

# **UNIVERSITY OF GHANA**

## **THE IMPACT OF PORT OPERATIONS ON THE HEALTH AND SAFETY OF DOCKWORKERS AT THE PORT OF TEMA**



**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA IN  
PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF M.A.  
PORTS AND SHIPPING ADMINISTRATION DEGREE**

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## DECLARATION

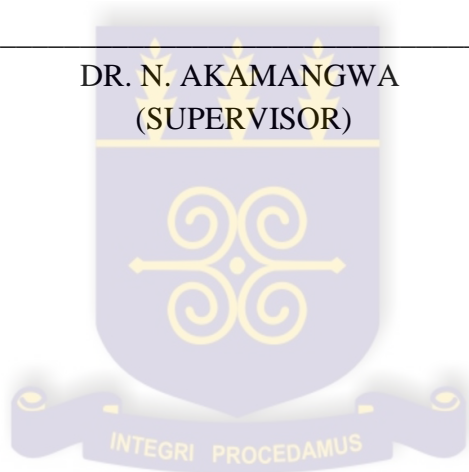
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IVAN ANNAN-METTLE  
(STUDENT)

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DR. N. AKAMANGWA  
(SUPERVISOR)



**DEDICATION**

TO

GOD and FAMILY



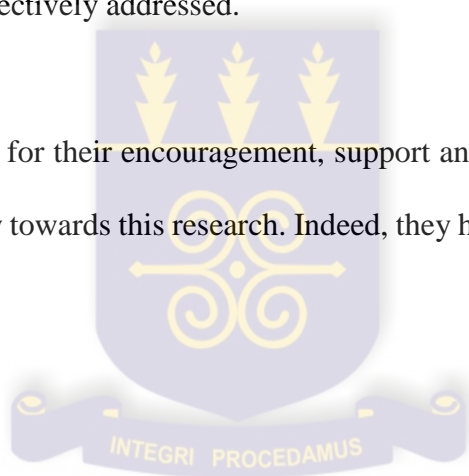
## ACKNOWLEDGEMENT

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I wish to thank my lecturers for the knowledge imparted to me, without which the issues in the study might not have been effectively addressed.

My final thanks to my family for their encouragement, support and contributions throughout my academic life, and particularly towards this research. Indeed, they have been very wonderful. May God richly bless them all!



## ABSTRACT

This study examined the impact of port operations on the health and safety of dockworkers at the Port of Tema. Specifically, it sought to find out dockworkers' perception of health and safety risks, the prevalent health and safety risks at the Port of Tema, and how such risks impact on the health and safety of the dockworkers. By means of two sets of questionnaires designed for 100 dockworkers on one hand and 5 health and safety managers on the other, qualitative and quantity data were collected and analyzed by means of *Microsoft Excel* 2010.

The study found that the various shipping organizations had in place health and safety management policies, of which 61% of the dockworkers were aware. Although the health and safety managers were 72% sure that a port-worker would put on a health and safety gear while at work, 71% and 91% of the dockworkers had worked without putting on safety and protective gears respectively, in spite of the prevalence of hazards such as noise, trips and falls, falls from heights and exposure to dangerous chemicals. Port operations had also affected the health and safety of 63% of dockworkers, while 72% had also been involved in workplace accidents before, out of which 64% resulted in injuries. Medical records at the GPHA Clinic also indicated that 38% of dockworkers who reported at the clinic had suffered musculoskeletal diseases, 28% diseases of the respiratory system, 24% diseases of the circulatory system and 10% mental and behavioural disorders.

Among other things, the study recommends that the health and safety managers should effectively supervise the dockworkers to ensure they comply with the health and safety rules and regulations, provide the dockworkers with healthy and safe working environment and institute a periodic but regular medical screening for the dockworkers.

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

The impact of port operations on the health and safety of dockworkers is a subject matter which has received enormous attention at the international, regional and national levels. Berko (2010) has observed that activities such as dry and liquid cargo handling, sandblasting of ships, construction and maintenance services, liquid/solid waste management and movements of vehicles and heavy duty equipment at the port, create different forms of health challenges to dockworkers in particular, and port users in general. Indeed, results from health surveys conducted in some other ports have produced results which give credence to how port operations are posing health challenges to people. For example, three out of five dockworkers surveyed reported that the activities of Port of Seattle had worsened their health conditions (Public Health of Seattle and King County, 2012).

According to Filikowski and Plonka (1979), there exists a well-documented high incidence of injuries among dock workers. Bonassi, Ceppi and Puntoni (1985) confirm this statement and assert that the risk of accidents in dock work is high and is intensified by frequent changes in the place of employment and working conditions, by the diffusion of responsibility, and, in many places, by the need to work fast. Waskiewicz (1996) has also stated that in some cases, poor visibility, traffic congestion and sharp differences in the level of illumination can create serious hazards and lead to serious and costly accidents.

Indeed, the International Labor Organization (ILO) has also recognized the arduous and dangerous environment in which dockworkers operate, as reflected in the particularly high incidence and seriousness of accidents which occur at ports and other work places. The ILO (2005) estimates that 317 million accidents occur on the job annually, and every day, 6,300

people die as a result of occupational accidents or work-related diseases, representing more than 2.3 million deaths per year. According to Johnson (2007), the human cost of this daily adversity is vast and the economic burden of poor occupational safety and health practices is estimated at 4% of global Gross Domestic Product each year (Takala, 2002). Earlier in 1994, the World Health Organization had reported that poor occupational health and reduced working capacity of workers could cause economic loss of up to 10-20% of the Gross National Product of a country (WHO, 1994). The Disease Control Priorities Project (2007) has also stated that occupational injuries alone account for more than 10 million Disability-Adjusted Life Years (DALYs) lost, or healthy years of life lost whether to disability or premature deaths worldwide.

In view of the social costs which arise due to poor health and safety practices at the ports in particular, the ILO has directed so much attention towards the adoption of conventions and recommendations which provide dockworkers with protection, as far as safety and health are concerned. The current reference instruments are the Occupational Safety and Health (Dock Work) Convention, 1979 (No. 152) and Recommendation (No. 160), which call on member states to ensure that appropriate safety, health, welfare and vocational training have been provided to ensure lasting improvement in the situation of dockworkers (ILO, 2003). The two instruments further prescribe in great detail the measures to be taken to improve and maintain workplaces and cargo-handling equipment, the use of working methods offering adequate guarantees of safety to workers, as well as regular inspection and appropriate sanctions. In spite of this, the World Health Organization (2007) estimates that only 10–15% of the global workforce has access to occupational health services. This means that in spite of the efforts which port authorities are making to provide safe and healthy work environments for dockworkers, the occurrence of accidents due to port operations cannot be completely curtailed. This study therefore examines the impact which the port operations have on the health and safety of dockworkers at the Port of Tema.

## **1.2 Problem Statement**

Daily operations at the Port of Tema make the place potentially dangerous for dockworkers, in view of the impact such operations can have on health and safety of the workers. Furthermore, high rate of unemployment and labour instability in Ghana have resulted in a situation where dockworkers place a lot more value on job security, much to the neglect of the health and safety risks to which their work expose them. The result is a work environment that places dockworkers at risk of occupational injury, work-related diseases, and in extreme cases, death. In recent years, the Port of Tema has experienced a series of fatal accidents which have claimed the lives of several employees and injured others. For example, a major fire outbreak claimed the lives of over twenty (20) workers at the dry-dock and its surrounding areas. Again, a mock exercise to test the disaster-preparedness of the port resulted in an explosion which caused harm to a number of employees resulting in medical treatment and hospitalization, (Ghana Health Services, 2010). In another development, recording clerk was crushed to death at the port by a 45-footer *ritchstacker* machine used in lifting containers, while empty container handler accidents, gantry crane accidents, vessel burning, container truck falling down, and cargo truck accidents have also been recorded (Ghana Ports and Harbours Authority, 2011). In spite of all these issues, not much has been done to examine the impact of port operations on the health and safety of dockworkers, thereby creating a literature gap which this research intends to fill.

## **1.3 Research Objectives**

The core objective of the study is to examine the impact of port operations on the health and safety of dockworkers at the Port of Tema.

Specifically, the study pursues the following objectives:

- a. to examine dockworkers' perception of risk in their area of operation;

- b. to identify the health and safety risks in port operations at the port, and
- c. to determine the impact which port operations have on the health and safety of dockworkers.

#### **1.4 Research Questions**

The main questions which drive this research are as follows:

- a. How do dockworkers perceive risk?
- b. What are the health and safety risks in port operations at the Port of Tema?
- c. How do port operations impact on the health and safety of the dockworkers?

#### **1.5 Significance of the Study**

The findings from the study are of benefit to the following groups of people:

**Dockworkers** – to deepen their understanding of the impacts which port operations can have on their health and safety, so as to take steps to manage such risks and to reduce their potential impacts on them, even if it calls for agitation for better and safer working environments. This is necessary to produce a healthy workforce that can contribute significantly to productivity at the port, and to reduce any incidence of insurance and legal liabilities, as well as the economic losses that normally arise when dock-related accidents occur.

**Regulatory Authorities** - knowing the perception of dockworkers towards risk can help the regulatory authorities such as the Ghana Ports and Harbours Authority, as well as the Ghana Dock Labour Company Ltd. to establish a communications protocol through which they can educate dockworkers about adopting lifestyles and work practices that promote their personal safety and that of their fellow workers. It is also an opportunity assess the effectiveness of any health and safety policies in place, so as to take steps to deal with any loopholes in the

implementation of the policy. In view of the fact that increased productivity of the port depends on a healthy workforce, any attempt to make the port healthier and safer will greatly increase port productivity, and make it more competitive within the West African sub-region.

**The academia** - the study also contributes to the body of literature on the subject matter and also serves as a reference material and basis for further academic research.

### **1.6 Scope of the Study**

The study focuses on cargo handling-related operations on board ships or at a terminal within the Port of Tema, involving the dockworkers there.

### **1.7 Limitations of the Study**

Limited time and financial constraints could not make it possible to extend the study beyond Tema to include the Port of Takoradi. If this had been done, the information would have reflected a nationwide experience, rather than just a focus on one port.

### **1.8 Organization of the Study**

The study consists of five chapters. The first chapter deals with the introduction which incorporates areas such as the background to the study, statement of the problem, the objectives, research questions, the significance, scope, limitations and organization of the study.

The second chapter looks at the review of relevant literature relating to the study.

The methodology of the study is presented in chapter three. The study area, research design, population and sample methods, research instruments and data analysis are examined in this chapter.

The fourth chapter deals with data presentation, analysis and interpretation of information or data collected.

The final chapter is on summary of findings, conclusions and recommendations from the study.

### **1.9 Definition of Key Words**

**Impact** – refers to the marked effect or influence which port operations have on health and communities;

**Port Operations** – Cargo handling activities involving dockworkers (stevedores), cargo handling equipment and facilities, among others.

**Dockworkers** - those who are involved in cargo handling (loading and unloading of cargo) either mechanically or manually. The term is used in this study as being synonymous to stevedores or longshoremen.

**Health** – condition of the human body and its ability to resist illness.

**Safety** – the condition of being free from harm due to accidental events.

## CHAPTER TWO

### LITERATURE REVIEW

This chapter deals with the review of literature relating to the subject matter. In line with the objectives of the study, the literature dwells on the concept of port management and operations, the associated risks and hazards, the context of occupational health and safety, as well as the impact which port operations can have on dockworkers, as far as their health and safety are concerned.

#### 2.1 Port Management and Operations in Perspective

According to Bichou (2009), at the global level, very little literature exists to provide a comprehensive understanding of what port management and operations are, with exception of the UNCTAD's *Monographs on Port Management* and World Bank's *Port Reform Tool Kits*. All other references focus on specific port management and operational activities, undertaken at the national or port level, like the Ghana Ports and Harbours Authority's *Port Manual*.

This notwithstanding, a good starting point to stimulate understanding of port management is to consider management as the function of a port authority that coordinates the efforts of people to accomplish goals and objectives, through the efficient and effective use of available resources. In this regard, management comprises planning, organizing, staffing, leading or directing, and controlling an organization or initiative to accomplish a goal (Gomez-Mejia, Balkin and Cardy, 2008). Resourcing encompasses the deployment and manipulation of human resources (including dockworkers), financial resources, technological resources, and natural resources (Kleiman, 2011).

In the face of increased use of the sea as a means of transporting large volumes of cargoes over long distances, the Port of Tema is more than ever challenged to deal with a number of different

activities, involving the movement of ships, containers and other cargoes, the loading and unloading of ships and containers, customs activities. Within that context comes the effective deployment of human resources, and provision of infrastructure, including anchorages, channels, lighters, tugs, berths, warehouse and other storage spaces (Iarossi, 2003). According to Filikowski and Plonka (1979), the interaction between the human resources (encompassing all categories of port workers) on one hand, and port operations involving the use of port infrastructure, equipment and facilities, on the other hand, produces a complex mix of issues (including the welfare, health and safety of port workers) which are worth investigating, in view of the impact such issues can have on port productivity and competitiveness.

Additionally, the globalization of trade and high complexity of port operations also require ports to deploy sophisticated information and communications technology (ICT) systems and applications, all of which have implications for dock work (Talley, 2002; Clark, 1999). Also in recent years, the size of ships has doubled and has added to the difficulty in managing port operations and demanded an even larger logistical effort. The International Labour Organization (2003) explains that these developments have brought changes in cargo-handling methods which rely more on highly-skilled cargo handling personnel, thereby impacting negatively on employment opportunities for dockworkers. This notwithstanding, the World Health Organization (2007) has stated that the deployment of sophisticated cargo handling equipment and reliance on skilled labour have their own health implications, as well as stress and work-related injuries are concerned.

Based on the study of available literature on the subject matter, Mahfouz and Arisha (2009) categorize port management into three different perspectives, namely: strategic port management, economic port management and operational port management. For the purpose

of this study, the operational perspective of port management is explained in the subsequent paragraphs.

### **2.1.1 Operational perspective**

An important aspect of port management is port operations management in which operational decisions take into account how best to allocate resources in order to optimize the whole system performance (Dahal, Galloway, Burt, and Macdonald, 2003). Port operations normally arise out of the fact that ports receive imported or exported materials from either landside or seaside respectively. After that, these materials are stored, processed and dispatched using port components such as unloader, loader, conveyor, transfer station and cranes, among others (Bassan, 2007). Ports then act as buffers between the incoming and outgoing vessel traffic. The arrival and departure of vessels from a port are the inputs and outputs of the facility (Dahal et al., 2003). The influence of uncertainty and variability on seaport performance is tremendous. Changes happen extremely fast, impacting highly on operations output. It is therefore not surprising that port authorities pay a great attention to the analysis of their ports operations performance.

According to Renke (1988), at the core of these port operations are dockworkers who are commonly employed in the loading and unloading of ships, the transfer of goods between ships and barges, trucks, trains, pipelines and wharfs, and vice versa. De La Hoz and Szeinuk (2003) expands the horizon of dock work to include the storage of goods in warehouses, the inspection and packaging of goods, the transport of personnel and goods within the confines of the port, and the maintenance of special plants for transferring goods. Thus, stevedores, crane operators, truck and trolley drivers, forklift truck operators, staff in charge of weighing and packaging, maintenance workers and others, all work on the wharves, on the quays, or in transit sheds and warehouses as part of the dock work team.

### **2.1.2 Economic port management**

A discussion on the impact of port operations on the health and safety of dockworkers cannot be complete without considering the economic perspective of port management. In developing economies and economies in transition, for example, some of the reasons why some workers may accept to work in hazardous conditions, irrespective of the risk to their health, stems from economic factors (O'Toole, 2002). Quinlan (2013) has confirmed this assertion by saying that, poverty and job insecurity are very important factors that can influence a worker's perception of safety, to the extent that, some workers are unable to speak up against the dangerous conditions under which they work, for fear of losing their jobs or failing to secure an extension of a job-contract. With reference to countries like Ghana, Amponsah-Tawiah, and Datey-Baah (2011) have stated that with a fast growing labour force coupled with a growing informal sector as opposed to the formal sector, workers have tended to fight for job security while neglecting the need to promote the quality of work life, although the provision of a safe and healthy work environment is a human right issue, and investment in occupational health and safety yields improved working conditions, higher productivity and better quality of goods and services.

When weighed against the maritime industry, Kozan (1994) has said that, as shipowners push for shorter turn-around time in order to avoid the payment of extended port charges, and as charterers push for faster cargo handling in order to avoid the payment of demurrage, or even to earn despatch, the health and safety of dockworkers are in most cases compromised to achieve these economic ends. This brings to the fore the relative importance of the economic management of seaports, as far as health and safety are concerned.

Much of the research in this area, focuses on the analytical approaches that can be used to assess the economic efficiency of seaports, involving production function, cost-efficiency

functions (Kozan, 1994). Other researchers such as Gardner, Marlow and Pettit (2006) use economic measures such as profit, cost, and revenue as performance indicators reflecting the significance of management alternatives.

Furthermore, the impact of port charges on the economic performance of a port has been studied. Indications are that, a port charge is a full cost recovery that is applied on port users to cover investments sunk in the port (Martin, 2001). Apart from service quality and time costs, port charges are a major factor that determines the demand for port services (Gardner et al. 2006), which according to Meifeng (2003), is affected by: the international trade pattern; the geographical location of a port with respect to sources and markets; the availability of multi-modal transportation networks, and the associated general total cost.

In addition, the economic performance of a port can be assessed by evaluating the performance of the port using port throughput analysis, a comparison between port's actual and optimum throughput, measured in tonnage or number of containers handled (Talley, 2007). Benchmarking can also be used as an alternative method for evaluating ports economic performance, using standard port performance indicators. From an economic point of view, performance indicators are the controllable variables that port manager can assign to optimize economic objective functions (Talley, 2006). In all these circumstances, the role of the dockworker cannot be over-emphasized, whether or not the operations at the port are manual or automated.

The Port of Tema undertakes several operational activities which among other things, include offering pilotage services, supervising stevedoring, lighterage and container services, as well as appointing, licensing and regulating stevedores and master porters to operate in container terminals.

In all these, at least six categories of dockworkers can be identified, namely: terminal handlers who undertake goods-movement activities such as receiving, checking,, opening packages, among others; stevedores who are involved in goods movement on the decks or in the holds of vessels, using equipment on board; weight masters who count volumes and annotation of their characteristics, origin or destination, checking condition of goods, and giving weighing assistance, among others; vessel guards who monitor the entry and exit of persons on board vessels moored or anchored in port; maintenance workers who repair and restore the packaging of goods, loading and unloading of vessels; and workers block who are involved in clean-up activities and preservation of merchant vessels and their tanks. Irrespective of the category of dock work, health and safety concerns are prevalent, in the light of the risks which normally accompany those activities.

## **2.2 Dockworkers' Perception of Risk**

Risk perception can be described as the belief, whether rational or irrational, which is held by an individual or a group about the probability of occurrence of a risk or a hazard and the extent or magnitude of its effects on them.

Slovic (2000) states that several factors such as demographics, socio-psychological variables and structural variables such as an experience with the hazard of depth of knowledge about the hazard, impact on a person's perception of risk. Huddy and Feldman (2006) have thus established that there exists a link between risk perception on one hand, and gender, race and emotional affect on the other hand. He concludes that females judge risk to be higher; in terms of race, minorities have higher perception of risk, but one-third of white men have much lower perception of risk than everyone else, regardless of gender or race.

According to Slovic (2000), An understanding of risk perception is beneficial because it provides insight into people's lifestyle and attitudes towards risks or hazards. This helps to establish communication protocol which can be used to educate people about how their disposition to risk can impact on their health and safety.

In the maritime industry, a number of studies have highlighted maritime workers' perception of risks and accidents (Sampson, 2011; Bailey, Ellis, and Sampson, 2010; Ellis, 2007). In their study of perceptions of risk, in relation to ship casualty and personal injury across the maritime industry, Bailey, Ellis, and Sampson (2007) discovered that the workers' perception of risk for each type of injury was greatly influenced by their nationality, and concluded that Chinese tended to see the risk of injury as higher than other national groups in the sample. On the other hand, respondents from the Philippines tended to see the risk of injury as lower than other national groups in the sample. These findings fall in line with Huddy and Feldman (2006) and Slovic (2000) demographics and socio-psychological factors influence people's perception of risk.

In relation to shore-side activities, the respondents perceived 'slips, trips and falls', and 'handling, lifting or carrying' as the greatest hazards or risks, but those who work aboard ships had different perceptions. Ellis et al. (2007) further discovered that the perception of risk of 'handling, lifting or carrying' increased with age and duration of experience or time served. Overall the greatest risk was perceived to exist at times when individuals worked having consumed alcohol or drugs. Another study by the authors in 2010 produced similar results as the 2007 study.

A study by Soares et. al (2008) discovered that, at the Port of Rio-Grand in Brazil, dock workers perceive falling to the ground or the sea, falling objects which have been suspended, exposure to noise and weather as the greatest risks but in Norway, Rundmo (1992) found that, slippery

surfaces, exposure to explosions, blow-out, fire, noxious gases and sabotage were perceived to be the greatest risks. The level of dissimilarities in these findings makes one to conclude that there are perceived and real risks in port operations, but what is perceived to constitute the greatest risks differs from port to port or environments. It is therefore important for each port to conduct an assessment of its risk factors, so as to design the appropriate responses to deal with them.

### **2.3 Risks/Hazards in Port Operations**

Port operations, just like in other work, is fraught with a number of risks or hazards. There exists a well-documented high incidence of injuries among dock workers. The risk of accidents in dock work is high and is intensified by frequent changes in the place of employment and working conditions, by the diffusion of responsibility, and, in many places, by the need to work fast. In some cases, poor visibility or traffic congestion may lead to serious and costly accidents. Poor road surfacing, poor maintenance of traffic lanes, and sharp differences in the level of illumination can create serious hazards. Based on observation of port operations and findings from studies, some common and frequent hazardous risk factors have been identified, including the following:

- a. Falls from Heights, which occurs while carrying out trimming, sheeting and container lashing, securing loads, accessing ships, working on board a ship or working on heavy machinery (Oenning, Carvalho, Lima, 2012).
- b. O'Toole (2002) identifies falling objects, which normally happen when carrying out loading and unloading operations and stacking and stowing goods, as a common hazard. Items may be loose and incorrectly or poorly slung or stacked. Fittings and fixtures used during lashing operations may be dropped. Loads or objects may collapse or fall having become unstable during transport or having been poorly loaded.

- c. Fatigue has been identified as one of hazards. Dock operations can be prone to unexpected events and delays over which there may be little control. Fatigue can develop slowly and will not always be obvious.
- d. Exposure to hazardous or asphyxiate substances is another hazard. Raine (2006) explains that when loading and unloading solid bulk cargoes, dockers may be exposed to dust or respiratory sensitizers that can cause asthma. Cargoes may be flammable, toxic, poisonous or corrosive. Some cargoes, for example grain, may have been fumigated. Some solid bulk cargoes in the hold may not be hazardous themselves, for example fishmeal or bark, but may produce gases due to decomposition or bacterial action. Vehicle exhaust emissions in the ship's hold may also give rise to exposure.
- e. Mooring Hazards - Bailey, Ellis and Sampson (2010) have reported that mooring can be a hazardous activity as there is a risk of a person getting caught in a line or a winch. The lines can be very heavy and awkward, particularly if they are wet, and may break and snap back.
- f. Noise - Equipment and engines may produce noise which is augmented when they are operated in a ship's hold or a warehouse. As a rule of thumb, a person is at risk if he or she has to shout to be clearly heard by someone who is two metres away, or if the ears still ring after leaving the workplace or if there are noises due to impacts such as those caused by hammering (Quinlan, 2013).
- g. Slips and Trips - The majority of dock accidents reported are due to slips, trips and falls on the same level. Wind, ice and fog can all increase the risk of slips, trips and falls. Bailey, Ellis and Sampson (2010) discovered that those who worked shore-side saw hazards originating from 'slips, trips and falls' as a greater risk than those who worked aboard ship.

- a. Tidal and Environmental Hazards - The weather can have an adverse effect on port and dock operations and can reduce visibility. Cold and wet weather can reduce concentration and make manual work more difficult. Hot weather may result in heat exhaustion, sunburn or sunstroke. Tidal movements can affect access and egress to the ships, cause difficulties during loading operations and result in collisions between dockside equipment and a ship (Oenning, Carvalho, Lima, 2012; O'Toole, 2002.)
- b. Public Health of Seattle and King County (2012).

The list of hazards at the port can be in-exhaustive, because in addition to the above, certain conditions at the port also pose a lot of risks to dockers. These include, but not limited to:

- i. Poorly designed or maintained equipment: cranes, derricks, and winches may fail or may be difficult to maneuver; dangerous parts may not be guarded; and hoists in warehouses may be inadequately fenced or maintained (Palaniappan, Prakash, Bailey, 2006).
- ii. Unsatisfactory means of access, confined spaces, and poor lighting can cause falls, which may lead to drowning (O'Neill, 2002).
- iii. Demands and job stress can lead to accidents and injuries (National Center for Injury Prevention and Control, 2006).
- iv. Working in a hot environment has been identified to be a most likely potential cause of injury to someone working on board a ship.
- v. The lifestyles of dockworkers, such as smoking and drinking can pose a lot of risk for them. Overall the greatest risk is perceived to exist at times when individuals work after having consumed alcohol or drugs (Bailey, Ellis and Sampson, 2007).
- vi. The inability of the authorities to provide safe and healthy working environments for the workers in some circumstances (National Center for Injury Prevention and Control, 2006).

It needs to be emphasized that in order to deal effectively with hazards and risks at the port, the human factor cannot be ruled out. This is because, human-centred elements such as negligence, carelessness, ignorance, non-compliance with safety rules and regulations, unwillingness to change, incompetence, over-confidence and complacency have been found identified to cause accidents and personal injuries at the port (Cezar-Vaz, 2014).

#### **2.4 Legislating Health and Safety of Dockworkers in Ghana**

Health and safety of dockworkers is an issue that has gained a lot attention from the international community, notably, the International Labour Organization (ILO), the International Maritime Organization (IMO), the International Transport Federation (ITF) and other agencies, which over the years, have come out with regulations and recommendations on what measures and standards governments can put in place to ensure health and safety at workplaces.

The ILO for example, has produced about 70 conventions and recommendations which are occupational health and safety-related. These include Occupational Health and Safety Convention Numbers 45 (1935), 81 (1947), 90 (1948) 103 (1952), with 170 (1990) and 174 (1993) being some of the recent additions (Amponsah-Tawiah and Datey-Baah, 2011). The current ILO reference instrument for dockworkers is the Occupational Safety and Health (Dock Work) Convention, 1979 (No. 152), and the corresponding Recommendation No. 160. Under the terms of *Article 6* of the Convention and *Paragraph 31* of the Recommendation, appropriate health and safety measures, should be applied to dockworkers.

The IMO, being the umbrella organization of the United Nations on maritime issues, has also been concerned about safety at sea, and also ashore. The IMO has noted that the observance of safety standards in shipping is poor, particularly when investigations into accidents and injuries

have revealed that 80%–90% of maritime-related accidents are attributable to human error. These investigations also highlight shortcomings on the part of ship management both at sea and ashore. These concerns have compelled the IMO to come out with several conventions to deal with safety and protection of the marine environment, notable among them being the Convention for the Safety of Life at Sea (SOLAS), 1974, and the International Convention for the Prevention of Pollution from Ships (MARPOL).

In order to set standards to deal with the human element, the Standards of Training, Certification and Watch-keeping for Seafarers (STCW) 1978, (which was significantly amended in 1995) was established, but this instrument applied to only a small segment of the shipping industry, especially those at sea. The only attempt to integrate shore-based ship safety is through the introduction and implementation of the International Management Code for the Safe Operation of Ships and Pollution Prevention (ISM Code). The objectives of the ISM Code are to ensure safety at sea, prevention of human injury, loss of life and the avoidance of damage to the marine environment.

The ISM Code also requires owners and operators of ships to set in place a Safety Management System (SMS), which requires a shipping company to document its management procedures to ensure that conditions, activities and tasks, both ashore and afloat, affecting safety and environmental protection, are planned, organized, executed and checked in accordance with legislative and company requirements.

It must be emphasized that although the ISM Code applies to safe operations on board ships while at sea and at the port, most of its recommendations and guidelines are applicable to safety measures and standards required during cargo handling operations.

In general, governments are required to ratify and localize these international conventions. However, successive governments of Ghana, appear not show so much political will, commitment and support for bold occupational health and safety policies. This is evident in the fact that out of the about seventy conventions and recommendations of the ILO on health and safety, only ten have been ratified by the government of Ghana, namely, Conventions 45, 81, 89, 90, 103, 115, 119, 120, 147 and 148). Surprisingly, the four core conventions on occupational health and safety (that is, Conventions 155, 161, 170 and 174) have all not been ratified.

This notwithstanding, the Labour Act of Ghana (Act 651) 2003 has a section which attempts to deal with Occupational Health and Safety in its Section 15. In addition, there are two other statutes which help to deal with health and safety. These are the Factories, Offices and Shops Act 1970, Act 328 and the Workmen's Compensation Law 1987 (PNDC Law 187).

The main provisions of the Factories Offices and Shops Act 1970 concern improvements necessary to attain internationally-acceptable standards of providing for the safety, health and welfare of persons employed in factories, offices, shops, dock work and construction, even though a vast majority of industries including agriculture, and most of the organizations under the informal sector are not covered under the Act. Provisions in the Act are also very limited in scope because it does not make adequate provision for accident and injury prevention. For example, preventive strategies like risk assessments, medical surveillance and control of hazards are not catered for in the Act. Also missing in the Factories Offices and Shops Act are standards against which services will be measured. The lack of uniform standards against which organizations could be evaluated has resulted in factory inspectors assuming a lot of discretionary powers and falling to the temptation of abuse of power.

The Workmen's Compensation Law 1987, by its name, suggests that it deals with issues which arise after the accident and injury have occurred, thereby adding weight to emphasis on risk mitigation (prevention and avoidance) as being superior to curing the risk and hazards (Muchiri, 2003).

## **2.5 The Impact of Port Operations on the Health and Safety of Dockworkers**

From the forgoing analysis and discussions, there is no doubt that port operations do have impact on the health and safety of dockworkers. The literature reports a high incidence of injuries among dock workers (Waskiewicz, 1990; WHO, 2007; Soares et. al. 2008).

Dock work carries one of the highest risks of traumatic injuries, when compared with other industrial occupational groups (Waskiewicz, 1990). In general, the most common accidents in this work group involve slips and falls, falling loads or objects, or manual handling and mechanical equipment (Bailey, Ellis and Sampson, 2007). Soares et. al. (2008) also report that the majority of injuries involve the lower back, the hands, the trunk, the lower limbs, and the feet. Another study has also reported a statistically significant higher incidence of traumatic injuries (severe enough to cause fractures or dislocations) among dockers (United States Department of Labor, 2012).

Apart from accidents which cause injury and sometimes death, occupational diseases are reported among maritime industry workers (Oenning, Carvalho, and Lima, 2012). For example, Musculoskeletal Disorders (MSDs) which are caused mainly by manual handling, frequent bending and twisting and heavy physical work is common among dockers (O'Toole, 2002). The risk of MSDs can increase with the pace of work and low job satisfaction. Palaniappan, Prakash, and Bailey (2006) have also highlighted spine and joints injuries, ergonomic problems in Sweden and quality of sleep in a port in Norway. Another study has also identified the

occurrence of mental alterations caused by disorders of the sleep-wake cycle and the mental strain related to port working conditions (Cummings et al., 2010).

The impact of the injuries on job performance has also been a subject of investigation. Ellis (2007) has reported that some dockers take sick leave for a number of days, ranging from one day to several weeks in the last three years.

Overall, occupational diseases are a source of extreme suffering and absenteeism in the workplaces. According to the WHO (2010), occupational diseases are annually responsible for killing six times more people than work-related accidents, even though most of the diseases remain invisible and hidden in the workers. Furthermore, the nature of these diseases changes rapidly because of the technological and social changes, combined with the global economic conditions, aggravating existing health hazards and generating new risk factors (Sampson, 2011). However, whether or not the suffering is brought about by a disease, accident or injury, there is no doubt that the dockworkers suffer social and economic costs. This therefore must engage the attention of policy-makers to find solutions that highlight prevention and ensure the solutions are applied effectively in the various workplaces.

## CHAPTER THREE

### METHODOLOGY

#### 3.0 Introduction

This chapter describes the methodology which was employed to collect and analyze data for this study, taking into consideration the research objectives and questions. It provides an overview of the research design, the population and sampling technique, the research instruments and methods for analyzing the data collected.

#### 3.1 Research Design

This is a case study research which seeks to examine the impact of port operations on the health and safety of dockworkers at the Port of Tema, Ghana. According to Burns and Grove (2001) a case study is a research on a person, a group, a single situation or a specific case, involving documented evidence of a particular issue or situation. Thus, the case study method was used to conduct an in-depth investigation into the subject matter, based on the following objectives:

- i. to examine dockworkers' perception of risk in their area of operation;
- ii. to identify the general operational health and safety risks at the Port of Tema, and
- iii. to determine the impact which these operations have on the health and safety of dockworkers.

Yin (1994) describes a case study as a research on a person, a group of people, a single situation or a specific case, and involves the collection and presentation of detailed information about the subject(s), the situation or issue. The case study approach was therefore adopted to enable the researcher to carry out an in-depth study about the health and safety risks which are associated with dockwork at the Port of Tema, and how such risks impact on the health and safety of the dockworkers. This also made it possible for the results to be particularized for the

dockworkers at the Port of Tema, rather than generalizing it for all dockworkers wherever they may be found.

The study also used both qualitative and quantitative methods of data collection. The combined method enabled the researcher to gather qualitative information about the demographic data (such as gender, age and level of education and work experience) of both dockworkers and health and safety managers at the Port of Tema, their perception of risks, and how such risks affect their health and safety. At the same time, it made it possible for quantitative data on the occurrence of health and safety incidents and the respondents' involvements in such incidents to be collected and analyzed to give a concrete picture of the situation at the Port of Tema. The combination of qualitative and quantitative approaches helped to provide a more complete understanding of the subject matter under consideration, than using any one of the methods alone.

### **3.2 Population and Sampling**

According to Fraenkel and Wallen (2000), a research population is generally a large, well-defined collection of individuals or objects with common characteristics that are the main focus of a scientific enquiry. However, due to the large sizes of populations, researchers often cannot test every individual in the population because it is too expensive and time-consuming. Thus, researchers use sampling techniques to pick samples from the population (Aina, 2004). A research sample therefore is a subset of the population but it must be representative of the population from which it was drawn and it must have a good size to warrant statistical analysis to draw conclusions which apply to the population (Burns and Grove, 2001).

For this study, the population consisted of permanent dockworkers employed by private stevedoring companies and GPHA and the health and safety managers (HSMs) of these institutions. Although the dockworkers were the primary target of the study, it became

necessary to include the HSMs since their operations or responsibilities towards the dockworkers could have impact on the latter's health and safety. In this study for example, information was sought from the HSMs as to the effectiveness of the training and protective gears/materials given to the dockworkers, as well as their evaluation of the dockworkers' disposition towards health and safety matters, among others. Information from both populations were then weighed against each other for a more balanced analysis. Table 3.1 shows the population size and sample used for the study.

Table 3.1 Population and sample size

<b>Population</b>	<b>Size</b>	<b>Sample Size</b>
Permanent dockworkers	733	100
Health and Safety Managers	14	5
<b>Total</b>	<b>747</b>	<b>105</b>

The permanent dockworkers were drawn from the GPHA and Ghana Association of Stevedoring Companies (GASC), which is the umbrella body of the private stevedoring companies. The total number was 733, out of which 100 were sampled. This excluded those from the Ghana Dock Labour Company Ltd (GDLCL), who were predominantly casual workers. Their exclusion was due to the fact that they would not be able to provide the kind of information required for this study, since they were not permanently or regularly working at the port.

Similarly, the HSMs were drawn from the GPHA and the GASC, and numbered 14, out of which 5 were sampled.

A combination of simple random sampling and purposive sampling methods were used to select respondents for the study. Random sampling without replacement method was used in selecting respondents from the dockworkers and HSMs. This relied on the lottery system by which each member of the population in each category was numbered and placed in a box, and samples drawn one-after-the-other up to the required number.

### **3.3 Sources of Data**

Data from both primary and secondary sources were used for this study. The primary source of data came from the use of questionnaires, which consisted of structured questions posed to the both dockworkers and health and safety managers about their perception of health and safety risks or health and safety culture, the common health and safety risks at the port and how such risks impact on their health and safety. The secondary sources of data consisted of 127 medical files of dockworkers from the GPHA Clinic, which contained information such as the category of dockworkers, their age, and the type of medical condition reported or diagnosed. These were analyzed to determine the prevalence of risk or health condition among the various categories of dockworkers.

### **3.4. Research Instruments and Administration**

The main research instruments which were used in the study were questionnaires. Two sets of questionnaires were used, one set for the dockworkers, and the other set for the HSMs. The questionnaire for the dockworkers for example, enquired about the dockworkers' awareness of health and safety policies at the port, the dockworkers' perception of health and safety risks, regularity of putting on safety and protective gears and using intoxicating drugs or substances at work, among others. The questionnaire for HSMs also enquired about how they perceived the dockworkers' disposition towards health and safety, the probability that a dockworker

would wear a safety and protective gear at work, and the impact of the risks in port on the dockworkers' health and safety.

Two types of questions were asked in the questionnaire: closed and open-ended questions.

Closed-ended questions are easy to use, score and code for analysis on a computer, because all subjects respond to the same questions, hence providing standardized data. They also tend to have a high rate of response and are easy to score or can be answered quickly. Examples of those questions were those which were intended to gather demographic data about respondents (including gender, age and educational level). In addition, most of the questions which sought to examine the dockworkers' perception of risk and their health and safety culture were provided with a range of possible answers from which the respondents could tick, for quantitative analysis purposes.

The open-ended questions, on the other hand, ensured that respondents were able to answer questions in their own way and express their own justification for their answers. Typical examples were questions asking the respondents to express their opinions about the challenges inherent in the health and safety practices at the port, and they would like to smoke or use intoxicating substances at work.

In order to validate the research instruments, the questionnaires were pre-tested on a sample of ten (10) respondents by the researcher (7 for the first set of questions for dockworkers, and 3 for the second set for HSMs). This aimed at correcting any ambiguity that might be found in the questions, as well as assess the ease of answering the questions by the respondents with the view to ensuring that the responses would be reliable and valid.

The questionnaires were personally administered by the researcher to the respondents. This aimed at ensuring that the questionnaires were given to the intended recipients. The

researcher's personal interaction with the respondents also made it possible to clearly explain the purpose of the research and to solicit the support of the intended respondents. This facilitated the process of data collection.

### **3.5 Data Presentation and Analysis**

Each of the responses obtained through the closed-ended questions were given numeric codes and entered to create a data file in the *statistical package for social sciences, v.20* (SPSS 20). With the aid of the analysis *tools-pack* in the SPSS, descriptive statistical methods such as frequencies, percentages, tables and charts were used to present and analyze the information, as entered. On the other hand, the information obtained from the open-ended questions were presented in descriptive format, since they were not easy to be coded for quantitative purposes. An independent sample *t*-test and Levene's test for variances were conducted to compare the perception of risks among the male and female dockworkers, via the SPSS.

### **3.6 Ethical Consideration**

Prior to the commencement of the fieldwork, the consent of the institutions, which were included in this study, was formally obtained through letters written to them, to use information obtained from them for the research. With respect to the information from the GPHA Clinic, it was limited to the type of dock-related incidents (such as musculoskeletal injuries, circulatory and respiratory diseases, and behavioural or mental disorders) reported, and the category of dockworkers (such as drivers, deckmen and mechanics) who reported at the clinic. In order to protect the said dockworkers, their names were not required but their ages and gender were included. In relation to the individual dockworkers, they were contacted at their various office premises and were assured of strict protection of their personal identities. As a result, their

names were not recorded but each was assigned a code for reference purposes. This encouraged them to give their maximum co-operation.

In addition, information taken from other sources other than from the researcher's own work were duly and properly acknowledged.

### **3.7 Research Reliability and Validity**

The term 'reliability' is a concept which is often used to test the quality of a research work, in relation to the consistency of a test, survey, observation or any other device or instrument (Bryman and Bell, 2003). In relation to a case study research, a good quality research is one which helps to understand a situation that would otherwise be enigmatic or confusing (Eisner, 1991). Healy and Perry (2000) therefore suggest that for a research work to be reliable, it must have the essential elements of credibility, neutrality, consistency or dependability and applicability. In order to ensure reliability, the study used multiple methods of data collection and data analysis, involving the information from the dockworkers, the HSMs and the GPHA Clinic. Again, the selection of the sample was free from any biases, since the probability sample method which was used ensured that each member in the population had an equal chance of being selected.

On the other hand, validity deals with whether the study measures what it set out to study (Stenbacka, 2001). In order to ensure validity of the study, the questions on the research instruments were based on the research objectives and questions, in order that the information obtained would measure what the study set out to measure. Besides, the questions were screened and pre-tested before the actual fieldwork. All these were aimed at eliminating bias and increasing the researcher's truthfulness about the research findings.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS

In all, 106 people were sampled for the study. They consisted of 100 dockworkers, 5 Health and Safety Executives (3 from stevedoring companies, 1 each from the GPHA and Ghana Dockworkers Company Ltd) and, 1 administrative officer from the GPHA Clinic in Tema.

#### 4.1 Responses from the Dockworkers

##### 4.1.1 Demographic data of the respondents

Table 4.1 Demographic data of the respondents.

Characteristic	Attributes	Frequency	Percentage
<b>Gender</b>	Male	82	82
	Female	18	18
<b>Total</b>		<b>100</b>	<b>100</b>
<b>Age (years)</b>	18 -27	17	17
	28 - 37	26	26
	38 - 47	33	33
	48 - 57	11	11
	58+	13	13
<b>Total</b>		<b>100</b>	<b>100</b>

The respondents consisted of 82 males and 18 females, thereby depicting a male-dominance, with a difference of 64% above the female population. The distinction between the genders was necessary because males and females perceive situations differently. Therefore, the inclusion of both genders allowed the researcher to obtain different opinions from both sexes.

In relation to the age distribution, the respondents ranged between 18 and 58 years and above, with the most dominant age group being 38 - 47 with 33%, followed by those in the 28 - 37 bracket with 26%, while the least age bracket was 48 to 57 years with 11%.

With a mean age of 43 years, the respondents could generally be described as youthful. Just like gender, the different age groups perceive situations differently and therefore express their opinions based on their level of experience. Therefore, obtaining information from the different age groups helped to enrich the information analyzed in this work.

The respondents also consisted of people with varying educational backgrounds. As indicated on Table 4.2 below, 19% of the respondents had obtained basic education, 27% had been to secondary school, 13%) with tertiary education, while 23% had had apprenticeship training. The rest, 18%, however, had not had any formal education.

Table 4.2: The Level of Education of the Respondents

<b>Educational Level</b>	<b>Frequency</b>	<b>Cumulative Frequency</b>	<b>Percentage</b>
Basic (JHS/MSLC)	19	19	19
Secondary	27	46	27
Tertiary	13	59	13
Apprenticeship	23	82	23
Non-formal	18	<b>100</b>	18
<b>Total</b>	<b>82</b>		<b>100</b>

From the table, those with formal education from basic to tertiary dominated the population with 59%. The respondents' level of education was investigated because education influences a person's understanding, perception and appreciation of health and safety. The diverse

educational backgrounds of the respondents therefore enabled the researcher to obtain diverse opinions for analysis in this study.

The respective roles of the respondents at the port are as indicated on table 4.3 as follows:

Table 4.3 The role of the respondents at the port

<b>Role</b>	<b>Frequency</b>	<b>Cumulative Frequency</b>	<b>Percentage</b>
Deckman	16	16	16
Dockman	37	53	37
Driver (forklift, crane, truck etc)	9	62	9
Checker	6	68	6
Holdman	18	86	18
Gearman (mechanic & maintenance etc)	9	95	9
Warehouseman	5	<b>100</b>	5
<b>Total</b>	<b>100</b>		<b>100</b>

The respondents consisted of 16 deckmen, 37 dockmen, 9 drivers of various vehicles and equipment, 6 checkers, 18 holdmen, 9 gearmen and 5 warehousemen. The most dominant group of workers was the dockers, consisting of 37% of the total population, followed by the holdmen with 18%. The work group with the least number of respondents was the warehousemen with 5%.

Out of the total number of 100, 18 had worked at the port for between 1 and 3 years, 37 had done so for between 4 and 6 years, while those within the 7 - 9 years bracket were 31 in number. The rest consisted of 14 who had worked for 10 years and above. This is indicated on table 4.4.

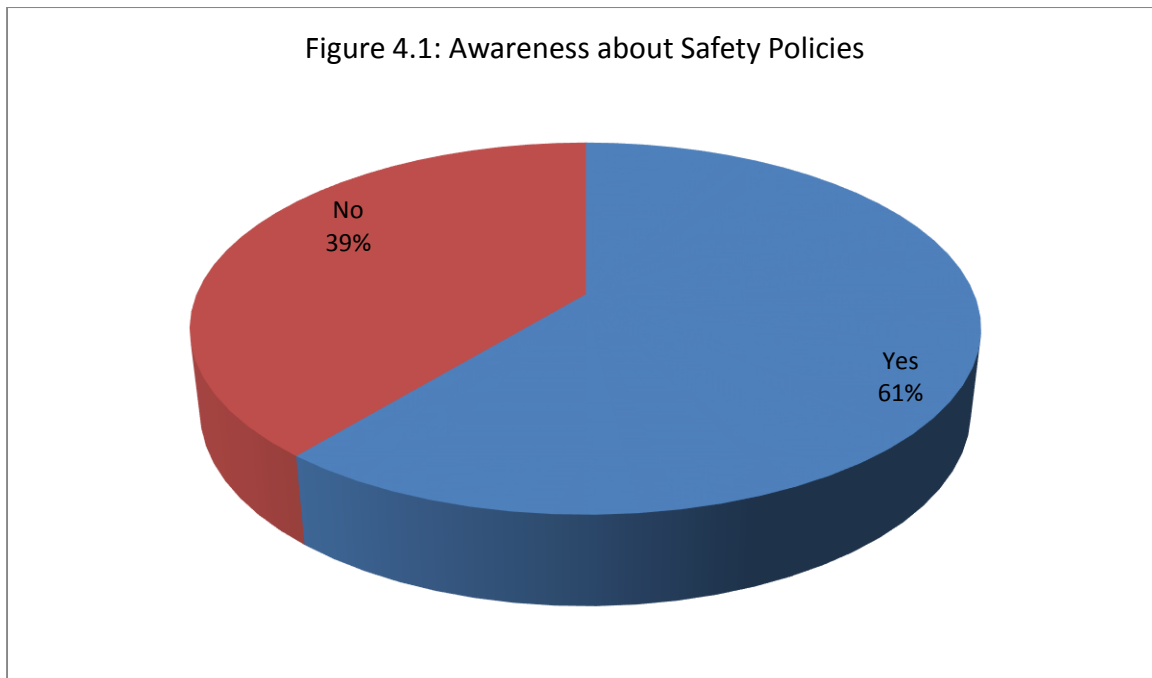
Table 4.4: The level of experience of the respondents

<b>Years of Experience</b>	<b>Frequency</b>	<b>Cumulative Frequency</b>	<b>Percentage</b>
1 - 3	18	18	18
4 - 6	37	55	37
7 - 9	31	86	31
10+	14	93	14
<b>Total</b>	<b>100</b>		<b>100</b>

From the table, most of the respondents (37%) fell within the 4-6 years bracket, followed by 31% in the 7-9 years group. The least experienced (those within 1-3 years bracket) were 18%, while the most experienced (10+ years) were 14%. Overall, those who had worked for between 1 and 9 years were in the majority with 86%, with the 14% having worked for at least 10 years. The general level of the respondents' experience at the port was good enough to provide the necessary information required for the research because 82% of them had worked for at least 4 years at the port (between 4 -10+ years).

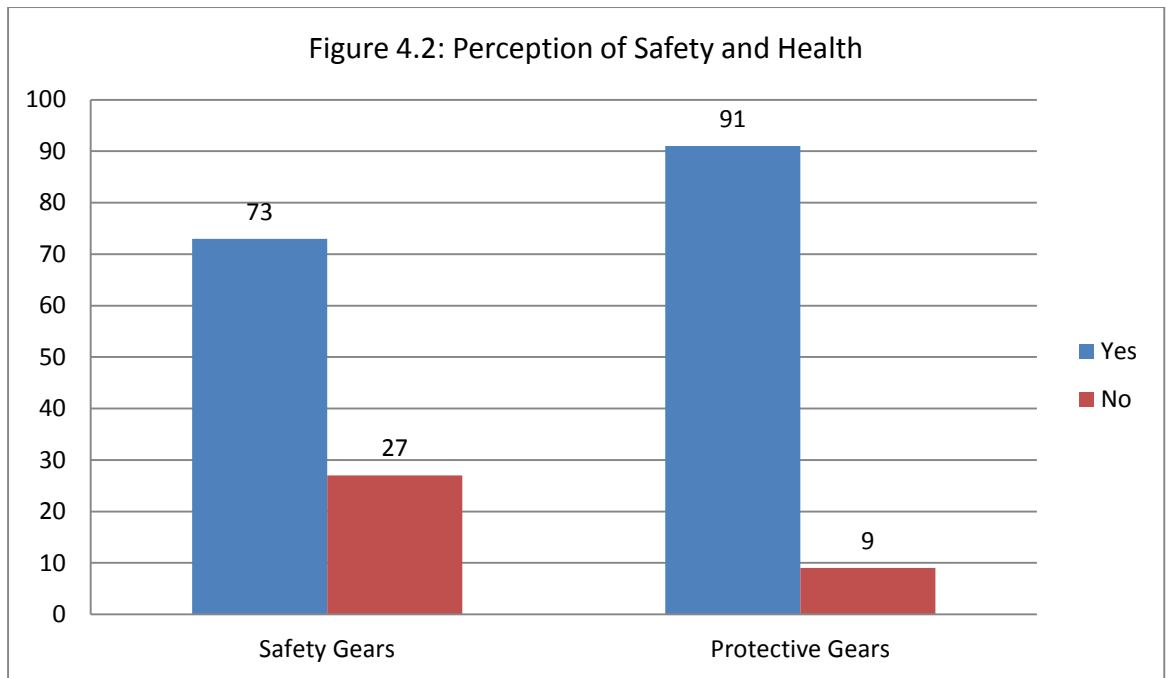
#### **4.1.2 The Respondents' Perception of Risk**

There was a general level of awareness among the respondents that their work environment had implications for their health and safety. The majority of them answered in the affirmative when they were asked whether they were aware of the health and safety policies in their respective workplaces, as indicated on figure 4.1.



From figure 4.1, majority of the respondents (61%) said they were aware of the safety policies in their work places while 39% answered in the negative. Although the majority of the respondents were aware of the safety policies in place, the fact that as many as 39 did not have any knowledge about the safety policies might indicate that not much has been done to educate the workers about the importance of safety management and behavior at work. It is the considered opinion of this research that how well the respondents know about the safety policies in place can influence their perception of health and safety and accordingly, and exact a positive attitude towards the safety culture required at the seaport (Huddy and Feldman, 2006; Slovic, 2000).

Furthermore, 73 of them (73%) admitted having been at work before without putting on a safety wear such as hard hats, helmets and safety boots. Additionally, as many as 91 of them (91%) admitted having worked without putting on any protective gadget such as face mask, nose guard, overall jacket, goggles and ear pieces, among others.



According to figure 4.2, as many as 73 of the respondents could risk working without putting on safety gears, and as many as 91 did so without any protective gears. In the area of safety, therefore, it is a total of 36% who were averse to risk protection. The fact that this might have happened only once in the working life of the respondents does not matter because the perceived risks still existed. In the event of any accident, the health and safety of the affected respondents would have been compromised. The number of occasions on which the respondents had worked without putting on safety or protective gears is presented on table 4.5 as follows:

Table 4.5: The occasions when the respondents do not put on safety and protective gears

	Safety Gears		Protective Gears	
	Frequency	Percentage	Frequency	Percentage
<b>Always</b>	0	0	0	0
<b>Sometimes</b>	31	42	44	48
<b>Just Once</b>	42	58	47	52
<b>Total</b>	<b>73</b>	<b>100</b>	<b>91</b>	<b>100</b>

Out of the 73 respondents who had worked without putting on safety gears before, 31 (42%) had done it not just once, but on a number of occasions, while 42(58%) had done it once. In relation to protective gears, 44 (48%) sometimes do it, while 47 (52%) had done it once. The analysis is an indication that, irrespective of the existence or non-existence of health and safety policies, some respondents have poor perception of health and safety, to the extent that they can ignore all safety and protection protocols and work without protecting themselves against work-related hazards.

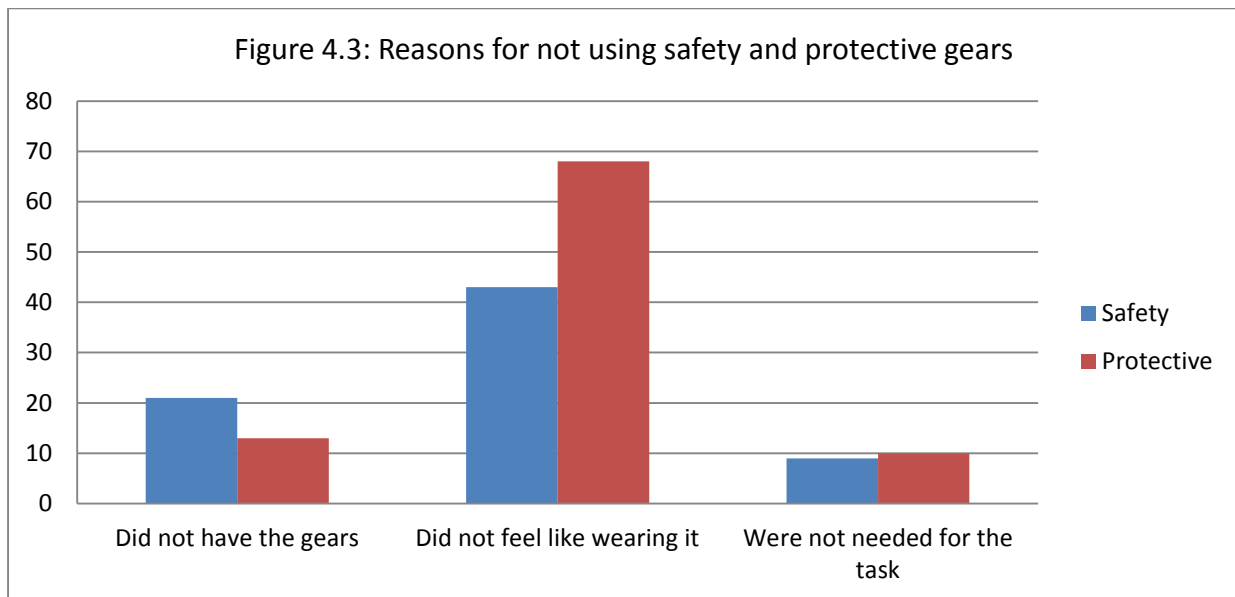
When asked why they did not put on the safety gears, 21(29%) said they did not have them, but 43 (59%) maintained that they had them but did not feel like using them. 9 (12%) however, indicated that the kits were not needed for the task at hand. In relation to the protective gears, 13(14%) did not have the kits at the time, but 68 (75%) did not feel like putting them on, although they had them. However, 10(11%) felt the protective kits were not needed for the given task. Table 4.6 provides details of the responses.

Table 4.6: Reasons for not wearing safety and protective gears

	Safety Gears		Protective Gears	
	Frequency	Percentage	Frequency	Percentage
Did not have the safety and protective kits	21	29	13	14
Did not feel like using them	43	59	68	75
They were not needed for the particular job	9	12	10	11
<b>Total</b>	<b>73</b>	<b>100</b>	<b>91</b>	<b>100</b>

From table 4.6, the most important reason why the respondents did not put on the safety and protective kits was their personal decision not wears them because they did not feel like it. In both safety and protection, those who did not feel like using the kits were in the majority (59% in the case of safety and 75% in the case of protection). The indication is that, the respondents

exercise a poor attitude towards their personal protection and safety, but as indicated on figure 4.3, the situation is better in safety than in protection.



Again, the fact that some of the respondents were allowed to work without putting on their safety and protective gears because the respondents in their judgment felt that the kits were not fit for the task, smacks of compromising health and safety at the supervisory or managerial level. Closely associated with this is the fact that a significant number of the respondents also did not put on the kits because the kits were not available. Granted that the respondents' views are true, it simply means that the respondents' apparent poor health and safety culture also due to some lapse on the part of management to provide the necessary gadgets needed to protect the workers against accidental harm.

Part of the respondents' perception was ascertained based on their disposition towards drugs and other intoxicating substances. When asked whether they had taken alcohol, smoke or other intoxicating substances while at work before, 48 (representing 48%) admitted doing so but the rest said 'No'.

When asked why they did that at work, the responses are presented on table 4.7 as follows:

Table 4.7: The reasons why the respondents drink or smoke at work

<b>Reasons</b>	<b>Frequency</b>	<b>Percentage</b>
For pleasure	12	25
For relaxation	17	35
As energy booster	13	27
As requirement of the job	6	13
<b>Total</b>	<b>48</b>	<b>100</b>

Out of the 48 respondents who said they had smoked or drank alcohol or related substances before, 12(25%) said they did that for pleasure, 17(35%) said they did that to relax their body, 13 (27%) said they used the substances as energy boosters, but 6 (13%) said the job required that they took the substances. All the respondents however agreed that drinking alcohol, smoking cigarette or taking any intoxicating substance was dangerous to their health and safety at work.

Meanwhile, within the last 24 months, 27 out of the 100 respondents had attended 2 training sessions, seminars or conferences, 17 had done so once, but the rest has not had any training at all.

#### **4.1.2.1 Perception of health and safety by gender**

An independent sample t-test conducted to examine the perception of health and safety risks by gender indicated that there was a statistically significance difference between the perception of risks by the male and female dockworkers, as shown on tables 4.8 and 4.9:

Table 4.8: Perception of health and safety risks by male and female dockworkers

	The gender of the Dockworkers	N	Mean	Std. Deviation	Std. Error Mean
Working with Safety Gear	Male	82	1.16	.367	.041
	Female	18	1.78	.428	.101
Working with Protective Gear	Male	82	1.05	.217	.024
	Female	18	1.28	.461	.109

It is clear from table 4.8 that in the use of safety and protective gears, the female dockworkers were more risk averse than the male dockworkers. The females had greater mean of 1.78 and standard deviation of .428 (in the use of safety gears) and a mean of 1.28 and standard deviation of .461 in the use of protective gears.

On the other hand, the male dockworkers had a mean of 1.16 and standard deviation of .367 in the use of safety gears, and a mean of 1.05 and standard deviation of .217 in the use of protective gears, meaning that the male dockworkers were less risk averse than the female dockworkers.

In order to determine whether the observed differences between the risk perception of the male and female dockworkers are statistically significant, table 4.9 is very useful. The independent samples *t*-test first assumes that both male and female dockworkers have equal variances. This assumption is examined by the Levene's Test for equal variances. On table 4.9, the result shows that two groups cannot be assumed to have equal variances, and that, the observed mean differences in the two groups are statistically significant, as indicated by the significance 2-tailed column, the *p*-values of which fall below and/or are equal 0.05, at 95% confident interval.

Table 4.9: Perception of health and safety risks according to gender - the *t*-test for equality of means

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Using Safety Gear	Equal variances assumed	1.484	.226	-6.283	98	.000	-.619	.099	-.815	-.424
	Equal variances not assumed			-5.697	22.828	.000	-.619	.109	-.844	-.394
Using Protective Gear	Equal variances assumed	36.098	.000	-3.198	98	.002	-.229	.072	-.371	-.087
	Equal variances not assumed			-2.059	18.681	.050	-.229	.111	-.462	.004

### 4.1.3 Health and Safety Risks at the Port

In answering to an open-ended question, the respondents identified noise, slips, falls, exposure to gaseous substances, dusts, fumes, smoke emissions and falling objects as constituting health and safety hazards at the port. However, when they were asked to identify the hazard that constitutes the greatest risk to their safety and health, the responses are as presented on table 4.8 below:

Table 4.10: The hazard that constitutes the greatest risk to health and safety

<b>Hazards</b>	<b>Frequency</b>	<b>Percentage</b>
Slips and falls	19	19
Noise	21	21
Exposure to gaseous substances	9	9
Dusts	17	17
Smoke and fumes	8	8
Falling objects	20	20
Fatigue	6	6
<b>Total</b>	<b>100</b>	<b>100</b>

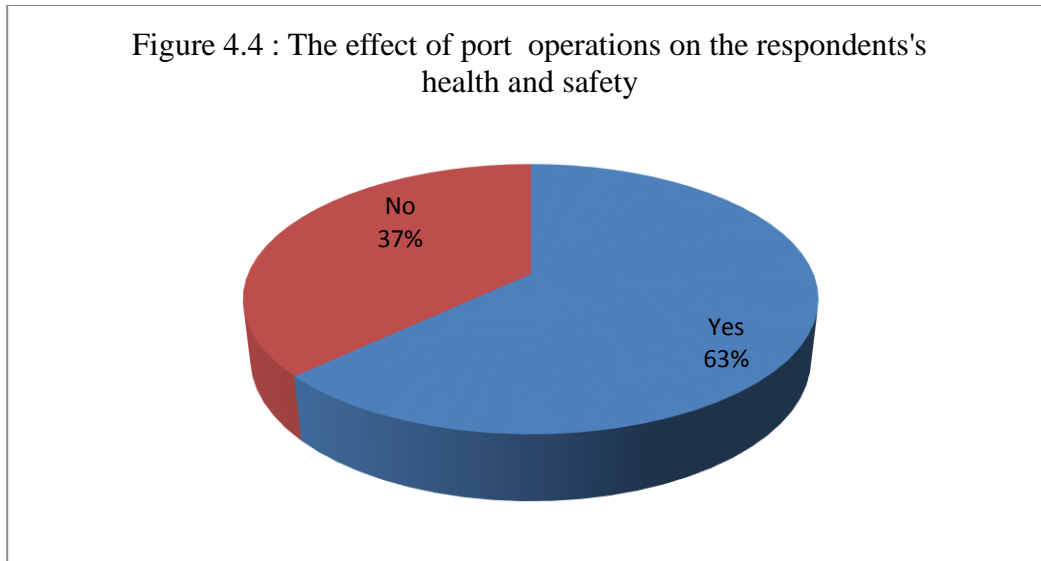
From the table, noise has been identified as the greatest hazard (21%) to the health and safety of the respondents, followed by falling objects (20%) slips and falls (19%) and dusts (17%). Others included exposure to gaseous substances (9%), smoke and fumes (8%) and fatigue (6%). What this implies is that, the risks to health and safety originate from many sources, as indicated in this section.

All the respondents also indicated that they often work over-time, giving the impression it is a common practice at the port to work overtime. If that is the situation, it is indication that the

respondents underestimate how fatigue, arising out of regular overtime work, can constitute a serious risk to their health and safety.

#### 4.1.4 The Impact of Port Operations on Health and Safety

As indicated on figure 4.5, 63 respondents said port operations have had an impact on their health and safety, while the rest said 'No'.



The majority of the respondents (63%) felt port operations had had effect on their health and safety. Some of the reasons they gave for their choice of answer included unusual headaches experienced from time to time in spite of periodic medical checks; feeling of waist and chest pains, feeling of dizziness from time to time; shouting when talking, even in noiseless environments; sustaining various degrees of cuts and injuries, as well as permanent physical signs of scars on the body of some of the dockworkers, sustained on the job.

In addition, 72 said they had been involved in a workplace accident before, while 38 answered in the negative. 64 of them said that they had sustained some form of injury at work before, while the remaining 8 said 'No'. This means that, not all the accidents resulted in injuries being sustained, but accidents are rampant in port operations.

At the time of the accident or injury, 67 (93%) were involved in cargo operations, while 5 (7%) were carrying out maintenance services. The accident sustained also resulted in the following:

Table 4.11: The consequences of accident and injuries

<b>Consequences</b>	<b>Frequency</b>	<b>Percentage</b>
Hospitalized for some time	26	36
Treated and discharged	18	25
Suffered a trauma	9	13
Took days off work	19	26
<b>Total</b>	<b>72</b>	<b>100</b>

The consequences that followed the accidents were various. The majority, 26(36%) resulted in the hospitalization of the respondents, 18(25%) were treated and discharged, 9 (13%) suffered a trauma, while 19(26%) said they took some days off work. What is clear from this analysis is the fact that the work-related accidents affected the respondents' ability to work in one way or the other, a situation which was likely to reduce productivity in port operations. It also means that matters relating to health and safety should be considered as serious and effective measures taken to minimize their incidence or the impact they can have on people when they do occur.

Whereas 29 (40%) of the respondents said they personally paid for the cost of their treatment, the rest said their employers intervened. In 3 out of the 64 respondents who sustained injuries, compensations were paid but no such thing happened in the other situations.

In relation to work-related diseases, 23 respondents said that they had been diagnosed with work-related diseases before. These included the 9 respondents who suffered trauma due to the accidents sustained. The diseases included hearing impairments, spinal (neck and back) problems, pelvic dislocations, tuberculosis and cancer.

On the other hand, the respondents said that due to the risks associated with port operations, they have learnt to be more careful than before. The experience they have gone through has also taught them a lot about port operations and lessons in life in general.

#### 4.2 Responses from the Health and Safety Managers (HSM)

The Health and Safety Managers were five (5) in number, drawn from stevedoring companies (3), the Ghana Ports and Harbours Authority (1) and the Ghana Dock Labour Company Ltd (1).

##### 4.2.1 The demographic characteristics of the respondents

Table 4.12: The demographic characteristics of the HSM

Characteristic	Attributes	Frequency	Percentage
<b>Gender</b>	Male	4	80
	Female	1	20
<b>Total</b>		<b>5</b>	<b>100</b>
<b>Age (years)</b>	18 – 27	-	-
	28 – 37	-	-
	38 – 47	1	20
	48- 57	1	20
	58 – 67	3	60
<b>Total</b>		<b>5</b>	<b>100</b>
<b>Educational background</b>	Tertiary	5	100
	Secondary	-	-
	Basic	-	-
<b>Total</b>		<b>5</b>	<b>100</b>
<b>Level of experience as HSE at the port (years)</b>	1 -3		
	4 – 6	1	20
	7 – 9	4	80
	10 – 12	-	-
	13 – 15	-	-
	16+	-	-
<b>Total</b>		<b>5</b>	<b>100</b>

The HSMs consisted of 1 (20%) female and 4 (80%) males, thereby depicting a male dominance of 60% over the females.

They were aged between 37 and 67 years, with (20%) of them falling between the 38 - 47 year bracket, another 1(20%) in the 48 - 57 years bracket, while the majority (60%) were aged between 58 - 67 years. With an average age of 53 years, the population could generally be described as a matured population

In relation to educational background, all the respondents had obtained tertiary education, meaning that the level of enlightenment of the population was considerably high.

Their level of experience ranged from 4 years to 9 years. 1 (20%) had worked as an HSE at the port for a period between 4 and 6 years, while the rest (80%) had done so between 7 and 9 years. The average number of experience was 7 years, which can be considered good enough to provide the information and data required for this study.

#### 4.2.2 The Health and Safety Culture

In the opinion of the respondents, dockworkers attach a high level of importance to their health and safety. On a scale of 1-10, the probability that a dockworker will put on safety or protective gear was an average of 0.72 (which is 72%). The details as presented on Table 4.11 below:

Table 4.13: The probability that a dockworker will put on a safety/protective gear

HSE	Probability Score	Percentage
1	7/10 (0.7)	70
2	6/10 (0.6)	60
3	8/10 (0.8)	80
4	7/10 (0.7)	70
5	8/10 (0.8)	80
<b>Mean Score</b>	<b>0.72</b>	<b>72</b>

With an average of 0.72 (72%), it means that some gaps exist within the health and safety culture which needs to be addressed and the situation improved, although overall, it is not a bad score, reflecting what the respondents describe as 'high'.

In practice, the respondents gave the indication that they always remind their workers of the need to protect their own health and safety, as well as those of other colleagues, and also answered in the affirmative that their respective organizations have health and safety policies in place.

At the moment, none of the organizations has fully implemented all the elements of its health and safety policy. Altogether, the industry has approached an average of 82% of implementation of health and safety policies. Table 4.12 gives details of the situation.

Table 4.14: Health and safety management policy implementation

<b>HSE</b>	<b>Percentage Implementation</b>
1	75
2	85
3	75
4	90
5	85
<b>Mean Score</b>	<b>82</b>

The table shows a varying degree of implementation of health and safety policies in the various organizations, with the least level of implementation being 75%. The average industry average is 82, which indicates a gap of 18% which the industry must strive to achieve, in order to improve health and safety at the port.

The total number of health and safety training sessions organized by the institutions for their workers within the last 12 months stood at 7, which is an average of 1.4 per organization. In view of the important role which health and safety play in the working life of dockworkers, as well as the impact they can have on productivity at the port, an average of 1.4 training sessions in a year is not good enough.

The respondents also identified the following as the challenges inherent in implementing health and safety programmes:

1. Inadequate financial resources which make it difficult to supply health and safety kits or replace worn-out ones on regular basis.
2. The inability of the workers to work within the health and safety framework outlined for them to help minimize accidents and minimize the impact of such accidents on them;
3. Inadequate co-operation from top management to ensure that the outlined programmes are run according to plan and more effectively.
4. Unclear objectives for the health and safety programmes;
5. Inability of workers to report colleagues who engage in unsafe and unhealthy practices at work at the blind side of supervisors and managers.
6. The refusal of workers to put to practice the skills imparted to them to deal with safety and health problems.

#### 4.2.3 Health and Safety Risks at the Port

Table 4.15: The greatest risk to the health and safety of the respondents' workers

<b>Hazards</b>	<b>Frequency</b>	<b>Percentage</b>
Slips and falls	2	40
Noise	1	20
Exposure to gaseous substances	-	-
Dusts	1	20
Smoke and fumes	-	-
Falling objects	1	20
Fatigue	-	-
<b>Total</b>	<b>5</b>	<b>100</b>

According to the respondents, the greatest risk to the health and safety of their workers are slips and falls (40%), followed by noise, dusts and falling objects with 20% each.

#### **4.2.4. Impact of Port Operations on Health and Safety Management**

The following were identified to be the negative impact of accidents and injuries arising out of port operations:

1. Increased operational budgets because the companies have to spend money to treat injured workers in most situations
2. The compensations paid to injured workers or those who die in the accidents are huge. Those monies can be used to undertake other economic activities.
3. Absenteeism at work. This affects productivity.
4. Accidents and injuries sometimes de-motivate workers. This makes them not willing to perform certain tasks.
5. Accidents and injuries also create negative perception about health and safety of the port in the eyes of the international community.
6. This raises issues with how well the port is complying with the International Safety Management (ISM) code.

In addition to injuries arising out of accidents at work, the following diseases were identified to be the common ones normally diagnosed with dockworkers:

1. respiratory infections
2. spinal problems relating to both neck and back
3. pelvic and waist problems
4. tuberculosis
5. hearing impairments
6. skin diseases

### 4.3 Medical Records from the GPHA Clinic

As part of the research methodology, medical files and records from the GPHA Clinic were examined. The available records covered a period of 24 months, involving 127 cases.

#### 4.3.1 The demographic characteristics of the dock workers on the medical files

Table 4.16: Demographic characteristics of dockworkers on medical files

Characteristic	Attributes	Frequency	Percentage
<b>Gender</b>	Male	121	97
	Female	6	3
<b>Total</b>		<b>127</b>	<b>100</b>
<b>Age</b>	30 - 39	31	24
	40 - 49	29	23
	50 - 59	24	19
	60 - 69	43	34
<b>Total</b>		<b>127</b>	<b>100</b>
<b>Profession</b>	Terminal Handlers	18	14
	Mechanics	25	20
	Weight Masters	9	7
	Stevedores	21	17
	Dockman	29	23
	Vessel guards	13	10
	Deckmen	12	9
<b>Total</b>		<b>127</b>	<b>100</b>
<b>Working time</b>	1 - 5	18	14
	6 - 10	28	22
	11 - 15	42	33
	16 - 20	39	31
<b>Total</b>		<b>127</b>	<b>100</b>

The medical records involved those 121 (97%) males and 6(3%) females. Their ages ranged from 30 to 69 years, with the modal age being 60 to 69 with a frequency of 43 (34%). The youngest age group was 30 to 39, with a frequency of 31 (24%), followed by 40 to 49 with 29(23%), while those in the 50 to 59 bracket were 24 (19%).

In terms of professional grouping, they consisted of 18 (14%) terminal handlers, 25 (20%) mechanics, 9(7%) weight masters, 21(17%) stevedores, 29(23%) dockmen, 13(10%) vessel guards and 12(9%) deckmen.

Their experience at the port ranged from 1 to 20 years. 18(14%) had worked from 1 to 5 years, 18(22%) had done so for 6 to 10 years, 42 (33%) had worked for 11 to 15 years while 39 (31%) had worked for 16 to 20 years.

#### 4.3.2. Medical diagnosis among the workers

Overall, 169 different diagnoses were made in respect of the 127 subjects, meaning that some of them were diagnosed with more than one kind of disease. The diagnoses can be categorized into the following main groups as follows:

##### 4.17: Medical diagnosis

<b>Consequences</b>	<b>Frequency</b>	<b>Percentage</b>
Disease of the musculoskeletal and connective tissue	64	38
Disease of the circulatory system	41	24
Disease of the respiratory system	47	28
Mental and behavioral disorders	17	10
	<b>169</b>	<b>100</b>

Musculoskeletal diseases (inflammatory conditions that cause fractures, pain and impairment at different parts of the body including the upper and lower back, neck, shoulders and extremities such as arms, legs, feet and hands) were the most prevalent among dockworkers with a frequency of 64 (38%).

The next most prevalent diseases were those connected with the respiratory system, and include pneumonia, asthma, lung and liver cancer, tuberculosis, influenza, sinusitis, and respiratory tract infections. These occurred in 47(28%) of the cases.

Circulatory diseases such as hypertension, cardiac dysfunction, leukemia, arteriosclerosis, arrhythmia, acute myocardial infarction and apraxia, were the next most prevalent set of diseases diagnosed, occurring in 41 (24%) of the cases.

The least prevalent set of diseases were mental and behavioral disorders, which occurred in 17(10%) of the cases. These included depression, alcohol and substance abuse, schizophrenia, anorexia, nervosa and eating disorders. Others were dermatitis, trigger finger, tendinitis, and corrective lenses.

#### 4.3.3 Disease prevalence among the various professional groups

Table 4.18 Disease prevalence among the dockwork professional groups

	<b>Musculoskeletal</b>	<b>Circulatory</b>	<b>Respiratory</b>	<b>Mental/Behavioral</b>
Terminal handlers	7	8	6	4
Mechanics	16	5	6	3
Weight Masters	4	-	3	1
Stevedores	9	12	7	6
Dockmen	13	6	12	1
Vessel guards	8	7	4	2
Deckmen	7	3	9	-
<b>Total</b>	<b>64</b>	<b>41</b>	<b>47</b>	<b>17</b>

From table 4.18, there was a greater prevalence of musculoskeletal diseases (relating to bone fractures, impairment and bones) among the mechanics (16), followed by the dockmen (13) and vessel guards (8). The least affected group was the weight masters (4).

Circulatory diseases affected more of the stevedores (12) than any other professional group, followed by terminal handlers (8) and vessel guards (7). None of the weight masters was diagnosed with any circulatory disease.

More dockworkers (12) than any other group suffered respiratory diseases, followed by the deckmen (9) and stevedores (7).

#### **4.4 Discussion**

The fact that the majority (61%) of the respondents were aware of the health and safety management policies in their respective organizations is worth considering. The health and safety managers corroborated this position, except that their perception index was higher (72%) than those of the port workers. It is therefore clear that, dockworkers attach a high level of importance to their health and safety. These findings support the view by Huddy and Feldman (2006) that, the level of awareness about health and safety management policies among a group of workers has the potential of influencing not only their perception of health and safety, but also their attitude towards the safety culture required at the seaport. Slovic (2000), has also stated that an understanding of risk perception is beneficial because it provides insight into people's lifestyle and attitudes towards risks or hazards. It can therefore be argued that knowing the perception of risks can help to establish communication protocols which can be used to educate people about how their disposition towards risk can impact on their health and safety management. The only difference between the findings made in this study and those of Huddy and Feldman (2006) and Slovic (2000) is that, whereas their studies were carried out under

multi-cultural environments, this study focused on only one setting, that is the Port of Tema, where the subjects used were overwhelmingly Ghanaians. This therefore limits the findings to only Ghanaians, as opposed to people from different cultural environments.

Another important issue which may have positively influenced the disposition of port workers towards risk is the involvement of the management of the respective organizations in developing health and safety management policies, and ensuring that the port workers are always reminded about the need to protect their own health and safety, as well as those of other colleagues. This is an indication of the seriousness with which health and safety management at the port is handled. As Amponsah-Tawiah and Datey-Baah (2011) have explained, the panoply of regulations made by the International Labour Organization (ILO) and International Maritime Organization (IMO) to regulate health and safety management will have no effect, if the member countries and shipping organizations operating therein do not localized these regulations and provide rules and guidelines to implement those regulations. The provision of health and safety management policies therefore is consistent with the provisions of the Occupational Safety and Health (Dock Work) Convention, 1979 (No. 152), the *Article 6* of which recommends that appropriate health and safety measures should be applied to dockworkers. This is in spite of the fact that Ghana has not yet ratified ILO's four core conventions on occupational health and safety, that is, Conventions 155, 161, 170 and 174 (Amponsah-Tawiah and Datey-Baah). It stands to reason therefore that, if these conventions are ratified and appropriate measures taken to effectively implement them, a higher degree of success could be achieved in health and safety management at the port. This is particularly important because the application of those ILO conventions will complement the implementation of the ISM Code which predominantly relates to ship-board activities, but has implications for port side operations as well (Cezar-Vaz, 2014).

In spite of the efforts being made by management in ensuring that health and safety policies are effectively handled at the ports, there appears to be certain lapses in the management system, in relation to lack of effective supervision of port workers, and non-provision of the required health and safety kits. This was reflected in the findings in which 73% and 91% of the respondents indicated that they had worked before without putting on safety and protective gears respectively. A situation of this kind cannot exist if there is effective supervision of the workers in the use of their health and safety kits. It does not also matter whether the non-use of the gears lasted a few minutes or hours - anything could have happened within that time to endanger the health and safety of the workers concerned. This issue has been well addressed by Bailey, Ellis and Sampson (2007) and Cezar-Vaz (2014), who maintain that the lifestyles of dockworkers, and human-centred elements such as negligence, carelessness, non-compliance with safety rules and regulations, over-confidence and complacency have been identified to cause accidents and personal injuries at the port. It is therefore crucial that efforts by management take these issues into consideration in the implementation of their health and safety management policies and regulations.

Also worthy of note is the non-provision of the health and safety kits by management in some 29% of the circumstances. This simply means that the respondents' apparent poor health and safety culture has been influenced by some lapses on the part of management to provide the necessary gadgets needed to protect the workers against accidental harm. The literature by the National Center for Injury Prevention and Control (2006) does not make specific mention of the non-provision of health and safety kits as a contributing factor to accidents and injury at the port, but it mentions the inability of the authorities to provide safe and healthy working environments for workers in some circumstances. In this instance, providing 'safe and healthy working environments' can be so interpreted to include the provision of the safety and

protective gears for workers, working under safe and healthy conditions. Be that as it may, the findings is consistent with the literature.

In relation to the hazards identified at the port, discrepancies were found between what the dockworkers pointed out and what the health and safety managers also identified. Whereas the dockworkers considered noise to be the greatest hazard (21%), followed by falling objects (20%), the health and safety managers identified slips and falls as the greatest (40%), followed by noise with 20%. The differences may be as a result of the fact that both parties may be using different database or records of such hazards. Indeed, not all accidents may be officially reported, and this could account for such differences. However, the various hazards fall within those which have been described in the literature (Raine, 2006; Bailey, Ellis and Sampson, 2010; Quinlan, 2013). When compared with other high risk industries such as textile and engineering factories, noise and exposure to hazardous substances are the hazards which are common to all (Desert Research Institute, 2005).

Based on the information obtained from the respondents and the GPHA Clinic, it is evident that dock work carries one of the highest risks of traumatic injuries, the most common of which are musculoskeletal diseases (inflammatory conditions that cause fractures, pain and impairment at different parts of the body including the upper and lower back, neck, shoulders and extremities such as arms, legs, feet and hands). This supports Soares et. al. (2008) and Waskiewicz (1990), who reported that the majority of injuries involved the lower back, the hands, the trunk, the lower limbs, and the feet.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents a summary of the findings from the fieldwork, draw conclusions and make recommendations on how to improve upon health and safety culture at the port, based on the given circumstances.

#### 5.1 Summary of Findings

1. A significant majority of the dockworkers were males (82), while the females were 18, making a total of 100. They were aged between 18 and 58 years and above, with most of them (33%) being in the 38 - 47. The mean age was 43 years, thereby making the subjects relatively youthful.

A total of 82% of them had undergone formal education, with most of them (23%) being secondary school certificate holders. There was 18% who had had no formal education at all. The diverse educational backgrounds of the respondents therefore enabled the researcher to obtain diverse opinions for analysis in this study.

The most dominant group among the dockworkers were dockmen, who were 37 in number, followed by holdmen (18), deckmen (16), drivers (9), gearmen (9) checkers (6), warehousemen (5). The workers have had varying years of experience working at the port, with the majority of them (72%) having worked between 4 years and over 10 years.

On the other hand, the health and safety managers consisted of 20% females and 80% males, aged between 37 and 67 years, with the majority of them (60%) falling between 58 and 67 years. All them had obtained tertiary education and worked at the port for between 4 and 9 years.

As regards the information obtained from the GPHA Clinic, the medical records involved 121 (97%) males and 6(3%) females, aged between 30 and 69 years, and involved 18 (14%) terminal handlers, 25 (20%) mechanics, 9(7%) weight masters, 21(17%) stevedores, 29(23%) dockmen, 13(10%) vessel guards and 12(9%) deckmen. Their experience at the port ranged from 1 to 20 years.

2. The majority of the respondents (61%) were aware of the safety policies in their work places, and indeed, all the health and safety managers indicated that they had health and safety management policies in their workplaces, with average policy implementation level of 82%. According to the managers, the probability that a dockworker will put on safety or protective gear was an average of 0.72 (which is 72%). In addition, they always reminded their workers of the need to protect their own health and safety, as well as those of other colleagues.

This notwithstanding, 73% of them had worked before without putting on a safety gear, while 91% also done so without using any protective gadget, but 58% and 52% admitted doing it just once in the case of safety and protective respectively. Among the reasons cited for not using the safety and protective gadgets were the fact that some of the workers did not have them or did not feel like using them and the fact that the gears were needed for the job at hand.

In addition, 48% admitted having taken alcohol, smoke or other intoxicating substances while at work before, for reasons such as pleasure (25%), relaxation (35%), energy booster (27%) and as requirement of the job (13%).

Overall, an independent samples *t*-test which was conducted showed that the female dockworkers had higher perception of health and safety risk than the male dockworkers, and that, the observed differences were statistically significant ( $t = -6.283$ ,  $df = 98$ ,  $p < .001$ ) in the use of safety gears; ( $t=-2.09$ ,  $df=18.681$ ,  $p=0.05$ ) in the use of protective gears.

3. The respondents identified noise (21%), falling objects (20%), slips and falls (19%), dust (17%), exposure to gaseous substances (9%), smoke and fumes (8%) and fatigue (6%) as the main health and safety hazards at the port. On the other hand, the health and safety managers identified the key health and safety hazards as slips and falls (40%), followed by noise, dusts and falling objects with 20% each. Based on the observed differences in the assessment of the key health and safety hazards at the port, one is inclined to put a lot more weight on the assessment of the dockworkers, since they are the people on the ground and know what affect them most. The situation could also mean that perhaps, management feel remotely attached to the dockworkers and therefore are unable to know what hazards greatly affect the dockworkers. In another breadth, management may be doing the assessment based on cases which are formally reported to them. Their assessment therefore may be backed by the available data. The lesson however is that, an assessment of the hazards and health risks should not be based solely on reported cases, but on surveys conducted from time to time in relation to the subject matter.
4. 63% felt port operations had had effect on their health and safety, such as developing unusual headaches waist and chest pains, dizziness, ear problems, and various degrees of injuries.

Furthermore, 72% had also been involved in workplace accidents before, out of which 64% resulted in injuries. 93% of the accidents occurred during cargo operations, and resulted in hospitalizations (36%), days off work (26%) and trauma (13%). 40% of the respondents personally paid for the cost of their treatment, while their employers intervened in 60% out of the case. Only 3 out of the 64 who sustained injuries received compensations from their employers.

According to the health and safety managers, the impact of such incidents on their operations include increased operational budgets; using money to compensations instead of using it for other economic activities; absenteeism; employee de-motivation; creating wrong perception about the health and safety culture at the port, in relation to compliance with the ISM Code.

In relation to work-related diseases, 23 of the respondents had been diagnosed with work-related diseases before, including hearing impairments, spinal (neck and back) problems, pelvic dislocations, tuberculosis and cancer. respiratory infections. This was corroborated by both health and safety managers and information obtained from the medical records at the GPHA Clinic, which ranked musculoskeletal diseases (inflammatory conditions that cause fractures, pain and impairment at different parts of the body including the upper and lower back, neck, shoulders and extremities such as arms, legs, feet and hands) as the most prevalent disease among dockworkers with a frequency of 64 (38%). Others included respiratory infections (pneumonia, asthma, lung and liver cancer, tuberculosis, influenza, sinusitis, and respiratory tract infections), circulatory diseases such as hypertension, cardiac dysfunction, leukemia,

arteriosclerosis, arrhythmia, acute myocardial infarction and apraxia), as well as mental and behavioral disorders. These affected all categories of dockworkers.

7. Among the challenges inherent in the implementation of health and safety management programmes are inadequate financial resources, non-compliance by some workers with health and safety management guidelines, inadequate cooperation from top management, unclear health and safety management programme objectives, inability of workers to report colleagues who engage in unsafe and unhealthy practices at work, and the refusal of workers to put to practice the skills imparted to them to deal with safety and health problems.

## **5.2 Conclusions**

Based on the findings and discussions, a number of conclusions can be drawn from the study as follows:

Dockworkers are exposed to a number of health and safety risks at the port. This is irrespective of the sex, age, work experience and dockwork category. Indeed, the medical records from the GPHA Clinic clearly demonstrated that the various types of diseases diagnosed affected all manner of dockwork professionals, cutting across age, gender and work experience. This must serve as a guide to all dockworkers to take personal responsibility to protect oneself against any health and safety risks.

Furthermore, ensuring effective health and safety at the port requires total cooperation from the authorities of the various shipping organizations (including the Ghana Ports and Harbours Authority) as well as the port workers. The findings had pointed out that although the various organizations had in place health and safety management policies, about which the majority of

the dockworkers were aware, there were deficiencies in implementation and compliance by the dockworkers. This had resulted in a situation where some dockworkers could work without putting on safety and protective gears. This could only be due to lack of effective supervision on the part of the authorities in ensuring that there is effective compliance by the dockworkers. However, the female dockworkers had greater perception of risk than the male dockworkers. This means that the female dockworkers were more conscious of their health and safety, and were more likely to put on safety and protective gears when working. This situation could be due to natural consequences because males generally appear braver than females and are therefore able to take on certain risks which the females will not venture taking. However, doing this at a risk environment like the port is not commendable.

Furthermore, it is not just enough to develop health and safety management policies or organize training sessions for the dockworkers, without creating safe and healthy working environments for them, or providing them with the needed safety and protective gears to work with. It is management's responsibility not to leave health and safety management to chance, but make a deliberate and conscious effort to protect the workers from health and safety risks.

The lifestyles of some of the dockworkers have the possibility of increasing the risks to which they are exposed. That is to say, while drinking alcohol and smoking intoxicating substances can be harmful to one's health, they can also increase the possibility of work-related accidents or injuries, thereby making the personal lifestyles of the dockworkers an important issue in health and safety management.

Overall, the objectives of the study have been achieved. The dockworkers perceive their work as risky and are clearly aware of the risks to which they are exposed, except that due to negligence, complacency or over-confidence, some of them risk their lives by not putting on safety and protective kits, while working. In addition, the various risks which are associated

with dock work have been identified with noise, trips and falls as the most dominant risks. It has also been established that dockwork results in accidents and injuries, but it is also associated with diseases which affect the musculoskeletal, respiratory and circulatory systems, as well as mental and behavioral disorders.

### **5.3 Recommendations**

1. The dockworkers must strictly comply with the health and safety management policies and regulations of their respective organizations, particularly that of the port authority. This is necessary for the dockworkers to respect their own personal safety and that of other colleagues. However, the port authority and the supervisors of the dockworkers must supervise the dockworkers more effectively to ensure that they do not work without taking safety and protective measures under any circumstances. In this regard, dockworkers must report those who flout the rules and regulations in order for penal actions to be taken against them.
2. The dockworkers must make an official report on every health and safety incident that occurs in the course of their work. This is necessary to assist the port authority and stevedoring companies to have a clearer picture of the main hazards or risks which the workers are exposed to, so that the appropriate remedial actions can be taken to deal with the situation. This however calls for a deliberate action plan by the port authorities to review the hazards at the port from time to time to know which of them affects the health and safety of dockworkers most, in order to make decisions based on the information. A quarterly review will be very appropriate.

3. The dockworkers must undertake voluntary health screening at the clinic designated for them. This will enable them to detect any possible disease or infection earlier so that an appropriate action can be taken to deal with the problem. The screening should concentrate on the key related diseases such as musculoskeletal diseases, respiratory and circulatory infections, as well as mental or behavioral disorders. However, the port authority must ensure that this screening service is made available for the port workers to access freely, so that financial limitations will not discourage the dockworkers from undertaking the screening.
  
4. The dockworkers must also change their lifestyles and avoid drinking and smoking at work, since this increases the risks of involving themselves in accidents or developing any of the respiratory diseases. This calls for effective education and counseling.

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**APPENDIX I**

**DEPARTMENT OF MARITIME STUDIES  
REGIONAL MARITIME UNIVERSITY, ACCRA**

**QUESTIONNAIRE FOR DOCKWORKERS**

*This questionnaire is intended to solicit information from you to complete a dissertation on the impact of port operations on the health and safety of dockworkers at the Port of Tema.*

*The researcher is a student of the Regional Maritime University and requires the information to complete a dissertation, which will be submitted to the Regional University as a requirement. You are kindly requested to answer the questions as candidly and objectively as possible. Any information provided will be treated with utmost confidentiality. Thanks for your cooperation.*

**A. Demographic Data of the Respondents**

(Please tick (✓) where appropriate)

1. Gender of Respondent

Male

Female

2. Age of respondent

18 - 27

28 - 37

38 - 47

48- 57

58 +

3. Respondent's level of education

Tertiary education (university, polytechnic, professional training etc)

Secondary education (GCE O/A Level, Senior High School, Commercial/Technical)

Basic education (Middle School, JHS etc)

Non-formal

Other (specify).....

4. What role do you play in port operations?

Deckman

Dockman

Driver (forklift, crane, truck etc)

Checker

Holdman

Gearman (mechanic/maintenance etc)

Warehouseman

5. For how long have you worked at the port?

- 1-3 years
- 4-6 years
- 7-9 years
- 10+ years

**B. The Respondents' Perception of Health and Safety**

6. Are you aware of the health and safety policies in your organization?

- Yes  No

7. Have you ever worked without putting on safety wear ( such as hard hats, helmets and safety boots etc) before?

- Yes  No

8. Have you ever worked without putting on protective gear (such as face mask, nose guard, overall jacket, goggles and ear pieces etc) before?

- Yes  No

9. If you answered 'Yes' to question 7 and/or 8, indicate how often you do that.

- Always
- Sometimes
- Just Once

10. If you answered 'Yes' to question 7 and/or 8, give reasons for not wearing safety or protective wear at work.

- Did not have the safety and protective kits
- Did not feel like using them
- They were not needed for the particular job
- They were not needed for the particular job

11. Have you taken drugs or other intoxicating substances (such as alcohol, cigarettes etc) at work before?

- Yes  No

12. If you answered 'Yes' to question 11 above, give reasons for doing that.

- For pleasure
- For relaxation
- As energy booster
- As requirement of the job

13. Do you agree that drinking alcohol, smoking and taking intoxicating substances at work are harmful to your safety and health?

- Yes  No

14. Have you attended any health or safety-related training within the last 24 months?

Yes

No

**C. Health and Safety Risks at the Port**

15. Which of the following constitutes the greatest risk to your health and safety at work?

Slips and falls

Noise

Exposure to gaseous substances

Smoke

Dust

Smoke and fumes

Falling objects

Fatigue

16. Do you often work overtime?

Yes

No

**D. The Impact of Port Operations on Health and Safety**

17. Have you been involved in a workplace accident before?

Yes

No

18. If you answered 'Yes' to question 18, explain what happened to you after the accident

Hospitalized for some time

Treated and discharged

Suffered a trauma

Took some days off-work

19. Apart from accident, have you been diagnosed with work-related disease before?

Yes

No

20. If you answered yes to question 18, what was the nature of disease?

Hearing impairment

Spinal (neck and back) problems

Pelvic dislocations

Tuberculosis

Cancer

Thanks for your cooperation  
Ivan Annan-Mettle

APPENDIX II

**DEPARTMENT OF MARITIME STUDIES  
REGIONAL MARITIME UNIVERSITY, ACCRA**

**QUESTIONNAIRE FOR HEALTH AND SAFETY MANAGERS**

*This questionnaire is intended to solicit information from you to complete a dissertation on the impact of port operations on the health and safety of dockworkers at the Port of Tema.*

*The researcher is a student of the Regional Maritime University and requires the information to complete a dissertation, which will be submitted to the Regional University as a requirement. You are kindly requested to answer the questions as candidly and objectively as possible. Any information provided will be treated with utmost confidentiality. Thanks for your cooperation.*

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(Please tick (√) where appropriate)

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3. Respondent's level of education

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Secondary education (GCE O/A Level, Senior High School, Commercial/Technical)

Basic education (Middle School, JHS etc)

Non-formal

Other (specify).....

**A The Health and Safety Culture**

4. Does your organization have health and safety policies in place?

Yes

No

5. On a scale of 1 - 10, what is the probability that a dockworker will put on safety and protective gear, without being prompted to do so?

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6. How often do you remind the workers in your organization to wear safety or protective gears?
- Always
  - Sometimes
  - Never

7. How many training sessions on health and safety has your organization held for its dockworkers, within the last 12 months?

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8. What challenges do you encounter in implementing health and safety policies?

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**B. Health and Safety Risks at the Port**

9. Which of the following do you consider to constitute the greatest risk to the health and safety of your workers?
- Slips and falls
  - Noise
  - Exposure to gaseous substances
  - Smoke
  - Dust
  - Smoke and fumes
  - Falling objects
  - Fatigue

**C. The Impact of Port Operations on Health and Safety**

10. Which of the following work-related diseases are commonly reported among your workers? respiratory infections
- Spinal problems relating to both neck and back
  - Pelvic and waist problems
  - Tuberculosis
  - Hearing impairments
  - Skin diseases

Thanks for your cooperation  
Ivan Annan-Mettle