Effects of Occupational Health Interventions on Health-Related Quality of Life of Industrial Workers in Oyo State, Southwest, Nigeria

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Certification

This is to certify that Adekemi Agnes ONI with Matriculation Number LCU/PG/001873 carried out this research work titled 'Effects of Occupational Health Interventions on Health-Related Quality of Life of Industrial Workers in Oyo State Southwest Nigeria' in the Department of Public Health, Faculty of Basic Medical and Health Sciences, Lead City University, Ibadan, Oyo State, for the award of Doctor of Philosophy Degree (PhD) in Public Health and that this has not been previously submitted.

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Dedication

This research is dedicated to God Almighty whose wisdom, grace, guidance and unwavering love made this work possible.

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Abstract

Occupational hazards and work-related diseases pose significant public health challenges, contributing to high morbidity and mortality rates globally. In Nigeria, industrial workers face heightened risks due to inadequate work environments and insufficient emphasis on health and safety. This study investigates the effects of occupational health interventions on the health-related quality of life (HRQoL) of industrial workers in Oyo State, Southwest Nigeria and addresses the gap in understanding how targeted interventions such as safety training, ergonomic programs, and behavioral health initiatives can mitigate these risks and improve workers' overall well-being. The study employed a quasi-experimental design, utilizing a mixed-methods approach to collect both quantitative and qualitative data. A total of 212 industrial workers were selected through a multistage random sampling technique, divided into intervention and control groups. The intervention group participated in a three-month occupational health program, which included safety training, ergonomic adjustments, and behavioral health sessions, while the control group continued with standard workplace practices. Data were gathered using the WHOQOL-BREF questionnaire to assess HRQoL across four domains: physical health, psychological health, social relationships, and environmental health. Statistical analyses, including Pearson correlation and independent t-tests, were performed using SPSS version 23 to evaluate the impact of the interventions. Key findings revealed significant improvements in HRQoL among workers in the intervention group. Post-intervention, these workers reported higher scores in all WHOQOL-BREF domains compared to the control group, with notable enhancements in physical health (reduced musculoskeletal disorders) and psychological well-being (lower stress levels). The prevalence of occupational injuries, such as cuts, wounds, and biological hazards, decreased significantly in the intervention group, underscoring the effectiveness of the implemented programs. For instance, only 19% of intervention group workers reported biological hazards post-intervention, compared to 35% pre-intervention. Additionally, the study identified managerial commitment and comprehensive safety culture as critical factors influencing the success of these interventions. The results align with the Health Belief Model (HBM), which posits that workers' awareness on perceived severity, perceived susceptibility and perceived benefits of occupational hazards drive their adoption of preventive measures. The study also highlighted perceived barriers to effective intervention implementation, including inadequate resources and communication gaps, which must be addressed to optimize outcomes. These findings contribute to the growing body of evidence supporting the integration of occupational health programs into industrial settings to enhance worker safety and productivity. In conclusion, this study demonstrates that occupational health interventions significantly improve the HRQoL of industrial workers by reducing hazard exposure and fostering healthier work environments. The research underscores the need for policy reforms and organizational commitment to sustain these interventions. Recommendations include regular safety training, ergonomic workplace redesign, and the establishment of robust safety communication channels. By prioritizing occupational health, industries in Nigeria and similar contexts can achieve safer workplaces, higher productivity, and improved quality of life for their workers.

Keywords: Industrial Workers, Occupational Hazards, Occupational Interventions
Word Count: 458

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List of Acronyms

Abbreviation	Meaning
CI	Confidence Interval
EHO	Environmental Health Officer
FCT	Federal Capital Territoty
FMOH	Federal Ministry of Health
HBM	Health Belief Model
HRQOL	Health-Related Quality of Life
ILO	International Labour Organization
IOI	Incidence of Occupational Injuries
NCDC	Nigeria Centre for Disease Control
NGO	Non-Governmental Organization
OHI	Occupational Health Interventions
OHS	Occupational Health and Safety
OHSMS	Occupational Health and Safety Management System
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
QOL	Quality of Life
SPSS	Statistical Package for the Social Sciences
UCH	University College Hospital
WHO	World Heath Organization
WHOQOL-BREF	World Health Organization Quality of Life- Brief Version

Chapter One

Introduction

1.1 Background to the Study

Occupational hazards and diseases have been identified as a public health challenge because of their major contribution to the high morbidity and mortality rate[1]. Globally, about 2.8 million people were reported dead at work from an occupational accident and work-related disease annually, of which about 2.4 million deaths were disease related. An additional 374 million workers suffered non-fatal occupational accidents, which significantly contributes to absenteeism and health issues, including musculoskeletal diseases and mental disorders[2]. This indicates that work-related diseases are the leading cause of workplace mortality, resulting in approximately six times more deaths than occupational accidents, hence more focus not only on occupational injuries but also on work-related diseases[3]. As one of the most populous countries and the largest economy in Africa, Nigeria also grapples with the significant burden of occupational accidents[3].

In Nigeria, occupational accidents frequently occur because of health hazards stemming from inadequate work environments and conditions, especially in organizations that place a lower emphasis on health and safety[4]. A Research on occupational hazards among cement factory workers documented more than three thousand injuries over a decade, with a fatality rate of 2.2%[2]. Another study also revealed that occupational accidents negatively affect workers' health and performance[5]. The significance of occupational health is now acknowledged as a crucial factor affecting individuals' quality of life[6]. Occupational health encompasses various components, including the maintenance and promotion of workers' health, enhancement of the working environment, and the development of a culture of industrial health and safety. In

other words, it addresses all facets of health and safety in the place of work with a strong emphasis on the prevention of occupational hazards and overall improvement in organisational productivity and workers' health related quality of life[6].

Health related Quality of life is defined as " an individual's view of their place in life within the framework of their environment's culture and values, as well as in relation to their aims, expectations and concerns" The health-related quality of life (HRQOL) is related to physical, psychological and social conditions of individuals or groups[7].

Promoting occupational health in a workplace creates a safe and healthy working environment, increases self-confidence, job satisfaction, health protection skills and decreases stress[8]. Occupational health was also reported to be associated with increased productivity and overall quality of life while decreasing work absenteeism, health expenditures, penalties and litigations.

In order to reduce the incidence of injuries and improvement in overall quality of life of industrial workers, different occupational health interventions have been demonstrated by many studies. These interventions include work redesign, safety trainings, ergonomic programmes, behavioural health programmes, introduction of legislation, workplace inspection, and health campaigns[9]. A study that assessed the effect of introduction of legislation, an occupational health intervention at workplace, revealed moderately strong evidence that occupation health and safety programmes significantly reduce the incidence of injuries and fatalities[10].

In a Cochrane collaboration review on the effect of safety inspections on the incidence of occupational diseases and injuries revealed declination in the occurrence of injuries in the long term but not short term[11]. Some other studies have also reported no effect. A recent Cochrane review on interventions aimed at reducing injuries among construction workers found that regulations alone are insufficient for decreasing both non-fatal and fatal injuries[12]. This indicates that despite the introduction of occupational health interventions, industrial workers still experienced occupational accidents and consequently affecting their health-related quality of life.

1.2 Statement of the Problem

Occupational injuries have been recognized as one of the public health challenges impacting industrial workers and have been associated with increasing morbidity and mortality rate[3]. The International Labour Organisation (ILO) reported over 2.6 million deaths from an occupational accident and work-related disease annually, of which about 2.3 million are attributed to work-related disease[13]. Studies conducted in Nigeria have also reported high incidence of occupational accidents among the industrial workers. A study conducted among cement factory workers in Nigeria reported about 3000 occupational injuries within a 10 year-period with an associated mortality rate of 2.2%[5]. Another industry-based study conducted among cement factory workers showed higher incidence rate of occupational injuries[2]. These occupational injuries are a major contributor to work absenteeism, and morbidities such as musculoskeletal diseases and mental disorder[14]. Some studies have also reported a poor health-related quality of life among industrial workers who are exposed to occupational injuries. A study conducted on the effect of occupational hazard on workers' performance made it known that occupational accidents impact negatively on the health and

overall performance of workers[5]. A descriptive study investigating the factors influencing health-related quality of life among industrial workers indicated that extended working hours and excessive workload conditions that may lead to occupational injuries considerably affect all aspects of health-related quality of life[15].

Another study investigating the factors that influence health-related quality of life showed that occupational stress and injuries adversely affect the quality of life for workers[15]. To reduce the rate of occupational injuries, many occupational health interventions have been implemented. These include safety training, campaigns, legislations etc. Even though some of these interventions have been effective in some studies, many surveys still report insignificant or no reduction in occupational hazards even with the introduction of health interventions[10,12].

1.3 Justification of the Study

Industrial workers are usually at risk of occupational injuries due to the nature work activities of most industries. Currently, the incidence of occupational injuries is becoming alarming with an associated significant reduction in overall health qaulity and organisation productivity. To lower the incidence rate, particularly among high-risk industrial workers, it is crucial to implement systematic and regular monitoring of occupational injury rates and trends. This approach aims to address this public health challenge effectively. Hence, this study will assess the incidence of occupational health outcomes among the industrial workers in southwest Nigeria. Health-related quality of life is an important factor that have been shown to predict organisational productivity[5]. Industrial workers who had good quality of

life will be able to work more efficiently and adhere strictly to safety regulations thereby contributing to the growth and development of an organisation.

In Nigeria, there are few studies that have focused on wellness-related quality of life among industrial workers. Hence, this research will assess the wellness-related quality of life among the industrial workers in southwest. To reduce the occupatioanl injuries and improve the overall quality of life among industrial workers, different occupational health interventions have been studied and surprisingly, only few have reported a significant reduction in the incident rate of occupational injuries among the industrial workers. Some studies only showed a moderate impact while others reported impact only on long-term[10] Hence, this study evaluated the other forms of occupational health interventions.

1.4 Aim and Objectives of the Study

The aim of this study is to evaluate the effects of occupational health interventions on the quality of life of industrial workers in Oyo State, Southwest Nigeria.

The specific objectives of the research were to:

i. identify the prevalence of self reported occupational injuries among industrial workers in both control and intervention groups
ii. assess the self reported health-related quality of life among industrial workers in both control and intervention groups
iii. evaluate the effect of occupational health interventions on the prevalence of self reported occupational injuries in the intervention group and control group
iv. evaluate the effect of workplace health interventions on the quality of life related to health in the intervention group.

1.5 Research Questions

1. What is the rate of self reported workplace injuries among industrial workers in the control and intervention groups?
2. What is the health-related quality of life among industrial workers in the control and intervention groups?
3. Is there a significant change in the prevalence of self reported occupational injuries in the intervention group after the occupational health intervention?
4. Is there a notable improvement in the quality of life related to health in the intervention group after the occupational health intervention?

1.6 Hypotheses

Ho1: There will be no significant influence of workplace health interventions on the incidence of injury and health-related quality of life of the industrial workers

Ho2: No significant difference exists in the average health-related quality of life between industrial workers participating in health and safety training (intervention group) and those who are not (control group).

Ho3: No significant difference exists in the average health-related quality of life between industrial workers enrolled in ergonomic programs (intervention group) and those who are not (control group).

Ho4: No significant difference exists in the average health-related quality of life between industrial workers participating in behavioral health programs (intervention group) and those who are not (control group).

1.7 Significance of the Study

Information on occupational injuries and diseases would be essential to design an effective prevention strategy on Occupational Health and Safety (OHS). This survey provided information on hazardous sectors and occupations which require prioritization for occupational health interventions such as formulating effective legislation, policies and programmes as well monitoring the implementation of the formulated policies. This enabled policy makers set the right target towards reducing occupational injuries and diseases, which in turn may contribute to improved workers' wellbeing, the economic growth and development of the organisations.

1.8 Scope of the Study

The current research is restricted to industries in Oyo State, Southwest, Nigeria. Specifically, all staff including the managers, supervisors, and the labourers participated in this survey. The study covered all the departments of the industries. Hence, respondents of this study cut across all the units of the industries to ensure that the sampled opinion is representative enough for unbiased results and findings. However, only the employees of the industry at the time of the researchers' visitation were included as the respondents of this study. The study specifically assessed the impact of occupational health interventions on occupational health outcomes and workers' wellness-related quality of life. In addition, the concept of employees QOL was examined using the WHOQOL. Hence in this study the scope was limited to HRQOL, occupational health outcomes, and possible occupational health interventions to improve HRQOL of employee in an industrial setting. The choice of these industrial workers is based on the increasing incidence rate of occupational injuries observed among this

population. Similarly, industries have an appreciable number of employees who constituted respondents in this study.

1.9 Limitation of the Study

The limitation of this study is the sample size and area of coverage. The sample comprised only two hundred and twelve (212) respondents, which form the study sample; selected because of the variables of concern which are: occupational health interventions and health-related quality of life. The sample size and restricted area of study was due to the constraints of time and finance.also,the study relied on self-reported information from respondents,which may be subject to recall bias or inaccurate reporting. This could alter the objectivity of the responses on occupational health practices and quality of life. Therefore, generalisability of the findings of such an experimental study like this, may pose some limitation, since only industrial workers were investigated in the study. Nevertheless, the study has in no doubt contributed positively to the existing literature and empirical research findings on industrial workers' health-related quality of life.

1.10 Operational Definition of Terms

- Occupational Health Interventions refer to the structured programs, policies, and practices implemented within industrial workplaces to prevent work-related injuries and illnesses, promote the physical and mental well-being of workers, and ensure a safe and healthy working environment.
- Health-Related Quality of Life (HRQoL) refers to the overall well-being of industrial workers as it relates to their physical health, psychological state, level of independence, social relationships, and relationship to salient features of their environment. In this

study, it is assessed using standardized instruments (such as WHOQOL-BREF), and it represents the subjective evaluation of how health status influences their quality of life.

- Industrial Workers are defined in this research as individuals employed in formal industrial settings within Oyo State, Southwest Nigeria.
- Effects in the context of this study are the observable or measurable changes in the health-related quality of life of industrial workers that can be attributed to occupational health interventions. This may be measured by comparing HRQoL scores before and after the implementation of interventions.

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Chapter Two

Literature Review

2.1 Conceptual Review

2.1.1 Occupational Health Safety and Culture

The industrial sector is a key revenue generator in many developed countries. Along with the economic benefits it provides, the construction industry often faces significant challenges due to its strong link to workplace accidents[1]. Assessment of workplace safety incidents involving cement manufacturing workers recorded 3,200 wounds over a span of 10 years, with a fatality rate of 2.2%[2]. Another study indicated that occupational accidents adversely affect workers' health and performance, the significance of safe workplaces is increasingly acknowledged as a crucial factor influencing safety behavior, quality of life, and overall individual performance[3].

Safety culture is a vital component of an organization's overall culture, and substantial evidence has shown a direct connection to employees' productivity and performance[5]. Consequently, developing an effective organizational safety culture can enhance both individual and organizational performance and productivity. In defining the organisational safety culture, the International Labour Organisation (ILO) described it as the maintenance and promotion of employee's health, and improvement of the working environment[6]. In other words, safety culture can be described as the shared attitudes, behaviors, beliefs, and skills of employees regarding safety, along with the effectiveness and competence of the organization's health and safety management systems while others have described safety culture based on different components[7].

The Human Engineering for Health and Safety Executives identified key elements of organizational safety culture as leadership commitment, two-way communication, employee participation, and a culture of learning[8]. Evidence has linked an improved organizational safety culture to enhanced safety practices, better compliance with safety regulations and standards, and a reduction in workplace incidents. However, organisational safety culture is considered an important factor to understand and predict employee's performance and behaviour safety hazard recognition and improved attitude towards safety response[9].

The roots of occupational health and safety issues can be traced back to the Industrial Revolution, which was marked by advancements like cotton spinning, textiles, steam engines, and iron manufacturing, this resulted in the emergence of cotton mills, semi-automated factories and iron industries, which became the leading 'sectors' which established the base for Industrial Revolution[10]. Although the Industrial revolution contributed to economic development, it had negative impact on the health and safety, working in these factories and industries[10]. There are three distinct 'ages' in the evolution of occupational health and safety, the first age of safety arose in response to major transformations in agricultural, industrial, and manufacturing practices that began with the Industrial Revolution.[11]. This period mainly focused on developing engineering and technological solutions to tackle a new range of workplace hazards[11].

Fundamentally, authors try to explain what occupational health and safety management should be, an article offers a collection of safety management strategies that cover safety principles, overseeing safety performance, evaluating safety effectiveness, encouraging safe practices, and additional safety methods[12]. Another article employs a technical perspective

for safety management, concentrating on detailing particular hazards (including acceleration, falls, falling objects, pressure risks, thermal hazards, electrical dangers, fires, and toxic substances) and the technical strategies for their mitigation[13]. The discussion of safety management was structured into five sections: the promotion of safety, management and safety practices, hazard control technology, human factors, and professional domains[14].

These varied workplace wellness guidelines are certainly not simplistic in their analysis the individual components extensively reference occupational health and safety research and case studies to illustrate and clarify essential concepts. An article employs a sociotechnical systems perspective in their primarily psychological approach of occupational health and safety management[15]. Another article defines organizational wellbeing as "actions by workplaces to enhance the health of workers, customers, and communities," aiming to integrate this with a risk management approach for preventing hazards and harm[16]. Similarly, a general risk management framework was employed, proposing a best practice approach as a foundation for organizing and managing occupational health and safety[17].

However, the limitations of a purely technological approach became apparent, leading to a renewed focus on the interaction between people and technology. Consequently, the second age of safety emphasized human factors more prominently[16]. Research began to uncover the crucial role of leadership and structural factors in influencing occupational health and safety outcomes. As a result, an article highlights that in the 3rd age of safety, the emphasis has shifted to the implementation of OHS management systems. Workplace wellbeing is a cross-disciplinary field that engages with other areas such as occupational medicine, industrial hygiene, public health, safety engineering, ergonomics, toxicology, epidemiology, health

physics, environmental health, organisation relations, public policy, industrial sociology, social law, labour law, and occupational health psychology[18]. It is an interdisciplinary area that encompasses topics related to law, medicine, technology, economics, and sector-specific concerns.

This method highlights that the area of occupational safety has expanded to include both safety and health aspects. As a result, managers, technical staff, and engineers in this field need to be well-versed in health and safety, and be ready to manage a corporate program that covers both areas of responsibility[19]. Safety and well-being, while interconnected, are distinct concepts. One perspective is that safety focuses on situations that can lead to injuries, whereas health addresses conditions that can cause illness[20]. Another perspective is that safety pertains to hazards that pose immediate risks to humans due to sudden, severe circumstances, while health addresses negative effects from exposure to toxic or otherwise harmful hazards. Both perspectives accurately illustrate the distinction between safety and health. However, the boundary between these two concepts is not always clearly defined[21].

With swift advancements, the industry's technological evolution has also undergone the Industrial "1.0" mechanization phase. During this period, the invention and use of steam engine technology introduced a new approach to large-scale mechanized production, replacing traditional handicraft workshops and paving the way for the Industrial "2.0" era. In the electrification era, the invention and use of electricity introduced a new approach to electric-powered mass production[22]. Subsequently, the industry transitioned into the Industrial "3.0" automation era. The new automated production techniques in the manufacturing sector have replaced the earlier methods that relied heavily on manual labor.

Each upgrade in industrial eras has been driven by technological advancements. In the Fourth Industrial Revolution, economies of scale have dismantled barriers, achieving new heights. Interactions between people and work are becoming increasingly varied and dependent on network-related technologies[22]. We refer to the digitalization of the current industry as "Industry 4.0." This phase of production marks the rise of intelligent technology grounded in Cyber-Physical Systems (CPS)[22].

This production technology facilitated the transition to the "Industry 4.0" era of intelligence, introducing new production methods to the economic system and replacing traditional practices[23]. Therefore, the advent of "Industry 4.0" is poised to significantly impact traditional business models, making the evolution of today's business practices inevitable. Several studies have explored multi-stakeholder interests and expectations regarding the implementation of circular economy initiatives from an organizational perspective[23]. The transformation to a circular economy in Industry 4.0 necessitates a deeper understanding of the interests and expectations of governments, suppliers, and international organizations regarding the Internet of Things (IoT)[24]. In the current advanced commercial and industrial landscape, the importance of the healthcare supply chain during the COVID-19 pandemic is clearly highlighted in forecasting predictions. The ongoing healthcare supply chain is crucial for reducing COVID-19 cases. The findings indicate that sub-Saharan African countries must enhance their efforts to control coronavirus cases by effectively improving their healthcare logistics supply chains[25].

The expectation that workers can be productive without harm from wealth-generating activities reflects a mature, responsible, and equitable industry. Research on Occupational

Health and Safety (OHS) management has often concentrated in specific areas over time, such as policy and practice, individual characteristics and social relationships, incidents of injuries and accidents, and aspects of management control and industrial relations[25]. The Occupational Safety and Health Act of 1970 (OSHA) "guarantees workers the right to a safe and healthful workplace". This legal right should be enjoyed by all workers, union and non-union, alike. Clearly, trade unions should advocate for employers to fulfill their responsibilities under Section 5(a)(i) of the Act, which mandates providing each workers with a work environment that is free from recognized hazards that may cause serious injury[25].

Unions have historically taken strong action to guarantee that their members have a healthy, hazard-free work environment. Occupational health addresses all facets of health and safety in the workplace, emphasizing the primary prevention of hazards[26]. Workers' health is influenced by various determinants, including workplace risk factors that can lead to cancers, accidents, musculoskeletal disorders, respiratory illnesses, hearing loss, circulatory diseases, stress-related conditions, communicable diseases and more[27].

Occupational health and safety is a comprehensive discipline that includes various specialized fields. It addresses the social, mental, and physical well-being of workers, focusing on the "whole person"[26]. It is a discipline focused on preserving and protecting human resources in the workplace. Occupational health involves adapting work to the individual and ensuring that each person is suited to their job. Occupational health and safety is one of the most important aspects of human concern. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical,

mental and social well-being of workers in all occupations[28]. Occupational health and safety have the following components.

- Fostering and upholding the highest standards of physical, mental, and social health for workers in all areas.
- Preventing health issues among workers that arise from their working conditions.
- The placement and maintenance of a worker in an occupational environment suited to their physiological and psychological needs.
- Safeguarding workers in their jobs from health risks posed by unfavorable factors.

The problem of occupational health and safety, as a global concern, is now evolving in a new direction. The primary factors contributing to this uniqueness appear to stem from the rapid industrial and agricultural development occurring in developing countries, along with the emergence of new products and processes from these regions[29]. Additionally, the relentless pursuit of technical advancement in these countries has led to the importation of machinery and equipment, impacting not only industrial production but also services and commerce, this shift has been linked to changes in the labour force structure, including an increase in female employment. As to be expected, the health problems would also change. This obviously would be a new challenge for occupational health and safety practice in most of the African countries because the tool to deal with such a problems and the expertise is not yet advanced when compared to the developed countries[30].

However, an article eloquently demonstrates that prevailing social structures and organisational arrangements are key factors in determining whether new technologies are

adopted into practice[31]. Thus, the effective deployment of technological solutions to the industry's OHS problems may be greatly enhanced by the adoption of a socio-organisational-technical systems theoretical perspective to evaluate and optimize the extent to which there exists a good 'fit' between people, the tasks they perform and the new technology[31]. It has been argued that OHS problems in supply chains and production networks stem from three key factors, namely: (1) economic and reward pressures that become successively greater towards the bottom of supply chains (2) disorganisation due to the engagement of many different (often small) businesses and (3) the use of workers, whose employment is often precarious, working within complex and fragmented production arrangements[32]. Conversely, an overly stressed worker may be more likely to overlook safety precautions increasing the risk of accidents. In this context, stress becomes a safety concern, since professionals in this evolving field are often responsible for both safety and health, it's crucial that they possess a comprehensive academic background that encompasses both areas[33].

Each year, an estimated 2 million people worldwide die from work-related injuries and diseases, surpassing the global annual death toll from malaria. Additionally, around 160 million new cases of work-related diseases are reported annually, including respiratory and cardiovascular conditions, cancer, hearing loss, musculoskeletal and reproductive disorders, as well as neurological illnesses[34]. However, technological solutions may offer the greatest potential for eliminating OHS hazards or minimizing risks at their source. There is broad consensus that technological approaches to managing OHS risks—those that either eliminate a hazard or create physical barriers between the hazard and individuals—are more effective than controls that depend on worker behavior, such as administrative measures or personal protective equipment[35].

Most workers receive minimal information about the substances or compounds they handle and the risks associated with exposure to these agents. Containers and packages are usually labelled poorly, identifying the product only by trade name or codes. Comprehensive hazard and toxicity information is rarely provided. The Occupational Safety and Health Department has to prepare “right to know” educational materials to help workers in their jobs, ensuring that employers with whom the union has a contractual agreement are providing members with a safe and healthy work environment[36].

However, as many as half of the workers in developed nations consider their work to be "mentally taxing." Over the last ten years, psychological stress caused by tight deadlines, rapid work environments, and the threat of job loss has become more widespread. Other factors that contribute to negative psychological impacts include positions that involve major responsibility for human or financial consequences, repetitive tasks, and jobs requiring sustained attention[37]. Other factors include shift work, occupations involving the risk of violence like police or correctional facility jobs and roles that are isolated or solitary in nature. Excessive psychological stress has been connected to issues with sleep, burnout conditions, feelings of anxiety, and depressive disorders[38]. Additionally, epidemiological studies have shown an increased risk of cardiovascular conditions, especially coronary heart disease and high blood pressure.

In 2005, advocates of the idea that safety is good for business placed an advertisement in a widely circulated U.S. business magazine, highlighting the financial benefits of prioritizing safety for companies[39]. While it is attractive for the safety sector to assert that "safety is good

business," others remain skeptical from an economic standpoint about the direct link between occupational safety performance data and operational outcomes[40].

There should be no denying that showing a relationship between occupational safety performance and operating performance has always been a complicated proposition with very real methodological issues[41]. Even so, occupational safety specialists need to go beyond linking of occupational safety performance to regulatory compliance performance by linking safety performance to operating performance[41]. The exclusive use of customary budget approaches (i.e., regulatory, moral), is a major factor that explains the exclusion of safety considerations during decision making in reactive organisations, during a management turnover, or during economic down-turns when internal budget requests become increasingly competitive and focus on traditionally value-added functions[42].

Early research by psychologists and sociologists explored individual traits and social factors, using disciplinary frameworks to develop concepts and theoretical insights into occupational health and safety (OHS)[43]. These findings were further enhanced by the results of workplace surveys by industrial relations specialists that drew attention to the importance of legislation and innovative non-regulatory as well as regulatory[44]. The prescriptive literature now predominates, focusing on tools, techniques and practices rather than on defining concepts or systematically engaging with comprehensive empirical studies that could inform theoretical debates[45]. The result of this historical progression has been a pause in more comprehensive, interdisciplinary research that integrates theoretical questions with real-world investigation.

Reports from France, the U.S., and China indicate that men experience higher rates of work-related injuries compared to women[46]. The Ethiopian Ministry of Labour and Social Affairs

has reported that the highest proportion of work-related injuries occurred among young adult individuals, these studies emphasized that work-related injuries in young individuals were more common due to lack of experience, lack of job knowledge and knowhow than in other age groups[47]. Many workers start their careers at a tender age, frequently without receiving adequate safety training. According to research on the impact of cultural, tourism, and operational model innovations, there are notable revenue effects on brick-and-mortar stores in western China[48]. The results indicate that enhancing the cultural experience for tourists and the appeal of innovative operation models significantly affects the average income of brick-and-mortar stores. While improving consumer satisfaction can boost consumption behavior in the short term, enhancing tourism perception does not significantly impact income[49].

Koch focuses on safety culture within the construction sector, suggesting that a deeper understanding of this aspect could help address one of the industry's most serious issues workplace accidents by improving prevention efforts[50]. Koch's work contributes to the expanding collection of qualitative research on safety culture, he employed an ethnographic approach that examined key aspects such as the integration, differentiation, ambiguity and various configurations within safety cultures. The multiple configuration in the analysis spans from cultures at a carpenter's crew to constellations of national safety cultures. At the carpenter's crew Koch finds an overarching common integrative culture of pride of work, which overlaps with the differentiation of four cultures, and finds ambiguous perceptions of risk and possibilities for prevention[50]. Studies of 25 different safety cultures reveal a national pattern of both reactive and proactive safety cultures. Koch argues that future prevention efforts must align with this complex pattern to be effective[50].

A further study highlighting the importance of contextual differences among seemingly similar cultures was conducted, and Swedish and Danish construction workers were examined on a joint venture project to build a 16km road/rail link between Denmark and Sweden[51]. It was discovered that Danish workers had approximately 4 times the lost-time injury rate to their Swedish counterparts. These differences were explained in terms of: a) broader national factors, for example, Swedish workers' pay for the first day of absence off work and are provided more formal training through a structured apprenticeship programme (macro-level elements) b) organisational factors, for example, Danish worker are remunerated by a piecework system and tend to have employment linked to projects on a temporary basis (more so-level elements) and c) work group factors, for example, the continuous employment and formalised training of Swedish workers created a different attitude to work than their Danish counterparts who relied on practical on-site experiences and advice from other team members[51].

The authors show how factors at various levels interact in shaping behaviours and also, how countries that would be seen as culturally similar can experience very different outcomes in terms of lost-time injury rates and attitudes to work. Behm and Schneller applied the Loughborough Construction Accident Causality (ConAC) model and propose it as a useful organisational learning tool for construction safety research and practice[52]. They utilized the model to investigate incidents with a State Department of Transportation in the USA. Operational definitions were developed for each cause, factor and influence within the ConAC model which enhanced its reliability across each investigation. A detailed interview protocol was developed and is described so the study can be duplicated. The authors conducted semi-structured interviews with employees, witnesses, supervisors, managers and

safety engineers to determine causes, factors and influences in 27 incidents[52]. The ConAC model proved to be a useful tool to guide investigators who wish to extend their investigations beyond the identification of immediate causes (acts and conditions) and learn about the impact of upstream factors and influences (e.g. supervision, site constraints, safety culture, project management, etc.). Safety-related incidents are complex and multi-faceted. Construction organisations seeking to learn how to effectively reduce safety risks through incident investigations should view investigation as a research-based activity, using an appropriate theoretical model to identify upstream as well as immediate contributing factors. The authors demonstrate that the ConAC model can be a useful tool to support organisational learning in relation to safety[52].

For example, an article examined the implications of the growth in more flexible work practices for employee involvement in occupational health and safety[53]. The author argued that structural change associated with the decline in union density, the growth in casual and home-based work, and increases in subcontracting have all served to undermine the provision of occupational health and safety arrangements. There is a need to address these issues in the development of new and innovative regulatory and non-regulatory strategies, such as in the use of mobile representatives to represent workers' interests in these newly emerging forms of small-dispersed workplaces[53]. Whereas International Labour Organisation spotlights concern over the tendency for powerful business groups to lobby governments over the so called 'business constraints' of health and safety legislation'[54].

The use of real time positioning systems was integrated to improve safety in blind lifting and loading operations. Having carried out a case study and interviews in Hong Kong, the authors

explored the risks associated with blind lifting and loading. They developed a safety support system integrating the use of positioning systems to obtain the precise position of workers and the crane's hook[55]. The system presents real time information about the position of workers in relation to the crane hook in the loading and lifting zone. The authors applied the system in a case study construction site in Hong Kong. Interviews were conducted and site staff provided positive feedback regarding the use of the system. The authors suggest the system has the potential to prevent 'struck-by' accidents during blind lifting and loading operation of cranes. The use of positioning systems to monitor the location of workers or different objects represents an innovative use of advanced technology. The case study establishes the foundation for further development and application of positioning system technology for other safety management purposes.

An analysis of nearly 30,000 workers across 31 European countries, using the European Working Conditions Survey, reveals that migrants face higher rates of negative occupational exposures compared to native workers. Migrant workers tend to encounter high temperatures, loud noises, rapid work speeds and extended standing periods. Moreover, many of them frequently work without contracts and endure unfavorable work schedules[55]. The industries that predominantly employ migrant workers are typically those that pose the highest risks to worker health. According to the U.S. Census of Fatal Occupational Injuries immigrant workers are 15% more likely to suffer fatal injuries on the job compared to their native-born counterparts[56]. Migrant workers are less likely to have a permanent job contract than are native-born workers, and studies have shown greater reporting of poorer health to be associated with the lack of a permanent job contract[57].

Utilizing data from the 1998 Workplace Employee Relations Survey (WERS), it was found that unionised organisations with established health and safety committees had higher levels of workplace risk in terms of the reported counts of work-related injuries[58]. They conclude that the increased level of reporting is attributed to unionization and the effective functioning of health and safety committees, which serve dual roles: first, as channels for complaints and concerns about hazards and unsafe working practices and second, as a way of securing compensation for a work-related injury or illness[58]. As such, the full reporting of incidents demonstrates good risk management practice rather than, what might appear on first viewing, that highly unionised firms with operational health and safety committees are higher risk environments than their non-unionised counterparts[59].

2.1.2 Health and Safety Performance of Employees

Workers' health and safety performance involves the act of maintaining safe work place and one of the ways to achieve this is through employee's safety behaviours[60, 61]. Highly performing employees in terms of safety were able to assist organisation to achieve its objectives and set goals thus sustaining the organisation competitive advantage[70,71]. The success of any organisations is largely dependent on the performance of its workers since the performance of an organisation arises from employees who are the movers of organisational resources[72]. Safety performance is defined by two main dimension- safety compliance and safety participation[72]. In a model generated by some authors to interpret safety performance concluded that safety compliance and safety participation as the components of safety performance[73]. The safety compliance refers to following safety protocols and performing tasks in a safe and responsible manner, while the safety participation refers to "the

behaviours that might not directly enhance workplace safety, but they foster an environment that promotes it"[59].

Compliance as one of the most important components of safety performance, involved adhering strictly to the standard working procedures as well as the frequent use of personal protective equipment[74]. Safety participation involves the educating and assisting co-employees on how to prevent work related hazards and promoting health and safety programs within workplace. Safety participation has an indirect relationship to worker's safety performance unlike safety compliance that is directly associated with safety performance[74]. The DuPont Bradley curve was used to demonstrate the link between organisation culture and performance.

2.1.3 DuPont Bradley Curve

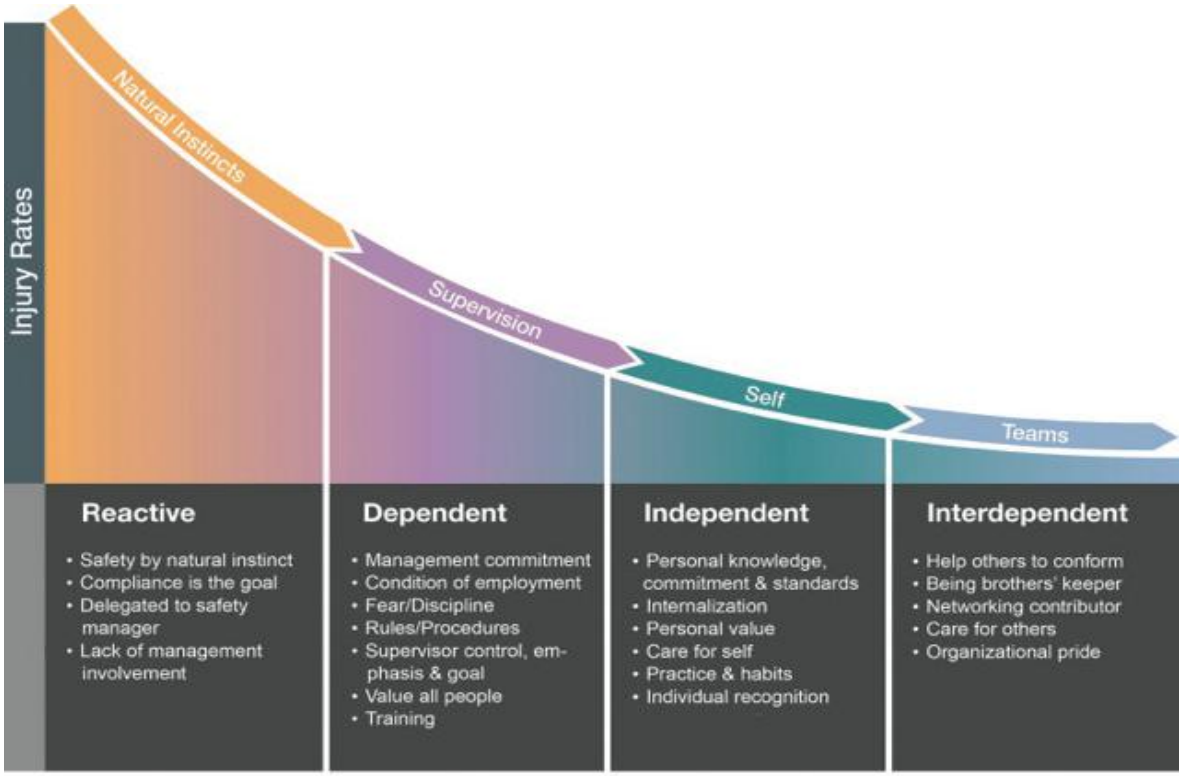

Figure 2.1: DuPont Bradley Curve[75]

The curve was designed to assist companies and their employees in understanding and fostering optimal health and safety performance and culture[75]. The Bradley Curve illustrates four stages of employees' attitudes toward safety[75]:

1. Reactive: Individuals believe safety is a matter of luck and don't take responsibility.
2. Dependent: Employees feel safety is governed by rules that must be followed.
3. Independent: Workers take personal responsibility for safety and believe their actions can make a difference.

4. Interdependent: Individuals take responsibility for both their own safety and that of others[60].

The interdependent group of employees is the most effective, as they believe that safety management is a collective responsibility. They understand that true safety improvement can only be achieved through teamwork and collaboration. A mature health and safety culture is achieved by prioritizing employees. In terms of the Bradley Curve, the focus should be on the independent and interdependent phases, where individuals take personal responsibility and work collaboratively for safety[76]. In a study, organizations that view their employees as assets for organizational development tend to perform excellently compared to their counterparts[77].

2.1.4 Relevance of Managerial Commitment to Occupational Health and Safety

It was emphasized that PMCS and employee participation are key elements of safety culture, concluding that PMCS represents the essence of safety culture[75]. Most studies acknowledge that safety culture is multi-dimensional however, the effectiveness of other safety elements, such as training, communication, and motivation, is partially reliant on the perceived level of management's commitment to safety[81].

A study identified a direct correlation between PMCS and safety compliance behavior, suggesting that PMCS serves as the most critical prerequisite for employees' safety compliance behavior[81]. Studies have similarly identified PMCS as the strongest predictor of employees' safety participation[82,83]. Management elements like empowering employees, providing training for new skills, supplying resources, motivating staff, and creating reward and incentive schemes have been shown to boost employee commitment[83].

2.1.5 Conceptualisation of Hazard

Occupational health and safety issue has been an all-time subject of research interest and discourse across diverse disciplines, ranging from Physiology, Ergonomics, Environmental sciences, Public health, Occupational medicine, Epidemiology, Engineering, Chemistry, Toxicology, Biology, Psychology, Economics, Law, even to Sociology[84]. As a multi-disciplinary subject of research, the central focus of occupational health according to the 1950 joint committee of ILO and World Health Organisation (WHO), is on primary prevention of work-induced risks and hazards[84]. Interestingly, this current study aligns strongly with the issue of prevention and management of exposure to occupational hazards using the personal protective equipment among cement and ceramic factory employees in Oyo State.

It is on the above premise that the ILO/WHO focuses occupational health perspective on the enhancement and maintenance of the highest level of health status covering several domains of health status like the physical, mental and social well-being of workers across all occupations. The literature further opined as a possibility that the purview of occupational health service should also capture workers' families[85]. This was another point the study connects social health status with family relationships among the factory employees. Other vital issues that are embedded in the occupational health include the protection and promotion of workers' health by way of preventing and controlling occupational diseases, accidents and hazardous factors associated with the workplace environment[86]. However, economically, there are multi-sectorial variations in the occupational health needs of workers across company types and sizes[86]. In line with the central and the specific objectives of the study, the following thematic issues were reviewed and they included awareness of work-

related health hazards risk factors that accentuate or minimise exposure to work hazards patterns of self-reported morbidity distribution exposure to ergonomic and psychosocial hazards as a predictor of employees' mental and social ill-health and factors that influence compliance with hazard-control use of the Personal Protective Equipment[62].

According to the occupational safety and health paradigm, hazard is best conceptualised as anything that constitutes a source of possible risk or harm. Some of the things that could constitute the source of harm include but not limited to object, condition, substance, process and even behaviour[59]. In other words, the concept embodies the pathways and conditions that constitute hazards in any work situation. Hazard is a concept associated with material, which is a measure or the likelihood of the human working with, or studying the material in question[87]. It is opined that a hazard represents a situation that has the potential to inflict harm on a person who is said to be exposed to some agents, substances or processes. From the above definition, "exposure" is a critical factor for a process, an agent and a substance to be considered as hazardous. However, hazard and risk are two different things, albeit used interchangeably by some people[59]. Risk denotes the likelihood of a hazard causing harm to an individual or group within a specific time period and set of circumstances. It is defined with respect to the effect of uncertainty on the set goals. Risk assessment strategy and protocol are used to control and manage hazards. Therefore, the usage of hazard and risk is contextualised and amenable. Within the purview of this study, the concept of hazard was suitably applied.

The sectors with the highest hazards include agriculture, construction, forestry, fishing, and manufacturing, collectively accounting for 63% of all occupational fatalities[88]. Africa, including Nigeria, holds the highest attributable fraction of work-related deaths at 7.39%,

followed by Asia and the Pacific at 7.13%, with Oceania trailing at 6.52%[88]. This sombre statistic signifies that a substantial 86.3% of the deaths were attributed to occupational diseases, while the remaining 13.7 million cases stem from occupation-related injuries[88].

The lack of comprehensive health insurance for many workers can lead to catastrophic healthcare expenses, particularly for those affected by frequent occupational health issues and permanent disability[89]. The economic and human costs of occupational injuries and illnesses, especially in the manufacturing sector, highlight the renewed demand for research into occupational hazard exposure and the health status of cement and ceramic factory employees. This resonates with the ongoing pursuit of Sustainable Development Goals (SDGs) 3 and 8, focusing on health and well-being, as well as decent work, respectively, at the global level.

Unlike traumatic injuries, occupational diseases often reveal themselves after prolonged asymptomatic "incubation" periods due to varying timeframes of hazard exposure before disease onset[90]. Cement and ceramic industries encompass a gamut of hazards ergonomic, mechanical, physical, chemical, and psychosocial. Ergonomic hazards, linked to tasks involving automated machinery and heavy lifting, can lead to Cardiovascular Diseases (CVDs) and Musculo-Skeletal Disorders (MSDs)[81]

Specifically, mechanical hazards include machinery collisions and manual load handling, while physical hazards encompass extreme temperatures, noise, and poor ventilation[91]. Exposure to chemicals in cement and ceramic industries can result in kidney diseases, tumours, and dermatitis. Psycho-social issues like job insecurity and workplace violence

contribute to anxiety, depression, and mental ill-health[92]. Additionally, the generation of hazardous substances in cement and ceramic production poses risks to both employees and host communities[92]. Extended exposure to cement dust is associated with severe health risks including liver abnormalities, pulmonary disorders, and respiratory illnesses[93]. Similar health concerns arise from prolonged contact with ceramic fibres, impacting lung functions[94]. The persistence of health challenges can necessitate incapacitation and early retirement[94].

The intricate interplay of occupational hazards and their impact on mental and social health status of employees necessitated a comprehensive sociological inquiry this study delved into the intricate landscape of occupational hazards and the ensuing health status of cement and ceramic factory employees in Oyo State, Nigeria. By comprehensively exploring the relationship between work environments, health outcomes and social dynamics this research endeavoured to untangle the complexities of safeguarding the welfare of the factory employees within a broader sociological context.

2.1.6 Awareness of Occupational Health Hazards

It can be reiterated that every occupation and industry have some hazards and health risks that the employees must contend with day in, day out. But the more important issue is whether they are aware of the hazards associated with their respective job functions. Awareness in this context has a positive implication for protective behaviour against exposure to occupational hazards. For example, a study conducted in Nigeria using a health facility and discovered that most employees were knowledgeable about hazards associated with their job functions[105]. However, it was concluded that the high level of awareness demonstrated by the respondents did not translate into the observance of health and safety

practices at the facility. It, therefore, means that the awareness of hazards was inconsistent with observance of safety practices. The gap in this study was that it failed to account for reasons behind the inconsistent relationship between high awareness of work-induced hazards and low observance of safety practices, including the use of the PPE. Besides, the study was conducted among health workers in a health care facility which was slightly different from cement and ceramic industries, though related in terms of exposure to chemical and psychosocial hazards as the subject of interest.

Furthermore, a study involving selected paint factories in Lagos State revealed a high level of hazard awareness among workers[106]. However, it was noted that less than half of the workers used personal protective devices, while many reported symptoms related to hazard exposure. This finding informs the focus of the current study, particularly regarding hazard exposure awareness and the use of personal protective equipment (PPE)[106].

Similarly, a qualitative study identified the awareness of occupational risk exposure among ceramic factory workers, revealing an adequate level of occupational hazard awareness and potential death effects among respondents. A study conducted in Menoufia Governorate, Egypt, found that many ceramic workers had a solid understanding of occupational health hazards associated with their jobs. However, there was a notable gap between this knowledge and full adherence to hazard prevention protocols[45].

Additionally, significant awareness of occupational hazards was noted among sawmill factory employees in Osun State. This finding aligns with a related community-based study involving cement production, which also discovered a high level of hazard awareness[32].

A group of authors equally documented appreciable knowledge of occupational hazard awareness among welding factory workers[107]. However, only a little less than half of the respondents used one or more types of the available protective devices. Moreover, according to the authors, those who reportedly used the protective devices were twice more likely to have been aware of the associated hazards and several times more likely to have been aware of protective devices when juxtaposed with the respondents who did not report the use of protective equipment[107]. In contrast, a study found a low level of work-induced hazard awareness among sawmill workers in Ilorin, Kwara State[108]. Similarly, another study noted a low level of hazard awareness among some welders in India.

2.1.7 Types of Occupational Hazards

Workers in various industries are confronted with a lot of hazards. Scholars have variously noted that hazards come in various degrees and magnitude, ranging from physical, mechanical, chemical, ergonomics, to psychosocial[95]. However, hazard classification from the perspective of occupational safety and health does not strictly follow any order of arrangement. The classification of hazards in this context was based on the sources that produce them. The various forms of hazards may be usually interconnected, interrelated and mutually reinforcing thereby producing some acute and sometimes chronic health afflictions, depending on the degree of exposure and other predisposing risk factors. These risk factors might include age, sex, education, tobacco addiction, alcoholism, compliance or non-compliance with controlling measures among others[81].

Usually, the technologies of cement and ceramic production operations are inherently complex, hazardous and health threatening. For example, the production process of cement

mainly involves crushing, grinding, raw meal preparation, kiln burning, packaging and other subsidiary but important activities[59]. If not properly controlled and managed, the associated hazards may impact cumulatively on the factory employees, thereby leaving behind some deleterious consequences, specifically, on their mental and social health status domains. With reference to the United States of America, an author stated that occupational injuries and illnesses significantly accounted for a major source of morbidity and mortality[96]. However, the resultant effects of exposure to hazardous working conditions are noticeable on the morbidity patterns and profiles of the workers in question.

i. Ergonomic hazard

Etymologically, ergonomics is an academic discipline focused on studying and designing the "human-machine" interface to prevent injuries and illnesses while enhancing work performance and productivity. The field attempts to ensure a compatible alignment between workers' capabilities and the assigned tasks. It is the harmonious adjustment of man with machine and work environment. As an omnibus field of study, ergonomics incorporates knowledge from various scientific fields, including physiology, biomechanics, psychology, and anthropometry. Ergonomic hazards, therefore, emanate from the discharge of workers' duties which include but not limited to keeping pace with automated machines, carrying of heavy loads, maintaining constant posture, excessive machine-induced noise, constant body vibration, meeting challenging job output, shift work, quota and performance demands[96].

Certain physical factors significantly influence ergonomics such as force, acceleration and thermal factors. Force is a sufficient causative agent in injuries when a job requires lifting. Other important ergonomic issues include work duration, repetition and constant stresses[97].

The health consequences of exposure to ergonomic hazards are quite disturbing and costly. One of the ergonomic health problems is Musculo-Skeletal Disorders (MSDs), which is often associated with manual handling of very heavy and large loads[28]. In addition, work-related repetitive activities produce ergonomic hazards coupled with prolonged standing, awkward positioning and long hours of sitting. Consequently, workers exposed to ergonomic hazards are likely to manifest leg pain, tingling, and numbness as initial symptoms, potentially leading to a disc rupture. All these are symptomatic of MSDs associated with most factory employees.

ii. Chemical hazard

As the name implies, chemical hazards are harmful substances and compounds in the form of solids, aerosol, smoke, fog, liquids, gases, mists, fumes and vapour that exert toxic effects on human health and the entire ecosystem. The effects of these chemicals can be felt by man through inhalation, skin absorption and ingestion (eating or drinking). Air-borne chemical hazards exist as a concentration of mists, vapour, gases, fumes and solids. Some are toxic through inhalation, while others cause irritation to the skin upon contact[97]. An article regarding occupational health and safety maintained that exposure to chemical hazards is of two dimensions, namely: acute and chronic[98]. A factory employee is said to be acutely exposed to chemical hazards if the effects are generally noticed within 24 hours. On the other hand, chronic exposure deals with the chemically induced hazards whose effects are felt repeatedly over time. The degree of an employee's risk from exposure to any given chemical substance depends on the nature and potency of the toxic effects, the magnitude and duration of exposure[98]. It also depends on the physiological resilience and capacity of the individual worker in a hazardous work environment. The resultant health effects of exposure to work-

related chemical hazards have been documented. Contacts with chemical agents like metals, disinfectants, solvents, tar, grease, oils, acids, alkalis and lime could cause dermatitis, eczema and burns on some body parts. In the same manner, inhalation of dusts, gases, metals and their compounds could cause a couple of respiratory diseases like pneumoconiosis and asthma[4].

iii. Physical hazard

Physical hazards were described to consider factors in the workers' environment, such as extreme heat or cold, loud noises, inadequate lighting, poor ventilation, vibrations, electrical hazards, and radiation exposure[99]. Excessive heat generated by ovens and furnaces during the production process in cement and ceramics factories can cause fatigue, heat rash, muscle cramps, fainting, and heatstroke. The former involves work technology, equipment and workstation design, while the latter entails lighting, temperature, air quality and acoustics[99].

iv. Mechanical hazard

Mechanical hazards exist in the form of accidents and injuries resulting from operations like being caught-in, struck by machinery, falling from height and manual handling of loads, slips and trips[100]. Moreover, injuries, deaths and damage to the property due to electrocutions, short-circuiting and fires resulting from combustible material poorly stocked are common in industrial operations like cement and ceramics factory production. Against this backdrop, conducted a prospective cohort study and later concluded that uneasy working postures, lifting of loads, and pushing or pulling loads accentuate the risk of getting long term sickness absence[101]. An author equally concurred that physical work environment was a risk factor for

a long-term sickness absence[102]. In contrast, it was noted that moderate and vigorous physical activity was less probably linked to subjective accounts of depression, arthritis and stroke[103].

v. Psychosocial hazard

Job insecurity, challenging work hours, inadequate work-life balance, relentless pressure from top management to boost productivity, limited career prospects, discrimination, poor communication, imbalance between effort and reward, and workplace stress are key factors contributing to psychosocial hazards in the workplace[104]. Stress can lead to diverse responses among employees based on factors such as age, gender, social support, and individual processing styles. Stress manifests at an individual level both psycho-behaviorally and psycho-somatically. Organizational impacts of stress can manifest as decreased performance, low morale, increased accidents, high staff turnover, and elevated absenteeism[105]. Moreover, associated psychological demands, decision freedom, social support and physical work demands with gender-based subjective health status[104].

2.1.8 Determinants of Occupational Health Hazard Awareness

The level of awareness about occupational health hazards in an industry could be a function of certain socio-demographic and work-related factors[109]. These factors may include the age at which individuals start working, educational status, health and safety training, job schedule, and permanent job status. In this context, some socio-economic factors such as age, educational status, and the use of safety measures have been associated with the level of awareness of occupational hazards[110]. Similarly, a study found an association between educational level and awareness of occupational health hazards.

Additionally, a study among mine workers in India revealed that virtually all respondents were aware of at least one form of hazard related to their job functions. However, none had

received health and safety training in the year prior to the study. While a high percentage of mine workers were aware of personal protective equipment (PPE), only a few actually used them while working. Interestingly, awareness of occupational hazards was significantly related to age and work experience. Failure to use PPE was likely influenced by factors such as work schedule, lack of safe drinking water, and social considerations like caste and tribal identities.

Moreover, a study investigating the knowledge of work-related hazards and PPE use among employees of a cement factory in Nepal found that nearly three-quarters of respondents had sufficient knowledge about occupational hazards[111]. While all workers had some basic understanding of PPE, only a few reported using items like masks, gloves, and boots. The findings suggested that educational level and awareness of occupational hazard exposure were likely influencers of hazard prevention behaviors[111].

Also, it was noted among some welders in Borno State that hazard awareness was a function of age, educational level and years of work with experience[106]. In a more precise context, awareness of work-related hazards was reportedly emphasized by factors such as greater work experience, adherence to work regulations, job satisfaction, marital status (whether married or single) and higher educational attainment[111].

2.1.9 Exposure to Occupational Health Hazards and the Risk Factors

Hazard exposure is a chance of being at risk or vulnerable to certain environments, agents, processes, substances or threats. Cement and ceramics production activities are inherently associated with several forms of hazards ranging from ergonomic, physical, chemical, psychosocial, to mechanical[112]. So, cement and ceramic factory employees are exposed to these hazards almost daily at work. However, exposure to the hazards is neither accidental

nor coincidental as certain risk factors may act individually or interactively to either accentuate or reduce an employee's chance of getting exposed. Some of these risk factors encompass age, knowledge of hazard, gender, marital status, educational status, working conditions, and utilisation of available health care services, work time schedule, smoking habit, alcoholism and substance abuse[113]. In view of the above, a study involving bottling company workers in Borno State and subsequently revealed that exposure to occupational risks and hazards were mainly moderate among the employees[114]. However, less than half of the respondents were reported to have high exposure to the hazards. Similarly, age and knowledge were found to have likely associations with exposure to occupational hazards. Meanwhile, the authors reported that gender and educational attainment did not have any possible associations with the level of exposure to the hazards. Also, it was affirmed that the respondents had a good adoption of safety precautionary measures by using personal protective techniques.

In contrast, educational status, working conditions and workplace health services were recognized as contributing factors to Occupational Health Hazards (OHH) vulnerability even as dermatitis and minor MSDs were noted among construction workers[114]. In a countrywide study in Zambia, various forms of exposure to work hazards were highlighted, including vibration, extreme temperatures, smoke, fume, inhalation of powder or dust, deafening noise, chemical handling or skin contact, as well as exposure to heavy object lifting and frequent bending or rapid movement of limbs, which can cause body pain[115]. Additionally, exposure to work-induced health hazards was significantly associated with age, sex, educational level, and marital status. In a related study, exposure to occupational health hazards among workers

at Sheba Leather Company in Maiduguri indicated that the level of exposure was primarily moderate. Exposure was found to be significantly linked to age[116].

A comparative study featuring cement factory employees and civil servants associated exposure to cement dust with age, night shift work schedule and smoking habit[115]. A meta-review was study conducted on occupational respiratory diseases in Iran, covering the period from 1999 to April 2023. The study underscored the significant association between occupational respiratory challenge and exposure to hazardous substances in the workplace, with factors such as physical activity, age, and duration of occupational exposure influencing disease severity. It was submitted that the prevalence rates of work-induced respiratory diseases among Iranian workers underscored the urgency for implementing preventive measures to mitigate potential adverse health impacts associated with occupational exposures[81].

2.1.10 Health Implications of Exposure to Ergonomic and Psychosocial Hazards

The heated nuances surrounding the definition of health makes the operationalising of health status a bit challenging. As defined by WHO, health is a condition of complete physical, mental, and social well-being of an individual, rather than merely the absence of illness or disability[116]. This definition offered above views health as a multi-dimensional concept that has practical methodological and policy implications. Specifically, three major definitional domains can be extrapolated and situated within the context of this study, namely: physical, mental and social health status. However, the focus of this study was on mental and social health status of the cement and ceramic factory employees in Oyo State[117].

2.1.11 Concept of Pollution

Environmental pollution refers to the release of substances or energy into water, land, or air that disrupts the earth's ecological balance or diminishes the quality of life, either through immediate or long-term harm. Pollutants can lead to primary harm, causing direct and noticeable effects on the environment, or secondary harm by disrupting the fragile equilibrium of the biological food chain. The discharge of substances that are harmful into the environment, causing damage to ecosystems and harm to living beings is known as pollution. This can manifest through chemicals or various forms of energy, such as heat, light or noise[59]. Environmental pollution is one of the most difficult challenges facing humanity and other life forms on our planet today, it refers to as the contamination of the Earth's physical and biological parts to such an extent that normal environmental procedures are negatively impacted[9]. Pollutants can be naturally occurring substances or forms of energy, but they are deemed contaminants when their levels exceed natural thresholds. Any use of natural resources at a rate that surpasses nature's ability to replenish itself can lead to the pollution of air, water, and land. Environmental pollution involves the buildup and piling of toxic heavy metals in the air, water, and land, which diminishes the ability of contaminated sites to support life[118].

Pollutions from Industrial waste

Pollution is the introduction of pollutants into environments that cause harm or disruption to other living organisms or environmental damage that may occur in the form of chemicals or energy, such as heat, light or noise. Environmental pollution is one of the most important challenges confronting humanity and other life forms on our planet today[119]. Environmental

pollution refers to the tainting of Earth's physical and biological parts to such a degree that normal environmental processes are negatively impacted. Pollutants can be naturally occurring materials or energies, but they are regarded as contaminants when their concentrations exceed natural levels. The use of natural resources at a rate that exceeds nature's ability to replenish itself can lead to the pollution of air, water and land[110]. Environmental pollution involves the accumulation of toxic heavy metal in the air, water, and land, which diminishes the ability of affected sites to support life.

Water Pollution

Water pollution happens when contaminants from farming, industry, and household sources are released into rivers, lakes, and oceans[117]. When toxic substances enter lake, stream, rivers, ocean and other water bodies they may dissolve, remain suspended in the water, or settle on the bottom. The most polluting are the city sewage and industrial waste discharge into the rivers. The facilities to treat wastewater are not adequate in any city in Indian and other developing Countries. Currently, only about 10% of the wastewater generated is treated, while the remainder is discharged untreated into water bodies. As a result, pollutants enter groundwater, rivers, and other water bodies. This contaminated water often reaches our households and can carry disease-causing microbes. Factories and Industries often release poisonous chemical substances in to sea, river or lakes, resulting in the destruction of natural resources[120].

Air Pollution

Most of the health impacts of air pollution on humans are expected to be understood by medical researchers in the near future. However, air pollution is largely linked to circulatory and respiratory diseases, as well as issues affecting the eyes, nose, and throat. Many asthma

cases worsen in areas with air pollution. Air pollution include indoor and outdoor categories, each having considerable health impacts. It is calculated that indoor air pollution from solid fuels and urban outdoor air pollution is responsible for 3.1 million premature deaths worldwide annually, accounting for 3.2% of the overall disease burden.

Globally, indoor smoke from solid fuel combustion is responsible for approximately 21% of deaths from lower respiratory infections, 35% from chronic obstructive pulmonary disease, and about 3% from lung cancer. Additionally, carbon monoxide decreases the blood's ability to carry oxygen. Symptoms associated with exposure to carbon monoxide include dizziness, nausea, headache, loss of consciousness and death. Persons with coronary artery disease and fetuses are particularly susceptible. Exposure to biological contaminants of indoor air that are related to dampness and mold increases the risk of acute and chronic respiratory diseases, including asthma.

Noise Pollution

Urbanization has led to noise pollution becoming a significant environmental nuisance. Noise is increasingly pervasive, yet remains a neglected type of pollution While it might not seem as damaging as other types of pollution, it poses a significant issue impacting human health, wellbeing, and environmental quality. Noise pollution refers to loud, unwanted, or excessive sounds that can negatively impact human health and the quality of the environment.

Noise pollution is said to have several health effects, including hearing problems, high blood pressure, stress, ulcers, aggression, and poor concentration, which can result in accidents and reduced academic performance[121]. A review on noise pollution and its impact on human health highlights various effects, such as hearing impairment, annoyance, negative social

behavior, disrupted spoken communication, sleep disturbances, cardiovascular problems, and mental health issues[120].

2.1.12 Relevance of Safety Communication in Occupational Health and Safety

Communication is a crucial factor influencing employee performance. It plays a significant role in worker performance, as employee behavior largely depends on new occurrences[122]. Efficient communication helps track hazards and prevent work-related injuries. In one study, communication was identified as an important component of management practices aimed at controlling workplace injuries. Additionally, effective communication and feedback enable top management to make informed decisions regarding potential hazards.

Safety communication within an organization promotes workplace safety behavior, enabling both management and employees to comprehend and analyze work-related injuries to improve safety performance. Research conducted within Algerian petrochemical industries emphasized that effective safety communication is a crucial element of safety culture influencing employees' safety behaviors and performance. Furthermore, effective safety communication has been recognized as a major contributor to improving workplace safety[123].

2.1.13 Relevance of Safety Training in Occupational Health and Safety

A report indicates that higher perceived hazard levels enhance employee adherence to warnings and instructions. Therefore, it is essential to train all employees to recognize and respond effectively to workplace hazards[84].

A study conducted in Algeria on safety evaluation within the petrochemical sector identified a positive correlation between safety training and employees' safety behaviors[124]. It was also proposed that conducting safety training through seminars, workshops, and similar methods

could enhance employees' safety performance[84]. To enhance health and ensure employee safety, ongoing and effective safety training is essential, particularly in stress management, proper use of safety equipment, and maintaining a safe work environment.

2.1.14 Relevance of Employees Motivation in Occupational Safety and Health

In an organization, a key responsibility of managers is to ensure that employees perform their assigned tasks excellently. Achieving this requires not only hiring the most qualified employees but also ensuring they are adequately motivated[123]. *"Motivation is the process by which managers inspire their employees to work towards their goals and objectives"*[125].

An employee's attitude, particularly regarding safety, is influenced by both environmental factors and internal characteristics[126]. Each employee inherently possesses unique desires, needs, and goals they aim to fulfill[127]. As per Verom theory, rewarding an employee within an organization enhances their skills, leading to improved performance, better safety behaviors, and increased job satisfaction[127] (Figure 2.3).

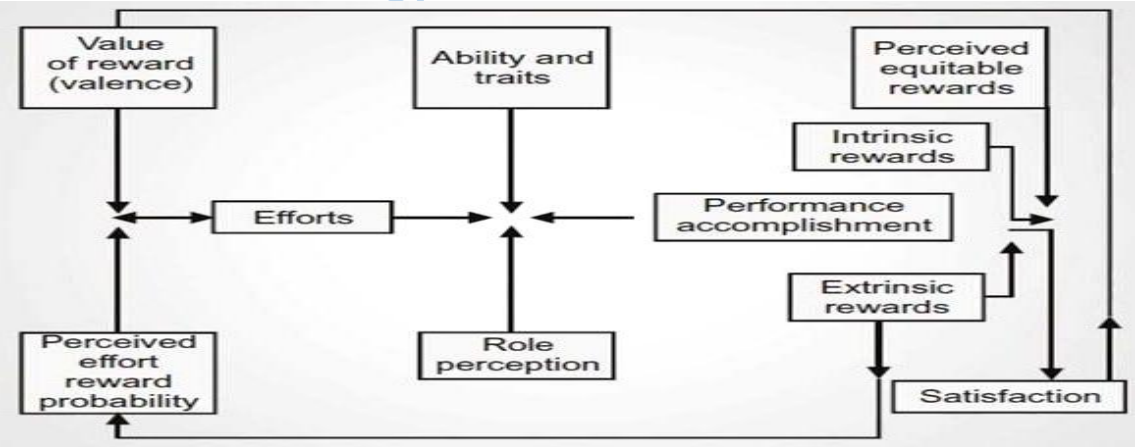

Figure 2.2: Porter and Lawler Model[128]

Paying closer attention to employee motivation has proven to be a challenging task for managers in organizations. However, studies indicate that employee motivation is the key factor in improving health and safety behaviors among employees[84]. Employees' satisfaction of needs is positively linked to their safety behaviors and which subsequently enhances their performance in the organisation. A separate study highlighted that motivational factors, such as higher wages and salaries, contributed to improved safety performance among employees[129].

2.1.15 Barriers to Effective Occupational Health and Safety Implementations

There are multiple advantages linked to an effective workplace safety program. The advantages encompass more satisfied and healthier employees, enhanced productivity, reduced expenses, and better employee morale and retention[79]. Despite these advantages, establishing an effective workplace safety program can be difficult. These attitudes may include a lack of commitment, placing excessive responsibilities on employees, and insufficient training provided[79]. Insufficient amenities, particularly the necessary tools for performing tasks safely, have also been identified as significant challenges to the effective implementation of a safety culture.

Inadequate resources and communication have been identified as major barriers to effective safety culture implementation. Similarly, the presence of an adequate safety kit and open discussions have been noted as sources of safety barriers[70].

2.2 Theoretical Framework of the Study

Over the years, several models and theories have been formulated and applied to explain reasons behind individuals' health and illness behaviours with respect to protecting and

promoting good health. Some of the models and theories have concentrated their explanations more on preventive and protective health behaviours[129]. The theoretical anchorage of this study was Health Belief Model (HBM). The model has a trans-disciplinary origin in Psychology, Engineering, Public Health, Environmental studies as well as Sociology. This sub-section therefore, basically revolved around the review of the HBM and its applicability to the study. The hallmark of the HBM is about the perception and evaluation of danger or unfavourable situation with a view of preventing it. In short, cement and ceramic factory employees that imbibe some theoretical orientations of HBM are likely to be better for it health wise since the theory borders on health pro-action.

2.2.1 Health Belief Model

It has been suggested that an individual's perception of threat or risk can predict their involvement in preventive and protective health behavior[130]. This premise highlights the relevance of the Health Belief Model (HBM) to this study. The HBM can be described as a value-expectancy theory with significant roots in social psychology. It is recognized as one of the enduring psychosocial approaches developed over the years to predict preventive and health-promoting behavior at the individual level[131].

A key aspect of the model is its emphasis on perception and motivation regarding preventive health behavior. In agreement with this, preventive health behavior has been conceptualized as any activity undertaken by an individual who perceives themselves to be healthy, aimed at preventing disease or detecting it before symptoms manifest.

The model was pioneered by some psychology scholars around 1950's to provide plausible explanations behind some people's behaviour or disposition to the use or non-use of the

installation and provision of medical services for the then targeted population[132]. The social psychologists like Hochbaum, Rosenstock and Kegels that developed the model were in turn, influenced by the theoretical postulation of Kurt Lewin[123]. According to Lewin, a person exists in a life space that is made up of regions that are considered positive, negative or neutral. In this case, illness is a negative occurrence that must be avoided or escaped from, so that persons could remain in positive or neutral life spaces.

The HBM mainly focuses on threat perception and behvaioural assessment by individuals. Threat perception comprises perceived vulnerability and expected severity of the consequences of illnesses[133]. Behavioral assessment similarly focuses on the perceived benefits of adopting the recommended health action, along with the potential costs or obstacles involved. Additionally, people engage in preventive health behaviors based on their perception of the severity of health risks[133]. Occupational health risks can be assessed either objectively or subjectively, influenced by factors such as a worker's experience, gender, education level, personal health priorities, and workplace social dynamics involving plant managers, supervisors, and colleagues[127]. Also, the factory employees may inculcate certain orientations towards work which may be dominant, instrumental and solidaristic[124]. Consequently, such diverse work orientations could influence hazard exposure evaluation either subjectively or objectively. The HBM also states that as individuals place higher premium on their personal health, there is a tendency for them to make some meaningful changes behaviourally if they perceive the health risk to be severe. This theoretical orientation reinforces the value-expectancy theory of motivation. The health belief theorists opined that an individual's actions and perceptions are predicated on his or her inner world[130].

The foundational components, often known as the HBM constructs, consist of perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy[101]. However, it is worthy of note to state that the relationships that exist between and among the HBM constructs are not direct and linear in practical terms as they may overlap, leapfrog and even reinforce each other. The constructs of the HBM can be briefly explained below:

i. Perceived susceptibility or vulnerability: this has to do with the subjective perception of an individual with respect to the risk of getting a disease or harm[98]. For example, perceived exposure to occupational hazards sufficed here. In this context, a cement and ceramic factory employee must believe that there is a possibility of getting exposed to work-induced hazards before he or she can be interested in complying with the use of PPE to prevent or minimize the severity of the exposure. Besides, the extent of perceived severity of getting exposed to work-induced hazards is also a reasonable factor.

ii. Perceived severity: this is a situation whereby individuals (for instance, the cement and ceramic factory employees) evaluate the seriousness of an unfavourable condition, disease or harm. That is, perception of the risk of consequences of getting a disease or health threat[133]. When applied here, the seriousness has to do with exposure to the work-induced hazards and the manifest symptoms of diseases, illnesses, accidents, injuries and even death. Cognitively, either a cement or ceramic factory employee might reflect on issues like the disease outcome of getting exposed to occupational hazards, the likely negative impacts of getting a sickness on marriage, family, social relationship, career distortion, compulsory early retirement, financial

insecurity and the fear of chronic health incapacitation. By thinking over the possibilities of the following far-reaching consequences of getting exposed to occupational hazards, the factory employees are likely to experience perceived severity of the situation psychologically. At this stage, there may be a prompting to take an action based on "cost-benefit" analysis.

iii. Perceived benefits of the presumed action: this deals with the perceived advantages of taking an alternative action (for example, the use of PPE and the avoidance of health afflictions due to hazard exposure) to mitigate or reduce the risk of a disease and its attendant deleterious health consequences. Put differently, it implies that persons perceive the value and utility of exhibiting new ways of behaving with respect to reducing the associated risk of an illness. Perceived benefits of taking actions among the likely affected factory employees are basically anchored on "cost-benefit" analysis of an action to avert or mitigate a threatening situation[134]. In other words, cement and ceramic factory employees in Oyo state may think that by complying with the company's safety rules and standards, they are likely to avoid being exposed to occupational health hazards in advance. At this point, certain factors may facilitate, delay or hinder the action of complying with the use of the available PPE. Needless to reiterate those factors here as they have been reviewed in the main literature.

iv. Perceived barriers: it encompasses those factors that hinder individuals from carrying out some preventive health behaviours. Relating it to this study are factors like non-availability of the PPE pain and discomfort induced by the use of PPE interruption of work speed, forgetfulness and even the lack of PPE use awareness. In addition, the

perceived barriers could also involve some psychological factors like psychological distress, ridicule from the co-workers and non-compliance with the use of PPE by supervisors and foremen in the factory.

v. Cues to action: it is a process where certain events (for example, personal health value, knowledge about hazard exposure and safety rules enforcement) trigger or motivate behaviour or action towards PPE use. Cues to action could be categorised into external and internal factors[32]. While some behaviour-stimulating external factors have been highlighted above within the context of this study, the internal components of cues to action are basically psychological such as pain, distress, ridicule, bullying and insult. However, over time, the cue to action construct has been dropped because of the problem of measurability associated with it[58]. In other words, even though cue-motivating action sounds interesting, the engagement with it in an explanatory survey is problematic[122].

vi. Self-efficacy: it was extrapolated from Bandura's work as a part of the HBM construct. It is the self-reposed confidence in a person's ability to take the recommended action (for instance, using PPE) to avert or mitigate the perceived negative impacts of getting exposed to occupational diseases and illnesses. Self-efficacy was not part of the original constructs of the model as it was later incorporated to broaden the scope of the HBM[17].

In this study, perceived susceptibility may be imbibed by the cement and ceramic factory employees to assess the extent to which they feel unsafe and vulnerable to the everyday work-induced hazards. The awareness or knowledge of the hazard exposure comes into play at this point. The awareness of hazards among the factory workers is itself influenced by

some socio-demographic, work-related and behavioural factors which have a sort of bearing on perceived susceptibility. This could be the starting point of decision making in response to the identified health hazards, be it ergonomic, mechanical, chemical, physical or psychosocial. Also, there may be a sense by factory workers' perception of the seriousness of the perceived health threats engendered by the workplace hazards. The perceived seriousness of the hazard exposure may be anchored on the thinking about the potential health challenges like musculoskeletal disorders, cardiovascular diseases, haematological afflictions, dermatological and respiratory problems. When this thinking is properly appreciated by the factory employees, it has implications for the cost of losing a job if declared incapacitated health wise, which in turn might trigger financial crisis in the family and other realms of life. In short, perceived severity of a work-induced illness can be accentuated by the disturbing fear of global and national problem of unemployment and underemployment with the attendant multiple socio-economic consequences affecting several domains of social human life existence. All these can weigh heavily on the perceived severity of getting an occupational disease by the respondents and the need to take a corresponding preventive action of using PPE.

The perceived benefits of not being exposed to the occupational health hazards and at the same time maintaining healthiness may make the respondents to use PPE while working. However, the knowledge or awareness of the availability of PPE and hazard exposure may provide the cue to action to comply with safety rules and standards by the factory workers. In the nutshell, the model tends to portray man as a rational being with a sense of economic principle of "cost-benefit" analysis. It, therefore, ascribes to an individual the rational capacity to juxtapose "costs" with "benefits" before an action is taken or otherwise,

depending on the expected health outcome. That is, if benefits supersede costs, predictably, a healthy action was taken and the reverse is likely the case. Unfortunately, all factory employees may not always behave rationally due to certain external circumstances. So, this is inherently one of the drawbacks of the HBM[135].

2.2.2 Application of HBM to the study

The widespread reach of the model in terms of explanations as it applied to this study was a major strength in some respects. Practically, a cement and ceramic factory employee who was aware and believed that he or she was vulnerable to some occupational hazards and the attendant health consequences was likely to act in a way to comply with some hazard-control measures put in place by the company management in question. However, the perception of the work-induced risk must be strong enough for a factory employee to exhibit some preventive behaviours like the use of the PPE against exposure to health hazards[122].

Similarly, work-related health risk perception and evaluation among the cement and ceramic factory employees could be influenced by their accumulated work experience on the job over the years as individuals. In the same manner, the attitudes of some co-employees, foremen, supervisors and even plant manager towards work safety could impact either negatively or positively on the evaluative risk perception as it concerns the factory workers. This perceived susceptibility comes with an anxiety and fear of getting an occupational disease or illness through exposure to physical, chemical, mechanical, ergonomic and psycho-social hazards. Also, the perception of the respondents being exposed to the workplace hazards may not be sufficient for any likely action to be taken, even though there is a controversy regarding objective and subjective perception of risks[98].

However, the theoretical application of the HBM in this study was confined to the individual subjective assessment of the occupational hazard exposure. Therefore, as a follow-up, the individual cement and ceramic factory employee was likely to assess the perceived seriousness or severity of his or her personal hazard exposure and the attendant health consequences on their social and mental health status domains. Similarly, the individual who perceives being exposed to the work-related hazard at this stage may embark on "cost-benefit" rationalisation with a view of determining the appropriate action to be taken in order to mitigate or reduce the effect of the exposure on their health ahead of time. Perceived severity was conceptualised in this study to include the thought of getting exposed to hazards while working and its interconnected consequences like the tendency to endanger the respondents' career fear of permanent body disability and the thought of the illness degenerating from acute stage to a chronic one thereby leading to compulsory disengagement/retirement and the thought of the associated financial crisis.

Moreover, the decreasing capacity to perform social roles due to illness and at worst, the thought of untimely death resulting from occupational illnesses might all heighten perceived severity at the individual level. These variables highlighted above might be factored into the cement and ceramic factory employee's appraisal of the perceived severity of getting their health exposed. The issue that may bother the curiosity of the affected factory employees was whether the advantages of using the PPE exceeded that of the disadvantages. That is, the perceived benefits of not getting exposed to the health hazards and its consequences, should they comply with the safety rules and hazard-control measures put in place. Whichever side the pendulum of the decision swings determines the likelihood of use or non-use of the available PPE among the factory employees. Apart from the use of the PPE,

these preventive actions to be taken depend on the perceived benefits derived from such and could also entail periodic medical examination, attending workshops and seminars on hazard prevention and control among others[135].

Furthermore, there can be some perceived barriers surrounding the action to be taken by the factory employees to safeguard their health. Some of these barriers as perceived by the employees may be the non-availability of the PPE interference with effective job performance work speed ridicule from co-workers for using PPE, discomfort in using PPE forgetfulness to use the available PPE lack of personal value for one's health stress and pains associated with the PPE use[111]. On the other hand, what may provide a trigger to the action of the employees to comply with the safety rules and hazard control measures in spite of the perceived barriers may be due to work experience knowledge of hazard exposure, personal health values, safety consciousness, fear of being sanctioned by the company management in the forms of suspension from work demotion salary deduction, fines and at worst, outright dismissal from the company in question. At the individual level, tobacco smoking and alcoholic in-take may provide a sort of motivation or trigger to some of the factory employees to use PPE when working[122]. On the other hand, some cement and ceramic production companies that believe in high productivity through investment on workers' health may institute certain positive sanctions for their compliant factory employees like awards, accelerated promotions and gifts. This might be aimed at entrenching the culture of health and safety compliance rules. In terms of self-efficacy, the factory employees might think of having confidence in the PPE use to protect them against exposure to occupational health hazards. This confidence might be reinforced by the proper and correct use of the PPE[110].

Arguably, the HBM is certainly not without its shortcomings as there are no laid down rules for combining the explanations of the constructs[70]. However, the model has a durable capacity to explain a broad spectrum of phenomena with complex variables. Moreover, the fact that health hazards permanently characterise cement and ceramic manufacturing operations informed the need to engage the model to provide practical explanations regarding exposure to occupational health hazards, risk factors, self-reported morbidity, attitude to the use of personal protective devices and the overall mental and social health domains of the exposed employees.

2.2.3 Adoption of the Choice of HBM for the Study and its Justifications

The major theoretical anchorage for this study was the HBM. The adoption of the HBM was underscored by its widespread explanations of the various variables embedded in the study. Particularly, the issue of awareness of occupational hazards which could influence perception and assessment of health risks as partly addressed by the construct of perceived susceptibility. In addition, perceived severity of exposure to the occupational hazards among the target respondents could be accentuated or reduced by some work-related, behavioural and socio-demographic factors like shift work, employee health and safety training, work department or unit, work experience, permanent or temporary job status, job target, PPE use or non-use, duration of exposure, age, gender, marital status, educational level, addiction to tobacco smoking, alcoholism, over-dependence on hard drugs, use of healthcare services and periodic medical check-up. Furthermore, exposure to ergonomic and psychosocial hazards and the factors influencing compliance with the hazard control use of PPE were central issues that the HBM addressed in this study. The works of several scholars similar to

this current study have been highlighted below to lend credence to the adoption of the Health Belief Model (HBM) as the major theoretical base:

i. The HBM was applied to explain the preventive behavior of wastewater workers in the United States of America [101].

ii. The model was used to examine the behavior of workers in six plastic packaging manufacturing plants regarding compliance with safety rules and standards.

iii. The HBM was adopted to explain the health-seeking behavior of a group of women in a rural area in Western Turkey concerning breast self-examination and mammography.

iv. More recently, the HBM has been applied to the study of coronavirus prevention in Saudi Arabia [103].

2.3 Empirical Review

2.3.1 Prevalence of Occupational Accidents among Industrial Workers

The industrial sector is one of the major sources of revenue in most developing nations and in addition to the economic advantages it creates, most construction industries also come with lot of devastating challenges owing to it strong association with work-related accidents[97]. According to a 2020 study on impact of occupational hazards on employee performance in a cement industry, the researcher states that industrial sectors is a very high-risk industry due to their working environment and condition, and production processes especially in an organisation that placed lesser priority to health and safety. Several studies have highlighted increasing prevalence of occupational accidents among industrial workers. A systematic and meta-analysis review on the prevalence of occupational injuries and it associated factors

among Ethiopian employees showed a pooled prevalence of occupational injury to be 45% with the highest burden among construction workers[15].

In a textile industry, a study on the prevalence of non-occupational injury in Ethiopia showed that out of the 291 employees, 11% have experienced non-fatal occupational injuries in the past 12 months. A similar study assessing the prevalence and contributing factors of occupational injuries among textile workers in Ethiopia found that the rate of occupational accidents was 31.4%[122]. Another survey conducted in among Ethiopian industrial textile employees showed that 42.7% of the employees have also experienced occupational accidents[126].

In a construction industry, a study that assessed workplace injuries and the associated factors among Ethiopian employees revealed a high prevalence of work-related injuries where 39% of the employees have experienced any form of work-related injuries within the last 3 months[17]. A cross-sectional survey on occupational injuries among workers in iron and steel industries in Ethiopia reported higher incident rate (384 injuries/1000 employees) of occupational injuries in the last 12 months[15]. In the Ethiopian woodwork industries, about 42% of the employees reported to have experienced at least one occupational injury in the past 12 months[61].

Among Ugandan employees, a study that investigated the prevalence and determinants of occupational injuries in the welding industries reported a high prevalence (87.8%) of self-reported occupational injuries with cuts/burn (84%) and eye injuries (63%) reported as the main occupational accidents[25].

A comparative study conducted among Egyptian construction workers also reported that all the Marble and Granite employees have experienced one or more injuries in the past year. These employees reported high prevalence of superficial wounds, contusion/bruises, tear and laceration[84]. Among Ghanaian industries, a cross-sectional quantitative survey on the prevalence and determinants of occupational injuries among solid waste collector reported that 21.8% of the employees experienced at least one work-related injury in the last 6 months[71].

In the Nigeria industries, reports have also shown alarming occupational injuries among employees. According to a study conducted among waste pickers in Nigeria, it was revealed that 1474 frequencies of injuries were reported among 247 waster pickers in the Northern part of Nigeria. Among electronic waste workers in Nigeria, 38% and 68% of the employees experienced different forms of injuries within the last 1-2weeks and 6 months respectively[100].

Another prevalence study on occupational illness and diseases among construction workers in Niger Delta, Nigeria also revealed high level of occupational illness and diseases among the workers with higher prevalence of vision-related diseases followed by musculoskeletal diseases, skin diseases, and nasal related illnesses[109]. In the southwest Nigeria, a study among Brewery employees showed that about 69% of the employees had work-related musculoskeletal disorders[66].

Among Sawmill workers in Uyo, Nigeria, health problems such as low back pain, cough and eye irritations were prevalent among 40.9%, 35.4% and 26.8% of the employees (Johnson and Umoren, 2018). Among domestic gas workers and staff of works department in Enugu, Nigeria showed that musculoskeletal disorders were prevalent among 86% and 38% of the

domestic gas workers and staff of works department[103]. Among quarry workers in Nigeria, a cross-sectional study on the prevalence of occupational injuries showed that majority (89.8%) of the employees had musculoskeletal disorders with most common types being lower back pain (83.1%) and elbow pain (45.9%)[30].

2.3.2 Predictors of Occupational Injuries among Industrial Employees

Evidence have shown that the occurrence of occupational injuries is related to many different factors. According to a systematic review conducted on the predictors of occupational injuries among industrial workers, working overtime (more than 8 hours/day), lack of supervision for labour workers, lack of personal protective equipment, and lack of occupational health and safety training were identified as the major predictors of occupational injuries among industrial workers[84].

Among Ugandan welders, occupational injuries were associated with informal training (AOR, 4.71 95%CI 2.04-10.85) longer working hours (AOR, 2.65 95%CI 1.27-5.52)[59]. Among Egyptian construction workers, unsafe working environment, using inappropriate instruments, lack of personal protective equipment and non-adherence to safety measures were the major factors associated with occupational injuries among the Egyptian Marble and Granite workers[69].

A study among the iron and steel industrial workers in Ethiopia reported that working night shifts, working more than 48 hours per week, lack of safety training and poor utilization of personal protective equipment were the main predictors of occupational injuries among these employees[66]. Among the Ghanaian industries, a cross-sectional quantitative survey on the prevalence and determinants of occupational injuries among solid waste collector identified

tedious work duty and lack of personal protective equipment as the determinants of occupational injuries[104].

A Nigerian study conducted among waste picker showed age of the employees, their educational status and working experiences were the major significant influencing factors to the prevalence of injuries among waste pickers[136]. Another Nigerian study conducted among construction workers in Niger Delta revealed the major predictor of the occupational illness to be lack of effective safety management in the organisation[25].

Among domestic gas workers and staff of works department in Enugu, Nigeria, the longer work duration and poor sleep quality were identified as the main factors that influenced the incident rate of occupational injuries[25].

2.3.3 Health-Related Quality of Life of Industrial Workers

Generally, industrial workers are usually subjected to tedious activities that may include frequent lifting, carrying, pushing, and pulling of heavy objects. In addition to the tedious tasks, industrial workers are also usually exposed to irritant inhalants, vehicle exhaust, unfavourable atmospheric conditions such as air and noise pollution, and psychological stress[106]. These multiple work demands and hazards result in a higher incidence of health problems and injuries that may impact the workers' overall quality of life.

Several studies have investigated the health-related quality of life of workers in different industrial sectors. A study conducted on the quality of life of workers exposed to noise in a Textile industry shows that the workers are at greater risk of hearing loss and consequently resulted in a lower quality of life particularly in the dimension of physical health, mental health, social and emotional health and general health[110].

Another study on the level of wellness among industrial workers have also reported a significant reduction in overall wellness of the industrial workers with greater burden among the aged and those with longer working hour[137]. In contrast, study on quality of life and the associated factors among younger industrial workers revealed a better quality of life among this population. Similarly, the report from a descriptive study on the predictors of HRQoL revealed that the industrial workers had good physical health while the employees had lower score in the environmental domain[66].

A report from an investigation that assessed the factors affecting the health-related quality of life of manufacturing industrial workers of Ulsan"s vehicle industry revealed a moderate quality of life in the physical and mental health dimensions[21]. In Indian, the reports on the occupational stress, musculoskeletal disorders and other factors affecting the quality of life among construction workers showed that all the employees had lower scores in all the domains of the quality of life[132].

A cross-sectional study conducted among municipal waste collection workers in Germany revealed the presence of an impaired HRQoL with 68.3% of the workers reported impairment in one or more dimensions[132]. A similar study conducted among former lead workers in Brazil revealed that majority of the former workers had a very poor quality of life[138]. A descriptive correlational study on the predictors of health-related quality of life among construction industrial workers in Jordan showed that the construction workers had good physical health with a poor working environment. The poor environment health can be linked to the fact that most industrial workers in the construction sectors are usually exposed to high-risk and potentially unsafe and unhealthy occupational environment[138]. A cross-sectional study on the quality of life among migrant construction workers in Banglore city

showed that the migrant construction workers had poor physical, social, and psychological domain while in the environmental domain, the workers displayed good quality of life[70]. Another investigation among Indian construction industries on occupational stress and quality of life reported that in addition to the incidence of musculoskeletal pain, the workers also displayed poor quality of life in all the dimension of quality of life[139].

Other similar studies in the construction industries have also reported good physical health with a compromised environmental domain[10]. Lower health-related quality of life has also been reported among rural-to-urban migrant industrial workers i.e individuals who individuals who migrated from rural areas and had worked in the urban areas for more than 3 months had lower scores in all domains of HRQOL when compared to those in the rural settings[100].

In Egypt, a study on the occupational hazards and quality of life among fertilizer factory workers in Assuit city revealed that 5.5% and 41.4% of the workers had good and poor quality of life respectively[139]. Among the Turkish industrial employees, the health-related quality of life was even found to be below the Turkish community standard[140]. Another health-related quality life study among construction workers in Kuniamithur Village in Coimbatore district also showed that only few (28%) of the employees had good quality of life while 26% and 46% displayed moderate and low quality of life respectively. In Nigeria, a cross-sectional study on socio-demographic and workplace determinants of quality of life among quarry workers showed that majority (74.1%) of the employees had poor quality of life particularly in the areas of social and psychological domain[29].

In addition, studies have also investigated other specific forms of health-related quality of life. For instance, an analytical cross-sectional study on pulmonary function and respiratory morbidity-related quality of life among construction workers showed that pulmonary function and respiratory functions-related quality of life are very poor among the construction workers[14]. Another study on pulmonary functions and HRQoL among Silica exposed workers in chemical industries showed that exposed workers had lower values of pulmonary function indices and lower health-related quality of life[141]. Oral health related quality of life has also been investigated. A cross-sectional study on the oral health status and oral health-related quality of life among steel factory workers of Visakhpatnam reported poor quality of life among the production line workers and those in administrative sections although those in the production line displayed a significant lower quality of life than the administrative workers[71].

2.3.4 Occupational Health and Safety Interventions to Improve the Occupational Health-Related Quality of Life

The increasing incidence of occupational accidents and compromised health-related quality of life among industrial workers have led to the recommendation of many occupational health and safety interventions such as safety inspections and regulations, training, ergonomic programmes, and exercises[29]. In an interventional study that investigated the effectiveness of safety regulations on the incidence of occupational injuries and diseases revealed that despite the introduction of occupational health interventions, industrial workers still experienced occupational accidents and consequently affecting their health-related quality of life[79]. This finding also indicates that safety regulations are not sufficient to reduce

occupational injuries and improve the overall health related quality of life of industrial workers.

A quasi-randomized controlled trial on the effectiveness of ergonomics training program on musculoskeletal disorders, job stress, quality of work-life and work-related quality of life revealed significant improvement in the quality of life of the workers[142]. Another study that investigated the effectiveness of an ergonomics intervention programme in an Iranian steel industry showed that the ergonomic intervention significantly improved the general health of the employees as well as their human resource capacity[103]. The effectiveness of workers independence interventions has also been examined among industrial workers. In Indonesia, a study conducted among employees with disabilities caused by occupational accidents concluded worker's independence has a significant positive effect on their quality of life. In other words, the better the workers' independence, the better the quality of life of the employees[119].

Exercise and physical exercise are also among the recommended interventions for the improvement of workers' health related quality of life. According to a study conducted on the effect of physical exercise on musculoskeletal problems, stress and quality of life of workers shows that employees who are enrolled to the physical exercise program reported a lower prevalence of musculoskeletal problems compared to the control group while there is no significant difference in the quality of life of those enrolled to the physical activity and those who are not, and this indicate that the quality of life of employee cannot be improved by physical exercise only[66,142].

2.4 Conceptual Model

Fig 2.3: Conceptual Model

Source: Researcher's Field Study 2024

The conceptual model presented in Figure 2.3 illustrates how occupational health interventions influence the health-related quality of life (HRQoL) of industrial workers through behavioural and perceptual patterns explained by the Health Belief Model (HBM). The model explains that participation in occupational health interventions such as health and safety training, ergonomic programmes, and behavioural health programmes serves as cues to action that shape workers' perceptions and attitudes towards workplace health and safety.

Specifically, the interventions are expected to enhance workers' perceived susceptibility to occupational hazards and their understanding of the severity of potential injuries or illnesses. They also reinforce the perceived benefits of adopting safe work practices while reducing perceived barriers such as lack of knowledge or motivation. Through consistent exposure to training and supportive workplace policies, workers' self-efficacy , then their confidence in performing safe behaviour is strengthened.

Collectively, these modified perceptions promote positive behavioural change, such as adherence to safety guidelines, proper use of personal protective equipment, and engagement in health-promoting practices. Sustained behavioural improvements subsequently lead to enhanced health-related quality of life across the physical, psychological, social relationship, and environmental domains, as defined by the WHOQOL-BREF framework.

Thus this conceptual model designed for industrial workers is anchored on the premise that the implementation of occupational health interventions within industrial workplaces directly influences the health-related quality of life of workers. Occupational health interventions such as safety training, health education, behavioural programs, ergonomic programs, use of

PPE, and periodic medical examinations are expected to reduce occupational risks, improve health awareness, and promote safer work practices.

The effectiveness of these interventions, however, may be mediated by organizational support, workers' compliance, and the general workplace environment. Improved interventions and favorable mediating factors are hypothesized to enhance workers' quality of life as measured by the WHOQOL-BREF domains: physical, psychological, social, and environmental well-being.

2.5 Summary of Literature Reviewed

Despite the extensive body of literature highlighting the high prevalence of occupational injuries and poor health-related quality of life (HRQoL) among industrial workers both globally and within Nigeria, significant gaps remain in the research landscape. Numerous studies have described the frequency, types, and contributing factors to occupational injuries, identifying key predictors such as long working hours, poor supervision, lack of personal protective equipment, and insufficient health and safety training. However, most of these studies are descriptive or cross-sectional in nature, limiting their ability to establish causal relationships or assess the long-term effectiveness of interventions. In the Nigerian context, particularly in Oyo State, there is a notable lack of intervention-based studies that rigorously evaluate how occupational health and safety measures impact both injury rates and workers' overall quality of life.

Moreover, while poor HRQoL has been consistently linked to occupational hazards, stress, and physical strain, few studies have explored how targeted interventions such as ergonomic programs, behavioral health support, or structured safety training can simultaneously reduce

injury occurrence and improve various domains of HRQoL. Few studies have adopted a quasi-experimental design to evaluate the effectiveness of occupational health interventions in real industrial settings. Existing interventions, where they exist, often lack follow-up evaluation or fail to incorporate standardized measures like the WHOQOL to provide a comprehensive view of workers' health and well-being. Additionally, many studies treat injury reduction and HRQoL as isolated outcomes, without examining the potential interdependence between the two. Therefore, there is a clear gap in empirical evidence regarding the effectiveness of structured occupational health intervention programmes on the overall health-related quality of life of industrial workers in Nigeria. This study addresses this gap by implementing a three-month occupational health intervention in selected industries in Oyo State and measuring its impact using the WHOQOL-BREF tool. This study aims to fill these critical gaps by adopting a comparative design involving both control and intervention groups, using standardized tools to assess the dual impact of occupational health interventions on injury prevalence and HRQoL among industrial workers in Oyo State. The findings are expected to offer evidence-based recommendations for improving occupational health policies and practices in similar industrial settings.

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Chapter Three

Methodology

3.1 Research Design

An essential stage in carrying out a research project is having an appropriate research strategy, as it is the scientific study of the specific techniques, procedures, template, tools and mechanics utilized for identifying, selecting, processing and analysing information and data for this research work. Having a research strategy is of most significance as it is being recognised by the researcher to have opened various means to collect and analyse data and information through the opportunity given to distinctively distinguish amongst the functions of various tools.

Hence, a quasi-experimental design was used to assess the effect of occupational health interventions on occupational health hazards and the workers' Health Related Quality of Life (HRQOL)[1,2]. The study was carried out at Industrial areas in Oluyole, Ibadan, Oyo state.

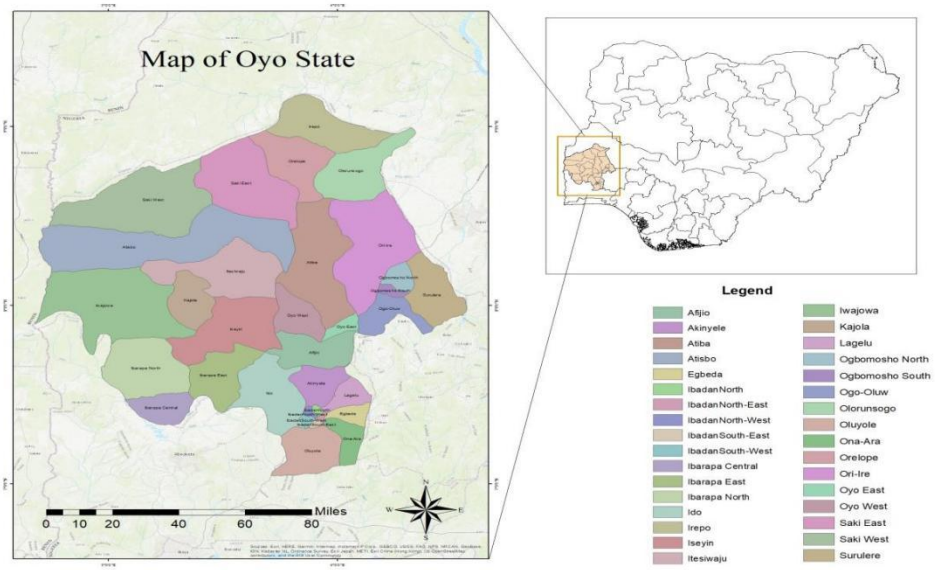

Fig 3.1: Map of Oyo State[3]

3.2 Population of the Study

Occupational health studies often involve a diverse range of staff within industrial settings. Accordingly, the population for this study included employees, managers, supervisors, and labourers across selected industrial sectors in Oyo State, Southwest Nigeria[4,5]. The intervention and control industries shared similar characteristics in the area of workforce size, production schedules and potential exposure to occupational hazards which ensured the validity of inter-group comparism. This also helped to ensure that post intervention differences were attributable to the intervention rather than contextual disparities.

3.3 Sample and Sampling Techniques

The samples size calculated was based on pre-intervention pilot data and previous related study from an author on the effect of training on the knowledge and practice of occupational health and safety measures among poultry farm workers in Kaduna State, Nigeria[6].

Minimum sample Size $n = \frac{2[(Z\varphi + Z\beta)\ 2\ P(1-P)]}{(P1 - P2)^2}$

Where Zφ = Standard normal variant corresponding to 95% = 1.95

Zβ = Standard normal variant corresponding to 80% = 0.84

P1 = Proportion of workers with good OHS practices in the intervention group = 88.6%

P2 = Proportion of workers with good OHS in the control group = 60.0%

P = Average of P1 and P2

$P = \frac{0.886 + 0.602]}{2} = 0.743$

Minimum sample size (n) = 36

Adjusting the sample size for 10% non-response

$N=n/1-F$

N=36/1-10% = 40

An average of 50 workers were recruited in each of the four industries used for the experimental and the control group making a total of 212 respondents.

Sampling Techniques

A multistage sampling procedure was adopted in selection of study participants. Due to the nature of this study, Ibadan, the state capital of Oyo State was purposively selected because she is largely dense with industries[7]. The first stage involved the selection of the largest indusrial local governments in Oyo state. Here, Oluyole Local Governments was purposively selected. The second stage involved selection of industries, and this formed the cluster of the sampling. At this stage, using strtification, one industry was selected each from the selected local governments. The industries were randomly assigned to either an intervention or the control group by independent personnel who had no idea on identity of the industries.

3.4 Description of Research Instruments

A structured questionnaire consisting of socio-demographics (e.g. gender, age, marital status, ethnicity, and religion), socio-economic (e.g. educational status and monthly allowances), health-related factors (quality of life), occupational hazards and work-related factors (e.g. work schedule, job tenure, working hours, workload, occupational accidents, and conflict between work and individual, family, and social lives). The WHOQOL-BREF guide was used to assess the workers overall Health-Related Quality of Life[8]. The WHOQOL-BREF questionnaire, developed by the World Health Organisation (WHO), is a short version of the WHOQOL-100 scale[9]. The WHOQOL-BREF is a 26-item scale used to assess HRQOL among industrial workers. It is composed of four domains including: physical health (seven

items), psychological health (six items), social relationships (three items), and environment (eight items). The items of the scale were scored using a five-point Likert scale ranging from 1 (very dissatisfied/very poor) to 5 (very satisfied/very good). The scoring of each domain was performed according to the WHOQOL-BREF manual, ranging from 4 to 20, in which high scores indicate better status of the functional domain[10].

Hence, the modified instrument comprised of three sections:

*Section A: socio -demographic and work-related characteristics

*Section B: Exposure to occupational hazards (biological and non-biological)

*section C: Health-related quality of life, based on the standardized WHOQOL-BREF items.

3.4.1 Intervention

The occupational health interventions that were adopted for this study was work safety training. The training programme which was designed to improve workers knowledge, attitude and practices related to occupational health and safety was divided into different components including safety practices, ergonomic, behavioural health and work-life balance[11]. The safety training programme was delivered by the principal investigator with the support of professional occupational health instructors over a period of three months and each section lasted approximately one hour per day. Interested health and safety personnel in the organisation were also recruited to assist in the training programme and coordination of other events where necessary[12].The health and safety training components covered key topics like workplace accident prevention, hazard identification, use of personal protective equipment (PPE) and emergency response procedures. The ergonomic programme emphasized correct posture, safe lifting techniques, optimal workstation design, and

prevention of musculoskeletal strain. The behavioural health pogramme focused on stress management, mental wellbeing, lifestyle modification, and motivation for sustained safe work practices Posters, fliers and other infographics addressing ways of ensuring optimal work-related safety practices, harmful effect of poor safety behaviour, and good ergonomic practices was made, distributed and put up in all the offices. The adapted WHO Work and Safety plan was also utilised. The sessions were delivered by occupational health experts using participatory methods such as lectures, practical demonstrations, and group discussions. Supplementary materials such as posters and handouts were distributed to reinforce learning. The control group did not receive any of the interventions during the study period but they were provided with a summary of the training materials after the study for ethical reasons.

3.4.2 Intervention Groups

In this group, the industries/employees were enrolled into occupational health interventions of work-related safety training programmes for a period of 3 months.

3.4.3 Control Groups

The industries and employees enrolled into the control group were not enrolled to any training programme although they continue with their usual organisational standard procedures.

3.5 Validity of Research Instrument

To ensure content clarity and appropriateness, the adapted questionnaire underwent face validity by experts in the fields of public health and occupational health. Their feedback helped confirm the relevance, wording and logical flow of the items, ensuring alignment with the study objectives and target populations. The questionnaire was also pretested among

respondents of similar industrial groups in another Local Government area of Oyo State,. specifically, Ibadan north local government area. This formed the basis for reliability of the instrument.

3.6 Reliability of the Research Instrument

The internal consistency of the research instruments was tested using Cronbach's alpha coefficients obtained ranged between 0.78 and 0.86, indicating that the instrument was reliable and consistent for data collection. The WHOQOL-BREF, which has been widely validated in both local and international studies, also maintained acceptable reliability levels across its domains (physical, psychological, social and environmental).

3.7 Data Collection

Data were collected using a structured, self-administered questionnaire that was printed and distributed in hard copy (paper based) format to participants in their workplaces. The paper based administration method was chosen in order to accommodate varying levels of digital literacy among industrial workers and to ensure high response rates. Respondents completed the questionnaires during scheduled breaks under the supervision of trained research assistants who provided clarifications where necessary and also retrieved all completed forms immediately after completion to avoid data loss. Participants and research assistants who were responsible for the data collection were unaware of the intervention allocation until the point prior to the commencement of the intervention to avoid infiltration[11]. The intervention included work redesign, training, ergonomic programmes, and behavioural health programmes. The intervention groups were enrolled to the above programmes while the

control groups were not being enrolled for any. The main outcomes were the differences in the workers' occupational health outcomes and their health-related quality of life.

3.8 Data Analysis

Statistical Package of Social Sciences (SPSS) version 23 was used for data analyses. Results were reported as mean, SD and 95% confidence interval, Pearson product moment correlation was used for hypotheses 1&2 and Independent sampled t test was used to determine the mean difference in HQOL in hypotheses 3, 4 & 5 between the intervention and the control group. All analyses were 2 sided and p values of < 0.05 was statistically significant.

3.9 Ethical Considerations

Ethical approval was obtained from Oyo State Ministry of Health Research Ethics Committee (HREC) with approval no: NHREC/OYOSHRIEC/10/11/22. Ethical issues relevant to this study were duly observed to ensure compliance with established research standards and participant protection, as described below.

Official permission was obtained from the management of the participating industries before data collection. The study complied with contemporary international ethical standards for human research participants, emphasizing respect, beneficence, and justice.[13]

Informed consent was obtained from all participants after a detailed explanation of the study's purpose, procedures, benefits, and potential risks.[14] The process ensured participants' full comprehension and voluntary participation, in accordance with modern best practices in

ethical research.[15] The study emphasized participant understanding and voluntariness consistent with current recommendations in ethical research conduct.[16]

Confidentiality and anonymity were rigorously maintained throughout the study. No identifying information was collected, and completed questionnaires were securely stored to prevent unauthorized access.[17] Participants were informed of their right to withdraw at any stage without penalty, consistent with recent global standards promoting autonomy and participant protection.[18]

Endnotes

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Chapter Four

Results and Discussion of Findings

4.1 Demographic Data Analysis

Demographic Information of the Intervention Group

Table 4.1: Participants' Distribution by Socio-demographics (Intervention Group, n = 106)

Variables	Responses	Frequency	Percentage
Age	20-25Years	29	27
	26-31Years	27	26
	32-36Years	27	26
	37Years and above	23	21
	Total	106	100
Sex	Male	58	55
	Female	48	45
	Total	106	100
Marital Status	Single	48	45
	Married	56	53
	Divorced/Separated	2	2
	Total	106	100
Ethnicity	Yoruba	68	64
	Igbo	34	32
	Hausa	2	2
	Other (Specify)	2	2
	Total	106	100
Religion	Christianity	74	70
	Islam	26	24
	Traditional	5	5
	Atheist	1	1
	Total	106	100

Source: Researcher's Field Study, 2024

The table 4.1 reveals the summary of participants' bio data in terms of age, sex, marital status ethnicity and religion. From table 4.1 it is observed that 29 respondents, (27%) of the study participants were age ranges between 20-25years, 27 respondents, (26%) of the study participants were age ranges between 26-31years, 27 respondents, (26%) of the study participants were age ranges between 32-36years and 23 respondents, (21%) of the study participants were in age 37years and above. Deducing from the findings, it is obvious that majority of the respondents were in age 20-25years, followed by respondents in age 26-36years, these calibres of people are mature enough to give accurate information to the researcher.

In the same vein, it was observed that 58 respondents, (55%) of the study participants were male while 48 respondents, (45%) of the study participants were female. The result implies that there are more male who participated in the study than their female counterpart. Additionally, table 4.1 indicates that 48 respondents (45%) are single, 56 respondents (53%) are married, and 2 respondents (2%) are divorced or separated. The result implies that there are more married who participated in the study than their counterparts in other marital status.

Furthermore, it was observed from table 4.1 that, 68(64%) respondents, were Yoruba, 34(32%) were Igbo, 2(2%) respondents were Hausa, while 2(2%) respondents, were from other tribes. The result implies that there are more Yoruba who participated in the study followed by Igbo compare to respondents from other tribes. Table 4.1 shows that 74 (70%) participants were Christian, 26(24%) participants were Muslim, 5(5%) participants followed Traditional beliefs, and 1(1%) participant was Atheist. The result implies that there are more Christians who participated in the study compared with respondents in other religion.

Table 4.2 : Participants' Distribution by Socio-Economic Characteristics

(Intervention Group, n = 106)

Variables	Response	Frequency	Percentage
Educational Status	No formal education	7	7
	Primary	2	2
	Secondary	20	19
	Tertiary	77	72
	Total	106	100
Occupational	Construction	27	25
Industrial Type	Food Industry	14	13
	Salary Section	4	4
	Cleaning	4	4
	Factory Worker	4	4
	Administration	4	4
	Agriculture	8	8
	Others (hatchery, sales manager, IT student)	41	38
	Total	106	100
Monthly Income	10,000-50,000	49	46
	51,000- 100,000	35	33
	101,000- 150,000	15	14
	151,000 – 200,000	5	5
	201,000 and Above	2	2
	Total	106	100

Source: Researcher's Field Study 2024

Table 4.2 shows the educational status of respondents, it can be observed from the table that, seven (7) respondents, which represent (7%) of the study participants did not have formal education. Similarly, two (2) respondents which represent (2%) of the study participants are first school leaving certificate holders. In addition, twenty (20) respondents which represent (19%) of the study participants are SSCE holders. Moreover, seventy-seven (77) respondents which represent (72%) of the study participants are holders of different certificate in tertiary institutions. The result implies that respondents who hold higher certificate are many in study participants, followed by respondents with SSCE Holders compare to calibre of people in other educational status.

Similarly, one observes from table 4.2 that: twenty-seven (27) respondents which represent (25%) of the study participants were in construction, fourteen (14) respondents which represent (13%) of the study participants were in food industry, four (4) respondents which represent (4%) of the study participants were in salary section four (4) respondents which represent (4%) of the study participants were in cleaning, four (4) respondents which represent (4%) of the study participants were factory worker, four (4) respondents which represent (4%) of the study participants were in administration, eight (8) respondents which represent (8%) of the study participants were in agriculture, and forty-one (41) respondents which represent (38%) of the study participants were in other occupational industrial type such as (hatchery, sales manager, IT student).

The result implies that hatchery, sales manager and IT student, followed by respondents in construction unit, are more in the study participants compare to other calibre of people who participated in the study. Similarly, table 4.2 shows the monthly income of the respondents,

forty-nine (49) respondents which represent five percent (46%) of the study participants earned ₦10,000 – ₦50,000. Also, thirty-five (35) respondents which represent thirty-three percent (33%) of the study participants earned ₦51,000 – ₦100,000, Fifteen (15) respondents which represent thirty-seven percent (11%) of the study participants earned ₦101,000 – ₦150,000, five (5) respondents which represent five percent (5%) of the study participants earned ₦151,000 – ₦200,000 while two (2) respondents which represent two percent (2%) earned. between ₦201,000 and above. The result implies that majority of the respondents earned ₦10,000 – ₦50,000 followed by those who earned ₦51,000 – ₦100,000 respectively.

Table 4.3a: Respondents' Distribution by Occupational Characteristics (Intervention Group, n = 106)

Variables	Response	Frequency	Percentage
Position/Job Role	Staff	30	28
	IT Students	3	3
	Cleaners	4	4
	Accountant	3	3
	Supervisor	11	10
	Casual Workers	10	9
	Manager	6	6
	Others (Attendants, store-keeper/ Production. Receptionist, Guards, Transport)	39	37
	Total	106	100
Department	Mechanic	7	6
	Electronic	1	1
	Civil Engineering	2	2
	Water Treatment Plant	38	36
	Accounting	3	3
	Transport	2	2
	Other (Sales department, Finance, Quality control, store)	53	50
	Total	106	100
Years of Experience	1-5years	52	49
	6-10years	29	27
	11-15years	7	7
	16-20years	11	10
	21-25years	5	5
	31years and above	2	2
	Total	106	100
Nature of Work	Full Time	80	75
	Shifting	24	23
	Working Overtime	2	2
	Total	106	100
Work Load	Light	29	28
	Medium	67	63
	Heavy	10	9
	Total	106	100

Source: Researcher's Field Study 2024

It can be observed from table 4.3a that thirty (30) respondents which represent (28%) of the study participants were staff, three (3) respondents which represent (3%) of the study participants were IT Students, four (4) respondents which represent (4%) of the study participants were Cleaners three (3) respondents which represent (3%) of the study participants were Accountant, eleven (11) respondents which represent (10%) of the study participants were Supervisor, ten (10) respondents which represent (9%) of the study participants were Casual Workers, six (6) respondents which represent (6%) of the study participants were in Manager, and thirty-nine (39) respondents which represent (37%) of the study participants were in others position and job roles (attendants, store-keeper/production. receptionist, guards, transport). The results indicate that participants such as attendants, store-keepers/production personnel, receptionists, guards, and transport workers, followed by respondents who were staff members, were more represented in the study compared to other categories of individuals who participated.

In addition from table 4.3a one observed that: seven (7) respondents which represent (6%) of the study participants were in mechanic Department, one (1) respondents which represent (1%) of the study participants were in Electronic Department, two (2) respondents which represent (2%) of the study participants were in Civil Engineering Department, thirty-eight (38) respondents which represent (36%) of the study participants were in water treatment plant Department, three (3) respondents which represent (3%) of the study participants were in Accounting Department, two (2) respondents which represent (2%) of the study participants were in Transport Department, and fifty-three (53) respondents which represent (50%) of the study participants were in other Department such as Sales department, Finance, Quality control, store. The result implies that participants in Sales department, Finance,

Quality control, store departments, followed by respondents who were water treatment plant, were more in the study participants compare to participants in other Departments.

Respondents' years of experience is also observed from table 4.3a., fifty-two (52) respondents which represent (49%) of the study participants had 1-5years of experience. Furthermore, twenty-nine (29) respondents which represent (27%) of the study participants had 6-10years of experience. Moreover, seven (7) respondents which represent (7%) of the study participants had 11-15years of experience. Similarly, eleven (11) respondents which represent (10%) of the study participants had 16-20years of experience. In addition, five (5) respondents which represent (5%) of the study participants had 21-25years of experience. Also, two (2) respondents which represent (2%) of the study participants had 31years and above of experience. The result implies that majority of the respondents had had 1-5years of experience followed by those who had 6-10years of experience. Majority of the respondents fall within 1-5years of experience.

Table 4.3a further revealed the respondents' nature of work, it was observed that eighty (80) respondents which represent 75% of the study participants were full time workers. Additionally, twenty-four (24) respondents which represent 23% of the study participants were into shifting while two (2) respondents which represent 2% of the study participants were working overtime. The result revealed that majority of the sampled workers were full time workers.

Table 4.3a further revealed the respondents' workload, it was observed that Twenty-nine (29) respondents which represent 28% of the study participants enjoyed light workload. In terms of enjoying workload, sixty-seven (67) respondents which represent 63% of the study participants enjoyed medium workload. Ten (10) respondents which represent 9% of the study participants were under heavy workload. The finding implies that majority of the respondent had medium workload.

Table 4.3b: Respondents' Distribution by Work Conditions and Safety Practices (Intervention Group, n = 106)

Variables	Response	Frequency	Percentage
Duration of Working Hours	1-5 hours	17	16
	6-10 hours	71	67
	11-15 hours	13	13
	16 hours and above	5	5
	Total	106	100
Professional Occupational Training	Yes	93	88
	No	13	12
	Total	106	100
Occupational Health and Safety Training	Yes	93	88
	No	13	12
	Total	106	100
Personal Protective Equipment Use	Yes	88	83
	No	18	17
	Total		
Occupational Accident History	Yes	42	40
	No	64	60
	Total	106	100

Source: Researcher's Field Study 2024

Table 4.3b further revealed the respondents' duration of hours, it was observed that seventeen (17) respondents which represent 16% of the study participants worked within 1-5hours. Also, Seventy-one (71) respondents which represent 67% of the study participants worked within 6-10hours.Likewise, thirteen (13) respondents which represent 13% of the study participants worked within 11-15hours. More so, five (5) respondents which represent 5% of the study participants worked within 16hours and above. The finding implies that majority of the respondents normally work within 6-10hours.

Table 4.3b revealed the professional occupational training of the respondents. It was discovered from the table that ninety-three (93) respondents which represents 88% of the study participants had attended professional occupational training while thirteen (13) respondents which represents 12% of the study participants have not in any time attended professional occupational training. The finding implies that majority of study participants had attended professional occupational training.

Table 4.3b showed the occupational health and safety training of the respondents. It was discovered from the table that exactly ninety-three (93) respondents which represents 88% of the study participants had attended occupational health and safety training while thirteen (13) respondents which represents 12% of the study participants have not at any time attended occupational health and safety training. The finding implies that majority of the study participants had attended occupational health and safety training.

Table 4.3b further explained the personal protective equipment usage of the respondents. It was discovered from the table that about eighty-eight (88) respondents which represents 83% of the study participants had used personal protective equipment. while eighteen (18)

respondents which represents 17% of the study participants have not at any time used personal protective equipment. The finding implies that majority of the study participants usually use personal protective equipment.

Table 4.3b showed the occupational accident history of the respondents. It was discovered from the table that forty-two (42) respondents which represents 40% of the study participants had occupational accident history while sixty-four (64) respondents which represents 60% of the study participants have not in any time have occupational accident history. The finding implies that majority of the study participants did not have occupational accident history.

4.4: Participants' Distribution by Occupational Hazards **(Intervention Group, n = 106)**

Items	Yes	No
Biological Hazards	37 (35%)	69 (65%)
Sharp related injuries (such as needle sticks)	35 (33%)	71 (67%)
Cuts and wounds	43 (41%)	63 (59%)
Direct contact with contaminated specimens/bio-hazardous materials	22 (21%)	84 (79%)
Airborne diseases	9 (9%)	97 (91%)
Infectious diseases and/or infections	19 (18%)	87 (82%)
Others (blood borne pathogens, vector borne diseases)	22 (21%)	84 (79%)

Source: Researcher's Field Study 2024

Table 4.4 explains the pattern of occupational hazard experience by the study participants. it was observed from the table that about thirty-seven (37) respondents which represent (35%) of the study participants had experience biological hazards while sixty (60) respondents which represent (65%) of the study participants did not have this experience. Also, thirty-five (35) respondents which represent (33%) of the study participants had experience sharp related injuries (such as needle sticks) while seventy-one (71) respondents which represent (67%) of the study participants did not have this experience. Furthermore, forty-three (43) respondents which represent (41%) of the study participants had cuts and wounds while sixty-three (63) respondents which represent (59%) of the study participants did not have this experience. Additionally, twenty-two (22) respondents which represent (21%) of the study participants had experience direct contact with contaminated specimens/bio-hazardous materials while eighty-four (84) respondents which represent (79%) of the study participants did not have this experience.

Similarly, nine (9) respondents which represent (9%) of the study participants had experience Airborne diseases while ninety-seven (97) respondents which represent (91%) of the study participants did not have this experience. Also, nineteen (19) respondents which represent (18%) of the study participants had experienced Infectious diseases and/or infections while eighty-seven (87) respondents which represent (82%) of the study participants did not have this experience. Furthermore, twenty-two (22) respondents which represent (21%) of the study participants had experience blood borne pathogens, vector borne diseases while eighty-four (84) respondents which represent (79%) of the study participants did not have this experience. The result implies that majority of the study participants had in one time or the other experience highlighted occupational hazards in the study.

Table 4.5: Participants' Distribution by Common Hazards (Intervention Group, n = 106)

Items	Yes	No
Stress	60(57%)	46(43%)
Physical, psychological, sexual, and/or verbal abuse	21(20%)	85(80%)
Musculoskeletal injuries	20(19%)	86(81%)
Slips, trips, and/or falls	29(27%)	77(73%)
Fractures	30(28%)	76(72%)
Others (chemical spills, noise, burns, and radiations)	20(19%)	86(81%)

Source: Researcher's Field Study 2024

Table 4.5 shows the pattern of common hazard experience by the study participants. It was observed from the table that, sixty (60) respondents which represent (57%) of the study participants had experience stress while forty-six (46) respondents which represent (43%) of the study participants did not have this experience. Moreover, twenty-one (21) respondents which represent (20%) of the study participants had experience physical, psychological, sexual, and/or verbal abuse while eighty-five (85) respondents which tepresent (80%) of the study participants did not have this experience. Also, twenty (20) respondents which represent (19%) of the study participants had experience musculoskeletal injuries while eighty-six (86) respondents which represent (81%) of the study participants did not have this experience.

Similarly, twenty-nine (29) respondents which represent (27%) of the study participants had experience slips, trips, and/or falls while seventy-seven (77) respondents which represent (73%) of the study participants did not have this experience. Also, thirty (30) respondents which represent (28%) of the study participants had experience fractures while seventy-six (76) respondents which represent (72%) of the study participants did not have this experience. In addition, twenty (20) respondents which represent (19%) of the study participants had experience chemical spills, noise, burns, and radiations while eighty-six (86) respondents which represent (81%) of the study participants did not have this experience. The result implies that majority of the study participants had in one time or the other experiences the highlighted biological hazards in the study.

Demographic Information of the Control Group

Table 4.6: Participants' Distribution by Socio-demographics (Control Group, n = 106)

Variables		Frequency	Percentage
Age	20-25Years	38	36
	26-31Years	30	28
	32-36Years	10	10
	37Years and above	28	26
	Total	106	100
Sex	Male	73	69
	Female	33	31
	Total	106	100
Marital Status	Single	64	60
	Married	40	38
	Divorced/Separated	2	2
	Total	106	100
Ethnicity	Yoruba	76	71
	Igbo	24	23
	Hausa	6	6
	Total	106	100
Religion	Christianity	78	74
	Islam	26	24
	Traditional	1	1
	Atheist	1	1
	Total	106	100

Source: Researcher's Field Study 2024

Table 4.6 reveals the summary of participants' bio data in terms of: Age, sex, marital status ethnicity and religion, from table 4.6 it is observed that 38 respondents, (36%) of the study participants were age ranges between 20-25years, 30 respondents, (28%) of the study participants were age ranges between 26-31years, 10 respondents, (10%) of the study participants were age ranges between 32-36years and 28 respondents, (26%) of the study participants were in age 37years and above. Deducing from the findings, it is obvious that majority of the respondents were in age 20-25years, followed by respondents in age 26-36years, these calibres of people are mature enough to give accurate information to the researcher. In the same vein, it was observed that 73 respondents, (69%) of the study participants were male while 33 respondents, (31%) of the study participants were female. The result implies that there are more male who participated in the study than their female counterpart.

In addition, one observes from table 4.6 that, 64 respondents, (60%) of the study participants are single, 40 respondents, (38%) of the study participants are married, while 2 respondents, (2%) are divorced/separated. The result implies that there are more married who participated in the study than their counterparts in other marital status. Furthermore, it was observed from table 4.6 that, 76 respondents, (71%) of the study participants were Yoruba, 24 respondents, (23%) of the study participants were Igbo and 6 respondents (6%) of the study participants were Hausa. The result implies that there are more Yoruba who participated in the study followed by Igbo compare to respondents from other tribes.

Furthermore, one observes from table 4.6 that, 78 respondents, (74%) of the study participants were Christian, 26 respondents, (24%) of the study participants were Muslim, 1 respondent, (1%) of the study participants were Traditional, while 1 respondent, (1%) of the study participants were Atheist. The result implies that there are more Christian who participated in the study compared to respondents in other religion.

Table 4.7: Participants' Distribution by Socio-Economic Characteristics

(Control Group, n = 106)

Variables	Response	Frequency	Percentage
Educational Status	No formal education	6	6
	Primary	1	1
	Secondary	42	40
	Tertiary	57	53
	Total	106	100
Occupational	Construction	25	23
Industrial Type	Food Industry	4	4
	Salary Section	6	6
	Cleaning	5	5
	Production	14	13
	Factory Workers	3	3
	Administration	8	8
	Agriculture	3	3
	Others (hatchery, sales manager, IT student)	38	35
	Total	106	100
Monthly Income	₦10,000 – ₦50,000	51	48
	₦51,000 – ₦100,000	31	29
	₦101,000 – ₦150,000	8	8
	₦151,000 – ₦200,000	3	3
	₦201,000 and Above	13	12
	Total	106	100

Source: Researcher's Field Study 2024

Table 4.7 shows the educational status of respondents, it can be observed from the table that, six (6) respondents, which represent (6%) of the study participants did not have formal education. Similarly, One (1) respondent which represent (1%) of the study participants is first school leaving certificate holder. Similarly, forty-two (42) respondents which represent (40%) of the study participants are SSCE holders. In addition, fifty-seven (57) respondents which represent (53%) of the study participants are holders of different certificate in tertiary institutions. The result implies that respondents who hold higher certificate are many in study participants, followed by respondents with SSCE Holders compare to calibre of people in other educational status.

Similarly, one observes from table 4.7 that Twenty-five (25) respondents which represent (23%) of the study participants were in construction, four (4) respondents which represent (4%) of the study participants were in food industry, four (4) respondents which represent (4%) of the study participants were in salary section four (4) respondents which represent (4%) of the study participants were in cleaning, fourteen (14) respondents which represent (13%) of the study participants were production, three (3) respondents which represent (3%) of the study participants were factory workers, eight (8) respondents which represent (8%) of the study participants were in administration, three (3) respondents which represent (3%) of the study participants were agriculture, and thirty-eight (38) respondents which represent (35%) of the study participants were in other occupational industrial type such as (hatchery, sales manager, IT student). The result implies that hatchery, sales manager and IT student, followed by respondents in construction unit, are more in the study participants compare to other calibre of people who participated in the study.

Similarly, table 4.7 shows the monthly income of the respondents, fifty-one (51) respondents which represent five percent (48%) of the study participants earned ₦10,000 – ₦50,000. About, thirty-one (31) respondents which represent twenty-nine percent (29%) of the study participants earned ₦51,000 – ₦100,000, Eight (8) respondents which represent eight percent (8%) of the study participants earned ₦101,000 – ₦150,000, three (3) respondents which represent three percent (3%) of the study participants earned ₦151,000 – ₦200,000 while thirteen (13) respondents which represent twelve percent (12%) earned around ₦201,000 and above. The result implies that majority of the respondents earned ₦10,000 – ₦50,000 followed by those who earned ₦51,000 – ₦100,000 respectively.

Table 4.8a: Participants' Distribution by Occupational Characteristics (Control Group, n = 106)

Variables	Response	Frequency	Percentage
Position/Job Role	Staff	10	9
	Cleaners	2	2
	Accountant	18	17
	Supervisor	6	6
	Casual Workers	24	23
	Production	12	11
	Manager	10	9
	Others (Attendants, store-keeper. Receptionist, Guards, Transport)	24	23
	Total	106	100
Department	Mechanic	19	18
	Civil Engineering	2	2
	Water Treatment Plant	2	2
	Accounting	1	1
	Security	2	2
	Production	16	15
	Transport	4	4
	Other (Sales department, Finance, Quality control, store)	60	56
	Total	106	100
Years of Experience	1-5years	64	60
	6-10years	25	23
	11-15years	8	8
	16-20years	5	5
	21-25years	2	2
	26-30years	2	2
	Total	106	100
Nature of Work	Full Time	74	70
	Shifting	28	26
	Working Overtime	4	4
	Total	106	100
Work Load	Light	30	28
	Medium	63	60
	Heavy	13	12
	Total	106	100

Source: Researcher's Field Study 2024

It can be observed from table 4.8a that ten (10) respondents which represent (9%) of the study participants were staff, two (2) respondents which represent (2%) of the study participants were IT Students, eighteen (18) respondents which represent (17%) of the study participants were Cleaners six (6) respondents which represent (6%) of the study participants were Accountant, twenty-four (24) respondents which represent (23%) of the study participants were Supervisor, twelve (12) respondents which represent (11%) of the study participants were Casual Workers, ten (10) respondents which represent (9%) of the study participants were in Manager, and twenty-four (24) respondents which represent (23%) of the study participants were in others position and job roles (attendants, store-keeper/production. receptionist, guards, transport). The result implies that participants who are casual workers and attendants, storekeepers, receptionists, guards, transport workers, followed by respondents who were accountants, were more in the study participants compared to other calibre of people who participated in the study.

In addition from Table 4.8a one observed that nineteen (19) respondents which represent (18%) of the study participants were in mechanic department, two (2) respondents which represent (2%) of the study participants were in Civil Engineering Department, two (2) respondents which represent (2%) of the study participants were in water treatment plant Department, one (1) respondent which represent (1%) of the study participants were in Accounting Department, two (2) respondents which represent (2%) of the study participants were in security, sixteen (16) respondents which represent (15%) of the study participants were in security, four (4) respondents which represent (4%) of the study participants were in transport and sixty (60) respondents which represent (56%) of the study participants were in other Department such as Sales department, Finance, Quality control, store. The result

implies that participants in Sales department, Finance, Quality control, store departments, followed by respondents who were mechanic and production, were more in the study participants compare to participants in other Departments.

It is also observed from the table on the respondents' years of experience, that, sixty-four (64) respondents which represent (60%) of the study participants had 1-5years of experience. Additionally, twenty-five (25) respondents which represent (23%) of the study participants had 6-10years of experience. Also, eight (8) respondents which represent (8%) of the study participants had 11-15years of experience. In addition, five (5) respondents which represent (5%) of the study participants had 16-20years of experience. Furthermore, two (2) respondents which represent (2%) of the study participants had 21-25years of experience. More so, two (2) respondents which represent (2%) of the study participants had 31years and above of experience. The result implies that majority of the respondents had 1-5years of experience followed by those who had 6-10years of experience. Majority of the respondents fall within 1-5years of experience.

Table 4.8a further revealed the respondents' nature of work, it was observed that Seventy-four (74) respondents which represent 70% of the study participants were full time workers. In the same vein, twenty-eight (28) respondents which represent 26% of the study participants were into shifting while four (4) respondents which represent 4% of the study participants were working overtime. The result revealed that majority of the sampled workers was full time workers.

Table 4.8a further revealed the respondents' workload, it was observed that thirty (30) respondents which represent 28% of the study participants enjoyed light work load. Here,

sixty-three (63) respondents which represent 60% of the study participants enjoyed medium workload while thirteen (13) respondents which represent 12% of the study participants were under medium work load follow by participants in light work load. The finding implies that majority of the respondent had medium workload.

Table 4.8b: Participants Distribution by Work Conditions and Safety Practices (Control Group, n = 106)

Variables	Response	Frequency	Percentage
Duration of Working Hours	1-5Hours	11	10
	6-10Hours	85	80
	11-15Hours	7	7
	16Hours and above	3	3
	Total	106	100
Professional Occupational Training	Yes	98	92
	No	8	8
	Total	106	100
Occupational Health and Safety Training	Yes	87	82
	No	19	18
	Total	106	100
Personal Protective Equipment Use	Yes	91	86
	No	15	14
	Total	106	100
Occupational Accident History	Yes	26	25
	No	80	75
	Total	106	100

Source: Researcher's Field Study 2024

Table 4.8b further revealed the respondents' duration of hours it was observed that eleven (11) respondents which represent 10% of the study participants worked within 1-5hours. However, eighty-five (85) respondents which represent 80% of the study participants worked within 6-10hours while, seven (7) respondents which represent 7% of the study participants worked within 11-15hours. The table also revealed that three (3) respondents which represent 3% of the study participants worked within 16hours and above. The finding implies that majority of the respondents normally work within 6-10hours.

Table 4.8b revealed the professional occupational training of the respondents. It was discovered from the table that ninety-eight (98) respondents which represents 92% of the study participants had attended professional occupational training while eight (8) respondents which represents 8% of the study participants have not in any time attended professional occupational training. The finding implies that majority of study participants had attended professional occupational training.

Table 4.8b showed the occupational health and safety training of the respondents. It was discovered from the table that eighty-seven (87) respondents which represents 82% of the study participants had attended occupational health and safety training while nineteen (19) respondents which represents 18% of the study participants have not in any time attended occupational health and safety training. The finding implies that majority of study participants had attended occupational health and safety training.

Table 4.8b further explained the personal protective equipment usage of the respondents. It was discovered from the table that: Ninety-one (91) respondents which represents 86% of the study participants had used personal protective equipment while fifteen (15) respondents

which represents 14% of the study participants have not in any time used personal protective equipment. The finding implies that majority of study participants usually use personal protective equipment.

Table 4.8b showed the occupational accident history of the respondents. It was discovered from the table that twenty-six (26) respondents which represents 25% of the study participants had occupational accident history while eighty (80) respondents which represents 75% of the study participants have not in any time have occupational accident history. The finding implies that majority of study participants did not have occupational accident history.

Table 4.9: Participants' Distribution by Occupational Hazards (Control, n = 106)

Items	Yes	No
Biological Hazards	20(19%)	86(81%)
Sharp related injuries (such as needle sticks)	25(24%)	81(76%)
Cuts and wounds	27(26%)	79(74%)
Direct contact with contaminated specimens/bio-hazardous materials	23(22%)	83(78%)
Airborne diseases	20(19%)	86(81%)
Infectious diseases and/or infections	20(19%)	86(81%)
Others (blood borne pathogens, vector borne diseases)	14(13%)	92(87%)

Source: Researcher's Field Study 2024

Table 4.9 explains the pattern of occupational hazard experience by the study participants. It was observed from the table that: Twenty (20) respondents which represent (19%) of the study participants had experience biological hazards while eighty-six (86) respondents which represent (81%) of the study participants did not have this experience. Also, twenty-five (25) respondents which represent (24%) of the study participants had experience sharp related injuries (such as needle sticks) while eighty-one (81) respondents which represent (76%) of the study participants did not have this experience. In addition, twenty-seven (27) respondents which represent (26%) of the study participants had cuts and wounds while seventy-nine (79) respondents which represent (74%) of the study participants did not have this experience.

Furthermore, twenty-three (23) respondents which represent (22%) of the study participants had experience direct contact with contaminated specimens/bio-hazardous materials while eighty-three (83) respondents which represent (78%) of the study participants did not have this experience. Also, twenty (20) respondents which represent (19%) of the study participants had experience airborne diseases while eighty-six (86) respondents which represent (81%) of the study participants did not have this experience. Similarly, twenty (20) respondents which represent (19%) of the study participants had experience infectious diseases and/or infections while eighty-six (86) respondents which represent (81%) of the study participants did not have this experience. Likewise, fourteen (14) respondents which represent (13%) of the study participants had experience blood borne pathogens, vector borne diseases while ninety-two (92) respondents which represent (87%) of the study participants did not have this experience. The result implies that majority of the study participants had in one time, or the other experienced some highlighted occupational hazards in the study.

Table 4.10: Participants' Distribution by Common Hazards (Control, n = 106)

Items	Yes	No
Stress	66(62%)	40(38%)
Physical, psychological, sexual, and/or verbal abuse	17(16%)	89(84%)
Musculoskeletal injuries	15(14%)	91(86%)
Slips, trips, and/or falls	25(24%)	81(76%)
Fractures	17(16%)	89(84%)
Others (chemical spills, noise, burns, and radiations)	21(20%)	85(80%)

Source: Researcher's Field Study 2024

Table 4.10 explains the pattern of Common hazard experience by the study participants. It was observed from the table that, Sixty-six (66) respondents which represent (62%) of the study participants had experience stress while forty (40) respondents which represent (38%) of the study participants did not have this experience. In addition, seventeen (17) respondents which represent (16%) of the study participants had experience physical, psychological, sexual, and/or verbal abuse while eighty-nine (89) respondents which represent (84%) of the study participants did not have this experience. Also, fifteen (15) respondents which represent (14%) of the study participants had experience musculoskeletal injuries while ninety-one (91) respondents which represent (86%) of the study participants did not have this experience. Similarly, twenty-five (25) respondents which represent (24%) of the study participants had experience slips, trips, and/or falls while eighty-one (81) respondents which represent (76%) of the study participants did not have this experience.

Furthermore, seventeen (17) respondents which represent (16%) of the study participants had experience fractures while eighty-nine (89) respondents which represent (84%) of the study participants did not have this experience. In addition, twenty-one (21) respondents which represent (20%) of the study participants had experience chemical spills, noise, burns, and radiations while eighty-five (85) respondents which represent (80%) of the study participants did not have this experience. The result implies that majority of the study participants had in one time or the other experienced the highlighted biological hazards in the study.

4.2 Presentation of Data

4.2.1 Research Questions

Research Question One: What is the health-related quality of life among the control group?

Table 4.11: Health-Related Quality of Life among the Control Group

S/N	Items	AL	MD	M	C	Mean	Std Dev
1	How would you rate your quality of life?	27 (26%)	46 (43%)	22 (21%)	11 (10%)	2.16	0.93
2	How satisfied are you with your health?	22 (21%)	48 (45%)	17 (16%)	19 (18%)	2.31	1.00
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	19 (18%)	53 (50%)	18 (17%)	16 (15%)	2.29	0.94
4	How much do you need any medical treatment to function in your daily life?	28 (26%)	44 (42%)	22 (21%)	12 (11%)	2.17	0.95
5	How much do you enjoy life?	14 (13%)	47 (45%)	34 (32%)	11 (10%)	2.40	0.85
6	To what extent do you feel your life to be meaningful?	29 (27%)	38 (36%)	23 (22%)	16 (15%)	2.25	1.02

7	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	37 (35%)	40 (38%)	15 (14%)	14 (13%)	2.06	1.01
8	How well are you able to concentrate?	12 (11%)	38 (36%)	37 (35%)	19 (18%)	2.59	0.91
9	How safe do you feel in your daily life?	10 (9%)	58 (55%)	38 (36%)	0 (0%)	2.26	0.62
10	How healthy is your physical environment?	16 (15%)	31 (29%)	44 (42%)	15 (14%)	2.55	0.91
11	Do you have enough energy for everyday life?	6 (5%)	53 (50%)	22 (21%)	25 (24%)	2.62	0.91
12	Are you able to accept your bodily appearance?	9 (9%)	51 (48%)	34 (32%)	12 (11%)	2.46	0.81
13	Have you enough money to meet your needs?	25 (24%)	61 (58%)	16 (15%)	4 (3%)	1.99	0.74
14	How available to you is the information that you need in your day-to-day life?	11 (10%)	58 (55%)	25 (24%)	12 (11%)	2.36	0.81
15	To what extent do you have the opportunity for leisure activities?	31 (29%)	45 (43%)	24 (23%)	6 (5%)	2.05	0.87
16	How well are you able to get around?	17 (16%)	55 (52%)	24 (23%)	10 (9%)	2.25	0.84

17	How satisfied are you with your sleep?	20 (19%)	45 (42%)	20 (19%)	21 (20%)	2.40	1.01
18	How satisfied are you with your ability to perform your daily living activities?	13 (12%)	54 (52%)	29 (27%)	10 (9%)	2.34	0.81
19	How satisfied are you with your capacity for work?	14 (13%)	54 (51%)	20 (19%)	18 (17%)	2.40	0.92
20	How satisfied are you with yourself?	18 (17%)	53 (50%)	14 (13%)	21 (20%)	2.36	0.99
21	How satisfied are you with your personal relationships?	14 (13%)	57 (54%)	30 (28%)	5 (5%)	2.25	0.74
22	How satisfied are you with your sex life?	21 (20%)	61 (58%)	19 (18%)	5 (4%)	2.08	0.75
23	How satisfied are you with the support you get from your friends?	23 (22%)	49 (46%)	23 (22%)	11 (10%)	2.21	0.90
24	How satisfied are you with the conditions of your living place?	18 (17%)	48 (45%)	25 (24%)	15 (14%)	2.35	0.93
25	How satisfied are you with your access to health services?	25 (24%)	55 (52%)	20 (19%)	6 (5%)	2.07	0.81
26	How satisfied are you with your transport?	24 (23%)	41 (39%)	25 (24%)	16 (14%)	2.31	0.90
Weighted Mean						2.29	0.88

Note that: AL = A little, MD = Moderately, M = Mostly, C = Completely
Source: Researcher's Field Study 2024

Table 4.11 reveals health-related quality of life among the control group to answer this question, the two response formats on the lower level that is: a little and moderately were collapsed to be represented by “little” while the two response formats at the higher level that is: mostly and completely were collapsed to be represented by “complete”. Similarly, the average of the response formats was taken as: (A little =1, moderately = 2, Mostly = 3, and completely = 4) 1 + 2 + 3 + 4 = 10. Therefore, 10/4 = 2.5. From the table it was observed that a total of 69% of the study participants claimed that their quality of life is little while 31% agreed that it is complete. Likewise, a majority of 66% of the study participants claimed that their satisfaction with health quality of life is little while 34% agreed that it is complete. In terms of physical pain, it was found that 68% of the study participants claimed that they feel that physical pain prevents them from doing what they need to do a little while 32% agreed that it is completely affecting them. Similarly, the same proportion of 68% of the study participants claimed that they need medical treatment a little to function in their daily life, while 32% agreed that they completely need it. Additionally, it was reported that 58% of the study participants claimed that they enjoy life a little while 42% agreed that they enjoy life completely. Lastly, a total of 63% of the study participants claimed that they feel that life is meaningful a little while 37% agreed that life is completely meaningful.

Similarly, 73% of the study participants claimed that they have negative feelings such as blue mood, despair, anxiety, depression a little while 27% agreed that it is completely affecting them. Among the study participants, 47% reported that they could concentrate a little, while 53% indicated that they were completely unable to concentrate. Similarly, 64% of the study participants claimed that they feel little safe in their daily life while 36% claimed that they were completely safe. Furthermore, 44% of the study participants claimed that they have a

little healthy physical environment while 56% agreed that their environment is completely safe. Among the study participants, 56% reported that they had a little energy for their everyday life, while 45% stated that they had a complete energy. Similarly, 57% indicated that they could accept their bodily appearance a little, whereas 43% reported complete acceptance. A total of 82% of the study participants claimed that they have little money to meet their needs while 18% agreed completely that they have enough money to meet their daily needs. Among the study participants, 65% reported having only a little access to the information they need for daily life, while 35% stated that they had complete access. Similarly, 72% indicated that they had only a little opportunity for leisure activities, whereas 28% reported having complete opportunities. In terms of mobility, 68% stated that they were able to get around easily, while 32% indicated that they could do so completely. Furthermore, 61% of the participants reported being a little satisfied with their sleep, while 39% stated they were completely satisfied. Likewise, 64% indicated that they were a little satisfied with their ability to perform daily living activities, whereas 36% reported complete satisfaction. A similar trend was observed regarding work capacity, with 64% of participants stating they were a little satisfied, while 36% were completely satisfied.

Regarding self-perception and relationships, 67% of participants reported being a little satisfied with themselves, while 33% were completely satisfied. Similarly, 67% indicated that they were a little satisfied with their personal relationships, whereas 33% reported complete satisfaction. In terms of sexual satisfaction, 78% of participants stated they were a little satisfied, while 22% were completely satisfied. Additionally, 68% indicated that they were a little satisfied with the support they receive from friends, whereas 32% were completely satisfied. Regarding living conditions and access to services, 62% of participants

reported being only a little satisfied with their living conditions, while 38% were completely satisfied. Similarly, 76% indicated that they were a little satisfied with their access to healthcare services, while 24% stated they had complete access. Additionally, 62% of participants reported being a little satisfied with transport, while 38% were completely satisfied.

From these findings, it was observed that the health-related quality of life among the control group was generally poor, as the majority of respondents indicated limited access to essential aspects of daily life. This is further supported by the weighted mean of 2.29 from Table 4.11, which is lower than the response format average of 2.5, confirming that the health-related quality of life of the control group was suboptimal.

Research Question Two: What is the health-related quality of life among the intervention group?

Table 4.12: Health-Related Quality of Life among the Intervention Group

S/N	Items	AL	MD	M	C	Mean	Std Dev
1	How would you rate your quality of life?	78 (74%)	2 (2%)	19 (18%)	7 (6%)	1.58	1.00
2	How satisfied are you with your health?	84 (79%)	2 (2%)	15 (14%)	5 (5%)	1.44	0.91
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	26 (25%)	62 (59%)	13 (12%)	5 (4%)	1.97	0.75
4	How much do you need any medical treatment to function in your daily life?	36 (34%)	46 (43%)	20 (19%)	4 (4%)	1.92	0.83
5	How much do you enjoy life?	34 (32%)	6 (5%)	62 (59%)	4 (4%)	2.34	0.98
6	To what extent do you feel your life to be meaningful?	77 (72%)	3 (3%)	23 (22%)	3 (3%)	1.55	0.93
7	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	44 (41%)	24 (23%)	27 (26%)	11 (10%)	2.05	1.05

8	How well are you able to concentrate?	42 (40%)	3 (3%)	49 (46%)	12 (11%)	2.29	1.11
9	How safe do you feel in your daily life?	60 (57%)	4 (4%)	37 (35%)	5 (4%)	1.88	1.05
10	How healthy is your physical environment?	43 (41%)	2 (2%)	56 (53%)	5 (4%)	2.22	1.04
11	Do you have enough energy for everyday life?	20 (19%)	42 (40%)	33 (31%)	11 (10%)	2.33	0.90
12	Are you able to accept your bodily appearance?	25 (24%)	32 (30%)	45 (43%)	4 (3%)	2.26	0.87
13	Have you enough money to meet your needs?	25 (24%)	48 (45%)	27 (26%)	6 (5%)	2.13	0.84
14	How available to you is the information that you need in your day-to-day life?	20 (19%)	46 (43%)	31 (29%)	9 (9%)	2.27	0.87
15	To what extent do you have the opportunity for leisure activities?	28 (26%)	55 (52%)	17 (16%)	6 (6%)	2.01	0.81
16	How well are you able to get around?	17 (16%)	56 (53%)	19 (18%)	14 (13%)	2.28	0.89
17	How satisfied are you with your sleep?	53 (51%)	30 (28%)	13 (12%)	10 (9%)	1.81	0.99

18	How satisfied are you with your ability to perform your daily living activities?	58 (55%)	25 (24%)	20 (19%)	3 (2%)	1.70	0.88
19	How satisfied are you with your capacity for work?	56 (53%)	5 (5%)	30 (28%)	15 (14%)	2.04	1.18
20	How satisfied are you with yourself?	64 (60%)	6 (6%)	24 (23%)	12 (11%)	1.85	1.13
21	How satisfied are you with your personal relationships?	55 (52%)	7 (7%)	28 (26%)	16 (15%)	2.05	1.18
22	How satisfied are you with your sex life?	67 (63%)	3 (3%)	28 (26%)	8 (8%)	1.78	1.08
23	How satisfied are you with the support you get from your friends?	47 (44%)	14 (13%)	40 (38%)	5 (5%)	2.03	1.01
24	How satisfied are you with the conditions of your living place?	56 (53%)	18 (17%)	27 (26%)	5 (4%)	1.82	0.97
25	How satisfied are you with your access to health services?	57 (54%)	24 (23%)	22 (21%)	3 (2%)	1.73	0.89
26	How satisfied are you with your transport?	53 (50%)	17 (16%)	19 (18%)	17 (16%)	2.00	1.16
Weighted Mean						1.97	0.97

Note that: AL = A little, MD = Moderately, M = Mostly, C = Completely

Source: Researcher's Field Study 2024

Table 4.12 reveals health-related quality of life among the control group to answer this question, the two response formats on the lower level that is: a little and moderately were collapsed to be represented by “little” while the two response formats at the higher level that is: mostly and completely were collapsed to be represented by “complete”. Similarly, the average of the response formats was taken as: (A little =1, moderately = 2, Mostly = 3, and completely = 4) 1 + 2 + 3 + 4 = 10. Therefore, 10/4 = 2.5.

From the table, it was observed that 76% of the study participants reported that their quality of life was low, while 24% stated that it was complete. Similarly, 81% indicated that their satisfaction with health-related quality of life was low, whereas 19% reported complete satisfaction. Regarding physical pain, 84% of participants stated that it slightly prevented them from carrying out their daily activities, while 16% reported that it completely affected them. Additionally, 77% indicated that they required medical treatment to function in their daily lives to a small extent, whereas 23% stated that they completely needed it. In terms of life enjoyment, 37% of participants reported that they experienced a little enjoyment in life, while 63% stated that their life enjoyment was complete. Likewise, 75% indicated that they felt their life had little meaning, whereas 25% reported that their life was completely meaningful. Also, 64% of the study participants claimed that they have little negative feelings such as blue mood, despair, anxiety, depression while 36% agreed that it was completely affecting them. More so, 43% of the study participants claimed that they can concentrate a little while 57% agreed that they are able to completely concentrate. Furthermore, 61% of the study participants claimed that they feel safe in their daily life a little while 39% agreed that they completely feel safe.

Moreover, 43% of the study participants claimed that they have little healthy physical environment while 57% agreed that it was completely healthy. Also, 59% of the study participants claimed that they have little energy for everyday life while 41% agreed that their energy for everyday life was completely. Additionally, 54% of the study participants claimed that they were able to accept their bodily appearance a little while 46% agreed that it was completely. Again, 69% of the study participants claimed that they have little money to meet their needs while 31% agreed completely that they have enough money to meet their needs. Also, 62% of the study participants claimed that they have a little access to day-to-day life information while 38% agreed that they completely have access. In addition, 78% of the study participants claimed that they have a little opportunity for leisure activities while 22% agreed that it was completely. Similarly, 69% of the study participants claimed that they get around a little easily while 31% agreed that they completely get around. In the same vein, 75% of the study participants claimed that they were a little satisfied with their sleep while 21% agreed that they were completely satisfied. Additionally, 79% of the study participants claimed that they were a little satisfied with their ability to perform daily living activities while 21% agreed that it was completely.

In addition, 58% of the study participants claimed that they were a little satisfied with their capacity for work while 42% agreed that it was completely. Also, 66% of the study participants claimed that they were a little satisfied with themselves while 34% agreed that that they were completely satisfied. A total of 59% of the study participants claimed that they were a little satisfied with their personal relationships while 41% agreed that they were completely satisfied. Furthermore, 66% of the study participants claimed that they were a little satisfied with their sex life while 34% agreed that their satisfaction with sex life was

completely. Also, 57% of the study participants claimed that they were a little satisfied with the support they get from their friends while 43% agreed that the support they enjoy from friends was completely. Again, 70% of the study participants claimed that they were a little satisfied with the conditions of their living place while 30% agreed that they were completely satisfied. More so, 77% of the study participants claimed that they were a little satisfied with their access to health services while 23% agreed that their access to health service was completely satisfactory. Again, 66% of the study participants claimed that they were a little satisfied with their transport service while 34% agreed that they were completely satisfied with the means of transport. The inference from this finding is that health-related quality of life among the intervention group was poor as majority of the respondents asserted that they have a little access to all the highlighted basic necessities of life in the items used to measure health-related quality of life. Similarly, the weighted mean 1.97 from table 4.7 is less than the average of the response formats 2.5 which testified to the fact that health-related quality of life of the intervention group was poor.

Research Question Three: Is there any significant improvement in the health-related quality of life within intervention group after administration of intervention?

Table 4.13: Post Intervention Health-Related Quality of Life among the Intervention Group

S/N	Items	AL	MD	M	C	Mean	Std Dev
1	How would you rate your quality of life?	4 (4%)	6 (6%)	29 (27%)	67 (63%)	3.50	0.77
2	How satisfied are you with your health?	21 (20%)	68 (64%)	7 (7%)	10 (9%)	3.42	0.91
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	4 (4%)	9 (9%)	27 (25%)	66 (62%)	3.46	0.81
4	How much do you need any medical treatment to function in your daily life?	41 (39%)	52 (49%)	9 (9%)	4 (4%)	1.77	0.76
5	How much do you enjoy life?	5 (5%)	14 (13%)	26 (24%)	61 (57%)	3.35	0.88
6	To what extent do you feel your life to be meaningful?	5 (5%)	12 (11%)	21 (20%)	68 (64%)	3.43	0.87
7	How often do you have negative	66	24	3	13	1.65	1.01

	feelings such as blue mood, despair, anxiety, depression?	(62%)	(23%)	(3%)	(12%)		
8	How well are you able to concentrate?	2 (2%)	13 (12%)	21 (20%)	70 (66%)	3.50	0.78
9	How safe do you feel in your daily life?	9 (9%)	11 (10%)	25 (24%)	61 (58%)	3.30	0.97
10	How healthy is your physical environment?	0 (0%)	7 (7%)	16 (15%)	83 (78%)	3.72	0.58
11	Do you have enough energy for everyday life?	5 (5%)	4 (4%)	25 (24%)	72 (68%)	3.55	0.78
12	Are you able to accept your bodily appearance?	2 (2%)	14 (13%)	19 (18%)	71 (67%)	3.50	0.80
13	Have you enough money to meet your needs?	1 (1%)	9 (9%)	27 (25%)	69 (65%)	3.55	0.69
14	How available to you is the information that you need in your day-to-day life?	2 (2%)	11 (10%)	23 (22%)	70 (66%)	3.52	0.76
15	To what extent do you have the opportunity for leisure activities?	2 (2%)	15 (14%)	15 (14%)	74 (70%)	3.52	0.81
16	How well are you able to get around?	4 (4%)	12 (11%)	22 (21%)	68 (64%)	3.45	0.84

17	How satisfied are you with your sleep?	4 (4%)	12 (11%)	20 (20%)	70 (65%)	3.47	0.84
18	How satisfied are you with your ability to perform your daily living activities?	2 (2%)	10 (9%)	19 (18%)	75 (71%)	3.58	0.74
19	How satisfied are you with your capacity for work?	6 (6%)	8 (8%)	20 (20%)	72 (68%)	3.49	0.86
20	How satisfied are you with yourself?	5 (5%)	4 (4%)	24 (23%)	73 (69%)	3.56	0.78
21	How satisfied are you with your personal relationships?	3 (3%)	11 (10%)	35 (33%)	63 (59%)	3.53	0.79
22	How satisfied are you with your sex life?	2 (2%)	6 (6%)	35 (33%)	63 (59%)	3.50	0.69
23	How satisfied are you with the support you get from your friends?	4 (4%)	6 (6%)	25 (24%)	71 (67%)	3.54	0.77
24	How satisfied are you with the conditions of your living place?	6 (6%)	9 (9%)	21 (20%)	70 (66%)	3.46	0.87
25	How satisfied are you with your access to health services?	3 (3%)	10 (10%)	28 (26%)	65 (61%)	3.46	0.78
26	How satisfied are you with your transport?	5 (5%)	16 (15%)	22 (21%)	63 (59%)	3.35	0.90
Weighted Mean						3.35	0.81

Source: Researcher's Field Study 2024

Table 4.13 reveals the post-intervention health-related quality of life within the intervention group. To answer this research question, the two response formats on the lower level, namely "A little" and "Moderately," were collapsed into "Little," while the two response formats on the higher level, namely "Mostly" and "Completely," were collapsed into "Completely." Likewise, the average of the response formats was calculated as follows: (A little = 1, Moderately = 2, Mostly = 3, Completely = 4) 1+2+3+4 = 10. Therefore, 10/4 = 2.5.

From the table, it is observed that 10% of the study participants claimed that their quality of life was little, while 90% agreed that their quality of life was completely satisfactory. Also, 16% of the study participants claimed that they had little satisfaction with their health-related quality of life, while 84% agreed that they were completely satisfied. In addition, 87% of the study participants accepted that physical pain prevented them from doing what they needed to do a little, while 13% agreed that it completely affected them.

Similarly, 87% of the study participants claimed that they needed little medical treatment to function well in life, while only 13% of the participants agreed that they completely needed it. In addition, 18% of the study participants claimed that they enjoyed life a little, while 82% of the participants agreed that they enjoyed life completely. Furthermore, 16% of the study participants were of the opinion that their life was a little meaningful, while 84% agreed that their life was completely meaningful. Additionally, 85% of the study participants claimed that they had negative feelings such as blue mood, despair, anxiety, and depression a little, while 15% completely agreed that they had negative feelings. Also, 14% of the study participants claimed that they were able to concentrate a little, while 86% agreed that they were able to concentrate completely.

Moreover, 19% of the participants claimed that they felt a little safe in their daily life, while 81% claimed that they felt completely safe. Additionally, 7% of the study participants claimed that they were a little healthy in their physical environment, while 93% claimed that their physical environment was completely healthy. Similarly, 9% of the study participants claimed that they had little energy for their everyday life, while 91% agreed that they completely had enough energy for everyday life. Furthermore, 15% of the study participants claimed that they could accept their bodily appearance a little, while 85% agreed that they could completely accept their bodily appearance. Likewise, 10% of the study participants claimed that they had only a little money to meet their needs, while 90% completely agreed that they had enough money.

In addition, 12% of the study participants claimed that they had little access to the information they needed in their day-to-day life, while 88% completely agreed that they had access to the necessary information. Also, 16% of the participants claimed that they had little opportunity for leisure activities, while 84% agreed that they had complete access to leisure activities. Furthermore, 15% of the study participants claimed they were able to get around a little, while 85% agreed that they were able to get around completely. Moreover, 15% of the study participants claimed that they were a little satisfied with their sleep, while 85% were completely satisfied. Also, 11% of the participants claimed that they were a little satisfied with their ability to perform their daily living activities, while 89% completely agreed. Additionally, 14% of the study participants claimed they were a little satisfied with their capacity for work, while 84% completely agreed that they were satisfied with their capacity for work.

Similarly, 9% of the study participants claimed that they were a little satisfied with themselves, while 91% claimed that they were completely satisfied. Additionally, 13% of the study participants claimed that they were a little satisfied with their personal relationships, while 87% completely agreed. Also, 8% of the study participants claimed that they were a little satisfied with their sex life, while 92% of the participants completely agreed. Likewise, 10% of the study participants claimed that they were a little satisfied with the support they received from friends, while 90% completely agreed. Additionally, 15% of the study participants claimed that they were a little satisfied with the condition of their living place, while 85% agreed completely. Moreover, 13% of the study participants claimed that they were a little satisfied with their access to health services, while 87% agreed that they were completely satisfied. Also, 20% of the study participants claimed that they were a little satisfied with their transport, while 80% agreed completely.

The inference from this finding is that the post-intervention health-related quality of life within the intervention group is high, as the majority of the respondents asserted that they had complete access to all the necessities of life, as measured by the health-related quality of life indicators. Similarly, the weighted mean of 3.35 from Table 4.8 is higher than the average response format of 2.5, which testifies to the fact that the post-intervention health-related quality of life of the intervention group is high as a result of the administered intervention (health and safety trainings, ergonomic programs, and behavioural health programs).

Table 4.14: Post Intervention Health-Related Quality of Life among the Control Group

S/N	Items	AL	MD	M	C	Mean	Std Dev
1	How would you rate your quality of life?	27 (26%)	46 (43%)	22 (21%)	11 (10%)	2.16	0.93
2	How satisfied are you with your health?	22 (21%)	48 (45%)	17 (16%)	19 (18%)	2.31	1.00
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	19 (18%)	53 (50%)	18 (17%)	16 (15%)	2.29	0.94
4	How much do you need any medical treatment to function in your daily life?	28 (26%)	44 (42%)	22 (21%)	12 (11%)	2.17	0.95
5	How much do you enjoy life?	14 (13%)	47 (45%)	34 (32%)	11 (10%)	2.40	0.85
6	To what extent do you feel your life to be meaningful?	29 (27%)	38 (36%)	23 (22%)	16 (15%)	2.25	1.02
7	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	37 (35%)	40 (38%)	15 (14%)	14 (13%)	2.06	1.01
8	How well are you able to	12	38	37	19	2.59	0.91

	concentrate?	(11%)	(36%)	(35%)	(18%)		
9	How safe do you feel in your daily life?	10 (9%)	58 (55%)	38 (36%)	0 (0%)	2.26	0.62
10	How healthy is your physical environment?	16 (15%)	31 (29%)	44 (42%)	15 (14%)	2.55	0.91
11	Do you have enough energy for everyday life?	6 (5%)	53 (50%)	22 (21%)	25 (24%)	2.62	0.91
12	Are you able to accept your bodily appearance?	9 (9%)	51 (48%)	34 (32%)	12 (11%)	2.46	0.81
13	Have you enough money to meet your needs?	25 (24%)	61 (58%)	16 (15%)	4 (3%)	1.99	0.74
14	How available to you is the information that you need in your day-to-day life?	11 (10%)	58 (55%)	25 (24%)	12 (11%)	2.36	0.81
15	To what extent do you have the opportunity for leisure activities?	31 (29%)	45 (43%)	24 (23%)	6 (5%)	2.05	0.87
16	How well are you able to get around?	17 (16%)	55 (52%)	24 (23%)	10 (9%)	2.25	0.84
17	How satisfied are you with your sleep?	20 (19%)	45 (42%)	20 (19%)	21 (20%)	2.40	1.01
18	How satisfied are you with your	13	54	29	10	2.34	0.81

	ability to perform your daily living activities?	(12%)	(52%)	(27%)	(9%)		
19	How satisfied are you with your capacity for work?	18 (17%)	53 (50%)	14 (13%)	21 (20%)	2.36	0.99
20	How satisfied are you with yourself?	14 (13%)	57 (54%)	30 (28%)	5 (5%)	2.25	0.74
21	How satisfied are you with your personal relationships?	21 (20%)	61 (58%)	19 (18%)	5 (4%)	2.08	0.75
22	How satisfied are you with your sex life?	23 (22%)	49 (46%)	23 (22%)	11 (10%)	2.21	0.90
23	How satisfied are you with the support you get from your friends?	18 (17%)	48 (45%)	25 (24%)	15 (14%)	2.35	0.93
24	How satisfied are you with the conditions of your living place?	25 (24%)	55 (52%)	20 (19%)	6 (5%)	2.07	0.81
25	How satisfied are you with your access to health services?	24 (23%)	41 (39%)	25 (24%)	16 (14%)	2.31	0.90
26	How satisfied are you with your transport?						
	Mean					2.29	0.88
Weighted							

Note that: AL = A little, MD = Moderately, M = Mostly, C = Completely

Source: Researcher's Field Study 2024

Table 4.14 reveals health-related quality of life among the control group. To answer this question, the two response formats at the lower level—A little and Moderately—were collapsed to be represented by "little," while the two response formats at the higher level—Mostly and Completely—were collapsed to be represented by "complete." Similarly, the average of the response formats was calculated as follows: (A little = 1, Moderately = 2, Mostly = 3, Completely = 4), which sums to 10. Therefore, 10/4 = 2.5. From the table, it was observed that 69% of the study participants claimed that their quality of life is little, while 31% agreed that it is complete. A total of 66% of the study participants claimed that their satisfaction with health-related quality of life is little, while 34% agreed that it is complete. Additionally, 68% of the study participants claimed that they feel that physical pain prevents them from doing what they need to do a little, while 32% agreed that it is completely affecting them. Furthermore, 68% of the study participants claimed that they need medical treatment to function in their daily life a little, while 32% agreed that they completely need it. In terms of life enjoyment, 58% of the study participants claimed that they enjoy life a little, while 42% agreed that they enjoy life completely. Regarding life's meaning, 63% of the study participants stated that they feel that their life is a little meaningful, while 37% agreed that their life is completely meaningful. Similarly, 73% of the study participants claimed that they have negative feelings such as blue mood, despair, anxiety, and depression a little, while 27% agreed that it is completely affecting them. In terms of concentration, 47% of the study participants claimed that they can concentrate a little, while 53% responded that they were completely unable to concentrate. Similarly, 64% of the study participants claimed that they feel a little safe in their daily life, while 36% agreed that they were completely safe. Also, 44% of the study participants claimed to have a little healthy physical environment, while

56% agreed that it is completely healthy. Furthermore, 56% of the study participants claimed that they have enough energy for everyday life a little, while 45% agreed that they have complete energy. In addition, 57% of the study participants claimed that they were able to accept their bodily appearance a little, while 43% agreed that it is completely acceptable. In the same vein, 82% of the study participants claimed that they have enough money to meet their needs a little, while 18% agreed that they completely have enough money to meet their daily needs. Also, 65% of the study participants claimed that they have a little access to the information they need in day-to-day life, while 35% agreed that it is completely available to them. Furthermore, 72% of the study participants claimed that they have the opportunity for leisure activities a little, while 28% agreed that it is completely available to them. More so, 68% of the study participants claimed that they get around easily a little, while 32% agreed that.

Besides, 61% of the study participants claimed that they were a little satisfied with their sleep, while 39% agreed that they were completely satisfied. However, 64% of the study participants claimed that they were a little satisfied with their ability to perform daily living activities, while 36% agreed that they were completely satisfied. Furthermore, 64% of the study participants claimed that they were a little satisfied with their capacity for work, while 36% agreed that they were completely satisfied. In addition, 67% of the study participants claimed that they were a little satisfied with themselves, while 33% agreed that they were completely satisfied. Moreover, 67% of the study participants claimed that they were a little satisfied with their personal relationships, while 33% agreed that they were completely satisfied. More so, 78% of the study participants claimed that they were a little satisfied with their sex life, while 22% agreed that they were completely satisfied with their sex life. Also,

68% of the study participants claimed that they were a little satisfied with the support they get from their friends, while 32% agreed that the support they receive is completely satisfactory. Similarly, 62% of the study participants claimed that they were a little satisfied with the conditions of their living place, while 38% agreed that it is completely satisfactory. In addition, 76% of the study participants claimed that they were a little satisfied with their access to health services, while 24% agreed that their access to health services is completely satisfactory. Furthermore, 62% of the study participants claimed that they were a little satisfied with their transport, while 38% agreed that their satisfaction with transport is completely satisfactory. Based on the findings, it was discovered that the health-related quality of life among the control group was poor, as indicated by the items used to measure health-related quality of life of the workers. Similarly, the weighted mean of 2.29 from Table 4.9 is lower than the average response format of 2.5, which testifies to the fact that health-related quality of life among the control group was poor.

4.2.2 Hypothesis

Ho1: There will be no significant influence of occupational health interventions on the incidence of occupational injuries and the health-related quality of life of the industrial workers

Table 4.15: Correlation between Occupational Health Interventions (OHI) and Incidence of Occupational Injuries (IOI) among the Industrial Workers

Variables	No	(r)	P	Remark
Occupational Health Interventions	212	0.529	0.000	Significant
Incidence of Occupational Injuries among the Industrial Workers	212			

Significant at p < 0 .05. n =212

Source: Researcher's Field Study 2024

Table 4.15 presents the Pearson product moment correlation result of the relationship occupational health interventions and the incidence of occupational injuries among the industrial workers. The table revealed positive high significant relationship between the two variables at (r = 0.529, p = 0.000).

Table 4.16: Correlation between Occupational Health Interventions and Health-Related Quality of Life of the Industrial Workers

Variables	No	(r)	P	Remark
Occupational Health Interventions	212	0.311	0.000	Significant
Health- Related Quality of Life of The Industrial Workers	212			

Significant at p < 0 .05. n =212

Source: Researcher's Field Study 2024

Table 4.16 presents the Pearson product moment correlation result of the relationship occupational health interventions and the health-related quality of life of the industrial workers. The table revealed positive moderate significant relationship between the two variables at (r = 0.311, p = 0.000)

Therefore the null hypothesis one (Ho1) which stated that: There will be no significant influence of occupational health interventions on the incidence of occupational injuries and the health-related quality of life among the industrial workers was rejected. The result implies that there is a significant influence of occupational health interventions on the incidence of occupational injuries among the selected industrial workers in the coverage area as well as a significant influence of occupational health interventions on the health-related quality of life of the industrial workers in the coverage area.

Ho2: There is no statistically significant difference in the mean level of health-related quality of life between the industrial workers who are enrolled to health and safety trainings (intervention group) and those who were not (control group).

Table 4.17: T-Test Analysis on the mean Difference in Level of Health-Related Quality of Life between the Industrial Workers Enrolled to Health and Safety Trainings (Intervention Group) and those who were not (Control Group)

				t-test for equality of Means						
Level of Health-Related Quality of Life Between the Industrial Workers	Grouping	Mean	Std Dev	t	df	Sig	Mean Diff	Std Error Diff	95% Confidence Interval of Difference	
									Lower	Upper
	Intervention Group (health and safety trainings)	15.89	0.32	2.41	210	.017	0.133	0.05	0.24	0.02
	Control Group	11.76	0.43							

Source: Researcher's Field Study 2024

An independent–sample t-test analysis was carried out, comparing the mean scores of level of health-related quality of life between the industrial workers enrolled to health and safety

trainings (intervention group) and those who were not (control group), given the P-value of 0.017 and t-value of 2.41. The finding in table 4.17 shows that significant difference exists between level of health-related quality of life between the industrial workers (intervention and control groups) and the mean difference is in favour of industrial workers enrolled to health and safety trainings (intervention group). Which implies that health and safety trainings is impactful on workers' level of health-related quality of life in the study coverage.

H_o3: There is no statistically significant difference in the mean level of health-related quality of life between the industrial workers who are enrolled to ergonomic programmes (intervention group) and those who were not (control group)

Table 4.18: T-Test Analysis on the mean Difference in Level of Health-Related Quality of Life between the Industrial Workers Enrolled to Ergonomic Programmes (Intervention Group) and those who were not (Control Group)

				t-test for equality of Means						
Level of Health-Related Quality of Life Between the Industrial Workers	Grouping	Mean	Std Dev	t	df	Sig	Mean Diff	Std Error Diff	95% Confidence Interval of Difference	
									Lower	Upper
	Intervention Group (ergonomic programmes)	6.47	2.55	4.88	210	.000	1.93	0.42	1.15	2.71
	Control Group	4.54	3.15							

Source: Researcher's Field Study 2024

An independent–sample t-test analysis was carried out, comparing the mean scores of level of health-related quality of life between the industrial workers enrolled to ergonomic

programmes (intervention group) and those who were not (control group), given the P –value of 0.000 and t – value of 4.88. The finding in table 4.18 shows that significant difference exists between level of health-related quality of life between the industrial workers (intervention and control groups) and the mean difference is in favour of industrial workers enrolled to ergonomic programmes (intervention group). Which implies that ergonomic programmes is impactful on workers' level of health-related quality of life in the study coverage.

H_o4: There is no statistically significant difference in the mean level of health-related quality of life between the industrial workers who are enrolled to behavioural health programmes (intervention group) and those who were not (control group)

Table 4.19: T-Test Analysis on the mean Difference in Level of Health-Related Quality of Life between the Industrial Workers Enrolled to behavioural health programmes (Intervention Group) and those who were not (Control Group)

				t-test for equality of Means						
Level of Health-Related Quality of Life	Grouping	Mean	Std Dev	t	df	Sig	Mean Diff	Std Error Diff	95% Confidence Interval of Difference	
									Lower	Upper
Between the Industrial Workers	Intervention Group (behavioural health programme)	14.03	0.55	3.48	210	.000	0.25	0.07	0.11	0.39
	Control Group	11.15	0.42							

Source: Researcher's Field Study 2024

An independent–sample t-test analysis was carried out, comparing the mean scores of level of health-related quality of life between the industrial workers enrolled to behavioural health

programmes (intervention group) and those who were not (control group), given the P-value of 0.001 and t-value of 3.48. The finding in table 4.14 shows that significant difference exists between level of health-related quality of life between the industrial workers (intervention and control groups) and the mean difference is in favour of industrial workers enrolled to behavioural health programmes (intervention group). Which implies that behavioural health programmes is impactful on workers' level of health-related quality of life in the study coverage.

4.3 Discussion of Findings

Discussion on Industrial Workers' Quality of Life

The result from this study which revealed that health-related quality of life among the intervention and control groups was poor before the intervention was administered as majority of the respondents asserted that they did not have access to all the highlighted basic necessities of life in the items used to measure health-related quality of life[1]. The result establishes the discoveries and assertion of authors and researchers. For instance, a study on the quality of life of workers exposed to noise in the textile industry found that these workers are at greater risk of hearing loss, which negatively impacts their quality of life, particularly in the dimensions of physical health, mental health, social and emotional health, and general health[2,3]. Additionally, it has been noted that industrial workers often face tedious tasks and are exposed to irritant inhalants, vehicle exhaust, unfavorable atmospheric conditions such as air and noise pollution, and psychological stress[4].

Another study on the level of wellness among industrial workers have also reported a significant reduction in overall wellness of the industrial workers with greater burden among

the aged and those with longer working hour[5]. In contrast, study on quality of life and the associated factors among younger industrial workers revealed a better quality of life among this population[6]. Similarly, the report from a descriptive study on the predictors of HRQoL revealed that the industrial workers had good physical health while the employees had lower score in the environmental domain[7].

In the same vein, a study in Nigeria using a health facility and discovered that most employees were knowledgeable about hazards associated with their job functions[8]. However, it was concluded that the high level of awareness demonstrated by the respondents did not translate into the observance of health and safety practices at the facility[9]. It, therefore, means that the awareness of hazards was inconsistent with observance of safety practices. A cross-sectional study on the quality of life among migrant construction workers in Banglore city showed that the migrant construction workers had poor physical, social, and psychological domain while in the environmental domain, the workers displayed good quality of life[10]. Another investigation among Indian construction industries on occupational stress and quality of life reported that in addition to the incidence of musculoskeletal pain, the workers also displayed poor quality of life in all the dimension of quality of life[11].

In Egypt, a study on the occupational hazards and quality of life among fertilizer factory workers in Assuit city revealed that 5.5% and 41.4% of the workers had good and poor quality of life respectively[12]. Among the Turkish industrial employees, the health-related quality of life was even found to be below the Turkish community standard[13]. Another health-related quality life study among construction workers in Kuniamithur Village in Coimbatore district also showed that only few (28%) of the employees had good quality of

life while 26% and 46% displayed moderate and low quality of life respectively[14]. Studies have also investigated other specific forms of health-related quality of life[15,16]. For instance, an analytical cross-sectional study on pulmonary function and respiratory morbidity-related quality of life among construction workers showed that pulmonary function and respiratory functions-related quality of life are very poor among the construction workers[17].

The health of the workers has several determinants, including risk factors at the work place leading to cancers, accidents, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress related disorders band communicable diseases and others[18].

Discussion on Treatment (Health and Safety Trainings, Ergonomic Programmes, Behavioural Health Programmes) and Industrial Workers Quality of Life

The result from this study revealed that significant mean difference exists in the level of health-related quality of life among the industrial workers enrolled to health and safety trainings, ergonomic programmes, behavioural health programmes (intervention groups) and those who were not (control group. This result appears in this way because the intervention exposes the workers to the need to cater for their life. The results indicate that safety training plays a vital role in management practices to enhance safety performance and, consequently, improve employee performance[19.]

Similarly, the findings suggest that safety training is essential as it helps make accidents more predictable[20]. The perceived benefits of not being exposed to the occupational health hazards and at the same time maintaining healthiness may make the respondents to use PPE while working. However, the knowledge or awareness of the availability of PPE and hazard

exposure may provide the cue to action to comply with safety rules and standards by the factory workers[20].

The increasing incidence of occupational accidents and compromised health-related quality of life among industrial workers have led to the recommendation of many occupational health and safety interventions such as safety inspections and regulations, training, ergonomic programmes, and exercises[21,22]. In an interventional study that investigated the effectiveness of safety regulations on the incidence of occupational injuries and diseases revealed that despite the introduction of occupational health interventions, industrial workers still experienced occupational accidents and consequently affecting their health-related quality of life[23]. This finding also indicates that safety regulations are not sufficient to reduce occupational injuries and improve the overall health related quality of life of industrial workers.

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Chapter Five

Conclusion

5.1 Summary of Findings

The study examined Effects of Occupational Health Interventions on Health-Related Quality of Life of Industrial Workers in Southwest Nigeria. In line with this, four(4) research questions were raised and answered, in the same vein, five hypotheses were stated and tested at 0.05 level of significant. The following findings were discovered:

It was found that Health-related quality of life among the control group was poor as majority of the respondents asserted that they did not have access to all the highlighted necessities of life in the items used to measure health-related quality of life.

Likewise, the health-related quality of life among the intervention group was poor before the intervention was administered as majority of the respondents asserted that they did not have access to all the highlighted necessities of life in the items used to measure health-related quality of life.

Post intervention health-related quality of life within the intervention group was found to be as high as majority of the respondents asserted that they have a complete access to all the necessities of life in the items used to measure health–related quality of life.

There is a significant influence of occupational health interventions and the incidence of occupational injuries among the industrial workers in the coverage area.

Furthermore, it was found that there is a significant influence of occupational health interventions and the health-related quality of life of the industrial workers in the coverage area.

There is a significant mean difference in the level of health-related quality of life between the industrial workers enrolled to health and safety trainings (intervention group) and those who were not (control group).

Likewise, there is a significant mean difference in level of health-related quality of life between the industrial workers enrolled to ergonomic programmes (intervention group) and those who were not (control group).

Finally from this study, it was found that there is a significant mean difference in level of health-related quality of life between the industrial workers enrolled to behavioural health programmes (intervention group) and those who were not (control group)

5.2 Conclusion

Owing from the findings of the study, which revealed that significant mean difference exists in the level of health-related quality of life among the industrial workers enrolled to health and safety trainings, ergonomic programmes, behavioural health programmes (intervention groups) and those who were not (control group) and similarly with notable improvement in the quality of life of sampled industrial workers selected for intervention after the administration of intervention.

It can be reiterated that every occupation and industry have some hazards and health risks that the employees must contend with day in, day out. But the more important issue is whether they are aware of or not aware of the hazards associated with their respective job functions. The findings of this research necessitate further stimulation of critical awareness of impacts of occupational hazard on quality of life. Therefore, the researcher submitted that when safety unit in every industry continue to organise monthly workshops

aimed at cultivating a heightened sense of vigilance regarding potential occupational hazards, this went a long way to enhance desirable quality of life among industrial workers not only in the Southwest Nigeria but in the entire country.

5.3 Recommendations

The findings summarised above necessitate recommendations for companies' owners, human resources managers, Head of various unit in the companies or factory, workers and government Therefore, the following recommendations were made. The safety unit in each industry should hold monthly workshops to increase awareness of potential occupational hazards and develop appropriate response measures for different situations.

1. Regular Occupational Health Training:

Industries should institutionalize continuous health and safety education to sustain awareness and improve workers' physical and psychological well-being.

2. Management Commitment:

Industrial management should demonstrate stronger support for safety policies through consistent PPE supply, enforcement of rules, and motivation of employees.

3. Improved Work Environment:

Employers should enhance workplace ergonomics, ventilation, lighting, and overall safety infrastructure to improve workers' quality of life.

4. Psychological and Social Support:

Workplaces should provide stress management programmes and promote teamwork to strengthen mental health and social relationships among workers.

5. Behavioral Model Integration:

Behavioral frameworks such as the Health Belief Model should guide future occupational health interventions and policy formulation for sustained impact.

6. Policy and Research Collaboration:

Government agencies should enforce occupational safety regulations and partner with researchers to monitor and evaluate workplace interventions so as to ensure improed quality of life for all workers on their job.

5.4 Implications for Public Health Practice

The findings of this study have a lot of implications for public health practice in Nigeria and other developing countries. First, they underscore the need to strengthen occupational health promotion as an important component of workplace wellness programmes. This shows that structured interventions improve health-related quality of life, the study provides evidence that workplace-based education and behavioral change strategies can reduce the burden of occupational diseases and injuries.

Secondly, the findings highlight the importance of managerial participation and policy enforcement in sustaining occupational health interventions. Public health practitioners should therefore collaborate with industry leaders to integrate safety culture into daily operations and organizational policies.

Furthermore, the study stresses the value of applying behavioral models. Such as the Health Belief Models in designing effective workplace interventions. Incorporating such

frameworks into occupational health policy can improve compliance, risk perception, and self-efficacy among workers.

In all, the study provides a foundation for scaling up occupational health programmes within the context of Sustainable Development Goal (SDG) 3 (Good Health and Well-being) and SDG 8 (Decent Work and Economic Growth), thereby linking individual health outcomes to national productivity and sustainable development.

5.5 Contribution to Knowledge

Concisely, this study provides information on Effects of Occupational Health Interventions on Health-Related Quality of Life of Industrial Workers in Southwest Nigeria. The results of the study shall add to the existing literature on effectiveness of the intervention (health and safety trainings, ergonomic programmes and behavioural health programmes) used in this study at improving the Quality of Life of Industrial Workers.

Besidess, the results in the study broadened the stakeholders' understanding on the necessity of making workers comfortable in their places of work as this improved their quality of life and graduate into efficiency in their part to achieve organisation goals.

Similarly, the study brought attention to the work environment experienced by Industrial Workers, particularly how it affects their physical and mental health. It underscored the close relationship between occupational health interventions and the incidence of occupational injuries, urging further investigation into how these occupational health interventions contribute to general health outcomes.

The study also explored the social implications of job demands, showing how work-related pressures extend beyond the workplace to affect employees' personal relationships and social lives. The instruments used for data collection in this study, constructed by the researcher were of immense benefits to the incoming researcher in industrial workers' welfare and it is hoped that the result of this research work contributed immensely to the development of knowledge hence, the results served as a threshold for further empirical investigation on industrial workers' health-related quality of life in Nigeria.

5.5 Suggestions for Further Studies

Critical investigation into the above results and subsequent discussion in chapter four, it is evident that this investigation requires further empirical studies.

Firstly, since the research was limited to industrial workers in Southwest Nigeria, it is necessary to widen the scope by enquiring into other manufacturing sector. In other words, similar research can be replicated in textile industry, small scale business factory, chemical industries and agro-business factory, interested researcher could examine this area. Secondly, some factors that can influence industrial workers' health-related quality of life discovered in the process of literature search were not investigated in this study. Some of these are: availability of personal protective equipment (PPE), motivation through incentive and access to good health care facilities, future researchers should attempt to examine the nexus among these variables and industrial workers' health-related quality of life. Conclusively, future investigations on the variables of the study could be extended to more Local Government Areas, Constituency, Geographical zone, State of the federation and capital city so as to have a solid base for generalisation or to refute the findings.

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APPENDIX I

Questionnaire - Pre Test

Lead City University

Public Health Department

Faculty of Basic Medical and Health Science

Consent Form

Good day, my name is Adekemi Agnes ONI, a PhD student of Public Health at Lead City University, Ibadan. I am working on the topic "Effects of Occupational Health Interventions on Health-Related Quality of Life of Industrial Workers in Oyo State, Southwest Nigeria" for the completion of my PhD program.

I would like to ask you some questions about Occupational Health and also carry out intervention programs to assess its effects on your Health-Related Quality of Life. I would be very grateful if you could spend some time to take part in this study.

Thank you.

Do you agree to participate in this research? Yes……. No……..

Signature of Respondent: ……. Thumb Print: …….

Date: …….

WHOQOL - BREF QUESTIONNAIRE

This questionnaire is designed for data collection in respect of my Doctoral Degree in the Faculty of Basic Medical and Applied Sciences, Public Health Department, Lead City University Ibadan. Kindly supply the information required in the space provided. You are required to be very objective. All information will be strictly used for academic purpose and treated confidentially. Thank you

SECTION A

Socio-demographics

1. Age: (a) 20-25years [ ] (b) 26-31years [ ] (c) 32-36years [ ]
   (d) 37years and above [ ]

2. Sex: (a) Male [ ] (b) Female [ ]

3. Marital status: (a) Single [ ] (b) Married [ ] (c) Divorced/separated [ ]
   (d) Widow/widower [ ]

4. Ethnicity: (a) Yoruba [ ] (b) Igbo [ ] (c) Hausa [ ]
   (d) Others, specify _____

5. Religion: (a) Christianity [ ] (b) Islam [ ] (c) Traditional [ ]
   (d) Atheist [ ] (e) Others, specify _____

Socio-economic characteristics

6. Educational status: (a) No formal education [ ] (b) Primary [ ] (c) Secondary [ ] (d) Tertiary [ ]

7. Occupation/industry type: _____

8. Monthly income (₦) :(a) 10,000-50,000 [ ] (b) 51,000- 100,000 [ ] (c) 101,000-150,000 [ ] (d) 151,000 – 200,000 [ ] (e) 201,000 and Above [ ]

Work-Related Characteristics

9. Position/job role: _____

10. Department: _____

11. Years of experience: (a) 1-5years [ ] (b) 6-10years [ ] (c) 11-15years [ ] (d) 16-20years [ ] (e) 21-25years [ ] (f) 26-30years [ ] (g) 31years and above [ ]

12. Nature of work: (a) Full time [ ] (b) Shifting [ ] (c) Working overtime [ ] Others, specify _____

13. Workload: (a) Light [ ] (b) Medium [ ] (c) Heavy [ ]

14. Duration of working hours: (a) 1-5hours [ ] (b) 6-10hours [ ] (c) 11-15hours [ ] (d) 16hours and above [ ]

15. Professional/occupational training: (a) Yes [ ] (b) No [ ]

16. Occupational health and safety training: (a) Yes [ ] (b) No [ ]

17. Personal Protective Equipment use: (a) Yes [ ] (b) No [ ]

18. Occupational Accident History: (a) Yes [ ] (b) No [ ]

SECTION B

Occupational Hazards Exposed to:

19. Biological hazards: (a) Yes [ ] (b) No [ ]

20. Sharp related injuries (such as needle sticks): (a) Yes [ ] (b) No [ ]

21. Cuts and wounds: (a) Yes [ ] (b) No [ ]

22. Direct contact with contaminated specimens/bio-hazardous materials:

    (a) Yes [ ] (b) No [ ]

23. Airborne diseases: (a) Yes [ ] (b) No [ ]

24. Infectious diseases and/or infections: (a) Yes [ ] (b) No [ ]

25. Others (blood borne pathogens, vector borne diseases): (a) Yes [ ] (b) No [ ]

Non-Biological Hazards

26. Stress: (a) Yes [ ] (b) No [ ]

27. Physical, psychological, sexual, and/or verbal abuse: (a) Yes [ ] (b) No [ ]

28. Musculoskeletal injuries: (a) Yes [ ] (b) No [ ]

29. Slips, trips, and/or falls: (a) Yes [ ] (b) No [ ]

30. Fractures: (a) Yes [ ] (b) No [ ]

31. Others (chemical spills, noise, burns, and radiations: (a) Yes [ ] (b) No [ ]

SECTION C: Health Related Quality of Life

Instructions: This assessment asks how you feel about your quality of life, health, or other areas of your life. Please answer all the questions. If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life in the last two weeks. Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer that represent your quality of life.

S/N	Items	Very poor	Poor	Neither poor nor good	Good	Very good
32.	How would you rate your quality of life?					
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
33.	How satisfied are you with your health?					

The following questions ask about how much you have experienced certain things in the last two weeks.

S/N	Items	Not at all	A little	A moderate amount	Very much	An extreme amount
34.	To what extent do you feel that physical pain prevents you from doing what you need to do?					
35.	How much do you need any medical treatment to function in your daily life?					
36.	How much do you enjoy life?					
37.	To what extent do you feel your life to be meaningful?					

S/N	Items	Not at all	A little	A moderate amount	Very much	An extreme amount
38	How often do you have negative feelings such as blue mood, despair, anxiety, depression?					
39.	How well are you able to concentrate?					
40.	How safe do you feel in your					

	daily life?				
41.	How healthy is your physical environment?				

The following questions ask about how completely you experience or were able to do certain things in the last two weeks.

S/N	Items	A little	Moderately	Mostly	Completely
42.	Do you have enough energy for everyday life?				
43.	Are you able to accept your bodily appearance?				
44.	Have you enough money to meet your needs?				
45.	How available to you is the information that you need in your day-to-day life?				
46.	To what extent do you have the opportunity for leisure activities?				
47.	How well are you able to get around?				

The following questions ask you to say how good or satisfied you have felt about various aspects of your life over the last two weeks.

S/N	Items	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
48.	How satisfied are you with your sleep?					
49.	How satisfied are you with your ability to perform your daily living activities?					
50.	How satisfied are you with your capacity for work?					
51.	How satisfied are you with yourself?					
52.	How satisfied are you with your personal relationships?					
53.	How satisfied are you with your sex life?					
54.	How satisfied are you with the support you get from your friends?					
55.	How satisfied are you with					

	the conditions of your living place?
56.	How satisfied are you with your access to health services?
57.	How satisfied are you with your transport?

APPENDIX II

Questionnaire- Post Test

Lead City University

Public Health Department

Faculty of Basic Medical and Health Science

Consent Form

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I would like to ask you some questions about Occupational Health and also carry out intervention programs to assess its effects on your Health-Related Quality of Life. I would be very grateful if you could spend some time to take part in this study.

Thank you.

Do you agree to participate in this research? Yes……. No……..

Signature of Respondent: ……. Thumb Print: …….

Date: …….

WHOQOL BREF QUESTIONNAIRE

This questionnaire is designed for data collection in respect of my Doctoral Degree in the Faculty of Basic Medical and Applied Sciences, Public Health Department, Lead City University Ibadan. Kindly supply the information required in the space provided. You are required to be very objective. All information will be strictly used for academic purpose and treated confidentially. Thank you

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    (d) 37years and above [ ]

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Work-Related Characteristics

40. Position/job role: _____

41. Department: _____

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44. Workload: (a) Light [ ] (b) Medium [ ] (c) Heavy [ ]

45. Duration of working hours: (a) 1-5hours [ ] (b) 6-10hours [ ] (c) 11-15hours [ ] (d) 16hours and above [ ]

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47. Occupational health and safety training: (a) Yes [ ] (b) No [ ]

48. Personal Protective Equipment use: (a) Yes [ ] (b) No [ ]

49. Occupational Accident History: (a) Yes [ ] (b) No [ ]

SECTION B

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(a) Yes [ ] (b) No [ ]

54. Airborne diseases: (a) Yes [ ] (b) No [ ]

55. Infectious diseases and/or infections: (a) Yes [ ] (b) No [ ]

56. Others (blood borne pathogens, vector borne diseases): (a) Yes [ ] (b) No [ ]

Non-Biological Hazards

57. Stress: (a) Yes [ ] (b) No [ ]

58. Physical, psychological, sexual, and/or verbal abuse: (a) Yes [ ] (b) No [ ]

59. Musculoskeletal injuries: (a) Yes [ ] (b) No [ ]

60. Slips, trips, and/or falls: (a) Yes [ ] (b) No [ ]

61. Fractures: (a) Yes [ ] (b) No [ ]

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SECTION C: Health Related Quality of Life

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54.	How satisfied are you with the support you get from your friends?					
55.	How satisfied are you with					

	the conditions of your living place?
56.	How satisfied are you with your access to health services?
57.	How satisfied are you with your transport?

INTERVENTION PLAN

Three-Month Occupational Health & Safety Training Timetable

(1 Hour Daily – Monday to Friday)

Month	Week	Topic	Method	Materials	Expected Outcome
Month 1 – Foundation & Awareness					
	Week 1	Introduction to OHS	Lecture & Discussion	Flip chart, slides	Workers understand basics of OHS
		Importance of Safety	Group discussion	Posters	Workers appreciate benefits of safety
		Rights & Responsibilities	Lecture	Handouts	Workers know their OHS roles
	Week 2	Workplace Hazards	Lecture & brainstorming	Charts	Workers identify

	(physical, chemical, biological)			hazards
	Ergonomic & Psychosocial Hazards	Role-play	Chairs, workstation demo	Workers recognize ergonomic risks
Week 3	Health Belief Model & Behaviour	Interactive talk	Flip chart	Workers understand behaviour change
Week 4	PPE – Types & Use	Demonstration	Helmets, gloves, masks	Workers practice correct PPE use
	PPE Maintenance	Practical session	PPE samples	Workers maintain PPE properly

Month 2 –

Skills Development & Application	Week 5	Safe Work Practices	Demo & role-play	Tools, chairs	Workers adopt safe practices
		Ergonomics & Posture	Practical session	Workstation	Workers apply correct posture
	Week 6	Chemical Safety	Lecture & demo	Chemical labels	Workers practice safe handling
		Machine Safety	Demo & discussion	Machine parts	Workers identify unsafe practices
	Week 7	Fire Safety	Practical demo	Fire extinguisher	Workers can operate extinguisher
		Emergency	Role-play	Safety chart	Workers

		Preparedness			respond to emergencies
	Week 8	First Aid Basics	Practical	First aid kit	Workers give basic first aid
		CPR & Accident Response	Role-play	Mannequin (or demo)	Workers practice CPR
Month 3 – Health Promotion & Sustainability					
	Week 9	Stress Management	Lecture & exercise	Relaxation audio	Workers manage stress
		Mental Health Awareness	Discussion	Posters	Workers reduce stigma
	Week 10	Nutrition for Workers	Talk & Q&A	Food chart	Workers adopt healthy diet
		Lifestyle Risks (smoking,	Lecture	Flyers	Workers know health

	alcohol)			risks
Week 11	Communication in Workplace	Role-play	Scenario cards	Workers practice safety reporting
	Building Safety Culture	Group discussion	Commitment board	Workers value "safety first"
Week 12	Review of Training	Group quiz	Flip chart	Workers recall knowledge
	Evaluation & Pledge	Discussion & signing	WHOQOL-BREF, pledge form	Workers commit to safety

APPENDIX III

PRACTICAL SESSIONS

Picture showing participants demonstrating ergonomic training practice during the intervention.

Picture showing fully kitted workers during safety training

Picture showing training review session

Picture showing practical traing on safety practices

Picture taken during one of the training sessions
Practical Training Session

Practical Training Sessions

Picture showing occupational experts taking questions during the training

APPENDIX IV

TRAINING MATERIALS

Ergonomic Training Practice Poster

APPENDIX V

Lead City University

Faculty of Public Health

Motto: Redefining Health

Ref: LCU/FPH/EXT/302 **Wednesday, August 17, 2022**

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION

I wish to inform you that the bearer is currently a Postgraduate student in the Faculty of Public Health, Lead City University, Ibadan.

The bearer is obliged to conduct research as one of the requirements for the award of a degree of Master in Public Health. In this regard, kindly accord any relevant information and assistance.

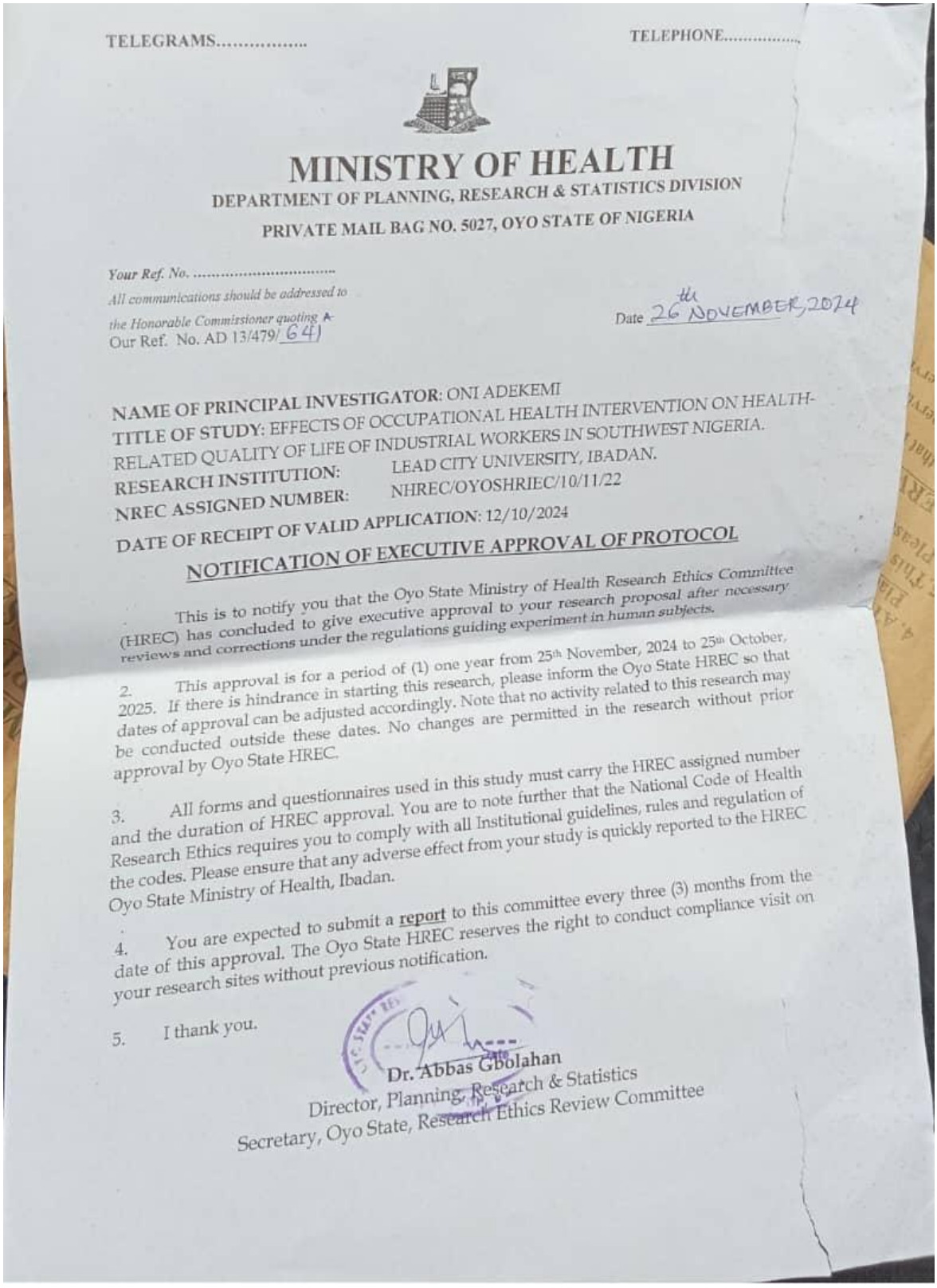
Thank you, and I look forward to your favorable support.

Best regards,

Dr. F. T. Akinsolu,
Head, Department of Public Health,
Lead City University, Ibadan.
Email: akinsolu.folahanmi@lcu.edu.ng
Contact Number: +2347033171050

Lagos-Ibadan Expressway, Toll Gate Area.
P.O. Box 30678, Secretariat, Ibadan Oyo State Nigeria.
publichealth@lcu.edu.ng
Tel: 02-7510682

APPENDIX VI



TELEGRAMS..... TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting A-
Our Ref. No. AD 13/479/641

Date 26th NOVEMBER, 2024

NAME OF PRINCIPAL INVESTIGATOR: ONI ADEKEMI
TITLE OF STUDY: EFFECTS OF OCCUPATIONAL HEALTH INTERVENTION ON HEALTH-RELATED QUALITY OF LIFE OF INDUSTRIAL WORKERS IN SOUTHWEST NIGERIA.
RESEARCH INSTITUTION: LEAD CITY UNIVERSITY, IBADAN.
NREC ASSIGNED NUMBER: NHREC/OYOSHRIEC/10/11/22
DATE OF RECEIPT OF VALID APPLICATION: 12/10/2024

NOTIFICATION OF EXECUTIVE APPROVAL OF PROTOCOL

This is to notify you that the Oyo State Ministry of Health Research Ethics Committee (HREC) has concluded to give executive approval to your research proposal after necessary reviews and corrections under the regulations guiding experiment in human subjects.

2. This approval is for a period of (1) one year from 25th November, 2024 to 25th October, 2025. If there is hindrance in starting this research, please inform the Oyo State HREC so that dates of approval can be adjusted accordingly. Note that no activity related to this research may be conducted outside these dates. No changes are permitted in the research without prior approval by Oyo State HREC.

3. All forms and questionnaires used in this study must carry the HREC assigned number and the duration of HREC approval. You are to note further that the National Code of Health Research Ethics requires you to comply with all Institutional guidelines, rules and regulation of the codes. Please ensure that any adverse effect from your study is quickly reported to the HREC Oyo State Ministry of Health, Ibadan.

4. You are expected to submit a **report** to this committee every three (3) months from the date of this approval. The Oyo State HREC reserves the right to conduct compliance visit on your research sites without previous notification.

5. I thank you.

Sign ---
Dr. Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethics Review Committee

Biodata

A. Personal data:

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Date and Place of Birth:	2nd April, 1978, Ibadan, Oyo State, Nigeria
Nationality:	Nigerian
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B. Educational Background:

School Attended	Date	Qualification
• Olodi Primary School, Warri, Delta State	1984-1989	PSLC
• Isale Oyo Commercial Secondary School, Oyo, Oyo State	1996	SSCE
• Oyo State College of Health Science and Technology, Ibadan, Oyo State	1997-2001	HND Environmental Health
• University of Nigeria, Nsukka, Nigeria	2002-2006	BSc Health Education
• University of Ibadan, Oyo State	2009-2010	Diploma, Tutor of Health Sciences

- Ladoke Akintola University of Ogbomoso (2011-2013) Masters in Technology, Public Health

C. Work Experience

- Senior Tutor March 2016 till date
  University College Hospital (Environmental Health Officer Tutors Course)

- Chief Environmental Health Officer November 2013 – March 2016
  Akinyele Local Government (Environmental Health Science Department)

- Principal Environmental Health Officer Nov.2004 – Oct.2013
  Iseyin Local Government (Environmental Health Science Department)
- Environmental Health Officer Nov. 2001 – Oct.2004
  Oyo East Local Government (Environmental Health Science Department)

D. Awards (if any):

- Best Staff, Akinyele Local Government, Moniya, Ibadan
- Best Graduating Student, Oyo State College of Health Sciences, Ibadan, Oyo State

E. Professional Membership:

- Member, West African Post Graduate College of Health
- Member, Environmental Health Officers Association of Nigeria (EHOAN)

- Member, Environmental Health Officers Association of Nigeria (EHOAN) Southwest Chapter
- Member, Environmental Health Officers Association of Nigeria (EHOAN) Oyo State Chapter
- Member, Environmental Health Scientist Association of Nigeria (EHSAN)
- Member, Environmental Health Council of Nigeria (EHCON)
- Member, Medical and Health Workers Association of Nigeria (MAHWAN)
- Member, Environmental Health Tutors Welfare Association of Nigeria (ETHWAN)

F. Publications (if any):

- Oni Adekemi Agnes, Arulogun O, Balogun F, Akinsolu F, Aduroja P, Adeniran I.A, Post Intervention Assessment of Health Related Quality of Life Among Industrial Workers in Oyo State, Nigeria. An abstract accepted for publication in the International Journal of Health and Medical Information Volume 8 No 2 of 2025 Edition
- Oni Adekemi Agnes, Arulogun O, Balogun F, Akinsolu F, Aduroja P, Adeniran I.A, Baseline Assessment of Health Related Quality of Life Among Industrial Workers in Oyo State, Nigeria Implications for Occupational Health Interventions. An abstract accepted for publication in the International Journal of Health and Medical Information Volume 8 No 2 of 2025 Edition
- Oni Adekemi Agnes, Arulogun O, Fadekemi, Jaiyeola T.M, Effect of Occupational Health Intervention on Quality of Life Among Factory Workers in Oyo State, Nigeria.

A paper accepted for presentation at the 2nd Lead City University Postgraduate Conference, 2025

G. Major Conferences Attended with Dates:

- 10 th International Conference on Environment and Health Organised by the Living Science Foundation at Ilesa University, October, 2025
- 2nd Lead City University Postgraduate Conference, October 2025
- International Conference 8th South West Conference/Scientific Workshop in collaboration with Environmental Health Council of Nigeria (EHCON) by Environmental Health Officers Association of Nigeria (EHOAN) 21 – 24 July, 2025
- 5th Annual Scientific Virtual Conference and Congress organized by WAPCEH in collaboration with WAHO 27 November, 2020
- 4th Scientific Symposium "GHANA 2019" organized by WAPCEH in collaboration with WAHO 18 – 22 November, 2019
- 2019 Triennial National Conference by Environmental Healyyth Teachers Welfare Association of Nigeria (EHTWAN) 29 – 30 October, 2019
- Occupational Health & Safety in the Healthcare Setting by University College Hospital (UCH) 2 November, 2018
- 1st West Africa Joint Scientific Conference 12-16 March, 2017

H. References:

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_____ _____

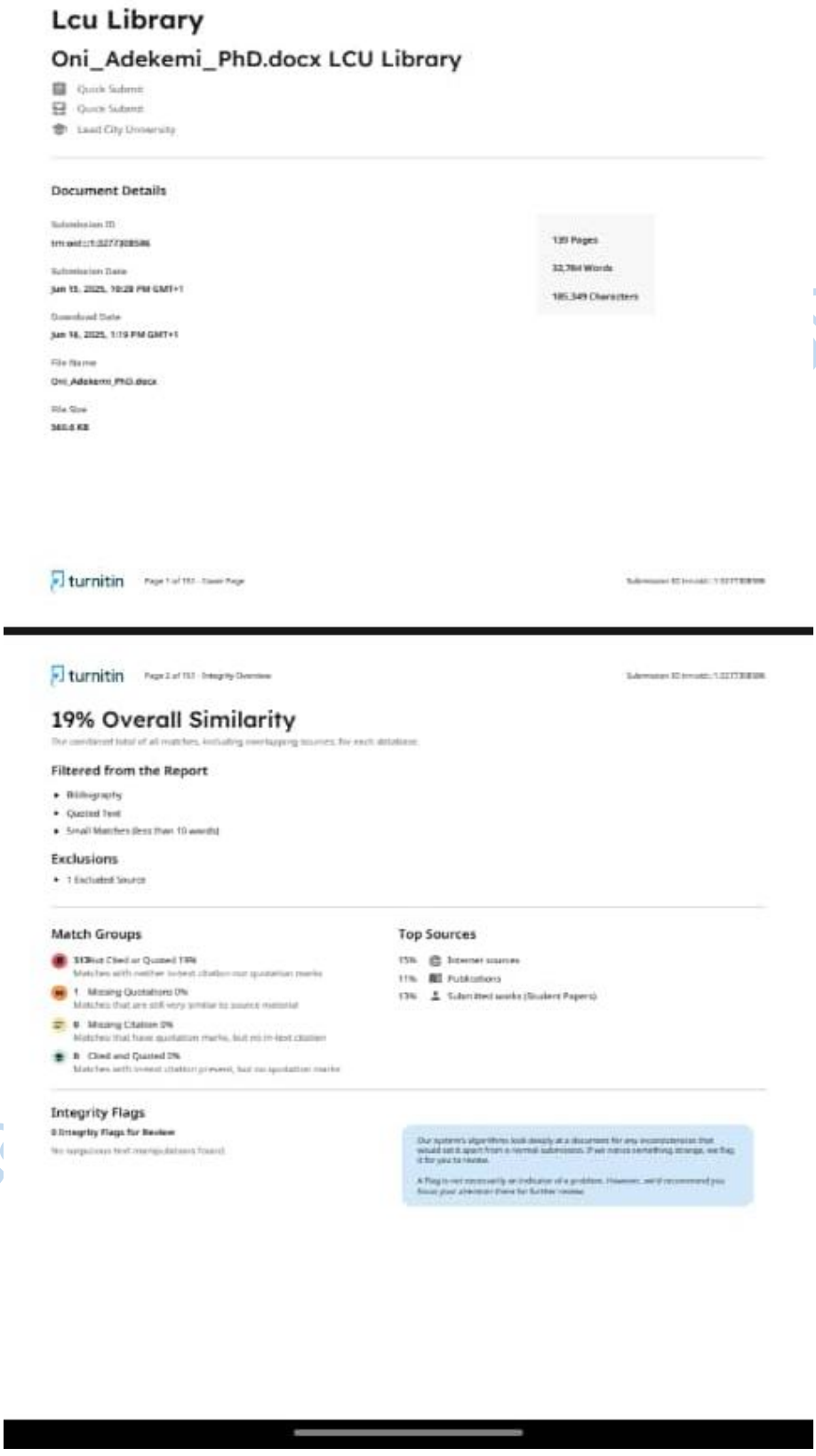
Signature **Date**

The University Compliance Certification

This is to certify that the thesis by Adekemi Agnes ONI with the matriculation number LG/PG/001873 in the Department of Public Health, Faculty of Medical and Applied Sciences, Lead City University, Ibadan is in full compliance with the University format and style.

_____ _____

Signature Date



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