UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

THE INFLUENCE OF CONSTRUCTION WORKERS' PERCEPTION OF HEALTH AND SAFETY RISK ON THEIR BEHAVIOUR: A STUDY OF CONSTRUCTION SITES IN CENTRAL GONJA DISTRICT.

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A dissertation to The Department of CONSTRUCTION AND WOOD TECHNOLOGY EDUCATION, FACULTY OF TECHNICAL EDUCATION, University of Education, Winneba in partial fulfillment of the requirement for the award of Master of Technology (Construction Technology Education)

AUGUST, 2018

DECLARATION

STUDENTS DECLARATION

I hereby declare that this dissertation is the result of my own original research, except the quotations from books which I have acknowledged; and that no part of this study has been presented for another degree in the University Of Education, Winneba or elsewhere.

Candidate's Name: IBRAHIM KAILA MOHAMMED

Signature of student…… Date……

SUPERVISOR'S DECLARATION

I hereby declare that preparation and presentation of this dissertation was supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Education, Winneba.

Supervisor's Name: Dr. Kheni Alkanam Nongiba

Signature of Supervisor…… Date……

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God bless you all.

DEDICATION

I dedicate this dissertation to the entire Yidaan Zemoli family.

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ABSTRACT

Construction project sites are prone to many hazards that can result in accidents if they are not properly controlled. Construction site workers are by far the group that is most exposed to hazards on construction sites. Their perception of the risk of health and safety hazards in general is an important issue on construction sites. The aim of the study was to examine the perception of workers about the risk of hazards and their behaviour on construction sites. The study adopted a quantitative research strategy involving the design and administration of survey questionnaires. The target population of this study comprised personnel of construction project sites in Central Gonja District. The study employed convenience sampling technique to select a sample size of 170 site personnel of construction companies from 16 different construction sites in the Central Gonja District. A response rate of 88% was achieved. The findings revealed that proactive steps taken by site personnel to minimize risk of hazards included; the display of standard site rules and hazard signs at construction sites by site personnel, appointing someone responsible for aspects of health and safety and ensuring clear goals and objectives for the health and ssafety on site, On the second objective, the study revealed the following factors affecting health and safety behaviour of site operatives on sites; using personal protective equipment for protection against falling objects and while working on platform, hoist and scaffolds, being cautious when excavating trenches below ground level, paying attention when using vibrating equipment at site and paying attention to their health conditions when lifting, carrying or moving heavy tools or materials at site. Also, the site operatives' behaviours towards health and safety hazards include; clearing the construction site of obstacles and dangers whenever they can, a view of health and safety at site as a serious issue and reporting to site management on issues bordering on health and safety without fear. It is recommended that construction companies should reinforce health and safety training programmes on regular bases for all categories of workers.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Safer behaviour is reflected by good attitude. Many accidents/incidents that occurred in the workplace especially in the building construction sites were due to inadequate adherence of workers to work procedures. The workers must realize that they play an important role contributing in the accomplishment of the building construction. Article 5 Section 24 (1) of the 1992 Constitution of the Republic of Ghana states that "Every person has the right to work under satisfactory, safe and healthy conditions…" The National Building Regulation of 1996 stipulates the need to ensure safety precaution measures at the construction site. Accident do terminate life or cause permanent and temporary disabilities to workers and users, and these result in reduced productivity, non-conformance to quality standards, time overruns and cost overruns of the projects.

The influence of construction workers' perception of heath safety risk on their behaviour and their working environment are important aspects to enhance the building construction to the better condition to the workers themselves. However, the country's drive for socio-economic development and the improvement of social welfare prompts the need for more infrastructural development. This stimulates the need for appropriate measures to be put in place to ensure safety of workers and reduced fatalities. This will enhance the safety performance of the construction industry in the country and reduce the socio-economic cost associated with safety related accidents for construction firms, their employees and society as a whole.

According to Kheni et al. (2008), the poor safety performance of firms in the construction industry in most developing countries could be attributed to lack of express and adequate safety controls. Construction projects in these countries are characterized by numerous risk factors including the high levels of uncertainty regarding the cost, completion time, and quality of output, which not only threaten the general performance of the industry, but have serious repercussions for the socio-economic development of a nation. This affects the behaviour of all major stakeholders in the industry.

The nascent economies of Africa have recorded equally high rates of work-related accidents in their construction industries. However, according to Loewenson (1999), reported data on construction industry accidents are inadequate and unreflective of the real facts on the ground. She attributes factors such as poor coverage of certain employee clusters, poor ability of authorities to ascertain the causes of disease and their relation to work, and the characteristics and bottlenecks within the reporting systems in these countries. (International Labour Organization 2007; Kheni, Dainty& Gibb 2008; Idoro 2011). Ghana, like many emerging economies, have a very fledgling construction industry characterized by low worker awareness of safety management practices that are widely adopted by more advanced economies coupled with some negative cultural factors.

According to Harsini and Ghofranipour (2016), this is even higher when employees perceive that management is not living up to their safety commitments and promises and employees who feel their safety is being short-changed for profits (Mearns et al. 2001) or for higher productivity (Lee and Harrison, 2000), tend to engage in unsafe behaviours as a way of registering their dissatisfaction with management, especially when they are forced to work

under pressure. Therefore, to ensure appropriate safety behaviours, management needs to apply policies and rules that create a culture of safe employee work behaviour.

Every case of construction accident involving casualty of an individual or to a number of workers had never been investigated thoroughly and ironically the matters are finally resolved with conclusion of careless conduct (Danso, 2010; Kheni, 2008).

Also, Hale, Walker, Walter and Bolt (2012) opined that the construction industry is complex and quite inefficient in handling worker safety issues. Similarly, Laryea and Mensah (2010) found that the construction industry is increasingly evolving, presenting new safety concerns. According to them, this evolution, coupled with high employee turnover rates, makes the industry more risky than any other industry as the safety awareness of employees is not always adequate (Sha, 2010). This is supported by Khan, Suguna and Raghunath (2015) who reiterated that awareness of the safety risk exposure and risk management practices in the construction industry is low and the level of importance given to these issues is uneven at the different levels within the industry (See also Shamsuddin, Ani, Ismail, & Ibrahim 2015).The cost of accidents to construction firms has led many studies to advocate for prevention and/or reduction in the rate of accidents in the construction industry (Leopold & Leonard 1987; Kheni 2008). This led to a paradigm shift in the approach to construction safety management globally.

According to HSE (2016), over the past 25 years, the construction industry in the United Kingdom has been a leadings accident prone occupation compared to other industrial sectors. This is not different from China, where the construction industry is noted for its high rates of work related accidents. Moreover, Safety remains an ongoing concern for the construction manager. Construction by nature is inherently dangerous, with a high degree of hazard and

risk. The toll of construction accidents is high in terms of both costs and human suffering. Accidents add a tremendous burden of needless and avoidable expense. Financial loses pale when compared to bodily injury and death, and the resulting human, social impacts. Construction accidents add $10 billion annually to construction cost. Insurance (such as workmen' compensation) protects the contractor from certain direct expenses, but accidents also involve substantial costs that are not insurable, referred to as hidden or indirect cost (Bob Muir, 2005).

According to Center for Disease Control and Prevention, (2009) Construction workers build our roads, houses, workplaces, repair and maintain our nation's physical infrastructure, these works includes many hazardous tasks and conditions such as work at height, excavations, noise, dust, power tools and equipment, confined spaces and electricity.

Safety in construction sites is needed to be highly considered in order to reduce the risk of being injured at work. Safety is also identified as one of the major factors affecting the image of the project manager and the organization (Grandjean. 2011). "Safety, health and welfare on construction sites", the training manual published by the International Labour Office in Genev, states that high rate of accidents occurs in the construction industry than in the other manufacturing sector. This is possibly because the construction industry consists of high self-employed workers, and large number of seasonal and migrant workers; when safety risk is accurately perceived, workers are more likely to adopt responsive safety measures to prevent injuries (Arezes and Miguel 2008). These studies have proposed that individuals with a higher degree of self-efficacy will be more motivated, directly or indirectly, to engage in safety behaviours. Other scholars, instead of targeting specific industries, have chosen to

address specific safety issues and behaviours, such as the use of hearing protection (Arezes and Miguel, 2008),

1.2 Statement of Research Problem

The quandary of safety risk exposure and related health issues have become a global concern, especially for stakeholders of the construction industry, which records most incidences of work-related accidents and diseases globally. In Ghana the state of safety practices violation on construction site are very rampant and glaring. The labour Department in Ghana in the year 2000 reported that the country's construction industry accounted for the highest rate of occupational accidents in comparison to other industrial sectors .According to the labour Department report 56 out of a total of 902 occupational accidents that occurred on construction site were fatal. Workers in the construction industry have little control over safety practices on their job sites. This is even direr in nascent economies, where employee safety legislations are either inadequate or relaxed. This is reinforced by poor monitoring systems and negative socio-cultural factors (Soehod & Lekha 2007). However, there is growing global agitation for increased occupational health and safety legislation in most countries and many countries, seek to improve the safety environment for workers in general and those in the construction industry in particular.

Given the popular negative effects of these risk factors, especially on health and safety outcomes, construction firms must exploit strategies not only to prevent accidents but also reduce the level of fatality when they occur. Recent studies on safety risk management in the industry have therefore concentrated on prevention of accidents and exposure to disease and accident causing factors. Examples of these strategies include safety audits, hazard analysis and safety climate. This is because, a clear understanding of the safety climate of construction

firms allows for the modification of factors and behaviour to ensure a reduction of risk exposure and improved safety performance, (Hofmann & Stetzer, 1996; Lee, 1998; Zohar, 2000).

Work pressure, or the perception of its existence at work has been found by many studies to influence employee safety behaviour. For instance, Bronkhorst (2015) found out that workers who experience high job demands are more inclined to show unsafe behaviours. Nadesan (2013) also found a significantly negative relationship between work pressure and employee safety behaviour in Malaysia.

Ghana as an emerging country has a huge infrastructure deficit with general road network development still at a fledgling stage. This offers a huge space for both the state and private entities to deliver on the infrastructural needs of citizens. This large and inexplicable sector is prone to very high levels of accidents and other risk (Kheni, 2008). Earlier studies on construction safety in Ghana have focused on finding out the types and basic causes of construction site accidents in the country. Though many studies in other countries and sectors have has shown a relationship between work pressure and employee safety behaviour, the researcher found no prior research on work pressure and its effects on employee safety behaviour and safety performance of the construction sector in Ghana.

Therefore, this study proposes to examine work pressure as a dimension of safety climate and its effects on employee safety behaviour and the safety performance of construction sites. It will therefore cover both road and building construction firms to allow for more general solutions to the problem and ensure higher safety performance of the industry in general. The aim is to bring out facts that will help improve the safety management systems adopted by

construction firms and reduce the number and effects of construction site accidents and illnesses in the country.

1.3 Aim and Objectives of the Study

The aim of the study is to examine the perception construction site workers about the risk of hazards on construction sites and their behaviour. Specifically, the study seeks to achieve the following:

- to identify the extent to which construction site personnel in the Central Gonja District take proactive steps to minimize the risk of hazards;
- to identify factors that affect safe and healthy behaviour of construction workers on project sites in the Central Gonja District;
- to assess site operatives' behaviour towards hazards on construction sites in the Central Gonja District; and,
- to make recommendations for promoting safe and healthy attitudes towards hazards on construction sites in the Central Gonja District.

1.5 Research Questions

From the above objectives stated, the study shall find answers to the following pertinent questions:

- What are the extent to which construction site operatives in the Central Gonja District take proactive steps to minimize the risk of hazards?
- What are the factors that affect safe and healthy behaviour of construction workers on project sites in the Central Gonja District?

- What are the behaviours of construction workers towards health safety risk in construction sites?
- What are the recommendations for promoting safe and healthy attitudes towards hazards on construction sites in the Central Gonja District?

1.6 Significance of the Study

A developing country like Ghana is an emerging country which is still faced with major infrastructural development challenges. Successive governments in Ghana have always considered infrastructure as a major need and have often allocated huge national resources to this industry. This study comes at a time when the government of Ghana is undertaking massive infrastructural development across the nation and encouraging private entities to go into the industry to help reduce the infrastructural deficit in the country. An understanding of health and safety behaviour of construction site workers and its implications for firm safety performance will go a long way to guide policy formulation and implementation aimed at ensuring more effective safety precautions and guidelines tailored to suit the Ghanaian context.

There is also growing concern for the high construction accidents and a study aimed at helping to provide a better understanding of the safety needs and implementation strategies of construction workers in Ghana is not only timely, but necessary. The study is expected to bring out the facts and suggest new ways of improving the safety measures put in place by the law, contract awarding institutions, construction companies, and employees at construction sites. It is the conviction of the author that the findings of this study will be of value not only to ensuring the safety of the workers on construction sites, but reducing the social and economic cost that goes with construction site accidents in the country.

1.7 Scope and Limitations

This research is an in-depth study on the influence of construction workers' perception of health and safety risk on their behaviour in construction site at Central Gonja District. It was limited to a relatively small sample of construction workers to allow for a more comprehensive study and analysis of the subject matter. This forms a heterogeneous sample that allows for the socio-cultural determinants of construction worker behaviour and perceptions to be studied. The study was also on building construction sites.

1.8 Organization of the Study

The study comprises 5 chapters which are organized as follows: Chapter One comprises an introduction, giving an overview of the study. It presents a broad background for the rest of the study, guiding readers through motivation and objectives of the study. Chapter two presents the theoretical and empirical literature that forms the conversation this study seeks to join. It therefore serves as a foundation for this study and its findings. Chapter three presents the methodological tools and data analysis and presentation techniques that were employed in the study to arrive at the conclusions of the study. Chapter four is made up of the data analysis and presentation of the facts found from employing the various methodological tools whiles Chapter five comprises the summary of the study's findings and their discussion as well as the conclusions of the study and the recommendations that reveals the additions of this study to the conversation on safety performance and its improvement in nascent economies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a summary of the various contributions earlier studies have made to the concept of influence of construction workers perception on health and safety risk on their behaviour and management issues that are pertinent to the current study. This is expected to serve as a guide for the rest of the work. It also helps identify the gaps in the literature and helps clarify the focus of this study.

Economic pressures on construction firms to increase productivity can lead to increased exposure to new risks, such as increased accident and injury rates (Sacks, Rozenfeld & Rozenfeld, 2005).

According to Sacks, Rozenfeld and Rozenfeld (2005), the dynamic, complex, and often unpredictable construction tasks and environment add to the risks. Thus, improving safety in construction remains a priority in almost every country around the world, because the construction industry stands out among all other industries as the main contributor to severe and fatal accidents. While there have been improvements in occupational safety outcomes over the last few decades, the construction industry remains the sector with the greatest number of fatalities. A Center to Protect Workers 'Rights report states that in 2008, the fatality rate in construction industry accounts for an annual total in excess of 1,000, which is more than three times the fatality rate of the manufacturing sector. The report also states that there are more than 182,000 serious injuries annually in construction. The loss or injury of trained and experienced workers, and the resulting disruption to progress of work, undeniably represent waste in the performance of construction. When left uncontrolled, these factors can

create disruption due to many cost related factors; such as escalating workers' compensation insurance costs, high cost of medical treatment and rehabilitation programm. The economic losses also include indirect losses such as administrative cost, productivity losses and low morale.

The International Labour Organization (ILO) estimates that there are at least 60,000 fatal accidents on construction sites around the world each year. This means one construction fatality occurs every ten minutes. Construction accounts for a 17% (one in six) of all fatal workplace accidents (ILO, 2005). Improving safety practices in the construction industry is essential, not only because enlightened clients demand excellent safety performance from construction workers behaviour, but also due to continuous search for more economic benefit and increased productivity. Economic pressures on construction firms to increase productivity can lead to increased exposure to new risks, such as increased accident and injury rates (Sacks, Rozenfeld & Rozenfeld, 2005).

2.2 Health and Safety in Construction

According to the International Labor Organization (2005), occupational hazards and work related safety concerns are characteristic of the construction industry in any country and workers are exposed to very precarious working conditions on a regular basis for even the most small construction project. The industry is full of perils, even for the most skilled worker and continues precaution and management of safety risk is necessary for every firm and individual worker in the industry. The very nature of construction work, coupled with other predisposing factors makes the industry more prone to incidences of accidents and work related diseases than most other industries. However, apart from the general perils presented by the industry as a whole, other environmental factors as well as worker behavior

accounts for the high levels of safety risk exposure in the industry. This, according to Sexies et al (1998) accounts for the differences recorded by different construction firms and even 11 different sites within the same firm. These accidents and work-related illnesses increase the cost of construction projects and often results in huge losses to firms and the individuals involved and may affect the general welfare of society in the long run. The evidence in the literature suggest that the situation is present in both advanced and nascent economies, with both clusters recording very high rates of accidents and work-related health risk exposures over the years. Moreover, the different exposures come with varying degrees of fatality. The most common types of accidents recorded in the construction industry include; crane accidents (Neitzel, Seixas & Ren 2001); scaffold accidents (HSE, 2004); slips, trips and falls (Tappin et al (2004); and electrocution and related accidents (Crowley &Homce 2001)

2.3 Health and Safety Management in Construction

2.3.1 Health and Safety Management Systems

The need for improved occupational safety has been advanced by many civic society groups and other institutions as an urgent but continuous initiative that must be pursued by all organizations. This is especially essential for the construction, agricultural and manufacturing sectors of every economy which record more accidents and occupational health risks issues than most other organizations.

In the construction industry, safety management has previously involved minimizing or if possible, eliminating the safety risk exposure of workers. According to Hamid et al. (2004), construction firms have become proactive in their bid to reduce the incidence and fatality of workplace accidents. This is often achieved through the adoption and implementation of safety management systems that ensure continuous management of worker safety throughout

the construction process. This often includes four basic components: thus, planning; implementing of plans, monitoring and evaluation of plans and corrective actions to improve the safety management strategy of the firm. A similar study by Helledi (1999) suggested that small and medium scale construction firms in Finland adopted similar strategies and recorded varying degrees of success in reducing construction site accidents and disease.

However, according to Biggs, Banks, Davey and Freeman (2013), most methodologies adopted to deal with the problem of occupational health risk in the construction industry are rarely adequate enough to be named as safety management systems. This is because they mostly lack key ingredients according to Deming's Plan-Do-Check-Act (PDCA) cycle. A case in point is Agrilla's (1999) 3Es, which intimates that by adopting safety engineering, safety education and safety rule enforcement, construction firms could improve upon their overall safety performance. This system involves some elements of the PDCA cycle, but lacks the monitoring and evaluation as well as the corrective action needed to improve setbacks in the initial system adopted. According to Vassie et al. (2000), this is even more difficult for SMEs in the construction industry which operates under more informal management systems with no clear safety management systems and procedures.

2.3.2 Behavioral Approaches to Health and Safety Management.

There is evidence in a number of studies suggesting that accidents in organizations are caused by human behavior, either through their actions or inactions (Haslam et al. 2005). Several recent studies have advocated for a behavioral approach to safety risk management through the targeting and modification of human behavior towards desirable outcomes. According to Duff, Robertson, Phillips and Cooper (1994) results in higher safety performance in the construction industry. By combining goal setting and using feedback for improvements of

human behavior, firms in the construction industry and other sectors can improve the safety performance of their projects and enhance overall improvement in occupational health management systems globally.

Additionally, Duff et al. (1994) pointed out that the scope of behavioral methods of workplace safety management should be broadened to include not only operatives but supervisors and management personnel as well. This is because available literature suggests that supervisors and management have a huge role to play in ensuring better safety management practices in construction firms and their behavior have repercussions for the safety of site workers. Lingard and Rowlinson (1997) applied similar techniques to construction firms in Hong Kong and concluded that by setting goals for safety performance and appraising feedback enhances the overall safety performance of firms. They emphasized the importance of employee commitment to the firm and t work groups as an important variable in achieving set safety performance goals. This is because the safety of workers is intertwined and any individual's behavior may have implications for not only that individual's safety, but the safety of others. Therefore, by modifying individual behavior, overall safety can be improved. By encouraging workers to adopt safety management as their own enhances the probability that they will report incidents of risk exposure, look out for their own and the safety of co-workers, follow laid down health and safety rules on site, and use personal protective equipment provided on-site among other desirable behavioral traits.

2.3.3 Behavioural–based safety

Behavioural-based safety (BBS) addresses unsafe behaviour in a formal management system. Many organisations spend a lot of time and effort improving H&S, by addressing

hardware issues and installing H&S management systems. These efforts tend to produce dramatic reductions in accident rates; however, a plateau of minor accidents often remain that appear to be stubbornly resistant to all efforts to remove them. Although many of these are attributed to human carelessness, or poor H&S attitudes, most are triggered by deeply ingrained unsafe behaviour patterns (Behavioural Safety Now, 2009). BBS not only covers programs that analyses human behaviour in the context of H&S aspects, but also provides research to support intervention strategies.

According to Behavioural Safety Now (2009), behavioural safety, or what is sometimes referred to as behaviour-base safety (BBS), is simply the use of behavioural psychology to promote H&S at work and at home. Behavioural safety typically involves creating a systematic, ongoing process that clearly defines a finite set of behaviour patterns that reduce the risk of injury within an organisation, collects data on the frequency and consistency of those behaviour, and then ensures feedback and reinforcement to ensure support of the behaviour.

In a behavioural process, employees usually conduct observations and provide feedback on H&S practices within their work areas (Groover, 2006).

These observations provide data that is used as the basis for recognition, problem-solving, and continuous improvement.

2.4.1 Health and Safety Problems on Construction Sites

According to Mensah & Laryea (2010), there are safety problems on almost all construction sites which relate to reporting accidents, employing and subcontracting. Employing: all

personnel who are employed to carry out construction work on site must be trained, competent and fit to do the job safely and without putting their own or others' health and safety at risk; properly supervised and given clear instructions; have access to washing and toilet facilities; have the right tools, equipment, plant and protective clothing; educated about health and safety issues with them (or their representatives); have arrangements for employees' health surveillance where required. Accidents: all accidents or work-related illness should be reported to the appropriate authorities within a reasonable or stipulated timeframe. Subcontracting: main contractors should ensure that they check the safety performance of the subcontractors they plan to use; give subcontractors safety information they need for the work; talk about the work with them before they start; make sure that you have provided everything agreed (e.g. safe scaffolds, the right plant, access to welfare, etc.); and check their performance and remedy shortcomings Laryea & Mensah, (2010).

There are two Acts in Ghana (the Labour Act, 2003 and the Factories, Offices and Shops Act, 1970) that provide some form of regulatory instruments for ensuring health and safety on construction sites. However, these are not strongly enforced and many contractors are not even aware of their Health and Safety obligations under these Acts. Regulatory bodies responsible for ensuring compliance are not properly resourced to carry out their statutory responsibilities under the two legislations. Hence there is a big problem with construction health and safety in Ghana. Most workers interviewed in the course of the study indicated that injuries and accidents are common on sites and often they have to go through a long period of frustration and pleading with employers before they are provided with some form of compensation for injuries and accidents. The parties responsible for ensuring internationally acceptable standards of health and safety on construction sites in Ghana are Government, clients, consultants, contractors, workers and civil society. Government should

take the lead in enacting appropriate legislation and enforcing this by resourcing the appropriate Ministries, Agencies and Departments of Government to do their jobs well. Clients, contractors and consultants of the construction sector in Ghana should ensure that every construction contract takes comprehensive account of health and safety requirements for the project, environment and the workers. Workers and civil society should ensure and demand the provision of adequate health and safety policies, procedures and provisions to govern construction work (Laryea & Mensah, 2010).

2.4.2 Health and Safety Practices on Construction Site

Safety practices generally implemented comply with safety statutory in the developing countries. Safety regulations are strictly applied, and it is everyone's obligation involved in hazardous work place to implement it. This may be true in advanced industrial countries where safety programs are taken seriously and programs are maintained as a priority before commencing high risk jobs. Safety practices which are identical to the techniques of accident prevention. Accident prevention in the construction industry is not just a matter of setting up list of rules and making safety inspections, although both have their place. What is required is a system for managing health and safety which meets the needs of the business and complies with the law (Holt, 2001).

The contractor is responsible to use proper material when building hoarding (e.g. lumber, plywood, scaffold frames, tarps). All hoarding must be designed to sustain loads that it is likely to be subjected to such as wind and snow loads and falling debris. Hoarding must meet permit conditions and be constructed in accordance with all local regulatory requirements. Site fencing must be adequately braced and/or secured to withstand site conditions including wind. Consider securing bases and avoid base details that create a tripping hazard. Jersey

barriers can be utilized at strategic points around a construction site to protect the public and construction workers from high incident traffic intersections that are in close proximity to the entrance gates of work sites. Jersey barriers may also be used to protect fire hydrants, gas valves and main power distribution equipment. The location of Jersey barriers would be at the discretion of the jurisdiction having authority. Consider having viewing cut-outs in solid fencing, complete with protection, to allow for public viewing. Light duty scaffold, although designed of sufficient strength to provide the minimum building code or OHS Code standard for an overhead protection system, has restricted width due to the arch frame. It should only be used in the event that the exterior public walkway or sidewalk is too narrow to provide a wider frame work system. Considerations should be made to the width for ease of access and travel for the handicapped, snow removal and maintenance. Heavy duty scaffold is the preferred system if a contractor is planning to utilize the space on top of the hoarding for storage of materials or for locating their field office. This system must be engineered to comply with the building code and OHS Code and have a height of not less than 2.5 meters (8'- 3") and a clear width of not less than 1.5 meters (5' – 0"). The roofing system must be designed and constructed to safely support a minimum of 2.4 kPa (50 PSF). The roofing system must also be watertight and sloped towards the construction site. Splash boards with a minimum height of 300 mm (12") must be installed on the street side. A railing of 1070 mm (42") is required on the street side where the covered way is supported by posts. The structure must also be totally enclosed on the street side with a smooth surface. Consider the use of pre-engineered structures such as modified containers. When heating equipment is used within a hoarding, adequate fire protection must be used. Air quality monitoring may be required for enclosed hoarding. A minimum of a 20lb. ABC fire extinguisher must be

placed outside the hoarding in an easily accessible location in the vicinity of propane/gas heaters (Krsek, 2012).

On safety provisions, hard hats or helmet emerged within the first three rankings of the employers and casual workers. This is also an indication that hard hats or helmet is important safety material in addressing the occupational health and safety issues of casual workers on Ghanaian construction site. Again, for employers, the training of casual workers in safety norms and appointment of safety officer on sites is a kind of proactive measures for preventing accident on site. Acting proactively requires one to anticipate problems before they occur and take steps to make sure accidents don't happen. Therefore, the employers were demonstrating the proactive kind of preventing accident on site. To react proactively, casual workers think that wearing of safety boots and helmet couple with safety signs is the best option and this is to the fact that they are directly involved in the actual construction work (Danso, 2010).

When asked about their OH&S procedures, over three-quarters of the respondents said they had instituted measures in respect of first aid, portable drinking water, personal protective equipment and labour certificate on their sites. The rather high response to this question is in line with the responses to the question on whether their procedures met the requirements of OH&S provisions in conditions of contract. Public contracts contain clauses in respect of these OH&S items and, in a few cases; they are covered by provisional sums. Two-thirds (65%) also cited insurance cover for project sites as a measure they implemented. Insurance of workers against injury is not compulsory by law although employers are required to take all necessary measures to indemnify the employer against damages resulting from accidents. Site safety inspections within the businesses surveyed was informal and very common

(83%). Notwithstanding the impressive responses on these OH&S practices, contractors under the pressures of competition and desire to maximise profit, may tend to undermine these practices on project sites by pricing these OH&S items unrealistically. Thus, the amounts and types of first aid items, personal protective equipment and other measures may be insufficient (Kheni et al., 2010).

Formal safety meetings were held regularly on site with the project management team and contractor representatives in attendance. These meetings developed action plans to manage identified risks and made various parties accountable for the implementation. A key aspect in achieving a safe working site was that project management team members spent a considerable proportion of their day on site with workers and operation team (APSEC, 2000)

2.5 Work Pressure and Safety Behaviour

Work pressure, or the perception of its existence at work has been found by many studies to influence employee safety behavior. For instance, Bronkhorst (2015) indicates that workers who experience high job demands are more inclined to show unsafe behaviors. Similarly, Nadesan (2013) found a significantly negative relationship between work pressure and employee safety behavior in Malaysia. According to Harsini and Ghofranipour (2016), this is even higher when employees perceive that management is not living up to their safety commitments and promises. According to them, employees who feel their safety is being short-changed for profits (Mearns et al. 2001) or for higher productivity (Lee and Harrison, 2000), tend to engage in unsafe behaviors as a way of registering their dissatisfaction with management, especially when they are forced to work under pressure. Therefore, to ensure appropriate safety behaviors, management needs to apply policies and rules that create a culture of safe employee work behavior.

In an earlier study, Flin, Mearns, O'Connor and Bryden (2000) argued that the balance between pressure for production and safety is a related theme which is recognized as a key component of safety culture (ACSNI, 1993). Also, Dickety et al. (2002) found that work pressures influence employees to „cut corners" and commit unsafe behaviors in the process; in an attempt to meet deadlines. According to Dyer (2000) this situation is worsened when managers and supervisors are also working under pressure. He explained that under pressure, supervisors either ignore or fail to see employee unsafe practices, which increases the chances of an accident at the workplace. Therefore, in the construction industry where continuously experience high job demands, there is always a tendency for them to behave unsafely at work.

Moreover, the literature identifies two distinct types of employee safety behavior. Whereas safety compliance refers to the core activities that need to be carried out by employees to maintain and promote workplace safety, safety participation describes the behaviors that do not directly affect an individual's personal safety, but help create a context that supports safety. Work pressure and an employee's perception of their work difficulty, influences these two facets of safety behavior in various ways (Bronkhorst, 2015). According to the Job Demands- Resources view, when an employee perceives that his work demand is too high and he has inadequate resources to finish tasks on schedule, a health-impairment process takes place in their brain, which leads to the exhaustion of mental and physical capabilities and pushes the worker towards unsafe practices. Therefore, according to this view, work pressure influences an employee to place performance over safety. The second strand of literature, suggest that the adequacy of resources motivates employees to focus on 20 safety behaviour and the vice versa is true (Bronkhorst, 2015; Harsini and Ghofranipour, 2016).

2.6 Health and Safety Culture Theory

The theory on safety climate and safety culture is quite fragmented with researchers having major disagreements on the best approaches to handling occupational safety management theory (Guldenmund 2000; Glendon 2003; & Zohar 2010). According to Zohar (2010) there is yet to be a consensus on what constitutes safety culture and what does not. According to Biggs et al. (2013), the definition offered by ASCNI (1993) seems to offer a quite comprehensive description of the concept of safety culture. They define safety culture as "the product of individual and group values, attitudes, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management" (ASCNI, 1993). However, most studies modify this definition to operational its usage to suit their theoretical position or industrial context. Despite these conceptualization challenges, the importance of safety culture cannot be overemphasized.

Theoretically safety culture has been described in a number of ways. Firstly, the interpretative theory suggests that safety culture is something that emerges from the shared values and behavioral interactions of all worker groups and not an engineered product from senior management. It is seen as a gradual and consistent, but evolving phenomenon that emerges from shared beliefs, values, attitudes and shared patterns of behavior. According to Cox and Cheyne (2000), this does not happen as an event but develops gradually overtime. In contrast, the functionalist view suggest that safety culture is the set of desired behaviors, attitudes, values, and beliefs that are carefully natured by management and taught to employees through a carefully natured set of reinforcements (See Hopkins 1995 & Reason 2000). A third strand of literature view safety culture as an unattainable state of safety behavior desired by senior management in an organization to which all members aspire (Reason 1997). This is often referred to as the absolutist view of safety culture. In line with

this, the relativist theory of safety culture sees safety culture as a continuum of desirable standard to which every organization aspire and firms are placed on this continuum based on their safety performance relative to the standard (Hudson 2007).

Our study does not align to any particular theory but integrates a number of theories to form the basis for the arguments being advanced and which will inform the interpretation of our results. We combine the arguments in both the functional approach and the relative approach, while leaving some room for the interpretative approach. This is because, safety culture of construction firms has been standardized in several countries, with general guidelines set by national health and safety bodies to which firms must aspire, yet, every organization has its unique strengths regarding the achievement of these targets.

Management therefore has to use various strategies to manipulate organizational behavior towards the achievement of set targets for safety outcomes.

In addition to definitional difficulties, the factors that comprise safety culture are also frequently debated in the literature. Early empirical research on safety culture and climate focused on exploring its multi-dimensional nature (Brown &Holmes 1986; Dedobbeleer & Beland 1991; Zohar 1980). In one of the earliest studies on safety climate, Zohar (1980) proposed an eight-factor model, which was later tested and refined to a three-factor model (Brown & Holmes, 1986). Interestingly, of the studies reviewed by Guldenmund (2000), the majorities were exploratory, and those that were confirmatory did not support previous factor structures, further highlighting the disparity in safety culture descriptions. In a study with construction workers, two factors were found to provide the best ft: management's commitment to safety, and worker's involvement in safety (Dedobbeleer & Beland 1991).

Later studies on the role of safety leadership and management corroborate this result (Biggs et al. 2005; Dingsdag, Biggs & Sheahan 2007; Flin et al. 2000; Zohar 2010). Furthermore, research on the role of communication (Zohar 2010) and quality of relationships (Carmeli & Gittel 2009) highlight that safety culture is a complex construct. Other research places culture in the context of other organizational elements. Alignment theory (Semler 1997) suggests that congruence or alignment between the various elements of an organization leads to optimum performance. Whilst the theory encapsulates a broad view of organizational performance, it can also be specifically applied to safety, as it is measured by performance indicators relevant to the organization.

The nine organizational elements identified in alignment theory are: environment; vision, values and purpose; strategy; culture; structures and systems; rewards; practices; behavior; and performance. Considering the degree of alignment between the different elements may provide an important perspective on the interdependencies of safety culture within the organization. Importantly, the theory suggests, in line with the functionalist perspective discussed earlier, that alignment can be deliberately improved by organizational leaders through identifying leverage points across the elements and maximizing alignment opportunities.

2.7 Health and Safety Management within the Construction Industry in Developing Countries

Construction processes in developing countries share similar characteristics in terms of the adoption of technology, construction methods, cultural environments and regulations (Hillebrandt 1999; Ofori 1999; Thomas, 2002). For instance, in Ghana infrastructure like feeder roads, wells for water, small dams, small-scale irrigation, buildings are constructed

using labour-based methods (European Commission, 1994). From OH&S perspective, it may be argued that construction SMEs which dominate the construction sector in Ghana are likely to share similar characteristics with their counterparts in other developing countries. Arguably, the findings of this study are of relevance to other developing countries (cited in Kheni et al., 2010).

OH&S administration in many developing countries evolved from pre- independence colonial regulatory systems and institutions. For instance, the origin of Ghana's current Factories, Offices and Shops Act 1970 (FOSA) can be traced to the Factories Ordinance of 1952 when Ghana was a British dependency (Visano&Bastine,2003). Regulatory systems and institutions for implementing OH&S standards in many developing countries, particularly SSA, are ineffective in securing protection against backlash of worsening exposures to hazards from increasingly high rates of industrialization in these countries. Hämäläinen et al. (2006) argued that rates of accidents will increase in parallel with the pace of industrialisation in these countries. Current general literature on OH&S focus mainly on examination of factors that could lead to high OH&S performance (Fredericks et al. 2002; Hinze & Gambatese, 2003; Hinze & Wilson 2000; Huang & Hinze 2006; Jaselskis et al. 1996; Maloney et al., 2007). Equally countries have highlighted lapses in OH & S administration. For example, Suazo and Jaselskis important are studies dedicated to design issues in relation to OH&S (Coble and Blatter 1999; Gambatese et al. 2005; Seo & Choi 2008). In contrast, literature on OH&S relating to developing (1993) has found that Honduran OH& S regulations are comparatively incomprehensive and limited in coverage. More recently, LaDou (2003) reports that OH&S laws cover 10% of working population in developing countries, omitting many high

risk sectors such as agriculture, fishing, forestry and construction (cited in Kheni et al., 2010).

Reasons for poor OH&S performance in developing countries include bureaucracy, time pressures, ineffective institutional structures for implementing OH & Slaws and ignorance on the part of workers about their rights to a decent workplace (Koehn et al., 1995). For example, Coble and Haupt (1999) argue that cultural influences on OH&S management in developing countries are stronger than in developed countries and advocate integrating positive cultural aspects with OH&S management. Similarly, Peckitt et al. (2002; 2004) found that Caribbean construction workers considered values of freedom, love and social interactions as having impact on site safety. OH&S management in developing countries is not devoid of religious influences. As Smallwood (2002) found, there is a strong link between many religions and OH&S. these studies attribute problems in construction OH&S management within developing countries to economic conditions, methods of working, attitudes and physical environment. With the exception of the first study, implementation of OH&S programs is rarely documented (cited in Kheni et al., 2010).

Peckitt et al. (2002, 2004) studied the construction industries of Britain and the Carribean. Construction workers of the latter country, which has a culture similar to and originating from West Africa, were found to view values of freedom, love and social interactions as having impact on site safety, whereas British workers rated these values as having a lower impact. Other religions have been similarly linked to health and safety. The study therefore highlights the importance of national culture in the management of health and safety (Kheni, 2008).

2.8 Improving Health and Safety Performance of Construction Sites in Central Gonja District.

Appropriate safety material must be produced in such a way as to be understood and followed by the industry parties themselves. Everyone within the industry has a duty to protect themselves and others who may be affected by their own work or process. The role of Workplace Eliminating or reducing accidents and injuries at the place of work will not only save a great deal of pain and suffering to workers but will also help to reduce the many direct and indirect financial costs related to these accidents and injuries. Furthermore, owners of Health and Safety Officers, Workplace Health and Safety Representatives and Workplace Health and Safety Committees are extremely important in providing the information and support necessary where informed decisions can be made to minimise risk. Greater workplace consultation requires further consideration and will cut across all industry boundaries for development and resolution. The consultative process is essential in providing avenues where genuine health and safety concerns can be raised and resolved in an atmosphere of cooperation and trust (Australia Department of Employment, Training and Industrial Relations, 2000).

Identifying and assessing the hazards and risks is an essential step in safety management (Brown, 1976; Goetsch, 1996; Holt, 2001). Job Safety Analysis (JSA), also known as Job Hazard Analysis (JHA), is a practical method for identifying, evaluating and controlling risks in industrial procedures (Chao & Henshaw, 2002). However, the differences between construction sites and manufacturing facilities give rise to the need for a specialized method for construction. Construction projects are dynamic (Bobick, 2004). They are characterized by many unique factors – such as frequent work team rotations, exposure to weather conditions, high proportions of unskilled and temporary workers. Construction sites, unlike

other production facilities, undergo changes in topography, topology and work conditions throughout the duration of the projects. These features make managing construction site-safety more difficult than managing safety in manufacturing plants. Particularly in construction, a different approach is needed to identify hazards and risks, increase safety and prevent accidents (cited in Rozenfeld, Sacks, Rosenfeld & Baum, 2010).

2.9 The Impact of Health Safety Practices on Construction Sites

In examining the impact of worker safety attitudes on construction safety outcomes, McCabe et al. (2005) surveyed construction workers and supervisors. The research revealed that employee demographics influence safety attitudes. Siu et al. (2003) observed similar results in their study into the impact of age differences in safety attitudes and performance among Hong Kong construction workers. It was found that older workers exhibit more positive attitudes to safety than younger workers and that an impetus exists for safety programs to reflect this trend. Conversely, Gun and Ryan (1994) observed that risk of injury was unrelated to operator age or experience. Keeping within this theme of worker demographics and accident causes, Chau et al. (2004) examined the relationship between individual characteristics and OHS injuries in the French construction sector. Their case-control study involved surveying 880 male workers who had experienced one or more workplace injuries within a two-year period. Chau et al. (2004) observed that, although young age, sleep disorders, smoking, disabilities, sporting activities and experience influenced the likelihood of occupational injuries, the risk for individual workers was dependent on their specific position within the construction supply chain. In addition, Ringen et al. (1995) noted that, where a large proportion of the construction labour force in an Anglophone nation is comprised of immigrants with limited language capabilities, the inability of workers to

understand English also has the capacity to increase the risks of injury (cited in Charles et al., 2004).

Poor safety records lead to increases in insurance premiums which in turn lead to increases in construction project costs. Contractors with poor safety records pay approximately twice the amount of insurance premiums of those with good safety records. In the United States, the construction industry accounts for 20 percent of traumatic occupational injuries and 12 percent of disabling injuries, but only represents 5 percent of the nation's employed workforce (Liska, 1993).Construction projects that have successful safety programs were found to also have management commitment, hazard control, safety training and meetings, employee support, safety inspections, internal communications, accident investigation procedures and record keeping, emergency procedures and services, and a safety coordinator (Liska, 1993).Many of these items go hand in hand with the type of objectives that effective teams focus on (cited in Sykes, 1998).

Table 2.10. 1: Roles of Parties in Ensuring Health and Safety in Construction Sites

Client	**Contractor**	**Regulatory agencies**	**Employee**
Appoint the right people	Provide safe access on site	Guidance notes	Wearing of PPE
Allow adequate time	Provide welfare facilities	Safety alerts	Take care of equipment
Take care of equipment team	Working at height safety precautions	Health and safety education	Report any defects
Ensure that team communicates and co-operates	Safe scaffolds	Enforcement	-
Ensure suitable management	Safe ladders	Health and safety law	-

arrangements are in place			
Ensure adequate welfare facilities are on site	Roof work safety precautions	-	-
Ensure workplaces are designed correctly	Safe excavations	-	-
Appoint a principal contractor	Safe manual handling	-	-
Ensure a health and safety plan is in place	Safe loading and unloading of goods	-	-
Keep the health and safety file	Safe traffic, vehicles and plant	-	-
Protecting the public	Safe tools and machinery	-	-
-	Safe hoists and cranes	-	-
-	Safe emergency procedures	-	-
-	Fire safety	-	-
-	Safe storage, handling and disposal of hazardous substances	-	-
-	Managing of noise levels	-	-
-	Hand-arm vibration safety procedures	-	-
-	Safety in use of electricity and	-	-
-	Protecting the public	-	-

Source: HSE (2004); Lingard and Rowlinson (2005); Ringen et al. (1995)

2.11 Conclusion

This chapter reviewed literature on the influence of construction workers' perception of health safety risk on their behaviour of construction sites, the level of severity of health and safety hazards on construction sites, the extent to which construction site operatives in the Central Gonja District take proactive steps to minimize the risk of hazards, factors that affect safe and healthy behaviour of construction workers on project sites, recommendations for promoting safe and healthy attitudes towards hazards on construction sites.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section describes the research techniques employed and the instruments used to gather data for the study. These methods were carefully selected based on literature to help the study meet its objectives and answer the research questions as best as possible. The chapter consists of a brief overview of the Construction Sites in the Central Gonja District in the Northern Region of Ghana; the research design; the target population; sampling technique and

sampling size; data collection; research instrument; validity and reliability of Research Instrument; Ethical Considerations and Data Analysis.

3.2 Research Design

The study adopts a quantitative research strategy. In line with this research strategy, a descriptive survey approach was used to examine site operatives' perceptions of health and safety risk on construction sites and their consequent behaviour patterns in the Central Gonja District. The design therefore seeks to examine, discuss, and document the facts about construction workers perceptions on construction sites their resulting safe and healthy behaviours. This approach is also useful for identifying variables and constructs that may warrant further investigations while also providing an indirect way to find answers to key research questions (Patton 1990).

3.3 Research Population

Research population refers to the group of entities to which the findings of the study could be universally applied (Koul 2001). This group often has a common characteristic of interest to the researcher and about which the study seeks understanding. The population of this study comprised construction site personnel of construction companies on construction project sites in Central Gonja District in the Northern Region of Ghana. Site personnel in this sense include site managers, general foremen, foremen, tradesmen, gang leaders and labourers on construction sites.

3.4 Sampling Technique and Sample Size

The study employed convenience sampling technique. The reason this sampling technique was employed is that it allows for the inclusion of only relevant respondents whiles reducing sampling bias and allows for validity of the study findings in explaining population parameters (Taylor-Powell 1998 & Salkind 2008). Another reason is that, there is no comprehensive database of construction site workers including managers and the study was conducted using the limited financial resources of the researcher. This also helps boost, to a large extent, the validity of the information gathered by the study and the generalization of the findings despite the fact that, it was not possible to get the relevant list of members of interest in the present study allow for more probabilistic sampling methods.

The sample size considered was 170 site personnel from 16 different construction sites in the Central Gonja District in the Northern Region of Ghana. The sample comprised site managers, site engineers, foremen, artisans and labourers employed at the selected construction site during the study period.

3.5 Data Collection

The study relied mainly on primary data collected through a field survey of construction site workers and managers in the Central Gonja District in the Northern Regions of Ghana. The decision to use a field survey for collecting the data needed for the study is predominantly informed by the issues under investigation and the nature of the explanatory variables. Additionally, however, useful secondary information regarding the level and severity of

general health and safety behaviour details of the selected construction sites will be collected from the contractors to facilitate a better understanding of the situation in the country. The reason was to enhance the validity and reliability of the findings of the study.

The key data collection tool for the study consisted of a semi-structured questionnaire which is fashioned to reflect the gaps that have been identified in the literature whiles allowing for new knowledge to be learnt from the respondents. This allows for readers to understand the findings of the study in the broad context of the conversation around health and safety behaviour and safety risk management in construction in developing economies. By using a semi-structured questionnaire, respondents get the opportunity to express their varying opinions within the scope of the study, minimizing deviations of responses whiles providing for the rich addition's respondents may add to the literature on the subject under study (William, Anderson & Sweeney, 2006). To this end, the questionnaire included closed-ended for easy discussions and some open-ended questions to unfetter respondents to provide novel ideas not found in the current literature.

The study administered the data instrument to only respondents who indicated their willingness to participate in the study and this was done based on a convenient sampling process. However, the study was only able to retrieve 155 out of the 170 questionnaires administered, and after data cleaning; accounting for incomplete questionnaires, the study used 150 questionnaires for its analysis.

3.5.1 Data Collection Instruments

Quantitative data was collected on the demographic characteristics of the respondents, proactive steps to minimize the risk of Health and Safety hazards, factors that affect Safe and Healthy Behaviour of Construction Workers on Project Sites and Construction Workers

Behaviour towards Health Safety Risk in Construction Sites. Interviews were used for collecting primary data. The interviews were held with site managers, clerks of works and both skilled and unskilled workers.

Questionnaires were used as the main tool for data collection. They were administered to site managers, site engineers, foremen, artisans and labourers employed at the construction sites. The questionnaires were self- administered whereby they were hand delivered to the respondents.

Direct observation was also used which involved guided visits to construction sites to observe and document the identified work practices and equipment and tools being used.

The data collection instruments were piloted for validity. The purpose of pilot testing is to assess the clarity of instrument that is validity and reliability of each of the items in the instrument as well as suitability of the language used in the instrument (Borg and Gall, 1993). Pilot testing was conducted with construction workers in sites outside the study area.

According to Kothari (2004), a questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms. The questionnaire adopted in this study was a likert scale. According to Mugenda & Mugenda (2003), this procedure requires a higher level of inference on the part of the observer since it involves observation and evaluation.

3.6 Validity and Reliability of Data Collection Instruments

Validity and reliability of data collection instruments is essentially to minimize bias in the study findings.

3.6.1 Reliability of Data Collection Instruments

According to Kumar (2011) reliability refers to consistency of measurement. The more reliable a measure is, the great its statistical power and more credible its findings. If a measuring instrument is unreliable, it may dilute and obscure the real effects of a study, and the study may appear to be less effective than it actually is. It is therefore important to ensure that the instrument is as reliable as possible. Reliability refers to the consistency of the instrument in tapping information from different participants. In order to ensure reliability of the data collection instruments, the researcher carried an out pilot testing by randomly selecting a few building construction sites, 10 in number, administered the questionnaire and observed the response to note if the questions were understood, and if the answers were relevant to the study. Observed weaknesses in the data collection instrument were noted and corrections made.

3.6.2 Validity of the Data Collection Instruments

This refers to the relevance of the data collection instruments in relation to the anticipated outcome of the study. To ensure validity of the data collection instruments the researcher formulated simple easy to understand questions whose answers had a critical bearing to the variables under investigation so as to guide the study achieve its purpose.

3.7 Ethical Considerations

In recognition of the critical role played by adherence to research ethics, the study took various steps to ensure the protection and freewill of participants as much as possible (Malhotra & Birks 2007). The researcher therefore sought ethical clearance from the university through the supervisor before going to the field for data collection. This included ensuring that there was adequate provision in the data instrument and data collection

procedures to allow for respondent protection from any form of harm due to their participation in the study.

Also, in accordance to Welman et al. (2005), permission was sought from the contractors and managers of the various projects before workers were administered the data instruments. Moreover, the objectives of the study were explained to participants in a language they understood before seeking their consent for participation in the survey which was indicated by filling a voluntary participation consent form. Participants were also assured of the protection of their personal and geographic data and that the study was purely for academic purposes. These pieces of information have been kept confidential throughout the study.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents analysis, results and discussions. The chapter consists of four sections which were response rate, demographic characteristics of the respondents, results of severity

of health and safety hazards on construction sites in the Central Gonja district, the extent to which construction site operatives in the Central Gonja district take proactive steps to minimize risk of hazards, factors that affect safe and healthy behaviour of construction workers on project sites in the Central Gonja district and suggestions for promoting healthy and safe attitudes towards hazards.

4.2 Response Rate

The researcher in attempt to collect data relevant to the study distributed a total of one hundred and seventy (170) questionnaires which were administered to the respondents working in various construction sites in the Central Gonja District. However, out of the 170 questionnaires that were distributed, 150 questionnaires were completely filled and returned making a response rate of 88% while 12% were not returned. This response rate is acceptable and representative and conforms to Mugenda (1999) in which he stipulated that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent.

4.3 Demographic Characteristics of the Respondents'

The section presents the data results on the respondents' general information. The demographic information included gender of respondents, age category, category of work in the construction site, number of years served in the construction site, and their level of education.

4.3.1 Respondents' Gender

The respondents were required to indicate their gender to ensure equal representation of both gender and obtain their views. The results are presented in Table 4.1.

Table 4.1: Gender distribution of the survey respondents

Gender	Frequency	Percentage (%)
Male	132	88.0
Female	18	12.0
Total	**150**	**100.0**

Source: field survey (2018)

The results indicate that 88% of the respondents were male while 12% were female, a mean of 1.12 and standard deviation of 0.326. The results indicate that there is significantly more male than female due to nature of work done at Central Gonja District. This shows that the study was not influenced by gender imbalance.

4.3.2 Respondents' Age Category

The study sought to identify the age bracket of the respondents in the construction sites. The results are summarized in the Table 4.2.

Table 4.2: Respondents Demographic By Age Category

Age group	Frequency	Percentage (%)	Mean	Std. Deviation
20–29 year's	52	34.7	2.23	1.108
30-39 year's	37	24.7		

40 - 49years	35	23.3
50 - 59year's	**26**	**17.3**

Source: field survey (2018)

Table 4.2 above revealed that majority of the respondents were between 20-29years representing (34.7%), 30-39 years (24.7%), 40-49 years (23.3%) and above 49 years (17.3%). The study concluded that employees of all age categories participated in the research.

4.3.3. Respondents' Level of Education

The study sought to identify the educational qualification level of the employees. The results are presented in table 4.3.

Table 4. 3: Respondents Demographic By Level of Education

Level of Education	Frequency	Percentage (%)
No Formal Education	45	30.0
. B.E.C.E	23	15.3
SSSCE/WASCE	32	21.3
Technician Certificate	16	10.7
H.N.D	18	12.0

Bachelor's Degree	14	9.3
Master's degree	2	1.3

Source: field survey (2018)

From Table 4.3 it indicates that only 1.3% of the respondents were Master's Degree holders, followed by 9.3% respondents with Bachelor's Degree, 10.7% were with Technician Certificate and 12.0% were with H.N.D. Certificate. The rest were with No Formal Education, BECE and SSSCE/WASSCE graduates representing a sum total percentage of 66.7%.

4.3.3 Category of Work in the Construction Site

The study sought to establish the category of respondents in the Construction Site. The results are shown in Table 4.4.

Table 4.4: Respondents Demographic By Work Category

Work Category	Frequency	Percentage (%)
Labourer	56	37.3
Artisan	45	30.0
Foreman	16	10.7
Site Engineer	17	11.3
Site Manager	16	10.7

Total	**150**	**100.0**

Source: field survey (2018)

From the research results as shown in Table 4.4 it revealed that majority of the respondents were labourers in the construction company (37.3%), Artisan (30.0%), Foreman/supervisor (10.7%) and top management site engineers and site managers representing (11.3 %) and (10.7%) respectively. While the Mean (2.28) and Standard Deviation (1.352) of the respondents. The research concludes that all level of employees was represented as their response may have significant effect on the results of their study.

4.3.5. Years of Employment at the Construction Company

The study sought to know the number of years the employees have been employed in the Construction site. The result is presented in the Table 4. 5. The results as shown indicate that majority of the respondents had been employed for 20 and above years 3.3%, 15-20 years15.3%, 10-15 years 20.7%, 5-10 years 29.4% and 0-5 years 31.2% while the Mean 2.30 and Standard Deviation 1.163 of the respondents. These results show that most of the respondents had worked at the construction company for more than 10 years. It can be concluded that most of the respondents had enough experience hence provided most reliable information on health and safety programs in the construction sites.

Table 4. 5: Respondents Demographic By Experience

Years of experience	Frequency	Percentage (%)
Less than 5years	47	31.3
6 – 10yeays	44	29.3
11 – 15years	31	20.7

16 – 20years	23	15.3
21years and above	5	3.3
Total	**150**	**100.0**

Source: field survey (2018)

4.4 Extent to which Construction Site Operatives take proactive steps to minimize the risk of hazards,

One of the objectives of the study was to establish the extent to which Construction Site Operatives in the Central Gonja District take proactive steps to minimize the risk of hazards. The respondents were asked to indicate the worksite health and safety provided in the Central Gonja District Construction Sites for responses. This section therefore deals with the extent to which Construction Site Operatives in the Central Gonja District take proactive steps to minimize the risk of hazards. The respondents were asked to indicate the safety and health programs provided by Construction Site in the Central Gonja District in a five (5) -point Likert Scale in collecting the data so the factors were ranked based on Strongly Agree (SD) =5, Agree (A) =4, Neutral (N) =3, Disagree (D) =2 and Strongly Disagree (SD) =1 for respondents to indicate their rate of agreement on the various questionnaire items are given in Table 4.6 below.

Table 4. 6 proactive steps to minimize the risk of hazards

Proactive Step taken by site personnel	SD	D	N	A	SA	Total
Management do assign someone responsible for communicating all of aspects of Health and Safety Programme on site.	5 (3.3%)	1 (0.7%)	5 (3.3%)	4 (2.7%)	135 (90.0%)	**150 (100%)**

There are clear goals and objectives for the Health and Safety Program on site	1 (0.7%)	2 (1.3%)	4 (2.7%)	8 (5.3%)	135 (90.0%)	**150 (100%)**
Management do restrict Health and safety activities to only technical experts on site.	130 (86.7%)	8 (5.3%)	6 (4.0%)	4 (2.7%)	2 (1.3%)	**150 (100%)**
Management do display standard site rules and hazard signs at construction sites.	3 (2.0%)	2 (1.3%)	7 (4.7%)	9 (6.0%)	129 (86.0%)	**150 (100%)**
Management do examine construction workers for drugs and alcohol at site.	124 (82.7%)	12 (8.0%)	7 (4.7%)	4 (2.7%)	3 (2.0%)	**150 (100%)**

Source: Field Survey, 2018

As Table 4.5 indicates, 135 of the respondents representing 90% did strongly agree that management did assign someone who was responsible for communicating all aspects of health and safety programme on site with only 3.3% (5) of the respondents strongly disagreed to that assertion. It was clear that, there were clear goals and objectives for the health and safety programme on site as 135 of the respondents representing 90% strongly agreed to this statement while 1(0.7%) respondents strongly disagreed and 4 (2.7%) were neutral. 130 (86.7) of the respondents strongly disagreed that management restricted health and safety to technical experts on site whereas 6 (4%) were neutral, 2 (1.3%) of the respondents strongly agreed to that assertion. On management displaying Health and safety hazard signs at construction sites, 129 representing 86% of the respondents agreed and only 2% (3) of the respondents strongly disagreed. In addition, about 82.7% (124) of the respondents strongly objected with the assertion that management does examine workers for drugs and alcohol on site and 2% (3) of the respondents strongly agreed.

4.5 Factors that affect Safe and Healthy Behaviour of Construction Workers

This is the second objective of the study which was used to establish the Factors that affect Safe and Healthy Behaviour of Construction Workers on Project Sites in the Central Gonja

District. Respondents were asked to indicate the Factors that affect Safe and Healthy Behaviour of Construction Workers for responses. This section therefore deals with the affects Safe and Healthy Behaviour of Construction Workers. The respondents were asked to indicate the Safe and Healthy Behaviour of Construction Workers in the Central Gonja District in a five (5) -point Likert Scale in collecting the data so the factors were ranked based on 'Very High (5)' High (4) Neutral (3) Low (2) and Very low (1) for respondents to indicate their level of contribution towards Factors that affect Safe and Healthy Behaviour of Construction Workers on Project Sites to the various questionnaire on the above objective under discussion.

This section discusses certain factors that affect Safe and Healthy Behaviour of construction site workers. This is to find out whether workers in the construction sites in the Central Gonja District are exposed to Safe and Healthy Behaviours. The section ends with a discussion of the work Safe and Healthy Behaviours rate of workers in the Central Gonja District construction sites. To this end, the respondents were asked to reveal the nature of their working environment. This is to find out whether certain factors within the work setting in Central Gonja District Construction sites expose workers to Safe and Healthy Behaviours. Their responses are displayed in the Table 4.7.

Table 4.7 Factors that affect Safety and Healthy Behaviour of Construction Workers

Safe and healthy behaviours	Very low	Low	Neutral	High	Very High	Total
Paying attention to their health conditions when lifting, carrying or moving heavy tools or materials at site	1 (0.7%)	2 (1.3%)	5 (3.3%)	53 (35.3%)	89 (59.3%)	**150 (100%)**
Attending tools box talks and education on health and safety on site	4 (2.7%)	5 (3.3%)	19 (12.7%)	57 (38.0%)	65 (43.3%)	**150 (100%)**

Being cautious when excavating trenches above their heights	1 (0.7%)	3 (2.0%)	1 (0.7%)	39 (26.0%)	106 (70.7%)	**150 (100%)**
Paying attention when using vibrating equipment at site	2 (1.3%)	2 (1.3%)	3 (2.0%)	54 (36.0%)	89 (59.3%)	**150 (100%)**
Using personal protective equipment for protection against falling objects and while working on platform, hoist and scaffolds	1 (0.7%)	1 (0.7%)	4 (2.7%)	31 (20.7%)	113 (75.3%)	**150 (100%)**

Source: field survey (2018)

As Table 4.7 indicates, Among the factors that affects health and safety behaviour of Construction Workers on Project Sites, 89 of the respondents representing 59.3% did paid very high attention to their health conditions when lifting, carrying or moving heavy tools or materials at site, 53 (35.3%) paid high attention and 4 representing 0.7% of the respondents paid very little attention to this statement. However, 43.3% (65) and 38% (57) of the respondents on receiving education on health and safety on site indicated very high and high respectively and 12.7% (19) of the respondents chose to be neutral on the subject. Also 106 of the respondents representing 75.3% of the respondents took very high care about their health when excavating trenches above their height and 54 (36%) of the respondents were also conscious about their health conditions when do same work. Most of the respondents paid attention to vibrating equipment at site as 89 (59.3%) and 54 (36%) of the respondents paid very high and high attention respectively. With the level of protection from objects falling from platforms of scaffolds, 75.3% (113) of the respondents indicated very high and 20.7% (31) of the respondents indicated high. Regarding management talking about awareness of safety rules and regulations to workers on site, 77 of the respondents representing 51.3% of the respondents indicated very high and 63 representing 42% of the respondents indicated high.

4.6 Workers Behaviour towards Health and Safety Risk at Construction Sites

This is the third objective of the study which was used to establish Workers Behaviour towards Health and Safety Risk in Construction on Project Sites in the Central Gonja District. The respondents were asked to rate the influential level of management and other Workers Behaviour towards Health and Safety Risk in Construction for responses. This section therefore deals with the influential level of management and other Workers Behaviour towards Health and Safety Risk in Construction. For each issue, a 5-point Likert scale of influence was used with the Health and Safety Risk of Workers Behaviour in the Central Gonja District in collecting the data. The scale used to indicate (5) -point Likert Scale in the factors were ranked based on the following; The value (5) represented 'Very influential, The value (4) represented Influential, The value (3) represented Quite influential, The value (2) represented Less influential and The value (1) represented Not influential (1) for respondents to indicate their rates the influential level of management and other of Workers Behaviour on Health and Safety to the various questionnaire on the above objective under discussion. It was noted that the range of response was from 1 to 5, covering the full range of responses, presented in Table 4.8.

Table 4.8. Site Workers' Behaviour towards Health and Safety Risk

Workers Behaviour towards Health and Safety Risk	Not influential	Less influential	Quite influential	Influential	Very influential	Total
I view Health and Safety at site as a serious issue.	1 (0.7%)	1 (0.7%)	2 (1.3%)	31 (20.7%)	115 (76.7%)	**150 (100%)**
I report to management on issues bordering on health and safety without fear.	6 (4%)	2 (1.3%)	11 (7.3%)	26 (17.3%)	105 (70%)	**150 (100%)**

I request for first aid for myself and my colleagues.	69 (46.0%)	51 (34.0%)	18 (12.0%)	7 (4.7%)	5 (3.3%)	**150 (100%)**
I use personal protective equipment because of my safety at all times.	38 (25.3%)	93 (62.0%)	9 (6.0%)	3 (2.0%)	7 (4.7%)	**150 (100%)**
I clear the construction site of obstacles and dangers whenever I can.	0 (0%)	0 (0%)	2 (1.3%)	33 (22.1%)	115 (76.7%)	**150 (100%)**

Source: field survey (2018)

The behaviour of Construction Workers towards risk posed by health and safety hazards was assessed using five items given in Table 4.7. As can be seen from the table, the workers viewed health and safety at the construction sites as an issue of great concern. From the table, 115 representing 76.7%, while 31 (20.7%) of the respondents admitted they viewed health and safety as an issue of serious concern and as such could have serious consequences on behaviour on site. One hundred and five (105) representing 70% of the respondents were however of the view that they will report to management on health and safety issues affecting their site. With regards to request for first aid at site, 46% of the respondents affirmed that it was not an issue of concern to them and 12% were neutral in that regard. Use of personal protective equipment was also accorded a low priority perhaps because the construction sites were perceived as a low risk environment. Attention to obstacles and dangers was very high with 33 representing 22% and 115 representing 77% affirming that they perceived it high and very high and took steps to minimise the risk of hazards.

4.8 Summary of Chapter

This chapter presented results of quantitative analysis of the field data. The results are presented in the form of summary tables giving frequency counts as well as percentages to facilitate meaningful interpretation of the resulting data. The preliminary sections presented the demographic characteristics of construction workers in the Central Gonja District. The

other sections presented the results in the following areas; the extent to which Construction Site Operatives in the Central Gonja District take proactive steps to minimize the risk of Health and Safety hazards., Factors that affect Health and Safety Behaviour of Construction Workers on Project Sites in the Central Gonja District and The Construction Workers Behaviour towards Health Safety Risk in Construction Sites in the Central Gonja District.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the research process and the major findings from the study. This is to enhance reader comprehension of the study. It then draws conclusions and makes recommendations and Suggestions are also made for future research.

5.2 Overview of the Study

The study was conducted in the Central Gonja District on Construction Sites to access the Influence of Construction Workers' Perception of Health and Safety Risk on their Behaviour and their working environment to enhance better condition for the Workers. Additionally, it purposed to access is also to access the Extent to Which Construction Site personnel are taking Proactive Steps to Minimize Risk of Hazards and their Behaviour towards Health and Safety Risk at Construction Sites. Descriptive research design was used to conduct the study. The target population consisted of employees and the management. The total sample size sample size considered was 170 site personnel from 16 different construction sites.

Questionnaire were designed and used to collect data for the study. The items were administered personally by the researcher. The research instruments were designed with the assistance of the supervisor. Data collection lasted for three weeks. The data were

edited, coded, presented and analysed using statistical tools such as percentages, frequency tables were used to summarise the data and the results were presented in the form of tables for discussion which aided in answering the research questions. Even though various

recommendation techniques were adopted to reduce the cumulative effects of the limitations on the study, their impacts on the findings were not entirely ruled out.

5.3 Key Findings

The study revealed that majority (90%) of the workers who participated in the study Strongly agreed that Site management do assigned someone responsible for communicating all of aspects of Health and Safety Programme on site and (90%) also Strongly agreed for there are clear goals and objectives for the Health and Safety Program on site respectively. It again came to the fore when majority (75.3%) Using personal protective equipment for protection against falling objects and while working on platform, hoist and scaffolds (70.7%) indicated Very High for Being cautious when excavating trenches above their heights (70.7%) and majority (59.3%) of the workers indicated Very High for Paying attention to their health conditions when lifting, carrying or moving heavy tools or materials at site.

While Majority (43.3) of the workers affirm Very High for Attending tools box talks and education on health and safety on site.

However, with regards to the Site Workers Behaviour towards Health Safety Risk majority (76.7%) indicated Very influential for both I view Health and Safety at site as a serious issue and I clear the construction site of obstacles and dangers whenever I can respectively and 70% also indicated Very influential for I report to management on issues bordering on health and safety without fear. However, majority (46.0%) indicated Not influential for I request for first aid for myself and my colleagues and majority (62.0%) also indicated Less influential for I use personal protective equipment because of my safety at all times.

It again emerged almost all respondents affirmed to the influence of construction workers' perception of health safety risk on their behaviour.

5.4 Conclusion

In line with the findings discussed above, the study concludes that the construction sites is predominantly males, especially in the artisans aspects of the work whiles females are predominantly found among the labourers worker group. Health and safety behaviour is therefore gradually increased and replaced with unsafe practices as workers try to deal with the influence of safe behaviour to prioritize schedule in a fast-paced environment, that influence of construction workers' perception of health and safety risk on their behaviour and their working environment to enhance the building construction to the better condition of the workers in the construction sites is in conformity with what has been described as "best practices". This is because, responsibilities of employees and management are clearly spelt out with regards to health and safety. Employees are well trained for protection against risk and hazards at the construction site in the Central Gonja District.

Increasingly, health and safety is recognized as an issue that can influence on the effective functioning of construction sites in the Central Gonja District and economic growth of the country. Health and Safety of employees is primarily important at any construction site be it the manufacturing, construction, utility, educational institution or hospital. The importance of health and safety at construction sites in the Central Gonja District cannot be over simplified. From the study, it can also be deduced that health and safety of the workers is the better motivation instrument to boost productivity at the construction site in the Central Gonja District. Adaptation of health and safety behaviours, procedures, laid down rules and

regulations do not only ensure safety of life of the employee and fellow workers but also their family dependents.

The findings of the study have shown that employees health and safety behaviours at the construction sites in Central Gonja District, is influenced positively by good management of health and safety practices programmes, good management attitude towards health and safety, and training of employees on safety standards at the construction sites even though on the part good management attitude towards of accidents records keeping, reporting system at the construction sites and influencing the use of first aid at site were responded strongly in contradiction of management. However, construction workers including site managers, site engineers, foremen, artisans and labourers should play active roles accordingly in influencing.

5.5 Recommendations

Finally, it is appropriate to make some recommendations arising from the findings of this study and the reviewed literature. Management should be more responsible for the needs and concern of their employees' Health and Safety Behaviours by being more sensitive to the problems of the employees. This can be supported by the provision of a suggestion box or other avenues for employees to give their suggestions on how Health and Safety Behaviours can be improved. Furthermore, Management should put in place policies and structures for improving Health and Safety Behaviours within their Construction Sites. Management should not wait to form ad hoc committees after an accident has occurred at the Site. Management should allocate funds and invest in Health and Safety Programmes. This

Programme should include proactive measures like near miss reporting, accident investigations, and risk assessment.

Again, Construction Sites should put in place active Health and Safety Behaviours officers who should be given full mandate to implement their recommendations. Moreover, copies of Construction Site Health and Safety Behaviour procedures should be given to employees in order to make them aware of the laid down policies, rules and safety precautions to reduce accidents on sites. The level of measurement to be assign to Construction workers must identify unhealthy, unsafe conditions and behaviours and try to correct them, to what level of measurement would you assign to motivation of construction operatives by instituting safety awards. Top management should be committed to Workers Safety through the establishment of Safety training and Orientation for employees. Safety responsibilities should be assigned to all levels of management and workers at the construction sites. Employers should institute Safety Award Schemes to motivate construction site operatives to observe high level health and safety standards Safety committees should be set up to conduct periodic safety auditing.

5.6 Suggestions for Further Research

The survey should be expanded from a District level to a national level and should include casual workers and not just limited to full time workers which is the scope of the present study.

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APPENDIX: QUESTIONNAIRE

THE INFLUENCE OF CONSTRUCTION WORKERS' PERCEPTION OF HEALTH SAFETY RISK ON THEIR BEHAVIOUR: A STUDY OF CONSTRUCTION SITES IN CENTRAL GONJA DISTRICT.

SECTION A

PERSONAL DATA:

(Please tick [√] or fill as appropriate)

1. Please indicate your gender. a. Male [ ] b. Female [ ]

2. Please indicate the age group you belong to;

a.20 – 29 year's [ ] b. 30 – 39 years [ ]

c.40 – 49 year's [ ] d. 50 – 59 years [ ]

3. Please tick [√] your educational qualifications Level

.a No Formal Education [ ] b. B.E.C.E [ ]

c. SSSCE/WASCE [ ] d. Technician Certificate [ ]

e. H.N.D [ ] f. Bachelor's degree [ ]

g. Master's degree [ ]

Others (specify)……

4. Which of the following work categories do you belong to?

a. Labourer [ ] b. Artisan [ ]

c. Foreman [ ] c. Site Engineer [ ]

e. Site Manager [ ]

5. How many years of experience do you have in the construction industry?

a. Less than 5years [ ] b. 6 – 10yeays [ ]

c. 11 – 15years [ ] c. 16 – 20years [ ]

e. 21years and above [ ]

SECTION B

(10) The extent to which Construction Site Operatives in the Central Gonja District take proactive steps to minimize the risk of Health and Safety hazards.

Indicate on the Likert scale of 1 to 5 the level of contribution of the following factors to Health and Safety Hazards on your Construction Sites in the last five years

NO	Statement	Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly agree [5]
a	Site management do assigned someone responsible for communicating all of					

	aspects of Health and Safety Programme on site?					
b	There are clear goals and objectives for the Health and Safety Program on site					
c	Site management do restrict Health and safety activities to only technical experts on site					
d	Site management do displayed standard site rules and hazard signs on construction sites?					
e	Site management do examined construction workers for drugs and alcohol at site?					

SECTION C

7. Factors that affect Safe and Healthy Behaviour of Construction Workers on Project Sites in the Central Gonja District.

Indicate on the Likert scale of 1 to 5 the level of contribution of the following factors to Health and Safety Hazards on your Construction Sites.

	FACTOR	1 Very low	2 Low	3 Neutral	4 High	5 Very High
A	Paying attention to their health conditions when lifting, carrying or moving heavy tools or materials at site					

B	Attending tools box talks and education on health and safety on site					
C	Being cautious when excavating trenches above their heights					
D	Paying attention when using vibrating equipment at site					
E	Using personal protective equipment for protection against falling objects and while working on platform, hoist and scaffolds					

SECTION D

(9) The Construction Workers Behaviour towards Health Safety Risk in Construction Sites in the Central Gonja District

Indicate on a Likert scale of 1 to 5 which factor under each behaviour has a high level of influence on the workers' health and safety management system on construction sites.

	Workers Behaviour towards Health and Safety Risk	1 Not influential	2 Less influential	3 Quite influential	4 Influential	5 Very influential
a.	I view Health and Safety at site as a serious issue.					
b.	I report to management on issues bordering on health and safety without fear.					

c	I request for first aid for myself and my colleagues.					
d	I use personal protective equipment because of my safety at all times.					
e	I clear the construction site of obstacles and dangers whenever I can.					

THANK YOU FOR TAKING TIME TO FILL OUT THIS QUESTIONNAIRE