AKENTEN APPIAH MENKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT

ASSESSING THE KNOWLEDGE OF WORKERS IN OCCUPATIONAL SAFETY AND HEALTH HAZARDS: A CASE STUDY OF SELECTED WOOD WORKSHOPS AND SAWMILLS WITHIN ADA AND SOGAKOPE DISTRICT IN GHANA

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A Thesis in the Department of CONSTRUCTION AND WOOD TECHNOLOGY EDUCATION, Faculty of TECHNICAL EDUCATION, submitted to the School of Graduate Studies, Akenten Appiah Menka University of Skills Training and Entrepreneurial Development in partial fulfilment of the requirements for the award of Master of Technology in Wood Science and Technology Education

JANUARY, 2023

DECLARATION

STUDENT'S DECLARATION

I **Caesar Christian Tetteh,** declares that this Dissertation, with the exception of quotations and references contained in the published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE.....

DATE.....25-01-2023.....

SUPERVISOR'S DECLARATION

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

NAME: PROFESSOR STEPHEN JOBSON MITCHUAL

SIGNATURE.....

DATE.....25/01/2023.....

DEDICATION

I dedicate this work to my dear wife, Hilda Caesar, for her love and meritorious services she is rendering to me. Also to my children, Mavis, Theodora, Racheal, Obed and Christiana Caesar.

ACKNOWLEDGEMENT

I will sing of your steadfast love, O Lord, forever with my mouth I will proclaim your faithfulness to all generations. Psalm 89:1.

My sincerest thanks go to my family members, church elders and friends for their co-operation, physically and spiritually during the period of this project begun.

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ABSTRACT

In order to understand the issue of workplace safety among woodworkers, there is the need to assess the knowledge of workers in occupational safety and health hazards. Consequently, the purpose of the study was to assess the knowledge of workers in occupational safety and health hazards in some selected wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana. The study adopted a cross sectional descriptive survey research design. The study focused on wood producers working with sawmill firms and small-scale furniture workshops within Ada and Sogakope Districts. Purposive sampling technique was used to select 160 respondents. Data was gathered through questionnaires formulated based on the research questions. The study revealed that the job category that records the highest prevalence of injuries at the workshops and sawmills were wood cutting followed by logging, trimming and processing. The study found that woodworkers usually report of back pains, hip and leg pains, headaches, respiratory problems, nausea and small cuts. The study revealed that the level of knowledge and experience of woodworkers in the occupational health hazards and safety practice was low. The study revealed that woodworkers' sources of information of occupational hazards and safety measures were mainly from personal experiences and colleagues. The study brought to light that the safety trainings that exist among woodworkers in the study area do not equip woodworkers with adequate knowledge and skill to promote safety in an effective way. The study concluded that the knowledge of Ghanaian woodworkers is limited and outmoded to minimize risk of accidents and diseases at the workshop. Promotion of occupational health and safety through workshops, seminars and public lectures is recommended. Similar research could be carried out in other regions to confirm or refute the findings of this study.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Concerns about occupational health and safety have recently risen as a result of globalisation and its impact on labour standards, the environment, and public health (Bentum et al, 2021). According to Adu, et al., (2015), occupational health and safety (OHS) encompasses the social, emotional, and physical well-being of workers, as well as the "whole person,". More people die at work than in battles across the world (ILO, 2004). According to the ILO, over 2.3 million men and women die each year as a result of work-related accidents and diseases, including close to 360,000 fatal accidents and an estimated 1.95 million fatal work-related diseases.

The assessment of occupational dangers as well as the assurance of occupational safety is a critical subject to consider. It has been estimated that every third occupational fatality or injury occurs at a workshop or wood processing site. Also, in compared to other economic activity, the sector has far more infractions of regulatory enactments governing health and safety (Fender, 2012). According to World Health Organization (WHO) figures, around 250 million occurrences of industrial accidents and illnesses occur each year globally, with prevalence studies from Botswana, Zimbabwe, Zambia, Ghana, and Nigeria indicating a significant frequency of occupational disease in Africa (Diwe et al., 2016).

Korkor (2016) postulates that Ghana has come a long way in her effort to develop her natural forests for timber production and consumption. The timber sector, i.e., forestry and timber industry, is important for Ghana because it provides jobs and incomes for numerous local communities, and significantly contributes to Ghana's foreign exchange earnings through timber products export (Marfo et al., 2016). Even though these

activities bring food to the table of many, it poses a great risk to the workers in these sectors, observance of safety rules and regulations to enhance these activities is being a great worried.

Sawmilling is one of the principal timber industries that engage in the processing and the efficient utilization of the timbers, a producer of semi-finished intermediate goods for other sectors. Ghana's domestic wood market accounts for more than 80% of the 600,000m3 of lumber sold on the domestic market each year (Amos and Seth, 2016). The saw mill business is one of these industries that processes wood into lumber and other wood products. Despite this, in the forest sector, wood processing activities are considered unhealthy (Sobierary, et al., 2007) and risky because they are carried out under high pressure, an accelerated pace, temperature extreme and high noise and wood dust levels (Michael and Wiedenbeck, 2004). This results in prolonged exposure to risk factors that, if not addressed in a timely manner, risk the physical integrity of workers and causes an increasing number of accidents or illnesses (Holcroft and Punnett, 2016).

The sawmill industry is one such activity that has been linked to a number of occupational injuries. When timber is processed into semi-finished goods and finished fresh wood, plywood, and wood composites, about 3.6 million employees worldwide are exposed to wood dust (Jacobsen, et al., 2010). To be able to cope with the imminent difficulties in satisfying the ever-growing demand for lumber in the country, appropriate sawmilling practices which encourage high conversion efficiency and minimal waste generation, will be required. Several organisations and nations have been compelled to create guidelines restricting wood dust (as the most prevalent source of damage) or to develop recommendations for exposure (Chamba and Nunes, 2016).

Accidents on sawmilling sites, in general, might be classified as flaws in the health and safety management system, which occur due to a variety of variables, including

technical, technological, organisational, and other sorts of problems (De jus, 2011). Health and safety in the woodworking industry can only be addressed holistically by combining all realms of work (Tabi-Agyarko, 2001). The nature of the danger is influenced by the nature of the work in the wood processing industries, as well as the sort of equipment and materials used on the job (Judd, 2014). Occupational injuries in the woodworking industry are a major source of public concern. According to previous studies, noise-induced hearing loss is the most prevalent health outcome connected with noise from sawmills (Kling, et al., 2011). Previous survey results also show that, in addition to hearing issues, noise exposure may be an important risk factor for acute myocardial infarction in a lumber mill environment (Diwe et al., 2016).

To that extend, Akinyeye, et al., (2013) mentioned that during timber processing, sawmill workers may be exposed to multiple chemical, physical and biological hazards, such as, wood dust, pesticides, fungicides, noise and so on, which often lead to diseases or injuries such as sprain, bruise, wounds or deep cuts in the body of the workers. Lost time, insurance costs and other expenses can add up quickly and if an incident draws media coverage, the employer may also find their sales, image and reputation will suffer adverse effects. However, very limited interventions have been put in place to reduce physical injuries among them. The parties responsible for ensuring internationally and national acceptable standards and occupational health policies on wood processing and wood processing sites in Ghana are Government, clients, consultants, contractors, workers and civil society (Laryea and Mensah, 2010).

Moreover, Ghana has a low infrastructural growth rate and a fairly unstable political climate, coupled with a dormant inspectorate division, which leads to poor wood processing and site health and safety (Kheni, et al., 2006). Meanwhile, other researchers have indicated that low adherence to safety practices within the wood industry promotes

the vulnerability to different hazards that are capable of predisposing sawmill workers to various forms of health problems (Agunbiade, 2015). Despite the vulnerability of wood processing workers to these risks, the proposal for effective adaptation and implementation of health and safety regulations at wood processing site has not been embraced as expected by developers and builders Laryea (2010) conducted a study on safety on wood processing sites and it was revealed that almost 90% of the wood processing sites visited did not implement the policies of occupational health during the execution of their works.

The Ghanaian wood industry still remains at the mercy of increased health and safety hazards during the processing of timber as workers working in the wood industry are incessantly borne to unsafe working conditions and have to confront several kinds of hazards. The subject of health and safety affects every workplace in every industry. Some more than others. But no matter where one work, or who one work for, one need health and safety. Because everybody at the worksite should be kept safe. Employees, workers and visitors must be protected from harm. No job should take a person's life, or health, away from him or her (Schuler, 1995).

Cole (2013) posits that employees who are healthy and feel safe at work are those who can fully invest their capabilities and exploit the best of their potentials to work. Similarly, Korkor, 2016 is of the view that when organizations fail to address poor working conditions such as health and safety issues, workers are more likely to judge the costs of staying with the firm as exceeding the costs of leaving. It is therefore vital for wood processing companies to have efficient health and safety services for their employees to promote and maintain the highest level of physical, mental and social well-being (Annan, 2010). Consequently, studies are required to generate evidence-based scientific data necessary to formulate policy measures for health and safety of sawmill

workers. It is against this background that this study aims to add better clarity to this research area by assessing the knowledge in occupational safety and health hazards in some selected wood workshops and sawmills.

1.2 Statement of the Problem

In Ghana, the promotion of occupational safety and health (OSH) has improved over the past decades. However, preliminary studies showed that the level of workplace fatalities, injuries and illnesses still remains unacceptably high and takes an enormous toll on men, women and their families. A general look at the industry seems to portray a gap in safety consciousness in the sector, as occupational health and safety of people working in wood workshops and sawmills are not given the due attention by both workers and management.

Personal observation by the researcher seem to reveal that, the use of safe working practices in wood workshops and saw mills within Ada and Sogakope Districts have been neglected for so long and these have caused a lot of accidents to many woodworkers and saw millers. Hence the need to identify the source of the problem and try to rectify it, as the rate of accidents leading to injuries, ill health and deaths due to sawmilling activities in the Volta Region are alarming and there is the need to take a critical look at this to formulate practicable policies to manage health and safety at sawmill sites.

Despite the voluminous body of research on the prevalence and impact of occupational injuries occurring among this working category (Diwe et al., 2016; Dutkiewicz et al., 2001; Kling et al., 2011; Agbana et al., 2016), the salience of the health seeking behaviour of sawmill workers and the existence of possible safety standards and regulations within the sawmill industry within Ada and Sogakope Districts in Ghana

have not been investigated and questioned in recent years. As a result, statistics on timber and wood processing injuries in Ghana is very scanty, providing little evidence of the health and safety performance of the sector (Kheni et al., 2006, Agbana et al., 2016). Silva and Dapilah (2012) analyse the occupational accident patterns and propose the strategies for improving safety. It is emphasised that more investigations should be undertaken to reveal options for improving education and training effectiveness of woodworkers and saw millers in the area of health and safety (Tartilas, 2008; Choudhry, 2012). From the empirical perspective, it is very clear that there exists gap literature that needs to be filled. The study is on the objective of seeking to assess the knowledge of workers in occupational safety and health hazards.

1.3 Objectives of the Study

The objectives of this study have been grouped into two; namely the general objective and specific objectives.

1.3.1 General Objective

The general objective of this study is to assess the knowledge of workers in occupational safety and health hazards in some selected wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana.

1.3.2 Specific Objectives

In furtherance to the main objective, the study considers the following specific objectives:

1. To identify safety and health hazards that woodworkers are exposed to in the workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana.
2. To assess the knowledge of woodworkers on the safety and health hazards related to their work within Ada and Sogakope Districts in the Volta Region of Ghana.
3. To examine the level of safety training that exists among wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana.

1.4 Research Questions

In order to achieve the research objectives, the key research questions that guided this study are:

1. What type of occupational injuries occur at each stage of the timber processing among woodworkers within Ada and Sogakope Districts in the Volta Region of Ghana?
2. What is the extent of experience and knowledge of woodworkers and sawmill operators on occupational health and safety hazards?
3. What is the level of safety training in wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana?

1.5 Significance of the Study

The findings from this study will educate the general public, managers and workers at the wood workshops and sawmills the importance of observing the safety practices at worksite to safeguard both workers and equipment. Thus, the outcome of the study would make stakeholders conscious and alert to enhance safety in the wood processing industries in Ghana therefore helping both the wood processing industries to save money

that could have been incurred as a result of poor safety practices as well saving lives of many Ghanaian workers in the timber and wood industries in Ghana. The study will lay bare shortcomings both management and employees on safety issues at sawmill sites and also create awareness and change the attitudes of both management and other employees. The findings of this study will contribute to both theoretical and managerial perspectives. From the theoretical standpoint, the results gained from this study may be consistent with the theories and the previous literature which supported these theories by providing empirical evidence and throwing in enrichment to the body of knowledge about occupational health and safety management theory. From the Managerial perspective, the results of this study will help timber processing firms to understand which factors are important to keep in mind during the training and how a good training can be delivered to their employees. It will also help sawmill managers to understand the importance of safety training to their employees so that they could perform the assign task in a better way.

1.6 Limitations of the Study

During the research certain limitations were realized. They include the availability of time to conduct research for obtaining the required data. Time was one of the limitations faced which has restricted the researcher to add more information about the importance of this topic. Another limitation was the access to data that was to be collected from various wood processing sites. The information gathered was difficult to acquire since some of the woodworkers were hesitant to share their true opinions. The study was limited to only questionnaire data collection instrument, mainly made up of five-point Likert-type scale. This type of questionnaire did not allow respondents to explain further than the limits of the question items as they were closed in nature. The researcher took

special care of the ethical aspect related to the research by ensuring the respondents that their responses will be anonymous and confidential to which no one will have access.

1.7 Delimitation of the Study

The study focused primarily on the artisans in the timber and wood processing industry in Ada and Sogakope Districts in the Volta Region of Ghana. Thus, the study is geographically delimited to Ada and Sogakope timber and wood workers. Also, there are myriad of issues that could have been looked at, but it had been delimited to the knowledge of workers in occupational safety and health hazards. Other variables relating to health and safety practices and management can be investigated in other studies in future. Therefore, the study is conceptually, theoretically and empirically limited in scope to the specific objectives.

1.8 Organization of the Study

This study consisted of five chapters. They include chapter one which deals with the introduction of the study. This contains the background of the study, statement of the problem, purpose of the study, significance of the study and of the study. Chapter two contains a review of literature, which focuses on relevant literature on health and safety practices. The methodology used for the study is discussed in the third chapter. This chapter contains discussions on study area, population, sampling and materials and method used for data collection. Analysis and discussion of findings are covered in the fourth chapter. Chapter five which is the last chapter contains the summary of findings, conclusions and recommendations. The conclusions feature the major summaries that were established during the research in relation to the objectives. The recommendations are construed from the findings and provide important policy implications for major stakeholder.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents review of existing related literature that has some relationship with the research topic understudy. The review is captioned under the following headings: Ghana's timber and wood processing industries; occupational health and safety in Ghana; health and safety knowledge of sawmill workers; safety training, impact of safety training, theoretical and conceptual framework.

2.2 Ghana's Timber and Wood Processing Industries

The timber industry has not undergone any major transformation over the past two decades. Currently, there are about 100 sawmills in the country with 17 involved in sliced and rotary veneer (Korkor, 2016). About 40 of these sawmills produce mouldings, profiles and machined wood. Six firms specialize in flooring products and doors while 10 are involved in plywood processing. The downstream segment of the wood industry (furniture production) is dominated by small enterprises that lack the capacity to produce export-grade furniture or to achieve the large volumes required to serve international markets (Badolo, 2017).

The domestic market satisfies different categories of consumers. Individuals, companies, as well as the government, rely on the domestic market for various wood needs. (Tabi-Agyarko, 2001). One of the deep rooted and old vocation in Ghana is wood processing and furniture production. The sector without a doubt utilizes and employs a colossal number of artisans. Moreover, it is a quick business road for young people who are unable to continue their education to tertiary institutions because of money related impediments (Adupong, 2011). As such, the sector has become a major contributor to

local economic development, and offers local communities the opportunity to work together for the improvement of the country's economy. In many jurisdictions across the globe, the sector has been identified as a major revenue contributor to the country's gross domestic product (Adupong, 2011).

The formal sector produces a wide range of wood products, such as lumber (kiln or air dried), sliced veneer, plywood, rotary veneer, mouldings, flooring, boules and furniture parts for export. Only a fraction of its products is sold on the local market. While most of the products of the formal sector are targeted at the export market, there is a large local market for furniture products and building materials that relies on local companies (Tabi-Agyarko, 2001). Dominated by over 41,000 small and medium-sized carpentry establishments, the industry has seen an increase in imports of furniture from Asia generally and especially from China.

2.3 Occupational Health and Safety in Ghana

Health is a sound state of the body and mind of people from illness resulting from the materials, processes or procedures used in the workplace, while safety is the protection of people from physical injury (Hughes et al., 2008). Thus, occupational health and safety (OHS) can be seen to concern the physical and mental well-being of the individual at a place of work. Workplace in the timber and wood industry is most often than not referred to as workshop or sawmill site. Therefore, occupational health and safety issues become a primary concern to governments, employers, employees, and project participants alike, as wood processing activities are likely to adversely affect the health of both workers and other persons at the workshop or sawmill sites.

The Occupational Health and Safety (OHS) of persons employed in the industrial sector in Ghana are regulated by the Department of Factories Inspectorate. The Inspectorate is

responsible for the promotion and enforcement of regulatory measures to give effect to the provisions of the Factories Offices and Shops Act (FOSA) 1970 Act 328. There are other agencies such as the Radiation Protective board of Ghana Atomic Energy Commission, The Ministry of Health and Mines Department which play complementary role in the promotion, but not enforcement of O.H.S measures. The diversity of the agencies involved in this programme underscores essentially the multidisciplinary and inter-sectoral approach to the promotion of O.H.S. The fragmentation of such implementing agencies detracts from the main stream focus and direction necessary for effective prevention of occupational accidents and work-related diseases.

The Department of Factories Inspectorate of the Ministry of Employment is the national agency responsible for the prevention of occupational accidents and work-related illnesses because of its recognition by the International Labour Organization as the focal institution. According to Bruce, (2006), there is the need for tripartite role of government, workers and employers as a basis for any effective O.H.S programme at the national level. Bruce, (2006) emphasis that there is the need to recognize the important role of management and workers who are expected to show commitment and to participate actively in O.H.S programmes in Ghana. These main actors according to Bruce, (2006) should be more familiar with the material elements of work including workplaces, working environment tools, materials, equipment, substances among others. They do the purchasing of the means of production and work with them. It should therefore be expected that they can more-effectively evolve systems and organizations to improve their safety performance. However, they can only do this if they are properly informed to be able to identify the hazards in the work environment, the mode of avoidance or prevention of these hazards and the need, especially having regard to the

dangers involved, to avoid these hazards. There is the need for periodic and continuous education and training of our stakeholders (Bruce, 2006).

Ghana as at now has no national policy on O.H.S. A draft policy document prepared in 2004 has not been processed for adoption, even though article 4 of the ILO convention 155 –Occupational Safety and Health Convention, 1981 requires the nation to give effect to the provisions of this convention (Bruce, 2006). The aim of this policy according to Bruce (2006) is to prevent injury to health arising out of or linked with or occurring in the course of work. It requires each member state to formulate, implement and periodically review a coherent national policy on occupational health and safety in the working environment (651).

The current national labour Act 651 does not include any comprehensive provisions on occupational health and safety. Chemicals that are banned restricted or strictly monitored in Europe, America and some other developed countries are commonly used in the industrial sector in Ghana (Bruce, 2006). Persons with requisite technical knowledge and expertise in the design, fabrication and installation of safety guards and dangerous moving parts of machinery are either not available or scarce in the country. In spite of the blatant obstacles to the effective management of occupational health and safety, a progressive process of legal reform has been initiated to bring our national occupational safety and health laws in line with current thoughts and developments in OSH, and to ensure as far as possible, Ghana's compliance with ratified ILO convention and to strengthen and make more effective the enforcement powers of the factory's inspectorate (Bruce, 2006).

A new bill "Occupational Health and Safety, Bill" has been amended to replace the Factories Offices and Shops Act presently in operation. The amendment of the Act is intended to reflect its possible applications to premises and other activities, and places of

work which are not necessarily factories, offices and shops. The bill seeks to protect the public from risks to safety and health arising out of activities of persons employed in factories, offices and shops and other premises and activities to which the provisions of the Bill may be extended. It seeks to extend and strengthen the provisions of the FOSA to deal with additional hazards and to give greater powers of enforcement to factory inspectors.

One major strategy adopted in strategically managing occupational health and safety in Ghana is Safe Place Strategy, which is based on the assumption that the material elements of work (equipment, machinery, substances, working environment etc.) are safe and without risk of injury to health and safety especially having regard to acceptable occupational health and safety standards (Bruce, 2006). This requires direct practical action to be taken to eliminate or control the hazards at source. However, there are limitations to this strategy due to the dynamic nature of the condition of the elements of work (machinery, equipment, substances etc) and the human interaction with these elements (Bruce, 2006).

In Ghana, Health and safety training is provided by the Ghana Employers Association (GEA) and the Ghana Institute of Management and Public Administration (Kheni et al., 2008). Organisations interested in participating in training programmes pay fees. Professional bodies like the Ghana Institution of Surveyors and Ghana Institute of Engineers, in conjunction with international consulting organisations also organise training seminars for owner/managers and their staff (Kheni et al., 2008). However, the costs of these training workshops are a limiting factor to some timber processing establishments' participation.

2.3.1 Occupational Injuries Associated with Timber Processing

Worker's processing wood could be exposed to various hazards that lead to injury (Dutkiewicz et al., 2001; Akinyeye et al., 2013). Sawmill work involves shaping, cutting, processing and marketing of wood. These activities expose workers to various hazards with negative health effects, which include injuries to various parts of the body (Diwe et al., 2016). Various exposures have been linked previously to cases of chronic and acute non-malignant injuries at different stages of wood processing, especially among workers in sawmills, wood chip and debarking operations, plywood factories, logging and landscaping (Ronald et al., 2003). Though these injuries are prevalent at different processing stages, loggers who perform the first processing operation are the most at-risk among workers of the wood products manufacturing and supply chain (Michael and Wiedenbeck, 2004). During the 1980s, Norwegian sawmill workers were frequently exposed to extensively high spore concentrations, particularly, those working in the wood- trimming departments, after introduction of kiln drying and indoor sorting of the timber (Rydjord et al., 2007). By-products of wood processing such as wood dust and noise are also well known with respect to their occupational health effects (Verma et al., 2010). Workplace exposures occurred primarily through direct skin contact and, to a lesser extent, through inhaling chlorophenol vapours, aerosols, and contaminated sawdust (Heacock et al., 2015).

2.4 Health and Safety Knowledge of Sawmill Workers

In recent years a growing body of evidence has been generated investigating the impact of occupational activities on a wide range of health outcomes among workers (Ostry et al., 2009). Although the rates of work-related injuries and physical illnesses have declined over the past two decades in developed countries (Robson et al., 2016)

occupational injury preventive coverage in developing countries ranges from 5% to 10% at best, with services being found mainly in manufacturing enterprises, while some sectors of industry, the self- employed, and the informal sector like the wood industry are usually not covered at all (Jahangiri et al., 2016). Thus, although the wood product industry has high rates of both acute and chronic injuries as a result of occupational factors, there is only limited evidence regarding preventable risk factors for these injuries and diseases (Holcroft and Punnett, 2016). Also, while the ethology of these diseases/injuries is not fully known (Akinyeye et al., 2013), workers, often are well aware, not only of the occupational and the environmental health hazards that they face, but also of the need to address the underlying causal factors (Barten, et al., 2008).

Previous studies (Alamgir, et al., 2006) have however shown that workers injured in the workplace do not always report injuries for health attention or file a claim for workers' compensation. Consequently, with inadequate medical compensation and absence of medical aid or free health services, it is predictable that timber factory workers would engage in self-care practices including medication and consumption of herbal mixtures that could lead to other health complications (Agunbiade, 2015). Even among severely injured Ghanaian sawmill workers, almost one fourth of those injured received no proper medical care, and cited financial barriers as the reason (Deroo, et al., 2005).

Though marginal efforts have been directed at ensuring the safety and health of those working and living around sawmills (Agunbiade, 2015), workers at the highest level, enterprises with 500 or more employees are obliged to establish a Labour Health Center staffed by an occupational physician, occupational health nurse, industrial hygienist, and a safety department staffed by safety officers and managers (Jahangiri et al., 2016), in order to ensure their health and safety. Therefore, there is an urgent need of taking into account the health impact of production processes and services on workers' health

(Montano, 2014). Pertinent to achieving this, is to engage with workers' and recognize risk factors that are crucial to developing efficient policies and programs that will impact positively in their health, safety and well-being (Barten et al., 2008).

2.5 Occupational Safety Guidelines and Practices Used by Sawmill Workers

Lack of organized occupational health services and use of personal protective equipment among workers of the sawmill industry, leads to hazards that have grievous consequences on their health (Ugheoke, et al., 2006). Occupational health and safety inspection and supervision have been subject to regulations by many National and International agencies worldwide (Adedeji and Nwosu, 2016). The International Labour Organisation (ILO) considers issues relating to occupational health and safety (OHS) to be of much importance in injury prevention to the extent that it has devoted about 80% of its standards and instruments either wholly or partly to it (Mitchual et al., 2015).

In addition, the Occupational Safety and Health Administration of the US Department of Labor (OSHA) has determined threshold limit values for noise and pressure levels that represent conditions which workers may be legally exposed to repeatedly (Aryanezhad, et al., 2008). Improved safety in the work-place, both through voluntary efforts and through governmental regulation, has been an important component of promotion of occupational health and of injury control in general (Deroo et al., 2005). Other injuries that come as a result of poor practices of occupational safety measures among sawmill workers have also been investigated (Agbana et al., 2016).

In a study conducted on the theme "Awareness of Occupational Hazards, Health Problems and Safety Measures among Sawmill Workers in North Central Nigeria", it was concluded that less than 20% of the sawmill workers wore protective devices/clothing (Mitchual et al., 2015), and another 5% of the workers wore face masks

and working boots (Ugheoke et al., 2006). This was due to the fact that health and safety standards were neither practiced nor enforced. Meanwhile, work practices and safety observations are crucial to ensuring safety and minimizing workplace injuries (Agunbiade, 2015). As indicated by (Dwomoh et al., 2013), when workers understand the health and safety rules and procedures of their job and the tools used for working, through continuous monitoring and supervision, hazards are avoided, injuries are prevented and workers work effectively and efficiently leading to better productivity. As a result, legislative guidelines were introduced in Quebec that mandated annual surveys and supervision of working conditions in the Quebec population (Smith et al., 2010). Similarly, countries like Brazil have instituted 36 Regulatory Norms (NR) and safety guidelines whose main objectives are to regulate and guide the required procedures related to safety and occupational medicine (Tavares et al., 2015). These guidelines aim to upgrade occupational health standards, contribute importantly to transnational legal harmonization and reduce the high socio-economic burden caused by occupational injuries (Maestrelli et al., 2012), especially among sawmill workers. Control of exposure can also be achieved by different control measures commonly applied in elimination, reduction, isolation, ventilation, avoidance of exposure and personal protection (Chamba and Nunes, 2016).

However, before this can be done, it is useful to have a nuanced understanding of how (i) accidents are caused (and therefore prevented); and (ii) safety management in organizations (Pillay, 2015). What is known is that despite great advances in occupational health surveillance in several countries in the last decades, adverse health outcomes are still more frequently observed among workers in hazardous occupations due to lack of safety standards (Montano, 2014). For example, recent studies in Ghana (Laryea and Mensah, 2010) found that only one wood processing site out of fourteen

surveyed sites had more than 50% of the standard health and safety indicators investigated. This is because, the implications for ensuring occupational safety policy and practice are not yet well understood and often not recognized among decision-makers that are mostly located outside this working-class timber processors (Barten et al., 2008). Characterizing occupational injuries among sawmill workers therefore, will produce data necessary for formulation of safety standard guidelines for injury prevention among sawmill workers.

2.6 Safety Training

Nowadays, managements of organizations are emphasizing safety training as an important safety intervention within organization. Safety training is a tool to change people's safety knowledge, behaviour and attitudes in the workplace (Cooper, 1998). Attempts to examine safety training outcomes on the significant improvements in safety knowledge, safety attitude and safety behaviour, as well as safely performed work activities, have been identified in the literature (Burke, 2006, Jensen, 2005; Lingard, 2002). Safety training, equips employees with adequate knowledge and skill to promote safety in an effective way (Fender, 2012) as the ultimate goal of workplace safety training is injury prevention and control.

A study sponsored by the Wood processing Industry Institute (2002) also identified nine areas, among which orientation and specialized training occupy a prominent position. Hinze et al., (2013) conducted interviews with the representatives of 57 projects in the U.S. and found that higher performance is achieved with intense safety training. Hallowell (2012) conducted eleven case studies in different regions of the U.S. and found that the most common methods used by companies to transfer safety knowledge are orientation and training sessions, toolbox talks, informal safety communication

among workers, and formal presentations by safety managers. Overall, the current literature supports the view that training is a major factor in sustaining and improving safety performance.

Han et al., (2008), state that low skill levels, inadequate technical knowledge, and a steep learning curve are the factors that affect the safety performance of wood processing workers in a negative manner. Jensen (2005), states that safety knowledge, skills and abilities could be improved by well-generated learning theories. The Occupational Safety and Health Administration specifically requires that safety proficiency be evaluated and documented by the use of a written assessment and a skill demonstration to evaluate the knowledge and individual skills developed in the course of training (OSHA, 2012).

Kirkpatrick (1998) suggests that the effectiveness of learning could be tested by observing the differences between a control group that does not receive training and a trained group. Furnham (2005) argues that individuals learn best when they encounter an obstacle or an intellectual challenge that is of interest to them. According to Furnham (2005), the best way to help people learn is to explain the abstract of the situation and provide varied examples over an effective learning period. Furnham (2005) also states that people learn by modelling others' skills. In addition, Furnham's (2005) study also indicates that safety training might be achieved by computer-aided tools since it has the benefit of being self-paced. BLR (2007), reports that three basic learning styles exist, including visual learning, auditory learning, and hands-on learning. Workers learn things in different ways and at their own pace. For example, visual learners learn best by seeing, while auditory learners like to listen, and hands-on learners learn best through practical instruction. The BLR (2007) report suggests using more visual aids in safety training sessions.

Dudley (2010) defines two teaching styles commonly used by trainers, namely andragogical and pedagogical styles. In the andragogical style, the learner is self-directed and is responsible for his/her own learning. Contrastingly, in the pedagogical style, the trainer takes the full responsibility in how the material is learned and the trainer evaluates learning. In the andragogical style, learners are internally motivated, display self-esteem, recognition, and confidence, while in the pedagogical style, learners are externally motivated by competition for performance and the negative consequences of failure. It is to be noted that safety training is negatively affected by factors such as economic downturns, limited training budgets, and unpredictable product and technical innovations (Furnham, 2005).

2.7 Basic Elements of Safety Training

Many authors (Bontis et al., 2016; Demirkesen and Arditi, 2015) assert that the efficiency of safety training programs depends on organizational-related elements, feedback-related elements, content–related elements, process-related elements and worker-related elements

2.7.1 Organizational Elements

Organizational issues consist of the firm's structure, middle management's commitment to safety, and the effectiveness of safety trainers in improving the quality of training sessions.

Bontis et al. (2002) asserts that a supportive firm structure results in knowledge transfer and motivates workers to learn quickly and capture the necessary information in an effective manner in safety training sessions. According to Hinze et al. (2013), middle management's commitment to safety training results in experiencing lower injury rates

and helps with improving a company's safety culture. Concerning the qualifications of a trainer, OSHA standards mandate that a trainer is considered to be qualified if he/she has previously completed a training program on the subject to be instructed. Furthermore, these trainers are expected to possess relevant academic credentials and teaching experience (OSHA, 2012). Organizational issues therefore, play an important role in improving safety performance on sites. Organizational-related elements include the following: employing qualified safety trainers, setting up an organizational structure that supports safety, and training and encouraging middle management involvement in safety training.

2.7.2 Feedback-Related Elements

According to Furnham (2005), safety performance is enhanced by accurate and timely feedback because feedback reinforces safety learning. Also, Janssen (2005) conducted research about the psychological mechanisms that cause poor safety performance in wood processing companies and found that feedback should be continuous to achieve actual safety performance that is aligned with planned performance. Therefore, feedback issues deserve special attention in conducting safety training. Feedback-related elements include the following: providing feedback to workers, observing workers' safety-related behaviours, and allowing experienced workers to transfer safety knowledge to less experienced workers

Content- Related Elements

According to (Tam and Fung, 2012; Demirkesen and Arditi, 2015) issues related to the content of training sessions consist of goal setting before conducting safety training and developing the safety training content with respect to worker needs and interests. A well-designed content that addresses worker needs and interests results in higher efficiency

during training sessions as workers start with different levels of knowledge (Tam and Fung, 2012). Therefore, designing safety training content requires an in-depth analysis of the materials, methods and processes that are perceived by workers to be of importance to safety. Content- related elements include setting goals ahead of safety training, designing content of training to satisfy worker needs/interests and encouraging worker input at safety training sessions

Process- Related Elements

According to Demirkesen and Arditi (2015) issues related to the training process may have significant impact on the effectiveness of safety training. The use of visual aids in training session deserves special attention. Bontis et al., (2016) emphasize that the use of 4D and 5D visualization tools helps to increase the knowledge gained in training sessions. Also, observing worker practices after training sessions could indicate how much workers learned in the training session. Process- related elements could include using visual aids in safety training, conducting periodic tests to assess worker learning and administering exams to workers during or after safety training

2.7.5 Worker-Related Elements

Worker-related elements include encouraging worker awareness about safety issues, promoting pride in work completed without accidents, and motivating workers through frequent and effective training meetings (Demirkesen and Arditi, 2015). Workers who are part of an effectively trained team take pride in their firm if projects are completed with a great safety record (Bontis et al., 2002). Han et al., (2008) studied critical factors and possible solutions to motivate foreign wood processing workers and found that one of the measures to be taken to motivate foreign wood processing workers was training

for better communication. Wanberg et al., (2013) study revealed that the promotion of safety and quality can be achieved through strategies such as assigning resources to preplanning, motivating leadership at workplace, and motivating workers to take pride in their work. The literature appears to support the idea that a good safety record can be achieved if workers are motivated through effective training. Worker-related elements could include encouraging worker awareness about safety issues, promoting pride in work completed without accidents, and motivating workers through frequent (daily) training meetings

2.8 Impact of Safety Training

Results and effectiveness of training outcomes are evaluated by training models. The purpose of safety training evaluation is to ascertain learning outcomes by trainees and also whether achieving predetermined objectives results in better performance on the job. According to Kirkpatrick (1998) no final results could be expected from training program unless a positive change in behaviour occurs. Therefore, it is important to observe if the knowledge, skills and/or attitudes learned in the programme transfer to the job. This framework is used for determining the success of training programme using the behaviour of site managers and operatives. The safety behaviour elements develop by Onowhakpor and Amenze (2017) and adapted for this study included work behaviour, importance to safety, follow safety rules and work executive.

2.9 Theoretical Background of the Study

There are various theories and models that health and safety behaviour of site operatives. Some of the theories include Theory of Planned Behaviour (TPB) in wood processing safety, the ABC theory of wood processing safety and attitudinal ambivalence.

2.9.1 TPB and Wood processing Safety Research

Ajzen developed the Theory of Planned Behaviour (TPB) and identified factors of human behaviour, which included attitude, subjective norm, and perceived behavioural control (Jovanovic, 2017). Attitude refers to the value attributed to the performance of the behaviour, and the most favourable behaviour is more likely to happen. The subjective norm indicates social pressure to perform certain behaviour; the behaviour under greater pressure is more likely to happen. The perceived behavioural control refers to a prejudgement of the possibility of performing certain behaviours; the easier behaviour is more likely to happen. The intention is an indication of a person's readiness to perform a given behaviour, and it is considered to be the immediate antecedent of behaviour. The TPB considers individual and environmental influence and could be used to explain human behaviour in a satisfactory extend. A search of existing literature showed that TPB has been cited more than 10,000 times and successfully applied in various research fields to predict safety-related behaviour such as unsafe driving behaviour (Jovanovic, 2017), green exercise (Flowers, et al., 2017), and the relationship between safety climate and unsafe behaviour (Goh and Binte-Sa'adon, 2015).

To promote safe behaviour on wood processing sites, previous researchers measured safety attitude, analysed the relationship between safety attitude and safety performance, and discussed how safety interventions could improve safety attitude and performance (Arcury et al., 2012). Mohamed et al., (2010) found that workers' attitudes towards safety responsibilities and their risk perceptions explained their intentional behaviour. Some of the research had identified that safety attitude could be under conflicting influencing factors and it is possible to impact the relationship between attitude and behaviour. In this research, by applying theoretical model fitting, the causal effect of attitude on behaviour can be further explored and discussed.

In wood processing safety, Cavazza and Serpe (2010) used TPB to argue that the improvement of safety performance was caused by psychological changes and positive attitudes after safety training programmes. Fang et al., (2016) developed a framework of social psychological causes of unsafe behaviour based on the TPB and used it to discuss the relationship between safety attitude and unsafe behaviour. Goh and Binte-Sa'adon (2015) used TPB to identify the key variable of the cognitive decision- making process of unsafe behaviour of scaffolders.

Applications of TPB model often expanded it with extra factors to better explain unsafe behaviour, as TPB was an open theoretical framework and new factors could be added to improve the explanation of human behaviour. The descriptive norms were distinguished from injunctive norms to better predict intentions and behaviour (Dunn et al., 2011). Other factors were added to TPB model as the leading factors of attitude and subjective norms, which included past behaviour and habits, belief salience, morality, and self-identity, and moral norms, which included self-identity and group identity. In this research, a focus was placed on the attitude factor; particularly, this research expanded the construct of attitude and introduced the concept of ambivalent attitude.

2.9.2 The ABC Theory of Wood processing Safety

A-B-C analysis began in the 1960s with the beginnings of applied behaviour analysis, with Sidney Bijou and colleagues asserting the importance behaviour on safety. The A-B-C analysis is a descriptive assessment that is conducted as an initial part of a complete functional behaviour assessment. The goal of this analysis is to develop hypothesis regarding the function that a problem behaviour serves for an individual with ASD. A-B-C analysis views behaviour (B) as a function of the antecedents (A) that precede it and the consequences (C) that follow it. The ABCs are just that – basic steps to helping

explain and understand behaviours in order to determine why employees choose to act in a certain way (Jovanovic, 2017). Safety is more than just following your company's guidelines or what OSHA says while you work. Safety is actually a combination of a safe attitude, behaviour, and control both on and off the job. Attitude means your frame of mind and the way in which you approach a given situation. Behaviour means what you do about it and how you react to a situation. Control refers to making your surroundings, where and what you do, safe. Safe attitude, behaviour, and control add up to a safer more productive you (Fang et al., 2016). The ABC theory have been explained as follows:

A – Attitudes: Employee behaviour is debatably one of the greatest determinants in workplace safety, especially as employees interact amid a host of varying safety issues. The human behaviour thus plays a huge role to a task performed by an employee. The task can have a negative and a positive impact on connected to the person doing the specified task. Employees work attitude not only affects how well they do their job, but it also affects how safe they are when doing it. Positive people usually perform better in the workplace because they maintain an open mind and consider the outcome of their behaviour. Negative people, on the other hand, complain about everything, including having to practice safety. The person with the negative work attitude is less likely to care about the quality of the job she is doing or how she does it. A negative work attitude can lead to unsafe work habits and accidents (Neef, and Peterson, 2007).

B – Behaviour: Behaviour in the workplace is all about emotions such as aggression, happiness, or depression. Negative workplace behaviour, such as workplace bullying, is an important work-related psychosocial hazard with the potential to contribute to employee ill health (Feldman, and Griffiths, 2014). Two major health issues can be noted; poor mental and cardiovascular health. How one reacts to a situation is an

important part of one being safe? Following established safety guidelines and procedures, refusing to take “shortcuts”, using personal protective equipment, asking questions when you need more information and the task at hand are all safe behaviours. Safe behaviour also means helping friends, co-workers, and family members understand the importance of safe practices and work, home or play. For instances, if a shop assistant supports the system of negative feedback on the business, the negative exposure in the workplace develops a physical disease and psychological illness. The behaviour of the workers indicates a poor cardiovascular health, and a significant effect of current exposure on the indicator of mental health problems (Feldman, and Griffiths, 2014).

C – Control/Condition: Control means taking responsibility for making your worksite, home, or recreational facility a safe place. You can help keep your surroundings safe from potential hazards by keeping them clean and orderly (Jovanovic, 2017). Keep machines in good repair, clean up spills and debris (or report them to the appropriate person), and make sure that walkways are free from obstacles. Store chemicals properly (both at home and on the job) and never switch containers. At work, be sure to report faulty equipment ventilation, or any potential hazards to your supervisor (Goh and Binte-Sa’adon, 2015). The condition to follow or consequences are what happen after the behaviour – reward or punishment. Most people do not want to suffer the "consequences" of their behaviour. When people understand and believe in the potential conditions, behaviour starts to change. The motivating conditions are different for people. The impact an injury has on them personally or their family is important. For others, losing their job, or having a consequence directly affect their social life is more important and can lead to behaviour change. The point is, we are all motivated differently. So, understanding the motivations for safety in our people becomes important for long-term behaviour change (Feldman, and Griffiths, 2014).

2.9.3 Attitudinal Ambivalence

The concept of attitudinal ambivalence refers to the degree to which an attitude object is evaluated positively and negatively at the same time (Guo et al., 2016). Ambivalence is an aspect of attitude strength which is likely to have consequences with respect to its impact on information processing, the persistence of the respective attitude, its resistance to persuasion, as well as the relationship between the attitude and relevant behaviour (Dunn et al., 2011). For example, attitudes are assumed to be less temporarily stable and to correspond less well with pertinent behaviours at higher levels of ambivalence. However, depending upon which operational approach to measuring ambivalence is adopted, different processes and consequences are to be expected.

Various factors may lead to conflicting information and stimuli regarding wood processing workers' safety attitude (Guo et al., 2016), and those factors may come from the individual level, the group level, and the organizational level. For example, Fender (2012) identified management safety commitment, team safety climate, and personal safety responsibility as factors of safety attitudes. Safety training not only increases safety knowledge but also improves safety climate on site and could be a positive factor of wood processing workers' safety attitude. On the other hand, acting in a safe way may sacrifice comfort and convenience. For example, dumper drivers may not get off the truck every time during unloading because they tried to save some efforts (Bohm and Harris, 2015); workers may also refuse to wear helmets because it is too hot in the summer. These conflicting factors may lead to the unstable, incongruent, and ambivalent safety attitude in wood processing crews. In addition, attitudes towards safety in the wood processing industry were affected by past experience; victims of accidents tended to be more careful while non-victims felt confident about their own behaviour (Dunn et al., 2011).

Wood processing crew members are under great peer pressure from their groups to behave unsafely if unsafe behaviour prevails, and wood processing managers' commitment to safety could be conflicting with the unsafe behaviour of the construction co-workers. Goh and Binte-Sa'adon (2015) stated that interaction and leadership were the predictive factors of the emergence of organizational climate, and safety culture emerged from the interactions and influence of multiple organizations. In small and medium wood processing groups, frank and frequent safety communication between wood processing workers and managers could improve safety performance (Alsamadani et al., 2013). Friendship network in the wood processing crews can compensate poor safety climate (Yagil and Luria, 2010), and social pressure in crews can influence the strength of safety climate. Novice and younger wood processing workers relied on the communications with their peers to attain safety knowledge (Lingard, et al., 2011). The safety performance of migrant or ethnic minority workers being worse than that of local workers could also result in the negative safety attitudes as a group (Bohm and Harris, 2015).

Therefore, it is necessary to study the existence and measurement of contradictory attitude towards safety behaviour, and attitudinal ambivalence may provide an explanation of the cognitive decision-making process with individual's intent of unsafe acts. Attitudinal ambivalence describes the coexistence of positive and negative attitude elements. Ambivalent attitude comes from conflicts among cognitive and affective dimensions of attitude, either within these dimensions or between them (Guo et al., 2016). Intracomponent ambivalence stands for the coexistence of positive and negative cognitions or feelings against certain attitude objects. For example, believing PPE an effective protection from danger but useless in safe environment is ambivalence within the cognitive attitude, while feeling protected by personal protective equipment and

feeling tedious wearing them are ambivalence within the affective attitude. Intercomponent ambivalence stands for the coexistence of positive cognition and negative feelings or that of negative cognitions and positive feelings towards attitude objects. For example, knowing to wear safety helmets and feeling uncomfortable wearing them represent ambivalence between cognitive and affective attitudes.

The measurement of attitudinal ambivalence could be direct or indirect. Respondents could be asked directly if they have conflicting beliefs and feelings towards unsafe acts, or they could be asked to rate the extent of their positive and negative beliefs and feelings separately, and the response would be calculated to indicate ambivalence (Goh & Binte-Sa'adon, 2015). Psychological studies have verified that conflicts could weaken behavioural intentions or the relationship between attitudes and behaviour (Smith et al., 2010). Cavazza and Serpe (2010) found that attitudinal ambivalence can mediate the impact of safety climate on complying with the safety behaviour rules. However, safety climate is a collective phenomenon, and individually, safety behaviour is influenced by safety attitude.

2.10 Conceptual Framework of the Study

According to Mugenda and Mugenda (2016), a conceptual framework is a hypothesized model indicating the relationship between the dependent and independent variables. Figure 2.1 was developed from the theoretical framework and the literature review. The correlations among variables are explored in this framework.

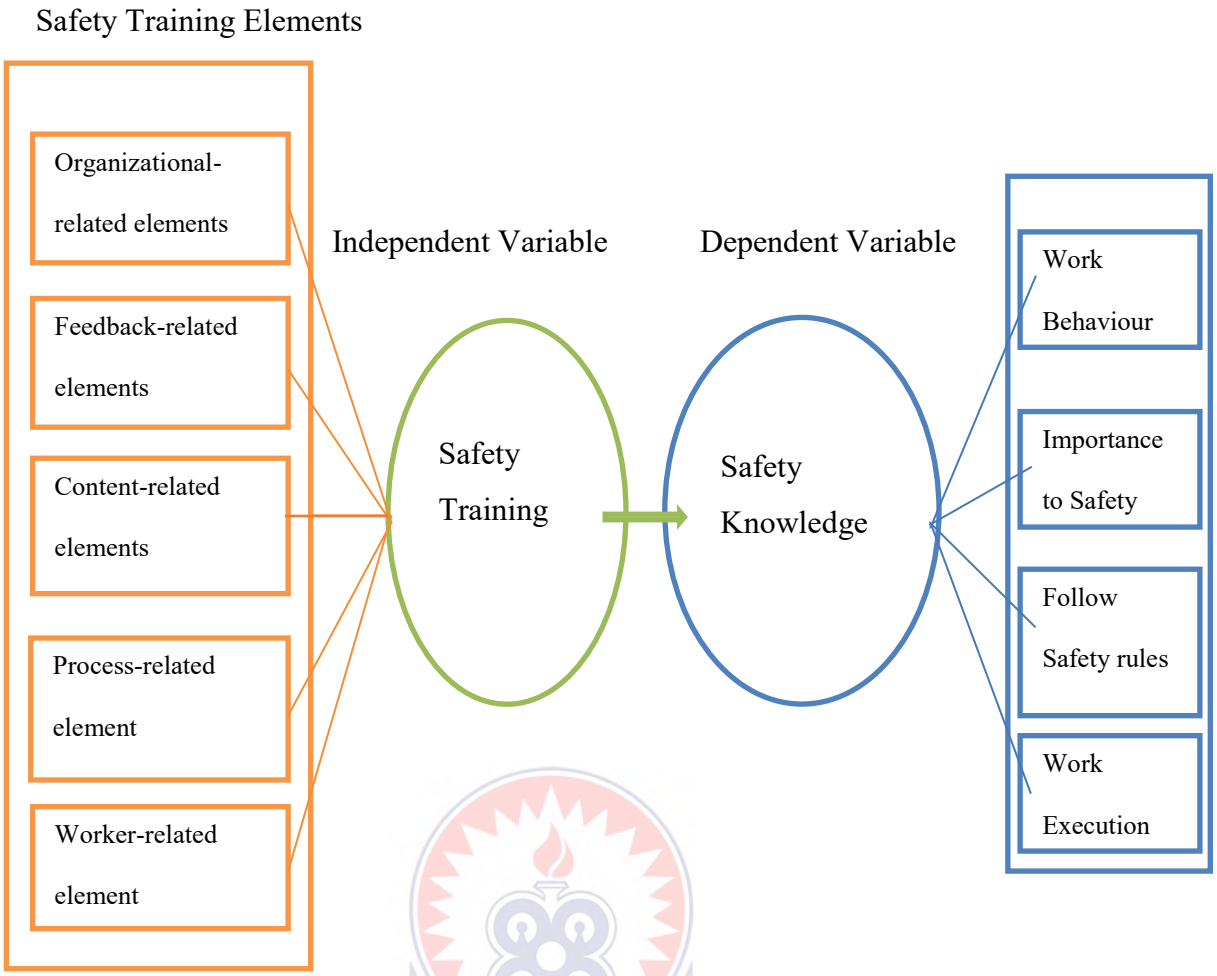

Figure 2.1: Conceptual Framework for the Study

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter considered the areas concerned with the methods used in the research. These include: the research design, population under study, sample size and sampling procedure, instrument for data collection, procedure for data collection and the method of data analysis.

3.2 Research Design

This study employed a cross-sectional descriptive survey research design. A descriptive research design was used in preliminary and exploratory studies to allow researchers to gather information and summarize, present and interpret data for the purpose of clarification (Saunders et al., 2012). The descriptive survey was selected because it provides an accurate portrayal or account of the characteristics, for example behaviour, opinions, abilities, and knowledge of a particular individual, situation or group. According to Mugenda and Mugenda (2016), the purpose of descriptive research is to determine and report the way things are and it helps in establishing the current status of the population under study. This design provides an accurate picture of events and it also seeks to explain peoples' perceptions and behaviour on the basis of data gathered at a point in time. It is also important to note that this design is appropriate when a researcher attempts to describe some aspects of a population by selecting unbiased sample of individual who are asked to complete questionnaires, interview or tests. Borg and Gall, (2009) note that descriptive survey research was intended to produce statistical information about aspects of a study that interest policy makers. Saunders et al., (2012), says that surveys are self-report study that requires the collection of quantifiable

information from the sample. They are useful for describing, explaining or exploring the existing status of two or more variables (Mugenda and Mugenda, 2016).

3.3 Population

According to Kothari (2009), defined population in research as the group of interest to the researcher, the group to which he/she would like the results of the study to be generalized. He further explained that the defined population has at least one characteristic that differentiates it from other groups. The population in this study comprises wood producers working with sawmill firms and small-scale furniture workshops within Ada and Sogakope Districts in the Volta Region of Ghana. This study defined sawmill workers as a category of workers within the timber processing industry who are employed to process timber into planks of wood, boards and other semi-finished or finished wood products, using machines and other equipment. Also, Volta Region was selected because it is one of the major regions in Ghana where most wood processing activities are highly concentrated (Ankomah, et al., 2010).

3.4 Sampling Techniques and Sample Size

This study used purposive sampling as sample technique. According to Mugenda and Mugenda, (2016), a purposive sample is non-probability sample that is selected based on the characteristics of population and the objective of the study. This technique is a sample procedure where the units that are investigated are based on the judgement of the researcher. Creswell (2009) sees purposive sampling as hand picking the cases to be included in the sample on the basis of their judgments of the typicality of the issue identified for study. Purposive sampling is the process of including whoever happens to have rich information and available for the study (Creswell, 2009). This was deemed

necessary because of the researcher's expectation of obtaining experienced experts who are directly involved in wood processing business. The sample however excluded all residents around the saw mill setting, whose occupations were not directly related to timber processing. A sample size of one hundred and sixty-five (165) was considered for this research consisting sawmill and small-scale furniture workers in the Volta Region of Ghana. This will ensure adequate representation of the population.

3.5. Data Collection Instrument

A structured questionnaire was the primary tool used to collect the necessary information from the respondents. Questionnaires are non-variable, stable, constant, and consistent measures. Because many responders prefer to write rather than talk about topics, they provide a comprehensive and impartial perspective on the subject. Personal field observations were used to collect data, which assisted the researcher in developing a standardised questionnaire that was used to obtain primary data from sawmill and small-scale furniture workers. The questionnaire was designed in line with the research objectives and socio-demographic characteristics were also elicited. The questionnaire was structured into four main sections. The first section, examined the respondents' background such as gender, position in company, years spent in the company, and their educational backgrounds. The second part sought to identify safety and health hazards that woodworkers are exposed to in the workshops and sawmills. The third section sought to assess the knowledge of woodworkers on the safety and health hazards related to their work. The section that followed sought to examine the level of safety training that exist among wood workshops and sawmills within Ada and Sogakope Districts.

The questionnaire was 6 pages long, omitting the cover page, which was in accordance with the notion that a questionnaire should be 10 to 12 pages long (Haupt, 2009).

According to Haupt, response rates for varied questionnaire durations under 12 pages are same. Open-ended questions were kept to a bare minimum, either to account for the broad range of expected or potential replies or to provide respondents the opportunity to thoroughly explain their responses. A 5-point Likert scale was found adequate for the majority of the questions, and scaled solutions were prepared. The most prevalent scale for gathering respondents' thoughts is the Likert scale (Haupt, 2009). This scale may be used to create preference hierarchies that can then be compared. Because of its simplicity and versatility, the semantic differential rating scale (Haupt, 2009) was chosen. The extreme scale locations were identified to make intensity rating easier. These labels appear to define almost equidistantly separated rating places, which is required for reliable measurement.

3.5.1 Validity of Instrument

According to Mugenda and Mugenda (2016), validity is the degree to which a test or an instrument measure what it purposes to measure. In other words, validity is the extent to which an instrument measures what it is supposed to measure. To ensure that the instrument covered all the relevant areas of occupational health and safety, safety training practices and the whole proposed survey instrument was well worded and understood; thus, content validity, the questionnaire was sent to experts on the subject; an academician well versed in the subject understudy to check the comprehensiveness of the items under each construct. This helped to improve the content, eliminate ambiguity and ease understanding.

3.5.2 Reliability of Instrument

Reliability refers to the extent to which an instrument measures the same way each time it is used under the same conditions with the same subjects (Agyedu, 2013). Cohen et al. (2003) explain reliability to mean that scores from an instrument are stable and consistent, scores should nearly be the same when researchers administer the instrument multiple times. Cronbach's Coefficient (α) was calculated to estimate the internal consistency reliability of the measurement scale. Cronbach's alpha is widely used in social science research to estimate the internal consistency of reliability of a measurement scale. The recommended minimum threshold of Cronbach's alpha value is 0.7 (Cohen et al., 2007).

3.6 Data Collection Procedure

To maximize both the quality and quantity of responses, attention was given to every detail that might affect response behaviour. Proven methods to increase response rate were implemented to maximize the number of respondents. The survey packet comprising of a cover letter and questionnaire prepared for the sample wood processing firms.

After the reliability and validity had been determined, data collection started with seeking permission from the construction managers. An introductory letter was obtained from the University, which sought to introduce the researcher to the managers of the firms and sought permission to carry out the administration of questionnaire. The letter spelt out the purpose of the study and ethical issues were identified. The inclusion and exclusion criteria were established before collection of data commenced. The researcher explained that participation was voluntary; that all responses would be confidential; and

those respondents needed to only answer those questions they felt comfortable with. The importance of the participation of the respondents in the study was stressed.

This allowed the researcher to determine who to be included and excluded in the study. One structured questionnaire was designed for the respondents. The questionnaires mostly consisted of Likert scale questions which required respondents to tick to indicate their perception where appropriate and few open-ended questions. The researcher visited each site and personally gave the questionnaires to the participants. The purpose of the study was explained to prospective respondents, their consent was sought and the questionnaire was self-administered to them and they were collected later within five days when they finished responding to them. This allowed respondents to take time to think about the questions before responding to them. Providing at least five days for respondents to think of responses has the tendency to result in reliable answers. The study made use of 48 questionnaire items related to research objectives.

3.7 Data Processing and Analysis

The data collected from the field were cross-checked and edited to ensure that there were no mistakes in the responses and that, the information given were relevant. Afterwards, the data were coded and fed into the computer. The Statistical Package for the Social Science (SPSS version 16) and Microsoft Excel 2016 were used to process, generate a database of responses and to conduct statistical analysis using the questionnaire.

3.8 Ethical Issues

In the data collection, ethical issues were taken into consideration, in that respondents were made fully aware of the purpose of the study and also assured that individual respondents and firms were not going to be identified; all the responses would be analysed together (Bailey, 2007).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The main purpose of the study was to assess the knowledge of workers in occupational safety and health hazards in some selected wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana. This chapter of the study presents the results of the study based on the data collected through the questionnaires. In discussing the results from the administered questionnaires and interviews, references were made to frequency figures, means, charts and tables. Descriptive statistics were used to determine the standard deviations and the mean scores of the variables based on the five (5) Likert scale. Silva and Dapila (2012) indicated the degree of agreement among the respondents to be more consistence when the standard deviation variables are less than 1.00. The relative importance index produces a ranging value from 0.2 up to 1.0 and mean score are considered vital when the variable is greater than 3.00. When two or more variables have the same mean, the one with lowest deviation is allocated the highest significance ranking (Ahadzie, 2009). The researcher distributed 165 questionnaires to the respondents; however, the researcher was able to retrieve 160 questionnaires. Therefore, the analysis of the study was based on 97% response rate. Data have been organised, presented and discussed under the following themes:

- Demographic data of respondents
- Safety and health hazards that woodworkers are exposed to in their workshops and sawmills
- Extent of experience and knowledge of woodworkers and sawmill operators in occupational health and safety hazards

- Level of safety training in wood workshops and sawmills within Ada and Sogakope Districts

4.2 Demographic Data of Respondents

In this section, the researcher provides data on the demographic characteristics of the respondents. The demographic features of the respondents entail gender, educational background, age, level of experience and trade expertise in accordance with the questionnaire for the study. The respondents' background help generate confidence in the reliability of data collected and eventually in the findings of the study. According to Anokye and Afrane (2012) it is always important to have a fair idea of the respondents so as to situate the responses within context.

4.2.1 Gender of the Respondents

The researcher enquired about respondents' gender. Responses registered by the selected respondents have been presented in Figure 4.1.

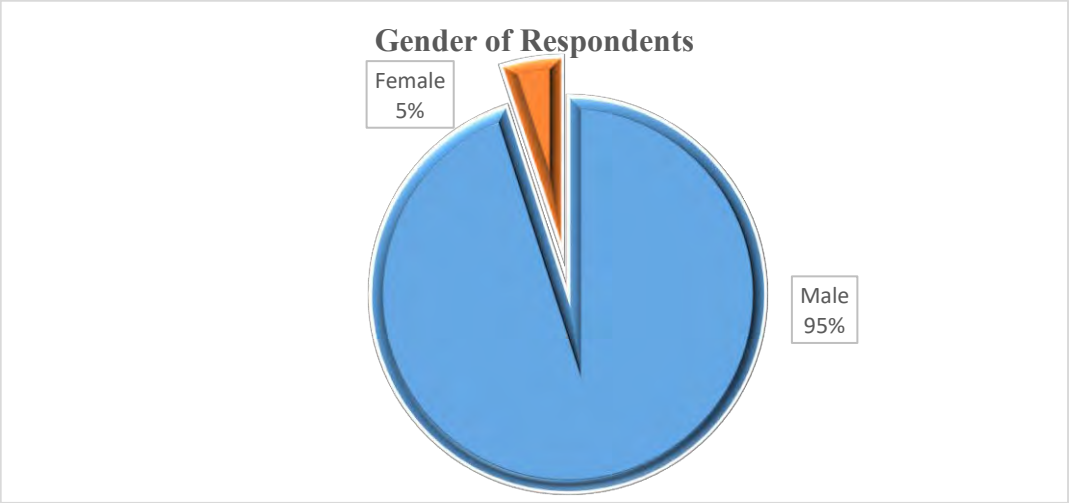

Figure 4.1: Distribution of Respondents by Gender

Source: Researcher's Field work, 2022, N= 160

From Figure 4.1, 152 (95%) respondents were males while 8 (5%) respondents were females. The gender gap that exists within the wood processing industry is wide with male's dominance more than double the number of females. This may be due to the fact that the wood processing industry is labour intensive and might require more strength. This could also be attributed to the nature of the cultural systems in Ghana and the health hazards associated with the work of a wood processor. This confirms with literature (Adeoye et al., 2015) where it is mentioned that more males were engaged in sawmill activities. However, Aruofor (2000) reported that female tendency is more towards rural farming and trading activities than timber related businesses. A survey of major employers by Offei-Nketiah (2019) also revealed a high level of scepticism about the recruitment of women in the wood processing industry and males dominated the construction sector. He further reported that women's role at sawmilling sites was limited to selling affordable food and water to workers. On the contrary, there was a large percentage of women in the Indian wood processing sector.

4.2.2 Age Distribution of Respondents

The respondents were asked to indicate the age they belong. The age of the respondents was categorized into ten years-intervals to isolate the particular age range that produced the majority of the respondents.

Table 4.1: Age of Respondents

Age (years)	Frequency	Percentage (%)
Below 20	19	12
20-29	28	18
30-39	47	29
40-49	40	25
50-59	16	10
Above 60	10	6
Total	**160**	**100**

Source: Researcher's Field work, 2022

The respondents' ages ranged from 18 to 65 years with the majority (29%) being in the 30-39 year's bracket, 19 (12%) respondents were in the age bracket of below 20, 28 (18%) of them were between 20 and 29 years, whilst 40 (25%) were between 40 to 49 years. Again, 26 (16%) of the respondents were over 50 years of age (Table 4.1). The results showed that the labour force in the Ghana informal construction sector at the time of the study was aging; the respondents below 30 years formed only 30%. This could be attributed to the lack of interest in the building trades by the country's rapidly increasing youthful population who were more interested in white-collar jobs than physical/skilled labour. This finding is in contrast with results from other studies conducted elsewhere, where respondents of ages between 20 and 34 were the majority (Olaoye, et al., 2016), while other reports also indicated that the larger percentage of sawmill workers of ages between 20 to 30 years were the minority (Jilcha and Kitaw, 2016). The results also signify an appreciable number of mature respondents who can be relied on for credible information and their take on the knowledge of workers in occupational safety and health hazards.

4.2.3 Respondents' Educational Level

The educational status describes the educational background of respondents in the study area. This represents the highest level of education attained by the respondents. The outcome of the analysis of the respondents' educational attainment is presented in Figure 4.2.

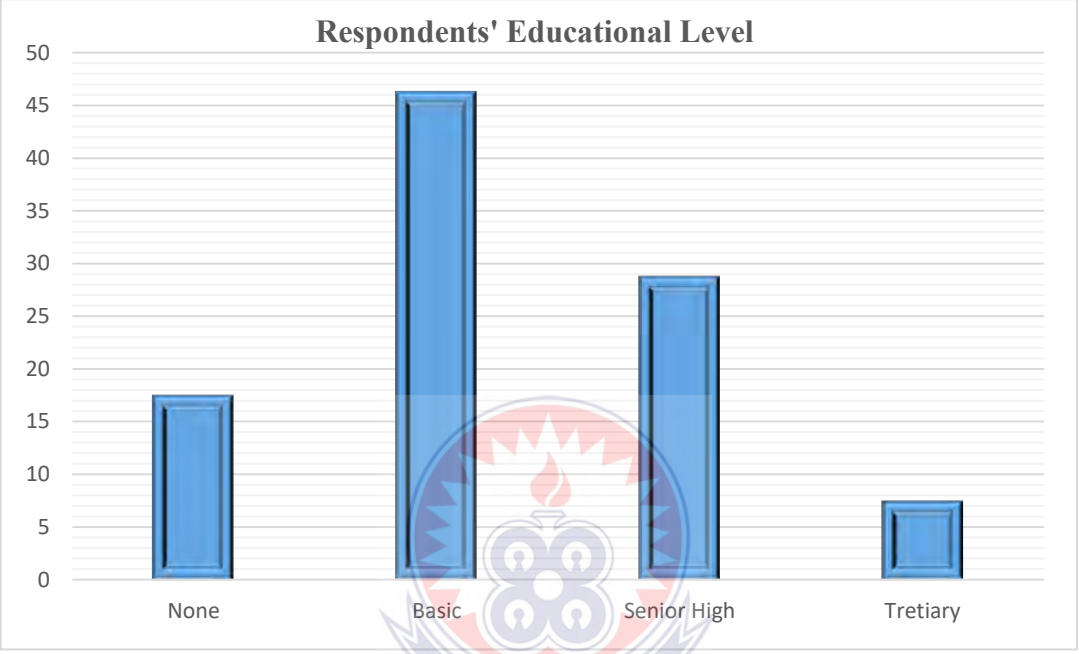

Figure 4.2: Distribution of Respondents by Highest Level of Education

Source: Researcher's Field work, 2022, N= 160

The results in Figure 4.2 show that 28 (18%) of the respondents had no formal education, while 74 (46%) of the respondents had basic education. 46 (29%) respondents had senior high or technical education and 12 (8%) respondents had tertiary education as their highest academic qualifications. It implies that one is more likely to meet a wood processor or artisan with basic education at the site than the other qualifications in the study area. Knowledge and practice of occupational safety can also be influenced by respondents' education on occupational health and safety. In line with this, studies conducted by Endroyo, et al., (2015), indicated that education and training are required to minimize occupational accidents among saw mill workers. Indeed, in support of this

argument. Fender (2012) reported that level of education is a determinant of occupational injury are could therefore, be use to predict occupational injuries among workers. In this current study, wood processors in the districts were found to be not highly educated.

4.2.4 Respondents' Work Experience

Experience plays a significant role in an artisan's construction operational excellence. Without well trained and experienced artisans or operatives, it would be difficult to produce quality workmanship. Bentum et al., (2021) reported that the skill level and experience of the workforce on site were the most important indicator of site safety and productivity in the wood processing industry.

Table 4.2: Respondents' Years of Experience

Age (years)	Frequency	Percentage (%)
1-5	32	20
6-10	21	13
11-15	12	8
16-20	68	43
21-25	15	9
Above 25	12	8
Total	**160**	**100**

Source: Researcher's Field Survey, 2022

Table 4.2 shows that 32 (20%) respondents had between 1 and 5 years working experience and 21 (13%) respondents had between 6 and 10 years of experience. Also, 12 (8%) respondents had worked between 11 and 15 years while 15 (9%) had worked between 21 and 25 years. For those who had 16 to 20 years of experience constituted the highest group (43%) while 12 (8%) had worked for more than 25 years. This implies that the respondents have an extensive number of years as construction site operatives and

hence have accrued a lot of experience with regards to the knowledge of workers in occupational safety and health hazards in some selected wood workshops and sawmills.

4.2.5 Respondents' Job Category

This section describes the work specification of respondents in the wood processing trade. For the purposes of this study, the responses were categorised into eight groups.

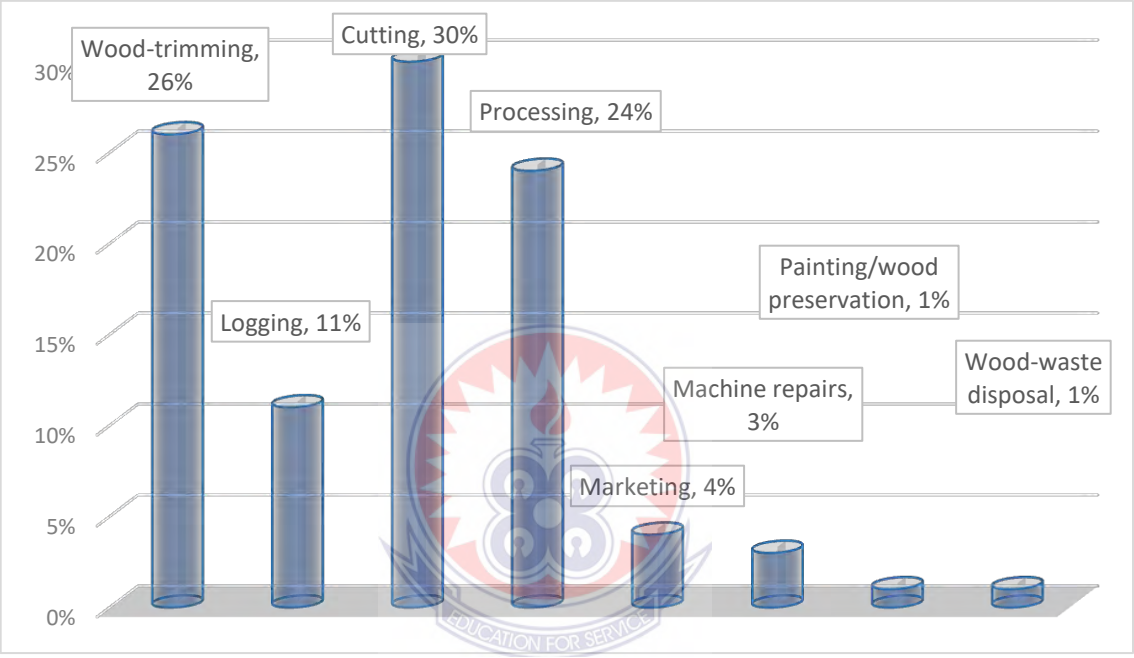

Figure 4.3: Respondents' Work Category

Source: Researcher's Field work, 2022, N= 160

From Figure 4.3, 42 (26%) respondents indicated that they were into wood trimming, 18 (11%) mentioned that were into logging, 48 (30%) were into cutting whilst 38 (24%) respondents were into processing. Accordingly, 6 (4%) respondents said they were into marketing and 4 (3%) were into machine servicing and repairs. However, painting/wood preservation and wood-waste disposal had a percentage each. These results indicate that most of the respondents were into cutting, wood-trimming, processing and logging. It can be mentioned that the respondents are exposed to higher levels of risks. The nature

of work done by workers in their occupations and the types of equipment and materials they handle could present many on-the-job hazards.

4.3 Occupational Hazards That Woodworkers Are Exposed to In Their Workshops and Sawmills

This section sought to present the results of the first research question. Here, the researcher sought to present data on the safety and health hazards that woodworkers are exposed to in the workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana. Woodworkers within Ada and Sogakope Districts had appreciable knowledge on occupational risks associated with their work. They mentioned injuries from abrasions and lacerations from fall-off forklift and heavy wood, fast revolving machines and saw cuts, and wood dust in noses and eyes as the common occupational risks they are exposed to. This section is further divided into two subsections and the outcomes of the analysis are shown in tables and figures.

4.3.1 Job Categories Recording Frequent Health Hazards and Injuries

Several factors contribute to the prevalence and difference in occupational injuries among sawmill workers which include the characteristics of the worker station of each sawmill worker with associate environmental hazards that could lead to injury. Figure 4.4 summarizes the results of characterization of occupational injuries among sawmill workers at each stage of the timber processing.

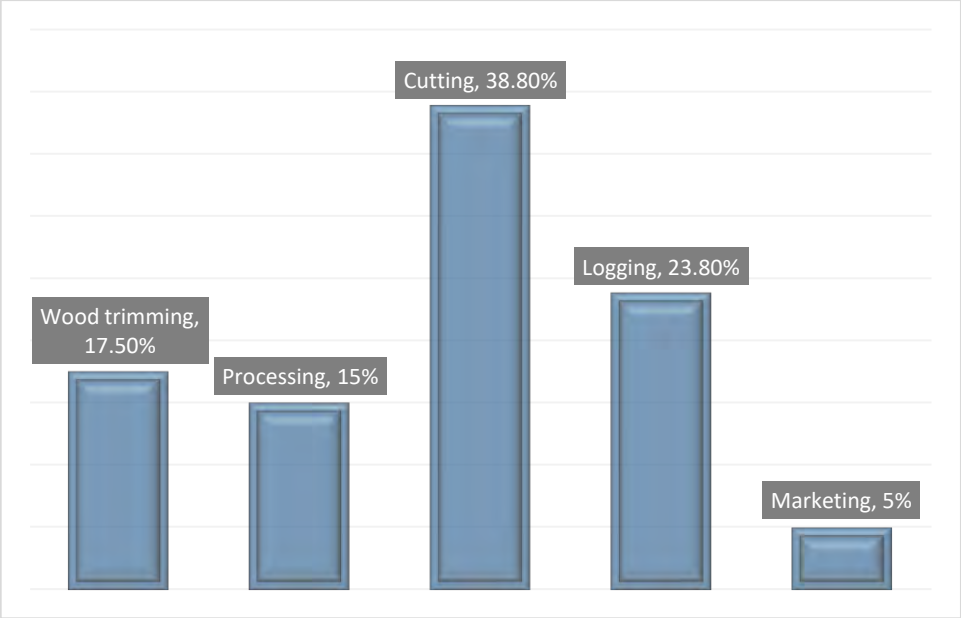

Figure 4.4: Job Category Recording Frequent Injuries

Source: Researcher's Field work, 2022, N= 160

From Figure 4.4, summarizes the results of characterization of occupational injuries among sawmill workers at each stage of the timber processing. As shown, the highest prevalence of occupational injuries such as hand injury, eye injury, head injury, leg injury, breathing complications, chemical burns, chemical ingestion and cuts, occurred among sawmill workers who engage in wood cutting (38.8%), logging (23.8%) followed by wood trimming (17.5%) and processing (smoothing and painting) which recorded 15 percent as compared to only hand, leg, and head injuries which occurred among those involved in timber marketing, who had the least prevalence (10%) of injuries. It can be mentioned that the job category that records the highest prevalence of injuries, particularly to the hands at the sawmill sites is wood cutting. This could be the most dangerous job activity in the processing of timber at the workshops and sawmill sites. This finding confirms the reports by Holcroft and Punnett (2016) who explained that cutting of timber mostly involves manual handling of tools, timber and operation of

machine, which exposes the hand to bruises, cuts and other hazards associated with saw mill work, hence the highest prevalence of hand injury among them.

4.3.2 Health Hazards and Injuries Associated with Wood Processing

This section of the study provides the means of the respondents' ratings of health hazards and injuries associated with wood processing as well as their corresponding standard deviations as indicated in Table 4.3. It is important to access the artisans' levels of awareness of occupational hazards and accidents associated with their daily operations. This is because, workers' level of awareness of accidents and hazards associated with their work is crucial to accident reduction, prevention as well as ensuring a safe and healthy workplace. According to Okuga et al. (2012), awareness of occupational accidents and hazards is the first step in promoting workplace safety.

Table 4.3: Responses on Health Hazards and Injuries Associated with Wood Processing

Statement	Response (N)					Mean	SD	Ranking
	5	4	3	2	1			
I do report of back pains after doing a work that involves	68	64	28	0	0	4.54	.525	1
I do report of hip and leg pains after doing a work that involves	86	74	0	0	0	4.25	.656	2
I do report of headaches due to the exposure to sawdust	46	68	46	0	0	4.00	.588	3
I do report of respiratory problems due to the exposure to	42	62	20	26	10	3.63	.486	4
I do report of nausea due to the exposure to sawdust	40	38	64	10	8	3.58	.632	5

I do report of small cuts due to the exposure to cutting sharp	50	38	28	32	12	3.51	.727	6
I do report of neck pains after doing a work that involves	20	36	44	28	32	2.90	.901	7
I do report of eye irritation due to the exposure to sawdust	0	40	24	72	24	2.50	.796	8
I do report of skin irritation or dermatitis due to the exposure	20	0	22	52	66	2.10	.842	9
I do report of poor eye sight due to noise/poor ventilation	0	0	66	42	52	2.09	.643	10
I do report of hearing loss due to noise/poor ventilation	0	0	22	72	66	1.73	.774	11
I do report of lack of appetite due to the exposure to sawdust	0	0	0	78	82	1.49	.575	12
I have had my arm/leg amputated due to the exposure	0	0	0	4	156	1.03	.688	13
Aggregate mean	**2.94**							

Source: Researcher's Field Survey, 2022

From Table 4.3, on a five-point scale, majority of the respondents ranked the statements "I do report of back pains after doing a work that involves manual operation" (4.54) and "I do report of hip and leg pains after doing a work that involves manual operation" (4.25) as first and second, indicating that the respondents agreed to the statements. These statements were significantly rated higher than the average (theoretical) mean value of 3.0. This shows that back, hip and leg pains are the most hazard associated with wood processing. Woodwork more often concerns standing long hours and lifting wood and tools. Such work often entails the handling of power tools, or forceful repetitive gripping, twisting, reaching or moving actions and work may occur in confined spaces or awkward positions, such as with the arms raised above shoulder level, or with awkward postures of the shoulder, arm and wrist. In this regard, it could be mentioned, it is common that workers in this area to have back and leg strains. The finding of Ochire-

Boadu, Kusi and Lawer (2014) supports this finding that, the common effects of the prevailing hazards on workers in the wood processing industry are leg, back and waist pains. This is consistent with earlier studies by Osagbemi, et al., (2010) who found that work done by woodworkers in twisted or bent postures, as well as machine operating and severe back accidents, were risk factors for sciatica.

Again, from Table 4.3, the statements "I do report of headaches due to the exposure to sawdust", "I do report of respiratory problems due to the exposure to sawdust" and "I do report of nausea due to the exposure to sawdust" had mean scores of 4, 3.63 and 3.58 respectively which were considerably above average indicating that the respondents agreed to the statements except that the standard deviation values depicted that there was a great variation in the responses to the means. These results indicate that most woodworkers in the study area experience headaches, respiratory problems and nausea due to the exposure to sawdust. Timber processing is characterized by the release of copious amounts of wood dust which could lead to respiratory exposure in the saw mill workers. Since the majority of the sawmill workers who participated in this study were not using personal protective equipment, including face masks, it is logical that most of them would have respiratory problems. This is consistent with the findings of Adu, et al., (2015) that the common physical hazard was exposure to sawdust. They further mentioned that wood dust particles tend to settle mostly in the upper airways where they are trapped and can nasal dryness or irritation, prolonged colds, and nose bleeding and obstruction, sneezing, sinusitis and headaches. Again, Table 4.3 reveals that the respondents agreed to the statement "I do report of small cuts due to the exposure to cutting sharp edge", which was ranked sixth. It had a mean score of 3.51 which is noticeably above the average score and had a high standard deviation value pointing that there was clear divergence in the responses. It is undeniable that a number of

woodworking tools and machines are very dangerous to operate. Woodworkers risk sustaining debilitating injuries such as lacerations and cuts while using defective power equipment and sharp tools. It could be deduced that, these tools are so dangerous because they are used more frequently, consequently, the more chances for an injury. This finding is in agreement with the study by Bentum et al., (2021) who found that woodworkers at the Sokoban Wood Village were predominantly exposed to occupational injuries like cuts and lacerations. This finding is in agreement with a study conducted by Agbana et al., (2016) in Kwara State, Nigeria where sawmill workers identified similar workplace hazards.

In addition, the statements "I do report of neck pains after doing a work that involves manual operation", "I do report of eye irritation due to the exposure to sawdust" and "I do report of skin irritation or dermatitis due to the exposure to sawdust" scored below the average mean (2.90, 2.50 and 2.10 respectively) and a standard deviation indicating that the responses were clearly converging. This means that the respondents do rarely suffer eye and skin irritation. The results imply that workers in sawmills, plywood and particle-board factories and veneer plants in the study area are not at high risk of suffering eye and skin irritations from the wood waste produced. As whether the workers become affected by noise and poor ventilation, the results show that woodworkers do not complain of vision and hearing impairment at the workplace. The lowest ranked statements were "I do report of lack of appetite due to the exposure to sawdust" (m=1.49) and "I have had my arm/leg amputated due to the exposure to cutting sharp edge" (m=1.03). These statements scored considerably below the theoretical mean indicating that the respondents vehemently rejected the statements. These findings confirm the outcome of Mitchual, et al., (2015) study that the workers of sawmill do

rarely report of skin irritation/dermatitis, eye irritation, lack of appetite, arm/leg amputation, neck pains, hearing loss and poor eye sight.

4.4 Extent of Experience and Knowledge of Woodworkers on Occupational Health and Safety Hazards

This section sought to present the results of the second research question. Here, the researcher sought to present data on the extent of experience and knowledge of woodworkers and sawmill operators on occupational health and safety hazards. This section is further divided into two subsections and the outcomes of the analysis are shown in tables and figures.

4.4.1 Respondents' Knowledge Acquisition in Occupational Health Hazards

The respondents were asked to indicate the means by which they acquired their knowledge in occupational health hazards. This may indicate their proficiency in their job area hence it is very important for the study. Figure 4.3 indicates Artisans' mode of acquiring their skill/knowledge.

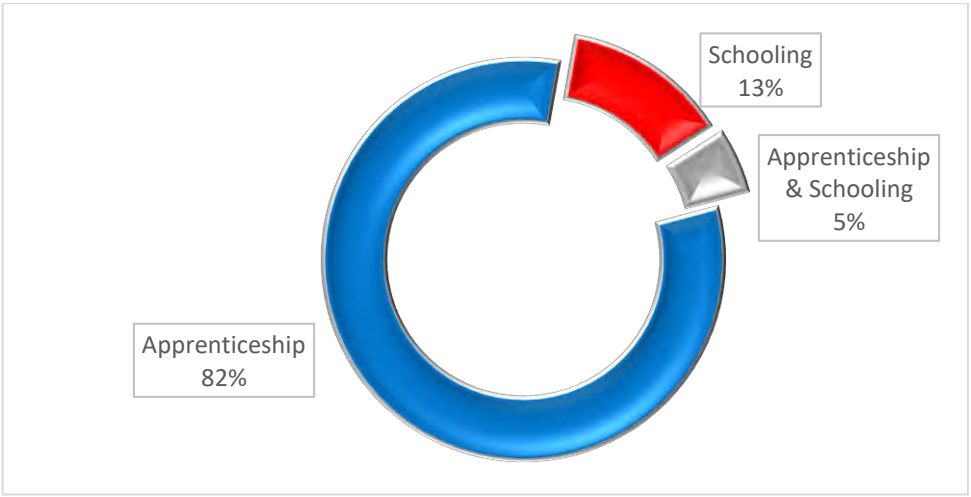

Figure 4.4: Mode of Skill / Knowledge Acquisition

Source: Researcher's Field Survey, 2021

The modes of artisanal training in the study areas identified by the survey were apprenticeship, schooling (vocational/technical training) and apprenticeship, and formal training. From the sample, 21 (13%) respondents acquired their skills through schooling, 131 (82%) respondents acquired their skills through apprenticeship whilst the remaining 8 (5%) respondents acquired their skills through apprenticeship and formal training. Skills in woodwork is mainly acquired via on-the-job-training where experienced woodworkers and/or owners of sawmill outlets train and mentor the apprentices. This means that most of the artisans were trained by master craftsmen on the job. In this training, a master (trainer) transferred his knowledge informally to an apprentice (trainee). Though this showed evidence of keen observation and integration of various classes of learners for better output, it could be deduced that the younger and inexperience ones could wrongfully imbibe bad habits and practices of master artisans. This finding also affirmed the study by Keteku-Atiemo (2006) who opined that there was a high tendency of a master artisan (trainer) transferring wrong or inadequate skills to an apprentice (trainee), who in turn transferred the wrong skills to others. This result was similarly reported by other Nigerian studies where most sawmill workers learnt their trade via apprenticeship (Agbana, 2016). The informal knowledge thus became widespread and common knowledge throughout the labor force.

The researcher enquired about respondents' level of skills speciality. Responses registered by the selected respondents have been presented in Figure 4.5

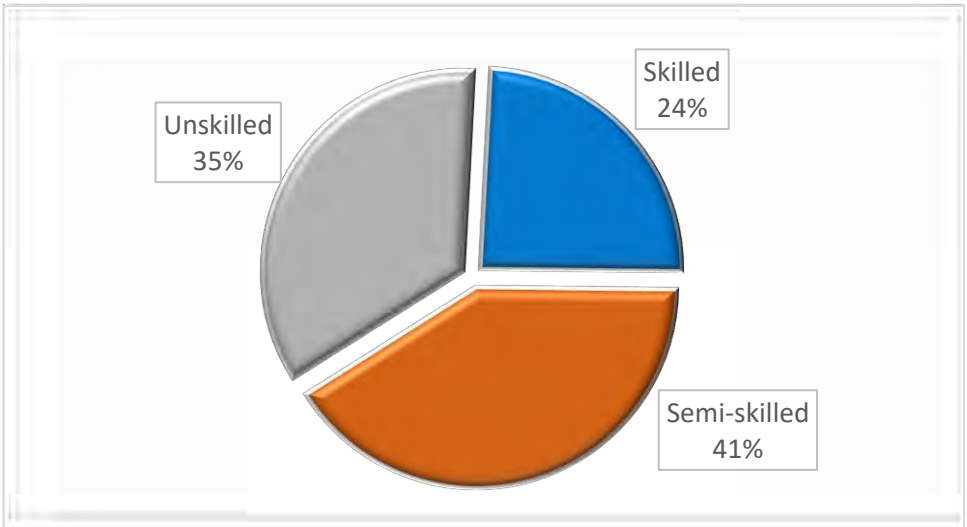

Figure 4.5: Respondents' Level of Skills Speciality

Source: Researcher's Field Survey, 2021

The data presented in Figure 4.5 shows that 38 (24%) respondents were skilled in their job descriptions at site, 66 (41%) were semi-skilled while 56 (35%) respondents were unskilled in their job descriptions at site. This indicates that majority of the personnel working in the workshops and sawmills within Ada and Sogakope Districts were not highly skilled. It could be deduced that; the informal labor force was easily influenced by sawmill owners who wanted cheap labor and were willing to sidestep standard codes. This confirms the literature that these groups of workers however have been reported not to know much about such hazards and to have little or no training on workplace safety (Johnson & Motilewa, 2016). The results imply that informal workers do not have the necessary awareness, technical means and resources to implement health and safety measures. This is backed by Okuga et al. (2012) that hazards relating to inadequate safety and health standards are particularly evident in the informal sector. the researcher further mentioned that poor work environment, including inadequate premises and often very unsatisfactory welfare facilities causes large human and material losses. This is parallel to the findings of Theuri (2012) that workers in the wood sector have been

shown to be more prone to work related hazards and injuries as they work in an unhealthy and unsafe work environment.

The researcher enquired about the sources of information of occupational hazards and safety measures in the study area. Responses registered by the respondents have been presented in Table 4.4.

Table 4.4: Source of Knowledge/Awareness of Occupational Hazards

Statement	Response (N)					Mean	SD	Ranking
	5	4	3	2	1			
My source of knowledge /awareness of the occupational health and safety hazards is from personal experience.	79	69	12	0	0	4.42	.615	1
My source of knowledge /awareness of the occupational health and safety hazards is from colleagues.	70	71	16	3	0	4.30	.712	2
My source of knowledge /awareness of the occupational health and safety hazards was acquired during training.	82	55	2	21	0	4.24	.695	3
My source of knowledge /awareness of the occupational health and safety hazards was through reading of books.	10	20	62	26	42	2.56	.597	4
My source of knowledge /awareness of the occupational health and safety hazards was through health education and seminars.	5	12	49	58	36	2.34	.743	5
Aggregate mean	**3.57**							

Source: Researcher's Field Survey, 2022

The mean rating of the 160 respondents on their sources of information of occupational hazards and safety measures in the study area ranged from 2.34 (SD = 0.743) to 4.42 (SD = 0.615). From Table 4.5, the statement "My source of knowledge /awareness of the

occupational health and safety hazards is from personal experience " had the highest mean score of 4.42, followed by “My source of knowledge /awareness of the occupational health and safety hazards is from colleagues” (m=4.30) and “My source of knowledge /awareness of the occupational health and safety hazards was acquired during training” (m=4.24). This indicates that respondents’ sources of information of occupational hazards and safety measures were mainly from personal experiences and training which was similar to the study by Osuchukwu et al. (2015), where personal effort and on-the-job training were attributed as the main sources of awareness of occupational health and safety. However, the respondents disagreed that books (m=2.56) and health education (m=2.34) were a source of information of occupational hazards and safety measures. This contradicts the study by Faremi et al. (2014) who attributed the main sources of information to seminars, manuals and catalogues. It can be construed that personal experience of respondents, related event at workplace, lack of access to appropriate and reliable information on occupational hazard as regards woodwork may significantly account for low knowledge of respondents about occupational hazard documented in the current study.

4.4.2 Woodworkers Practice of Occupational Health and Safety

The level of knowledge of workers in occupational safety and health hazards observed in the present study could be explained to some degree by the level of adherence to safety practices. Table 4.5, 4.6 and 4.7 indicate the mean and the resultant mean ratings as well as their corresponding standard deviations of practice of safety by the respondents.

Table 4.5: Perceptions of Respondents about Occupational Health Hazards and Safety Practice

Statement	Response (N)					Mean	SD	Ranking
	5	4	3	2	1			
God protects me from hazard.	61	50	19	20	10	3.83	.843	1
I am at risk of hazards.	56	47	19	16	22	3.62	.885	2
Occupational health hazards can be prevented.	30	22	80	26	2	3.33	.997	3
Hazards are for younger woodworkers.	20	10	26	44	60	2.29	.903	4
Hazards cannot affect me	12	12	26	47	63	2.14	.801	5
The government is responsible for the hazard at	5	10	24	58	63	1.98	.854	6
Aggregate mean	**2.87**							

Source: Researcher's Field Survey, 2022

With regards to respondents' perception about occupational health hazards and safety practice in Table 4.5, the respondents highly supported the assertion that God protects them from hazard (m=3.83), they are at risk of hazards (m=3.62) and occupational health hazards can be prevented (m=3.33). These perception statements scored above the average mean value with a standard deviation pointing that there were outliers and clear disparity in the responses, the respondents also disagreed with the perception statements like hazards are for younger woodworkers (m=2.29), hazards cannot affect them (m=2.14) and the government is responsible for the hazard at my workplace (m=1.98). It can be mentioned that the variation in respondent's perception about occupational hazards and safety may be influenced by their belief system, knowledge level of occupational hazards, duration of exposure to the hazards and number of years of practice. Nonetheless, it possible that respondents who showed low risk perception

towards workplace hazards are either apprentices who are not directly involved in carrying out the rigorous aspect of sawmilling or those who are yet to experience the adverse health effects that results from repeated exposure to workplace hazards. Raising the consciousness about the danger of workplace hazards to health and physical wellbeing may significantly address any widely held erroneous beliefs or misconception about occupational hazards amongst woodworkers.

Accordingly, the respondents were asked to rate the frequency of the use of personal protective equipment in their workshops and sawmills. Table 4.6 presents the descriptive statistics on this part of the study.

Table 4.6: Descriptive Statistics on the Use of Personal Protective Equipment

Statement	**Response (N)**					**Mean**	**SD**	**Ranking**
	5	**4**	**3**	**2**	**1**			
I wear hand gloves when working.	40	44	15	24	37	3.16	.752	1
I wear overall when working.	39	29	25	31	36	3.03	.728	2
I wear goggles when working.	36	42	16	19	47	3.01	.881	3
I wear nose mask when working.	20	5	21	44	70	2.13	.922	4
I wear face shield when working.	8	12	26	50	64	2.06	.797	5
I wear earplugs or ear muffs when working.	12	7	23	50	68	2.03	.802	6
I wear helmet when working	5	10	24	58	63	1.98	.653	7
Aggregate mean	**2.9**							

Source: Researcher's Field Survey, 2022

From Table 4.6, the mean rating of the 160 respondents on the use of personal protective equipment ranged from 1.98 (SD = 0.653) to 3.16 (SD = 0.752). The respondents ranked wearing of hand gloves (3.16), overall (3.03) and goggles (3.01) high which were marginally above average, indicating that the respondents use this personal protective

equipment during work. All the other statements had mean ratings lower than the theoretical mean. The respondents reported a low usage of personal protective equipment such as the use of nose mask (2.13), face shield (2.06), earplugs (2.03) and helmet (1.98). The respondents' knowledge of the effect of the hazards encountered, appeared not to have positively influenced either their safety practices or their opinion on the type of personal protective equipment they felt is the most important as the majority of the respondents felt that the hand gloves, coat overalls and eye goggles in that order, were the most important personal protective equipment; the face masks and the respirators needed to protect against the commonly experienced upper respiratory symptoms by the respondents, were considered the least important personal protective equipment, as none of the respondents even reported the respirator as important. It can be mentioned that there were poor safety practices in the present study exemplified by the total absence of fire extinguishers, lack and non-use of first aid boxes and the use of hospitals in the event of injuries and illnesses. This lack of safety practices compounds the consequences of the low prevalence of correct and consistent use of personal protective equipment amongst the woodworkers and this low prevalence especially in developing countries has consistently been reported in previous studies. This finding is consistent with that of Ochire-Boadu, Kusi and Lawer (2014) on small scale sawmilling industries in Tamale Metropolis in Ghana also indicated that a significant number of the workers in the study area did not use personal protective equipment when operating machines or performing jobs that require their use. The non-adherence to safety practices by the woodworkers exposed them to various degrees of hazards and injuries. This result is consistent with the outcome of a study conducted by Osagbemi et al. (2010) on the theme "Awareness of Occupational Hazards, Health Problems and Safety Measures among Sawmill Workers in North Central Nigeria", concluded that less than 20% of the sawmill workers wore

protective devices/clothing and this was due to the fact that health and safety standards were neither practiced nor enforced.

Table 4.7: Descriptive Statistics on Machine and Maintenance Safety Practice

Statement	Response (N)					Mean	SD	Ranking
	5	4	3	2	1			
I ensure that workers put off electrical gargets.	42	42	17	26	33	3.24	.721	1
I ensure that workers maintain and repair machines.	41	36	20	32	31	3.15	.700	2
I ensure that guards and fences are in place when	41	37	17	21	44	3.06	.653	3
I ensure that workers adhere to safety rules.	25	10	26	49	50	2.44	.828	4
I ensure that trained personnel operate the machines.	12	17	31	65	35	2.41	.724	5
I ensure that saws are adequately conditioned.	18	13	29	55	45	2.40	.751	6
I ensure that worn out chains and ropes are changed	13	17	30	56	44	2.37	.835	7
Aggregate mean	**2.72**							

Source: Researcher's Field Survey, 2022

With regards to machine and maintenance safety practices presented Table 4.7, ranged from 2.37 (SD = 0.835) to 3.24 (SD= 0.721). Apart from statements like "I ensure that guards and fences are in place when working" (m=3.24), "I ensure that workers put off electrical gargets" (m=3.15), "I ensure that workers maintain and repair machines" (m=3.06) for which the respondents' ratings were higher, all the other items had mean ratings lower than the average (theoretical) mean of 3.0. This suggests that the workers of the sawmill studied rarely or never insist ensure that workers adhere to safety rules (m=2.44), that only trained personnel operate machines (m=2.41), saws are adequately conditioned (m=2.40), and ensure that worn out chains and ropes are changed (m=2.37). The aggregate mean was found to be 2.72 which showed that, the respondents mostly

disagreed to the items presented in Table 4.7. This result suggests that majority of the statements had mean ratings below the average (theoretical) mean of 3.00. This therefore suggests that there is low level of safety practices among woodworkers within Ada and Sogakope Districts. This could mean that most of the respondents are not well briefed, instructed and enlightened enough to escape hazards and injuries at their workplaces. Both Adei and Kunfaa (2007) and Adu et al. (2015) support this finding; they attribute the high level of vulnerability of woodworkers in Ghana to ignorance and lack of requisite skills. This finding is in agreement with the study by Bentum et al. (2021) who found that most woodworkers at the Sokoban Wood Village do not comply with the health and safety provisions in Act 651. Champoux and Brun (2013) report that most employers in small and medium-scale enterprises trivialize risks and do not believe that their employees are susceptible to danger in the workplace.

4.5 Level of Safety Training That Exist Among Wood Workshops and Sawmills

This section sought to present the results of the third research question. Here, the researcher sought to examine the level and efficiency of safety training that exist among wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana. Safety training is a tool to change people's safety knowledge, behaviour and attitudes in the workplace (Cooper, 1998). Attempts to examine safety training outcomes on the significant improvements in safety knowledge, safety attitude and safety behaviour, as well as safely performed work activities, a study of current research yielded a list of potential metrics (elements of safety training). Respondents were shown these measurements and asked to assess them on a Likert scale of 1 to 5. Table 4.8 displays the mean value of each of the selected metrics as well as their standard deviation.

Table 4.8: Descriptive Statistics of Elements of Safety Training

Statement	Response (N)					Mean	SD	Ranking
	5	4	3	2	1			
Employing qualified safety trainers	24	22	58	46	10	3.03	.671	1
Observing workers' safety-related behaviours	12	16	46	42	44	2.44	.721	2
Providing feedback to workers	10	19	31	50	50	2.31	.728	3
Motivating workers through frequent (daily) training meetings	4	4	70	40	42	2.30	.814	4
Encouraging worker awareness about safety issues	11	17	35	40	57	2.28	.556	5
Using visual aids in safety training	10	10	28	51	61	2.11	.553	6
Conducting periodic tests to assess worker learning and administering exams to workers during or after safety	3	6	54	37	60	2.09	.549	7
Designing content of training to satisfy worker needs/interests	8	13	13	60	66	1.98	.725	8
Promoting pride in work completed without accidents	0	0	46	50	64	1.89	.796	9
Setting up an organizational structure that supports safety	0	2	28	32	98	1.59	.753	10
Encouraging worker input at safety training sessions	2	4	6	50	98	1.51	.888	11
Aggregate mean	**2.14**							

Source: Researcher's Field Survey, 2022

From Table 4.4, the mean rating of the respondents on their safety training that exist among wood workshops and sawmills ranged from 1.51 (SD = 0.888) to 3.03 (SD = 0.671). The results indicate that the respondents agreed to the statement "Employing qualified safety trainers" which had the highest mean score of 3.03 with a standard deviation value that indicated the variations in the responses from the mean. This was

placed first, suggesting that professional safety trainers are hired to improve the safety knowledge and behaviour of workers during training programs. The results imply that the trainers possess relevant academic credentials and teaching to transfer knowledge and motivate workers to learn quickly and capture the necessary information in an effective manner in safety training sessions. However, the results showed that the item scored marginally above average which could mean that the woodworkers doubt the teaching skills and experience of the trainers. The statements "Setting up an organizational structure that supports safety" and "Providing feedback to workers" were ranked second and third, respectively, with mean scores of 2.44 and 2.31, as respondents rejected that these were present in the training received. It is clear that safety performance is enhanced by accurate and timely feedback because feedback reinforces safety learning. Nevertheless, the results could mean that feedback is not continuous in the workshops and sawmills to achieve actual safety performance that is aligned with planned performance.

As indicated in Table 4.8, these statements were closely followed by “Observing workers' safety-related behaviours”, “Motivating workers through frequent (daily) training meetings”, “Using visual aids in safety training” and “Conducting periodic tests to assess worker learning and administering exams to workers during or after safety training” which were scored below the average mean value indicating that the respondents disagreed that these essential requirements were not addressed during training and were ranked fourth (2.30), fifth (2.28), sixth (2.11) and seventh (2.09) respectively. These statements also had standard deviation values pointing that there were outliers and clear disparity in the responses. The succeeding data from Table 4.8 on the level and efficiency of safety training that exist among wood workshops and sawmills presented that, the woodworkers vehemently rejected statements like “Designing content of training

to satisfy worker needs/interests" (1.98), "Promoting pride in work completed without accidents" (1.89), "Setting up an organizational structure that supports safety" (1.59) and "Encouraging worker input at safety training sessions" (1.51). These statements were ranked eighth, ninth, tenth and eleventh in that order among the presented elements of safety training. It can be inferred from the results that the content as well as the teaching style is not well-designed and could not address workers need and interest which negatively affect the workers levels of knowledge. The researcher also calculated the aggregate mean of the items presented to the respondents. The aggregate mean was found to be 2.14 which showed that, the respondents disagreed to the items presented in Table 4.8. This therefore suggests that there is low level and inefficient safety training that exist among wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana. This means that safety trainings do not equip woodworkers with adequate knowledge and skill to promote safety in an effective way as the ultimate goal of workplace safety training is injury prevention and control. The results confirm the findings of Sherif et al. (2014) who reported that training and skill gaps in knowledge influenced safety performance levels of workers; eventually contributing to injuries and accidents.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter draws the curtain on the research work. It has been desired to summarize the research work findings and draw conclusions based on the results gathered. The chapter finally ends with recommendations as well as areas for further research.

5.2 Summary of the Study

This research was set out to to assess the knowledge of workers in occupational safety and health hazards in some selected wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana. The study was guided by three objectives. Literature was reviewed along the lines of Ghana's timber and wood processing industries; occupational health and safety in Ghana; health and safety knowledge of sawmill workers; safety training and so on. The study adopted a cross sectional descriptive survey research design. The study focused on wood producers working with sawmill firms and small-scale furniture workshops within Ada and Sogakope Districts. Purposive sampling technique was used to select 160 respondents. Data was gathered through questionnaires formulated based on the research questions.

5.2.1 Summary of Findings

Concerning the question that sought to identify safety and health hazards that woodworkers are exposed to in the workshops and sawmills, the study found that the wood processing industry is exposed to high levels of occupation hazards. The job category that records the highest prevalence of injuries, particularly to the hands at the sawmill sites is wood cutting followed by logging, trimming and processing. The study

brought to light that the woodworkers do hardly report of arm/leg amputation, lack of appetite, skin irritation/dermatitis, eye irritation, neck pains, hearing loss and poor eye sight. Nevertheless, they usually report of back pains, hip and leg pains, headaches, respiratory problems, nausea and small cuts.

On the question which seeks to determine the extent of experience and knowledge of woodworkers and sawmill operators on occupational health and safety hazards., the study revealed that the level of knowledge and experience of woodworkers in the occupational health hazards and safety practice in Ada and Sogakope Districts was low. The findings of this study showed that the skills in woodwork was mainly acquired via on-the-job-training where a trainer could transfer wrong or inadequate skills to an apprentice, who in turn transfers the wrong skills to others. The study found that personnel working in the workshops and sawmills were not highly skilled and are more prone to work related hazards and injuries. The study revealed that woodworkers' sources of information of occupational hazards and safety measures were mainly from personal experiences and colleagues. The study also revealed that woodworkers hardly wear face shield, nose and mouth mask, earplugs or helmet during wood processing. Furthermore, the workers would rarely insist that only trained personnel operate machines, ensure that workers adhere to safety rules, ensure that saws are adequately conditioned, and ensure that worn out chains and ropes are changed.

With respect to the question that sought to examine the level and efficiency of safety training that exist among wood workshops and sawmills, the study brought to light that the level and efficiency of safety training that exist among wood workshops and sawmills was low. This therefore establish that safety trainings that exist among woodworkers in the study area do not equip woodworkers with adequate knowledge and skill to promote safety in an effective way.

5.3 Conclusions of the Study

Based on the significant findings that the apprenticeship programs offered by master craftsmen dominated the training-services market to build the skills and knowledge of artisans, it can be concluded that this fundamental procedure of perception and impersonation of skill acquisition and the absence of experiential techniques do not keep woodworkers abreast with safety practices and technological innovations with respect to the use of modern wood processing equipment. It can be established that the knowledge of Ghanaian woodworkers is limited and outmoded to minimize risk of accidents and diseases at the workshop. Whilst these woodworkers know about some of the hazards associated with their work, they are oblivious to the many dangers associated their work. Having regard to the non-adherence with health and safety practices in Ada and Sogakope Districts, it can be established that Ghana is still far behind in its efforts to reduce the incidence of accidents and injuries at the workshops. This empirical evidence from the study denotes that, inadequate supervision and knowledge of works, the use of poor safety training programs and work processes are rife leading to substandard work at most sites. It is apparent that if safety performance is to be employed successfully at sawmill and workshops, the inhibitive issues that have been identified from the woodworker survey need to be addressed on a comprehensive and integrative basis. It can also be concluded that these research results can help understand the current situation regarding health and safety practices in Ghana and can therefore help sawmill firms and operators in order to safe-guard and maintain good health and wellbeing among the workers.

5.4 Recommendations

Based on the findings of the study, the following recommendations are worth considering:

- Managers of wood processing companies should make provision for personal protective equipment and enforce the utilization of them at the workplace. Professionals should be made available to provide adequate training and effective education on the use of personal protective equipment for workers. Owners of sawmills should create awareness on safety by recommending protective devices for their projects.
- Promotion of occupational health and safety through awareness creation/ orientation workshops, seminars, public lectures especially in collaboration with district assemblies.
- Information on occupational safety and health should be disseminated through social networking available at the work sites.
- Occupational Health and Safety performance should be monitored and evaluated and managers should determine whether OHS standards have being met.
- There is the need for Government to legislate or promulgate an enforceable National Safety Policy to promote the operationalization of occupational health and safety at the national level. This policy should make occupational health and safety a priority to tackle issues relating to occupational health hazards.

5.5 Suggestions for Further Studies

This study was a cross sectional study, that is, it collected data at only one point in time. Further studies can take a longitudinal direction by collecting data across different points in time so as to check for patterns and discrepancies. Also, it is suggested in-depth qualitative and quantitative research is needed to provide solid evidence of adverse impacts of workplace injury exposure.

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APPENDICES

QUESTIONNAIRE FOR CONSTRUCTION ARTISANS

The bearer of this questionnaire is a student of AAMUSTED Kumasi, undertaking research on the topic "**the knowledge of workers in occupational safety and health hazards in some selected wood workshops and sawmills within Ada and Sogakope Districts in the Volta Region of Ghana**". This study is being conducted as part of the requirements for the award of a master's degree. The information you provide will therefore be used for academic purposes only and will be treated with confidentiality. Please tick (√) appropriately in the box corresponding to your choices for structured questions.

SECTION A: Background Information

1. Gender?

   a. Male [ ] b. Female [ ]

2. What is your age (in years)?

   a. Below 20 [ ] b. 20-29 [ ] c. 30-39 [ ] d. 40-49 [ ]

   e. 50-59 [ ] f. 60 and above [ ]

3. How long have you been involved in construction work?

   a. Less than a year [ ] b. 1 – 5 years [ ] c. 6 – 10 years [ ] d. 11–15 year[ ]

   e. 16 – 20 years [ ] f. 21 – 25 years [ ] d. Above 25 [ ]

4. What is your work specification in the wood processing trade?

   a. Wood trimming [ ] b. Logging [ ] c. Cutting [ ] d. Marketing [ ]

   e. Painting/wood preservation [ ] f. Wood-waste disposal [ ]

5. What is your highest academic qualification?

   a. Master's Degree [ ] b. Degree [ ] c. Diploma [ ] d. WASSCE/SSCE [ ]

   e. Basic [ ] f. None [ ] g. Others (specify) ……

SECTION B: Occupational Hazards That Woodworkers Are Exposed to In Their Workshops and Sawmills

This section sought to identify the safety and health hazards that woodworkers are exposed to in the workshops and sawmills. Please tick appropriately in box [√] corresponding to your choice and with the 5-point Likert-type scale using the following keys: **5=Strongly Agree, 4= Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree**, as sincere as possibly.

6. Which of the categories do you record frequent injuries?

a. Wood trimming [ ] b. Logging [ ] c. Cutting [ ] d. Marketing [ ]

e. Wood preservation [ ] f. Wood-waste disposal [ ] g. Others(specify) ……..

No.	Statement	1	2	3	4	5
7.	I do report of lack of appetite due to the exposure to sawdust					
8.	I do report of headaches due to the exposure to sawdust					
9.	I do report of nausea due to the exposure to sawdust					
10.	I do report of respiratory problems due to the exposure to sawdust					
11.	I do report of skin irritation or dermatitis due to the exposure to sawdust					
12.	I do report of eye irritation due to the exposure to sawdust					
13.	I do report of neck pains after doing a work that involves manual operation					

14.	I do report of back pains after doing a work that involves manual operation					
15.	I do report of hip and leg pains after doing a work that involves manual operation					
16.	I do report of poor eye sight due to noise/poor ventilation					
17.	I do report of hearing loss due to noise/poor ventilation					
18.	I do report of small cuts due to the exposure to cutting sharp edge					
19.	I have had my arm/leg amputated due to the exposure to cutting sharp edge					

SECTION C: Extent of Experience and Knowledge of Woodworkers and Sawmill Operators on Occupational Health and Safety Hazards

This section sought to determine the extent of experience and knowledge of woodworkers and sawmill operators on occupational health and safety hazards. Please tick appropriately in box [√] corresponding to your choice and with the 5-point Likert-type scale using the following keys: **5=Strongly Agree, 4= Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree**, as sincere as possibly.

20. What means did you acquire your skills/knowledge?

a. Schooling [ ] b. Apprenticeship [ ] c. Others (specify) ……

21. Where do you place the level of your skills specialty in occupational health and safety hazards?

a. Skilled [ ] b. Semi-skilled [ ] c. Unskilled [ ]

No.	Statement	1	2	3	4	5
Sources of knowledge on occupational health and safety hazards						
22.	My source of knowledge /awareness of the occupational health and safety hazards is from colleagues.					
23.	My source of knowledge /awareness of the occupational health and safety hazards was acquired during training.					
24.	My source of knowledge /awareness of the occupational health and safety hazards is from personal experience.					
25.	My source of knowledge /awareness of the occupational health and safety hazards was through reading of books.					
26.	My source of knowledge /awareness of the occupational health and safety hazards was through health education and seminars.					
Perceptions about occupational health hazards and safety practice						
27.	Hazards cannot affect me					
28.	Hazards are for younger woodworkers.					
29.	God protects me from hazard.					
30.	I am at risk of hazards.					
31.	Occupational health hazards can be prevented					
32.	The government is responsible for the hazard at my workplace.					

The use of Personal Protective Equipment at the workshops and sawmills						
33.	I wear helmet when working					
34.	I wear nose mask when working.					
35.	I wear goggles when working.					
36.	I wear earplugs or ear muffs when working.					
37.	I wear face shield when working.					
38.	I wear hand gloves when working.					
39.	I wear overall when working.					
Machine and maintenance safety practice						
40.	I ensure that workers adhere to safety rules.					
41.	I ensure that guards and fences are in place when working.					
42.	I ensure that worn out chains and ropes are changed					
43.	I ensure that workers maintain and repair machines.					
44.	I ensure that workers put off electrical gargets.					
45.	I ensure that saws are adequately conditioned.					
46.	I ensure that trained personnel operate the machines.					

SECTION D: Level of Safety Training That Exist Among Wood Workshops and Sawmills

This section sought to examine the level and efficiency of safety training that exist among wood workshops and sawmills. Please, respond to the statements by ticking [√] on the 5-point Likert-type scale using the following keys: **5=Strongly Agree, 4= Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree**, as sincere as possibly.

No.	Statement	1	2	3	4	5
47.	Setting up an organizational structure that supports safety					
48.	Designing content of training to satisfy worker needs/interests					
49.	Providing feedback to workers					
50.	Motivating workers through frequent (daily) training meetings					
51.	Encouraging worker awareness about safety issues					
52.	Using visual aids in safety training					
53.	Conducting periodic tests to assess worker learning and administering exams to workers during or after safety training					
54.	Observing workers' safety-related behaviours					
55.	Employing qualified safety trainers					
56.	Promoting pride in work completed without accidents					
57.	Encouraging worker input at safety training sessions					