SCHOOL OF PUBLIC HEALTH

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WORK-RELATED HEALTH HAZARDS FACED BY SANITATION WORKERS IN THE UPPER EAST REGION, GHANA

BY

CHARLES YINBIL AWUNI

10754381

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DECLARATION

I, Charles Yinbil Awuni, hereby declare that apart from references to other people`s works which have been duly acknowledged, this Thesis is my own independent work and has not been submitted for the award of any degree in any institution.

……..
Charles Yinbil Awuni
(Student)

18th August, 2021
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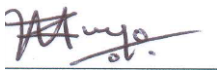
Date



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Dr. Mawuli Dzodzomenyo
(Academic Supervisor)

18th August, 2021
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Date

DEDICATION

I dedicate this work to the following dear ones. To my wife; Mrs. Faustina Z. Kuunyar and my son and daughter; Philbert and Fedora Awuni.

Finally, to Dr. Andrew Manoba Limantol and Mr. George Agana Akuriba, who supported me in various ways to make my studies in general a success.

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I am extremely thankful to the Upper East Regional Zoom-Lion Coordinator and the Municipal Chief Executives for allowing me to conduct the study in their Assemblies. Zoom-lion Municipal Managers and the Municipal Environmental Health Officers, I say thank you for your wholehearted support.

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ABSTRACT

Background: Sanitation employees are exposed to hazards and safety risks due to their waste collection activities. As a result, poor or lack of health and/or safety practices at the work environment could lead to adverse health impact that includes preventable work-related ill-health.

Objectives: This study assessed work-related health hazards faced by sanitation workers in the Upper East Region, Ghana.

Study design and methods: A descriptive cross-sectional study was conducted among 258 respondents selected using a weighting method from 720 sanitation workers (86 from government and 637 from Zoom-Lion Ghana) across the three Municipalities in the Upper East Region (Bolgatanga, Kassena Nankana and Bawku). Quantitative approaches were used to gather data using structured questionnaire and observation checklist. The data was analysed using mainly descriptive and inferential statistics such as linear regression with the aid of STATA version 15 software. Chi Square test was used to determine the significance of the factors used in the linear regression. The analysed data was reported using frequency tables

Results: The results revealed that sanitation workers were exposed to physical hazards, biological and ergonomic hazards in their work environment. Regression analysis indicated that the major risk factors responsible for work-related injuries and other work-related ailments among sanitation workers were non-observance of safety procedures, years of work experience, and time spent at work each day, which were all significant ($p<0.005$). With regards to ergonomic problems, majority (93.70%) of the respondents had general body pains and backaches were also common (70.90%). It also shows that injuries were mainly cuts injury (76.20%) and puncture wound (68.60%). Most workers also suffered respiration disorders such as chest tightness and dry cough with a percent of cases of 71.20% and 57.60% respectively. The study equally revealed vomiting and diarrhoea with 64.40% and 52.10% respectively as percent of cases suffered by these workers. The study finally revealed that with the exception of punishment given out to sanitation workers for non-compliance of safety protocols (63% and 2% partially and fully implemented respectively), all other safety measures were not implemented.

Conclusion: The study concludes that, sanitation workers suffered several work-related health hazards (physical, biological and ergonomic hazards) and these are as a result of poor safety work culture in the waste management organizations in the Region. Strict enforcement of health and safety protocols will give the needed protection for these waste handlers from suffering injuries or ailments from the work place.

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DEFINITION OF TERMS

- **Biohazard:** Any biological agent that can cause harm to human health.
- **Exposure:** hazards in the workplace that can be experienced by the employee, with precise modifying factors of intensity, frequency and time.
- **Hazard:** conditions or substances at the workplace that can cause harm.
- **Health hazards:** these are risk factors at workplace that can deteriorate the health of workers either gradually or cumulatively
- **Municipal wastes**: These are cities` or towns` wastes collected by a Waste Collection employee.
- **Occupational disease**: This is ailment a worker contracts at work due to an exposure to risk factors (hazards) arising from work activity.
- **Occupational health and safety**: Workplace Conditions that could affect the well-being of workers.
- **Occupational health:** The prevention of workers from departing from health, controlling risks and the adaptation of safe practices at the work-places.
- **Occupational injury**: Any cut, puncher wound or bruises resulting from an occupational accident.
- **Personal Protective Equipment (PPE):** These devices are used to protect workers from possible contact to hazards in the workplace.
- **Safety hazards** are risk factors in the workplace that have the potential of causing harm to an employee.
- **Sanitation workers:** These are workers whose responsibilities are to ensure the daily cleaning of public drains as well as sweeping, collection of refuse from the cities and transport the refuse to disposal sites.
- **Street cleansing**: The sweeping and collection of waste from streets for disposal.

LIST OF ACRONYMS

Acronym	Meaning
EPA	Environmental Protection Agency
FIOH	Finnish Institute for Occupational Health
GDP	Gross Domestic Product
HSE	Health and Safety Executive
IFC	International Finance Cooperation
ILO	International Labour Organization
MMDAs	Metropolitan, Municipal, District Assemblies
MSD	Musculoskeletal Disorder
NIOSH	National Institute for Occupational Safety and Health
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PHRM	Personnel and Human Resource Management,
SNA	Science National Academy
USCG	U.S. Coastal Guard
WHO	World Health Organization
WMSD	Work-related Musculoskeletal Disease

CHAPTER ONE

INTRODUCTION

1.1 Background

The work environment has an influence to workers' health, and exposure to risk factors such as biological, physical and chemical hazards in the workplace can adversely affect human health (WHO, 2008). Municipal waste is infectious in nature and workers who are involved in keeping the cities and or towns clean are exposed to high level of biological aerosols which could adversely affect the health of these workers (Perez, et al., 2006). According to Topal (2011), global workforces are faced with several health and safety hazards per day. Exposures such as excessive noise, dusts, gases, vibration and extreme climatic conditions. Work-related accidents and diseases have become a global challenge due to poor adherence of occupational health and safety at workplaces.

Gong, (2013) reported that, the effects of rapid urbanization in relation to waste management has increased the workload of sanitation workers, but without adequate policy guidelines for managing these wastes in developing countries including Ghana. Sanitation workers` health and safety are threatened owing to frequent exposure to various hazards such as dust, fumes and odours, injurious substance and chemicals, and hazardous equipment. These workers need to be provided with adequate PPE to guarantee their safety. Work related injuries are among health problems commonly experienced by most workers. Other health hazards or problems in the workplace includes exposure to harmful gases, respiratory disorder, musculoskeletal disorders, infections, skin problems and mental stress (Patil, Kamble, & Ward, 2017; WHO, 2002; Tiwari, 2008).

Rapid industrialization in some developing countries account for over 2 million loss of lives owing to accidents and diseases occurring from the work environment per year. A survey conducted by ILO on work-related health problems show that, the risk of work-related illness is commonly widespread risk faced by workers at their work environment. These illnesses are four times higher than fatal accidents per year. The joint report of ILO/WHO indicate that, apart from deaths occurring due to work activities, about 340 million occupational accidents and 160 million work-related illness occur annually (ILO & WHO, 2019). ILO evaluations indicate that approximately 2.3 million workers including women around the world suffer work-related accidents or diseases per year. The ILO concludes that there is an increase of work-related health problems including accidents among workers in their work environment (ILO, 2019).

Studies on Health and Safety challenges in most developing countries including Ghana are mostly focused on constructional, mining and sawmilling industries. There is therefore little study on work-related health hazards sanitation workers are exposed to. Also, official estimates are not available for work-related health hazards sanitation workers are exposed to in the three Municipalities of Upper East Region (UER), Ghana. Dealing with the city waste, sanitation workers are exposed to several risks factors that could affect their health negatively. Little is known about their safety and health in the context of their work practice and exposure. It is against this background that the study is being proposed. The findings of this research would augment the already existing literature and inform policy provision for safety of sanitation workers.

1.2 Problem Statement

Increase in waste generation due to increase in global population have contributed to the build-up and disposal of large volume of wastes around the world. Aerosolization of disease causing

microorganism, endotoxins, odours, and dust is unavoidable consequence of managing waste material (Pillai and Ricke 2019), and exposure to excessive hazards due to waste picking, sweeping and collection can predisposes waste collectors to accidents and work-related ill-health (Topal, 2011; Athanasiou, Makrynos, & Dounias, 2010; Kuijer and Frings-Dresen, 2017).

On daily bases over 960,000 workers get hurt because of accidents and 5,330 people die because of occupational-related ailments (Hämäläinen, et al., 2009). Solid waste in the urban centres is mostly generated from activities of various sectors (households, health facilities, commercial facilities and other institutions) in our cities or towns (Da, Asnani, Zurbrügg, Anapolsky and Mani 2008). In developing Countries, most cities or town waste contains a lot of human excreta and animal droppings due to poor waste management practice (Da, et al., 2008).

Sanitation workers are not given adequate opportunity to have influence over occupational health and safety policy formulation and resource allocation at the top and local levels, which adversely affect these workers` access to occupational safety and health to guarantee their health in their workplaces (Gong, 2013).

There are several studies conducted on health and safety problems among workers in developing countries like Ghana but these are limited mostly on constructional, mining, sawmilling or wood processing industries. There is little study on occupational health problems among sanitation workers. Also, official estimates are not available for occupational health problem among sanitation workers in the Upper East Region, Ghana. However, anecdotal report indicates of an increasing health problem mainly asthma etc. among sanitation workers at the Bolgatanga Municipal Hospital. Little is known about their health and safety problems in the context of their

work practice and exposure. The hazards available in the work environment exposes these workers to a high risk of health problems, hence the need for this study.

1.3 Research Questions

The research seeks to answer the following questions:

1. What are the hazards sanitation workers are exposed to during work?
2. Which factors are associated with work-related injuries among sanitation workers?
3. What are the occupational health problems encountered by sanitation workers regarding the work they do?
4. What are the occupational health and safety measures put in place by management to protect the health of sanitation workers?

1.4 General Objective of the Study

The main objective of this study is to assess work-related health hazards sanitation workers are exposed to during work in the Upper East Region, Ghana.

1.5 Specific objectives

1. To identify the hazards sanitation workers are exposed to during work.
2. To identify the factors associated with work-related injuries among sanitation workers
3. To determine work related health problems encountered by sanitation workers regarding the work they do.
4. To ascertain the health and safety measures put in place by management to protect the health of sanitation workers.

1.6 Justification

The rights of workers to enjoy maximum physical and mental health around the world is difficult to be achieved as several workforces are still exposed to intolerable levels of occupational hazards and as a result contract occupational diseases and other health-related problems. Most of these workers lacked adequate access to occupational health services (World Health Organization, 2006). Sanitation workers do not have adequate opportunity to have influence over occupational health and safety policy formulation and resource allocation at the central and local levels, which hinder their access to occupational safety and health to guarantee their health in their workplaces (Gong, 2013). This is of great concern and therefore needs to be studied.

There have been anecdotal reports that suggest an increasing health problem mainly asthma etc., among Sanitation Workers at the Bolgatanga Regional Hospital. This calls for an investigation to ascertain the work-related health hazards that sanitation worker in the UER are confronted with. This research therefore seeks to provide relevant information about the work-related health hazards and its related health issues these workers faced in the Region where there has been no prior similar study. This is crucial to the Assemblies and other stakeholders since it will provide relevant information that can be used as an input in planning occupational health and safety management services

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter of the study presents a review of relevant literature regarding work related health problems among sanitation workers. It focusses on the conceptual review, conceptual framework and enforcement of health and safety regulations, empirical review, among others.

2.2 Conceptual Review

Research has revealed that poor solid waste management is an environmental health problem caused by humans. Workers who work to keep public places tidy are exposed to biohazards and safety risks due to the work they do on daily basis (Abdul, Mohamed, & El-wahed, 2018). Hazards are workplace conditions that can adversely affect workers health such as injuries, diseases, or lead to organizational cost (Kohn, 2007). Any activity in the workplace that can cause fatigue, symptoms and injuries related to MSD, or other health problems should be carried out under standard operation procedure. Employees in the course of performing their task are exposed to some of these factors in their jobs (OSH Academy, 2017).

According to ILO, whilst hazards in workplaces are on the increase it is possible new ones may emerge. A concern in the occupational health could also be the risk factors such as stress and psychosocial hazards at workplace and the onset of non-communicable diseases resulting from lifestyle changes and coping behaviours. Also,, many of the world's workforces are faced by persistent health risks in their workplaces, which require lasting solution to ensure a culture of prevention at work (ILO, 2019). Reviewed literatures indicate that employees performing various activities in waste management are vulnerable to certain risk factors (hazards) which are

linked to increase workloads, and poorly organized work schedules may increase the baseline health risk (Das, 2009).

2.3 Conceptual Framework

The conceptual framework for the study is presented on Figure 2.1. The framework illustrates how all the variables associated with health-related problems among sanitation workers. It is observed from Figure 2.1 that, work-related health problems like posture issues, injuries, respiratory conditions, and gastrointestinal problems are influenced by several variables and factors such as work-related health hazards or occupational hazards, socio-demographic factors, other lifestyle factors and as well, measures to protect sanitation workers. The diagram illustrates that these factors or variables are interrelated and a combination of them causes occupational health problems among sanitation workers. For instance, work related health hazards such as physical, biological hazards, ergonomic hazards, among others are often prevalent or severe if there are no measure put in place by management to protect sanitation workers thereby causing serious work-related health problems. Also, inadequate or lack of the right personal protective equipment could worsen or increase the occupational or work-related health hazards which affects the health of sanitation workers. Again, ineffective measures to protect sanitation workers may lead to sanitation workers not supplied with the necessary PPE and equipment and as well, unavailability of PPE may also affect the ability of employers to effectively enforced occupational health and safety measures to protect the health of workers (Puplampu and Quartey 2012).

Moreover, organizational failure to train and communicate to workers on workplace hazards and how to avoid them can have direct negative health effects on sanitation workers (Puplampu and Quartey 2012). They further noted that poor standards and lack of comprehensive legislation and

enforcement have a direct link to occupational injuries and disease among sanitation workers. (ILO, 2019).

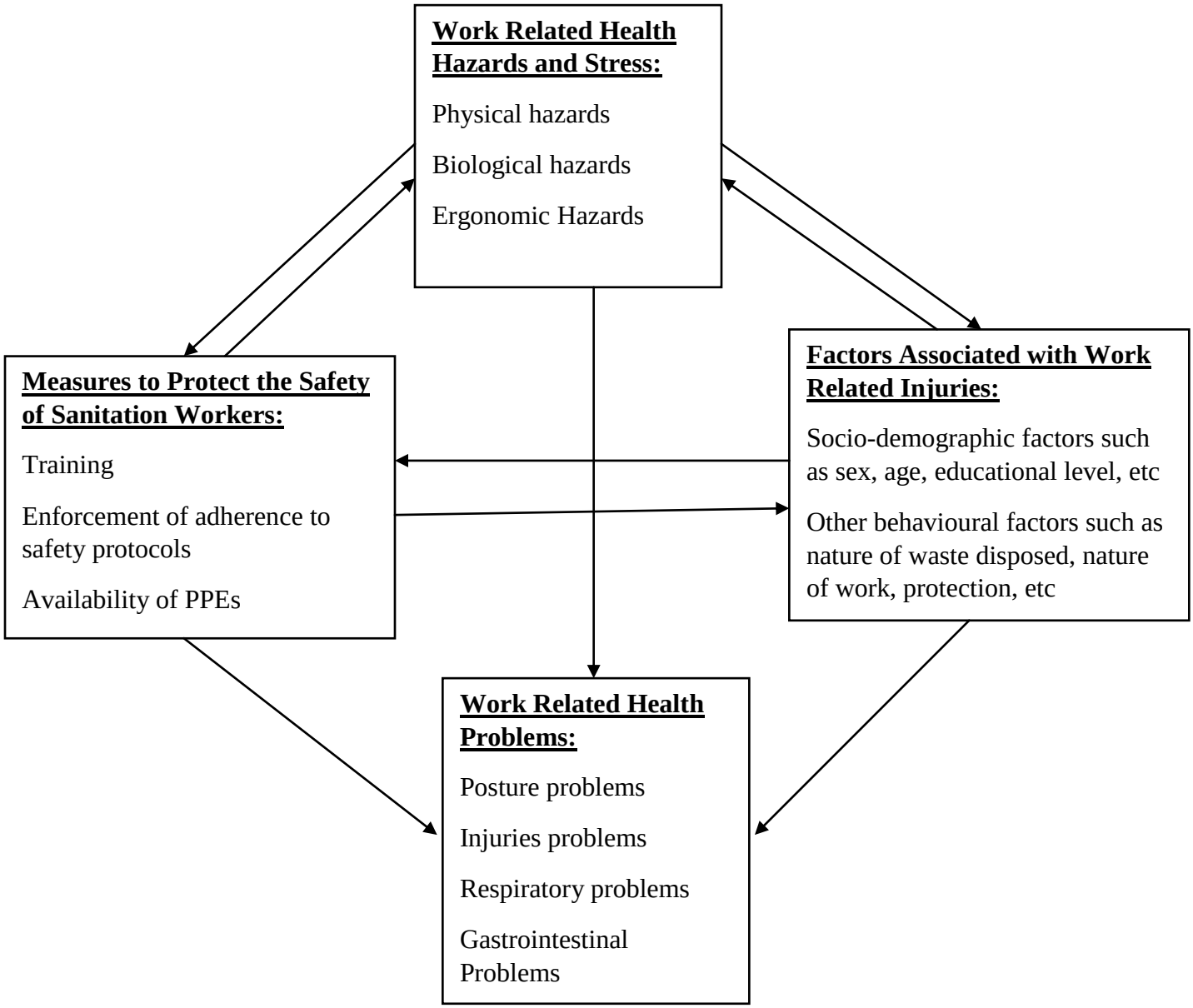

Figure 1: Conceptual framework for Work-related Health hazards among Sanitation Workers

2.4 Legislation and Enforcement of Health and Safety Regulations

Workplace situations have seen significant improvement during the past few years in many parts of the world. However, the global situation remains undesirable. Working conditions for a significant number of workers do not meet the required standards and guidelines for occupational health, safety and social protection. As an example, majority of workers in the world are not served by skilled occupational health services (ILO/FIOH, 2001). Cotton, Sohail & Scott, (2005) revealed that, the institutional and legal governance frameworks on occupational health and safety have little impact in developing countries. Government sectors that have the mandate to enforce occupational health and safety matters do not have the requisite resources to implement health and safety rules because of inadequate resources.

Available statistics from the ILO revealed that, out of every one hundred workers, around five injury and disease cases are recorded per year or around four million, annually. The overwhelming number of workers involved in these accidents are matters of public health concern (Kohn, 2007). Workers around the globe needs to work in good working conditions (independence, fairness, safety and self-esteem) in order to be productive. The ILO`s Decent Work Agenda meant to safeguard the health of workers are highlighted in Core ILO Occupational Safety and Health Conventions including:

- Occupational Safety and Health Convention. 1981 (No 155)
- Occupational Health Services Convention. 1985 (No 161)
- Promotional Framework for Occupational Safety and Health Convention. 2006 (No 187) (ILO, 2015).

Though some countries in the world have develop labour laws but are not able to enforce these laws well. There are also countries that have outdated labour laws, which are in need of review and modification. Due to the limited nature or poor courage of labour laws in most African countries, workers are not adequately protected against occupational accidents and diseases at the workplace (Ghebreyohanne, 2004). Most workplace hazards can be eliminated with primary prevention method (ILO/FIOH, 2001). Safety and health at work environment are fundamental human rights of all employees throughout the world. To ensure that these rights are enjoyed by all workers, countries need to formulate and implement national labour laws and the adoption of global standards on occupational health and safety matters. The government of Ghana has introduced labour Acts and many other policies to safeguard the health of all workers. The Labour Act, for instance, makes it mandatory for employers to implement safety standards at the work environment to protect their workers (Asumeng, Asamani and Afful, 2015), but their enforcement is a challenge in the country.

2.4.1 Health

According to the World Health Organisation (WHO) Study Group Technical Report (1975), health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Health is a way in which one functions within his environment. It includes having no pain or disease-free condition. The employees workplace is a significant part of human total environment, therefore, workers health can be affected by their work conditions (WHO, 2001)

2.4.2 Occupational Hazards

Occupational Hazards according to IFC report are physical, chemical, biological and special hazard environments; a wide range of injuries may occur due to exposure to work activity or exposure to physical hazards in the workplace. The report further noted that exposures to two or more hazards over a long period of time can lead to incapacitating injuries of corresponding significance and consequence. A single acute or chronic exposure to chemical hazards such as toxic, corrosive or oxidative substances are potential for illness or injury.

Biological agents in workplace can adversely affect the health of workers through an acute exposure or chronic exposure. Special hazard settings are work conditions where more than one hazards may exist under exceptional risky circumstances (IFC, 2007). Poor management of solid waste contents (toxic, allergic and infectious substances, others like gases, dust, leachate and hard objects like sharp and nature of the waste) can negatively affect the health of solid waste collectors (Das, 2009). Safety and health hazards have increased in recent times in most work environment due to advance in technology and industrial revolution. (Kohn, 2007)

2.5 Empirical Review

2.5.1 Hazards Sanitation Workers are exposed to During Work

In developing countries, most city solid wastes are dumped on land in an uncontrolled manner. These crude dumping often generate unfriendly and hazardous smoke from slow-burning fire (Da Zhu, Asnani, Zurbrügg Anapolsky & Mani 2008). The activities of sanitation workers are often involved physical handling tasks hence the higher incidents of musculoskeletal disorders (Jerie, 2016).

Sanitation workers are exposed to psycho social hazards followed by physical hazards because of the nature of their activities and work conditions (Abd, Fattah, El, Ali, & Kamel, 2016). In developing Countries, most city waste contains a lot of human faeces and animal droppings due to poor waste management practice (Da, Asnani, Zurbrügg Anapolsky & Mani 2008).

Street sweeping, drainage cleaning or management of communal container sites are necessary activities all around the world and executing these activities expose workers to a variety of hazards (Mehrdad, Majlessi-Nasr, Aminian, Sharifian, & Malekahmadi, 2008).

In developing countries, city solid waste collection is often labour-intensive (lifting, carrying, pulling, and pushing) (Mehrdad et al., 2008). Tidying the streets and public places especially in developing countries is physically demanding activity in nature hence exposing sanitation workforces to a high risk of work-related accidents (Eskezia, Aderaw, Ahmed, & Tadese, 2016)

Citizen complaints to safety authorities indicate that odours serve as a warning of potential risks and may cause health symptoms like nausea, vomiting, chest tightness (Schiffman & Williams, 2009). Individuals involved in managing municipal solid waste may be exposed to higher levels of biological aerosols which can likely result in adverse health problem (Schiffman & Williams, 2009). Sanitation workers are exposed to bad odours and dust. Even when these workers wear protective clothing they still look dusty due to the nature of waste they collect (Ahmed & Fouad, 2018).

The major hazards sanitation workers are exposed to are sharps related injuries (puncher wounds or cuts) and exposure to toxins (Mudalige & Dharmathilake, 2000).

Many disease causing organisms and organic dusts have been found to occur among workers in the cleaning and sanitation industries (Hogstedt & Pieris, 2000).

Exposure to hazards such as noise, vibration, radiations and micro-climatic conditions may negatively affect the health sanitation workers (Hogstedt & Pieris, 2000). Quite a significant number of workers in developing countries may be over burden with physical workload or to awkward working conditions (Hogstedt & Pieris, 2000)

2.5.2 Factors Associated with Occupational Health Problems

According to Giusti, (2009) occupational health problems are linked with every stage of waste management. Workers who involve in managing city wastes could be exposed either directly to hazardous substance in the waste such as vermin, odours and noise or emissions from disposal sites) or indirectly through taken in contaminated food, water or soil during waste management activities. According to Giusti, hazardous substances sanitation workers are exposed to can be (i) severe; short-term exposure to high levels of hazardous substances like bio-aerosols or dusts and (ii) chronic; long-term exposure to low level of hazardous substances. The health of sanitation workers is seriously affected due to exposure to some physical hazards (air pollutants) outside the work environment (Amegah, and Jaakkola, 2016).

Waste poses a lot of health challenges to workers in the waste management industries. The factors responsible for these health risk include:

- The nature and composition of the raw waste that is toxic, allergenic and infectious substances
- The decomposing of waste and the generation of hazardous substances like fumes, dusts among others.
- The sweeping, collecting or transport, processing and disposal of wastes, all can have negative health impact when one is exposed to them. (Cointreau, 2006).

According to ILO report (2005), the world-wide challenge of safeguarding the health and safety of workers is higher nowadays. The degree of the work-related health problem in the world is devastating, and the causes and mechanisms are multiple and complex (Ladou, 2006). Musculoskeletal symptoms among sanitation workers in cities or towns is high due to the long period of service, the demand that comes with the job they do which involves manual activities (lifting, pushing heavy loads or walking) during their daily work along their areas of operation. Also, sanitation workers with low level of education seems to have inadequate knowledge of the hazardous substances at the workplace and their possible effects on their health as they engage in their routine daily sweeping and waste collection activities. The poor working environments of sanitation workers could be perfected through the implementation of safety standards (Abouelwafa *et al.* 2012).

A study conducted by Inyang (2007) indicates that solid waste collectors in Port Harcourt municipality are exposed to various kinds of easy to manage risk factor inherent in their jobs due to their work activities. The effect of the hazards they are exposed to include injuries of all kinds, musculoskeletal and hearing disorders, lung and gastrointestinal disorder. The study also revealed that, workers were given low quality personal protective equipment to use and, in some cases, not all the workers were given. These workers with the protective wears were not using them frequently. There was poor compliance in the use of the PPE because of lack or inadequate monitoring by supervisors or management (Inyang, 2007).

Some of the factors contributing to the adverse health effects of workers in most countries includes weak legislation, poor enforcement of legislation and international transfer of hazardous technologies and goods (WHO, 2006).

Ghana as a country do not have a comprehensive national policy framework on safety standards. Other problems in the OSH are inadequate resource allocation for research, poor inspection, inadequate training and education and low capacity building and monitoring (Puplampu and Quartey 2012).

Low rates of compliance in wearing PPE has a relation with poor safety management system in an organization. Also, ineffective provision of PPE for employees such as provision of substandard quality PPE, poor supervision of PPE usage, lack of enforcement of PPE usage and lack of proper training for employees on the use of PPE are among poor work culture at the workplace (OSH Academy, 2017). Sanitation workers` activities are characterised with overload of work, low involvement in decision making of workers, and low levels of social support which can affect their psychological health and well-being (ILO, 2013)

The problem in the practice of OHS includes poor OHS resources and financing, inadequate number of qualified safety practitioners and lack of adequate information on safety issues in the workplace (Puplampu and Quartey, 2012). Lack of occupational health staffs, poor support from government for regulatory institutions and inadequate institutional frameworks for health and safety standards, lack of comprehensive information concerning occupational safety and health, and lack of qualified safety inspectors have been other drawbacks to the effective and efficient implementation of occupational safety standards and regulation (Kheni, 2008; Ghebreyohanne, 2004).

From the view of Kohn, long working hours, poor work environment, and labour-intensive nature city waste increased the likelihood of injury and illness for employees. Exposure to hazards like high temperatures and levels of humidity can increase workers Fatigue and ultimately reduce the worker`s mental capability to concentrate on an activity. Risk factors such

as heat stress, heat exhaustion, and heatstroke are additional dangers to sanitation workers (Kohn, 2007).

The work-related Health and Safety hazards partially persist in many less developed countries due to unfair striving economic programs established by governments, lack or inadequate regulation and inspection, lack or poor infrastructure for monitoring and services, and inadequate practitioners and institutions for occupational health (Amponsah-tawiah & Dartey-baah, 2015). In support, Quinlan (2015) buttressed that lack of legal protections negatively affects the working conditions of those holding informal jobs like waste collections. Other factors that can affect work-related health and safety in the work environment includes long working hours, poor wages, lack of OSH standards, lack of work injury insurance and lack of incentives (Quinlan, 2015).

A review on a scientific document on psychosocial work factors between 1998 and 2007 established that, workers who are exposed to a combination of work-related issues such as increase work load and others in the work place have an increased chance of harm to their mental health. A combination of risk factors such as high workload and low decision latitude and low rewards are predictors of common mental disorders among workers in the waste management organization (ILO, 2013). An established fact from the Municipal employees in a study in Finland showed that Municipal employees suffered musculoskeletal disorders because of increased physical workload among workers as well as poor incentives for them (Kivimäki, Vahtera, Ferrie, Hemingway, & Pentti, 2001). The fear of job loss and the stigma associated with waste collection may lead to the increase in the occurrence of Musculoskeletal Disorders (Devereux, Rydstedt, Kelly, Weston, & Buckle, 2004). Some employees especially sanitation workers will have to work harder and longer hours to pay off for the lack of human and financial

resources, contributing to physical and mental workload and fatigue.(ILO, 2013). These in real terms can lead to an adverse health effects on employees.

2.5.3 Adverse Health Impact from Exposure to Occupational Hazards

Information from the Bureau of Labour Statistics on occupational injuries and illness cases according to Kohn, (2007) Stands at about four million cases per year. This means that out of every one hundred workers approximately five injury and illness cases occur. The overwhelming accidents cases among workers are a real concern that needs critical attention.

According to Amegah, and Jaakkola, (2016) a study of waste handlers in Port Harcourt Municipality indicate that waste handlers suffer more health problems especially Musculoskeletal Disorders as compare to the general population. The study concludes that workers who have higher serving years in the waste industry and also smoke stand the chance of contracting some health problems.

The ILO in their recent estimates revealed that, the yearly global deaths of the working population is more than two million. This by indication means all is not well in terms of safety and health in the workplace.

- Available records show that, workers who go to work but die due to workplace accidents is approximately 1,000 workers per day
- Minor work related accidents account for more than 300 million per year (ILO, 2015).

ILO reported that around 3 million workers (2.78 million to be exact) die on yearly bases from workplace accidents and diseases as well as 374 million other workers suffering from minor

accidents at the workplace per year (Ryder, 2019b). This, he said, was an unacceptable human cost (Ryder, 2019a). The recent estimates fatalities at the workplace is 2.78 million compared to 2011 figures of 2.33 million. A comparative data on number of deaths occurring as a results of workplace fatal accidents between 2010 and 2014 is 380,500 workforces, representing 8% increase in cases. Number of deaths cases resulting from fatal occupational diseases in 2015 was 2.4 million. This figure compared to 2011 data has an increase in death cases to 0.4 million. Therefore, daily records show that over 7,500 workers die as a results of the work they do; 1,000 of these deaths are accidents occurring from the workplace and 6,500 of the deaths are related diseases contracted from the workplace (Hämäläinen, Takala, & Boon, 2017).

Sanitation workers by nature of their work makes them vulnerable to workplace health problems such as musculoskeletal and hearing problems. This can be blamed on high physical demand of their work. They also stand an increase chance of respiratory and gastrointestinal disorders due to exposure to infectious organic dust from the waste they handle (Kuijer and Frings-Dresen, 2017).

The United Kingdom (UK) report between 2001/02 on waste management organization has an overall accident rate of approximately 2,500 per 100,000 workers compare to the national rate of 559 per 100,000 workers. The findings of the report revealed that;

- Out of every 100,000 workers, 10 workers suffer fatal injuries at work. This is higher than the national rate of 0.9 per 100,000 workers.
- Out of every 100,000 workers, 330 workers suffer major injuries at work. This is higher than the national rate of 101 per 100,000 workers.

- The activities responsible for most accidents among waste handlers in the waste management industries in the UK were refuse collection, loading / unloading and on-site transfer of waste (HSE, 2004)

The largest groups of occupational diseases worldwide are cancers, cardiovascular diseases and infectious diseases (Nenonen & Kaija, Takala & Hämäläinen 2014). In 2015, fatal occupational diseases accounted for over 400,000 cases. Out of this, respiratory diseases represent over 70% of the cases recorded. This makes it the third largest occupational disease after cardiovascular diseases and malignant neoplasms (Hämäläinen *et al*. 2017). Waste handlers in our cities or towns suffer several health problems such as diarrhoea , eye infection, skin irritation, cut wounds, cough and body cramps (Abd *et al.* 2018).

Waste handlers suffer mentally due to increased workload, repetitive work, low job satisfaction, low decision latitude, and inability to cope with job situations. Workers also suffer upper extremity ailments when they are exposed to hazards such as high physical job demands and stigma. Demographic characteristics of employees especially their age, sex, and other risk features make these workers suffer musculoskeletal disorders (Sciences National Academy 2001; Abou-elwafa et al., 2012 and ILO, 2013a). According to Sciences and National Academy 2001 findings on epidemiologic studies revealed a direct association between back disorders and handling of physical load including awkward posture of workers and whole-body vibration.

Health problems among sanitation workers includes skin problems, musculoskeletal, runny nose and cough, diarrhoea, abdominal cramps, nausea, vomiting and headache (Abd, Fattah, El, Ali, & Kamel, 2016). There is a high reported cases of injuries (lacerations, contusions, strain/sprains) and illness among sanitation workers who handle waste in cities or towns (Rogers,et al., 2002).

Musculoskeletal disorder, skin problems, chest pain, body ache, tiredness were experience or reported by cleaning and sanitary workers. It was clear from a survey conducted that sanitation workers are closely associated with various occupational health problems (Ahire & Bhalerao, 2017).

Waste contains a whole lot of hazards that makes it dangerous to handle by waste collectors world-wide. Handling these waste makes waste workers susceptible to certain work related ill health (Das, 2009).

Solid waste handlers in the cities stand the chance of getting injuries and other health problems when they come into contact with infectious or hazardous waste in their workplace (Perez et al., 2006).

Sanitation workers are vulnerable to health conditions like musculoskeletal complains, respiratory disorders, headache, skin problem, gastrointestinal, cough and cold, allergies and malaria during work due to poor work environment (Patil, Kamble, & Ward, 2017b).

According to (Abdou, 2007) most common health issues affecting workers in their workplace are into four categories among which are respiratory health disorder, eye problems, gastrointestinal tract (GIT) disorder, and musculoskeletal disorder (Abdou, 2007). Some specific occupational diseases most waste handlers experience due to the occupational hazards were Back pain, traumatic injuries, itchy rash, and cough (Mudalige & Dharmathilake, 2000). Literature also revealed that allergies, injuries and respiratory problems are among major work-related illness most waste handlers suffer (Ravindra, Kaur, & Mor, 2016).

2.5.4 Control Measures of Occupational Health and Safety Challenges

Interrupting the pathways of diseases as well as injuries can control the likelihood of workers getting infections or injuries. The best solution to some of these health and safety challenges in the waste industries are making waste technologies more contained, reduce emissions of hazardous substances, use of automated technologies, use of PPE (Cointreau, 2006), share of work place safety and hazards information and training of workers on safety can help reduce occupational injuries and diseases (Ryder, 2019b). This satisfy the goal of occupational health which is prevention of ill health through health education, specific protection (equipment and environment), early diagnosis and treatment, disability, limitation and rehabilitation (Adebola, 2014), Hazards inherent in a workplace ideally should be identified, documented, monitored and managed. A good relation between employers and employees is necessary to address psychosocial hazards (trauma, violence, alcohol and drug addiction) at the workplace (ILO, 2013).

To promote health and safety culture at the workplace, contemporary legislation and its strict enforcement, engineering control, awareness creation programmes and services should be effectively implemented (WHO, 2006).

According to Inyang (2007) quality and appropriate protective clothing should be given to workers to use. Workers should be given adequate information on the need to use PPE and also authorities monitored the use of these PPE and workers who fail to use are severely punished to serve as lessons for other workers. Awareness creation programmes should be carried out to sensitise the public on the impact of indiscriminate waste disposal on public health and the best ways to address the menace. There should be a mandatory periodic health surveillance for all waste handlers to detect early signs of health problems (Inyang, 2007).

Waste handlers should go for periodic medical check-ups to determine workers ability to work.. Sanitation workers should be trained on safe handling of work tools and lifting of heavy loads at the workplace (Abou-elwafa et al., 2012).

WHO is of the belief that to achieve the objectives of the Global Strategy on Occupational Health for all, key stakeholders need to take action to safeguard the health of workers by considering the following:

- Establish a new political impetus for primary prevention and management of hazards associated with diseases and injuries occurring in the workplace.
- Ensure consistency in planning, delivery and evaluation of essential health interventions at the workplace, and stimulate the development of occupational health services for all workers
- The health sector needs to be empowered to advocate for addressing workers health issues through policies on employment, social and economic development, trade and environmental protection (World Health Organization, 2006).

Promoting safety practices in the work environment supported by appropriate national policies and programs will help safeguard workers health and safety at the work environment (ILO, 2003).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter looks at the methodology adopted for the research. These takes care of the study design, sources of data, sample population, sample determination, data analysis and presentation. It further looked at the instruments employed in the research and their application as well as reliability.

3.2 Research Design

A descriptive cross-sectional study design was employed in this work using quantitative study method to collect data. The questionnaire for the study consisted of both open and close-ended questions. The questionnaires were administered to the sanitation workers in the three municipalities of the Upper East Region, Ghana.

The managers or supervisors of the sanitation workers in the study area who have technical knowledge on OHS were also interviewed using semi-structured questionnaire. The administered questionnaire for the research work was preferred for this research. The study was conducted between the months of January 2019 to November, 2020.

3.3 Study Area

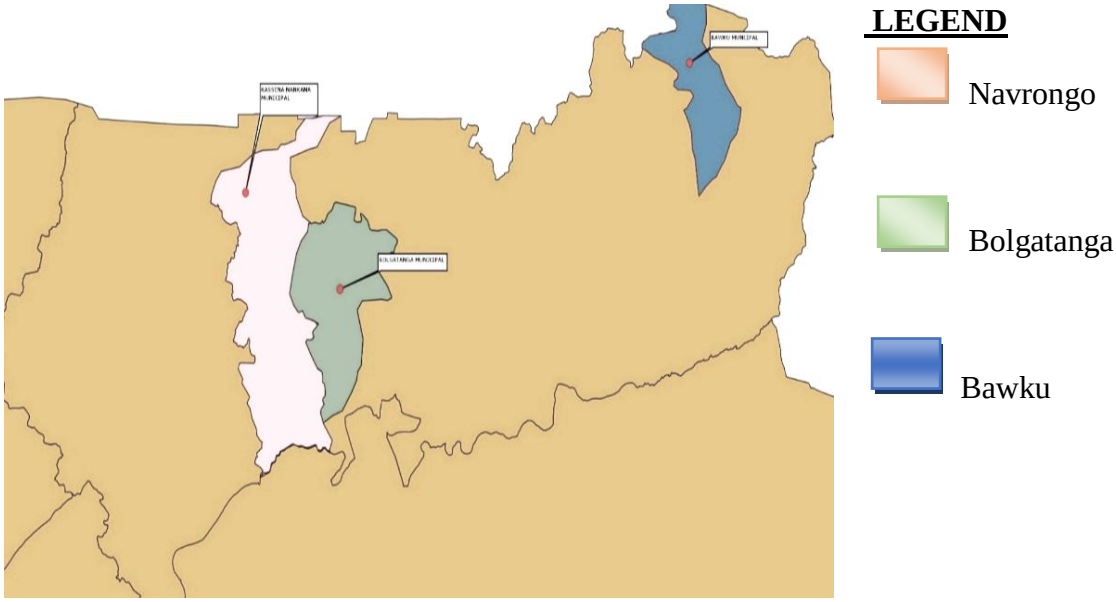

Figure 2: Map of the Study Areas

The research was carried out in the Upper East Region, taking samples of respondents from three municipalities namely, Bolgatanga Municipality, Bawku Municipality and Kassena Nankana Municipality. According to the 2010 Population and Housing Census, Bolgatanga has a total population of 131,550 with 62,783 males and 68,767 females, Bawku population has a total of 98,538 with 47,254 males and 51,284 females and Kassena Nankana municipal total population of 109,944 with 53,676 males and 56,268 females. The three municipalities therefore have a total population of 241,082.

The Bolgatanga Municipality bordered Bongo, Bolgatanga East, Talensi and Kassena Nankana Municipal to the North, East, South and West respectively. Bawku Municipality bordered Burkina Faso, Togo, Bawku West District and Garu District to the North, East, West and south respectively. The Kassena Nankana Municipality bordered Bongo District and Bolgatanga

Municipal to the East. West Mamprusi Municipal to the South, Builsa South District to the West and Kassena Nankana West District, Builsa North District and Burkina Faso to the North.

3.4 Study Population

The target group for the study was sanitation workers in three Municipalities and sanitation workers in Zoomlion Ghana limited Upper East Region. All the sanitation workers in the municipalities (Government and Zoom-lion) stand at a total of 720. Out of this, 86 were from government and 637 from Zoom-Lion. The study targeted all the 720 sanitation workers whose core mandate is to keep the cities clean. All managers/supervisors who have knowledge on OHS and supervise the daily activities of these workers were interviewed.

3.4.1 Inclusion criteria

Sanitation workers, with job experience of minimum one year and were working in Bolgatanga, Bawku and Kassena Nankana Municipality were included in the study. Those, who agreed and signed the consent form were considered to be part of the study.

3.4.2. Exclusion criteria

Those who were indispose and those who refused to give consent were excluded from the study.

Table 3.1: Sampling frame

	Zoom-Lion Ghana Ltd	Municipal Assembly	
Study Area	**Target Population**	**Target Population**	**Total**
Bolgatanga	179	32	211
Bawku	182	40	222
Kassena Nankana East	276	11	287
Total	637	83	720

3.5 Sample Size Estimation

A sample size of two hundred and fifty-eight (258) respondents was selected; this sample size was selected from each sub-group which was proportional to that sub-group in the entire population (self-weighting). With this method, individual respondent of the group has the same chance of been selected. Three Municipal Zoomlion Managers and three Municipal Environmental Health Officers) who supervise the work activities of these workers were considered in the study. The responses from these managers and supervisors were used to ascertain exactly what management has in place with regards to safety and health measures for their employees, while the responses from the workers were used in evaluating work-related health problems faced by these sanitation workers.

The sample size was calculated using Yamane (1967:886) formula with a 95% confidence level and Precision of 0.05.

$$n = \frac{N}{1 + N(e)2}$$

where **n** is the sample size, **N** is the total population of sanitation workers, and **e** is the level of precision. When this formula is applied to the above sample;

$$n = \frac{720}{1+720(0.05)2}$$

$$n = \frac{720}{2.8}$$

n = **257.14**

n≈ **<u>258</u>**

To select individual respondents, proportions were determined from the sample size for the two organisations in the three municipalities. For instance, the sample population was obtained by dividing the stratum for each organization by 720 and multiplying the result by 258, therefore the formula is: [Stratum÷ Population Size] × Sample for the study

For instance, from the Bolgatanga Municipal Zoom-lion`s sanitation workers where there are 179 employees therefore the formula is: [Stratum÷ Population Size] × Sample for the study. (179 ÷ 720) × 258 =64

Table 3.2: Sample size

S/N	Municipality	Zoom-lion Ghana ltd (n)	Government Sanitation Workers (n)	Total
1	Bolgatanga	(179 ÷ 720) × 258 =64	(32 ÷ 720) × 258 =12	76
2	Bawku	(182 ÷ 720) × 258 =65	(40 ÷ 720) × 258 =14	79
3	Kassena Nankana	(276 ÷ 720) × 258 =99	(11 ÷ 720) × 258 =4	103
Total		**228**	**30**	**258**

3.6 Sampling Technique

The research techniques considered for this work includes stratified sampling, simple random sampling and purposive sampling method. A simple random sampling was used to select the individual respondents. With the stratified sampling technique, the researcher segmented all the sanitation workers into two strata. That is Zoom-lion Ghana Ltd and the Government Sanitation Workers. All these categories of sanitary workers in the three municipalities were 720 in total. This segmentation was necessary because two different organizations were involved; Private organization and Government organization. Six (6) managers or supervisors three each from the two organizations. That is, 3 Municipal Zoomlion Managers and 3 Municipal Environmental Health Officers. The responses from these managers and supervisors were used to validate the responses of the sanitation workers and also, ascertain exactly what management has in place with regards to occupational health and safety services. The purpose of the study was explained to the study respondents and the questionnaire thoroughly explained to them as well.

3.7 Key Variables

Table 3. 3: Key Variables used in the study

Demographic variables	Age, sex
Socioeconomic variables	Level of Education, Monthly salary, former job, Part Time Job
Lifestyle variables	Smoking and alcohol
Job characteristics	Years of work experience, Length of work durations, nature of employment, training before joining job, Handling of waste
Safety measures	Use of PPE
Hazards	Physical, biological and ergonomic hazards
Reported health problems	Injuries, Musculoskeletal disorders, Respiratory disorders. Gastrointestinal disorders, Skin disorders, Eye problems. Work related health issues are measured by Self responded

3.8 Quality Control

The research questionnaire was tested at the Bongo District to determine the suitability of it. After the pre-test, the necessary corrections of the questionnaire were done. Training was provided for research assistants to enable them effectively administer the questionnaire to respondents for accurate information that is relevant for the study. The data was checked and cleaned after collection to ensure that uncompleted questions were discarded and completed ones were arranged well.

3.9 Data Collection, Processing and Analysis

Data was gathered by the administration of questionnaire that was adapted from (Das, 2009). Most of the questions were modified to suite the research work. Well trained data collectors translated the questionnaires into local languages to the best of the understanding of the study group in the presence of an independent witness where the recruited participant cannot read and write. Structured questionnaires and field observation checklist were used to collect the data. The data collected was edited, collated to eliminate errors and coded for analysis using STATA version 15 software. The coded data was analysed quantitatively.

Demographic and socioeconomic background of respondents:

The information on demographics was obtained using descriptive statistics such as frequencies, percentages and means and presented using frequency tables, and figures).

Hazards sanitation workers are exposed to during work:

The general hazards sanitation workers are exposed to during work was grouped into three types including physical, biological and ergonomic hazards. The multiple response analysis was used in identifying these factors. The frequency, percent of responses and percent of cases were obtained from the multiple response analysis and the mean scores of the respective factors regarding their degree of severity.

A three (3) point Likert scale was used to solicit information for the degree of severity of the factors identify. The scale was such that 1 stands for not severe, 2 stands for severe, and 3 stands for very severe. The results on the severity were interpreted such that the higher the mean score

on for a factor, the more such factor is severe among respondents the lower the mean score, the less severe such factor is. The mean score ranges between 1 and 3.

Factors associated with work related injuries among sanitation workers:

The simple linear regression model was used to determine the factors associated with job related injuries among sanitation workers. The variables used in the model are described on Table 3.2.

Table 3.4: Description of variables used in the model

Variable	**Measurement**
Dependent Variable:	
Injuries	1= Yes, 0 otherwise
Independent Variables:	
Sex	1= Male, 0 otherwise
Age	Years
Smoking Habit	1= Yes, 0 otherwise
Drinking Habit	1= Yes, 0 otherwise
Main job description	1= Sweeping, 0 otherwise
Training	1= Yes, 0 otherwise
Observance of safety procedure	1= Yes, 0 otherwise
Nature of Waste Disposal	1= well disposed, 0 otherwise
Work Experience	Years
Time spent at work each day	Hours

Health problems encountered by sanitation workers because of the work they do:

The multiple response analysis was also used to analyse the health problems encountered by sanitation workers because of the work they do. The health problems were grouped into four namely; posture problems, injury problems, respiratory problems, and gastrointestinal problems. The frequencies, percent responses and percent of cases were computed for each variable or health problem use the multiple response data.

Measures put in place by management to protect sanitation workers:

For the control and prevention measures put in place by employers to guard sanitation workers, descriptive statistics was also used in analysing the objective. The three (3) point Likert scale was used to solicit information from respondents regarding the implementation of the measures. The scale was set such that 1 stands for not implemented, 2 stands for partially implemented, and 3 stands for very fully implemented. The frequencies from the various responses to these variables were computed and used in estimating the percentages. The results were interpreted such that the implementation of each measure was determined using the majority of respondents rating the measures based on not implemented, partially implemented and fully implemented.

3.10 Ethical Consideration

Ethical clearance was sought from the Ghana Health Service Ethics Review Board. All data was handled confidentially. Only investigators of this study were privy to the data. Research information will not be disclosed to third parties who are not directly included in the study and was used purely for academic purposes. The study objectives and procedures were carefully explained in English and the local language to the sanitation workers before they were enrolled.

A written informed consent was obtained from eligible Sanitation workers. Questionnaire was administered to those who agreed to participate and satisfy the inclusion criteria. They were informed that; they were at liberty of quitting from the study at any point time. A pre-test voluntary counselling was done, permission and consent was sought from the managers of these sanitation workers as well as the works themselves before questionnaire was administered to them.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the results and discussions of the study. The results are presented using Tables and Figures. The results are presented under sections including the demographic and socioeconomic characteristics of sanitation workers, hazards sanitation workers are exposed to during work, factors responsible for occupational injuries among sanitation workers, health problems encountered by sanitation workers as a result of the work they do and as well as measures put in place by management to protect sanitation workers against work-related health problems.

4.2 Demographic and Socioeconomic Background of Respondents

This section presents the results and discussions on the demographic and socioeconomic background of respondents. The results are presented on Tables and Figures which follows the interpretation and discussions of the results. Section 4.2.1 presents the results for the demographic background of respondents while section 4.2.2 presents the results for the socioeconomic background of respondents.

4.2.1 Demographic Background of Sanitation Workers

The demographic background of respondents captures the age distribution, educational background, sex, marital status and religious background of respondents (sanitation workers).

Age Distribution of Sanitation Workers

Table 4.1 presents the results for the age distribution of respondents. It is observed from the Figure that majority of sanitation workers representing 46.5% were within the age group of 40-49 years followed by those within the age group of 30-39 years which represents 25.6% of sanitation workers. The least age group was those above 60 years which represents 0.8% of sanitation workers. The results generally revealed that a significant number of the sanitation workers were within the active age group for which their system may be able to resist the negative effects that come with their work hazards. It is also observed from Figure 4.1 that no sanitation worker was below the age of 18 years which implies that all sanitation workers were within the legal working age group and that there were no minors engaged in sanitation work.

Educational Background of Sanitation Workers

The result on the educational background of sanitation workers is presented on Table 4.1. The Figure showed that majority of sanitation workers have no formal education. This is represented by 39.9% of sanitation workers. Also, about 38.8% of sanitation workers had primary education whiles only 0.4% had secondary education. The results also revealed that no sanitation worker had tertiary education. It is clear from the results that, sanitation workers generally are not formally educated and those who had formal education only had primary education and probably dropped out of school. Generally, sanitation work especially sweeping, collection of waste, among others, are often left to those without higher or formal education. Their work is regarded us dirty work for most people. Also, workers with little or no formal education may not comply with all the safety measures in preventing the negative effects of the health hazards they are

exposed to. Some of them may not even appreciation the relevance of putting on personal protective equipment when carrying out their risky and hazardous work.

Sex Distribution of Sanitation Workers

This section presents the results and discussions on the sex distribution of sanitation workers. The results presented on Table 4.1 revealed that majority of the sanitation workers were females representing 64.7. Male sanitation workers were only 35.3%. Most sanitation work is regarded by many people from the north as work for women especially in respect to sweeping and general cleaning and therefore men often shy away from taking up sanitation work as their mainstream job. However, women who are generally vulnerable in society and do not have equal opportunities like men are often left with no option than to pick up sanitation work. Women services are mostly required in jobs that pay less with little skills and possibly casual in nature. The activities these women do are physical demanding, repetitive, long working hours and ergonomically unacceptable (FIOH, 2001).

Marital Status of Sanitation Workers

The result on the marital status of respondents is presented on Table 4.1. It is observed from the Table that majority of the sanitation workers were married. This is represented by 89.9% of sanitation workers. The results imply that most of these sanitation workers have other marital engagements such as taking care of children and spouses.

Religious Background of Sanitation Workers

The results presented on Table 4.1 revealed that most of the sanitation workers in the Upper East region, Ghana were Christians, followed by muslins and finally by traditionalist. Christians

represents 65.1% of sanitation workers. The Upper East region has more Christians than the other religions which might account for the higher percentage of sanitation workers being Christians.

Table 4.1: Results on the Demographic Background of Sanitation Workers

Category	Frequency	Percent
Age		
20-29 Years	27	10.5
30-39 Years	66	25.6
40-49 Years	120	46.5
50-60 Years	43	16.6
Above 60 years	2	0.8
Total	258	100
Education		
Primary Education	100	38.8
JHS Education	54	20.9
Secondary Education	1	0.4
No Formal Education	103	39.9
Total	258	100
Sex		
Male	91	35.3
Female	167	64.7
Total	258	100
Marital Status		
Married	232	89.9
Separated	18	7
Single	8	3.1
Total	258	100
Religious Background		
Christianity	168	65.1
Muslim	67	26
Traditionalist	23	8.9
Total	258	100

(Source: Field Survey, 2020)

4.2.2 Socioeconomic Background of Respondents

The socioeconomic background of respondents captures the incidence of cigarette smoking, main job description of sanitation worker, number of years worked as sanitation workers, and the length of time spent at work each day.

Incidence of Cigarette Smoking among Sanitation Workers

Smoking of cigarette have negative health effects on the human health system and persons engaged in smoking are more susceptible in contracting a lot of heart diseases which may not necessarily come from the health risk they often come into contact. The results on whether sanitation worker ever smoked cigarette or not is presented on Table 4.2. The Figure Showed that majority of the sanitation workers have never smoked cigarette. This is represented by 92% of sanitation workers while only 8% have ever smoked cigarette. Out of the 8% who have ever smoked cigarette, less than 5% currently smokes cigarette. Those who smoke cigarette were mostly men. None of the female workers ever smoked cigarette. The results generally implied that incidence of cigarette smoking was not prevalent among sanitation workers which means that it could not compound to their risk of getting diseases. However, those who smoke cigarette coupled with the hazards they are exposed to at work may stand a high risk of contracting several illnesses especially with regards to respiratory diseases among others.

Main Job Description of Sanitation Workers

This section presents the results and discussions on the main job description undertaken by sanitation workers. The results presented on Table 4.2 revealed that majority of the sanitation workers (72.1%) engaged in sweeping. The majority of workers who engage in sweeping are often exposed to various health hazards such as inhaling of dust, mosquito and insect bites, snake

bites, among others. Also, the sanitation workers may not be much exposed to dust especially in the rainy season but may also be exposed to mosquito bites, inhalation of poisonous chemicals, rotten solid waste, among others which can affect their health. Those engaged in drainage of gutters may also face similar health hazards.

Number of years worked as sanitation worker

The results presented on Table 4.2 on the number of years sanitation workers worked as sanitation workers revealed that majority of the sanitation workers (68.2%) have worked between 2-5 years. Only 17.8% have worked as sanitation workers for less than two years. The results generally showed that few workers have worked up to 10 years and that majority of the workers have less than 5 years of work experience. Because these workers have not worked for long as sanitation workers, the effects of some of the hazards they are exposed to may not manifest now but may manifest in the future.

Length of time spent at work each day

It is observed from Table 4.2 that sanitation workers spend between 3 to 10 hours each day at work. However, majority of the sanitation workers (84.9%) spend between 3 and 5 hours each day at work doing either sweeping, refuse collection or cleaning drainage. These workers often start their work early dawn and close in the morning. Their schedule at work gives them the opportunity to do other extra economic activities such as farming in the raining season, petty trading, night watchmen, and craft work, among others.

Table 4.2: Results on the Socioeconomic Background of Sanitation Workers

Category	Frequency	Percent
Incidence of Cigarette Smoking		
Ever Smoke	21	8
Never Smoke	237	92
Total	258	100
Main Job Description		
Street sweeper	186	72.1
Drainage and refuse laborer	72	27.9
Total	258	100
Number of years worked as sanitation worker		
Less than 2 years	46	17.8
2 -5yrs	176	68.2
6 -10yrs	20	7.8
11 -15yrs	10	3.9
>15yrs	6	2.3
Total	258	100
Length of time spent at work each day		
3-5 hours	219	84.9
6-7hrs	33	12.8
8-10hrs	6	2.3
Total	258	100

(Source: Field Survey, 2020)

4.3 Hazards Sanitation Workers are exposed to During Work

This section presents the results for the first specific objective of the study which seeks to find out the hazards sanitation workers often come into contact during work. Waste handlers are exposed to several hazards during work because of the nature of work they do. The study therefore identifies which among the several hazards are greatly felt or experienced by sanitation workers. It also determines the degree of severity of these factors as experienced by sanitation workers. The general hazards sanitation workers are exposed to during work have been grouped into three categories including physical, biological and ergonomic hazards. The multiple response analysis results are presented on Table 4.3. The results include the frequency, percent of responses and percent of cases from the multiple response analysis and the mean scores of the

respective factors regarding their degree of severity which ranges between 1 and 3, where 1 implies not severe and 3 implies very severe. The results are interpreted and discussed under each of the three groups of hazards sanitation workers are exposed to during work.

4.3.1 Physical Hazards

The study found dusts, noisy environment/ exposure, higher temperature, shocks, and vibration to be the physical hazards sanitation workers are exposed to during work with percent responses of 46.8%, 29.2%, and 22.8%, 0.8% and 0.4% respectively.

4.3.2 Biological Hazards

On the biological hazards, the study discovered that the main biological hazards for which majority of respondents identified were bacteria (78.3% of respondents), mosquitoes bites (73.3% of respondents), and allergies (60.1% of respondents).

4.3.3 Ergonomic Hazards

Also, the study found that the topmost and most significant ergonomic hazards to be lifting loads, holding work equipment/tools, bending, and pushing wheel barrow with percent of cases of 86.3%, 81.6%, 70.3% and 64.8% respectively.

Table 4.3: Multiple Response Analysis Results on the Hazards Sanitation Workers are exposed to During Work

Hazards	Frequency	Percent of responses	Percent of cases	Mean score for Degree of severity
Physical hazards				
Dusts	242	46.8%	96.0%	2.3
Noisy environment/ exposure	151	29.2%	59.9%	2.7
High temperatures	118	22.8%	46.8%	1.4
shocks	4	0.8%	1.6%	1.2
vibration	2	0.4%	0.8%	1.2
TOTAL	517	100.0%	205.2%	
Biological hazards				
bacteria	202	29.9%	78.3%	2.1
Mosquitoes bites	189	28.0%	73.3%	2.8
allergies	155	23.0%	60.1%	2.5
Other Insects bites	79	11.7%	30.6%	2.7
snake bites	20	3.0%	7.8%	1.9
viruses	13	1.9%	5.0%	1.1
bad odour	9	1.3%	3.5%	1.1
fungi	8	1.2%	3.1%	1.1
TOTAL	675	100.0%	261.6%	
Ergonomic hazards				
lifting loads	221	21.60%	86.30%	2.67
holding work equipment/tools	209	20.40%	81.60%	2.50
bending	180	17.60%	70.30%	2.80
pushing wheel barrow	166	16.20%	64.80%	1.72
walking	105	10.30%	41.00%	1.20
standing	61	6.00%	23.80%	1.30
squatting	51	5.00%	19.90%	2.21
eye strain	20	2.00%	7.80%	1.20
repetitive motion	10	1.00%	3.90%	1.11
TOTAL	1023	100.00%	399.60%	

(Source: Field Survey, 2020)

4.4 Factors Associated with Work-Related Injuries among Sanitation Workers

Sanitation workers are usually encounter occupational injuries because of the nature of job they perform at work. Their job which involves sweeping, draining or de-silting of gutters, collection and carrying of refuse coupled with the manner in which their employers treat them, often come with a lot of injuries and stress. The second objective of the study seeks to determine the factors

that are associated with the work-related injuries encountered by sanitation workers. This section therefore presents the results on the factors that are responsible for occupational injuries among sanitation workers.

From the regression results, it is observed that the R squared value of 0.17 connotes that about 17.7% of the variations in the factors responsible for occupational injuries is accounted for by the regresses (explanatory variables). Also, the F Statistic value of 1.67 is significant at 10% significance level which shows that the binary linear regression model is best fit for the analysis and that the results can be relied upon in making conclusions and generalizations regarding the factors associated with occupational injuries among sanitation workforces. The dependent variable is injuries while the independent variables are; sex, age, smoking habit, drinking habit, main job description, training, non-observance of safety procedures nature of waste disposal, work experience, and time spent at work each day.

The results revealed that the variables that are significantly associated with work-related injuries among sanitation workers were; sex, age, main job description, non-observance of safety procedure, work experience, and time spent at work each day. Sex has a negative regression coefficient of -0.203 and at 10% significance level. It implies that females were more likely to encounter work-related injuries compared to males. Age has a positive relationship with injuries (0.091) and significant at 10% significance level. This implies that older sanitation workers were more prone to injuries compared to the younger ones. Main job description has a negative relationship with injuries (-0.123) and significant at 10% significance level which implies that those workers who engage in collection of refuse and draining of gutters were more prone to injuries compared to those who sweep.

For non-observance of safety procedure, it has a positive relationship with injuries (0.085) and significant at 5% significance which implies that those who do not observe safety procedures were more likely to be injured compared to those who observe. Also, work experience has a negative relationship with injuries (-0.174) and significant at 5% significance level. It implies that those with relatively less work experience on the sanitation work were more likely to be injured compared to those with relatively higher work experience. Finally, on the time spent at work each day, it has a positive relationship with injuries (0.548) and significant at 1% significance level. This implies that the more time one spends at work each day, the more the person is likely to be injured compared to those who spend less time.

Table 4.4: Regression Results on the Factors Associated with Work-Related Injuries among Sanitation Workers

Variable	Coef.	Std. Err.	t	P>t
_cons	2.08	0.681	3.055	0.003
Sex	**-0.203**	**0.113**	**-1.802**	**0.073**
Age	**0.091**	**0.05**	**1.83**	**0.068**
Smoking Habit	-0.105	0.182	-0.577	0.565
Drinking Habit	-0.027	0.129	-0.206	0.837
Main job description	**-0.123**	**0.071**	**-1.73**	**0.085**
Training	0.01	0.041	0.241	0.81
Non-observance of safety procedure	**0.085**	**0.043**	**1.999**	**0.047**
Nature of Waste Disposal	0.041	0.041	0.994	0.321
Work Experience	**-0.174**	**0.074**	**-2.353**	**0.019**
Time spent at work each day	**0.548**	**0.136**	**4.022**	**0**
R Square = 0.177, Adjusted R Square = 0.14, F Stats =1.627				

4.5 Health Problems Encountered by Sanitation Workers Regarding the Work they do.

This section of the study presents the results and discussions on the third specific objective of the study which seeks to determine health problems encountered by sanitation workers regarding the

work they do. When it comes to high-risk jobs, sanitation workers are often left out as much attention is not given to them but, the work they do is associated with a lot of health problems. As already established in the previous findings of this study, sanitation workforces often come into contacts with several hazards and occupational stress and these factors have devastating impacts on the health of sanitation employees. This section therefore presents the results and discussions on these health problems encountered by sanitation workers as a result of the work they do. The health problems encountered by sanitation workers have been categorised under four thematic areas for the purposes of analysis and discussions. These include; posture problems, injuries problems, respiratory problems and gastrointestinal problems. The discussions are presented under each specific health problem. The joint report of ILO/WHO indicate that in addition to work related deaths, occupational accidents and work-related illness are also recorded on yearly bases with around 340 million and 160 million respectively (ILO & WHO, 2019).

4.5.1 Posture Problems

On posture problems, the study revealed that sanitation workers encountered general body pains, backaches, neck problems, and muscle related problems. However, based on the percent of cases, the topmost and most significant posture problems encountered by most sanitation workers with majority percent cases were general body pains (percent of cases=93.7%), and backaches (percent of cases=70.9%). The rest of the posture problems were encountered by few sanitation workers representing less than half the population.

4.5.2 Injuries Problems

The study revealed that sanitation workers encounter several specific work-related injury problems. These include; cutting injury, puncture wound, strain/sprain, fracture, contusion

(bruise) and cut and lacerated. However, it is observed from Table 4.5 that the topmost injuries problems encountered by most sanitation workers in the course of their work which has majority percent cases were cutting injury (percent of cases=76.2%) and puncture wound (percent of cases=68.6%). The rest of the injury problems (strain/sprain, fracture, contusion (bruise) and cut and lacerated) were not common among most sanitation workers even though some workers have encountered them in some occasions.

4.5.3 Respiratory Problems

Sanitation workers experience several respiratory problems due to work-related hazards. They include; chest tightness, dry cough, itching nose, running nose, cough with phlegm, sore throat, sneezing and asthma. However, the most common respiratory health problem encountered by most sanitation workers based on the percent of cases were chest tightness (percent of cases=71.2%), and dry cough (percent of cases=57.6%).

4.5.4 Gastrointestinal Problems

The most significant gastrointestinal problems encountered by most sanitation workers based on their wide spread and number of sanitation workers affected were vomiting (percent of cases=64.4%) and diarrhoea (percent of cases=52.1%).

Table 4.5: Multiple Response Analysis Results for the Health Problems Encountered by Sanitation Workers Regarding the Work they do

Health Problem	Frequency	Percent	Percent of Cases
Awkward Posture			
General body pains	222	44.4%	93.7%
Backaches	168	33.6%	70.9%
Neck problems	55	11.0%	23.2%
Muscle related problems	55	11.0%	23.2%
Total	500	100.0%	211.0%
Injuries			
Cutting injury	80	41.0%	76.2%
Puncture wound	72	36.9%	68.6%
Strain/sprain	27	13.8%	25.7%
Fracture	9	4.6%	8.6%
Contusion (Bruise)	5	2.6%	4.8%
Cut and Lacerated	2	1.0%	1.9%
Total	195	100.0%	185.7%
Respiratory Problems			
Chest tightness	84	35.0%	71.2%
Dry cough	68	28.3%	57.6%
Itching nose	48	20.0%	40.7%
Running nose	17	7.1%	14.4%
Cough with phlegm	11	4.6%	9.3%
Sore throat	9	3.8%	7.6%
Sneezing	2	0.8%	1.7%
Asthma	1	0.4%	0.8%
Total	240	100.0%	203.4%
Gastrointestinal problem			
Vomiting	47	35.1%	64.4%
Diarrhea	38	28.4%	52.1%
Burning Pain in abdomen (APD)	19	14.2%	26.0%
Typhoid	17	12.7%	23.3%
Dysentery	13	9.7%	17.8%
Total	134	100.0%	183.6%

(Source: Field Survey, 2020)

4.6 Health and Safety Measures Put in Place by Management to Protect the Health of Sanitation Workers

This section of the study presents the results on the health and safety measures put in place by management to protect the health of sanitation workers. There are several protective measures that can be put in place by management of these sanitation companies or organizations to protect

sanitation workers from any health issues. However, the extent to which these measures are implemented varies from company to company for which the study seeks to determine their level of implementation. The measures include; provision of the right equipment for work, provision of Personal Protective Equipment (PPE), safety training on first employment, management ensuring PPEs are used, regular monitoring of workers on safety standards, effective supervision by supervisors, availability of staircases at communal container sites, in-service training on safety and health practices, punishment for non-compliance, availability of medical service for first aid and treatment, reporting system on health and safety issues at work, and medical examination on employees before starting work. The sanitation companies are expected to fully implement these measures to ensure that the hazards that sanitation workers are exposed to maybe minimize to avoid work-related injuries and general health problems.

The results as presented on Table 4.6 revealed that most of the measures which were expected to be implemented by these sanitation companies were largely rated "not implemented". For instance, when it comes to the provision of the right equipment for work, about 97% of the sanitation workers rated it "not implemented" which implies that sanitation workers were not given the right equipment for sweeping, draining gutters, collecting garbage, among others. For the provision of Personal Protective Equipment (PPE) to sanitation workers to protect themselves, majority of the sanitation workers representing 84% rated it "not implemented". When it comes to safety training on first employment, about 76% which represents the majority of sanitation workers, rated it as "not implemented".

Also, for management ensuring that PPEs are used at all times in the course of their work (sanitation workers), majority of the sanitation workers representing 89% rated it as "not implemented". Again, for measure such as regular monitoring of workers on safety standards,

effective supervision by supervisors, availability of staircases at communal container sites, and in-service training on safety and health practices, majority of sanitation workers representing 77%, 88%, 78% and 88% respectively rated them as "not implemented". For punishment for non-compliance, only 34% of sanitation workers agreed that it was "not implemented". However, majority them represented 63% rated it as "partially implemented" while about 2% rated as "fully implemented".

With regards to preventive safety measures such as availability of medical service for first aid and treatment, reporting system on preventive issues at work, and medical examination on employees before starting work, majority of respondents representing 78%, 77% and 89% respectively, rated them as "not implemented".

Table 4.6: Results on the Health and Safety Measures Put in Place by Management to Protect the Health of Sanitation Workers (figures in percentages)

Safety measures	Not Implemented	Partially Implemented	Fully Implemented
Provision of the right equipment for work	78	19	3
provision of Personal Protective Equipment	84	11	5
Safety training on first employment	76	23	1
management ensuring PPE are used	89	8	3
Regular monitoring of workers on safety standards	77	19	4
Effective supervision by supervisors	88	9	3
availability of staircases at communal container sites	78	19	2
In-service training on safety and health practices	88	10	3
punishment for non-compliance	34	63	2
Availability of medical service for first aid and treatment	76	20	3
Reporting system on health and safety issues at work	89	8	3
Medical examination on employees before starting work	85	12	3

(Source: Field Survey, 2020)

CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

Sanitation workers are exposed to various kind of health hazards in the workplace. These workers are responsible for keeping the cities and towns clean to promote public health. In the process, they get exposed to several health hazards and other safety issues. The study therefore assesses work-related health hazards faced by sanitation workers in the Upper East Region, Ghana. This chapter therefore presents the discussions of the results presented on chapter four. The study assessed work-related health hazards or problems among sanitation workers in the Upper East Region, Ghana. The discussions are summarised under each specific objective outlined.

5.2. Hazards Sanitation Workers are exposed to During Work

This section presents the discussions on the first specific objective of the study which seeks to find out the health hazards sanitation workers are often come into contact at their work environment. Sanitation workers are exposed to several hazards during work because of the nature of work they do. The study revealed that sanitation workers in the Upper East Region are exposed to physical hazards, biological hazards and ergonomic hazards. Literature revealed that waste collection and disposal exposed sanitation workers to a variety of biological, chemical, mechanical, physical, and psychosocial hazards (Mehrdad et al., 2008).

5.2.1 Physical Hazards

The results revealed that the top three physical hazards sanitation workers are exposed to during work were dusts which was rated number one, followed by noisy environment/ exposure, and to higher temperature. The rest of the physical hazards were uncommon among most sanitation

workers as they scored very low percent responses. Similarly, other studies showed that on daily bases, workers world-wide experience several health hazards in the workplace. Some of which are exposure to excessive dusts, gases, noise, vibration and high temperatures (Topal, 2011).

As the study revealed earlier that majority of the sanitation workers were engaged in sweeping, it is obvious that sweeping comes with a lot of dusts especially in the dry season which can have negative health effects on sanitation workers. Inhaling dust all the time at work can cause a lot of health problems especially with regards to respiratory problems. Workers who are asthmatic may have to eventually leave the job because of the potential danger it can caused them. The exposure of sanitation workers to dust requires that these workers are given well equipped PPE and are made to wear them during work so as to minimize the impacts it can have on their health. However, the field visits to these workers during the survey period revealed that majority of the sanitation workers were not using PPE such as wearing of nose mask during work even in the era of COVID, 19. This was due to the unavailability of the PPE and in some cases, deliberate refusal by sanitation workers to wear them.

On the issue of noisy environment/ exposure and higher temperature, it was discovered most of workers work environments were by the roadsides where vehicular movements and honing from these vehicles generate a lot of noise which has a hearing impairment on them in the long-term. The use of ear protective devices could help reduce the impact of this physical hazard at the work environment. Also, those who sweep during the day and those who drain the gutters and collect refuse during the day are often exposed to the scorching sun. Performing a stressful job under higher temperatures especially that of the Northern part of Ghana in the heat seasons poses a lot of health risk to the sanitation workers. Working early in the morning or late night to avoid high temperature exposures also comes with other biological risk such as mosquito bites, snake

bites, among others which makes it difficult for sanitation workers to minimize their exposure to heat or high temperature during work.

5.2.2 Biological Hazards

The study found that topmost biological hazards sanitation workers are exposed to during work were bacteria, mosquito bites and allergies. Similarly, a survey conducted by Hogstedt and Pieris indicated that Many biological agents such as viruses, bacteria, parasites, fungi and organic dusts have been found to occur among workers in handling cities` wastes (Hogstedt & Pieris, 2000).

Sanitation workers are often exposed to bacteria, fungi and viruses which come from the waste they sweep and collect from public places for safe disposal. This is explained by the fact that most street refuse contains a lot of human faecal matter and animal droppings especially in most developing Countries (Da Zhu, Asnani, Zurbrügg Anapolsky & Mani 2008, Ahmed & Fouad, 2018)

These workers need adequate and appropriate PPE to safeguard their health in dealing with the cities and towns waste.

Sanitation workers are exposed to mosquito bites because they often carry out their work either late night or early dawn at the time in which mosquitoes are active and pose some danger to them. As indicated earlier, some work at night to avoid the heat during the day time and this makes them exposed to mosquito bites due to lack of proper protection. The study discovered that some sanitation workers do not protect themselves from mosquito and other insect bites due to inadequate access to these protective materials or equipment. The incidence of mosquito bites is often prevalent in the wet season between May and November each year.

5.2.3 Ergonomic Hazards

The work of sanitation workers involves the lifting of loads, holding of work equipment/tools, bending, and pushing wheel barrow full of refuse. This is in line with already existing knowledge that most workers in developing countries may be exposed to heavy physical workload or to poor ergonomic working conditions such as lifting, moving of heavy items or repetitive manual tasks and working from awkward positions (Hogstedt & Pieris, 2000; Jerie, 2016; Mehrdad et al., 2008 & Amedofu, 2002).

Field observation revealed that most of the tools such as shovels, rakes among others were faulty causing the workers to work from awkward position. Using of faulty equipment during work exposes workers to injuries. In carrying out their job by performing these activities, the sanitation workers are exposed to several injuries especially with regards to their muscles which may lead to deformation of some parts of their body among others. Because their work is done manually with little or no automated support systems, they often use their strength and muscles to lift these heavy loads which sometimes can even affect the spines. The study discovered that most of the refuse were collect manually using man power. Reviewed literatures indicate that, workers performing various task in the waste industries are exposed to some potential hazards due to high workloads and poorly organised work for workers. This in effect increases the baseline risk of these workers (Das, 2009).

5.3 Factors Associated with Work-Related Injuries among Sanitation Workers

Inadequate personal protective equipment is a major challenge among sanitation workers in the Upper East Region, Ghana and according to the sanitation workers and the results from the analysis, it a significant factor which is associated with work-related injuries. When sanitation workers are ill protected, they are often vulnerable to the various hazards that come with their

job. These hazards cause injuries in various forms to the sanitation workers. The study discovered that sex, age, main job description, non-observance of safety procedure, work experience, and time spent at work each day were the significant variables related with injuries sanitation workers suffered in their workplace in the Upper East region of Ghana. This is in line with some existing knowledge that demographic characteristics of employees especially their age, sex, and other risk features make them suffer musculoskeletal disorders (Sciences National Academy 2001; Abou-elwafa et al., 2012, ILO, 2013a and Amedofu, 2002).

Female sanitation workers are often more vulnerable and stand the chance to suffer injuries in the course of their work. Work that involves a lot of strength and physic do not often favour females as compared to their male counterparts. Also, older workers who are often weak are more susceptible to injuries and hence, were more likely to encounter injuries compared to the younger ones. Moreover, the aspect of the sanitation work which involved the collection of refuse and draining of gutters were more prone to injuries compared to sweeping. Improper disposal of waste by residents is another factor connected with injuries among sanitation workers in the workplace. The study discovered that some residence does not have waste bins to properly collect and segregate their waste for onward collection and disposal by the sanitation workers. Also, some of the residence who have waste bin do not segregate the waste they generate thereby mixing all sorts of waste together which cause injuries to the sanitation workers during waste collection, transportation and disposal. In some cases, refuse and waste materials are often left scattered on the floor for sanitation workers to gather and in the process, get exposed to several hazards which may cause some forms of injuries to the sanitation workers.

For non-observance of safety procedure, it was discovered that those who do not observe safety procedures were more prone to injuries compared to those who observe. The study discovered

that, some sanitation workers did not wear PPE during work due to lack of or inadequate access to safety wears. Similarly, different literatures are showing the same regarding to unsatisfactory access to and use of safety equipment by sanitation workers (Mudalige & Dharmathilake, 2000).

Some sanitation workers have to use their own resources in purchasing these PPE for their personal protection and self-interest. The other sanitation workers who could not afford these PPE risk their lives by working without protection and thereby exposing themselves to various forms of work-related injuries. Some of these injuries caused by inadequate protection ranges from shapes punching to cutting injuries.

Also, work experience significantly influences injuries which implies that those with relatively less work experience on the sanitation work were more likely to be injured compared to those with relatively higher work experience. Not all the sanitation workers are often taken through on-the-job training or refresher courses on waste management and safety precautions before embarking on their job. There is this notion that anybody at all is capable of sweeping, drainage cleaning, collecting refuse and at large being a sanitation worker and therefore management of sanitation companies do not see the need to spend resources training their workers. This attitude from management leave most sanitation workers to their faith in terms of safety percussions among others. Those with little or no experiences often get injured on the job.

5.4 Health Problems Encountered by Sanitation Workers Regarding the Work they do.

This section of the study presents the discussions on the third specific objective of the study which seeks to determine health problems encountered by sanitation workers regarding the work they do. When it comes to high risk jobs, sanitation workers are often left out as much attention is not given to them but the work, they do is associated with a lot of health problems. As already

established in the previous findings of this study, sanitation workforces are exposed to several hazards and occupational-related stress and these factors have devastating effects on the health of sanitation workers. The discussions are presented under each specific health problem. The joint report of ILO/WHO indicate that, in addition to work-related mortalities, workers also suffer occupational accidents and occupational-related illnesses with a recorded figures of around 340 million and 160 million respectively per year (ILO & WHO, 2019).

5.4.1 Posture Problems

For general body pains, the results showed that about 93.7% of sanitation workers have been encountering general body pains as a result of the work they do. A similar survey conducted indicates chest pain, body ache and tiredness as some health issues experienced by municipal wastes sweepers or collectors (Ahire & Bhalerao, 2017).

The work sanitation workers do involve hard physical work which makes them develop body pains as a result. The study discovered that some sanitation workers resort to taking pain killers on regular basis to reduce the pains.

Automation and mechanization of sanitation work would be the way forward to reducing these health problems but these were almost non-existent at the time of the survey. It is also observed from Table 4.5 that general body pains account for 44.4% of the posture problems encountered by sanitation workers. General body pains therefore represent the largest posture problems encountered by sanitation workers.

For specific backaches problems, the results showed that about 70.9% of sanitation workers experience backaches as a result of the work they do. Similar survey conducted indicates

musculoskeletal disorder, chest pain, body ache, tiredness as some health issues reported by sanitation workers (Ahire & Bhalerao, 2017). The act of bending to sweep, pushing loads of refuse using the wheelbarrow, among others cause backaches among sanitation workers. From the results presented on the percent of responses, backaches represent the second most encountered posture problem with percent of responses being 33.6%. This implies that backaches account for 33.6% of all the posture problems encountered by sanitation workers as a result of the work they do.

5.4.2 Injuries Problems

The multiple response analysis results presented on Table 4.5 shows that sanitation workers encounter several specific work-related injury problems. These include; cutting injury, puncture wound, strain/sprain, fracture, contusion (bruise) and cut and lacerated. However, it is observed from Table 4.5 that the topmost injuries problems encountered by most sanitation workers in the course of their work which has majority percent cases were cutting injury (percent of cases=76.2%) and puncture wound (percent of cases=68.6%). The rest of the injury problems (strain/sprain, fracture, contusion (bruise) and cut and lacerated) were not common among most sanitation workers even though some workers have encountered them in some occasions. . This is in line with already existing knowledge that sanitation workers reported high rates of lacerations (cuts), punctures, contusions, strain/sprains, and illness in their workplace (Rogers, Englehardt, An, & Fleming, 2002 and Mudalige & Dharmathilake, 2000)

For cutting injury, a percent case of 76.2% implies that about 76.2% of sanitation workers have encountered cutting injuries in the course of their work. This is as a result of the dangers they are exposed to at the work. Most of these injuries also occur because sanitation workers are not often

well protected especially with regards to the wearing of hand gloves, and safety footwear, among others during work. The research team observed during the field survey that some sanitation workers were not well protected and so were exposed to the hazards that come with their work. These exposers will usually lead to the sanitation workers encountering health problems such as injuries. Cutting injuries account for majoring of injury problems encountered by sanitation workers. From Table 4.5, it accounts for 41% of the injury problems encountered by sanitation workers as shown on the percent of responses.

Puncture wound has a percent case of 68.6% which implies that about 68.6% of sanitation workers have ever encountered puncture wounds in the course of their work. Puncture wounds accounts for 36.9% of all the injury problems encountered by sanitation workers in the Upper East Region, Ghana. As indicated earlier these injuries mostly occur because of poor protection among sanitation workers due to inadequate supplies. The survey discovered that some sanitation workforces resort to buying their own PPE (nose masks and hand gloves) to help minimize their exposer to these hazards that leads to puncture injuries.

5.4.3 Respiratory Problems

Most respiratory problems associated with sanitation workers occur due to the dusts, they come into contact with. The study earlier identified dust to be the major physical health hazard sanitation workforces are exposed to and as a result, exposure to dust without proper protection may lead to the development of chest tightness, itching, nose, dry cough, among others. Wearing of face mask which is mandatory due to the fast spread of the COVID-19, was not adhered to by some sanitation workers during the survey. Some of these PPE were in short supplies from management of the sanitation companies. Similarly, different studies reported that chest pain,

cough and cold, allergies as the most common type of respiratory problems (Ahire & Bhalerao, 2017, Patil, Kamble, & Ward, 2017 and Abdou, 2007).

5.4.4 Gastrointestinal Problems

The results imply that about 64.4% of sanitation workers have encountered vomiting because of their exposure to the hazards associated with their work whiles 52.1% have encountered diarrhoea. The results further showed that vomiting accounts for 35.1% of the gastrointestinal problems encountered by sanitation workers which represents the majority whiles diarrhoea accounts for 28.4% representing the second highest. In support of this finding, Abd, Fattah, El, Ali, & Kamel (2016) in their research study indicates that sanitation workers experienced diarrhoea, abdominal pains, nausea and vomiting as the most common type of gastrointestinal problems. Vomiting and diarrhoea could occur because of the presence of bacteria and other biological hazards in the waste handled by these categories of workforces.

5.5 Health and Safety Measures Put in Place by Management to Protect the Health of Sanitation Workers

The results revealed that most of these measures which are expected to be implemented by these cleaning and sanitary industries were largely rated “not implemented”. It was observed that, most sanitation workers were not given the right equipment for sweeping, draining gutters, collecting garbage, among others. It is worth to note that some of these sanitation workers would have to always improvise at times to ensure that the work is done. They still use outmoded and worn out tools and equipment for their work which may not guarantee their health and safety. Also, in some instances, sanitation workers would use their hands or sticks in gathering and collecting

refuse, among others. Literature revealed that only 30.0% of sanitation workers were given the personal protective equipment to work with (Ahmed & Fouad, 2018).

It was discovered that management of the sanitation workers were unable to provide adequate PPE for their workers to protect themselves. This however is a bad practice by management which may lead to sanitation workers endangering their lives in the course of their work since these sanitation workers do not have enough resources to personally purchase these PPE. An observation on the field revealed that most of the sanitation workers were not well protected in the course of their work. There were violations of the wearing of face/ nose mask, safety gloves, safety boots, safety goggles, and safety overall coats. According to the sanitation workers, management provides them only nose mask, safety gloves, and safety boots but were not in adequate supply. They sometimes get some of these PPE at most once in a year.

When it comes to safety training on first employment, it was revealed that the sanitation workers do not feel that they were given adequate safety training on their first employment. Safety training ensures that sanitation workers are able to acquire in-depth knowledge on how to go about with the work in such a safe manner to avoid work-related health problems. This is to help protect workers from endangering their health. Literature revealed that 30.0% of the employee don't receive any form of orientation on hazards related to waste collection or handling before the start of their activities (Ahmed & Fouad, 2018). Also, insufficient OHS education has been one of the challenges to occupational health and safety practices to workers (Ghana Health Service, 2007)

Also, for management ensuring that PPEs are used at all times in the course of their work (sanitation workers), it was not fully implemented. This implies that management of sanitation

workers were unable to ensure that PPE are used at all times by sanitation workers in the course of their work. It is obvious that management could not ensure the use of PPE by sanitation workers because they were unable to provide them with enough supplies. Cotton, Sohail & Scott, (2005) revealed that, the institutional and legislative frameworks on occupational standards in less developed countries are ineffective. State institutions mandated to formulate and enforce safety standards do not have the needed resource to formulate and enforce health and safety regulations.

Again, for measure such as regular monitoring of workers on safety standards, effective supervision by supervisors, availability of staircases at communal container sites, and in-service training on safety and health practices, were not fully implemented. The implication is that effective supervision on safety compliance, staircases at communal container sites, and in-service training on safety and health practices were not carried out or implemented effectively and that these measures may only be existing in principle but not in practice. Due to the unavailability of staircases at communal container sites, sanitation workers especially those in charge of refuse collection and those at refuse container sites often find it difficult pouring the refuse into the containers and end up injuring themselves and getting contaminated with the bacteria and others hazardous substances found in the waste materials. Also, lack of proper monitoring on the adherence to safety standards implies that sanitation workers are left on their own to do their work and may want to pass through short cuts in accomplishing their job without adhering to safety measures which may have a devastating effect on their health.

For punishment for non-compliance, only 34% of sanitation workers stated that it was “not implemented” However, majority of sanitation workers represented 63% rated it as “partially implemented” while about 2% rated as “not implemented”. The results imply that when it comes

to punishment for noncompliance of safety protocols, management of the sanitation companies were effective in implementing it. This happens especially when a sanitation worker involved in a work-related health problem or injuries which suggest that the worker did not conduct him or herself very well in terms of observing the safety protocols. They are usually threatened to be sacked or suspended for some time even though it may not be the fault of the sanitation worker. Due to discomfort, some sanitation workers often violate some safety protocols even when they have the necessary tools, equipment and PPE. Wearing of nose mask and safety gloves is often abused and violated by some sanitation workers even when they receive these PPE.

Protective measures such as availability of medical service for first aid and treatment, reporting system on work-related health problem at work, and medical examination on employees before starting work, were not fully implemented. The implication is that, management of these sanitation workers were unable to effectively implement issues relating to first aid tool kits for workers in case of injuries, reporting system for work-related health problems as well as medical examination of sanitation workers before they start work. Further, it shows that when it comes to measures set up by authorise to effectively respond to the health needs of the sanitation workers to protect them from health-related problems, management do not effectively implement such measures. Sanitation workers are not mostly involved or consulted to contribute to policy formulations and resource distribution at various levels in a country hence, their inability to improve access health and safety standards at work place (Gong, 2013). Other challenges hampering the smooth execution of health and safety legislation at work including lack of adequate knowledge among workers on potential hazards and their connections to health problems and lack of qualified inspectors to conduct workplace inspection to ensure compliance (Kheni, 2008; Ghebreyohanne, 2004).

Most developing countries are not able to effectively implement the safety policy because of lack of effective regulatory system, lack of accurate information on work-related health problems, and non-availability of basic professional training in the health and safety sector (Mostafa and Momen, 2014). Ghana as a country lack detailed nationwide health and safety policy to provide occupational health and safety guidelines for its workforces (Asumeng, et al., 2015). Ghana`s OHS legal requirement are not up to standard because they are under different jurisdictions with unclear roles and responsibilities (Annan et al., 2015).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of findings, conclusion and recommendation. The study assessed Work-Related Health Problems among Sanitation Workers in the Upper East Region, Ghana. The findings are summarised under each specific objective outlined.

6.2 Conclusion

The study concludes that the sanitation workers in the Upper East Region, Ghana were exposed to several work-related hazards including physical hazards (dusts, noisy environment/ exposure, higher temperature, shocks, and vibration), biological hazards (bacteria, mosquitoes bites and allergies) and ergonomic hazards (lifting loads, holding work equipment/tools, bending, and pushing wheel barrow).

Also, the study concludes that several factors were associated with work related injuries including; sex, age, main job description, non-observance of safety procedure, work experience, and time spent at work each day.

On the issue of the health problems sanitation workers encounter because of the work they do, the study concludes that sanitation workers encounter posture problems (general body pains, backaches, neck problems, and muscle related problems), injury problems (cutting injury, puncture wound, strain/sprain, fracture, contusion (bruise) and cut and lacerated) respiratory problems (chest tightness, dry cough, itching nose, running nose, cough with phlegm, sore throat, sneezing and asthma) and gastrointestinal problems (vomiting and diarrhoea) in the course of their work.

The study concludes that with the exception of punishment given out to sanitation workers for non-compliance of safety protocols, all the measures that were expected to be implemented by management of the sanitation companies or organizations were not fully implemented. This phenomenon further exposes sanitation workers to health problems as a result of the work they do.

6.3 Recommendations

All the stakeholders especially government, managers and employers have certain responsibilities to ensure workers take up periodic medical check-ups. Relevant authorities are to ensure engineering and safety legislative interventions are effectively implemented to make the work environment safer for sanitation workers. Legislative and regulatory policy may reduce occupational health related health problems and improve compliance with Occupational Health and Safety regulation (Andersen et al., 2019). The waste workforces are susceptible to hazards in their workplace and hence there is a need to protect them through policies and laws formulation and enforcement (Ravindra, et al., 2016)

Administrative measures such as Job rotation, attractive remunerations, prompt payment of salaries, provision of effective and efficient equipment are some interventions that can help reduce work related stress and injuries among sanitation workers.

Sanitation workers should be adequately trained on safety matters in relation to the work they are employed to do before they can commence work. Workers should be given adequate information on issues related to their work and taught on how important it is for them to adequately protect themselves from preventable hazards by constant use of quality and appropriate PPE during work (Ahmed & Fouad, 2018).

Employers or management should ensure that work practices in the waste industries are in line with occupational health and safety standards. To guarantee appropriate work practices, management should ensure workers receive adequate training on potential health hazards related to their work, provide adequate and appropriate personal protective equipment for these workers as well as enforcement of compliance (Patil et al., 2017).

Management and employers also need to play their roles well to protect workers from possibly contact to hazards by providing adequate and appropriate PPE and working tools for workers to work with. All other safety guidelines should be fully adhered to by all stakeholders (International Finance Corporation (IFC), 2007)

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APPENDICES

APPENDIX I: PARTICIPANT INFORMATION FORM

Title of study: Work-related Health Problems among Sanitation Workers in Three Municipalities of Upper East Region.

Introduction

The researcher is a postgraduate student of the School of Public Health, University of Ghana, Legon. As part of the program, we carry out research work. This work is to assess the Work-related Health Problems among Sanitation Workers in Three Municipalities of Upper East Region. Occupational injuries and diseases are major health issue because it is prevalent and can lead to death. It is therefore important that this work is done to look at some of the causes of these injuries and work-related health problems and how to address them from occurring.

The outcome of this study is will provide information which will be useful in planning different packages to address the need of sanitation workers.

Purpose of the study

The study aims at assessing the work-related health problems and its predictors among Sanitation Workers in The Three Municipalities of Upper East Region.

Eligibility criteria

Sanitation workers, with job experience of minimum one year and are working in Bolgatanga, Bawku and Kassena Nankana Municipality will be included in the study. Those who agreed and signed the consent form will be included in the study. However, sanitation workers who are indispose and those who refuse to consent are not legible to take part in the study.

Study Procedures

As part of the study, a short interview will be conducted to obtain the contact information, age, sex, highest educational level, ethnicity and religious affiliations. Also, there would be questions on knowledge about work place hazards and other safety problems faced by sanitation workers in their workplace.

A data collector with deep knowledge of the local language translated the questionnaire in the presence of a witness into the language of respondents especially to those with no or less education. This would be done in the location of choice of 10 - 20 minutes of each person's time.

Risks and Benefits

By participating in this research, any possible risk that may occur in the form of any distress will lead to the participants participating in the study being ended. Also, the results of the study will help formulate policies that will help improve occupational safety and health measures to safeguard the health of sanitation workers in the Region.

Freedom to participate/ Voluntary withdrawal

Your participation in this study is completely voluntary. If at any time, you are unwilling to respond to a question or you so desire to discontinue you are free to do so. Your decision will not result in any penalty. Also, refusing to participate would not affect you. Participant opinions and experiences are important to us, so we want you to be honest and truthful in answering our questions.

Privacy and Confidentiality

Kindly note that all your responses will be treated as private. The researcher and his supervisor conducting this research are the only people that will have access to the information you provide. Your responses will be numbered or coded and to ensure confidentiality and privacy we will not mark any of the questionnaires with study participant's names.

Protection of subjects' privacy

Participants do not have to answer any questions that they feel are an invasion of their privacy. Also, subjects do not have to participate in any particular aspects of the study that they find invasive.

The data collected will be destroyed at the conclusion of this study. Study survey forms (hard copy) will be destroyed at the end of the study.

Dissemination of Results

The study results after analysis has been done will be communicated to the study participants. Participants of the study will be assembled at the Municipal Assembly levels on a fixed day, after which the results of the study will then be made known to them.

Before taking Consent

Do you have any questions you wish to ask about the study? Yes/No

(If yes, please indicate the questions below)

……

Who to Contact:

In cases of any questions regarding the research, you can contact: Ghana Health Service/ Ethical Review Committee administrator: Nana Abena Apatu (mobile: 0503539896)

Dr. Mawuli Dzodzomenyo, School of Public health, University of Ghana, Legon

Mobile number: +233 (0)208376845 Email: mdzodzomenyo@ug.edu.gh /

APPENDIX II: CONSENT FORM

STUDY PARTICIPANTS (SANITATION WORKERS)

It is my pleasure meeting you today despite your busy schedules. Charles Yinbil Awuni is my name and would like to enquire from you about some work-related health problems you faced due to the work you do and some associated causes of those health problems. This interview will take less than an hour. All responses will be kept private. This means your responses to the research questionnaire shall not be disclosed to any thirty party apart from the researcher and his supervisor. Be informed that, you are at liberty to end the interview at any time if so desire.

Are there any questions about what I have just explained? Are you willing to participate in this interview?

YES / NO

Interviewee Witness Date _____

PARTICIPANTS' STATEMENT

I admit that I am adequately informed on the purpose and details of this study. Also, the Participant Information Sheet was read and adequately explained to me in my local dialect (Kusaal, Kassem or Guurine). I have an in-depth knowledge of the contents and any potential implications as well as my free will to stop participating in the study even if I have signed this form.

I willingly agree to be part of this study.

Name or Initials of Participant……..ID Code ……..

Participants' Signature ……OR Thumb Print…… OR Mark (Please specify)…….

Date:…….

INTERPRETERS' STATEMENT

The Participants' Information Sheet was adequately explained to the best of my ability in the local dialect (Kusaal, Kassem or Guurine) to the understanding of participants.

All clarities required by participant for a better understanding of the study were properly explained to his/her satisfaction.

Name of Interpreter……

Signature of Interpreter…….. Date:……

Contact Details

STATEMENT OF WITNESS

I was present at the time the Participant Information Sheet (purpose and content) was read and adequately explained to the participant in the Kusaal, Kassem or Guurine language, he/she understood.

I approve that participant was given the chance to ask questions and same were duly answered to his/her satisfaction before willingly agreeing to be part of the study.

Name: ……

Signature……. OR Thumb Print ……..... OR Mark (please specify) ……..

Date: ……

INVESTIGATOR STATEMENT AND SIGNATURE

I attest to the fact that the participant has been given sufficient time to read and learn about the study. All issues raised by the participant were adequately addressed.

Researcher's name…….

Signature …….

Date…….

STUDY PARTICIPANTS (SUPERVISORS OF SANITATION WORKERS)

It is my pleasure meeting you today despite your busy schedules. Charles Yinbil Awuni is my name and would like to enquire from you about some work-related health problems you faced due to the work you do and some associated causes of those health problems. This interview will take less than an hour. All responses will be kept private. This means your responses to the research questionnaire shall not be disclosed to any thirty party apart from the researcher and his supervisor. Be informed that, you are at liberty to end the interview at any time if so desire.

Are there any questions about what I have just explained? Are you willing to participate in this interview?

YES / NO

Interviewee Witness Date _____

PARTICIPANTS' STATEMENT

I admit that I am adequately informed on the purpose and details of this study. Also, the Participant Information Sheet was read and adequately explained to me to my understanding. I have an in-depth knowledge of the contents and any potential implications as well as my free will to stop participating in the study even if I have signed this form.

I willingly agree to be part of this study.

Name or Initials of Participant……..ID Code ……..

Participants' Signature ……OR Thumb Print…… OR Mark (Please specify)…….

Date:…….

INVESTIGATOR STATEMENT AND SIGNATURE

I attest to the fact that the participant has been given sufficient time to read and learn about the study. All issues raised by the participant were adequately addressed.

Researcher's name…….

Signature …….

Date…….

SANITATION WORKERS DATA COLLECTION TOOL

This questionnaire is being administered by a student of University of Ghana, Legon offering a master of public health. The research topic is **`Work-Related Health Problems among Sanitation Workers in Three Municipalities of Upper East Region`**. Be assured of confidentiality as this piece of work is purely for academic purpose. kindly respond to the questions with sincerity by cycling or filling in the spaces provided

Thank you for agreeing to participate in this important research project.

A: General Information

Questionnaire Number	
Participants Contact number	
Contact information of interviewer	
Name of interviewer	
Date of interview	
Place of interview	

SECTION-A

BIODATA PROFILE AND PERSONAL HABIT OF SANITATION WORKERS

1a. What is your Sex? [1] Male [0] Female

2a. What age group (yrs.) do belong to? [1] < 20 [2] 20-29 [3] 30-39 [4] 40-49 [5] 50-60 [6] > 60

Please state the number of years ……..

3a. What is your marital Status? [1] Married [2] Separated [3] Single

4a. What is your level of Education? [1] No Education [2] Primary Education [3] JHS Education [4] Secondary Education [5] Tertiary Education

5a. What is your religious background? [1] Christianity [2] Muslim [3] Traditionalist [4] Atheist

6a. Please do you ever smoke cigarette: [1] Yes [0] No

7a. Currently do you smoke cigarette: [1] Yes [0] No

8a. Please do you drink Alcohol: [1] Yes [0] No

9a. Past history of illness: …….

10a. Main job description: [1] Street sweeper [2] Drainage and Refuse labourer

[3] Please (Other specify) …….

11a. what other main economic activity do you engage in? **(multiple responses allowed)** [1] Farming [2] Sand winning [3] night watchman [4] None

[4] Please (Other specify) ……..

12a. Number of years worked as sanitation worker: [1] 1yr [2] 2 -5yrs [3] 6 -10yrs [4] 11 -15yrs [5] >15yrs

Please indicate the exact number of years …….

13a. Time spent at work each day: [1] 3-5 hrs [2] 6-7hrs [3] 8-10hrs [4] >10hrs

Please indicate the exact number of hours ……..

14a. Sleeping disorder: [1] Yes [0] No

SECTION B

OCCUPATIONAL HAZARDS SANITATION WORKERS ARE EXPOSED TO DURING WORK.

This section of the questionnaire seeks to assess the hazards you are exposed to during work.

1b. Kindly indicate your judgment for each of the following statements stated below. Please tick (√) in the right column under the 3-point Likert scale, with ***1- Not Severe, 2- Severe, 3- Very Severe***

NS	Statement	Yes=1 No=2	Not Severe	Severe	Very Severe
	Physical hazards				
P1	High temperatures				
P2	Noisy environment/ exposure				
P3	Radiation exposure				
P4	vibration				
P5	shocks				
P6	Dusts				
	Other, (please specify)				

	Biological hazards				
B1	bacteria				
B2	viruses				
B3	fungi				
B4	snake bites				
B5	Other insects bites				
B6	allergies				
B7	Mosquitoes bites				
B8	bad odour				
B9	other (please specify)				
	Ergonomic hazards				
E1	lifting loads				
E2	holding work equipment/tools				
E3	pushing wheel barrow				
E4	walking				
E5	squatting				
E6	bending				
E7	standing				
E8	repetitive motion				
E9	eye strain				

2b. How do you handle the waste you collect? [1] manually [2] mechanically

3b. How effective are your working tools? [1] very poor [2] poor [3] fair [4] good

SECTION C

FACTORS RESPONSIBLE FOR WORK RELATED INJURIES

This section of the questionnaire seeks to assess the factors responsible for work related injuries

C1. Have you received training on waste management and how to go about your work?

[1] yes [0] no

C2. Do you observe all the safety procedures in performing your work?

[1] yes [0] no

C3. How are waste disposed by residence for collection?

[1] well-disposed [0] not well disposed

C4. Kindly indicate your judgment for each of the following reasons stated below as factors responsible for injuries associated with your work. Please tick (√) in the right column under the 5-point Likert scale, with ***1- strongly disagree, 2- Disagree, 3- Neutral, 4- Agree and 5 – strongly agree***

NS	**Factor**	**1**	**2**	**3**	**4**	**5**
I1	lack of visibility around truck					
I2	Insufficient training					
I3	non-observance of safety procedure					
I4	Nature of work					
I5	Improper disposal of waste by residents					
I6	inadequate personal protective equipment					
I7	defective personal protective equipment					
I8	lack of job rotation					
I9	poor supervision by managers					

SECTION D

WORK-RELATED HEALTH PROBLEMS ENCOUNTERED BY SANITATION WORKERS REGARDING THE WORK THEY DO

1d. Does your posture at workplace cause any pain in the body? [1] Yes [2] No

2d. If yes, which of the following do you suffer? **(multiple responses allowed)** [1] General body pains [2] Backaches [3] Neck problems [4] Muscle related problems [5] Others (Please specify) ……

3d. Did you suffer any work-related injury in the past? [1] Yes [2] No

4d. If yes, what type of injuries have you suffered over the past six months? **(multiple responses allowed)**

[1] Cutting injury [2] Puncture wound [3] Contusion (Bruise) [4] Cut and Lacerated [5] Fracture [6] Strain/sprain [7] Other (please specify) …….

5d. Have you ever contracted respiratory problem(s) as a result of the work you do? [1] Yes [2] No

6d. If yes, what kind of respiratory problem(s) did you experience? **(multiple responses allowed)**

[1] Dry cough [2] Cough with phlegm [3] Chest tightness [4] Itching nose [5] Running nose [6] Sneezing [7] Wheeze [8] Wheeze and breathlessness [9] Sore throat [10] Asthma [11] Chronic Bronchitis [12] Chronic Obstructive Pulmonary Disease (COPD)

7d.

d8……..

.....

8d. Which of these gastrointestinal problem (s) did you suffer in the past due to the nature of your work? **(multiple responses allowed)**

[1] Vomiting [2] Diarrhoea [3] Dysentery [4] Worm infestation [5] Burning Pain in abdomen (APD) [6] Typhoid [7] Others, please specify …….

9d. Have you suffered any skin problem in the last one year due to exposure to workplace

hazards? [1] Yes [2] No

10d. If yes, what kind of skin problem (s) did you suffer during the last one year? **(multiple responses allowed)**

[1] Dermatitis [2] Allergic rash [3] Others, Please Specify…….

11d. How was the skin problem detected? [1] Self-reported [2] Medically diagnosed.

SECTION E

HEALTH AND SAFETY MEASURES PUT IN PLACE BY MANAGEMENT TO PROTECT THE HEALTH OF SANITATION WORKERS

1e. What is the level of implementation of the safety measures put in place in your organization to safeguard your health?

	Safety measures	Not implemented (1)	Partially implemented (2)	Fully implemented (3)
SM1	Provision of the right equipment for work			
SM2	provision of Personal Protective Equipment			
SM3	Safety training on first employment			
SM4	management ensuring PPE are used			
SM5	Regular monitoring of workers on safety standards			
SM6	Effective supervision by supervisors			
SM7	availability of staircases at communal container sites			
SM8	In-service training on safety and health practices			
SM9	punishment for non-compliance			
SM10	Availability of medical service for first aid and treatment			
SM11	Reporting system on health and safety issues at work			
SM12	Medical examination on employees before starting work			

2e. Which of the following Personal Protective Equipment do you have at your workplace? **(multiple responses allowed)**

[1] Safety Goggles [2] Nose mask [3] Gloves [4] Safety Boots [5] Rain coat [6] Safety over coat [7] Others (Please specify) …….

3e. Who provides the Personal Protective Equipment? [1] Employer [2] Employee [3] Government [4] Others (Please specify) .....

4e. Are you trained on the use of the Personal Protective Equipment? [1] Yes [2] No

5e. Do you use the Personal Protective Equipment? [1] Yes [2] No

6e. Does Covid-19 have a significant influence in your usage of PPE during your routine work? [1] Yes [2] No

7e. Do you think the protective devices are enough? [1] Yes [2] No

8e. If No, what other protective devices do you require?.....

9e. Are the protective devices comfortable? [1] Yes [2] No

10e. Indicate some of the things you want management to do to improve upon occupational health and safety of the organization? **(multiple responses allowed)** [1] External supervision of the organization`s safety protocols and compliance [2] Constantly reviewing health and safety practices [3] Sanction workers who fail to comply with safety rules [4] Creating the environment for workers to freely report on occupational health and safety issues in the work environment [5] Supervision and safety management by employers [6] Involvement of workers in decision making on safety and health issues [7] Job rotation [8] compensation for injuries at workplace [9] Others (please specify)……

SUPERVISORS OR MANAGERS DATA COLLECTION TOOL

This questionnaire is being administered by a student of University of Ghana, Legon offering a master of public health. The research topic is **`Work-Related Health Problems Among Sanitation Workers in Three Municipalities of Upper East Region`**. Be assured of confidentiality as this piece of work is purely for academic purpose. kindly respond to the questions with sincerity by cycling or filling in the spaces provided

Thank you for agreeing to participate in this important research project.

ORGANIZATIONAL FACTORS

1. Please which of the following do you consider before and after recruiting your sanitation workers? a) medical screening of applicants before recruitment b) training of recruited new workers c) orientation or refresher training d) none of the above e) other (please specify) ……..
2. Do you have effective procedure for conducting workplace hazard assessment Yes/No
3. If Yes, what are the steps involved……
   ……
   ……
   ……
   ……
4. Do you communicate your workplace assessment finding with your workers Yes/No
5. If yes, how do they get the feedback……
   ……
   ……
6. do you have effective Occupational safety and health management system in place? Yes/No
7. if yes, what are they?.....
   .....

.....

.....

REGULATORY FACTOR

8. Are your workers aware of their rights and obligation on safety and health practice at their workplace? Yes/No
9. If yes what are some of the rights of these workers? .....

   .....

   .....
10. Do you provide the necessary protection to safeguard the health of your workers? Yes/No
11. If yes what are some of the Protective and preventive measures are in place for them.....

    .....

    .....
12. Do your workers fully comply with safety measures in the workplace? Yes/No
13. Is there any sanction for workers who fail to comply with safety and health standards? Yes/No

TOPIC: ASSESSMENT OF WORK-RELATED HEALTH PROBLEMS AMONG SANITATION WORKERS IN THREE MUNICIPALITIES OF UPPER EAST REGION`

OBSERVATION CHECKLIST

Work Category: ……

VARIABLES	YES	NO
Physical Hazards		
Are the workers exposed to noise?		
Are the workers exposed to fumes/smoke?		
Are the workers exposed to dust?		
Is the working environment clean?		
Has any worker sustained injuries as a result of work place hazard?		
Are equipment being used by workers defective?		
Are there ladder attached to communal containers?		
Ergonomic Hazards		
Do workers stand often at their workplace?		
Do workers bend often at their workplace?		
Chemical Hazards		
Do the workers use chemicals?		
Are the chemicals harmful?		
Do the workers read labels of chemicals before using them?		
Biological Hazards		
Are workers exposed to infectious waste?		
Is there any sense of smell or odor coming from the waste sight?		
Availability of safety equipment		
Does the industry have a first aid box?		
Is the first aid box well stocked?		
Availability of Personal Protective Equipment		
Are workers using nose mask at the workplace?		
Are workers using goggles at the workplace?		
Are workers using hand gloves at the workplace?		
Are workers using safety boots at the workplace?		
Are workers using safety over coat at the workplace?		