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EFFECTS OF OCCUPATIONAL HEALTH HAZARDS AND INJURIES ON WORKERS AT CHILANGA CEMENT

BY

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DECLARATION

DISSERTATION CLEARANCE AND DECLARATION

I CHIPO LUNGU, do hereby declare that this dissertation is my own original work. It has been guided and marked by my supervisor in accordance with the guidelines for Bachelor of Science in Public Health at University of Lusaka. It has not been submitted elsewhere for a degree at this or another University.

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Supervisor

I, Aniset Kamanga guided, read this dissertation and approved it for presentation. I am satisfied that this is the origin work of the author under the name it is presented. I confirm that the work has been completed satisfactorily and ready for presentation.

Name of Supervisor Aniset Kamanga

Signature _____ **Date** 24 May 2023

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Abbreviations

CC	Chilanga Cement
ILO	International Labour Organisation
NAPSA	National Pension Scheme Authority
OHHI	Occupational Health Hazards and Injuries
OHS	Occupational Health and Safety
OHSI	Occupational Health and Safety Institute
RWI	Restricted Work Injuries
SADC	Southern Africa African Development Community
SPSS	Statistical Package for the Social Sciences
UNILUS	University of Lusaka
ZOHSA	Zambia Occupational Health Safety Association
ZOOHS	Zambia Organization for Occupational Health and Safety

Key Words

Accidents

Chilanga Cement

Impact

Injuries

Livelihood

Occupational health hazards

Workers

Definition of Terms

Occupational safety and health (OSH): the study of potential risks at work that could endanger workers' health and wellbeing as well as the environment, and which can be predicted, found, assessed, and controlled.

A hazard is generally defined as a possible source of injury to a worker or possibly hazardous effects brought on by inactive sources (Driscoll *et al.*, 2015).

A fatal: An accident is defined as one that which results in the death of one or more people, and a non-fatal accident (also known as a lost-time accident) is one in which the wounded party misses more than three days of work following the accident (Michelo *et al*., 2019; ILO,2012; Auditor General Report, 2015).

Occupational accident: Any incident that occurs from or arises during the course of work that injures a worker or damages or destroys any artificial aids employed by the worker while on the job Both lethal and non-fatal occupational injuries are possible. (ILO: 2012; Hamalainen, 2012).

Occupation injury: Death or any personal injury or disease resulting from an occupational accident, or it also means an injury contracted or suffered as a result of one's employment (ILO: 2012; Hamalainen, 2012).

Occupational disease is a condition that a person contracts or develops as a result of their occupation. It encompasses aspects of one's physical or mental health that have an impact on workplace safety and sanitation (ILO: 2012; Hamalainen, 2012).

Employee/worker is any person who works for another person, whether incorporated or not, or for a government agency, and receives entitlement to receive any remuneration.

Employer is any person who provide work for another person and who remunerates or expressly or tacitly undertakes or remunerates that other person (Chabala, 2015; ILO, 2012).

A Policy is a law, regulation, procedure, administrative action, incentive or voluntary practice of governments and other institutions.

National Policy is a policy on occupational safety and health and working environment developed in accordance with the principles of article of ILO Occupational Safety and Health Convention No. 155 of 1981 (Chabala, 2015).

A livelihood is defined as the resources (natural, physical, human, financial, and social capital), the activities, and the access to them that collectively determine the living achieved by the individual or household" (Carswell, 2012; Cooper, 2012; WHO, 2017)

Workers' Compensation: A system of financial support created by legislation to provide income, medical attention, and rehabilitation to employees for illness, injury, or death resulting from, and in the course of, their employment regardless of fault on the part of the employee. (Siziya *et al.,* 2012).

Abstract

Background

Occupational health hazards and injuries represent a significant public health concern, affecting millions of workers worldwide. This abstract presents a comprehensive overview of the multifaceted effects of these hazards and injuries on workers' well-being, productivity, and quality of life. It explores the physical, psychological, and socioeconomic repercussions while emphasizing the importance of prevention and

intervention strategies. Occupational health hazards encompass a broad spectrum, including exposure to toxic substances, ergonomic stressors, noise pollution, and physical trauma. These hazards can lead to acute injuries or chronic health conditions, ranging from respiratory disorders to musculoskeletal injuries, hearing loss, and mental health issues. The physical effects of these hazards often result in pain, suffering, and limitations in mobility, affecting individuals' daily lives and long-term health.

Methodology

This study adopted a quantitative study and the research design employed in this was a cross-sectional study as it is considered the most effective when looking at occupational health and safety among workers. Data was collected using a structured questionnaire.

Results

A total number of 108 respondents participated in the study of which 29.6% (n=32) were females and 70.4% (n=76) were males. The results further showed that 13% (n=14) of the respondents were single, 62.0% (n=67) were married, 13.9% (n=15) divorced and 11.1% (n=12) were widowed. In-addition, it was revealed that most of the participants had a family size of 6-8 (n=69; 63.9%) people per household. The study also showed the 51.9% (n=56) of the respondents were above the age of 40. Out of 108 participants, 91 (84.3%) of these responded with yes to being the head of the households. 37% (n=40) had 10 and more years of work experience with only 19.4% (n=21) representing those with less than 5 years of work experience

Conclusion

The findings of the study found that the effects of occupational health hazards and injuries on workers are wide-ranging and multifaceted. These effects encompass physical, psychological, and socioeconomic dimensions, underscoring the importance of comprehensive workplace safety and health initiatives. Prioritizing prevention, early intervention, and worker well-being is not only ethically imperative but also economically advantageous for employers and society as a whole

CHAPTER ONE

1.1 Background

One of the most significant factors in any economy that contributes to the growth of a country's infrastructure is industrialization. Consequently, workplace safety and health is a top issue for the public's health in developed nations, particularly in high-risk industries (Rachid *et al.,* 2015). an industry like cement is a crucial part of infrastructure construction and building projects. It is a crucial component in construction. Utilized for infrastructure development is essential to any mature or emerging society's economic growth (Nkhama, 2017; Koh *et al.,* 2013). According to Rampuri (2017), Cement production involves grinding, drying, and mixing limestone with other ingredients like bauxite ore and iron to create raw meal, a powder that is one of the largest leading industrial sectors. El-Sobky (2012) asserts that the exciting production process exposes workers to health risks that are particularly harmful to their health.

Haupt and colleagues reported in 2013 that several health and safety legislation and regulatory policies have been developed to safeguard workers from dangers and health concerns, with the goal of improving the sustainability of cement manufacturing. Standards and laws frequently promote the old command-and-control, judged to comply, or prescriptive approach to resolving unsafe conditions as well as current and potential dangers, while neglecting the employer's obligation to address harmful worker behavior (Taylor, 2013)

Regular check-ups and early detection of risks can be utilized to prevent work-related illnesses and accidents in cement factories, which are still a big problem in the world today (Abongomera, 2010; Gupta 2013; Rogers, 2013). Workers in various cement sectors are exposed to occupational dangers that can cause illnesses and accidents, however numerous groups both inside and outside of the cement industry have made a significant amount of interactive effort with idea exchange to address these issues (Rampuri, 2017). Exposure to cement dust and other by-products of cement, such as gaseous waste, may have harmful effects on one's health (Sultan *et al.,* 2013; Zeleke, *et al.,* 2012).

According to Aga and Anyadike 2020, Inorganic and organic hazardous substances known as toxic and hazardous mixtures of dissolved solids are released into the environment. Large volumes of dust are thrown into the air on a daily basis by quarries and cement factories in Nigeria. The multiple stone-crushing companies produce a significant amount of airborne particulate pollution (Ugbogu, *et al.,* 2013)

According to Environmental Health and Safety Management (2013), certain diseases do not affect workers' health as rapidly as anticipated, but when they do, it is frequently challenging to link the underlying causes to previous exposure. More than two million workers lose their lives to illnesses and accidents related to their jobs each year, according to the International Labour Organization (ILO), which also noted that this number is likely an underestimate. According to the ILO, there are 270 million accidents and at least 335 deaths among employees each year.

Cement workers are particularly at risk for exposure to dust, which can harm lung function and result in lung cancer, chronic obstructive pulmonary disease, restrictive lung disease, and pneumoconiosis in addition to other health problems.

Quarrying, crushing, raw material grinding, mixing, kiln burning, cement grinding, and packaging are all steps in the production of cement (Meo, 2012). As a result, one of the most crucial concerns for the cement business is ensuring that workers and contractors have safe and healthy working conditions, which is a basic component of corporate social responsibility (World Business Council for Sustainable Development, 2013). The highest level of a worker's physical, mental, and social well-being is what occupational health refers to as promoting and maintaining across all occupations.

According to Ahmed *et al.*, (2012), The basic goals of occupational health are to preserve workers' health and working capacity, enhance the workplace to make it safer and healthier, and shape working cultures and organizations in a way that promotes people's health and safety. The exposure of so many workers to major occupational health risks puts them at a high risk for developing work-related illnesses, which can range from mild irritants or injuries to cancer (De-Coninck, 2013; Steven, 2012). Generally, unsafe working conditions are to blame for accidents in the cement industry. A workplace accident can have a significant impact on a worker's entire life. The hands, fingers, and thumbs are some of the body parts of manufacturing workers that are most susceptible to damage.

According to Gautam & Prasain (2013), wrist and shoulder injuries are also fairly common. Workers and managers of cement plants and factories, as well as their families who live in the staff quarters of the companies, are the population groups most exposed to cement dust pollution, particularly in the case of cement factories.

The majority of quarrying processes and the associated activities of rock drilling, blasting, stone cutting, rock crushing, and aggregate manufacturing generate dust that can result in dangerous levels of airborne

contamination in the workplace because of frequent exposure to cement dust, according to Noah (2018). Due to the high silica content of the local rock, silicosis poses the biggest health risk to those who are exposed and breathe in the dust.

Hazardous materials kill thousands of employees each year across the globe, according to Rice (2012).

2.3.1 Occupational Safety Provision and Precaution Measures

Most of the occupational injuries and accidents are brought on by foreseeable causes that may be avoided by putting existing policies and procedures into practice. According to several studies (Dorman, 2020; Katsakior, 2018), many industrialized nations have broad and all-encompassing systems for managing occupational safety and health. The steadily lower accident rates serve as evidence of this. Globally, the process of gaining access to occupational health and safety has been incredibly difficult during pregnancy and difficult and lengthy during delivery (Moyo *et al.*, 2015). Alarming figures suggest that over 2 million work-related fatalities and nearly 300 million non-fatal occupational accidents occur each year, costing the global economy 4% of the world's gross domestic product. a good (GDP) (ILO, 2012; Moyo *et al*., 2015).

A study conducted by Oluwafemi (2017) to evaluate construction workers' knowledge of occupational hazards, attitudes toward them, and use of occupational safety measures in Nigeria's Abuja and Port Harcourt between the years 2000 and 2010 revealed that Lagos state led in the number of casualties with 178 during that time, followed by Abuja with 65 casualties, and Port Harcourt with 30 casualties. The study found that although people had a high level of knowledge about workplace hazards, they had a poor attitude and didn't always follow safety procedures. The attitude of non-compliance with the use of personal protection equipment related to their various types of work is indicative of this.

Despite the stated lack of occupational health and safety (OHS) coverage Southern African nations have showed some dedication to OHS through their acceptance of the ILO treaties related to health and safety (Moyo *et al.*, 2015). For instance, Zambia had the most ILO technical convention ratifications (36), followed by South Africa (17), Zimbabwe (15), and Botswana (6). (ILO, 2012; Moyo *et al*., 2015).

2.5 statement of the problem

Ideally Since gaining its independence, Zambia has kept up with the times by enacting numerous regulations pertaining to workplace health and safety. From the 1965 convention act on medical examinations of young people (underground work) to the more recent Occupational Health and Safety Act of 2010 (ILO, 2012:13). Hazards are however released during the cement production process although most workers are not fully aware of these hazards, according to Gabriel *et al.,* (2015). It is reasonable to hypothesize that the majority of cement industry personnel are ignorant of the occupational risks associated with their line of work. The majority of employees in the cement industry come from lower socioeconomic classes and frequently lack the necessary qualifications and training to work in the sector (Balague *et al.,* 2016). A study conducted by Shariat *et al.,* 2012 revealed that a 1-year and lifetime prevalence of different occupational health hazards ranged between 0.8%–82.5% and 11.0–8 4.0%, respectively which was carried out worldwide including low-income countries. Another study conducted in Nigeria at Dangote Cement Plc by Goncalves, *et al.,* (2011) revealed that of the 834 manual workers at the industry, 58 (7.1%) were exposed to harmful substances, 3 (0.4%) to fire, 3 (0.4%) to explosion and 9 (1.0%) were exposed to electricity accidents. These statistics further revealed that 57.5% returned to work between the same day-3rd day after accident while 37.2% were between 4th day after accident to weeks.

Therefore, workers in these industries are subject to a variety of risks due to the high incidence of occupational dangers now, particularly in the cement sectors, including noise from engines and machinery, which causes hearing loss, stress, and high blood pressure. There is a substantial difference in performance levels between healthy and unhealthy workers, and safe workers in the cement sector tend to perform better on the job than unsafe individuals do. The frequency of occupational risks has a major impact on worker performance.. In Zambia there are currently limited documentations on ‘effects of occupational health hazard and injuries on workers at Chilanga cement. It is from the above statement that the research topic was formulated because there is a need to identify effects of occupational health hazard and injuries on workers at Chilanga cement in order to add to the mentioned prevention strategies and further introduce health promotion interventions to chain the emergence of occupational health hazard in the mineworkers.

1.1 Study Justification

The study determined what effects of occupational health hazard and injuries on workers at Chilanga cement are. The data obtained from the study added to the existing body of knowledge in the area of occupational health hazard and injuries on workers around cement production in Zambia.

1.3 Research Questions

What are the roles and effects of occupational health hazards and injuries on workers at Chilanga cement?

1.4 General objective

To establish the effects of occupational health hazards and injuries on workers at Chilanga cement that occurred before 2017.

1.4.1 Specific Objectives

1. To determine the prevalence of different types of occupational health hazards and injuries among workers at the Chilanga cement industry that occurred before 2017

2. To assess the impacts of occupational health hazards and injuries on the livelihoods of workers

3. To establish the outcomes of occupational health hazards and injuries on the livelihoods of workers

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

According to Tetrick (2013), employees play a crucial role in achieving the aims and objectives of the firm. This centrality is jeopardized when the workplace is unfit or dangerous for workers to perform their assigned responsibilities, regardless of their knowledge, skills, experience, or competence. This suggests that job performance is greatly influenced by employee health and safety. Only a safe worker can feel at ease at work to carry out his or her duties, and only a healthy worker can be productive. Workers are susceptible to occupational risks, which frequently cause a variety of health problems including cardiovascular diseases. Cement manufacturing processes including quarrying, crushing, blending, and kiln burning make this clear. As a result, workplace dangers significantly harm both the health and productivity of employees.

Numerous analyses of occupational risks have been made in an effort to pinpoint the contributing elements, such as high absenteeism rates, low worker commitment, and other unproductive work practices. Workplace hazards include health and safety risks, which have an impact on employees' well-being and, consequently, their levels of productivity. For example, Okoye, Odumegwu, and Omuku's (2012) study revealed that the majority of Nigerian workers were ignorant of how dangerous their workplaces were and the implications of working there without taking the necessary safety precautions.

Despite the relatively high level of awareness of the harmful health effects of dust exposure among cement industry workers, Ahmed and Newson-Smith (2012) found that the use of respiratory protection equipment was insufficient. Lighting, temperature, noise, and atmospheric conditions are additional factors that affect a worker's performance and well-being at work (Asigele, 2012; Akintayo, 2012; Jagero, Komba, & Mlingi, 2012), with more recent research emphasizing the importance of other factors like damaged tools and the lack of a health insurance program (Yusuff et al., 2014).

2.1 Occupational Health Hazards and Injuries

As a public health issue, occupational health risks and injuries are thought to result in more than 300,000 worker deaths and numerous cases of disability each year (Takala, 2020). There are a variety of accidents

and injuries that happen throughout all occupational sectors, and people working in different sorts of employment confront a variety of distinct hazards. Serious occupational health hazards and injuries are all too common. (ILO,2015; Serole & Paul, 2016). Every year, over 4,405 workers lose their lives due to workplace accidents, and millions more sustain grave non-fatal injuries. In addition, 3.3 million people experience occupational injuries and illnesses from which they may never fully recover. equivalent to astonishingly 4.5 million estimated lost working days. (ILO, 2015). The reports of nine occupational accidents made public by the Federal Auditors of the Ministry of Labour and Employment for the years 2017–2021 (Goncalves, et al., 2011) The following were listed as the most typical workplace accidents and injuries by a number of different research (National Statistics, 2016; Dembe, 2011; Dembe et al., 2015), which concurred with this finding.

i. Slips, trips and falls: The top incident type for occupational health hazards minor injuries are common in many sectors including Water Supply, Sewerage, Waste Management and Remediation Activities, Wholesale & Retail Trade, Logistics & Transport, Information & Communications, Financial & Insurance Activities, Real Estate Activities, Professional, Scientific & Technical Activities, Administrative & Support Service Activities, Health Activities, Education, Mines and Other Personal Service Activities sectors.

ii. Muscle strains: Strained muscles are another common type of work-related injuries, as anyone who regularly lifts heavy items at work would probably know already. Back and neck strains, in particular, are all too frequently sustained while working.

iii. Being hit by falling objects: Falling or flying objects in a workplace can expose workers to relatively minor injuries, such as cuts or abrasions, as well as more serious injuries such as concussions or blindness.

iv. Repetitive strain injury: A problem that has become increasingly common at work over the years, and can be caused by a variety of tasks, such as forceful or repetitive activity, or by poor posture. The condition mostly affects parts of the upper body, such as the forearm, elbow, wrist, hands, shoulders and neck.

v. Crashes and collisions: Accidents resulting in crash or impact injuries are quite frequent. Whether they involve cars, Lorries or even smaller vehicles such as forklift trucks, they can have serious consequences.

vi. Cuts and lacerations: All sorts of office implements can end up leaving their user nursing a painful cut. From power saws to paper trimmers, it's easy to do yourself a mischief at work. The most common causes of these lacerations include poor training, inadequate safety procedures and failing to wear the proper

protection. Employers can help prevent such accidents by providing adequate safety equipment and putting the right procedures, including training, in place.

vii. Inhaling toxic fumes: The air in many workplaces contains hazardous substances in the form of dusts, fumes, mists, gases and vapours. Most workers without protection may be at risk of impairment to breathing, skin or eye reactions as well as potentially more serious injuries. Employers must provide workers with the correct work wear, including goggles and fitted face masks, to avoid dangerous exposure.

viii. Exposure to loud noise: Noise at work can cause hearing damage that is permanent and disabling. This can be hearing loss that is gradual because of exposure to noise over time, but also damage caused by sudden, extremely loud noises. Safety measures such as ear protection can help to prevent it.

ix. Walking into objects: When you suddenly find yourself on the sharp end of a door, table, wall or cabinet. Needless to say, these injuries can hurt. Luckily, such accidents can be avoided by reminding employees to be vigilant and moving unnecessary hazards out of the way where people can't walk into them.

x. Fights at work: Simmering workplace tensions can bubble under for months or even years before spilling over into physical confrontation. Fights in the workplace can, unsurprisingly, result in nasty injuries. Effective procedures for dealing with employee grievances can help reduce the risk of them coming to blows though.

Oketunji (2014) asserts that the absence of a health and safety system at work renders employees vulnerable to workplace risks that could have a negative impact on morale and productivity. The safety of workers should always be a primary priority in the workplace, regardless of whether they are employed in low-risk or high-risk positions (Oketunji, 2014). Occupational safety attempts to provide a safe working environment and avoid accidents brought on by risky employee conduct and/or an unsafe workplace. Safety researchers, either directly or indirectly, support adaptable employee safety behaviour in this situation. Violation of safety regulations increases workplace dangers that hinder employee performance. Health hazards are dangers to a worker's health that might be caused by environmental activities that could expose them to various diseases.

2.1.1 Physical Hazards in Cement Industries

Workers in Zambia are more likely to be exposed to a variety of workplace health risks, including vibrations from equipment, low temperatures, smoking, frame, powder, dust inhalation, pesticides, loud noise, chemicals, hard lifting, and frequent bending (Siziya *et al*., 2012). Other significant findings were the

correlation between self-employment, old age, male gender, poor education, and marital status and exposure to occupational health hazards.Among the physical risks at work are injuries brought on by falls while performing tasks such the bagging and filling phase of the factory's cement manufacturing, as well as entering the conveyor belt used in the manufacture of cement. Among the physical risks are: insufficient machinery guarding, exposed electrical issues, poor lighting, faulty hand tools, hazardous working conditions, and poor workplace design.

2.1.2 **Chemical Hazards in Cement Industries**

Nwachukwu (2015) defines chemicals as acidic or alkaline substances that can be produced artificially or naturally as solids, liquids, gases, fumes, dusts, or vapours. Some chemical substances are harmful to human health. Examples include vapours that affect the central nervous system, lungs, digestive system, and circulatory system as well as dust, acids, bases, heavy metals, fire, explosions, and smoke (Achalu, 2019). Chemicals are known health risks in occupations where they are utilized in manufacturing processes, regardless of their form. High airborne concentrations provide a concern for chemical contamination; chemicals can enter the body by inhalation, cutaneous contact, ingestion, or contaminated hands (Herztein, 2013).

2.1.3 Biological Hazards in Cement Industries

According to Gupta (2012), living things including plants, animals, and microbes are what lead to biological hazards at work. Significant biological exposures in the cement manufacturing process include skin infections from overused and worn-out work clothes and aprons, droplet infection particles, and parenteral exposure. Microorganisms naturally appear in the cement factory when the majority of the chemical reagents degrade. According to Achalu (2019), biological hazards include living things like plants and animals, infectious diseases caused by bacteria and viruses, rashes, and allergic reactions, as well as microbial agents that cause disease like insects, viruses, yeast, spores, parasites, and fungi.

2.1.4 **Ergonomic Hazards in Cement Industries**

The possibility of physical injuries to the human body as a result of moving objects, flying objects from damaged equipment and plants, and worker slips and falls as a result of their job process are all examples of ergonomic hazards, also referred to as mechanical hazards, according to Jain and Sunil (2015). They continued by saying that numerous mechanical dangers are common in sectors and can cause injury, incapacitating conditions, and occasionally even death to workers. Long durations of standing are required

of cement plant employees, which poses an ergonomic risk of back pain, waist pain, and other muscular skeletal illnesses (Asogwa, 2013). He continued by saying that headaches and bodily pain are the most typical complaints among cement workers.

2.1.5 **Psycho-social Hazards in Cement Industries**

As per Cooper (2013), psychosocial hazards are hazards that result from an employee's working environment and may include things like a lack of job satisfaction, dissatisfaction, stress, anxiety, inconsistent salary payment, and bad interpersonal relationships at work. The study by Frone (2012), which looked at the connection between work-family conflict and various mental diseases, found that having a mood of anxiety and a drug use disorder were both positively correlated with work-family and family-to-work conflict. Chen, Yu, and Wong (2014) looked into how musculoskeletal pain among Chinese cement plant workers was affected by occupational stress and other psychosocial factors. According to the study, extended standing in the factory caused low back discomfort in 7.5% of workers and elbow pain in 32% of them. Psychosocial hazards, according to Asogwa (2013), are dangers that result from a worker's inability to adjust to the strange psychosocial environment of his or her employment.2.2.1

2.2.1 Impacts and Outcomes of Occupational Health Hazards and Injuries

Workplace accidents are a severe public health issue since they not only have an impact on the wounded party but also on other family members who depend on the injured adult for support. They contribute significantly to the overall injury burden. (2012) Ezenwa, Dembe, and ILO Approximately 270 million industrial accidents occur annually, according to these estimates, resulting in lost workdays, medical expenses, disability, and the provision of survivor benefits to worker families (ILO, 2012).

According to Dorman (2020), occupational disease and injury are also economic issues because they are brought on by employment, which is an economic activity. At work, he considered two significant economic costs: disability and early death.

The first one is: Both the worker's lost wages while away from the job and any potential wage reductions after returning to it could have social costs, depending on whether or not it is possible to find a substitute worker who can perform the same tasks without a job.

The second one: the price of medical care, assistance during a disability, and rehabilitation. He discovered that while the expenses of social and health insurance systems are easily quantified, there are also housing expenditures that may go undetected.

Direct, indirect, and/or hidden costs of occupational accidents affect society as a whole (Hamalainen *et al.*, 2015). In affluent nations, the total economic consequences of work-related accidents are comparable to those of cancer and heart disease. As a direct result of their injuries or illness, victims sustain enormous financial losses. These expenses include ongoing medical expenses, a direct loss of income, transportation expenses, and losses resulting from the lifestyle adjustments persons had to make as a result of their illness. Dorman (2020) survey results from the United States of America, revealed that one in six injured workers needed some other family members to take care of him or her, and that 2/5 required other family members to perform some or all of their house hold tasks, on the other hand, even though these contributions of time and effort by the families of the injured workers have no price, in the market place, they certainly represent economic costs.

On the other hand, these economic calculations are made in industrialized countries that have established specific compensation and social security systems. Often in developing countries an accident which occurs in the workplace does not cause direct costs (Hamalainen *et al.*, 2015). The study by Stough *et al.,* (2015) examined how pre-existing disabling conditions influenced the recovery process of survivors of Hurricane Katrina. This study focused specifically on the barriers that hindered the recovery process. Five themes emerged as the most significant barriers to recovery: housing; transportation; employment; physical and mental health; and accessing recovery services. Their findings were that, when disaster recovery services and resources did not accommodate the needs of individuals with disabilities, recovery was hindered.

2.3.2 Institutions Advocating for the Rights of Workers in Zambia.

Occupational injuries have received limited research attention in the Southern African Development Community. Much of the published data come from South Africa and little has been reported elsewhere within the region (Moyo *et al.,* 2015; Siziya *et al.,* 2010; ILO, 2012)

Mines Safety Department

This department falls under Ministry of Mines Energy and Water Development is in charge of overseeing and inspecting mining businesses' occupational safety, health engineering, and hygiene. In accordance with the terms of the Mines Minerals Development Act number 7 of 2008, it addresses all issues relating to the safety and health of individuals working in exploration, mining, and mineral processing operations throughout the Republic of Zambia.

Occupational Health and Safety Institute

The Ministry of Health's Occupational Health and Safety Institution (OHSI) is in charge of worker safety and health inspections. Offering comprehensive, specialized occupational health care is the responsibility of OHSI. The OHSI not only offers occupational health services but also lab services and acts as an OSH research institute.

Workers' Compensation Fund Control Board

The Workers' Compensation Fund Control Board under the Ministry of Labour and Social Security, which is in charge of worker compensation, occupational safety, and health inspections in mining and non-mining private firms. The three parts of the WCFCB's mandate are: managing employer contributions to the Fund; compensating employees for disabilities they experience or illnesses they contract while working; and providing financial support to the dependents of employees who pass away due to occupational accidents or diseases (Siziya et al., 2020). The Workers' Compensation Fund Control Board offers free OSH programs, including health and safety lectures, seminars, inspections, and evaluation visits, to assist companies in reducing occupational accidents and diseases in their workplaces. The Workmen's Compensation Fund Control Board oversees the Zambian Employment Injury Scheme; the National Pensions Schemes Authority and Ministry of Labour and Social Services normally keep an eye on the fund (Fultz & Pieris, 2017)

2.3.3 Compensation of Occupational Accidents

The main goals of workers compensation are to offer some pay replacement and cover medical expenses for those who are employed. (Siziya *et al.,* 2012; Shannon & Lowe, 2012). The ability to receive compensation is still essential for getting injured workers the treatment they need.

Despite the requirement to report occupational illnesses and accidents, Michigan is seeing a unique case of an occupational disease. To determine the proportion of workers who do not submit claims for worker's compensation benefits, researchers (Shannon & Lowe, 2012) performed a study. In accordance with the findings, just 9% of people filed for a replacement, while 55% did not. Similar research revealed that 72% of claimants reported filing a claim, with 58% requesting benefits for wage loss. It was clear.

Siziya *et al.,* (2012) carried out a similar study examining compensation trends following workplace injuries in Zambia. Their findings demonstrate the correlation between demographic, social, and economic aspects and the likelihood of receiving benefits for accidents at work. Gender, geographic location (provinces),

employment status, and the number of people stationed at a workplace all had an impact on compensation. In addition, cases are frequently underreported. Only 14 fatal workplace injuries were reported to the ILO in 2020, and none in 2015.

According to Zambian laws, injured workers are eligible to file claims for compensation (Siziya *et al.,* 2012). These laws include the National Pension Scheme Act, the Minimum Wages and Conditions of Employment Act, and others. These are the main records that describe wages and benefits for workers in Zambia. The terms of collective bargaining are established by the Industrial and Labour Relations Act.

Theoretical Framework

The Health Belief Model is a widely used theoretical framework in public health and occupational health and safety to understand and predict individuals' health-related behaviours and decisions. It helps explain how workers perceive and respond to occupational health and safety risks. The HBM can be applied as follows:

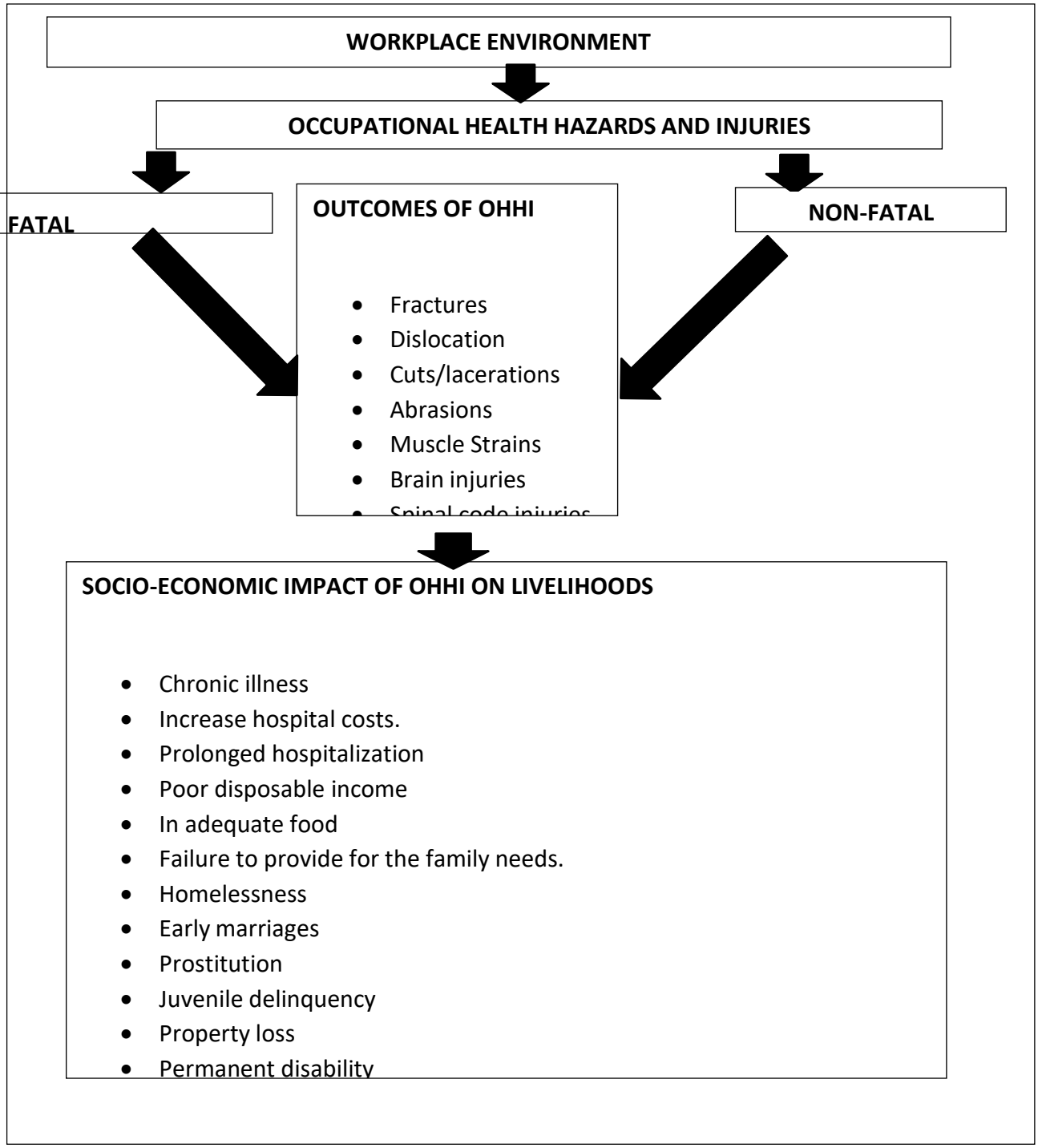
Perceived Susceptibility: In occupational health, workers assess their vulnerability to specific hazards or injuries. For example, workers may evaluate their risk of exposure to harmful chemicals or the likelihood of a workplace accident. Organizations can use the HBM to identify and address workers' perceptions of susceptibility by providing education and information about potential risks. Perceived Severity: This aspect focuses on how workers perceive the seriousness of potential health hazards or injuries. Workers may consider the consequences of exposure to occupational hazards, such as the severity of illness or disability. To promote occupational health and safety, employers can emphasize the severity of potential outcomes to motivate workers to take preventive measures, such as wearing protective gear. Perceived Benefits: In the context of occupational health and safety, workers weigh the benefits of adopting safety measures and practices. This includes considering the effectiveness of safety equipment and protocols in reducing risks. Employers can use the health belief model to highlight the benefits of adhering to safety guidelines and policies, such as improved health, reduced injury rates, and a safer working environment.

Perceived Barriers: Workers also evaluate the barriers or obstacles to practicing safe behaviours at work. These barriers can include discomfort, inconvenience, or the cost of safety equipment. Organizations can use the HBM to identify and address these perceived barriers. For example, they can provide accessible and affordable safety equipment or streamline safety procedures. Cues to Action**:** Cues to action are triggers that prompt individuals to take action regarding their health or safety. In an occupational setting, these cues can include safety training, reminders, or feedback on safety performance. Employers can use the HBM to design

effective interventions that provide timely cues to action, reminding workers to follow safety protocols and procedures. Self-Efficacy: Self-efficacy refers to an individual's belief in their ability to perform a specific behaviour successfully. In occupational health and safety, it relates to a worker's confidence in their capacity to follow safety guidelines and practices. Employers can promote self-efficacy by offering training, guidance, and support to ensure that workers feel capable of protecting their health and safety.

Application of the health belief model in Occupational Health and Safety

The health belief model can inform the development of occupational health and safety programs and interventions by considering workers' perceptions and attitudes toward safety. It helps organizations tailor their efforts to address specific barriers, enhance perceived benefits, and provide effective cues to action. By aligning safety initiatives with the principles of the HBM, employers can encourage safer behaviours among workers and reduce occupational hazards and injuries.



By the Researcher

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter outlined the methods that were used to carry out this study which included the study design, study setting, study population, data collection tool, data analysis procedure and ethical considerations.

3.1 Study Design

This was a descriptive cross-sectional study utilizing quantitative research methods to measure effects of occupational health hazard and injuries on workers at Chilanga cement.

3.2 Study Setting

The study was done in Lusaka, Zambia, at the Chilanga Cement Industry, formerly Lafarge, which is located on Farm 1880, Kafue Road. Founded in 1949, Chilanga is primarily a cement manufacturer that has been actively producing cement and cement clinker. Additionally, the business sells aggregates from a quarry it owns and exports cement and clinker to close-by nations like The Democratic Republic of the Congo (DRC), Malawi, Zimbabwe, and Burundi. The business also manufactures ready-mix concrete and provides goods for the construction of rail and road infrastructure. With a combined annual production capacity of 1.4 million tons, Lafarge Zambia's two fully integrated cement plants are located in Ndola and Lusaka. Drivers, mechanical fitters, stores, laboratory technicians, excavators, plant fitters, fabricators, assistant surveyors, drillers, safety officer, welder, sampler/fitter, rigger, operators, plasticians, instrument technicians, planning assistants, and crane operator make up the majority of its 200–500 employees.

3.3 Study Population

The study population included both male and female workers at Chilanga cement industry in Lusaka with a history of attaining work-related permanent injuries before 2017. This consisted of the members of the mine administration, drivers, mechanical fitters, stores, laboratory technicians, excavators, plant fitters, fabricators, assistant surveyors, drillers, safety officer, welder, sampler/fitter, rigger, operators, plasticians, instrument technicians, planning assistants and crane operators who had permanent injuries.

3.4 Section Criteria

In this study, for the participants to take part, the following criteria was to be fulfiled;

3.4.1 Inclusion Criteria

- Mineworkers at Chilanga cement industry in Lusaka aged 18 years and older, working for at least 5 years or more at the mine, involved in physical mining work.

3.4.2 Exclusion Criteria

Mine employees who had a history of LBP from non-work-related causes, such as a slip and fall at home or a car accident, as well as office holders like managers and supervisors hired by the mining firm.

3.5 Sample Size Determination and Sampling Method

3.5.1 Sample Size

Sample size was calculated using https://www.surveymonkey.com/mp/sample-size-calculator/ which uses the cochran formula.

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Where **N = population size, e = Margin of error (percentage in decimal form), z = z-score, p=sample proportion (percentage in decimal form) and n= sample size**

Variables used: N=200 Z=1.96 e =at 5% (0.05) p= at 50% (0.5) calculation n0 =1.962 x 0.5(1-0.5)/0.052 = 384.16 n =384.16/ 1 + ((384.16 – 1)/191) = 127.79 = 108 participants. therefore, a sample size of 108 workers at Chilanga cement was targeted.

3.4.2 Sampling method

The study established the effects of occupational health hazard and injuries on workers at Chilanga cement. Using a cross-sectional survey, it was necessary to use suitable methods such as Purposive (Deliberate), Convenience and Snowball sampling methods to select the participants for the study (Leedy & Ormrod, 2015). A researcher employed a variety of techniques while using purposive sampling to find any potential instances of a highly specialized and challenging-to-reach group. Key informants within the company of Chilanga cement Plc were used to identify and lead the researcher to participants who wished to take part in the study.

3.7 Data Collection Tool

Firstly, a consent form that was specified in the appendices needed to be signed by the chosen study participants. Thereafter, a self-administered, semi-structured questionnaire was given to each participant. The questionnaire comprised of the social demographic data, work place injuries, impacts of injuries on livelihood and extent of safety provisions and precaution measures.

3.8 Data Analysis

The collected data was analysed using the statistical package for social sciences (SPSS version 21) and Microsoft Excel. Each response was given a numerical code to enable data to be standardized and processed using statistical methods. Descriptive statistical analysis was carried to assess the types of occupational health hazards and injuries among study participants. Furthermore, a chi-square test was utilized to determine a relationship between injuries suffered and the social demographic characteristics of the participants. Confidence Interval set at 95% and P- value 0.05. For the sake of getting valid and reliable data, a qualified and an expert in statistics was consulted.

3.9 Ethical Considerations

Approval was sought from University of Lusaka Undergraduate Research Ethics Committee. Permission to conduct the study was also to be sought from the management at Chilanga cement. Confidentiality was highly observed; no names were used instead codes were assigned for purposes of data entry. Secondly, all soft copy files holding respondents' information was kept securely whereas hard copy files were properly disposed of once the information was extracted. Verbal consent was also obtained from every study subject after clearly explaining the purpose of study. Respondents were informed beforehand that participation in the interview was voluntary and that they were free to withdraw themselves at any time. Confidentiality of the data was strictly maintained throughout the study period. Participants received no direct benefits. Nonetheless, the study's findings aided the relevant authorities in improving the welfare of workers and contribute to formulation of new health policies, which positively impact many workers in the future. Outcomes of results, however, were significant in formulating measures to minimize the prevalence of different types of occupational health hazards and injuries among workers at the Chilanga cement industry.

CHAPTER 4: RESULTS

4.0 Socio-demographic characteristics of participants

A total number of 108 respondents participated in the study of which 29.6% (n=32) were females and 70.4% (n=76) were males. The results further showed that 13% (n=14) of the respondents were single, 62.0% (n=67) were married, 13.9% (n=15) divorced and 11.1% (n=12) were widowed. In-addition, it was revealed that most of the participants had a family size of 6-8 (n=69; 63.9%) people per household. The study also showed the 51.9% (n=56) of the respondents were above the age of 40. Out of 108 participants, 91 (84.3%) of these responded with yes to being the head of the households. 37% (n=40) had 10 and more years of work experience with only 19.4% (n=21) representing those with less than 5 years of work experience.

Table 1: Socio- demographic characteristics of mine workers (n=108).

Variable	Characteristics	Frequency	Percentage	p-value
Age (Years)	18-25	16	14.8	
	26-40	36	36	0.007
	Above 40	56	51.9	
Gender	Males Females	76	70.4	
		32	29.6	0.08
Marital status	Single	14	13	
	Married	67	62	0.132
	Divorced	15	11.1	
	Widowed	12	13.9	
Family size	1-2	6	5.6	

	3-5 6-8 More than 8	10 69 23	9.3 63.9 21.3	0.101
Work experience (Years)	1 2.5 6-10 More than 10	18 21 29 40	16.7 19.4 26.9 37.0	0.04

In the bar chart below, prevalence of different types of occupational health hazards and injuries among workers at the Chilanga cement industry that occurred before 2017 is shown. 46.3 % (n=50) had the severe types of injuries, this was followed by 37% (n=40). A small percentage (6.5%) was representing a portion for those that had minor injuries.

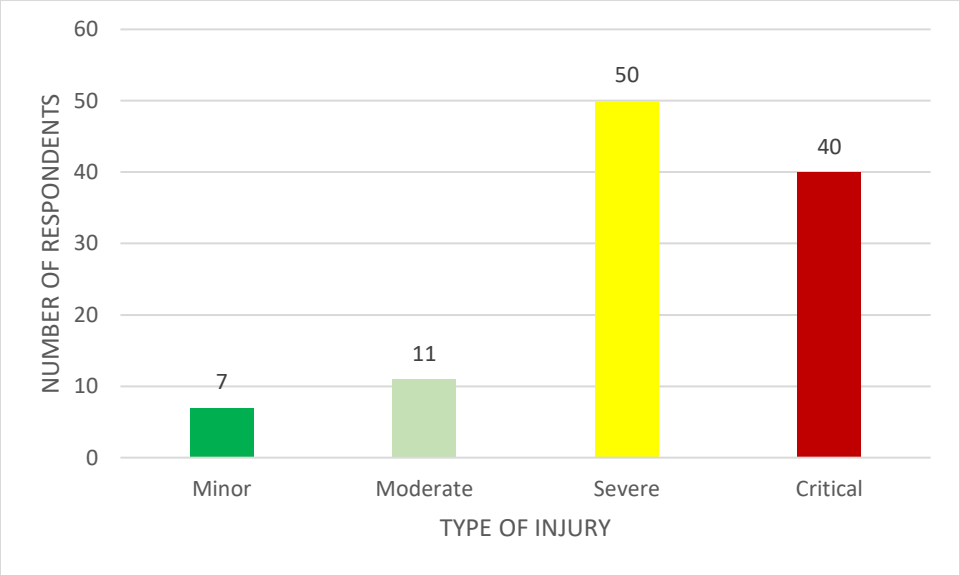


Figure 1: shows the prevalence of injuries.

Types of Injuries

Different types of injuries were found in the study. Inhaling toxic fumes 25% (n=27) and cut/laceration 18.5% (n=20) were common amongst the respondents while brain injuries were the least suffered injuries 0.93% (n=1) at Chilanga cement.

Types of injuries

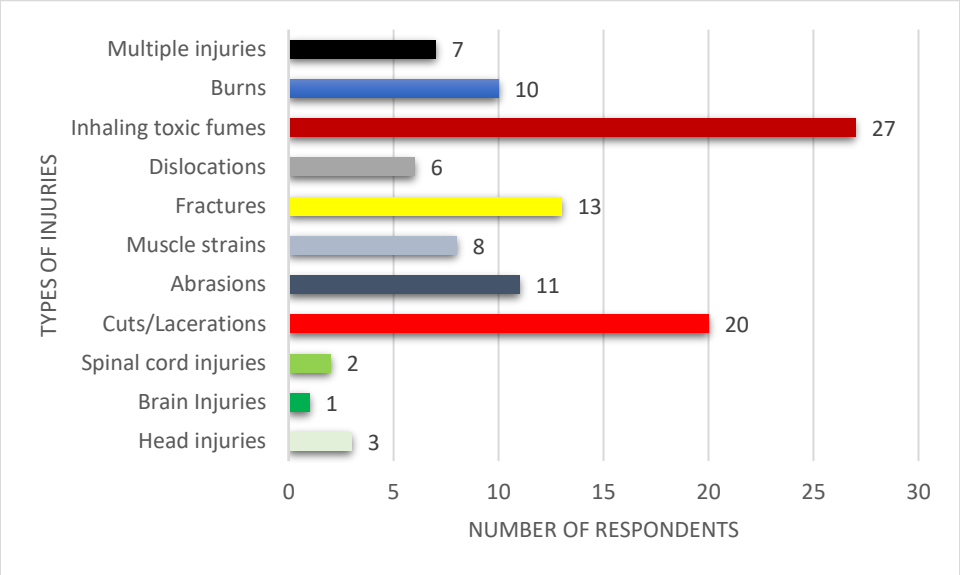


Figure 2: Shows the types of injuries experienced

Assessment on the outcomes of occupational health hazards and injuries on the livelihoods of workers.

It was brought to our attention that only 7/108 (6.5%) of effected workers had OHHI with a duration of less than 2 years while 21/108 (19.4%) of the affected workers had their OHHI with a duration between 3-4 years. 31/108 (28.7%) participants had OHHI with a duration between 5-10 years. Similarly, 49/108 (45.4%) of the participants had OHHI with a duration of more than 10 years.

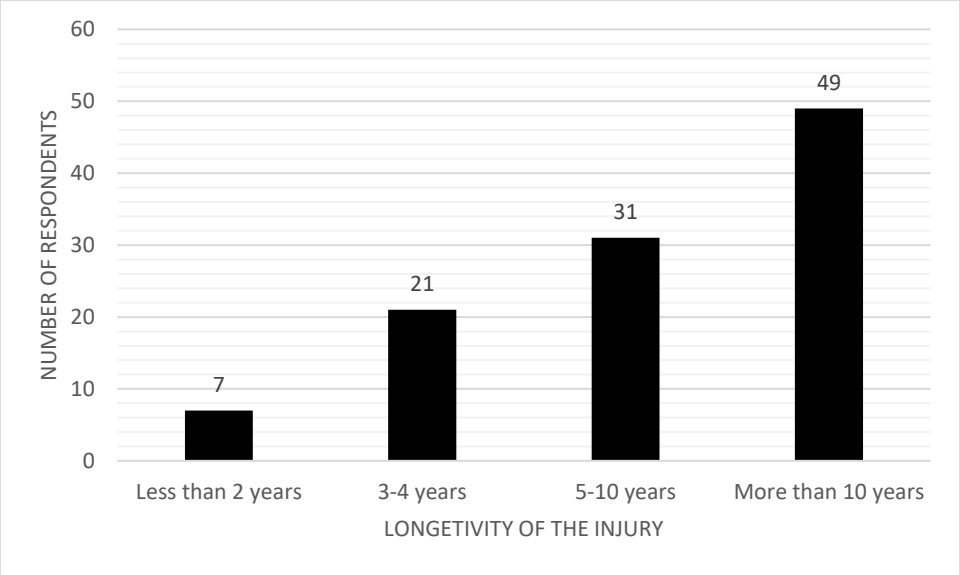


Figure 3: Shows the durations of the injuries

Compensation by relevant body

With regards to whether the participants were compensated or not for their exposure to occupational hazards and injuries by the relevant bodies, our results revealed that a total of 90/108 (83%) did not receive any form of compensation while only 18/108 (16.7%) stated that they were compensated.

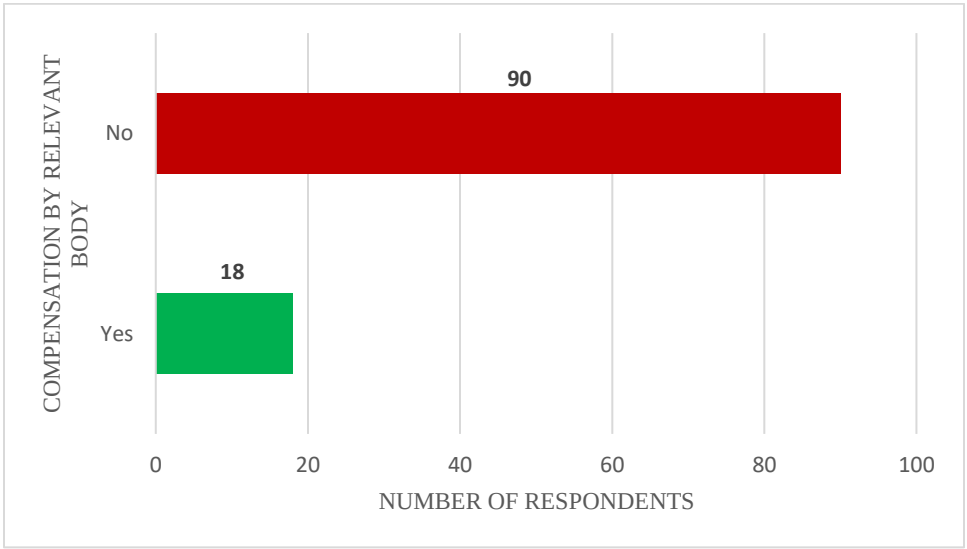


Figure 4: Shows the compensation by relevant body

Assessing the impacts of occupational health hazards and injuries on the livelihoods of workers.

Out of the 108 workers enrolled in this study, 42/108 (38.9%) were reported have been experiencing a chronic illness while 31/108 (28.7%) experienced a decrease in their productivities after the occurrence of the occupational health hazards and injuries. A total of 19/108 (17.6%) participants had experienced increased hospital costs while 8/108 (7.4%) reported that their income was greatly inadequate.

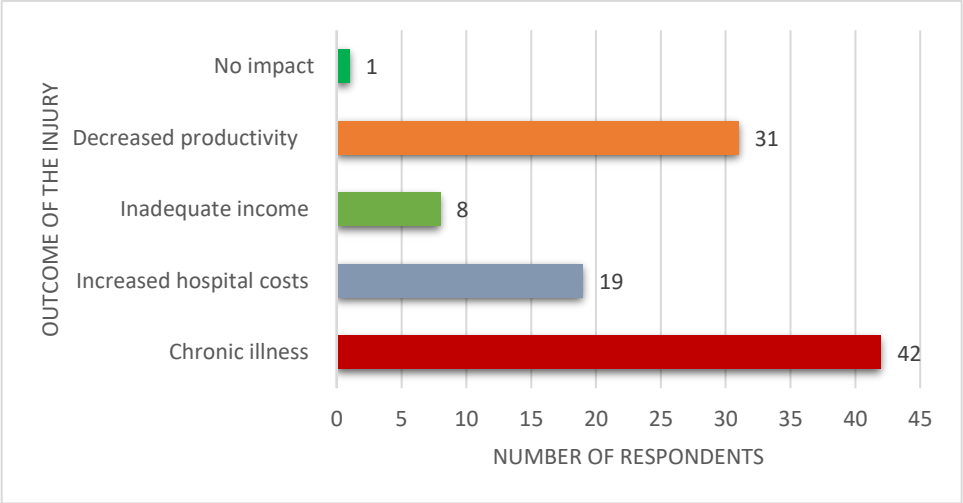


Figure 5: Shows the outcomes of the injuries

CHAPTER FIVE: DISCUSSION OF THE FINDINGS

5.0 Introduction

The discussion of the study's findings is presented in this chapter. The discussion centred on the main objective, which was to establish the effects of occupational health hazards and injuries on workers at Chilanga cement that occurred prior to 2017; a case of Chilanga cement industry in Zambia was answered through the specific objectives, which included; determining the prevalence of different types of occupational health hazards and injuries among workers at the Chilanga cement industry that occurred prior to 2017, and assessing the impact of these hazards and injuries.

5.1 Demographic characteristics of mine workers

The study's return rate (100%) was reasonable when compared to answer rates from other research. (Murtezani *et al.,* 2021) (Xu *et al.,* 2021). There was a substantial degree of difficulty when comparing the demographic aspects of this study with prior ones, particularly the age and mean age. According to the country where the research was conducted and the pronounced variance in the age distribution of the participants, there appears to be a broad range in the age at which participants are recruited between studies, making comparisons difficult. The mine workers in the current study were 37 years old on average. In the current study, the majority of the mineworkers (46.36%; n=51) were between the ages of 26 and 35. Comparing this outcome to demographic information from comparable research reveals a difference. The mean ages given by Kunda & Frantz (2021), Bandyopadhay *et al.,* (2021), and Kunda & Frantz (2021) were 40.31 years, 40 years, and 43.83 years, respectively.

Men made up 90.4% of the participants in the current study, while women made up just 29.6%. Tawiah, Oppong-Yeboh, and Bello's (2019) study revealed a prevalence of 90.1% for male respondents and 9.9% for female respondents, which conflicts with the findings of this study. Ghaffarri, Alipour, Jesen, Farshad, and Vingard (2020) reported that 78% of their research participants were male, in contrast to Pari and Dhara (2021), who had solely male participants. To do the daily requirements of a miner's profession, which are exceedingly risky and physically taxing, one must be exceptionally physically fit. The majority of those employed in this field are men.

5.2 General Discussion of the Results

The study discovered that the most common types of occupational injuries suffered from were head injuries, brain injuries, spinal cord injuries, cuts/lacerations, abrasions, muscle strains, fractures, dislocations, inhaling toxic fumes, burns, and multiple injuries, with cuts/lacerations and inhaling toxic fumes being the two most common conditions. These occupational injuries affecting workers are largely non-fatal as well.

The study also discovered that the impacts of occupational health risks and injuries on the affected employees' and their families' quality of life include financial hardships, the development of chronic illnesses, physical hardships, and high medical costs. Additionally, it was shown that both employees and their families had negative consequences, some of which persisted for at least two years.

According to the report, Zambia's occupational risks and injury regulations need to be improved, enforced, and made suitable to the contemporary working environment. It was also discovered that employees, businesses, and the government are adopting preventative steps to guarantee that workplace dangers and injuries are kept to a minimum since labor laws legislation is ineffectual. Despite having an impact on livelihoods, most injuries, according to the survey, are not deadly. Additionally, 57.4% (62) more respondents in the age categories of 26 to 40 and over 40 had sustained injuries than respondents under 26. The study unmistakably indicates that occupational health hazard injuries have a serious negative impact on most workers. The findings further suggest that workers are subjected to chronic illness, physical, expensive medical bills and financial challenges.

5. 2.1 Types of occupational hazards and injuries on the livelihoods of the affected workers.

The majority of the injuries sustained were serious and critical, according to the study's findings. Head injuries, spinal cord injuries, cuts and lacerations, dislocations, and burns were the most common forms of injuries. In addition to these injuries, the survey discovered that one of the most frequently mentioned hazards among responders was inhalation of poisonous gases. The most recent discoveries are consistent with earlier findings made by (Michelo *et al.,* 2019, Hamalainen, 2020, Siziya *et al.,* 2022, and National Statistics, 2016). The incidence of these injuries may result

from inadequate planning, mental diversion, disregard for safety precautions, shortcuts, and inadequate or nonexistent cleaning.

Siziya *et al.,* (2020) found that the majority of accidents and injuries were linked to either employer or employee carelessness rather than just a tiny error or simple incident from busy personnel. As a result, access to the required safety equipment, training, and signs can all be in good shape. The most prevalent method of damage, according to recent research, was handling of equipment and materials. According to the data, Zambian workers endure subpar working conditions.

The findings also revealed that age affected the kind of injuries sustained. Workers above the age of 40 had higher injuries than those under that ageA wide body of research has demonstrated that age influences the sort of damage sustained (Siziya *et al.,* 2020; Fingerhut, 2015; Michelo *et al*., 2019). This can be due to a variety of circumstances, including: "the common causes of occupational accidents in Zambia are poor safety culture, lack of training in basic safety information, poor housekeeping, the pressure of meeting deadlines, subcontracting, working long hours in order to increase their earnings, workers on temporary contracts rarely have adequate training, and lack of maintenance on machinery."

5.2.2 Impact of health hazards and injuries on the livelihood of workers

The findings reported in the statement suggest that occupational health hazards and injuries can have significant negative consequences for workers, including chronic illness, decreased productivity, increased hospital costs, and inadequate income.

Chronic illness is a health condition that persists over a long period and can negatively impact an individual's quality of life. In this study, 38.9% of the workers reported experiencing chronic illness, indicating that occupational health hazards and injuries may be contributing to the development of chronic conditions. Previous research has shown that work-related factors such as exposure to hazardous materials, physical demands, and psychosocial stress can increase the risk of chronic illness (Sabbath *et al*., 2019). Therefore, it is crucial to identify and mitigate occupational health hazards to prevent the development of chronic illness in workers.

Decreased productivity is another consequence of occupational health hazards and injuries. In this study, 28.7% of workers reported a decrease in productivity after experiencing these hazards. This finding is consistent with previous research that has shown that workplace injuries and illnesses can lead to decreased productivity due to absenteeism, presenteeism, and turnover (Pransky *et al*.,

2016). The economic costs of decreased productivity can be significant for workers and their employers, highlighting the need for effective prevention and management of occupational health hazards and injuries.

Increased hospital costs were reported by 17.6% of participants in this study. This finding suggests that occupational health hazards and injuries can result in increased healthcare utilization and costs. Previous research has shown that work-related injuries and illnesses are associated with higher healthcare utilization and costs, including hospitalizations, emergency department visits, and outpatient visits (Leigh *et al.,* 2019). These costs can be a significant burden for workers, particularly those with limited access to healthcare or inadequate insurance coverage.

Finally, inadequate income was reported by 7.4% of participants in this study. This finding suggests that occupational health hazards and injuries can have economic consequences beyond increased healthcare costs. Inadequate income can exacerbate the financial burden of healthcare costs and contribute to financial stress and hardship. Previous research has shown that work-related injuries and illnesses can lead to loss of income and financial strain for workers and their families (Liu *et al.*, 2017).

In conclusion, the findings reported in the statement highlight the importance of preventing and managing occupational health hazards and injuries to protect workers' health and well-being. Occupational health and safety programs should prioritize identifying and mitigating hazards in the workplace to prevent chronic illness, decreased productivity, increased healthcare costs, and inadequate income. Effective prevention and management of occupational health hazards and injuries can reduce the economic and social costs of work-related illnesses and injuries and promote a healthy and productive workforce.

5.2.2 Common injuries and why they are these injuries are common

Slips and falls, muscular strains, crashes and collisions, cuts and lacerations are among the most prevalent accidents and injuries, according to several research (National Statistics: 2016). Inhaling harmful fumes is also frequent in many jobs that include hazardous compounds in the form of dusts, fumes, mists, gases, and vapors, according to Siziya *et al*., 2012. WFCFCB, for example, stated that "cuts and lacerations, burns, dislocation, fractures, abrasions, and spinal code injury are the most common injuries in Zambia." Many analysts, however, suggest that these OHI are

widespread in underdeveloped nations. This can be linked to a variety of issues, including a lack of safety knowledge and programs, irresponsibility on both sides (for example, employees are provided safety boots but do not wear them), poor coverage of occupational safety and health in vocational and technical courses, and so on. Most of the organizations agreed with this. This was also corroborated by (Kunda *et al.,* 2013), who stated that most firms in Zambia do not prioritize employee health and safety because it is too expensive. Similarly, (CSO, 2012 & Michelo *et a*l., 2019) said that workers do not take the necessary precautions before working, or they are just too lazy to bother. When workplace accidents occur, most workers appear to prefer to locate "things" to blame rather than "root causes." According to Driscoll *et al*., (2015), over 4,405 people are murdered on the job each year, with millions more suffering significant non-fatal injuries. Environment, task, organizational, material and human, and maintenance factors are classified as occupational health risks and injuries (Hamalainen, 2010; Fingerhut, 2015; Michelo *et al*: 2019; Cooper, 2020; Katsakior, 2018; Ezenwa, 2021; Dembe *et al.,* 2015). Studies have often explored and established the fault of personal participation in accidents. Workers were either not taking the necessary preventive precautions before to working, or they were just too lazy to bother (Mills: 2019, CSO: 2012, Michelo *et al*., 2019).

Zambia does not have a policy on workplace accidents and diseases, although there are occupational safety and health requirements intended to prevent these things from happening. Periodic inspections carried out in workplaces subject to rules are used to enforce these requirements (Moyo *et al*., 2015). Employers are frequently obliged by the standards to implement certain measures to protect employees while they are on the job, as well as to acquaint themselves with the applicable standards and eliminate any dangers that might endanger employees. More evidence revealed that more than 2 million work-related deaths and roughly 300 million nonfatal occupational accidents occur each year, contributing to global economic costs and the same is true for Zambia, despite the fact that access to health and safety has had an inexplicably difficult gestation globally (ILO: 2012). The WCFCB offers free OSH programs, including health and safety lectures, seminars, inspections, and evaluation visits, to assist minimize OHHI in the workplace. Most workplaces in the nation generally follow safety procedures.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusions and recommendations of the study based on objectives and findings.

6.2 Conclusion

Accidents at work frequently result in injuries that can render a worker handicapped or even fatal. An employee's quality of life, career opportunities and advancement, income, job security, and psychological stress may all be impacted by a workplace accident. On the other side, the loss of an employee's productivity and manpower might have an impact on company and the national economy. Death of a breadwinner increases the responsibility on the government to combat poverty, which may result in hardship for surviving wives, kids, and dependents.

Different occupational health risks that put workers at risk for decreased productivity exist. This has resulted in the adoption of legislative initiatives including the Occupational Health and Safety Act, which was recently enacted, the Convention Act of 1965, the Factories Act, the Occupational Health and Safety Act, and the Workers Compensation Act of 1999. However, despite the country's occupational health and safety challenges being addressed by measures put in place, the situation has not changed. This is clear from the most recent numbers on reported injuries and fatalities, which are still quite high and include numerous OHHI that have not been recorded.

According to this study's findings, most injuries are not fatal, with the most common ones being burns, multiple injuries, cuts, lacerations, abrasions, muscular strains, fractures, dislocations, head injuries, brain injuries, spinal cord injuries, and burns. It was also shown that OHHI had negative consequences on workers, including financial difficulties, the onset of chronic illnesses, physical difficulties, and medical expenses.

In the end, it was determined that Zambia's present occupational injury and hazard rules are ineffectual because they do not adhere to the labor laws as they are today.

There is still more to be done, starting with the creation of a national policy on occupational health hazards, frequent inspections, better enforcement, and alignment of occupational health standards with the existing employment realities.

The government has not succeeded in establishing a thorough national policy that addresses workplace safety and health. In the areas of mining, labor, and health, the government has adopted ad hoc safety and health rules whose execution is not synchronized. when a result, there is duplication of effort and responsibility overlapping when occupational safety and health initiatives are carried out in an ad hoc manner without defined guidelines.

6.3 Recommendations

In view of the results of this dissertation, the following recommendations emerged from the study.

1. Implement a comprehensive safety program: Cement industries must establish and implement a safety program that includes identifying and assessing hazards, training employees on safety procedures, providing personal protective equipment (PPE), and maintaining equipment.

2. Provide adequate training: Workers must receive adequate training on handling equipment, machines, and chemicals. They should also be trained on emergency procedures, like first aid and fire safety.

3. Regularly inspect equipment: Cement industries should regularly inspect equipment and repair any damaged parts or replace them to ensure safe operation. Maintaining proper lubrication and routine maintenance of equipment is also important.

4. Ensure proper ventilation: Cement industries should ensure that the ventilation system is properly designed, installed, and maintained to reduce exposure to harmful dust and fumes.

5. Implement noise control measures: There should be measures in place to control the noise level, such as installing sound-absorbing materials and limiting the amount of noise generated by equipment.

6. Encourage breaks and ergonomics: Cement industries should encourage workers to take frequent breaks, stretch, and use ergonomic tools or furniture to reduce muscle strain or musculoskeletal disorders.

7. Conduct regular safety inspections: Regular safety inspections help to identify potential hazards and allow for corrective actions to be taken to protect workers.

   By implementing these recommendations, cement industries can reduce the risk of hazards, injuries, and illnesses, creating a safer and healthier work environment for their workers.

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APPENDICES

APPENDIX I: BUDGET

The total budget of the study is set to be K1, 925

ITEMS	QUANTITY	PRICE PER UNIT (ZMK)	TOTAL PRICE (ZMK)
Ethics committee approval	1	250	250
Pens	8	3	24
Printing		1	512
Binding		-	130
Realms of paper	1	90	90
Internet data bundles	-	-	350
Food	-	-	200
Contingencies (10% of total)	-	-	156
Total			1712

Table 1.0: Research budget

Budget justification

There was significant need for ethical approval for this research to be conducted at a cost of K250. Printing of the data collection sheets costed k1 each for 512 files which brought the total amount to K512. Hence 1 ream of plain papers was needed each costing K90 for printing of the same. 8 pens were needed for entering information into the collection sheets. For literature search and other online related needs, 35 gigabits of data bundles were required of which 1 gigabit was bought at an amount of K10 bringing the total to K350. K130 was needed for binding of the research report and a total of k200 was required to purchase foodstuffs during the process of carrying out the data collection as well as analysing it.

4.2 APPENDIX II: WORK PLAN

ACTIVITY	SEPTEMBER	FEBRUARY	MARCH	APRIL	MAY
Submission of proposal to ethics					
Data collection					
Data analysis					
Report writing					
Final report submission					

Table 2.0: Research worklan

APPENDIX III: INFORMATION SHEET

Dear participant,

I, Chipo Lungu, a Public Health student at the University of Lusaka, School of Health Sciences in partial fulfilment of the programme of study. In order to advance the body of knowledge and provide health awareness, students are expected to do research in any area of public health.

Research Title: Effects of occupational health hazards and injuries on workers at Chilanga cement

The main aim of this study is to establish the effects of occupational health hazard and injuries on workers at Chilanga cement. The information obtained from this study will be of beneficial use to different concerned stakeholders, researchers, policy makers to mention but a few. The collected data will help the above few mentioned stakeholders in finding ways to inform the development of more effective strategies for improving workplace safety for workers at Chilanga Cement. A data entry will also be used to collect the information. Contact information such as name and phone number(s) will not be entered because it is not necessary. There will be virtually no danger associated with the study, which means that none of the participants could get hurt. The study will rigorously maintain the confidentiality of all information collected.

Supposing you do not want to participate in this study, you will not face any consequences because your participation is voluntarily. You will also not face any consequences if you wish to withdraw from the study for any reasons, you can do so at any time. For any clarifications, questions and concerns, **you are free to contact me as well as any of the contact details stipulated below:**

Researcher: Chipo Lungu

Tel +260 970 663 494

Supervisor: Mr. Aniset Kamanga

Tel +260 977 305 805

Thank you for considering participating in this study.

APPENDIX IV: INFORMED CONSENT FORM

By signing this, I certify that I am aware of the nature, goal, and scope of the study. I am also aware that any information provided by the family and our personal information will be kept private, and that there will be no repercussions if I chose to withdraw at any time. I've had plenty of time to offer clarifications, ask questions, and voice any concerns that could be relevant. I hereby declare that I am willingly taking part in this study.

Signature (Participant)...……. Date…….

Witness…….....Date…….....

Signature (Researcher)……...……...Data……

Persons to contact for anything:

Miss. Lungu Chipo, University of Lusaka, school of Health Sciences. Mobile phone number; +260 970 663 494. Email: leelungu247@gmail.com

Mr. Aniset Kamanga, University of Lusaka, School of Health Sciences, Lusaka, Zambia. Mobile Phone; +260 977 305 805. Email: anisetk@zambia.co.zm

APPENDIX V: SEMI-STRUCTURED QUESTIONNAIRE

Research title: Effects of Occupational Health Hazards and Injuries on Workers at Chilanga Cement

Participants

Code……

Please take a moment to respond to the following questions by either checking the box next to each response or by filling in the blanks. Please respond to each query.

(Fill in the blanks below and tick accordingly).

SECTION A: SOCIAL DEMOGRAPHIC DETAILS

1. Gender

   Male [ ] Female [ ]

2. Age

   18 to 25 [ ] 26 to 40 [ ] over 40 [ ]

3. Marital Status

   [ ] Single [ ] married [ ] Divorced [ ] Widowed

4. Family size

   1-2 [ ] 3-5 [ ] 6-8 [ ] More than 8 [ ]

5. Head of household? [ ] Yes [ ] No

6. Bread winner? [ ] Yes [ ] No

7. How long were you in employment?

   Up to 1 year [ ] 2-5yrs [ ] 6-10yrs [ ] [ ] More than 10yrs [ ]

8. What is the highest level of education?

   Primary or less [ ] Secondary [ ] Tertiary [ ]

SECTION B: WORKPLACE INJURIES

1. What type of accident occurred?

Fatal [ ] Non-Fatal [ ]

2. What kind of injury did you suffer?

Head injury [ ] Brain Injury [ ]

Spinal code injury [ ] Cuts / Laceration [ ]

Abrasion [ ] Muscle strain [ ]

Fracture [ ] Dislocation [ ]

Inhaling toxic fumes [ ] Burns [ ] Multiple Injuries [ ]

3. Which body part was affected when you were injured?

Head [ ] Hands [ ] Stomach [ ] Lungs [ ] Waist [ ]

Legs [ ] Chest [ ] Multiple parts [ ]

4. How long have you been living with this injury?

Less than 2 years [ ] 3-4 years [ ] 5-10 years [ ] more than 10 years [ ]

5. Do you think your workplace has adequate safety structures in place?

Yes [ ] No [ ] Fairly [ ]

SECTION C: IMPACTS OF INJURIES ON LIVELIHOODS

1. What was the major outcome of the injury you suffered?

Chronic illness [ ] Increased hospital costs [ ] Inadequate income [ ] Decreased productivity [ ] No impact [ ]

2. Did the relevant body compensate you?

Yes [ ] No [ ]

3. If yes was the compensation package enough?

Yes [ ] No [ ]

4. How has your life been affected by the injury/loss of employment?

Difficult [ ] Better [ ] Still the same [ ]

5. Do you receive any external support?

Yes [ ] No [ ]

6. Do you think our labour laws are protective enough?

Yes [ ] No [ ] Fair [ ]

7. What do you think; an employee could avoid most of the occupational accidents?

Yes [ ] No [ ]

8. What do you think; its the government responsibility to protect its citizens against occupational accidents and injuries?

Yes [ ] No [ ]

Thank you so much for taking part in this study.

NATIONAL HEALTH RESEARCH AUTHORITY
Lot No. 18961/M, off Kasama Road, Chalala, P.O. Box 30075, LUSAKA
Tell: +260211 250309 | Email: znhrasec@nhra.org.zm | www.nhra.org.zm

Ref No: NHRA00010/22/02/2023 **Date: 22nd February, 2023**

The Principal Investigator,
Chipo Lungu,
University of Lusaka,
Lusaka, Zambia.

Dear Ms. Lungu,

Re: Request for Ethical Clearance and Authority to Conduct Research

The National Health Research Authority is in receipt of your request for ethical clearance and authority to conduct research titled **"Occupational Health Hazards and Injuries at Chilanga Cement."**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

NATIONAL HEALTH RESEARCH AUTHORITY

Ms. Sandra Chilengi-Sakala,
ACTING DIRECTOR/CHIEF EXECUTIVE OFFICER

SCHOOL OF MEDICINE AND HEALTH SCIENCES LEOPARDS HILL CAMPUS
Plot No. 37413, Off Alick Nkhata Mass Media. P. O Box 36711, Lusaka.
Phone: +260211258505, 258409 Fax +260211233409; Cell +260976075850,961917862,
E-mail:unilus@zamnet.zm,ictar@zamnet.zm

SCHOOL OF MEDICINE AND HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

Ref no: IORG0010092-2023/011

Date: 15th DECEMBER, 2022

LUNGU CHIPO - BSP19115379

Re: RESEARCH TITLE: EFFECTS OF OCCUPATIONAL HEALTH HAZARDS AND INJURIES ON WORKERS AT CHILANGA CEMENT

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS Research ethics committee
2. Approval from the Lusaka District health Management or equivalent health authorities should be sought.
3. The study tools should be added.
4. An informed consent form should be attached and filled by all study participants (If dealing with primary data)
5. The risks and benefits should be included in the consent form.
6. Ensure before commencement that approval is sought from ZNHRA

Congratulations and the committee wishes you success in your work.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean
University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.

SCHOOL OF MEDICINE AND HEALTH SCIENCES LEOPARDS HILL CAMPUS

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E-mail:unilus@zamnet.zm,ictar@zamnet.zm

Date: 15th DECEMBER, 2022

……

……..

……..

PERMISSION FOR **LUNGU CHIPO - BSP19115379** TO CONDUCT A RESEARCH STUDY AT YOUR FACILITY/ INSTITUTION/ORGANIZATION

Reference is made to the above subject matter

The University of Lusaka, School of Medicine and Health Sciences here by requests for permission for **LUNGU CHIPO** Public Health Student to conduct research at your facility/ institution/ organization, entitled**; EFFECTS OF OCCUPATIONAL HEALTH HAZARDS AND INJURIES ON WORKERS AT CHILANGA CEMENT.** The research is in partial fulfillment of the requirements for the degree of Bachelor of Science Public Health. This is purely for academic purposes and information gained in such a way will not be used in the public domain without prior authorization from the institutions/ organizations involved.

The research topic has been cleared by the University of Lusaka, School of Medicine and Health Sciences Research Ethics Committee as per the attached copy. Data collection is expected to be done from **1st January, 2023 to 31st March, 2023**.

The University of Lusaka avails itself of this opportunity to review to your office the assurances of its highest considerations and looks forward to your timely and favorable response.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.