≤25	62(37.4)	22(21.4)		
26-35	92(55.4)	46(44.7)		
≥ 36	12(7.2)	35(34.0)		
Education background			0.12(2)	0.943
Primary	39(23.5)	24(23.3)		
Secondary	50(30.1)	33(32.0)		
Tertiary	77(46.4)	46(44.7)		
Marital status			1.49(2)	0.481
Never Married	64(39.0)	78(75.7)		
Married	100(61.0)	25(24.3)		
Type of employment				0.002
Permanent	125(75.3)	67(65.0)	147(1)	
Temporary	41(24.7)	36(34)		
Working experience (years)			13.1(2)	0.001
≤ 1	17(10.2)	26(25.2		
1-5	59(35.5)	39(37.9)		
6+	90(54.2)	38(36.9)		

4.4 Multivariate analysis showing association between injury status and participant socio-demographic characteristics

A multivariate analysis was conducted to examine the association between age, type of employment and working experience. Holding other variables constant, having 36 years (aOR=0.33; 95% CI=0.52-0.98) or more were more likely to be involved in an accident at the workplace. Also, having temporary employment status increased a person's odds of experiencing an accident by 3.2(1.25-5.89) times.

Table 4- 4: Multivariate analysis showing association between Injury Status and Socio-Demographic Characteristics

Socio-demographic characteristics	cOR	95% CI	aOR	95% CI
Age groups (years)				
≤25	Ref		Ref	
26-35	1.41	0.77 - 2.57	1.23	0.67-3.14
≥ 36	0.21	0.63 - 0.92	0.33	0.52- 0.98
Type of employment				
Permanent	Ref		Ref	
Temporary	2.19	1.33-3.14	3.21	1.25 - 5.89
Working experience (years)				
1-5	0.56	0.16 -0.89	0.55	0.12-0.91
6+	0.62	0.31-0.74	0.55	0.25-0.89

cOR= Crude Odds Ratio; aOR=Adjusted Odds Ratio CI= Confidence Interval

4.5 The association between injury status and organizational factors

A bivariate analysis was conducted to examine the relationship between injury status and organizational factors using a Pearson Chi-Square test with an alpha level of 0.05. The findings suggest that job satisfaction (p=0.002), training on safety (p=0.043) and job strain (p=0.004) were associated with injury status.

Table 4- 5: Bivariate analysis showing the association between injury status and organizational factors

Organizational factors	Injury status		Chi-Square Test (df)	p-Value
	No	Yes		
Job satisfaction			4.41(1)	0.036
No	122(73.5)	87(84.5)		
Yes	44(26.5)	16(15.5)		
Safety supervision			3.05(1)	0.082
No	22(13.3)	22(21.4)		
Yes	144(86.70	81(78.6)		
Training on safety			4.37(1)	0.043
No	126(75.9)	89(86.4)		
Yes	40(24.1)	14(13.6)		
Reward system			0.10(1)	0.751
No	41(24.7)	27(26.4)		
Yes	125(75.3)	75(73.5)		
Job procedure			0.36(1)	0.551
No	153(61.4)	13(68.4)		
Yes	96(38.6)	6(31.6)		
Job strain			8.11(1)	0.004
No	64(73.6)	94(55.3)		
Yes	23(26.4)	76(44.7)		

4.6 Multivariate analysis showing association between injury status and organizational factors

A multivariate analysis was conducted to examine the association between injury status and organizational factors. Holding other variables constant, having job satisfaction (aOR=0.48; 95% CI=0.29-0.94), training on safety (aOR=0.51; 0.21-0.96) and job strain (aOR=1.95; 95% CI=1.12-5.86) significantly predicted occupational accidents.

Table 4- 6: Multivariate analysis showing association between Injury Status and Organizational Factors

Organizational factors	cOR	95% CI	aOR	95% CI
Job satisfaction				
No	Ref		Ref	
Yes	0.51	0.27-0.96	0.48	0.29- 0.94
Safety supervision				
No	Ref		Ref	
Yes	2.31	0.92- 4.26	2.14	0.89- 4.45
Training on safety				
No	Ref		Ref	
Yes	0.49	0.25-0.96	0.51	0.21-0.96
Job strain				
No	Ref		Ref	
Yes	1.35	1.09-5.27	1.95	1.12-5.86

cOR= Crude Odds Ratio; aOR=Adjusted Odds Ratio CI= Confidence Interval

4.7 The association between injury status and psychosocial characteristics

A bivariate analysis was conducted to examine the relationship between injury status and psychosocial characteristics using a Pearson Chi-Square test with an alpha level of 0.05. The only psychosocial characteristic associated with occupational injury in the current study is work stress ($p=0.004$).

Table 4- 7: Bivariate analysis showing the association between Injury Status and Psychological factors

Psychosocial characteristics	Injury status		Chi-Square Test (df)	p-Value
	No	Yes		
Work stress			8.11(1)	0.004
No	64(40.5)	23(23.2)		
Yes	94(59.5)	76(76.8)		
Excessive workload			4.88(1)	0.027
No	114(68.7)	57(55.3)		
Yes	52(31.3)	46(44.7)		
Verbal and physical harassment			1.00(1)	0.317
No	58(34.9)	29(29.0)		
Yes	108(65.1)	71(71.0)		
Poor interpersonal relationship			6.32(1)	0.012
No	65(39.2)	25(24.3)		
Yes	101(60.8)	78(75.7)		
Emotional demands			1.32(1)	0.250
No	5(3.01)	6(5.9)		
Yes	161(97.0)	96(94.1)		
Job insecurity			2.31(1)	0.128
No	1(0.60)	3(2.91)		
Yes	165(99.400	100(97.1)		

4.8 Multivariate analysis showing association between injury status and psychosocial characteristics

A multivariate analysis was conducted to examine the association between injury status and psychosocial characteristics. Holding other variables constant, having work stress (aOR=1.86; 95% CI=1.22-5.82), excessive workload (aOR=3.31; 95% CI=1.26-9.87) and poor interpersonal relationship (aOR=0.29; 95% CI=0.18-0.97) significantly predicted occupational accidents.

Table 4- 8: Multivariate analysis showing association between Injury Status and Psychological Characteristics

Psychosocial characteristics	cOR	95% CI	aOR	95% CI
Work stress				
No	Ref		Ref	
Yes	1.35	1.09-5.27	1.86	1.22-5.82
Excessive workload				
No	Ref		Ref	
Yes	3.58	1.18- 10.24	3.31	1.26-9.87
Poor interpersonal relationship				
#No	Ref		Ref	
Yes	2.36	1.22- 9.73	2.29	1.18-9.94
Job insecurity				
No	Ref		Ref	
Yes	2.18	0.94- 5.42	2.36	0.89 - 2.45

cOR= Crude Odds Ratio; aOR=Adjusted Odds Ratio CI= Confidence Interval

4.9 The association between injury status and work environmental factors

A bivariate analysis was conducted to examine the relationship between injury status and work environmental factors using a Pearson Chi-Square test with an alpha level of 0.05. None of the variables was significantly linked with injury status.

Table 4- 9: Bivariate analysis showing association between injury status and work environmental factors

Work environmental factors	Injury status		Chi-Square Test (df)	p-Value
	No	Yes		
Corrosive chemicals (ie acid)			0.037(1)	0.847
No	52(31.5)	31(30.4)		
Yes	113(68.5)	71(69.6)		
Infections from patients			0.10(1)	0.751
No	41(24.7)	27(26.4)		
Yes	125(75.3)	75(73.5)		
Poor lighting system			1.23(1)	0.262
No	111(66.9)	62(60.2)		
Yes	55(33.1)	41(39.8)		
Extremes of temperature			7.44(1)	0.006
No	59(35.5)	54(52.4)		
Yes	107(64.5)	49(47.6)		
Faulty electrical wiring			0.66(1)	0.418
No	69(41.6)	48(46.6)		
Yes	97(58.4)	55(53.4)		

CHAPTER FIVE

DISCUSSIONS

5.0 Introduction

This section consists of the research discussions. They have been organized according to the study objectives.

5.1 The prevalence and types of occupational injuries among workers of the University of Ghana Health Services

In the current study, about 27.8% of the study participants had experienced some form of injury at work. This is lower than the 74%, 84% observed in Saudi Arabia, Sokoto in Nigeria and Kampala in Uganda (Abdulmujeeb & Olaniyan, 2017; Alnaami *et al*., 2019; Awosan *et al*., 2017). The lower prevalence of occupational injuries among the participants at the University of Ghana Health Services can be attributed to the poor culture of reporting such incidents. However, it is very important to eliminate low back pain since it is linked with many adverse health outcomes.

We found that 55% of the participants had experienced low back pain. This confirms a study that low back pain affects more than 50% of all health care workers (Dajah & Daghdi, 2015). The study also argued that low back pain is the leading cause of absenteeism among health care workers. Notably, evidence on the interventions for preventing low back pain among nurses for instance is inconsistent. A systematic review argued that handling training and stress management in isolation were not effective for nurses (Hoof *et al*., 2018). A recently published study has recommended physical exercise, education and personal protective equipment as effective measures for

preventing low back pain (Sun *et al*., 2021). In some advanced nations, robots are being developed to assist health care workers with carrying patients and heavy objects (Babič *et al*., 2019). Considering the effect low back pain has on the workers and the organization, management should endeavor to adopt measures to ameliorate the low back pain among the workers.

About 6.5% of the study participants have experienced sharp injuries. According to WHO, approximately 10% of all healthcare workers experienced sharp injury (World Health Organization, 2002). These injuries accounted for 16000, 66000 and 1000 hepatitis C (HCV), B (HBV) and human immunodeficiency viral (HIV) infections. The infections are expected to account for 1142 deaths by 2030 (Rapiti *et al*., 2005). The 6.5% observed in this study is lower than the 38.5% observed in the Central Zone Tigray in northern Ethiopia (Weldesamuel *et al*., 2019). Approximately 3 of 1% of sharp injuries were observed in Northwest Ethiopia (Bazie, 2020). This development may be attributed to variation in compliance levels with safety measures in the facilities. The interpretation may have been influenced by poor knowledge since a study observed that between 21 and 32% of healthcare workers in sub-Saharan Africa had a poor understanding of measures for preventing needle-stick injuries (Mossburg *et al*., 2019). Also, an Ethiopian reported that those healthcare workers who experienced such injuries did not have safety instructions at work or had not been trained in safety and health (Assen *et al*., 2020).

The current study demonstrates that 7.2% of the health care workers had suffered needlestick/cut respectively. This is lower than the 77% observed in Pakistan (Rais & Jamil, 2013). The leading circumstances for needle stick/cut were using the needle, disassembling, preparing to use the needle again, and recapping the needle. The case of Pakistan is a reflection of inappropriate injection and sharp handling culture. A recent study has pointed to poor handling of injections as a major source of human immunodeficiency virus spread among children in the country (Mir *et*

al., 2021). Efforts should be made to reduce such hazards since they are means through which health care workers acquire infections.

5.2 The association between injury experienced within the last 12 months and participant socio-demographic characteristics

The current study assessed the association between socio-demographic characteristics and occupational injury status. The results showed a strong association between age, type of employment and work experience were significantly associated with occupational injury status.

Although results from this study indicated that participants that were 36 years (aOR=0.33; 95% CI=0.52-0.98) or more were more likely to be involved in an accident, a study in a district hospital in Kumasi published by Appiagyei *et al*, (2021) indicated that there were no statistically significant association between participants' age and injury.

With regards to the type of employment, non-permanent staff of the hospital are at higher risk of experiencing injury on the job compared to counterparts who have been employed permanently. Further analysis shows that the temporary staff were not as exposed to formal training on safety issues. Also, temporary staff such as the national service persons and rotation nurses do not benefit from the management provided PPEs.

Increasing work experience lowers the participant's odds of experiencing a work-related accident. Studies conducted in Bale Zone in Ethiopia and Kumasi in Ghana found no significant link between work experience and workplace injury (Appiagyei *et al*., 2021; Bekele *et al*., 2015). The variation observed in the current study may be explained by the increased knowledge and experience acquired on safety over the years.

5.3 The association between injury experienced within the last 12 months and organizational factors

The current study results show that participants who were dissatisfied with their job were more likely to experience occupational injury, compared to counterparts who were satisfied with their job. This corroborates the findings that job dissatisfaction can be a moderating factor in modelling the risk factors for occupational injury (Barling *et al*., 2003). Similarly, a study conducted in China reported a negative correlation between job satisfaction and occupational injury among healthcare workers (Shi *et al*., 2020).

The participants who had attended training on safety were less likely to experience occupationally related injury. This is confirmed by Moosburg *et al*. (2019) that reported a strong negative association between receiving training on safety and occupational accidents in Africa. Similarly, a systematic review of developing countries demonstrated that safety training reduces work-related injuries (Mengistu & Tolera, 2020). This can be explained by the fact that when the healthcare worker is exposed to training on safety, he would acquire knowledge that will inform his or her health-seeking behavior (Reinholz & Andrews, 2020).

The study found the participants who reported job strain were at increased risk for experiencing an occupational injury, compared to those who declined that their work was stressful. This corroborates with a study that was conducted in Kumasi (Appiagyei *et al*., 2021). The study also observed those who were stressed were 2.68 times more likely to be involved in occupational injury. Work pressure was found to be negatively connected with safety behavior in a comparative study of 422 Ghanaian HCWs. Increased managerial commitment to safety, on the other hand,

reduced the link between work pressure and safety behavior (Amponsah-Tawaih & Adu, 2016; Amponsah-Tawiah & Anuka, 2018).

5.4 The association between injury experienced within the last 12 months, psychosocial factors and work environmental factors

Similarly, perceived work overload increased the person's risk for occupational injury. Also, Bazie (2020) reported increased workload as a determinant of injuries among health care workers. The author attributed this to a lack of concentration stemming from tiredness and hastiness to win the workload (Bazie, 2020). The work may be accountable for the fact that some of the healthcare were on leave due to education and sickness.

The current study observed that poor interpersonal relationships increased the healthcare workers' odds of injury. The risk of physical injuries increases significantly among individuals with poor support from colleagues or superiors (Coupaud, 2017). This confirms that social support is critical for psychological health.

The current study observed a significant association between extreme temperatures. Physical changes occur as a result of heat stress in a hot environment, and mental and physical task performance, as well as cognitive and reaction speed for risk, are diminished, increasing the accident rate (Lee *et al.*, 2019). Workers' risk perception and risk response are reduced in a heated setting, which also decreases irritation and violence (De Almeida *et al.*, 2012). Participants in the current study might have been exposed to physical hazards because they were not always in PPE.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

About 27.8% of the healthcare workers had experienced work injuries in the past 12 months. Given this, the prevalence of injury is high and should be addressed immediately to avert negative outcomes. Notably, 55% of the injury is accountable for by backpain. This can be controlled or prevented.

In terms of socio-demographic predictors of occupational injury, having 36 years or more and being temporarily employed were associated with increased risk for injury. In addition, increasing work experience reduced the odds of work-related accidents. Although this cannot be modified, their relationship with the injury can be moderated using existing interventions.

Organizational factors such as job satisfaction and training on safety reduced the odds of an injury, while job strain increased the odds of occupational injury.

Work stress, excessive workload, poor interpersonal relationship and extreme temperature were the psychosocial, physical and work environmental factors that predicted work injury among the healthcare workers in the hospital. The factors increased the risk for the work-related injury.

6.2 Recommendations

Practices

Factors such as work stress, excessive workload, poor interpersonal relationship and extreme temperature are modifiable. Other variables such as younger age and type of employment injury.

- The hospital can consider establishing a counselling unit where health care workers who are burnt out, feel overburdened or needs help to improve their relationship with colleagues and superiors could access
- The hospital could also create a gym that is specialized in teaching physical workouts to reduce back pain.
- The hospital could also invest in assistive technology for carrying patients and other heavy objects to minimize the incidence of back pain
- Temporarily employed staff should be allowed to participate in all safety-related activities.

Policy

All temporarily employed staff should be allowed to participate in all safety-related activities.

Research

Feasibility studies should be conducted to determine the best approach for establishing counselling, training and gym units for the healthcare workers.

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APPENDIX

UNIVERSITY OF GHANA

UNIVERSITY HEALTH SERVICES

Ref. No. UHL/UBS.1

12th January,2022

JUDE KWABENA NUARKO (10875483)
DEPARTMENT OF BIOLOGICAL, ENVIRONMENTAL AND OCCUPATIONAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
COLLEGE OF SCIENCES
UNIVERSITY OF GHANA
P.O. BOX LG 13
LEGON

Dear Sir,

PERMISSION TO UNDERTAKE A RESEARCH IN THE UNIVERSITY OF GHANA HOSPITAL

Your letter seeking for permission to conduct a study with the title "Determinants of Occupational Injuries among Workers at the University of Ghana Health Services" at the University of Ghana Hospital, Legon has been approved.

You are expected to strictly adhere to the conditions prescribed by the ethical review committee. You are to contact the Director of the hospital for a commencement date of the study.

Sincere regards,

Dr. MARK ERIC FREMPONG
DIRECTOR
UNIVERSITY HEALTH SERVICES
UNIV. OF GHANA, LEGON.

DR MARK E. FREMPONG
DIRECTOR
UNIVERSITY HEALTH SERVICES, LEGON

cc: The Head, University of Ghana Basic School, Legon

SATELLITE CLINICS: UGMS CLINIC, KORLE-BU, UNIVERSITY CLINIC-FOHREC, KADE; STUDENTS' CLINIC (ACCRA CITY CAMPUS)
P. O. BOX LG 79, Legon, Accra, Ghana I Tel: +233 (0) 307 030 184 / 0307 030 182
Email: ughosp@ug.edu.gh I Website: www.ug.edu.gh/healthservices

UG

UNIVERSITY OF GHANA

NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH (NMIMR)
COLLEGE OF HEALTH SCIENCES
INSTITUTIONAL REVIEW BOARD

12th January 2022

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824 **IRB 00001276**

NMIMR-IRB CPN 020/21-22 **IORG 0000908**

On 12th January 2022, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting reviewed and approved your protocol titled:

TITLE OF PROTOCOL : Determinants of occupational injuries among workers at the University of Ghana Health Services

PRINCIPAL INVESTIGATOR : Jude Kwabena Nuarko, MSc Cand.

Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

Please report all serious adverse events related to this study to NMIMR-IRB within seven days verbally and fourteen days in writing.

This certificate is valid till 11th January 2023. You are to submit annual reports for continuing review.

Signature of Chair: .....
Dr. Abraham Hodgson
(NMIMR – IRB CHAIR)

P. O. Box LG 581, Legon, Accra, Ghana | Tel: +233 (0) 302-2916438
Email: nirb@noguchi.ug.edu.gh | www.noguchimedres.org | www.ug.edu.gh

NMIMR-IRB CONSENT FORM TEMPLATE

Title: DETERMINANTS OF OCCUPATIOANAL INJURIES AMONG WORKERS AT THE UNIVERSITY OF GHANA HEALTH SERVICES

Principal Investigator: [Jude Kwabena Nuarko]

Address: UNIVERSITY OF GHANA/UNIVERSITY OF GHANA SCHOOL OF PUBLIC HEALTH, P.O. BOX LG 25 LEGON, ACCRA.

General Information about Research

Dear participants, I am Jude Kwabena Nuarko, a student at the School of Public Health, University of Ghana, Legon. I am conducting a study on "Determinants of Occupational Injuries among Workers at the University of Ghana Health Services. The purpose of the study is to assess the determinants of occupational injuries among workers of the University of Ghana Health Services, to determine the prevalence of occupational injuries among workers of the University of Ghana Health Services, as well as to assess the knowledge of workers of the University of Ghana Health Services on Occupational hazards and injuries.

Procedures

The study will involve answering questions from a structured questionnaire. I will surely appreciate your participation in this study. You will not spend more than thirty (30) minutes in answering the questions.

Possible Risks and Discomforts

This research may pose risk and discomfort. However, if you feel tired at the time that I will want to engage you, I will allow you to rest for some time before engaging them at their arrange for an agreed and convenient time.

Possible Benefits

There would be no direct benefit to the participants.

Confidentiality

To ensure privacy and confidentiality, the questionnaire will be coded and the names of respondents will not be required in filling out the questionnaire. The interview will be conducted in isolated areas with individual respondents to guarantee their privacy. Participants' names will also not be mentioned in the report of the study and information gathered on participants will be kept strictly confidential between the principal investigator, supervisor, research assistants, and IRB monitoring team. The data will be kept in my drawer after entry for a month and later burnt after submitting my thesis.

Compensation

There would be no compensation for the participants

Voluntary Participation and Right to Leave the Research

Voluntary Participation and Right to Leave the Research

Participation in this study is voluntary and you can choose not to answer any particular question or even all the questions. You are at liberty to withdraw from the study at any time. However, I would like to encourage you to participate since your opinion is important in the determination of the outcome of this study.

Contacts for Additional Information

Please, in case you want to ask questions later, you may contact me, Jude Kwabena Nuarko the principal investigator on Tel. No 0552144523 or Dr, Quansah Reginald on 0272620401.

Your rights as a Participant
This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses: nirb@noguchi.ug.edu.gh

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research title
DETERMINANTS OF OCCUPATIOANAL INJURIES AMONG WORKERS AT THE UNIVERSITY OF GHANA HEALTH SERVICES
Has been read and explained to me. I have been given an opportunity to ask any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

_____ _____
Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____ _____
Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____ _____
Date Name Signature of Person Who Obtained Consent

STUDY QUESTIONNAIRE

I am conducting research titled "**Determinants of Occupational Injuries among Worker at The University of Ghana Health Services**". I would be grateful if you could participate in the study. However, your participation is voluntary and you may choose to withdraw from the study at any point in time. Your identity is not required and you are assured of full confidentiality. The information gathered would be used strictly for academic purposes.

CONSENT

I have read and understood fully the information pertaining to the study as written above. I have willingly decided to partake in this study and I understand that the response to these questions will be kept confidential.

Participant's signature/Thumb print: .....

Date.....

Instructions

You are requested to tick □ in the boxes provided for the appropriate option and provide brief answers to the other spaces provided.

SECTION A: DEMOGRAPHIC DATA

1. What is the nature of your engagement? a) Contractor employee b) Permanent employee C) Intern D) NSS

2. What is your gender? a) Male b) Female

3. Which of the following age brackets do you belong to? a) 18- 25 b) 26 – 35 c) 36 and above

4. What is your marital status? a) Single b) Married c) Divorced/Separated

5. What is your level of education? a) Primary b) Secondary c) Tertiary

6. Which department do you work in?

7. How many years have you worked at University of Ghana Health Services? a) Less than 1year b) 1 to 5 years c) 6 to 10 years d) More than 10 years

8. How long have you worked in your current work area? a) Less than 1year b) 1 to 5 years c) 6 to 10 years d) More than 10 years

9. How many hours per week do you work? a) Less than 20 hours/week b) 20 to 39 hours/week c) 40 hours /week d) more than 40 hours/week

10. How often do you usually have any kind of drink containing alcohol during the last 2 years? a) Once a week b) Two to Three times a week c) Almost every day d) Occasionally e) Not at all

SECTION B: PERCEPTION OF OCCUPATIONAL SAFETY AND HAZARDS

Perception of OSH, Policies and Guidelines

	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
1.	The university of Ghana Health services as a health facility has OSH policies					
2.	Occupational hazards refer to all workplace activities that have the potential to cause/increase the risk of injury or ill health.					
3.	Workplace safety generally refers to the process of protecting the health and safety of staff while on the job, irrespective of vocation					
4.	Occupational safety is the control of hazards in the health facility to reduce risk					
5.	Occupational health and safety cover both employers' and employee's welfare					
6.	I understand the facility OSH polices					

7. Healthcare workers are at high risk of occupational hazards					
8. I am aware of all hazards in my working environment					
9. Nurses are obliged to report work-related accidents/injuries					
10. Staff are required to put on protective clothing in the performance of their duties					
11. I am aware of injury reporting procedures					

SECTION C: PHYSICAL WORK ENVIRONMENT DETERMINANTS

In the course of your work what type of hazards are you exposed to and how well are they managed?

Physical Hazards			Well Managed? (Tick as Appropriate		
Present? (Circle as Appropriate)			Agree	Disagree	Uncertain
Y	N	Collision with moving vehicles			
Y	N	Working in confined spaces			
Y	N	Falls from height			
Y	N	Slippery/wet surfaces			
Y	N	Dangerous electrical energy			
Y	N	Exposure to hot surfaces			
Y	N	Inadequate lighting			

Y	N	Poor ventilation			
Y	N	Cut and wounds			
Y	N	Extremes of temperature, (cold/heat)			
Y	N	Radiation			
Y	N	Noise			
Y	N	Explosions from pressurized containers			
Y	N	Lancets, broken bottles injuries			
Y	N	Manuel lifting			
Biological hazards			Well Managed? (Tick as Appropriate		
Y	N	Microorganisms			
Y	N	Exposure to pathogens			
Y	N	Dangerous pests and insects			
Y	N	Infection from patients			
Y	N	Airborne disease			
Y	N	Direct contact with contaminated specimen			
Chemical hazards			Well Managed? (Tick as Appropriate		
Y	N	Handling of chemicals			

Y	N	Exposure to fumes			
Y	N	Exposure to cleaning detergents			
Y	N	Exposure to carcinogens			
Y	N	Reagents (used in laboratory and other areas)			
Y	N	Anaesthetic gases			
Y	N	Corrosive chemicals such as acids			
Y	N	Alcohols			
Y	N	Exposure to fossil fuels			
Psychosocial hazards			Well managed? (Tick as appropriate		
Present? (circle as appropriate)			Yes	No	
Y	N	Poor workstation design			
Y	N	Unnatural posture / motions			
Y	N	Gender harassment			
Y	N	Excessive work pressure			
Y	N	Lone working			
Y	N	I experience workload			

Y	N	I have issues at home that affect me at work			
Y	N	I have bad relationships with some of my colleagues at work that made me not to concentrate at work			

SECTION D: PROPORTION OF WORKERS WITH OCCUPATIONAL INJURIES

a) Have you ever had an injury in the course of work in this industry? a) Yes b) No

If yes, what type of injury were you involved in?.....

.....

b) Have you had an incident at work that resulted in injury to you in the last 12 months, that prevented you from work at least for 6hrs? a) Yes b) No

If your answer is 'yes,' which part of the body was affected? .....

c) Have you been involved in an activity with great potential to cause an accident at UGH? a) Yes b) No

If yes, please specify.....

d) Have you been treated for any injury sustained while working in the industry?

a) Yes b) No

If yes, please specify type .....

e) Have you been hospitalized as a result of the injury sustained at UGH? a) Yes b) No

If yes, how many days? .....

f) Time taken to go back to work?

f) Does your work need visual concentration? a) Yes b) No

If 'yes, the visual demand of your assignment was.....?

a) Low (almost no need to see fine details > 50 cm) b) High (fine details need to be shown > 50 cm)

h) Do you have any sleep disorders? a) Yes b) No

If yes, what could be the reason? A) Working for over 8 hours. Without moving b) Operating at night c) Attempting to do more than one job at a time d) Intense heat e) Others

i) Do you use any personal protective device while you are working? a) Yes b) No

"If yes, what type? a) Glove b) earplug c) respirators d) helmet e) overalls f) goggles g) face shield h) boots i) shoes j) other

j) Are machines/equipment always maintained immediately when old or unsafe? a) Yes b) No.

i) Does your work involve the manual operation of equipment/packaging?

SECTION E: SELF-REPORTED OCCUPATIONAL HEALTH AND SAFETY PRACTICE

Y	N		Agree	Disagree	Uncertain
Y	N	UGH has adequate OSH policies			
Y	N	Employees understand the company's OSH policies			
Y	N	UGH safety information is visible to all staff			
Y	N	Workers are aware of all hazards in my workplace			
Y	N	Workers are always involved in risk assessment			
Y	N	Safety operating procedures are available to all workers			
Y	N	Adequate personal protective equipment is provided to all employees			
Y	N	Safety and health induction training is mandatory for all staff			
Y	N	All staff receive refresher OSH training			
Y	N	The factory has an adequate number of trained first aiders			
Y	N	I am aware of injury reporting procedures			
Y	N	Dangerous parts of work equipment are adequately guarded			
Y	N	All workrooms are adequately ventilated			
Y	N	My workstation is always adequately lit			
Y	N	Management understands safety and health issues in my work area			
Y	N	I am strongly encouraged to report unsafe conditions and behavior			

Y	N	I underwent medical examinations before employment			
Y	N	Regular medical tests are done on employees			
Y	N	There are adequate first aid kits and medical services			
Y	N	Employees are aware of safety measures in case of fire			
Y	N	All plant and equipment is generally well maintained			
Y	N	All incidents/injuries are objectively investigated			
Y	N	I am familiar with the company disciplinary procedure			
Y	N	Hazard control measures in place are adequate and effective			
Y	N	My supervisor always prioritizes safety over other objectives			
Y	N	Safety training drills are important			

SECTION F: PERSONAL PROTECTIVE EQUIPMENT AND FACILITY SUPPORT

1. Do you know of any protective equipment used in your line of work?

   [ ] Yes [ ] No

2. Have you been trained in the use the personal protective equipment?

[ ] Yes [ ] No

3. Are these personal protective equipment's always available for use by you?

   [ ] Yes [ ] No

4. What personal protective equipment is always available for use by you? Please Tick where appropriate.

5. Protective Overall [ ] Face Protection (Mask) [ ] Goggles [ ] Safety Gloves [ ] Safety boots [ ] Helmets [ ]

6. Do you use this available protective equipment?

   [ ] Yes [ ] No

7. If yes, how often do you make use of the protective equipment?

   [ ] Always [ ] occasionally [ ] When Reminded [ ] When I feel it's necessary [ ] other (specify) .....

8. If No, what is your reason for the non-use of the protective equipment?

SECTION G: ORGANIZATIONAL FACTORS

1. Does management ensure strict adherence to safety guidelines? [ ] Yes [ ] No
2. Do you officially have periodic industrial health check-ups and screening? [ ] Yes [ ] No
3. What other measures are lacking that can contribute to ensuring your health and safety?

   [ ] Yes [ ] No

4. Do you have a management safety protocol for workers? [ ] Yes [ ] No
5. What factors influence the occurrence of occupational injuries in your facility?

   Lack of supervision [ ]

Unavailability of PPEs [ ]

Poor working conditions [ ]

Poor arrangement of work area [ ]

High work load (steep patient to staff ratio) [ ]

Unavailability of consumables (sharps box, disposal containers, etc.) [ ]

Others (specify):

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THANK YOU FOR PARTICIPATING