Chapter One

Introduction

1.1 Background to the Study

People frequently undervalue health safety in various work places, including the petroleum industry and they frequently associate industrialization and large industries with occupational health hazards or problems, thus the advancement of occupational health in developing nations was impeded by this limited perspective. The usage of petroleum products has grown significantly worldwide as a result of industrialization, and companies that distribute petroleum products are growing quickly[1]. As a result, new employees are hired every day to work as gas pump attendants in these stations. Petroleum products include a variety of volatile chemicals, and workers who are exposed to gasoline fumes at work are becoming concerned about the health risks linked with this exposure. Governments and businesses must implement a cogent national occupational safety and health (OSH) strategy that enhances working conditions and supports OSH in order to reduce occupational illnesses, injuries, and fatalities. However, depending on the degree of industrialization, different countries have different rates of accidents and injuries related to the workplace. To be more precise, developing nations continue to suffer far greater losses from work-related accidents than the others[1,2].

A staggering 2.9 billion workers worldwide are at risk of injury or illness at work. Each year, occupational illnesses and injuries claim the lives of two million people, accounting for 4% of the GDP lost as a result of these conditions. The three main focuses of the WHO's worker health program are humanizing work, protecting and promoting working populations, and reducing occupational health hazards[3]. Petroleum is distilled to produce diesel fuel and petrol. Less than 2% of the components in petrol vapor are aromatics, and the majority, around 95%, are aliphatic and acyclic chemicals. Nevertheless, the precise composition of the hydrocarbons found in gasoline is contingent

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upon the particular gasoline sample in question, including the type of oil used, the refiner, and the additives added. It is mixed with aromatic hydrocarbons to keep its high octane number and optimal anti-knock qualities. Typically, refined petroleum products have a 2-3% volumetric benzene content[3,4]. The usage of petroleum is highly significant for economic, political, and technological reasons in all spheres of society. The development of internal combustion engines, the expansion of commercial aircraft, and the growing use of pesticides are the main causes of this importance[4]. The speciality practice of occupational and environmental health focuses on the promotion, prevention, and restoration of health within the setting of a safe and healthy environment. It entails protecting one's health from occupational and environmental dangers. It provides occupational and environmental health and safety services to employees, worker populations, and community groups[5]. However, petroleum handling is dangerous due to its chemical makeup. Among its components are substances with significant dangers, like benzene and methane. For instance, benzene may lead to bone marrow aplasia, which manifests as anorexia, headache, and fatigue in the early stages before anemia sets in. Such risks may be greatly reduced with careful handling and preventive precautions. There aren't many studies that look at how occupational health principles can be applied to workers in the petroleum and related industries in our setting. The external elements that impact employees' behavior are what make up the work environment and it influences how the worker's safety is either favorably or unfavorably. Industrial dangers come in several forms for a large number of workers in developing nations like Nigeria[4].

Nigeria is a large producer of oil, and the economy of the nation is greatly influenced by the oil sector. Nigeria is one of Africa's top oil producers and is thought to have about 37 billion barrels of oil reserves. The country is a member of the Organization of the Petroleum Exporting Countries, or "OPEC." Following the start of operations, monitoring regimes are enforced by law, authority

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inspection and enforcement, industry adherence to management systems and self-regulation, or all three[6].The petroleum industry in Nigeria has had a rich history. Natural gas deposits in Nigeria are substantial; as of 2022, the country was reported to have proven gas reserves of 208.62 trillion cubic feet ("tcf"), up 2.09 tcf or 1.01% from the previous year, and unproven gas reserves of 600 tcf. These deposits are made up of both associated and non-associated gas; associated gas makes up more (69.55%) of the country's total gas production, even though non-associated gas makes up more of its gas reserves. Despite this, Nigeria's abundant gas reserves are still underutilized; in November 2020, the country's average daily gas production was 5.134 billion cubic feet, of which 6.09% was flared. The following uses of 93.9% were made possible by the project: fuel gas (6%), domestic gas sales (16.28%), liquefied natural gas ("LNG") export (32.7%), gas re-injection and gas lift make-up (32.35%), Escravos Gas-to-Liquid project (5.12%), and natural gas liquids, also known as liquefied petroleum gas ("LPG") (1.46%)[7].

There are differences in the actual and varied activities carried out in each of these areas, as well as the particular safety and environmental issues that they raise. The production of gas and crude oil is a part of the upstream petroleum industry. It includes tasks including development, production, decommissioning, appraisals and evaluations, and exploration. Conversely, the downstream industry encompasses product storage, distribution, retailing, transportation, and refining. Any government faces a difficulty in balancing the potential hazards to human health, safety, and the environment posed by either upstream or downstream industries' activities. These issues relate to the objectives of energy security and national economic development. Because of the severe health repercussions, Nigeria's deadly petroleum accidents have drawn attention from all around the world[8]. Nigeria LNG Limited ("NLNG"), an established joint venture between the Nigerian National Petroleum Company Limited ("NNPC"), Shell Gas B.V., Total Energies Gaz & Electricité Holdings, and Eni International

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N.A. N.V. S.àr.l., is principally responsible for producing and exporting LNG using Nigeria's gas output. The Escravos–Lagos Pipeline System (forming the Western Network), the Ajaokuta–Kaduna–Kano Gas Pipeline (currently under construction and will form the Northern network), and the Alakiri–Obigbo–Ikot Abasi Pipeline (forming the Eastern Network) are Nigeria's principal networks for the transportation of natural gas via pipelines[7].

Although there are laws and regulations in Nigeria that govern occupational health and safety, the non-oil sector of the economy, which makes use of these products from the petroleum and oil sector, sadly has a very low level of compliance with these laws and regulations. Making laws is beneficial and expedient, but if they are not followed, are not enforced, or are only applied to specific groups of people, they will be of little benefit[7]. One of the key issues in safety administration is that employees continue to show apathy toward following safety regulations. Employee safety behaviors and intents to follow safety protocols are strongly influenced by the organization's interest in and importance of obtaining positive safety results. The Heinrich Domino Theory, which contends that employee hazardous work practices account for 88% of accidents, lends further credence to this supposition[9].

Petrol stations are congested areas with a high volume of automobile and pedestrian traffic. They also store and distribute vast quantities of hazardous commodities, particularly combustible hydrocarbons like gasoline, diesel, and liquefied petroleum gas (LPG). That is why it is critical to have effective systems and processes in place to ensure people's health and safety[10]. Although most employees may never experience major adverse health impacts as a result of workplace exposures, all forms of job pose risks. These dangers can have both short- and long-term health repercussions, thus every effort should be taken to avoid and control workplace sickness and injury[5].

Petrol station attendants are exposed to a variety of dangers and health hazards in their working environment, which should be regarded as detrimental to their overall health. Contact with fuels and

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other chemicals, staying near to gasoline pumps, noise, heat, cold, risk of being run over, robbery, repetitive actions, standing for extended periods of time, and job overload as a result of the variety of tasks they carry out are some of the concerns. It is seen that physical hazard was reported by 88.2% of the petrol station attendants. Ergonomic risk factors on the other hand can arise from repetitive movements which the attendants engage in and from standing for long hours[11]. Chemical hazards which emanate mainly from contact and inhalation of fuel are recognised to have profound impact on petrol attendants. These workers are exposed to both the hydrocarbon in fuel and the fumes from the exhaust of vehicles[12]

The pollutants from fuel include benzene, toluene, ethylbenzene and xylenes (BTEX) which can lead to several health conditions such as neurological diseases and cancers. It can also cause teratogenicity. Many diseases affecting the immune, endocrine, cardiovascular, respiratory and reproductive systems have also been attributed to benzene which is considered the most hazardous pollutant in gasoline due to its genotoxic and carcinogenic effects[13]. Long term exposure of petrol attendants to petrol vapour have been reported to cause hepatotoxicity, nephrotoxicity and cardio toxicity The use of personal protective equipment (PPE) is an important safety measure which should be common practice among petrol station attendants to safeguard inhaling the fumes of the volatile liquids. Studies among petrol attendants such as those carried out in Ghana for example, have reported use of appropriate PPE ranging from 0 to 44%[14]. Despite the numerous petrol stations in Ibadan, there is paucity of data on the hazards and health problems of the attendants in these stations. The only documented study carried out in 2011 focused on effect of gasoline inhalation on the menstrual characteristics and the hormonal profile of female petrol pump workers[15]. Considering the various hazards that petrol attendants are exposed to and the resultant short and long term health implications, this study's objectives were to determine the occupational hazards, health problems and safety practices of petrol station attendants in

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Ibadan, Oyo State, Nigeria with the intention of communicating findings and making recommendations to the owners of the stations and other stakeholders.

1.2 Statement of the Problem

The problem is very little is known about possible occupational hazards, health problems and safety practices of petrol station attendants in Ibadan, Oyo State, Nigeria. Petrol attendants who work in Ibadan are exposed to both vapours and contact with petrol through their skin. Since the different petroleum products which the attendants dispense at filling stations are flammable even at low temperature, there is always a risk of fire outbreak or explosion if a source of ignition is present. The provision of firefighting equipment at such facilities is a dire necessity. Petrol station attendants are a high-risk group and are directly exposed to VOCs with no control over the length and frequency of exposure despite safety regulations. These attendants are exposed to several occupational hazards which may limit their efficacy, efficiency and productivity. The safety of people and protection of the environment are major concerns at petrol filling stations. Petrol and other motor fuels are potentially hazardous at ambient temperatures and petrol gives off vapors which when mixed with air in appropriate proportions can burn with explosive force if ignited. This information may help in improving the petrol attendants in Ibadan. It is against this backdrop that this study was prompted to find out occupational hazards, health problems and safety practices of petrol station attendants in Ibadan, Oyo State, Nigeria.

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1.3 Aim and Objectives of the Study

The aim of this thesis is to access the safety Practices, Health Hazards and Health Problems of Petrol Station workers in Ibadan, Oyo state, Nigeria.

The specific objectives were to:

i. determine the knowledge of safety practices among petrol station workers

ii. access the types of occupational hazard among petrol station workers

iii. investigate the health problem among petrol station workers in ibadan

iv. determine the health risk factors associated with petrol station attendant

v. examine the working environment in the petrol station

vi. determine the association between occupational hazards and health problem

vii. relationship between working environment and health problems.

1.4 Research Questions

In order to find solutions to the objectives of this study, the following research questions were raised:

1. What is the knowledge of safety practices among petrol station workers
2. What are the types of occupational hazard among petrol station workers
3. What is the health problem among petrol station workers in Ibadan
4. What is the health risk factors associated with petrol station attendant
5. What is the working environment in the petrol station
6. What is the association between occupational hazards and health problem
7. What are the relationship between working environment and health problems

1.5 Scope of the Study

This research work will be carried out by seeking the opinion of safety practices, health hazards and health problems of petrol station workers in Ibadan, Oyo state, Nigeria. However, feedback will be gotten on how well the safety practices have been focused on by the petrol attendants. However, this study covered Ibadan metropolis.

1.6 Significance of the Study

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The motivation to embark on this study was termed from the fact that some petrol station attendant expose to volatile component that come from the composition of petrol emitting based on their exposure to carcinogenic emption.

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Chapter Two

Literature Review

2.1 Conceptual Review

2.1.1 An Overview on Occupational Safety

According to the World Health Organization (WHO), a healthy work environment is one in which all parties collaborate to realize a shared vision for the health and wellbeing of employees as well as the local community. A petrol station is a location where motor fuel and lubricants are sold. Workers in the petroleum industry are exposed to vehicle exhaust as well as fumes from petrol and diesel[1].The lack of or inadequate application of occupational health and safety practices is the root cause of the majority of hazards and incidents that have occurred in various industries. The Centers for Disease Control and Prevention and the National Institute for Occupational Safety and Health advocates for the implementation of controls to protect workers[2]. Elimination is the first control method that entails getting rid of the danger. If the hazard cannot be eliminated, it should be replaced. Engineering controls should then be implemented to keep the worker away from the risk. Administrative controls can also be implemented at the same time, such as cutting shifts short, moving breaks, rotating employees, and teaching staff members how to identify risk factors. Wearing personal protection equipment is the final control[2,3]. The oil and gas sector is among one of many industries characterized with convergence of numerous hazardous exposures that can potentially cause serious catastrophes and work-related accidents. Serious catastrophes ever recorded in the oil and gas sector that has claimed life and caused damages to properties include the Piper Alpha disaster in 1988. If appropriate safety planning and management practices are implemented, occupational accidents may eventually be avoided[4]. The core idea of accident prevention is still that risks can be detected prior to the start of any operational activity. Starting off with its brief history in Nigeria, Shell British Petroleum (ShellBP),

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now known as the Shell Petroleum Development Company of Nigeria (SPDC), was the only concessionaire when the first successfully drilled oil was found in Nigeria in 1956 at a location named Oloibiri in the Niger Delta, after exploring for half a century. Nigeria became an oil producing nation in 1958 when its first oil field began to produce 5,100 barrels per day. Nigeria founded the Nigerian National Petroleum Company (NNPC) in 1977 after joining the Organization of Petroleum Exporting Countries (OPEC) in 1971. The creation of a sufficient regulatory framework, which consists of rules and regulations outlining rights, obligations, procedures, and standards as well as regulatory organizations tasked with keeping an eye on compliance, is how the health of workers is protected. Deposit the framework, there is still a lot work to be done regarding health safety in petrol stations and the overall petroleum industry[5].

Petrol stations are particularly hazardous workplaces which require to be licensed and regulated by Local Authorities because their operations involve loading, storing and selling a highly flammable liquid. However, petrol stations have attracted massive number of workers since customers visit these premises not only to refuel their automotives but also to access other services like car wash and catering services. According to World Health Organization (WHO), workplace is considered as a priority setting for health promotion in the 21st century and therefore should have a positive impact on the health and well-being of workers, their families and society at large. This is achievable through adoption of labour codes where every organization has laws and regulations on occupational safety, health and working environment. On the contrary, one in three workers‟ compensation accidents involve new employees and this may be attributed to lack of right training on safety precautions or if they are, they do not practice safety procedures within their work place[4].

According to Shin (2007), he reported that employers and management should communicate the safety rules put in place for the workers and enforce them. The effective communication of these rules will

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help to reduce the risks of occupational diseases and illness associated with exposure to volatile organic compounds (VOCs). This requires employers to inform, advice, assist and carry out trainings aiming at enlightening the workers on hazards and risks at their workplace and how to keep their work environment safe. Workers, especially those who are new to the workplace may not even see the risks that can cause ill-health. Workers who are new to the workplace are equally at risks of exposure to chemicals fumes and vapours which could affect their health at present and years after they have left the workplace. This is because they may lack experience, knowledge of hazards, and a full understanding of the consequences of being exposed to hazards. As a result, these workers cannot make the link between occupational exposures in petrol stations and health consequences. This underlines the importance of the role employers' play in making sure workers are protected from exposure hazards, through testing and improving their understanding of the health risks present and safety as well[6]

As a result, regular maintenance is an appropriate tool to ensure preserving a way of prioritizing the safety of the employees and those within the vicinity as a whole. In risk management, maintenance is evaluated alongside workplace safety. Risk management should be based on sound maintenance and safety procedures, which will strengthen decision-making for projects and implementation procedures. Safety is a top concern for the entire maintenance system and must to be incorporated into standard operating procedures. It imposes greater levels or new aims for planning, sets boundaries and optimal working circumstances, and increases the complexity of the planning and implementation operations. Generally speaking, protective devices designed to lessen or eliminate dangers are thought to boost safety standards. It makes sense that the safety of these operations has grown more complicated as a result of the administrative and technical requirements, which have exposed the shortcomings of the current systems[7].

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International Occupational Health

Occupational health, as a field, extends beyond national borders, and international organisations play a crucial role in promoting global health and safety standards. Two prominent international bodies dedicated to occupational health are the International Labour Organization (ILO) and the World Health Organization (WHO).

i. The International Labour Organization (ILO)

Established in 1919 in Geneva, Switzerland, the ILO's primary mission is to promote international labour standards and improve working conditions globally[8]. The ILO's programs encompass international labour standards in the form of conventions and recommendations, which are adopted by member states. These standards cover a wide range of labour-related topics, including occupational safety and health[9].The ILO places a strong emphasis on the safety and health of workers, especially concerning chemical and industrial risks[9]. It collaborates with the WHO in holding joint expert committee meetings related to occupational health and safety[10].The ILO's constituent states, employers, and employees create international labor standards, which serves as legal documents that outline fundamental values and rights at work. Conventions are legally binding international treaties that member nations may ratify; on the other hand, recommendations are non-binding advice. The ILO's standards for occupational safety and health give governments, companies, and employees the vital resources they need to set up effective reporting, inspection, and prevention procedures and to ensure the highest level of workplace safety. Its goal is to guarantee and encourage a healthy and safe workplace[11].

The ILO concentrated on creating OSH standards and codes of practice in addition to its normative role. They have offered OSH guidelines for the reporting and documentation of work-related illnesses

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and accidents, as well as for a number of economic sectors[12]. Additionally, the ILO funded research on a variety of OSH-related topics on a worldwide scale. As a result, the ILO launched a technical assistance program that offers support for the establishment of national institutions and labor inspection systems as well as capacity training to aid in delivering policies at the national level. More recently, shifts in the labor market's demography, evolving technologies, evolving work and industry patterns, and significant industrial accidents have made a new approach to OSH policy necessary[10, 12].

ii. The World Health Organization (WHO)

The WHO, founded in 1948, is a specialised agency of the United Nations with headquarters in Geneva, Switzerland. It is responsible for global health, and its role in the field of occupational health began with the report of the First Joint WHO/ILO Committee on Occupational Health in 1950[^12^]. The WHO's mission in occupational health is to promote and maintain the highest degree of physical, mental, and social well-being of workers[11].The WHO emphasises preventive measures, including safe working environments, healthful living conditions, and ergonomic considerations in machine design[13]. It collaborates with other international bodies to address complex issues related to occupational health

2.1.1.1 Occupational Safety and Health Management Systems

An occupational health and safety management system (OSHMS) is a set of laid schedule and routine process by management leadership to minimize the incidences of injury and illness at workplace. A safety management system (SMS) can be defined as a management system that is primarily focused on safety, or it can be a system that is used to manage and control safety of individuals, according to a study. After looking through various definitions of a safety management system (SMS), these authors concluded that an SMS's primary goal is to control risks and, in turn, prevent accidents. These three

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core issues—safety, management, and system—are what define an SMS. The four main areas of concentration for safety management are quality, OH&S, environment, and mayor accidents. This indicates that there is a connection between two branches of safety: large accidents and occupational safety. This encompasses monitoring, assessment, identification and control of hazard, ongoing inspection and incident investigation, emergency preparation and response to safeguard health of the workers and the surrounding community. Efficient and effective operations gain at any workplace including petrol stations are realized by organizations that move from simply attaining legal compliance towards implementing the best practices of safety and Health[14].

World Health Organization states that effective health and safety measures in a workplace helps to safeguard workers‟ health through reducing exposure to hazard elements. He further says that OSH includes the social, mental and physical wellbeing of the worker. Ill health is costly to workers and their families and they can also hurt organization through providing cover for personnel absent, time consuming incident investigation and increased employer's liability insurance premium. An effective health and safety management system for a petrol station should have basic elements of policy, organising, implementing, measuring, reviewing and auditing. It emphasizes on inclusivity of workplace precaution and risks control systems that looks at risk at input stage, process stage and at output stage in an organisation[15, 16]. It points out that training, education and efficacy on safety training needs to be carried out in three settings: at induction, on the job and in refresher courses. This should be supplemented by use of safety awareness campaigns and communication, and disciplinary action for those who contravene the safety rules and procedures outlined by the organization[15]. Training of petrol station attendants aims at teaching about the rules and how to obey them; education teaches workers why the rules and what they are and finally efficacy is a proof that the training worked. Posters and safety signs placed at strategic areas within the petrol station give a specific message and

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information to those who may be exposed to hazards by signifying health hazards in place, indicate the location of safety equipment and guidance on how to escape in case of an emergency. However, if the attendant is illiterate, he/she cannot interpret or not familiar with the symbols and terminologies used, then this posters and safety sign will not serve its objective. The safety symbols and terminology at the petrol station should therefore be simple, clear, brief and to the language understood by workers. This is achieved through translating into, explained in appropriate language and where practicable supported by a summary in a plain local language. Directorate of Occupational Health and Safety Services of the Ministry of Labour should be in a position to accredit the trained worker, by issuing a card or a certificate[17].

Safety management systems play a vital role in ensuring OSH in the petroleum industry. The International Labour Organization (ILO) and the World Health Organization (WHO) have jointly recognized SMS as a comprehensive approach to managing safety risks. The OSHMS attempts to minimize or completely eliminate the possibility of work-related illnesses, accidents, and fatalities brought on by occupational hazards. Thus, in order to protect the public's and employees' health, OSHMS includes hazard assessment, identification, and control, as well as continuing inspection, incident investigation, emergency planning, and response. It takes care of the predicted safety issues and leaves space for further enhancements to the established protocols and routing systems. All parties involved in the OSHMS, including but not limited to upper management, employees, and clients, must be committed to its success. Due to their hazardous nature, petrol stations must set up a safety and health management system that includes a safety policy and regular risk assessments[18].

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2.1.1.2 Legislations, Laws, Regulations and Governing Bodies Protecting Health Safety in Occupational Health

i. In other parts of the world

United States: The Occupational and Safety Health Act of 1970 is the primary law pertaining to worker health and safety. It applies to commercial workplaces and is enshrined, along with other federal statutes, in the United States Code (U.S.C.). The obligations of federal agencies to their employees are covered by a number of regulations. OSHA and other Acts' specific provisions as well as their interpretations are contained in federal rules and standards. These final regulations get codified when they are included to the Code of Federal Regulations (CFR), which is updated every July 1st. Occupational safety and health-related regulations presently occupy five volumes of the CFR[19]. This law's straightforward objective was to increase safety and provide safer working conditions for all employees, irrespective of their line of work or industry. Thus, the law addressed matters pertaining to recognized health and safety risks, including environmental pollutants, unhygienic environments, and stress from extreme heat and cold. The OSHA Training Institute was founded by OSHA in 1972 and the Institute is still in operation today where it is in charge of providing instruction and training to non-OSHA employees, state consultants, private sector safety managers, and state and federal compliance officers[20].

EUROPE:

The European Agency for Safety and Health at Work**:** This was established by the European Union (EU) in 1996 to oversee and uphold health and safety regulations throughout the continent. The Agency's headquarters are in Spain's Bilbao. Its goal is to increase productivity, safety, and well-being in every workplace throughout Europe. Its mission also includes promoting health and safety. The

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European Union promotes health and safety research, robust adherence to best practices in the field, and consistent training initiatives. This helps to improve the safety of workers from risks and hazards that are bound to happen in the workplace[21].

2. In Nigeria

The Nigerian National Council for Occupational Health and Safety is authorized by the Labour, Safety, Health and Welfare Bill of 2012 to administer the following regulations on its behalf. The inspectorate division of the Federal Ministry of Labour and Productivity is in charge of enforcing the Factories Act of 1990 in Nigeria. The Nigerian legislative framework pertaining to occupational health and safety began with the introduction of the Labour Act of 1974 and continued with the passing of the Labour, Safety, Health and Welfare Bill of 2012. The main stakeholders pay less attention to OHS regulations, which makes the OHS scheme inefficient and unenforceable. As a result, it is noted that the enforcement power of the OHS legislation has no effect[5].

A proposal for total deregulation of the downstream sector and the establishment of a distinct downstream regulatory body while the federal government started the deregulation of the sector can be found in the Petroleum Industry Bill (PIB-Draft), which the National Assembly divided into sections for easier passage on the restructuring of the Nigerian petroleum industry[5].

Occupational Safety and Health Convention No. 155, 1981: This convention was ratified by Nigeria in 1994. It addresses the establishment of suitable national frameworks for occupational safety and health, which will support the uniform application of good practices in this area throughout the nation. Its goal is to assist in facilitating engagement with tripartite partners during the development, execution, and recurring evaluation of a clear national policy for workplace health, safety, and conditions of employment[5].

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Factories Act, CAP F1, Laws of the Federation of Nigeria (L.F.N) 2004 is the stated version of the Nigerian factories Act. One of the regulations controlling occupational health and safety in Nigeria is the aforementioned act. This is the Nigerian adaptation of the UK Factory Act of 1961, which was enacted to address H&S issues. Parts II, III, and IV deal with health and safety (H&S) and worker welfare in order to protect workers from health dangers[5].

The Dock (Safety of Labour) Regulations, Factories (Woodworking Machinery) Regulations, and Factories (Notification of Dangerous Occurrences) Regulations are among the auxiliary laws that support it. The statute gives the inspector authority and addresses offenses, punishments, and court cases[22, 23]. Employees' Compensation Act (ECA) of 2010: The goal of the Employees' Compensation Act (ECA) of 2010 is to compensate employees who lose their lives performing their jobs at work or experience injuries while performing their tasks. It accommodates workers (part-time, temporary, or

casual, both in the public and private sectors) with mental stress and offers prompt and sufficient compensation without the need to go to court. The funds are managed by the National Social Insurance Trust (NSIT) and are disbursed regardless of the organization's financial situation. This Act is particularly reactive because it was enacted to address harm, injury, or death after it had already occurred, even though it was intended to guarantee a higher quality of life for persons employed in a variety of roles[23].

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2.1.1.3 Occupational Safety Practices: A Global Perspective

Occupational safety and health (OSH) is a critical concern in the petroleum industry, given the hazardous nature of the work environment. This aims to provide an extensive review of occupational safety practices among petroleum industry workers and petroleum station workers worldwide. It draws upon a comprehensive literature review of recent studies in various countries. This covers key aspects

such as risk assessment, safety management systems, training effectiveness, and factors influencing safety practices[24]. Occupational safety practices in the petroleum industry vary across countries due to differences in regulations, cultural attitudes, and economic development levels. Risk assessment is a fundamental component of OSH practices in the petroleum industry worldwide[24]. A study in Nigeria similarly underscore the significance of risk assessment in safeguarding workers' well-being[25].

At every three-and-a-half minutes, somebody in the European Union (EU) dies from work-related causes. This means that almost 167,000 people dies in a year as a result of work-related accidents and illnesses. This is despite the fact that employers are required by law to provide a reasonably practicable safe working environment. Where the hazard cannot be discarded for instance in petrol stations where toxic fumes are generated and released during operations, the employer is expected to provide information to the workers on the type of hazards in place and health and safety procedures available at petrol station including the persons or personnel to whom the worker may make an inquiry or launch a complain about their safety and health[26].While there are common principles of occupational safety practices, each country may have its unique approaches and regulations. Here are examples from selected countries:

United States

In the United States, the Occupational Safety and Health Administration (OSHA) is the primary federal agency responsible for setting and enforcing workplace safety and health standards[27]. OSHA provides training and resources to help employers and workers comply with these standards[27]. They carry out inspections to make sure rules are followed and workplace safety is maintained. OSHA sets a maximum of 5 ppm over any 15-minute period and a daily limit of 1 ppm (parts per million) for benzene exposure in most jobs. OSHA mandates that companies provide personal protective

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equipment, such as respirators, to employees who may be exposed to higher levels of risk while working[27].

United Kingdom

In the United Kingdom, the Health and Safety Executive (HSE) oversees workplace safety and health. HSE is responsible for regulating and enforcing health and safety standards across various industries. They provide guidance and support to businesses on managing safety risks[28].

Australia

Australia's Safe Work Australia agency is responsible for developing and promoting national workplace safety and health standards[29]. Safe Work Australia also offers training and resources to assist employers and workers in adhering to these standards[29].

Japan

Japan's Ministry of Health, Labour and Welfare takes on the responsibility of overseeing workplace safety in the country[30]. The ministry collaborates with relevant stakeholders to ensure the safety and well-being of workers[30]. They provide training and resources to address safety risks that occur through their workplace, where the overall protection rights are met.

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2.1.1.4. Health Safety Practices in Sub-Saharan Africa

Sub-Saharan Africa is witnessing efforts to align with global safety practices in the petroleum industry. Governments and industry stakeholders are emphasising the importance of risk assessments, engineering controls, administrative controls, and PPE[31,32]. In Sub-Saharan African countries about 54

000 fatal occupational accidents happen annually and approximately, 42 million work-related accidents that took place resulted to at least 3 days absence from work[31]. Moreover, the fatality rate as a result of work related incidences in Sub-Saharan African countries is 21/100000 workers and the accident rate per 100000 workers is 16000. This is because petrol stations which lack the minimum basic standard requirements in safety, health and risk control pose serious health threat to the station attendants, visiting clients and the residents who live next to the service station.

Therefore, the regulatory body mandated with environmental protection should not only issue permits during set up but also periodically inspect and fine erring operators[31]

Examples of OSH Practices in Sub-Sahara Africa:

1. Risk Assessment:

- Comprehensive risk assessments are recommended practices where employers evaluate workplace risks and implement strategies to mitigate identified hazards[33].Studies also emphasised the importance of risk assessment as a fundamental OSH practice[34].

2. Engineering Controls:

- The implementation of engineering controls involves modifying workplace infrastructure or equipment to eliminate or reduce hazards[35.] Engineering controls also helps by contributing to a safer work environments[35].

3. Administrative Controls:

- Administrative controls encompass adjustments to work procedures or practices aimed at minimising exposure to hazards[35]. A study, however, underscores the significance of administrative controls in reducing risks with details on its overall effect[36].

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4. Personal Protective Equipment (PPE):

- PPE is essential in safeguarding workers from various hazards, including safety glasses, respirators, and hard hats[37].The South African Petroleum Institute highlights the importance of PPE in ensuring worker safety[38].By elaborating on these points and incorporating literature references, we provide a more extensive understanding of the challenges, opportunities, and best practices in occupational safety within the SSA petroleum industry.

2.1.1.5. Health Safety Practices in Nigeria

Nigeria, as a major player in the global petroleum industry, faces unique challenges concerning occupational safety practices among workers in this sector. This examines the current state of OSH practices in Nigeria, both within petrol stations and the broader petroleum industry. It also explores the impact of training on safety practices among workers.

In Nigeria, there is a growing focus on addressing the challenges posed by rapid industrialization and promoting occupational health and safety. Organisations like the Nigerian Institute for Occupational Safety and Health (NIOSH) work toward improving safety standards and providing education and resources for workers and employers[39]

Training Effectiveness

Training programs are essential to equip petroleum industry workers with the knowledge and skills to work safely[40]. The petroleum industry in Nigeria is subject to various safety regulations and guidelines aimed at safeguarding workers. A study conducted an assessment of OSH practices in the petroleum industry and found that adherence to safety standards was generally high. However, continuous improvement is essential to address emerging risks[41].More studies evaluated the effectiveness of OSH training programs among petroleum industry workers. Their study emphasised the need for regular, practical training to enhance safety awareness and practices[42]

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Government Regulations and Policies

To ensure OSH in the petroleum sector, the Nigerian government has established key regulations and policies. The National Oil and Gas Safety Code provides comprehensive guidelines for safety in the industry[43]. The Department of Petroleum Resources has also issued specific safety guidelines for petroleum stations[44].

The Petroleum Products Pricing Regulatory Agency developed occupational safety and health standards for petroleum industry workers, further emphasising the importance of safety measures[45]. The Nigerian National Petroleum Corporation (2023) has also implemented a Health, Safety, and Environment Policy to promote a culture of safety within the organisation[46].

Occupational safety practices among petroleum industry workers and petrol station attendants in Nigeria are critical to mitigate the inherent risks associated with the sector. While there is evidence of awareness and adherence to safety measures, continuous improvement is necessary to address evolving challenges. Government regulations and policies, along with effective training programs, play a pivotal role in enhancing OSH practices within the petroleum industry. It is imperative that all stakeholders remain committed to ensuring the safety and well-being of workers in this vital sector of the Nigerian economy.

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2.1.1.6 Health Safety Practices in Post-COVID 19 Era

In today's technologically advanced world, petroleum pump stations are not only essential, but also vital to contemporary appliances. On the other hand, they put workers and the environment at great risk and danger. Numerous hazards to people's health and safety as well as the environs in which they live can be found at each gas station. Owing to the numerous risks present in these types of jobs and the general disregard for health and safety on the part of many employers, work-related illnesses and

accidents remain major issues everywhere in the world[47]. In order to stop the spread of COVID-19 in public spaces, including workplaces, all nations implemented lockdown strategies that encourage physical distance, in accordance with the World Health Organization's (WHO) recommendations. Many nations eased their lockdown regulations afterwards in order to allow industries, to restart selective operation in the interest of economic survival. However, there were chances that COVID-19 spread and broke out in workplaces during and after the pandemic due to proper occupational health and safety measures not put in place. Subsequently, it was seen that occupational safety and health professionals implemented the "Hierarchy of controls" to manage workplace risks. Specifically, they customized and implemented this system to control the spread of COVID-19 in workplaces. As applied in this instance, the most effective method of controlling an occupational hazard is to methodically remove it from the workplace. But when it comes to cost, effectiveness, and convenience of use, each of these control strategies has advantages and disadvantages[48]. There hasn't been enough research done to evaluate how Occupational Health and Safety Practices (OHS) based on WHO guidelines can moderate the effects of COVID-19 on industries' operations, logistics, and marketing (OLMP) as well as health and safety performance (OHSP).

The COVID-19 outbreak seems to be a motivator for encouraging the deployment of H&S and giving departments of H&S safer working procedures to reduce the risk of spreading. Applications of H&S are also related to loss, size, and growth[49].

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i. ILO Standards in Health Safety and COVID-19 (coronavirus)



ILO Standards and COVID-19 (coronavirus)[50]

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Key provisions made by the ILO in the areas of working conditions, non-discrimination, protection of particular worker categories, social security, and employment protection guarantee that workers, employers, and the government can continue to provide decent work while addressing the socioeconomic fallout from the COVID-19 pandemic and its aftermath. Employers are ultimately in charge of making sure that all reasonable precautions are taken to reduce occupational risks, both preventative and protective. Where necessary and to the extent that it is practically practicable, employers are required to provide workers with appropriate protective gear and apparel at no expense to them[50].

Providing resources and fostering an environment at work that encourages personal hygiene, mandating frequent hand washing, or utilizing alcohol-based hand rubs to reduce the spread of infection in the workplace are examples of safe work practices during and after the Covid 19 Pandemic Era[51].

2.1.1.7 Health Safety Practices and the Work Performance

Work Performance

Any behavior that helps employees carry out their tasks effectively and efficiently and that either directly or indirectly advances organizational objectives is referred to as work performance. Accordingly, their behavior and attitudes toward work directly contribute significantly to the success of the organization. The definition's context emphasizes the relevance of human resources as one of the organizational inputs that trigger performance. The work performance theory was expanded for this study in order to incorporate employee job performance and safety. Little research has been done on objectively challenging the inputs of task performance as a result of safety performance, despite

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the fact that a significant amount of prior literature has clarified the causal relationship between OHSM and safety performance as well as workers' behaviors, engagements, or welfare.

Task performance literally refers to how well a job is done in order to support the aims and objectives of the organization. It is defined as an employee's capacity to carry out their primary responsibilities in a meaningful way as required by the organization. These consist of the worker's competence in terms of job knowledge, job skills, quantity, and quality of labor. Thus, task performance refers to an employee's ability to carry out job duties without making mistakes, manage expectations, and make wise decisions consistently[23].

Conversely, safety performance describes adjustments to work practices intended to prevent or lessen illnesses, injuries, and accidents at work. Most of the time, businesses use accident or injury logs to assess employees' performance in terms of worker safety[23].

The link between Work Performance and Health Safety Practices

Prior research has clearly demonstrated the growing correlation between occupational health and safety concerns and an organization's competitiveness, operational effectiveness, and safety performance. It showed that employee productivity levels are highly impacted by the use of safety processes, strategic risk reduction approaches, application of safety standards, and management safety support. Additionally, they discovered that employees' acceptance of safety management was a predictor of improved job performance. They contended that a key factor influencing an organization's yield on operational outcomes is the caliber of the efforts and inputs that workers put into their work because of workplace safety. Others have also made an effort to connect safety measures to a wide range of relevant safety outcomes, such as the decrease in workplace accidents and injuries, employee productivity, safety commitment, and safety events.According to Aswathappa (2005), he reported that

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employers are required to promote a safe working environment to minimize the possible health effect to the workers. The employee has a right to refuse or even complain to the relevant authorities if he/she find that the task compromises their health status[52]. However, due to high job insecurity, low educational standards and poverty, petrol station staffs are vulnerable to exploitation by employers and high levels of occupational hazards[53].

Occupational safety and health measures and equipment may be present at the place of work but workers‟ negative attitude may hinder their implementation. Workers tend to ignore or misuse the personal protective equipment because they are oblivious of the risks and potential hazards they are exposed to. Prior research has emphasized the importance of effective emergency response planning, regular drills, and the availability of adequate resources to guarantee a timely and well-coordinated response to disasters. Others highlight the need for robust contractor management systems to guarantee adherence to safety regulations. These systems ought to encompass pre-qualification protocols, continuous audits, and oversight of contractors' safety performance[53]. This is evident in most workplaces in developing countries and petrol station is no exception. Workers who are new to the work may know the hazards present but may not understand the risks or have different perception about how exposure may affects their health. Workers may not report some illnesses or even seek for medical attention but continue going to the workplace as if everything is normal. Some assumptions and misconception are that risks are part of work and that short time exposure may not be a problem, thus it is only the older people who have experienced long exposures to hazards should be worried[54].

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i. Self Determination Theory (SDT) in Health Safety

Using ideas central to organizational psychology, self-determination theory (SDT) is a macro theory of human motivation. Basic psychological requirements and motivational types and qualities are some of the themes covered. Additionally, the theory has identified social-environmental elements that impact

the different motivational kinds as well as the satisfaction or frustration of fundamental psychological needs[55].

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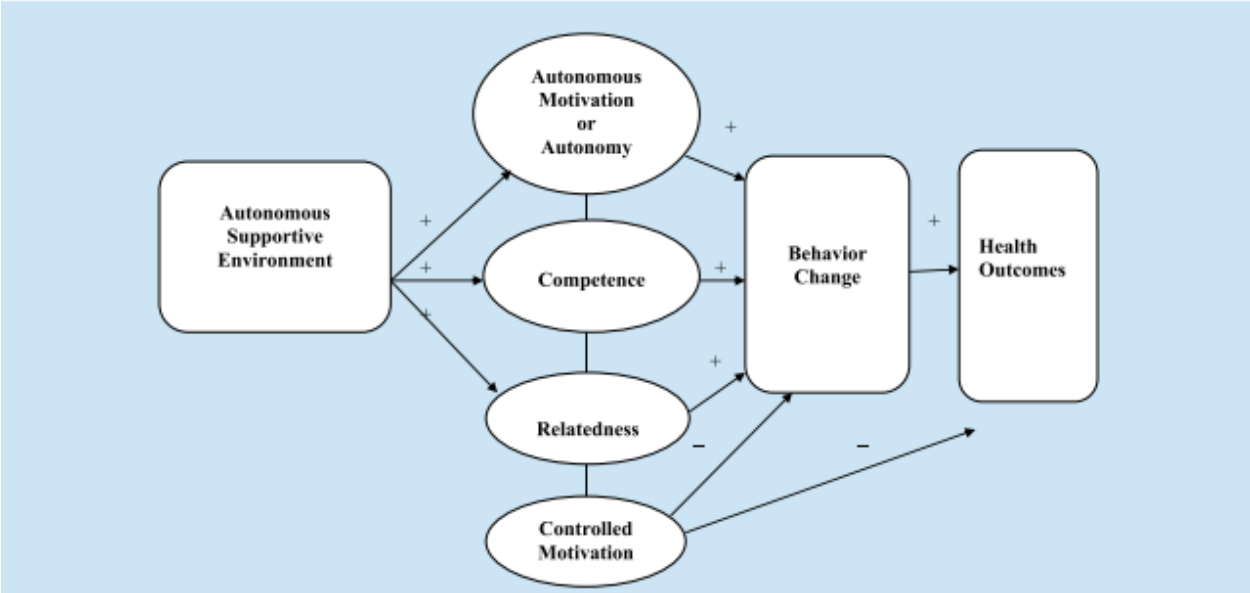


Figure 1. Self-determination theory (created from Deci & Ryan, 2000).

Note. In this theory, a work environment that supports employees in making autonomous health decisions will result in positive health behavior change and better health outcomes. Employees who are allowed to and supported in making autonomous health decisions, are competent to act in healthy ways, and can relate to other employees and personnel are more likely to make healthy behavior changes. However, a highly controlled work environment is unlikely to support positive behavior change in employees.

Self Determination Theory[56]

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Employers are turning to increasing levels of involvement within their influence to achieve this goal as research on the importance of managing H&S inside the workplace and raising worker motivation continues. The Self-Determination Theory (SDT) is a valuable tool for characterizing the motivation of workers. The important distinction between autonomous and regulated motivation is highlighted by Self Determination Theory (SDT). "Autonomy" describes a person's urge to feel responsible for their actions and to be able to control themselves. This also has to do with an individual's subjective sense of "choice and psychological freedom when carrying out an activity" in the job. A meta-analysis of 99 organizational workforce studies across cultures found that autonomy, competence, and relatedness were linked to higher levels of wellbeing and job satisfaction as well as lower levels of perceived work strain and intentions to leave the organization. People who engage in things that they can freely choose (i.e., who have self-determination) and that they generally find fascinating, fulfilling, or enjoyable are said to be autonomously motivated. Intrinsic motivation, which reflects workers' innate interest in or happiness with safety/health, is the most independent type of motivation. Controlled motivation is the desire to carry out actions in response to external factors directing one's actions. The most regulated type of motivation is extrinsic motivation, which is the drive to act in a certain way due to potential rewards or penalties. This is because it can be applied to forecast positive work performance and opportunities for improvement[56, 57, 58].

A study revealed that in addition to the psychological and physical damage linked to workplace accidents, employees who recognize the value of health and safety (H&S) in their jobs and who are eager to maintain a consistent source of income unaffected by disruptions in any way. As such, the primary source of their motivation is their regular earnings. Also, the employees shown that their drive, dependence on their teams to complete tasks safely, including health and safety into daily tasks reduces the risk of working in hazardous situations. But occasionally, the absence or inadequate

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supervision on site can result in occurrences relating to work resulting from violations of site H&S regulations[59]. A number of academic disciplines, including health care and health outreach, have used self-determination theory (SDT). This approach emphasizes relationships, autonomy, and competence as indicators of performance and health outcomes. According to certain theories, all people have basic psychological requirements for relatedness, competence, and autonomy that can either be met or not by their social settings, regardless of their culture or developmental stage. Employees can utilize their abilities to clarify and validate theoretical claims in order to improve the health and well-being of employee populations, since theory lays the groundwork for health safety. Understanding the SDT, a motivation-based theory, can help safety procedures improve health outcomes and anticipate behavior changes[56].

2.1.2 Occupational Health Problems: An Overview

Numerous risks to human health have arisen as a result of the modern workplace's growing mechanization and complexity. Because skilled labor is in short supply in developing countries, occupational health is especially important. Inadequate man-machine connections, weariness, physiological stress, and occupational diseases and injuries are all caused by the working environment itself. Injuries and illnesses in the USA result in direct expenditures of $65 billion and indirect costs of $106 billion annually. Every year, some 1.8 million people get work-related injuries, and a third of them miss work as a result of their issues.

An estimated 100,000 workers lose their lives and three or four times as many become crippled each year due to occupational diseases brought on by the introduction of new chemicals into industrial processes and products, many of which have not been thoroughly vetted for safety. In 1992, 862,000 illnesses and 60,300 deaths were attributed to industrial diseases like lead poisoning and lung cancer.

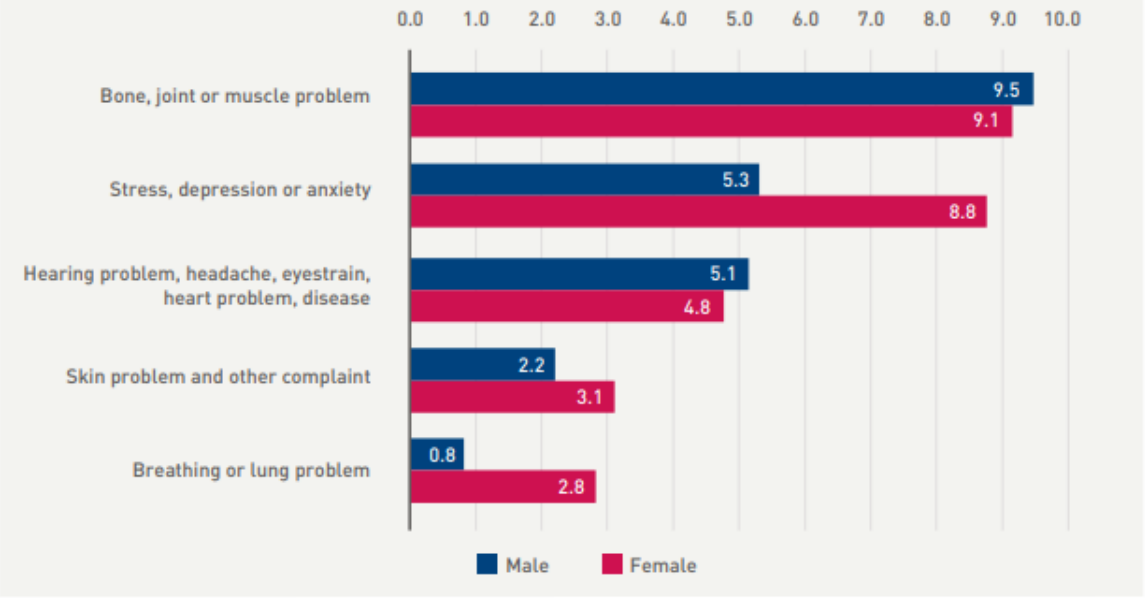
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A previous poll shows that 22% of US workers had hand problems, including carpal tunnel syndrome, and nearly 1 in 5 reported having back discomfort connected to their jobs for a week or longer in the previous year[60]. Occupational health problems among petroleum industry workers are of significant concern globally. These issues encompass a range of physical, chemical, biological, ergonomic, and psychosocial factors that affect the well-being of workers in the industry. The prevalence of these problems can vary depending on factors such as the nature of the work, geographical location, and adherence to safety practices. These problems usually occur due to some health hazards that occur within the industry.

These problems could be in form of diseases that affects the overall health of a workers. Any chronic illness brought on by employment or occupational activity is referred to as an industrial disease or occupational disease. It relates to occupational health and safety. When it is demonstrated that an occupational disease is more common in a certain group of workers than in the broader population or in other worker populations, it is usually classified as such. Sir Percival Pott discovered squamous-cell carcinoma of the scrotum in chimney sweep boys in 1775, making it the earliest known case of the condition[61].

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Rate of 0+ day work-related illnesses per 1,000 workers by gender and illness type in 2020 (CSO)



Annual Review of Workplace Injuries, Illnesses and Fatalities 2021–2022[62]

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Effects Caused by Petroleum Industry Exposure

i. Effects of Petroleum on Attendants

Petroleum products are used regularly both by industries and the general public. Individuals who works directly in petroleum industries are occupationally exposed, thus making them likely to be more affected than their fellow who do not work in these industries (Aleemuddin*et al.,* 2015). The individuals frequently exposed are the petrol station attendants, they are workers who dispense petrochemical products which are commonly sold at filling stations[63]. A lot of harmful effects have discovered after being exposure to petroleum products, this is due to the individual chemicals compounds in the mixture, such as benzene, lead and oxygenates[64]. Inhaling an amounts of petrol vapours can lead to nose and throat irritation, headaches, nausea, vomiting, dizziness, confusion and breathing difficulties. Gasoline, when exposed to the skin, causes some allergic reactions such as rashes, redness, and swelling. Hypersensitivity have also been reported but these are rare occurrences[65].

Exposure to petrochemical industries such as petrol stations increases vulnerability of the workers due to its integration of highly toxic compounds[66,67]. The escalated growth of the global population and increase in the automobile sector has raised the need for petrol, demonstrating a high exposure of the occupationally-exposed personnel[68]. The detrimental effects of the exposure have been corroborated by the findings of the International Agency for Research on Cancer (IARC), which has recognised petrol and petrol engines as potentially human carcinogen factors affecting the health of exposed individuals[68].Hydrocarbons in fuel and the fumes from the exhaust of vehicles regularly come in contact with these petrol attendants[69]. The known pollutants from petrol products include benzene, toluene, ethylbenzene and xylenes which can lead to several health conditions ranging from neurological diseases to cancers. Many diseases conditions affecting the immune, endocrine,

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cardiovascular, respiratory and reproductive systems have been attributed to benzene which is considered the most hazardous pollutant in gasoline due to its genotoxic and carcinogenic effects[70].

ii. Effects of Benzene

Pollution air pollution was increased with urbanization and rapid increasing number of automobiles in most of the towns and cities. Numerous epidemiological studies have reported decrements in pulmonary function and various other health issues associated with long term air pollution exposure[71]. Exposures to too much benzene long can give rise to effects that include haematotoxicity, genotoxicity, immunological and reproductive effects as well as various cancers[72]. Benzene is a volatile compound in urban air pollution which induce DNA oxidation[73]. Moreover, iron and other transition metals leaching from particles or by their presence on particle surfaces play a significant role in the generation of reactive oxygen species (ROS) in biological systems[74].

The volatile nature of petrol makes it readily available in the atmosphere and at any time it is dispensed, especially at petrol filling stations and depots. People are exposed to gasoline fumes during fuelling and refuelling at gas stations, but the gas station attendants or workers are more at risk by the virtue of their occupational exposure[75]. So, spotting on fuel station workers who are chronically exposed to gasoline seemed necessary, Workers were mostly suffering neurological symptoms including; headache, tiredness, irritability and disturbed sleeping, as recorded in the utilized questionnaires[76].

It reported that the refueling of vehicles is the primary source of exposure to benzene, where the degree of exposure depends on the liquid temperature and composition along with the dispensed fuel volume[77]. Various studies have shown severe detrimental effects of BTEX on neurological development and chronic health conditions[78,79,80].

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It was discovered that the increase in temperature increases the inhalation uptake[81]. Also the volatile organic compounds (VOCs) flux also increases when the pump has a canopy, i.e. roof. Those countries which have warm climatic conditions, the focus is on reducing or limiting the exposure time of the fuel station workers, due to health concern[82]. It is because the gasoline vaporization rises at an increased ambient temperature[68].

Risk of benzene exposure is mostly related to four main components; benzene, toluene, ethylene and xylene that known as BTEX[83]. However, benzene was found to be the most hazardous component due to mutagenic and carcinogenic effects of its metabolites[84]. Spotting on fuel station attendant who are chronically exposed to benzene vapours seemed necessary, as properly achieved in the study. Long term exposures to benzene carry the risk of numerous health problems including inorganic elements in such hazards.

ii. Effects of Heavy Metals on Human Being

High and increased levels of heavy metals in the environment in which they live cause heavy metal levels in most living tissues[89.] The origin of heavy metals are the rocks in the earth's crust. Thus, the metal concentration in the living environment is determined by the elements exist in the composition of the rock species common to this region. The concentration of heavy metals in the natural earth's crust are much by industrial activities, exhausts of motor vehicles, and enterprises, mineral deposits, volcanic activities, fertilizers and pesticides used in agriculture and urban wastes[85, 86, 87] Free radicals are high-energy, non-stable compounds containing electrons that do not form one or more pairs in their outer atomic orbitals. This undoubted electron causes a great deal of reactivity to free radicals and led them damage many biological materials such as proteins, lipids, DNA and nucleotide coenzymes. Oxidative stress due to heavy metals is a negative change in ROS (reactive oxygen

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species) production and biological system ROS/RNS (reactive nucleus species) mediated damage and repair balance. In contrast, preventive systems such as glutathione (GSH), paraoxonase (PON), catalase (CAT) and superoxide dismutase (SOD) in the antioxidant category have the function of eliminating free radicals[88]. Glutathione (GSH), a major reducing agent and antioxidant, is easily oxidized, as it contains an amino group in its structure, a sulfhydride group (-SH), two peptide bonds and carboxylic acid groups and is, therefore, plays vital role in many biochemical and pharmacological events. Sources of lead (Pb) exposure mainly include waste that spreads from industrial processes, petroleum products and waste, food, cigarettes, plumbing pipes and local resources (batteries, toys, e.t.c.)[89]. Cadmium element is found in automotive oils and diesel fuels. Cadmium acetate chemical compound is used in the refining process to remove crude oil and benzene mercaptans. The element of cadmium is spread to air during the filling and combustion of petroleum products and passes to the hair by contact and to the lungs by inhalation[90]. Chromium (Cr) belongs to VIA group, and being a transition metal exhibits multiple oxidation states from 0 to VI. Cr element is an essential element and plays an important role in glucose, fat and protein metabolism by increasing the effect of insulin in Cr (III) form. However, International Agency for Research on Cancer (IARC) and the United States Environmental Protection Agency (USEPA) have reported that high Cr exposure is carcinogenic, while Dangerous Substance Directive (DSD) classifies chromium as a potentially toxic element in both chronic and acute exposure[91,92]. Due to the aforementioned properties, in our study, we have given preference Zn (II), Pb (II), Cd (II), and Cr (II) elements and quantified the amount of these elements. Heavy metals can be directly harmful to public health by entering the body through inhalation, dermal contact, dust and soil[93]. Human hair has been used extensively in recent years to observe metal toxicity, evaluate risk for human health, and determine the level of environmental exposure[94]. Metabolically inactive hair tissue is less sensitive to the intake of heavy metals and is

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therefore a useful biological indicator that characterizes long-term exposure in measuring metal contamination. In contrast, the passage of heavy metal atoms contained in petroleum products through the respiratory tract into the lung and then diffusion through the blood demonstrates short-term (several months) metal exposure. It reported that, all of the accumulated metals are proposed to contribute to oxidative stress by different mechanisms[95]. The underlying mechanisms of their toxicity includes formation of the superoxide radicals, hydroxyl radicals and other reactive oxygen species (ROS). Increased in formation of ROS overwhelms body antioxidant protection which may be the underlying cause of the reduction or decrease in antioxidant activity, leading to possible induction of numerous conditions detrimental to health[96]. It was also reported that; both trace elements copper and zinc were significantly lower compared to peoples that are not exposed to fuels[97]. It was reported that too much exposure to benzene exposed individuals under oxidative stress due to decreased levels of antioxidants, including copper and zinc, in the plasma and red blood cells. In this study, copper and zinc were reduced by 51% and 56%, respectively, than lower limit of the accepted reference intervals and amounted 63% and 64% de- crease to control individuals. Zinc and Copper are essential antioxidants in the human body[95].

The most risky toxic metal is lead, which can cause abnormal alterations in the functioning of the vital organs and it is associated with increased risk of haematological malignancies. Unfortunately, the majority of the attendants are neglecting or lacking the protective safety measures such as; facemasks, protective cloths, this carelessness makes them more prone or susceptible to those toxic fumes. Lead exposure may increase the susceptibility of membranes by altering their integrity via causing deterioration of their components[98]. Cadmium metal was found to be elevated in the blood of the attendants exposed to benzene. High in lipid peroxidation represented by increased Malondialdehyde (MDA) level, has been observed in experimental animals treated with cadmium, while cadmium itself

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is unable to generate free radicals directly[99]. Indirect generation of various radicals has been reported. Such mechanism involves displacement of other redox-active metals from their binding sites thus increasing their free form and enhancing their capability of producing free radicals[100]. Fuel station workers who have been exposed to benzene showed highly significant decrease in total antioxidant capacity (TAC) activities and high significant increased plasma MDA levels[101]. Malondialdehyde (MDA) is one of the end-products of the peroxidation of membrane lipids caused by ROS formation, especially by the superoxide ion. This is in agreement with other studies which illustrated that Benzene exposure has been associated with increases in the overall formation of MDA[102]. MPO is one of the high promising biomarkers of oxidative stress for clinical cardiologists[103]. Elevated circulating MPO levels have been discovered to be associated with the presence of coronary artery diseases (CAD).High MPO levels were able to predict increased risk of developing CAD in benzene vapours exposed workers, this was in agreement that; high MPO levels were able to predict increased risk of developing coronary artery diseases (CAD) in healthy individuals[104]. Most of attention was directed toward gasoline related immunotoxicity through decreasing number of immunoglobulin (IgA, IgG) which are often measured to give information about immune system homeostasis[105]. Current study recorded remarkable decreases in IgA and IgG levels with significantly elevated levels of serum IgM and IgE in fuel stations individuals compared to the unexposed ones. It was found that people with primary immunedeficiency have decreased levels of serum IgG and IgA and normal or elevated levels of IgM[106]. Decreased levels of immunoglobulin in gasoline exposed to workers were explained to either suppression of immunoglobulin producing cells or decreased cell mediated immunity[73].

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2.1.2.2. Occupational Health Problems around the World

Physical Health Issues

A global analysis of occupational health issues reveals that petroleum industry workers frequently experience physical health problems. These problems can include musculoskeletal disorders, respiratory illnesses, and noise-induced hearing loss[107,108]. In particular, long hours, physically demanding tasks, and exposure to hazardous chemicals are common risk factors for these health problems. Around 2.3 million women and men worldwide are estimated by the ILO to die from work-related illnesses or accidents each year, which equates to more than 6000 deaths every day. Each year, there are about 160 million cases of work-related illnesses and 340 million occupational accidents worldwide. These numbers are periodically updated by the ILO, and the revisions show a rise in illnesses and accidents[109]. The trigger is the abnormal event that causes an incident. The most common triggers associated with fatal incidents in 2021 were fall from height (11, 29%), loss of control of means of transport (11, 29%), and fall of object from above onto victim (Four, 11%). For details on triggers associated with fatal incidents in each NACE economic sector[62].

Complete avoidance of the agent is the recommended initial therapeutic strategy for occupational asthma. Even years after exposure stops, bronchial hyperresponsiveness can still be present in up to 70% of patients. While respiratory symptoms may not completely disappear, they may momentarily improve with the use of personal respiratory equipment. About 15% of new adult instances of asthma are caused by occupational asthma, which is the most common occupational lung disease in developed nations. According to a survey conducted in 2012 on over 200,000 patients across 22 states, there were an estimated 1.9 million new instances of occupational asthma. Every year, occupational asthma causes around 1.6 million disability-adjusted life years and 38,000 deaths. Nowadays, there are now over 250 known occupational asthma[110].

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Chemical and Biological Agents

Exposure to harmful chemicals and biological agents is another major concern in the petroleum industry. Workers are at risk of contact with toxic substances, carcinogens, and biohazards, which can lead to various health issues[111]. These hazards can result from the handling of petroleum products, drilling operations, and maintenance tasks.

Psychosocial Factors

Psychosocial factors, such as stress, fatigue, and irregular work schedules, contribute to occupational health problems in the petroleum sector. Workers often face high-pressure situations, long shifts, and the challenge of maintaining work-life balance[113]. These factors can have adverse effects on mental health and overall well-being.

Division of labor may exacerbate relationships among employees if individual needs and variations are not taken into consideration. Jobs that are monotonous, repetitive, and overly standardized are despised, and working with automated machinery makes one feel alone. Inadequate communication, together with wage rates and the foundation for paying salaries, can also be a source of conflict and discontent[113]

Genetic Problems.

Because organic solvents are harmful to genes, they may alter an employee's somatic or germ cells genetically[69]. When concentrations of chemicals like benzene, toluene, and gasoline beyond certain thresholds, they cause an excessive level of genotoxicity that either results in genetic polymorphism or causes harmful mutations. The effects of genotoxicity are directly correlated with solvent kinds, quantities, and exposure times. Despite the fact that there are many established hazards to the health of those exposed to such chemicals, efforts would be undertaken to determine whether prolonged exposure results in a person becoming resistant to them[69].

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2.1.2.3 Occupational Health Problems in Sub-Saharan Africa

In Sub-Saharan Africa (SSA), where the petroleum industry plays a vital role in many economies, similar occupational health problems are prevalent among workers. Limited access to healthcare facilities, inadequate training, and cultural factors compound these challenges[33, 34].

However, the oil and gas sector in developing nations has not been able to meet ILO standards due to problems with convention ratification and inadequate execution. Offshore labor, female employees, flexible work schedules, newly emerging threats, personal protective equipment, and corruption are some of the industry-specific OHS difficulties[7]. According to a research conducted in Sub-Saharan Africa, almost half of Ethiopia's labor force had sustained an injury at work. The labor force was more likely to have this problem. In Ethiopia, the likelihood of an occupational injury was higher for males, those who worked more than eight hours a day, those who lacked personal protective equipment, those who were undersupervised, and those who had not had occupational health and safety training. Therefore, the relevant body ought to place a particular emphasis on each of the investigated elements in order to reduce the nation's rates of occupational injury, death, and illness[114].

Others problems could include the following:

1. Chemical Exposures and Effects:

Petroleum industry workers in Sub-Saharan Africa are exposed to a range of hazardous chemicals during drilling, refining, and distribution processes. These chemicals include hydrocarbons, volatile organic compounds (VOCs), and heavy metals, which can lead to respiratory problems, skin disorders, and long-term health issues[115]. A study also assessed the occupational exposure of petroleum industry workers in Nigeria to hazardous chemicals, emphasising the need for protective measures[116].

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2. Fire and Explosion Risks:

Workers in petroleum stations and oil rigs are at risk of fires and explosions, which can result from the flammable nature of petroleum products. These incidents can cause severe injuries and fatalities[117]. A report by the International Association of Oil & Gas Producers (IOGP) highlights the importance of safety measures and risk assessments to prevent fires and explosions in the oil and gas sector[118].

3. Injuries and Accidents Caused By Physical Hazards:

Occupational accidents are defined as sudden, unanticipated incidents that happen at work and cause a variety of deadly and non-fatal injuries. These mishaps can cause severe injuries, lost productivity, and substantial financial losses. They can also range from relatively small incidences like cuts and bruises to serious, life-threatening circumstances[62].

Physical hazards in the petroleum industry include heavy machinery operation, exposure to extreme temperatures, and the risk of falls. Workers in Sub-Saharan Africa may face additional challenges related to inadequate safety equipment and infrastructure[119]. The prevalence of falls among petroleum industry workers in Nigeria and recommended measures to reduce such incidents[120].

According to a study, there are three main reasons why accidents occur: hardware malfunctions, human mistake, and outside occurrences. Of the three, the number of accidents caused by malfunctioning equipment has decreased dramatically due to developments in technology. As a result, despite advancements in equipment design, accidents still happen, underscoring the importance of human factor in accident causation. Any deviation from these, nevertheless, could lead to strange behavior in people, which adds a human risk to the procedure. It is wise to devote a significant amount of resources to comprehending the role of human error in accident causation, even when the importance of any one factor does not necessarily outweigh the others[121].

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4. Infectious Diseases:

Workers at petroleum stations and rigs can be exposed to infectious diseases, especially in regions with poor sanitation and healthcare infrastructure. Contaminated water sources and living conditions can contribute to the spread of diseases[122]. A review by Gidado et al. (2016) discusses the risk of infectious diseases among workers in remote oil exploration sites in Sub-Saharan Africa and the importance of healthcare provisions[123].

5. Healing Loss/Deafness Caused by Noise Exposure:

Noise levels in petroleum industry workplaces can exceed safe limits, leading to hearing loss among workers. Lack of awareness and hearing protection exacerbates this occupational hazard[124] [^9^]. However, the evaluated noise exposure levels among petroleum station workers in Nigeria and recommended hearing protection measures[125].

6. Psychosocial Stressors:

The demanding nature of petroleum industry work, including long hours, isolation, and the risk of accidents, contributes to psychosocial stress among workers. Mental health support and stress management are essential[126]. A survey also explored psychosocial stress among petroleum industry workers in Ghana and highlighted the need for mental health programs[127].

7. Respiratory Problems:

Exposure to dust, fumes, and VOCs in the petroleum sector can lead to respiratory problems. Workers in Sub-Saharan Africa may have limited access to respiratory protective equipment[128]. Meanwhile, to assessed respiratory symptoms among petroleum workers in Nigeria and suggested interventions to reduce respiratory hazards[129].

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8. Musculoskeletal Problems:

Injuries or conditions of the muscles, tendons, joints, cartilage, and nerves that are brought on by abrupt effort or extended exposure to physical elements including force, vibration, awkward postures, repetitive motion, or repetitive strain are known as occupational musculoskeletal disorders. In addition to nonspecific strains, sprains, muscle tears, back pain, and hernias, common upper-limb ailments include carpal tunnel syndrome, lateral epicondylitis, wrist tendonitis, and shoulder issues[110]. Repetitive tasks, heavy lifting, and poor ergonomics contribute to musculoskeletal disorders among petroleum industry workers. Addressing ergonomic issues is crucial[130]. A study examined musculoskeletal disorders among oil rig workers in Nigeria and proposed ergonomic interventions`[131].

2.1.2.4. Occupational Health Problems in the Nigeria

The petroleum industry is a crucial sector that drives economic growth in many countries, including Nigeria. However, it poses significant occupational health hazards to its workers, including those in petroleum stations. Occupational hazards have the potential to cause fatalities, serious injuries, and long-term illness or incapacitation. Reduced output, significant equipment damage, material loss, and environmental degradation are possible additional outcomes. Nigeria's economy has been totally dependent on petroleum for many years; the majority of this oil comes from the Niger-Delta region. Therefore, the productivity of oil industry employees' companies and the country's economy depend heavily on their health. Even while methods to control, lessen, or even completely eliminate health risks and occupational hazards have been put in place over time, these hazards nevertheless happen frequently, resulting in suffering for people and financial difficulties[132].

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Prevalence of Occupational Health Problems in Nigeria

A study published found that occupational health hazards among petroleum industry workers in Nigeria are prevalent[133]. It may even lead to:

- Respiratory Problems: Workers in this sector are at an increased risk of respiratory issues, such as asthma and chronic obstructive pulmonary disease (COPD), due to exposure to dust, fumes, and gases[133].

Skin Problems:

According to a gathered study, workplace injuries were frequent among employees. Cuts, sprains, and fractures were among the injuries sustained by the study's laborers. The current study's onsite inspection of the farms revealed that these were caused by things like slipping on a wet surface, handling sharp materials and unsecured machinery without using personal protection equipment, and lacking pre-placement training. Due to working in moist circumstances and wearing bare feet for extended periods of time, workers frequently complained of dermatological diseases such as contact dermatitis and scabies[134]. Dermatitis and eczema are common among petroleum industry workers in Nigeria, primarily due to exposure to irritants and allergens present in petroleum products and solvents[133]

- Neurological Problems: Headaches, dizziness, and memory loss are frequently reported by these workers, which can be attributed to exposure to neurotoxins like benzene and lead[133, 135] .The continued use of lead in gasoline within Nigeria poses a severe health risk to petroleum industry workers. Lead exposure can lead to various adverse health effects, including neurological issues[136, 135].

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- Cancer: There is an elevated risk of cancer, including leukaemia, lung cancer, and bladder cancer, among petroleum industry workers in Nigeria due to exposure to carcinogens such as benzene and other volatile organic compounds (VOCs) [133, 135].

- Musculoskeletal Problems: In the petroleum industries, one of the biggest occupational dangers is work-related musculoskeletal symptoms (WMSS). Furthermore, WMSS have a detrimental socioeconomic effect on people, businesses, and society as a whole. Both mechanical and psychosocial aspects can be used to broadly classify the risk factors of WMSS. For manual laborers in Nigeria, the mechanically-induced WMSS is linked to unfavorable working environments[137]. The repetitive and physically demanding nature of the workplaces workers are at increased risk of musculoskeletal issues like back pain and carpal tunnel syndrome[133].Furthermore, this study revealed that petroleum industry workers in Nigeria face a higher mortality rate from cancer, respiratory diseases, and heart disease compared to workers in other industries[133].

2.1.2.5. Challenges in Managing the Risks of Health Problems

Several laws have been passed to control health and safety problems. This adds to the still alarmingly high number of accidents and fatalities. Examining the difficulties in enforcing health and safety laws in developing nations is essential. The results showed that managing people and the environment, internal and external management, human error, the enforcement system, working conditions, and human and environmental elements are the main obstacles to putting health and safety rules into practice. It is necessary to examine and update current health and safety legislation to reflect current realities and to periodically review safety records for future planning in order to mitigate and lessen the influence of these difficulties[138].

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Sub Saharan Africa

Poor Utilization of Safety Regulations and Enforcement:

Inadequate enforcement of safety regulations in some Sub-Saharan African countries poses a challenge. Strengthening regulatory compliance is essential for improving worker safety[139]. A report discussed about the efforts to enhance safety regulations in the oil and gas industry across Sub-Saharan Africa[140].

Poor Training and Education:

Providing comprehensive safety training and education to petroleum industry workers is crucial. It enhances awareness of occupational hazards and encourages safe practices[139]

Programs for safety training are useful in lowering workplace illnesses and accidents. A study aimed to investigate the efficacy of comprehensive safety training planning for the gas pipeline construction industry through a pilot project. This was the reason behind performing a risk-based training needs assessment in an interventional research study (before and after). On the basis of this assessment, a thorough training program was then created and put into place. This training program's efficacy was evaluated using 19 checklists and three questionnaires after six months of implementation. When scores from before and after the instruction were compared, it was evident that all of the changes were substantial[141].

In Nigeria

Transparency International puts Nigeria, the largest country in Africa, 139th out of 176 countries in terms of the corruption perception index. Nigeria is rife with corruption. Since the police and regulatory agencies have been shown to be corrupt, it is difficult for laws to be implemented

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effectively in the nation because people have doubts about the actions of the people in charge of executing the law. For example, there are instances where businesses with subpar health and safety procedures pass inspections because they bought off the inspectors out of self-serving financial gain. This undermines the purpose of the laws and encourages noncompliance.

Another significant obstacle to the successful implementation of health and safety in Nigeria is a shortage of qualified workers[23]. A study also evaluated the effectiveness of safety training programs for petroleum workers in Nigeria[142]. Efforts to mitigate occupational health issues among petroleum industry workers and petroleum station workers in Sub-Saharan Africa require collaboration between governments, industry stakeholders, and workers. Adequate safety measures, awareness campaigns, and improved healthcare access are key to safeguarding the health and well-being of these workers.

2.1.3.1 An overview of Health Hazard

Occupational health hazards are a global concern, affecting workers in various industries worldwide. These hazards can vary depending on the nature of the work, industry, and geographic location in petrol stations or the industry. An interplay of technological, social, organizational, human, managerial, and environmental aspects is necessary for the oil and gas industry's very complex systems. A disastrous incident may result from a "fall out" in any one of these areas. Research has indicated that the physical workspace, employees, and management are the main categories in which hazardous situations may arise. Failures in process, structural, and mechanical design are possible in the physical workplace. From the standpoint of the general public, carelessness and negligence are frequently among the main causes of accidents. The management viewpoint, which addresses the management's capacity to make choices that guarantee the preservation of the environment and the health and safety of the workforce, is, nevertheless, the most important[121].

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When compared to the construction business, the occupational mortality and injury statistics show a significant disparity, which shows that injuries in the oil and gas extraction sector are not being reported to the proper authorities. The goal of any investigation into occupational injury should be to pinpoint the precise causes of deaths and injuries as well as the reasons behind underreporting. Such studies will help shape safety actions, shed light on components of the industry's safety culture, and remove obstacles to reporting. Monitoring the effects of new technology, the efficacy of safety treatments, and initiatives to enhance safety culture will also be crucial[143].

The handling and manufacture of hazardous substances in the workplace can have serious consequences for workers, society, and the environment. This was brought to light after the Seveso disaster, which happened more than 40 years ago. An efficient plan was clearly needed in these industrial locations, known as "Seveso sites," to manage risky activities and provide security. Since that time, the most difficult research problems have been how to stop these kinds of accidents from happening and how to lessen their effects, which has led to the creation of numerous risk assessment techniques. Researchers and practitioners have attempted to offer helpful summaries of the current risk assessment approaches on possible occupational hazards in recent years, suggesting multiple reviews[144].

These hazards can come in different forms.

Physical Hazards: Contrary to popular belief, physical hazards are just as significant as chemical hazards. They have the potential to cause multiple health issues, injuries, or even death. Although there are many different types of physical agents, it is important to recognize that the following are the primary ones that can lead to injuries and occupational disorders: Sounds, the illumination, vibration and the non-ionizing as well as ionizing radiation[145].

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An example is seen from a study done in Japan. It is known that arc welding can produce blue light, which may lead to photoretinopathy. Understanding the risks and hazards connected to different welding circumstances is crucial for preventing retinal damage. The current study examined the spectral radiance of the arcs produced during tests using gas metal arc welding to weld mild steel under various situations. The data were then used to determine the effective radiance values, which are used by the American Conference of Governmental Industrial Hygienists (ACGIH) to measure the level of blue light exposure. According to ACGIH recommendations, the resultant values fell inside the dangerous range, ranging from 5.0 to 118 W/cm2/sr. higher welding currents and the utilization of pulsed currents as opposed to constant currents resulted in an increase in the effective radiance[146].

Another form is through chemical hazards. The inhalation of crude oil or its volatile constituents poses a danger of chemical hazard. Studies evaluating the neurotoxicity of crude oil vapor (COV) are few in number, despite the fact that many have examined the neurotoxic effects of volatile hydrocarbons. Concern over the immediate and long-term health implications of COV exposure has grown since the 2010 Deepwater Horizon (DWH) oil spill. According to NIOSH questionnaires, the DWH oil spill cleanup workers reported neurological symptoms such as mood disorders and depression, but it was impossible to determine whether the health consequences extended beyond oil dispersants. Moreover, in the STR and MB, subchronic exposure to COV increased the expression of synaptic and Parkinson's disease-related proteins. It is yet unknown if these changes will result in neurodegenerative consequences[147].

Furthermore, regulations restrict volatile organic compounds (VOCs) like benzene to 6%–8% of PMS content in Nigeria and 1%–5% (v/v) to 5% in the USA and Europe. From 1994 through 1998, there was an estimated number of 7400 fires and explosions safety measures among the attendants occurred per year at public service stations in the United States of America. Numerous workplace risks that

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these attendants face could reduce their effectiveness, efficiency, and productivity. At petrol stations, customer safety and environmental preservation are top priorities[148].

Psychosocial hazards can also occur and it refers to both social and psychological risks. Over the past ten years, time and job pressure have increased, which can lead to psychological risks. Adverse psychological consequences can also result from monotonous job, work requiring continual concentration, irregular working hours, shift work, work performed in a violent environment, isolated work, or work with excessive responsibility for economic or human problems. Insomnia, depression, and burnout syndromes have all been linked to psychological stress and overload[145].

Occupational Health Hazards in Sub-Saharan Africa

Sub-Saharan Africa faces similar occupational hazards within its petroleum industry. The region's growing role in oil and gas extraction has led to increased exposure to risks related to drilling, transportation, and storage[119, 31].

Occupational Health Hazards in Nigeria

Nigeria, as one of the largest oil-producing nations in SSA, experiences occupational hazards in its petroleum sector. These hazards include oil spills, pipeline explosions, and accidents at drilling sites[149, 150]. Safety regulations and adherence to best practices are essential for reducing these risks.

Chemical Exposures

Workers are frequently exposed to hazardous chemicals in petroleum facilities worldwide. The risk of exposure to carcinogens, neurotoxins, and respiratory irritants is a significant occupational hazard[151, 108].Our current understanding sheds light on the complex mechanisms underlying the harmful effects

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of gasoline, such as the production of reactive metabolites through bio-activation, which in turn causes the production of ROS and oxidative stress. These mechanisms are central to the aetiology of gasoline-induced toxicity and involve several different processes. These pathways include pro-oncogene activation, tumor-suppressive gene activity, and covalent attachment to deoxyribonucleic acid (DNA), which results in oxidative damage. Moreover, it triggers the induction of autoimmunity and local inflammatory reactions, interferes with the function of immune cells and numerous neurotransmitters, and destabilizes the functioning of several enzymes, including sodium-potassium adenosine triphosphate (Na+/K+/ATPase). According to available information, there may be a variety of diseases that could result from being around gasoline or the substances it contains. Proper handling, storage, and disposal of chemicals are critical to reducing these risks[153].

Machinery and Equipment

The operation of heavy machinery and equipment is integral to petroleum industry activities. Inadequate training or equipment malfunction can lead to accidents and injuries[40]. Safety practices related to machinery use are essential for minimising these hazards.

Improving Occupational Safety and Health

To address these occupational health challenges among petroleum industry workers in Nigeria and globally, several measures can be taken:

- Awareness Campaigns: Launching awareness campaigns to educate workers about occupational hazards and safety practices[136].
- Training Programs: Providing comprehensive training programs to teach safe work procedures and proper PPE usage[131].

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- Regulation Enforcement: Strengthening government regulation enforcement to ensure compliance with safety standards[136]

- Resource Provision: Offering financial support, training, and PPE resources to both workers and employers[131].

- Phasing out Lead in Gasoline: Gradually eliminating the use of lead in gasoline to reduce neurotoxic exposure[136, 150].

By implementing these measures, the petroleum industry can protect its workers, reduce occupational health risks, and enhance overall well-being.

In Sub-Saharan Africa

1. Government Initiatives:

- Several SSA governments have taken proactive measures to enhance OSH practices within the petroleum industry[153]. Notable examples include the development of Nigeria's National Oil and Gas Safety Code and Ghana's initiatives through the Petroleum Safety Authority[153, 43].

2. Industry-Led Initiatives:

- Oil and gas companies operating in SSA have initiated safety programs to drive improvements in OSH practices[154]. Programs like the Shell Foundation's "Safer Roads at Petroleum Stations" and Chevron's Safety Excellence Program demonstrate the commitment of industry leaders to safer workplaces[155].

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3. Non-Profit Organisations:

- International organisations like the International Labour Organization (ILO) and the World Health Organization (WHO) are actively engaged in enhancing OSH within the petroleum industry[32]. These organisations offer guidance, resources, and capacity-building initiatives to elevate safety standards in SSA[156].

The Interconnections between Occupational Health Problems, Hazards, and Safety Practices

The interconnections between occupational health problems, hazards, and safety practices in the petroleum industry are complex. While hazards and health problems are prevalent, safety practices play a vital role in mitigating these risks. The prevalence of health problems, such as musculoskeletal disorders and chemical exposures, underscores the need for robust safety practices. Risk assessments and engineering controls can significantly reduce the incidence of injuries and illnesses. However, challenges remain in implementing safety practices consistently, particularly in regions like Sub-Saharan Africa. Limited resources, inadequate training, and cultural factors can hinder effective safety measures.

To address these interconnections, a holistic approach is required. This includes:

1. Enhanced Training and Awareness

One of the linchpins in addressing the triad of occupational health problems, hazards, and safety practices is comprehensive training and heightened awareness. Workers need to be well-informed about potential health risks and hazards associated with their roles. This necessitates:

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- Tailored Training Programs: Designing training programs that are specific to job roles and potential hazards. These programs should include hazard recognition, emergency response procedures, and the proper use of personal protective equipment (PPE).

- Cultural Sensitivity: Acknowledging cultural factors that may influence how workers perceive and respond to safety practices. Creating training materials that resonate with diverse cultural backgrounds fosters a culture of safety.

- Continual Education: Providing ongoing education and regular updates on safety protocols and emerging hazards. This ensures that workers remain vigilant and adaptable in their approach to safety.

- Accessible Resources: Ensuring that training materials and safety resources are easily accessible to all workers, including those in remote or less accessible locations.

2. Regulatory Enforcement and Oversight

While regulations exist in many regions to govern safety practices in the petroleum industry, effective enforcement remains a challenge. To strengthen regulatory oversight and compliance:

- Capacity Building: Bolster the capacity of regulatory agencies with well-trained personnel who can conduct inspections, audits, and investigations effectively.

- Harmonization of Standards: Encourage alignment of safety standards and regulations across national and international boundaries. Consistency in regulations facilitates compliance for multinational companies.

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- Transparency and Accountability: Promote transparency in regulatory processes and mechanisms for reporting safety violations. Accountability mechanisms should be robust, with consequences for non-compliance.

- Collaboration: Foster collaboration between governments, regulatory bodies, industry stakeholders, and labour unions. A multi-stakeholder approach can yield more effective and holistic safety solutions.

3. Cultural Awareness and Behavioral Change

Cultural factors can significantly impact safety practices and reporting. Overcoming cultural barriers requires a multi-pronged approach:

- Cultural Sensitization Programs: Implement programs that promote a culture of safety, emphasising the value of each worker's health and well-being. These programs should be tailored to address specific cultural nuances.

- Anonymous Reporting: Establish anonymous reporting mechanisms for safety concerns. Workers must feel safe reporting hazards or incidents without fear of retaliation.

- Leadership Commitment: Engage leadership at all levels of an organisation to lead by example in embracing safety practices. When leaders prioritise safety, it sends a powerful message throughout the workforce.

- Behavioral Psychology: Utilise behavioural psychology principles to encourage safer behaviours. Positive reinforcement, peer recognition, and incentives can motivate workers to adopt safer practices.

4. Resource Allocation and Technological Advancements

Ensuring that workers have access to the necessary resources and technologies is paramount for safety. This includes:

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- Investment in Safety Equipment: Allocate resources for the procurement and maintenance of state-of-the-art safety equipment and infrastructure. This includes PPE, safety systems, and monitoring technologies.

- Technological Solutions: Leverage advancements in technology, such as sensors, drones, and data analytics, to monitor safety conditions in real-time. Predictive analytics can help identify potential hazards before they escalate.

- Research and Development: Encourage research and development efforts aimed at creating safer and more efficient processes and technologies in the petroleum industry.

5. Research and Data-Driven Decision-Making

A robust foundation of research and data is essential for evidence-based decision-making. To bolster this aspect:

- Data Collection: Establish comprehensive data collection systems to track occupational health issues, incidents, near-misses, and safety performance metrics. This data can inform preventive measures.

- Research Collaborations: Foster collaborations between academic institutions, industry, and government agencies to conduct research on emerging hazards and best safety practices.

- Benchmarking: Regularly benchmark safety performance against industry peers and global best practices to identify areas for improvement.

6. Global Collaboration

The petroleum industry operates on a global scale, and many safety challenges are shared across borders. Collaborative efforts should include:

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- Knowledge Sharing: Facilitate the sharing of best practices, research findings, and lessons learned among countries and organisations in the petroleum industry.

- International Conventions: Promote adherence to international conventions and agreements related to occupational health and safety. These agreements often set global standards for safety practices.

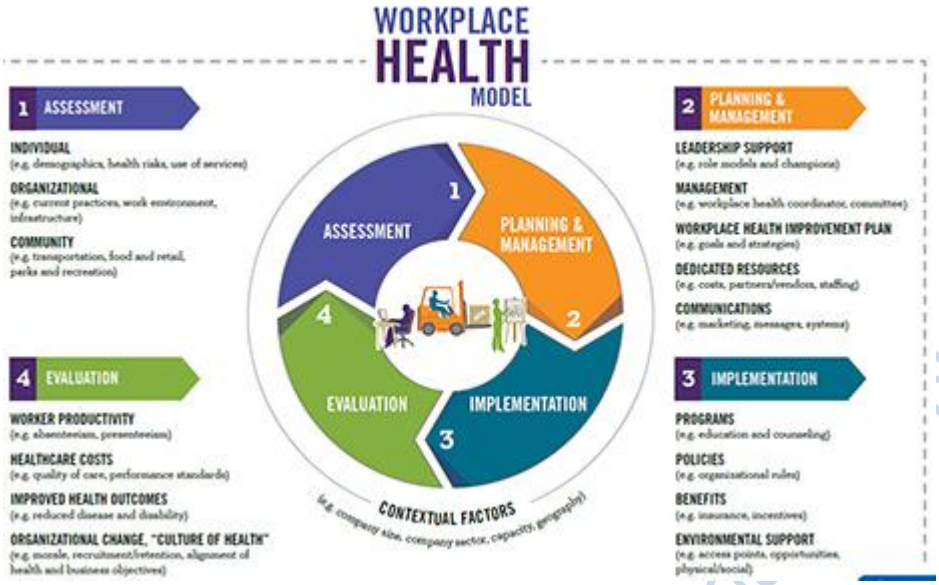
- Technical Assistance: Provide technical assistance and capacity-building support to developing countries to strengthen their safety practices.

In conclusion, the petroleum industry faces significant challenges in addressing occupational health problems and hazards. However, with a concerted effort to implement and enforce safety practices, it is possible to mitigate these risks and ensure the well-being of workers in this vital sector[19, 114, 126, 137, 141, 145]. This expanded section provides a comprehensive overview of the interconnected nature of occupational health problems, hazards, and safety practices in the petroleum industry. It outlines a holistic approach to address these challenges and emphasises the importance of a collaborative effort to ensure the well-being of workers in this critical sector.

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2.2 Theoretical Framework

2.2.1 Workplace Health Model



Workplace Health Model[157]

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At the individual and organizational levels, workplace health initiatives and safety practices have the potential to bring about change. In occupational health, it is an essential tool for managing health safety and prevention of health problems from these work hazards. With the use of this framework, workplace health promotion can be managed and the requirements of every employee may be met through a planned, structured, and all-inclusive suite of policies, benefits, programs, and environmental supports[157]. Workplace health programs may have an effect on an employee's health, including their health-related habits, illness risks, and overall health. Workplace health safety practices may have an effect on recruitment and retention, culture, employee morale, productivity, health care expenses, and absenteeism for firms. In general, everyone gains from maintained health and the avoidance of illness and harm[157].

Why then is it necessary to have a worldwide framework and guidelines given the moral, commercial, and legal justifications for establishing healthy workplaces? An examination of the worldwide landscape indicates that a significant number of businesses, organizations, and governments—possibly even the majority—do not recognize the benefits of healthy workplaces or lack the resources necessary to make improvements. Global organizations, such as the International Labor Organization (ILO) and the World Health Organization (WHO), generally concur that the health, safety, and well-being of workers—who account for almost half of the world's population—are integral[158].

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2.3 Review of Empirical Studies

2.3.1 Knowledge of Safety Practices among Petrol Station Workers

Petrol station attendants play a crucial role in the petroleum supply chain. However, their exposure to various hazards necessitates a comprehensive understanding of safety practices. A study conducted in Sokoto, Nigeria, to assess the knowledge of occupational hazards among petrol station attendants.

Many of the respondents were knowledgeable on work safety practices such as the harmful effects of VOCs on health (72.4%) and the need to use PPE while at work (71.4%); however, just 2.8% had hand gloves, 19.4% of them had an apron, only and boots while none of the respondents had any face mask or eye goggles. The study found that while some attendants had a basic understanding of hazards, there was a need for improved training and awareness[148]

More studies investigated the adherence to safety practices among petrol station attendants in Abraka, Delta State. Their study emphasised the importance of proper safety measures and equipment in mitigating the adverse effects of petroleum products on attendants' health[159].

A study was done to find out the occupational health and safety orientation in the oil and gas industry of Ghana and how these influence overall occupational health and safety compliance. Ghana's oil and gas industry provides the contextual backdrop for this research, given it is characterized by high rates of injury which revealed that the majority of workers were highly knowledgeable about reducing occupational health hazards and had a good attitude toward doing so. It's interesting to note that compared to their male colleagues, female employees demonstrated greater awareness of and compliance with workplace health and safety procedures[47]. An average mean score of 4.34 and standard deviation of 0.55 indicated that most employees had a high level of awareness of workplace dangers. The employees' replies about their knowledge of occupational dangers were found to be clustered near the mean score, as indicated by the Score of 0.55. This suggests that the employees had a uniform understanding of their workplace safety situation. They demonstrated a thorough knowledge of the many kinds of workplace risks, safety precautions, and necessary personal protective equipment (PPEs). They also had training in accident prevention and PPE usage[47].

A descriptive cross-sectional study was conducted in Sokoto, Nigeria. It revealed that just sixteen (15.1%) respondents had a negative attitude, whereas sixty-two (59.0%) respondents had inadequate

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information. Not only did 72 (72.4%) of the respondents know that smoking cigarettes at work is against work safety regulations, but a sizable number also recognized that volatile organic compounds (VOCs) are bad for one's health. Of those surveyed, only 2.8% used hand gloves, compared to 19.4% worn an apron all the time[148].

Types of Occupational Hazard among Petrol Station Workers

The following categories of health hazards are those that could lead to the development of diseases and illnesses: mechanical/ergonomic, chemical, biological, psychological, and physical. The majority of industrialized organizations may be linked to these health risks, and oil and gas refineries are not exception. Additionally, during the investigation, information was gathered from the workers and the occupational health physician using open-ended questionnaires. In addition, environmental monitoring and surveillance were conducted in the refinery's seven primary units. The purpose of the questionnaire, which was given to the employees at random, was to assess the refinery's occupational health practices, identify any health hazards, and find out how aware the workers were of those risks[160].

The majority of respondents could name the following health hazards: mechanical/ergonomics (78.8%), chemical (70.9%), and physical (74.2%). However, only a small percentage of respondents were aware of the psychological (48.3%) and biological (96.6%) health hazards, particularly the latter. Regarding the assessment of occupational health practices, the majority of respondents (78.1%) concurred that management has a strong commitment to the health and welfare of its employees. Based on environmental monitoring, it was determined that the Refinery is prone to the first three health hazards mentioned above as well as the biological health hazard. These detected health hazards

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posed a 3D, 5E, 3C, and 0A level of risk to the workers, according to the Hazards Risk Assessment Matrix[160].

Health Problem among Petrol Station Workers

A study in Nigeria showed that there is a high prevalence of Work-related Musculoskeletal Symptoms among workers in domestic gas stations, significantly higher than those of their counterparts in the works departments of tertiary institutions. Low back and shoulder Work-related Musculoskeletal Symptoms are more common among Gas Workers while thigh and hip Work-related Musculoskeletal Symptoms are the most frequent Work-related Musculoskeletal Symptoms among the workers. Stress indicated by high diastolic blood pressure, working greater than 8 h per day, female gender, sleep deprivation beyond 6 h per day, and poor exercise habits are the independent risk factors of Work-related Musculoskeletal Symptoms among these cohorts. Therefore, Gas Workers require break and leave periods, PPE, assistive devices, exercise, medical check-up, and ergonomically designed workplace[137]. A study in Abraka showed that there were reported health problems which includes cough 5 (14.3%), breathing difficulty 4 (11.4%), and headache 3 (5.6%) with most (51.4%) of the respondents using PPE during their working hours, although, only 13 (37.1%) respondents use them regularly. This helps to poor utilization of health safety tools which could lead to health problem that would affect the petroleum industry worker and allied-workers[159].

Health Risk Factors Associated with Petrol Station Workers

Safe work and workplace is necessary for increased production and higher productivity and hence promotion and protection of safe work and workplace is the complementary aspect of industrial development. According to a study, there are many factors that influence health and safety practices in

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a given workplace. These factors include and not limited to: design and location of Station, knowledge levels and altitude, Level of education and years worked (Experience), Learning at work (training), institutions and legislation. These factors will also influence occupational health and safety practices in a given petrol station[53].

A study was done in Thailand and questionnaires were administered to 141 workers. Spot urine was collected for the measurement of tt-MA, a biomarker of benzene exposure, and area samples were taken for benzene content. The majority of fuelling workers (77.5%) reported having these symptoms, and air benzene detected exceeded 50% of the NIOSH REL (>50 ppb) or the action threshold[161]. The top five negative symptoms that employees exposed to benzene reported experiencing were headache, fatigue, dizziness, nasal congestion, and runny nose. More specific symptoms of benzene toxicity were chest pain, bleeding/epistaxis, and anaemia. The workers' detected tt-MA was 506.7 ug/g Cr (IQR), which was greater than the asymptomatic workers' value and above the BEI. Having no prior experience with safety training (ORadj = 5.22; 95% CI: 2.16-12.58) and eating during work hours (ORadj = 16.08; 95% CI: 1.96-131.7) were risk factors that were significantly linked to unpleasant symptoms[161].

In a survey, professionals in the oil and gas industry were asked to rate their level of dedication to each of the vital factors for occupational health and safety management at work. A five-point rating system with the following descriptions was used to compile their responses: There are five categories: large, moderate, some, little, and not at all. The study found that, with a rating of 61.02%, participants gave the highest rating to the ability to make the right choice in emergency situations at work. With a score of 57.63%, "Level of understanding of injury preventive measures in the workplace" came next. The fact that they divided their devotion to each factor—55.93% among the three was a noteworthy finding[121].

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Moreover, a multiple regression analysis was performed to obtain the individual correlation coefficients for this association in order to facilitate the identification of the elements that significantly impact occupational health and safety. Furthermore, the individual correlation coefficients for the association between emotional intelligence as an intrinsic factor and the dedication to each of the crucial aspects of occupational health and safety were also found with the use of multiple regression analysis[121]. Additionally, a significant value of 0.009 (0.009 < 0.05) was obtained, indicating the presence of a robust correlation between the variables. The correlation coefficient result showed the same value of 0.75, and the greater significance value of 0.008 (0.008 < 0.009 < 0.05) indicated that there is no effect of the oil and gas industry's effort to occupational health and safety. It highlights the critical success elements for occupational health and safety that employees' emotional intelligence can enhance, and it also shows that not all factors can raise an organization's performance in these areas. The model illustrates how action plans in the workplace must be successful in order for employees to be committed to helping implement risk reduction. This also pertains to enhancing workers' dedication to attending meetings about workplace occupational health and safety measures, comprehending and adhering to safety regulations for all workplace machinery and equipment, and recognizing and appreciating workplace risks. It also concerns workers' comprehension of workplace security regulations[121].

Moreover, the effects of environmental factors on health hazards-affected chronic age-related disorders, particularly Alzheimer's disease, Parkinson's disease, stroke, small vessel disease, etc., as well as their development on cognitive health." Environmental variables influence its pathogenesis, which includes cellular and molecular causes of aging such as increased oxidative stress, reduced mitochondrial function, DNA damage, and inflammation[162]. It has been determined that environmental toxicants, such as pesticides, heavy metals, organic solvents, and ambient particulate matter,

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significantly contribute to aging problems of the brain and cardiovascular system. Numerous of these toxicants have the ability to pass across the blood-brain barrier and cause neurotoxic effects, neuroinflammation, and neuronal dysfunction in addition to causing macro- and microvascular damage. To sum up, environmental influences are crucial in regulating the aging process of the brain and heart[162].

The purpose of this cross-sectional study was to evaluate the factors influencing the prevalence of neurological symptoms among gas station employees in Rayong Province, as well as their exposure to organic solvents. Two hundred employees of petrol stations, including cashiers, refuelling staff, employees of food shops, coffee shops, and convenience stores, were included in the sample. The interview questionnaire covered neurological symptoms, employment history, and general information. Organic solvents metabolized in urine, such as methylhppuric acid (MHA), hippulic acid (HA), mandelic acid (MA), and t,t-muconic acid (t,t-MA), were detected using urine collecting devices[163].The workers' medians (interquartile range: IQR) of the metabolized organic solvents were as follows, according to the results: MHA was 0.40 (0.13) g/g, t,t-MA was 393.62 (244.59) µg/g Cr, HA was 0.32 (0.14) g/g Cr, and MA was 0.06 (0.02) g/g Cr. When it came to the frequency of neurological symptoms, headache (49.0%), dizziness (42.5%), and stress/irritability (38.5%) were the top three. Neurological symptoms were more prevalent in 32.5% of workers at gas stations than in the past. Neurologic symptoms were influenced by overtime work lasting more than six hours and HA content higher than the quartiles Q3, respectively, according to the assessment of exposure to metabolized organic solvents and factors affecting the prevalence of neurological symptoms (OR=2.17; 95%CI=1.23-5.10 and OR=2.15; 95%CI=1.18- 4.76, respectively). In conclusion, exposure to organic solvents such as toluene and time spent working in gas stations can eventually result in neurological problems[163].

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Working Environment in the Petrol Station

Maintaining employees' quality of life at work is essential and will probably boost their productivity because the size of an organization's staff in the oil and gas sector continues to be a key driver of organizational performance. The oil and gas extraction sector had a 2.5-times higher occupational mortality rate between 2005 and 2009 compared to the construction sector and a 7-times higher rate than the general industry. Workers in well maintenance were most vulnerable to deadly car crashes. Smaller businesses experienced a higher rate of fatal injuries from oil and gas production than did medium- and large-sized businesses. Regardless of how long they had worked in the industry, new hires were most at risk of dying from a fatal injury: more than half (53.4%) of all fatal injuries happened within the first year of employment, and more than a quarter (28.2%) happened within the first five years. The use of more recent extraction techniques comes with significant risks[143].

A study showed that the management of occupational health and safety in Nigeria has been significantly impacted by the legislation' implementation. This is due to the fact that implementing OHS legislation with sincerity will have a good effect on and perhaps reduce if not completely

Eliminate incidents and accidents at work and in Nigeria as a whole. The survey also showed that the petroleum sectors significantly complied with laws and regulations pertaining to occupational health and safety[5]. However, it demonstrates that there are substantial consequences of major or fatal accidents for Nigeria's economic development since there is little political will to penalize misbehaving international oil majors and domestic oil businesses. Further results revealed that 67.5% said, there is a significant compliance by the working environment with the occupational health and safety regulations / laws, while 32.5 percent (65 respondents) said there is no significant compliance by the working environment ie petrol industries with the occupational health and safety regulations or laws[5].

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Association between Occupational Hazards and Health Problem

The findings from a study imply that there may be an association between exposure to the petroleum stream's benzene percentage (occupational hazard|) and an elevated risk of bladder cancer (occupational problem). According to the study, workers who had been exposed to benzene for a longer period of time (≥18.8 years, HR = 1.89, 95% CI: 1.14-3.13; p-trend = 0.044) or who had a high cumulative exposure (HR = 1.60, 95% CI: 0.97-2.63; p-trend = 0.065) had higher risks than those who had not. After a 20-year exposure lag, associations remained strong. There were no correlations discovered between exposure to diesel exhaust, lubrication oil, hydraulic oil, turbine oil, or mineral oil through the skin or inhalation[164]. The association between poor safety standards and the injuries has been found to be mediated by a number of factors, including knowledge of safety and hazard perception, stress, and depression. Prior studies have advocated for the enhancement of security knowledge as a means of encouraging safety behaviors and averting work-related injuries and problems. According to the knowledge viewpoint, one of the main predictors of workplace accidents is a lack of safety awareness. Thus, it stands to reason that efficient safety knowledge management enhances safety behavior and is therefore a useful instrument for preventing accidents[18].

A study investigated the association between occupational stress hazard and the level of thyroid function and liver function (health problem) in petroleum refining and petrochemical workers which was seen to have certain influence on the level of health function. The TT(4) concentration level fell ($P<0.05$) as task control, decision control, resource control, and technology usage score increased[165]. The quantitative load, load variations, job dangers, employment prospects, promotion opportunities, and participatory decision rating ($P<0.05$) all raised the TT(4) concentration level. The level of total protein concentration rose when work risk, job monotony, and work prospects score increased

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(P<0.05), and decreased when task control, decision control, resource control, quantitative load, load change, promotion opportunity, and participation decision value increased (P<0.05)[165].

Results from a study done aimed to assess the link between fires and its risks in a fire hazard. With 47 petrol station used, there were no vapor recovery systems (VRS) on dispenser nozzles, and the average number of nozzles was 23 ± 12. There were 3382 L of gasoline sold every day on average. The average number of employees per gas station was 10 ± 5; they all worked within 1.5 meters of the dispenser (FHZ-I); and they used smartphones for more than four hours per day. The flammable gas level was 6.2% ± 5.2%, or 1.3%-7.4% LEL-UEL, on average. In FHZ-I at 40 stations (85.1%) and FHZ-II at 10 stations (21.3%), the fire risk was determined to be unbearable. In FHZ-II, a total of eighteen stations were classified as having a substantial danger, while nineteen other stations had a moderate risk; these ratings were correlated with the locations of the stations[166]

Relationship between Working Environment and Health Problems

A study's findings showed a somewhat greater and statistically significant unfavorable relationship between work-related accidents and injuries and the health and safety workplace framework. Therefore, a link was found ($r = -0.59$, $p < 0.05$) between this framework and occupational injuries, and ($r = -0.62$, $p < 0.05$) between the said framework and work-related accidents. There was a recorded link ($r = -0.41$ $p < 0.05$) between safety knowledge and OHSMF, as well as one between safety knowledge and workplace accidents ($r = -0.53$. $p < 0.05$). Additionally, there was a reported correlation ($r = -0.51$. $p < 0.05$) between workplace safety knowledge and occupational problems[4].

A study was conducted to evaluate the potential hazards associated with benzene inhalation among employees of gas stations. 150 employees of petrol stations provided a personal sample, of which 137 worked as fuelers and 13 as cashiers, to determine the ambient benzene levels. On-site observations

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and interviews were used to get more information about working characteristics. Given the elevated danger to their health, workers should be subject to health surveillance to prevent exposure to benzene. It was a nonsmoking workplace with very little passive smoking. The United States Environmental Protection Agency (USEPA) was used to determine the workplace assessment of inhalation exposure, which revealed a high risk of adverse health effects (Hazard Quotients (HQ) >1) in 51.33% of workers. The workers' lifetime cancer risk was 70.67% (>Inhalation Unit Risk (IUR): 2.2 × 10-6), and the cancer risk increased from 1.35 × 10-8 to 1.52 × 10-4. Employees who fill gas tanks compared to cashiers and those who work at gas stations in inner cities compared to rural areas were shown to be at a much higher risk. Every estimate was based on a single measurement taken during an eight-hour workday, which was taken to be the typical shift length for all 250 working days done in a full year[166]. Most workers find occupation problems that result in repeated injuries and accidents limit their operational activities; yet, in certain situations, these may lead to a shift in employment. Because of this, it is critical that one should view promoting safety knowledge through regular safety orientations or safety training as a top priority.

2.4 Conceptual Framework

The conceptual framework illustrates how independent variables which are knowledge levels, altitude, factors influencing safety practices, policies and regulation that govern petrol stations and health and safety management systems are likely to influence dependent variable which is the relevant occupational health and safety practices. Intervening variables for this study will include physical location of the petrol station; and Management and Organisational factors: - Independent Petrol Marketers & Multinational Companies (Figure 2.1).

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Independent Variables **Dependent Variable**

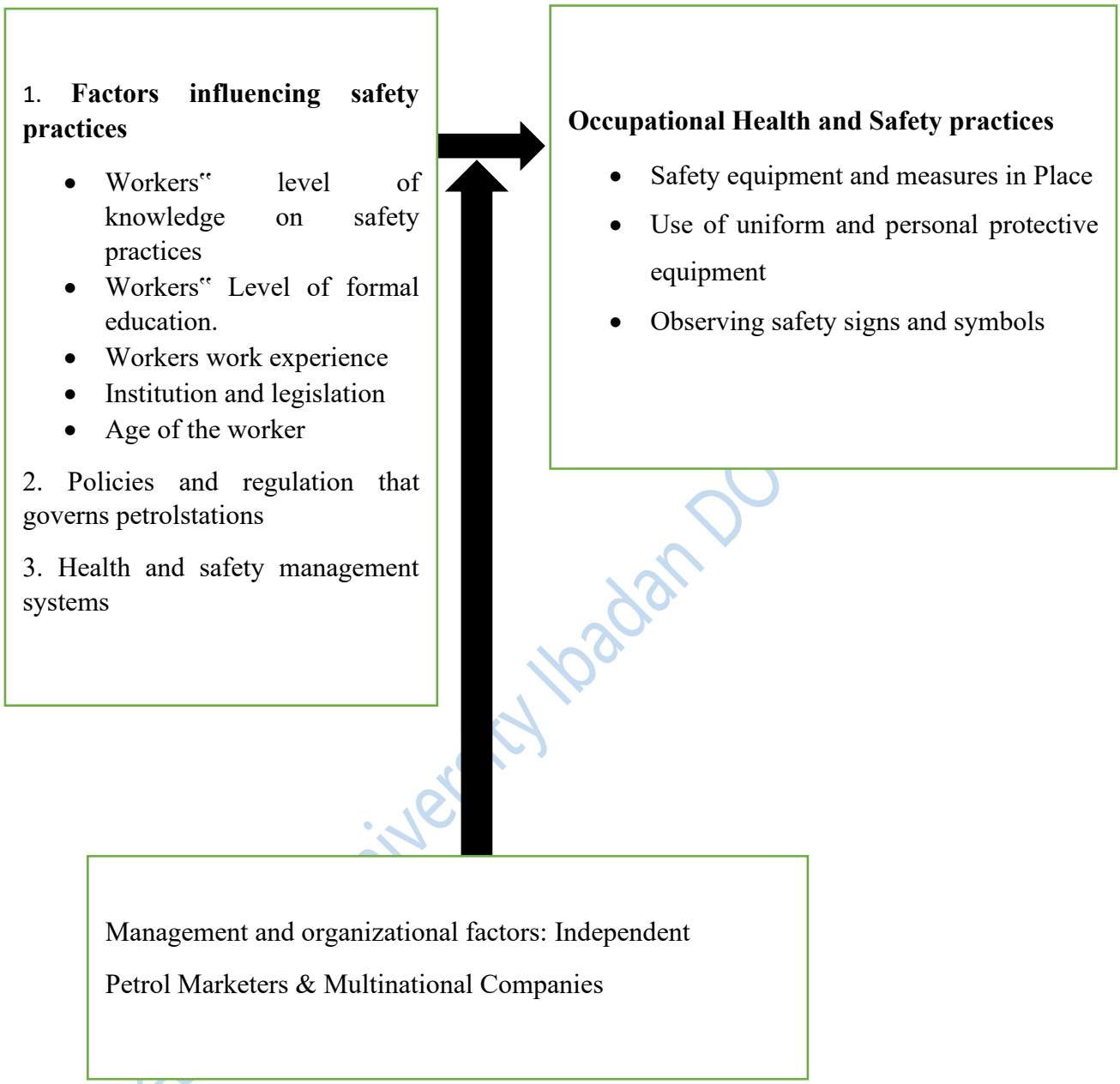


Figure 2.1: Conceptual Framework

Source: [18]

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The Level of knowledge and attitude on occupational health and safety practices will contribute to proper safety practices. Workers with better understanding of relevant occupational hazards present in their workplace tend to implement relevant safety procedures in place resulting to safe work environment. On the contrary, lack of knowledge and poor attitude towards safety procedures results to improper occupational health and safety practices thus putting the lives of fellow workers and customers at risk. In regard to level of formal education, workers with higher level of education are more likely to be aware of the occupational hazards and use of provided PPEs than those who are illiterate or with lower level of education. This is because they can read and get updates from different information sources thus increasing their awareness of potential occupational hazards, how to avoid exposure and obtain additional information on hazards, safety incidence and near misses experienced by other workers in other similar organization.

Duration of employment in a petrol station may have an impact on health and safety practices since the employees have been there for long to experience injuries and near miss incidents that have occurred in their workplace.

Age has an influence towards implementation of safety and health practices in a workplace. Young and middle aged may lack experience and psychological maturity thus may not take seriously enough the safety precaution and measure in place to safeguard health and safety at workplace. However, due to their level of knowledge, young workers are likely to have a more positive attitude towards implementation of new health and safety practices

Institution and existing legislation will affect the overall performance of petrol station toward implementation of safety procedures in place. It illustrates the roles and duties of both the employers and employees in relation to safety of all workers and members of the public. Workplace Policies

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(internal safety laws and regulations) provide a clear framework that enables workers to efficiently and effectively implement safety practices in the workplace.

Conversely, ineffective policies and lack of enforcement by relevant bodies is likely to result to poor housekeeping in these petrol stations. Moreover, Health and safety management systems which include set of laid schedule and routine process by particular petrol station leadership management ensure that safety procedures are strictly adhered to in all sections thus minimising the incidences of injury and illness at workplace.

Intervening variables which include physical location of the station and management and organizational factors may interfere with occupational safety and health practices in petrol stations. However, presence of strong Occupational Health and Safety Enforcement Agencies, efficient and effective health and safety management system in all petrol stations will yield positive outcome including proper safety practices and safe environment

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2.5 Summary of Gaps in Literature Reviewed

Petrol stations are considered hazardous places because they generate and release toxic fumes in all its operations. In order to address the safety concern, literature shows that in developed countries, Petrol stations are located in open spaced isolated areas away from major towns where least number of people and traffic is expected. Isolation of petrol station ensures that there is adequate ventilation within petrol station thus prevent accumulation of vapourised fumes around the station. It also ensures that there is sufficient space for evacuation in case of emergency. Apart from location, Europe, America and number of Asian countries have adopted self-service machines with some countries

including India, offerings its customers option of choosing a self-refueling petrol station where they refuel their own vehicles or traditional fueling service where customers‟ vehicles are refueled by a pump attendant. Safety awareness notices are posted conspicuously to inform workers and customers of the dangers that are present, past incidents and illness statistics. All these measures aim at reducing workers‟ risk of exposure to chemical fumes, and results to minimal loss of lives and proper in case of an incidence. On the contrary, the situation is different in Kenya; petrol service stations have pumps attendants at the dispenser pump to refuel customers‟ automotives and it is likely to find petrol stations located in major town within central business areas and/or with business malls built adjacent to these service stations causing congestion of both human and vehicles. However, it is unlikely to find a documentation or a report posted in workplace's notice board highlighting major accidents, injuries and near misses that have been reported in that particular workplace that can serve as a reminder whenever workers visit the workplace every day. Subsequently, there is little or no documentation on use of self-service dispenser pumps in Kenya. Nevertheless, it is unclear what measures have been put in place in the facilities to protect the workers and the regular customers from risks of exposure to volatile organic compounds which could affect their health at present and even years after they have left the petrol station.

In addition, health and safety related studies on Kenyan petrol station shows that petrol stations have done well in installation of firefighting equipment and warning signs thus taking fire risks very seriously by ensuring they comply to the legal frame work. However, documentation of studies on safety practices, staff and customers‟ awareness to health and safety regulations in Kenya is scanty. It remains to be seen whether these safety equipment are operational, and if workers are trained on how to use them and personal protective equipment in general.

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Furthermore, the WHO and ILO estimates for work related death and occupational diseases for sub-Saharan African countries is at alarming rate. However, there is little or no documentation on the case studies done in Kenya's Petrol station on occupational safety and health showing accidents, illness and fatal incidences meaning that there is likelihood that such cases go unreported or overlooked. Therefore, it remains unclear whether petrol stations in Kenya are in compliance with General Safety Orientation Guidelines for gas and Oil industry (2012) and if attendants are aware of the occupational hazards and safety procedures at their workplace. This study therefore aims at highlighting gaps in safety practices as well as factors that influence these practices in order to come up with appropriate data for health hazard control interventions.

Occupational safety practices are fundamental for preserving the health and well-being of workers worldwide. They serve as the foundation for preventing accidents, minimising occupational illnesses, and ensuring the overall productivity of nations. While challenges exist in their implementation, governments, employers, and workers must collaborate to create safer workplaces globally. By working together, they can overcome these challenges and promote a culture of safety that benefits everyone within the workplace where health safety would be prioritized.

This comprehensive section provides an in-depth exploration of occupational safety practices across the world, encompassing common principles, international organisations' roles, and examples from select countries. It also addresses challenges in the global implementation of these practices and underscores the significance of prioritising occupational safety for the well-being of workers and nations as a whole.

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Chapter Three

Methodology

Methodology is the overall approach of how a research undertaken. This section presents outlines and explains the general scientific steps, procedures and processes adopt for the conduct of this study. It gives the details of the research design, population of the study, sample of the study, sampling techniques, description of the research instruments, validation of the research instrument, reliability of the instrument, method of data collection and method of data analysis. The conception of research methodology when he noted that anything that has to do with procedure or techniques used in a piece of research is the ultimate idea of research methodology. Probing further also observed that research is the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data[1].

3.1 The Study Area

Ibadan is the capital of Oyo State, Nigeria. With a population of over 3 million, it is the third most populous city in Nigeria after Lagos and Kano; it is the country's largest city by geographical area. At the time of Nigeria's independence in 1960, Ibadan was the largest and most populous city in the country, and the second most populous in Africa after Cairo.

Ibadan is located in south-western Nigeria, 128 km inland northeast of Lagos and 530 km southwest of Abuja, the federal capital, and is a prominent transit point between the coastal region and the areas in the hinterland of the country. Ibadan had been the centre of administration of the old Western Region since the days of the British colonial rule, and parts of the city's ancient protective walls still stand to this day. The principal inhabitants of the city are the Yorubas, as well as various communities from other parts of the country.

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Ibadan came into existence in 1829, during a period of turmoil that characterized Yorubaland at the time. It was in this period that many old Yoruba cities such as old Oyo (Oyo ile), Ijaye and Owu disappeared, and newer ones such as Abeokuta, new Oyo (Oyo Atiba) and Ibadan sprang up to replace them. According to local historians, Lagelu founded the City, and was initially intended to be a war camp for warriors coming from Oyo, Ife and Ijebu. As a forest site containing several ranges of hills, varying in elevation from 160 to 275 metres, the location of the camp offered strategic defense opportunities. Moreover, its location at the fringe of the forest (from which the city got its name) promoted its emergence as a marketing centre for traders and goods from both the forest and grassland areas.

Ibadan thus had initially begun as a military state and remained so until the last decade of the 19th century. The city-state also succeeded in building a large empire from the 1860s to the 1890s which extended over much of northern and eastern Yoruba land. It was appropriately nicknamed *idi-Ibon* or "gun base", because of its unique military character.

Unlike other Yoruba cities with traditional kingship institutions however, In Ibadan, the warrior class became the rulers of the city as well as the most important economic group. According to HRH Sir Isaac Babalola Akinyele, the late Olubadan (king) of Ibadan (Olu Ibadan means 'Lord of Ibadan'), in his authoritative book on the history of Ibadan, *IweItan Ibadan* (1911), the first city was destroyed due to an incident at an Egungun (masquerade) festival when an Egungun was accidentally disrobed and derisively mocked by women and children in an open marketplace full of people. The Alaafin of Oyo of that time ordered the old city destroyed for the act. Lagelu who had become an old, frail man; could not stop the destruction of his city, but he and some of his people survived the attack and fled to a nearby hill for sanctuary. On the hill they survived by eating oro fruit and snails; later, they cultivated

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the land and made corn and millets into pap meals known as *oori or eko*, which they ate with roasted snails. They improvised a bit by using the snail shells to drink the liquefied *eko.* Ultimately, Lagelu and his people came down from the hill and founded another city, called **Eba'dan**.

The new city instantly grew prosperous and became a commercial nerve centre. Shortly afterwards, Lagelu died, leaving behind a politically savvy people and a very stable community. The newly enthroned Olubadan made a friendly gesture to the Olowu of Owu by allowing Olowu to marry his only daughter, Nkan. A part of Ibadan was historically an Egba town. The Egba occupants were forced to leave the town and moved to present-day Abeokuta under the leadership of Sodeke as a result of their disloyalty. Ibadan grew into an impressive and sprawling urban center so much that by the end of 1829, Ibadan dominated the Yorùbá region militarily, politically and economically.

The military sanctuary expanded even further when refugees began arriving in large numbers from northern Oyo following raids by Fulani warriors. After losing the northern portion of their region to the marauding Fulanis, many Oyo indigenes retreated deeper into the Ibadan environs. The Fulani Caliphate attempted to expand further into the southern region of modern-day Nigeria, but was decisively defeated by the armies of Ibadan in 1840, which eventually halted their progress. The colonial period reinforced the position of the city in the Yoruba urban network. After a small boom in rubber business (1901-1913), cocoa became the main produce of the region and attracted European and Levantine firms, as well as southern and northern traders from Lagos, Ijebu-Ode and Kano among others. The city became a major point of bulk trade. Its central location and accessibility from the capital city of Lagos were major considerations in the choice of Ibadan as the headquarters of the Western Provinces (1939) which ranged from the northernmost areas of Oyo State to Ekeremor, Bomadi and Patani, which were regions transferred from the old Delta province in the Old Western

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region and later Mid-west to the old Rivers state and later Bayelsa, in the redistricting of Nigeria carried out by the Yakubu Gowon administration shortly before the Nigerian civil war.

Colonial Ibadan

In 1893, Ibadan area became a British Protectorate after a treaty signed by Fijabi, the Baale of Ibadan with the British acting Governor of Lagos Colony, George C. Denton on 15 August. By then, the population had swelled to 120,000. The British developed the new colony to facilitate their commercial activities in the area, and Ibadan shortly grew into the major trading center that it is today.

Geography

Ibadan is located in south-western Nigeria in the southeastern part of Oyo State at about 119 kilometres (74 miles) northeast of Lagos and 120 kilometres (75 miles) east of the Nigerian international border with the Republic of Benin. It lies completely within the tropical forest zone but close to the boundary between the forest and the derived savanna. The city ranges in elevation from 150 m in the valley area, to 275 m above sea level on the major north-south ridge which crosses the central part of the city. The city covers a total area of 3,080 square kilometers (1,190 sq mi), the largest in Nigeria.

The city of Ibadan is naturally drained by four rivers with many tributaries: Ona River in the North and West; Ogbere River towards the East; Ogunpa River flowing through the city and Kudeti River in the Central part of the metropolis. Ogunpa River, a third-order stream with a channel length of 12.76 km and a catchment area of 54.92 km^2. Lake Eleyele is located at the northwestern part of the city, while the Osun River and the Asejire Lake bounds the city to the east.

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Climate

Ibadan has a tropical wet and dry climate (Köppen climate classification), with a lengthy wet season and relatively constant temperatures throughout the course of the year. Ibadan's wet season runs from March through October, though August sees somewhat of a lull in precipitation. This lull nearly divides the wet season into two different wet seasons. November to February forms the city's dry season, during which Ibadan experiences the typical West African harmattan. The mean total rainfall for Ibadan is 1420.06 mm, falling in approximately 109 days. There are two peaks for rainfall, June and September. The mean maximum temperature is 26.46 C, minimum 21.42 C and the relative humidity is 74.55%.

Administration and Demography

There are eleven (11) Local Governments in Ibadan Metropolitan area consisting of five urban local governments in the city and six semi-urban local governments in the fewer cities. Local governments at present are institutions created by the military governments but recognized by the 1999 constitution and they are the third tiers of government in Nigeria. Local governments Councils consist of the Executive Arm made up of the Executive Chairman, the Vice chairman, the Secretary and the Supervisory Councilors.

Local Government Areas and Demography

According to National census of 2006, Oyo state has a total population of 5,580,894. National population commission (2016), pronounced that Oyo state has population of 7,840,864 and the current estimated population of Oyo state by United Nation in 2018 is 15,000,000. According to World Population Review (2018) and Wikipedia, the population of people living within Ibadan metropolis is

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estimated to be over 3.5 Million. The target population for this study will include residential buildings, landlords, developers and building contractors. There are 11 Local government Areas within Ibadan metropolis categorized into urban and pheri-urban .These Local Government areas include and categorized as follows:

Table 3.1: Local Government Area in Ibadan and Population in 2006

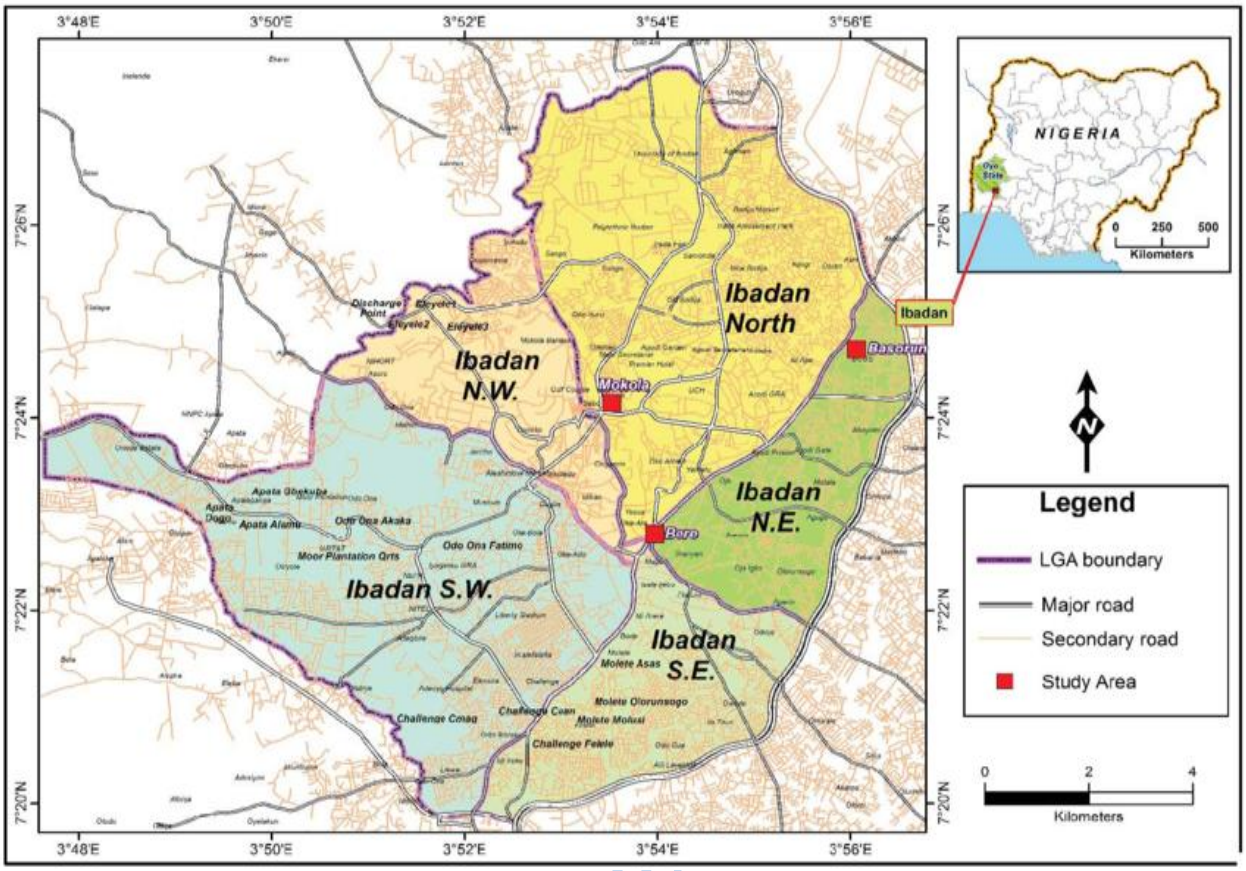
S/N	Urban LGA	Population Census Figure (2006)	Pheri-Urban LGA	Population Census Figure (2006)
1	Ibadan North	308,119	Oluyole	203,461
2	Ibadan North East	331,444	Egbeda	283,643
3	Ibadan North west	154,029	Ona-Ara	265,571
4	Ibadan South West	283,098	Akinyele	211,811
5	Ibadan South East	266,457	Ido	104,087
6	-Oluyole		Lagelu	148,133

Source: [2]

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Until 1970, Ibadan was the largest city in Sub-Saharan Africa by surface. In 1952, it was estimated that the total area of the city was approximately 103.8 km^2.However; only36.2 km^2 was built up. This meant that the remaining 67 km^2 were devoted to non-urban uses, such as farmlands, river floodplains, forest reserves and water bodies. These "non-urban land uses" disappeared in the 1960s: an aerial photograph in 1973 revealed that the urban land-scape had completely spread over about 100 km^2. The land area increased from 136 km^2 in 1981 to 210–240 km^2 in 1988-89 (Areola, 1994: 101). By the year 2000, it is estimated that Ibadan covered 400 km^2.The growth of the built-up area during the second half of the 20th century (from 40 km^2 in the 1950s to 250 km^2 in the 1990s) shows clearly that there has been an underestimate of the total growth of the city. In the 1980s, the Ibadan-Lagos expressway generated the greatest urban sprawl (east and north of the city), followed by the Eleyele expressway (west of the city). Since then, Ibadan city has spread further into the neighbouring local government areas of Akinyele and Egbeda in particular.

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Map of Ibadan

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Religion

Islam and Christianity are the dominant religions practiced in Ibadan with the overwhelming majority of the core Ibadan City Center inhabitants being Muslims. Christianity is also spread all across this core city to the suburbs. Next to the Olubadan's palace is the gigantic mosque where the Chief Imam holds his Friday Jumat service sermons. Ibadan's Cathedral of St. Mary is the episcopal see of the Metropolitan Roman Catholic Archdiocese of Ibadan, whose ecclesiastical province includes four suffragans bishoprics: Ekiti, Ilorin, Ondo, Osogbo and Oyo.

Traditional Yoruba religion is also very important in the city of Ibadan. There are numerous priests and priestesses of the Yoruba deities known as Orisa throughout, and some of the oldest compounds have shrines to both popular as well as local divinities that were brought from many different parts of Yoruba land. The Oke Ibadan festival is one of many festivals for indigenous Yoruba spirituality that draw pilgrims from many parts of Yoruba land in Nigeria as well as Benin Republic. Other important orisa festivals include the Egungun festival which celebrates the ancestors with masquerades, drumming, singing, and dancing, as well as the Yemoja festival, and the OseMeji festival for the deity Orunmila along with the spirit called Ela. Ose-Meji is from the Ifa sacred literary corpus that founded the city of Ibadan when divination was performed at its early settlement. The city has many Babalawo (priests of Ifa or the deity known as Orunmila), Yemoja priests, Egungun priests, Ogboni priests, Esu priests, Ogun priests, and various others of the Yoruba pantheon.

Monuments, Landmarks and Other Locations

The best method to move about the city is to use reference points and notable landmarks. Dugbe district is the commercial nerve centre of Ibadan. This is where many banks have one or more branches. The south west regional office of the Central Bank of Nigeria is at Dugbe. Also at Dugbe is the Cocoa House, Nigeria's first skyscraper. It is one of the few skyscrapers in the city and is at the

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hub of Ibadan's commercial centre. Cocoa house is the headquarters for the Oodua Investment Company co-own by all south-western states. Other tall buildings around Dugbe axis include Femi Johnson glass house, CBN building, United Bank for Africa, Oxford building, Federal Radio Corporation of Nigeria's Building, among others.

There is a museum in the building of the Institute of African Studies, which exhibits several remarkable pre-historic bronze carvings and statues. The city has several well stocked libraries, and is home to the first television station in Africa. The city has two zoological gardens, one located within the University of Ibadan and another at Agodi Gardens which also contain a botanical garden, swimming pool and leisure spots.

The Bower Memorial Tower to the east on *OkeAàre* (Aare's Hill) ("Aare" in Yoruba means commander-in-chief or generalissimo), which can be seen from practically any point in the city; it also provides an excellent view of the whole city from the top. Other attractions include Mapo Hall – the colonial style city hall – perched on top of a hill, "Oke Mapo," Mapo Hill ("Oke" is hill in Yoruba), the Trans-Wonderland amusement park, the cultural-centre Mokola and the Obafemi Awolowo Stadium (formerly Liberty Stadium). The first citadel of higher learning, University of Ibadan (formerly the University College of Ibadan), the Obafemi Awolowo Hall in the University of Ibadan is said to be the tallest and largest hostel in West Africa. The first teaching hospital in Nigeria, University College Hospital, were both built in this ancient city. Ibadan is also home to the Shooting Stars FC – a professional Football Club.

There are some good golf courses: the Ibadan Golf Club is a large 18-hole challenge and the Barracks course has just been extended to 18 holes. The most challenging and exclusive is the 9-hole IITA Golf Club based on the 1,000 hectare premises of IITA.

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Education

Ibadan is host to Nigeria's premier higher institution of learning, The University of Ibadan. Established as a college of the University of London in 1948, and later converted into an autonomous university in 1962, it has the distinction of being one of the premier educational institutions in Africa. Other higher educational institutions in the city include; The Polytechnic, Ibadan, Lead City University, Federal college of Animal health and Production Technology, Federal College of Forestry, Highland College of Technology, Samonda, Federal School of Statistics, Tower Polytechnic, Ibadan, Ibadan City Polytechnic, Citi-gate Polytechnic, NIIT University among others.

There are also numerous public and private primary and secondary schools located in the city and its suburbs. Other noteworthy institutions in the city include The University College Hospital, Ibadan (UCH), which is the first teaching hospital in Nigeria; the internationally acclaimed International Institute of Tropical Agriculture (IITA) headquartered in the city. Established in 1967, it focuses on the agricultural and developmental needs of tropical countries, with several research stations spread across Africa. The Nigerian Institute of Social and Economic Research (NISER), The Cocoa Research Institute of Nigeria, The National Root Crops Research Institute, and The Institute of Agricultural Research and Training (IAR&T), The Forestry Research Institute of Nigeria, The Nigerian Horticultural Research Institute (NIHORT), all under the auspices of The Agricultural Research Council of Nigeria. Before the dissolution of the Western Region, Nigeria, Ibadan and its environs were the home of the most sophisticated and liberal scientific and cultural community on the continent of Africa, as personified by the immortalized Ibadan School of historiography.

In 1853, the first Europeans to settle in Ibadan, Reverend David and Anna Hinderer, started Ibadan's first Western schools. They built churches and Anna taught at the new school. They built the first two-storey building in Ibadan, which can still be found today at Kudeti. The first pupils to attend an

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elementary school in Ibadan were Yejide Olunloyo (female) and Akinyele Olunloyo (male) – the two children of an Ibadan high chief.

Economy

Ibadan is the capital city of Oyo State, the fourth largest state economy in Nigeria, and the second largest non-oil state economy in Nigeria after Lagos state. With its strategic location on the railway line connecting Lagos to Kano, the city is a major center for trade in cassava, cocoa, cotton, timber, rubber, and palm oil. The city and its environs is home to several industries such as Agro allied, Textile, Food processing, Health Care and Cosmetic, Tobacco processing and Cigarette manufacturing, Leatherworks and furniture making Etc. There is abundance of clay, kaolin and aquamarine in the city environs, and there are several cattle ranches, a dairy farm as well as a commercial abattoir in Ibadan. There are dozens of banks and Insurance firms spread out across the cityscape that service the city's millions of inhabitants.

The main economic activities engaged in by the Ibadan populace include Agriculture, Trade, Public service employment, Factory work, Service sector/Tertiary production, Etc. The headquarters of the International Institute of Tropical Agriculture (IITA) have extensive grounds for crop and agricultural research into key tropical crops such as bananas, plantains, maize, cassava, soybean, cowpea and yam. According to a report, Ibadan is the 3rd cheapest Nigerian city to live in

Transport

The city of Ibadan is a major Nigerian transport hub with freeways linking it with Lagos in the South West, Ijebu Ode and Shagamu in the South, Abeokuta in the West, Oyo, Ogbomosho, Offa and Ilorin in the North, Ife, Ado Ekiti, Osogbo, Ilesha, Akure, Okene, Auchi and other cities towards the East. The city is also served by an airport, The Ibadan Airport, which operates daily flights to Abuja, Lagos,

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Kano, Ilorin etc. through major airlines in Nigeria such as Overland Airways and Arik Air. The city is a major terminus railway station on the main railway line linking Lagos with Kano in the North of the country. Nearly all the major roads are dualized (Double carriage roads), such roads include the Ojoo-Sango-Mokola road that passes in front of the University of Ibadan, and others include Ring road-Orita-Challenge-New Garage ways and the recently completed Dugbe-Eleyele-Jerico Road. There are various roundabouts, intersections and flyovers within the city, the latest being the Mokola flyover built to reduce persistent traffic gridlock being experienced in the Mokola axis of the city.

Modes of transport include, cabs & taxis, taxi-vans commonly called *Danfos*, and in more recent times mass transit buses have commenced operations to reduce the hardship of students and workers commuting from various suburban areas to the city center, private/personal/family cars, scooters commonly known as *Okadas*, Coach (bus) services, more commonly known locally as "luxurious busses" such as *Alakowe Bus*, *ABC Transport*, *Cross Country ltd* Etc., which operate To and Fro services linking Ibadan and all other major destinations in the country and beyond, as well as pedestrian walking

Public Space and Parks

- Trans Amusement park
- Fun factory
- Agodi Gardens and Leisure Park
- Heritage Mall
- Ibadan recreational park
- Shoprite mall in cocoa house Dugbe
- The Palms shopping mall
- Ventura Mall and Indoor park

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- Zoological garden University of Ibadan
- Botanical Garden University of Ibadan
- Adamasingba and liberty Stadia
- Shoprite mall Dugbe and Ring road

3.1 Research Design

The cross- sectional survey research design was adopted for data collection by this study. The design is suitable for collecting data from sample population when the population is large to be investigated as in the case of the effect of occupational safety practices, health hazards' and health problems of petrol station attendant in Oluyole local government of Ibadan, Oyo state, Nigeria. This design was considered appropriate because it shows the relationship between the independent variables and the dependent variables and none of the variables was manipulated.

Also, in using this research design, it will be possible to employ quantitative methods of data gathering as useful tools and make the study more encompassing. This research design will allow relevant instruments and techniques to be used to together data from a sample of the study population upon which conclusions will be drawn. Relevant statistical tools for data analysis will also be accommodated.

3.2 Population of the Study

The study population consisted of all the petrol filling station attendants working at petrol pumps in functional petrol stations in Ibadan metropolis in Oyo State. The target population of the study includes all petrol pump workers, men or women engaged in fuel filling for at least 6 months will be eligible to participate in the study. However, those who were working as petrol station cashier,

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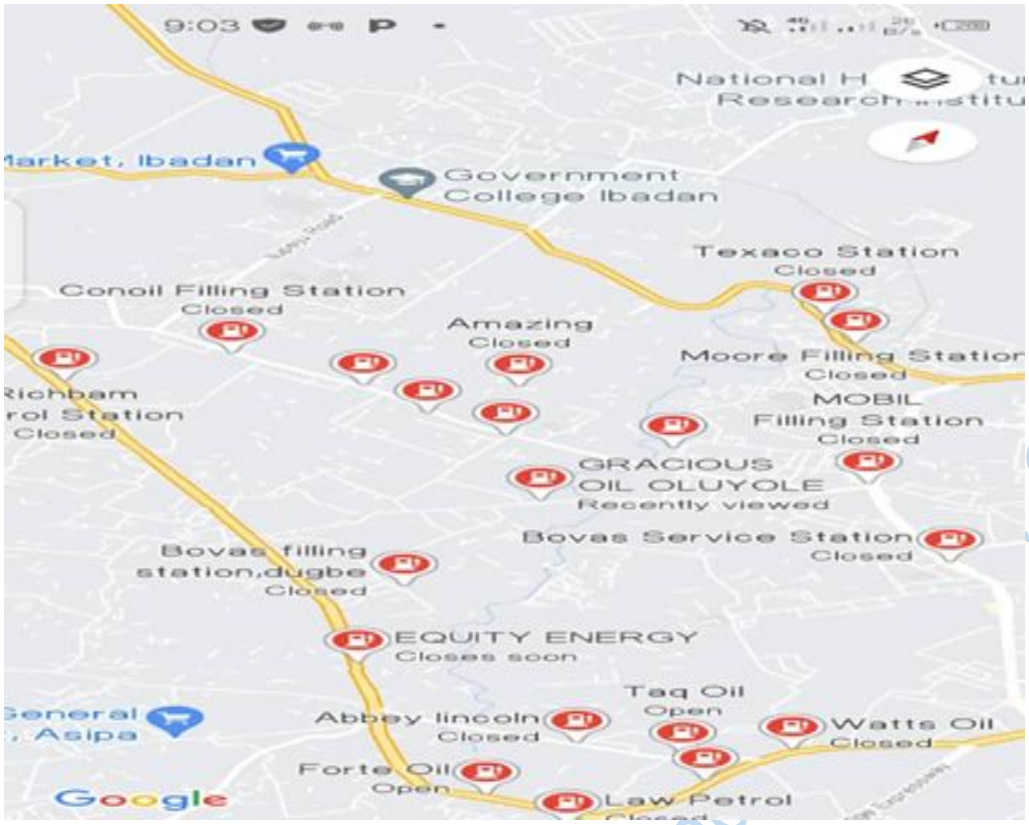
cleaner, clerk and customer service representative or who were involved in replacement of vehicle oil were also included in the study.

In the study area, about one hundred and fifty (150) petrol stations can be found but there are one hundred and thirty (130) being functional at the time of the study with 650 petrol station workers within Ibadan metropolis in Oyo state. Also, part of the study population was manager of all the petrol stations in Ibadan metropolis in Oyo state. However, the petrol filling stations belonged to the independent and non-independent marketers[3].

3.3 Sample Size and Sampling Procedure

For the purpose of this study, total enumeration was adopted for this study. The purpose of using this technique is to achieve a good representation of the population size whose fraction may not be too significant for the study. The total enumeration may be preferred when dealing with a small size of the population, for a given accuracy, one needs almost the entire population in order to achieve accuracy[3]. All the 130 petrol filling stations and 650 petrol attendants from petrol station was used. The population of this study was including all the petrol stations in all the local government area that constitutes the Ibadan metropolis in Oyo state. However, 130 petrol filling stations were sample within Ibadan metropolis. In doing this, 5 petrol station attendants were purposively selected making a total of sixhundred and fifty (650) consecutive petrol attendants. Therefore, 650 petrol station attendants were recruited for the study.

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3.4 Description of the Research Instrument

A research instrument is any type of written or physical device which is to measure variables. The type of instrument used for data collection depends on the data and the type of data to be collection. A choice of questionnaire was depend on many factors including validity and reliability, ease of administering, ease of acquisition of response and ease of interpretation

The researcher having taken the above factors into consideration used the structured questionnaire with both closed – ended and open- questions. The two sets of questionnaire were self-administered to seek the views of both bank officials and customers on the subject under investigation. The questionnaire was used as the data collection instrument because the respondents were required to answer the same questions.

Also, a set of check list was prepared to complement the use of structured questionnaire which was used for direct observation. The check list was designed to examine the environment and the conveniences. The check list was designed to achieve the objective of this research especially objective (Number iv).

The close –ended questions were relevant for the reason that they were easy to ask and quick to answer. This is significant since data had to be collected quickly to meet the time frame for the research. Another reason was that analysis of closed-ended questions was easy and straight forward. However, the potential for the closed ended questions to introduce bias was duly recognized. On the other hand, the open-ended provided the respondent the opportunity to express their view freely and spontaneously. Further, the open-ended questions offered the researcher the opportunity to probe respondents further if answers provided were unclear. However, the open-ended questions were difficult to answer and more difficult to analyze.

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Quantitative Instrument

Questionnaire

A questionnaire is described as a formalized framework consisting of a set of questions and scales designed to generate primary raw data[1]. The questionnaire was used because it was considered to be more convenient for respondents. The overriding objective is to translate the researcher's information needs into a set of specific questions that respondents are willing and able to answer. A questionnaire enables quantitative data to be collected in a standardized way so that the data are internally consistent and coherent for analysis. The questionnaire is divided into four-section.

Section A: Demographic Information. This section was designed to collect demographic information of the respondents including name of the filling station, age, sex, marital status, level of education, religion, years of experience and work category.

Section B: Occupational Safety Practices: This section has sub heading including. Occupational Safety Practices, personal protective equipment (PPE), Services in Convenience and General Services, **Environment and Health Problems**, Hand washing practices and types of accident. A total of 35 items were designed using yes or no response; 1 = Yes and 2 = No.

Section C: Health Hazards. This section consisted of questions on Attendants' Health Hazards. A total of 13 items were used to elicit information on the attendants' health hazards. The responses were ranking using yes or no response; 1 = Yes and 2 = No.

Section D: Health Problems. This section was made up of 25 items to elicit information on attendants' health problems. The responses were ranking using Yes or No response; 1 = Yes and 2 = No.

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Also there is a checklist on petrol station environment

Copy of check list on petrol station environment:

Yes or No

1. Provision of bathroom/Wash room
2. Clock room
3. First Aid box
4. Water supply
5. Presence of fire extinguisher
6. Spill containment devices

3.5 Validation of the Research Instrument

There are different form of validity, this study adopted content validity to authenticate that the study research instruments measured exactly what it was designed to measure. This was embarked on by the contribution of knowledge of persons who are conversant in the subject matter on the construct of the measurement tool. The questionnaire was given to my supervisor and two experts in the field in order to ascertain its face validity and resulting in useful criticism and corrections. So also the supervisor was of much assistance in validating the research, instrument.

3.6 Reliability of the Research Instrument

The reliability of a research instrument concerns the extent to which the instrument yields the same results on repeated trials. Although unreliability is always good deal of consistency. In the results of a quality instrument gathered at different times. A recall problem may arise when subjects are administered the instrument with too short an interval. Recalled responses will affect the instrument's ability to produce consistent results. A time problem may arise if the subjects are administered, the instrument within too long an interval differing subjects responses may be attributed

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to changes in the subject themselves and not inconsistencies in the instrument. Lastly, a problem with activity can occur when subjects are administered the instrument multiple times. Subject becomes sensitized to the instrument and "Learn" to respond as they perceive they are expected to respond. In order to ensure reliability of the instrument and adequate comprehension, the questionnaire was pretested at five petrol stations in Ido Local government area of Oyo State. Twenty (20) copies of the questionnaire were administered and returned. The Cronbach Alpha method was used to analyze the data collected and the reliability coefficient scale of the each of the instrument was determined; occupational safety practices reliability coefficient of 0.88, Attendants' Health Hazards reliability coefficient of 0.78, Attendants' Health Problems reliability coefficient of 0.74. This was done to enable the researcher generate data for computing the internal consistence reliability of the instrument.

3.7 Data Collection

The questionnaires were self-administered and with the assistance of a research assistant and petrol station attendants. Four research assistants who were previously trained by the researchers functioned as research assistants in the data collection activity. The hazards, health problems and occupational safety practices of petrol station attendants were discussed with them and all items on the questionnaire were reviewed until comprehension was ensured. Data collection was carried out over a period of one month.

3.8 Data Analysis

Descriptive and inferential statistics were employed for the analysis of data collected. Correlation and multiple regression analyses were used because the study is a multivariate one that seeks to determine the composite and relative effect of the two independent variables on the dependent variable. Descriptive statistics such as frequency counts, percentages, mean and standard deviation were used to

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analyze all the research questions in the study. Pearson product moment correlation method was used to test for relationships in hypotheses as well as multiple regression analysis. Association was explored between inhaling petrol vapour/vehicle exhaust fumes and the different health problems reported by the respondents. Level of significance was set at 5%. Questionnaire was analyzed using the Statistical Packages for Social Scientists (SPSS) Version 23software.

3.9 Ethical Approval

As a researcher, it is very pertinent to make sure that whatsoever is done in the name of research must first ensure the safety and convenience of the respondents. Therefore, the researcher will ensurethe protection of the information given by the sampled respondents without any privacy intrusion. They will be ensured of the fact that the information would not be traceable to them. The research proposal was submitted to the Lead City University Human Research Ethics committee and Oyo state ministry of health human research ethics committee. Permission to carry out the research was obtained from the Chairman, Independent Petroleum Marketers Association of Nigeria (IPMAN), Oyo state, who in turn issued an official letter to the researchers to take to each station. Permission was also obtained from the owners of the individual filling stations. The purpose, content and significance of the study were adequately explained to the respondents after which written consent was obtained from each of them. Participation was entirely voluntary. No names were used to ensure confidentiality.

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Endnotes

1. Ary, Jacobs, Razavieh, & Sorensen: *Introduction to research in education* (7th ed.). New York: Thompson/Wadsworth. 2006

1. National Population Commission.2006.

2. Researcher compilation, 2022

3. Morris: Open access: how are publishers reacting? *Serial Review*, 30.4:2015, pp. 304-307.

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Chapter Four

Results and Discussion of Findings

In this chapter, the analysis, result and discussion for this study were presented. It also presents the test of hypotheses formulated for the study. A total of 650 copies of questionnaire were administered on the respondents, out of which 630 copies were filled and returned, while 10 copies of questionnaires were discarded due to improper completion. Eventually, 620 were analyzable, representing 95.4% of the total questionnaires.

4.1 Background Characteristics of the Respondents

Table 4.1a & b illustrates the background characteristics of the respondents. Most of the respondents (28.4%) were less than 20 years of age, with the least being 20-29 years (20.2%). The respondents were mostly male (62.7%), and singles (60.6%). Majority (48.9%) of the study participants held Junior Secondary School Certificate, with only 8.9% having post-secondary school certificate. The study also reveals that 47.7% of the respondent were practicing Christianity, 47.4% were practicing Islam while only 4.8 are traditionalist. Similarly, majority (42.7%) of the respondents were earning above 30,000 per month, while 26.9% respondent earns less than 20,000 per month. 43.1% of the respondents had 6-10 years of working experience with only 27.1% had above 10years of working experience. The result further reveals that 54.2% of the respondents had been trained as petrol attendant, while 54.8% of the respondents works 2-3 days in a week. Majority (38.9%) of the respondents worked as attendants while only a few (12.3% and 11.0%) worked as Managers and Cashiers respectively.

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Table 4.1a: Percentage distribution of adolescents according to their Background Characteristics of the Respondents

Variables	Frequency	Percentage
Age		
less than 20	176	28.4
20-29	125	20.2
30-39	167	26.9
40 and above	152	24.5
Sex		
Male	389	62.7
Female	231	37.3
Marital Status		
Single	376	60.6
Married	244	39.4
Educational level		
Primary school	178	28.7
Junior secondary school	303	48.9
Senior secondary school	84	13.5
Post-secondary school	55	8.9
Religion		
Christianity	296	47.7
Islamic (Muslim)	294	47.4
Traditional religion	30	4.8
Monthly Allowance		
less than N20,000	165	26.6
above N30,000	265	42.7
N20,000 - N30,000	188	30.3

Source: Research work 2023

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Table 4.1b: Percentage distribution of adolescents according to their Background Characteristics of the Respondents

Variable	Frequency	Percentage
Number of working years		
less than 6years	184	29.7
6 - 10 years	267	43.1
Above 10 years	168	27.1
Training acquisition		
Yes	336	54.2
No	284	45.8
Number of working days		
2 - 3 days	340	54.8
4 - 5 days	280	45.2
Work category		
Attendant	241	38.9
Lubrication	152	24.5
Manager	76	12.3
Cashier	68	11.0
Administrative assistant and general services	83	13.4

Source: Research work 2023

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Figure 4.1 shows the percentage distribution of the respondents with various health problems. Majority (91%) reported experienced weakness, this was closely followed by cough (90.6%) with only 24% experienced insomnia.

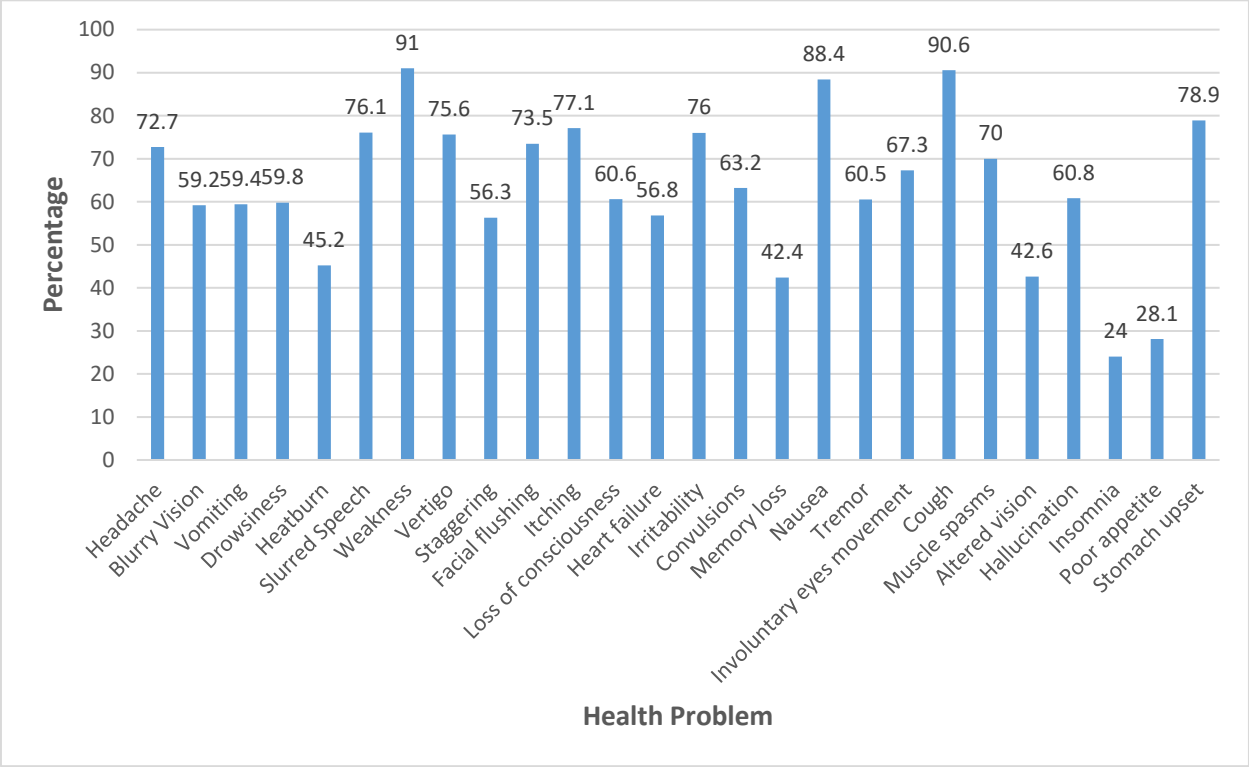
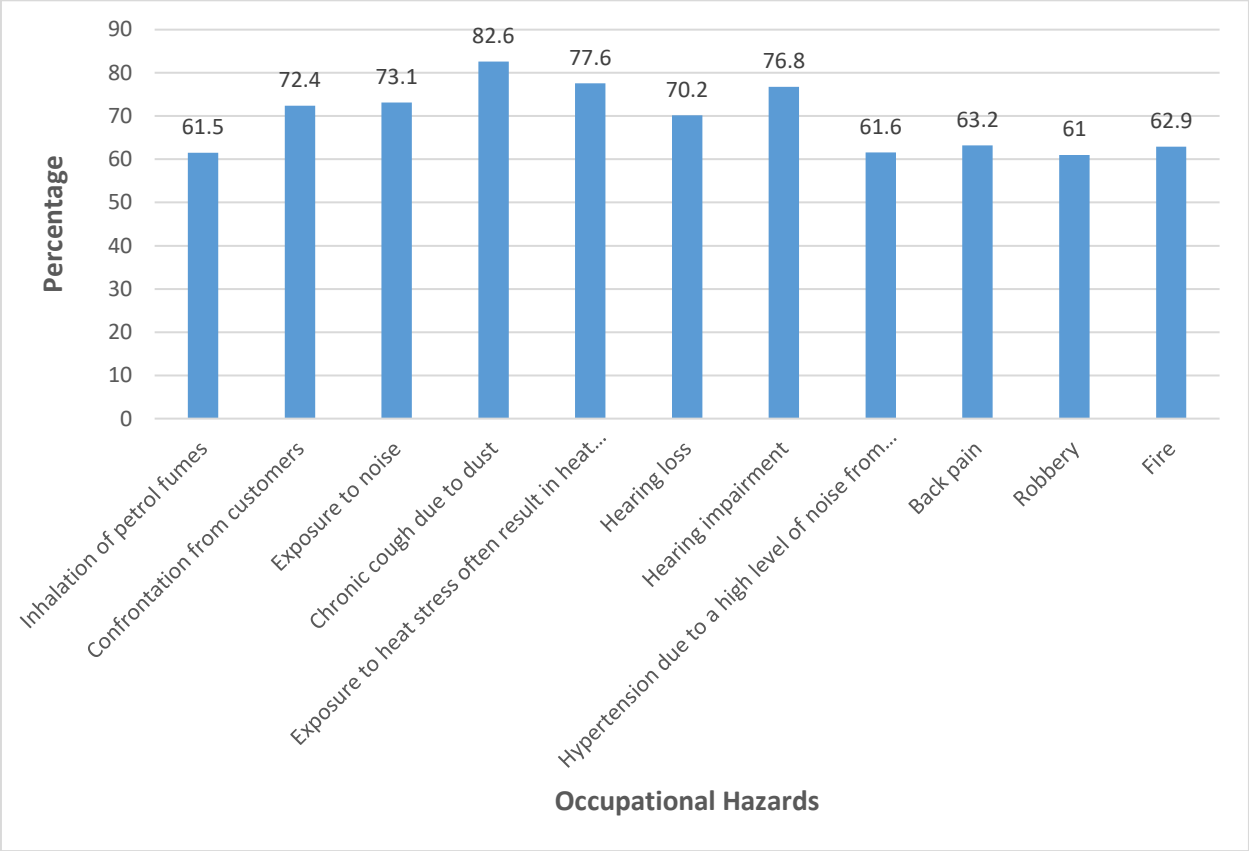


Figure 4.1: Percentage Distribution of Respondents with Various Health Problem

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Figure 4.2 illustrates the percentage distribution of the respondents with various occupational hazards. Majority (82.6%) reported experienced chronic cough due to dust, with 61% experienced Robbery attacks being the least.



Source: Research work 2023

Figure 4.2: Percentage Distribution of Respondents with Various Occupational Hazards

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Table 4.2 displays the percentage distribution of knowledge of safety practice, occupational hazard, health problem and working environment. Majority (41.5%) showed poor knowledge of safety practice with only 25.3% having good knowledge of safety practice. Most (90.3%) of the respondents showed unsatisfactory exposure to occupational hazards with 77.9% of the respondents experienced high health problem. However, 73.4% of the respondent had a safe Working environment.

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Table 4.2: Percentage distribution of Knowledge of Safety Practice, Occupational Hazard, Health Problem and Working Environment.

Variable	Frequency	Percentage
Knowledge of Safety Practice		
Poor	257	41.5
Fair	206	33.2
Good	157	25.3
Occupational Hazard		
Satisfactory	60	9.7
Unsatisfactory	560	90.3
Health Problem		
Minimal	137	22.1
High	483	77.9
Working Environment		
Safe	455	73.4
Unsafe	165	26.6

Source: Research work 2023

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Table 4.3: shows the Background Characteristics of the Respondents by knowledge of safety practice. This result shows a significant disparity in the level of knowledge of safety practices of the respondents. Specifically, 43.2% of respondents between ages 20-29 years had a good knowledge of safety practice compared to 19.9% and 15.8% of respondents between ages <20 years and 40 and above respectively (P-value = <0.001). Similarly, 29.0% of the male respondents had good knowledge of safety practices (P-value = <0.001). while the percentage of respondents with highest level of knowledge of safety practices was the primary school certificate holders (36.5%) with senior secondary school having the lowest level (14.3%) of knowledge of safety practices, (P-value = <0.001).

Furthermore, 29.6% of respondents with 5-10 years working experience had good knowledge (P-value = <0.001), with 43.2% of trained attendants having good knowledge as well (P-value = <0.001). About 38.8% of respondents who worked less (2-3 days) had good knowledge of safety practices, (P-value = <0.001), while respondents who were either administrative assistant and general services or managers (38.6% and 31.6%) had good knowledge of safety practices.

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Table 4.3: The Background Characteristics of the Respondents by knowledge of safety practice

Variable	Knowledge			Chi	P-value
	Poor	Fair	Good		
Age				**39.91**	**<0.001**
less than 20	76(43.2%)	65(36.9%)	35(19.9%)		
20-29	31(24.8%)	40(32.0%)	54(43.2%)		
30-39	81(48.5%)	42(25.1%)	44(26.3%)		
40 and above	69(45.4%)	59(38.6%)	24(15.8%)		
Sex				**16.31**	<0.001
Male	138(35.5%)	138(35.5%)	113(29.0%)		
Female	119(51.5%)	68(29.4%)	44(19.0%)		
Educational status				**25.18**	<0.001
Primary school	55(30.9%)	58(32.6%)	65(36.5%)		
Junior secondary school	132(43.6%)	104(34.3%)	67(22.1%)		
Senior secondary school	40(47.6%)	32(38.1%)	12(14.3%)		
Post-secondary school	30(54.5%)	12(21.8%)	13(23.6%)		
Marital status				**1.36**	**0.51**
Single	162(43.1%)	124(33.0%)	90(23.9%)		
Married	95(38.9%)	82(33.6%)	67(27.3%)		
Religion				**3.36**	**0.5**
Christian	132(44.6%)	92(31.1%)	72(24.3%)		
Muslim	116(39.5)	102(34.7%)	76(25.9%)		
Traditional	9(30.0%)	12(40.0%)	9(30.0%)		
Monthly allowance				**9.56**	**0.05**
less than 20,000	75(45.5%)	57(34.5%)	33(20.0%)		
20,000-30,000	75(39.5%)	53(27.9%)	62(32.6%)		
above 30,000	107(40.4%)	96(36.2%)	62(23.4%)		
Number of working years				**13.38**	**0.01**
less than 5 years	70(38.0%)	62(33.7%)	52(28.3%)		
5-10 years	110(41.2%)	78(29.2%)	79(29.6%)		
above 10 years	77(45.6%)	66(39.1%)	26(15.4%)		
Training as petrol attendant				**142.01**	<0.001
Yes	83(24.7%)	108(32.1%)	145(43.2%)		
No	174(61.3%)	98(34.5%)	12(4.2%)		
Number of working days per week				**83.33**	<0.001
2-3 days	98(28.8%)	110(32.4%)	132(38.8%)		
4-5 days	159(56.8%)	96(34.3%)	25(8.9%)		
Work category				**41.98**	<0.001
Attendant	105(43.6%)	77(32.0%)	59(24.5%)		
Lubrication	84(55.3%)	46(30.3%)	22(14.5%)		
Manager	29(38.2%)	23(30.3%)	24(31.6%)		
Cashier	12(17.6%)	36(52.9%)	20(29.4%)		
Administrative assistant and general services	27(32.5%)	24(28.9%)	32(38.6%)		

Source: Research work 2023

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Table 4.4 displays the Background Characteristics of the Respondents by the percentage of Health Problems. This result shows a significant degree of health problems faced by the respondents. The percentage of health problem was higher among respondents with senior secondary school certificate (97.6%) compared to those with post-secondary school certificate 18.2% (P-value = <0.001). Higher percentage (98.4%) of respondents between ages 20-29 years had health problems compared to 55.1% of respondents between ages <20 years (P-value = <0.001). Similarly, 84.0% of the married respondents had high health problem (P-value = 0.003), while the higher percentage of respondents practicing Christianity (80.4%) had high health problem (P-value = 0.001), while 87.9% of respondents earning above 30,000 had a high level of health problem (P-value = 0.001). Also, respondents with <5 years working experience had more health problem (P-value = 0.01) compared to those with 5-10 years working experience, while respondents who were either administrative assistant and general services or managers (97.6% and 88.2%) had a higher level of health problem (P-value = <0.001) compared to others in other work category.

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Table 4.4: The Background Characteristics of the Respondents by Percentage of Health Problem

variable	health problems			
	Minimal	High	Chi	P-value
Sex			**2.54**	**0.11**
Male	78(20.1%)	311(79.9%)		
Female	59(25.5%)	172(74.5%)		
Educational status			**136.40**	**<0.001**
Primary school	31(17.4%)	147(82.6%)		
Junior secondary school	59(19.5%)	244(80.5%)		
Senior secondary school	2(2.4%)	82(97.6%)		
Post-secondary school	45(81.8%)	10(18.2%)		
Age			**89.03**	**<0.001**
less than 20	79(44.9%)	97(55.1%)		
20-29	2(1.6%)	123(98.4%)		
30-39	34(20.4%)	133(79.6%)		
40 and above	22(14.5%)	130(85.5%)		
Marital status			**8.74**	**0.003**
Single	98(26.1%)	278(73.9%)		
Married	39(16.0%)	205(84.0%)		
Religion			13.48	0.001
Christian	58(19.6%)	238(80.4%)		
Muslim	79(26.9%)	215(73.1%)		
Traditional	0(0.0%)	30(100.0%)		
Monthly allowance			30.05	<0.001
less than 20,000	42(25.5%)	123(74.5%)		
20,000-30,000	63(33.2%)	127(66.8%)		
above 30,000	32(12.1%)	233(87.9%)		
Number of working years			9.51	0.01
less than 5 years	55(29.9%)	129(70.1%)		
5-10 years	48(18.0%)	219(82.0%)		
above 10 years	34(20.1%)	135(79.9%)		
Training as petrol attendant			0.12	0.73
Yes	76(22.6%)	260(77.4%)		
No	61(21.5%)	223(78.5%)		
Number of working days per week			1.92	0.17
2-3 days	68(20.0%)	272(80.0%)		
4-5 days	69(24.6%)	211(75.4%)		
Work category			42.72	<0.001
Attendant	65(27.0%)	176(73.0%)		
Lubrication	52(34.2%)	100(65.8%)		
Manager	9(11.8%)	67(88.2%)		
Cashier	9(13.2%)	59(86.8%)		
Administrative assistant and general services	2(2.4%)	81(97.6%)		

Source: Researcher's field work (2023).

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Table 4.5 demonstrates the Background Characteristics of the Respondents by the percentage of Occupational hazards. This result shows a significant degree of Occupational hazards faced by the study respondents. The percentage of Occupational hazards was higher among respondents with primary school certificate (98.9%) compared to those with post-secondary school certificate 81.8% (P-value = <0.001), Higher percentage (98.4%) of respondents between ages 20-29 years showed a higher percentage of Occupational hazards compared to 87.5% of respondents of ages 40 years and above (P-value = <0.001).

Also, a higher percentage of respondents (92.6%) who work for 2-3 days experienced more Occupational hazards (p=0.03) compared to those who worked for 4-5 days (87.5%), while respondents who were administrative assistant and general services (100.0%) had a higher level of Occupational hazards (p=0.01) compared to others in the work category.

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Table 4.5: The Background Characteristics of the Respondents by Percentage of Occupational hazards

Variable	Health Hazard			
	Satisfactory	Unsatisfactory	Chi	P-value
Sex			10.70	0.001
Male	26(6.7%)	363(93.3%)		
Female	34(14.7%)	197(85.3%)		
Educational status			29.91	<0.001
Primary school	2(1.1%)	176(98.9%)		
Junior secondary school	44(14.5%)	259(85.5%)		
Senior secondary school	4(4.8%)	80(95.2%)		
Post-secondary school	10(18.2%)	45(81.8%)		
Age			11.97	0.01
less than 20	21(11.9%)	155(88.1%)		
20-29	2(1.6%)	123(98.4%)		
30-39	18(10.8%)	149(89.2%)		
40 and above	19(12.5%)	133(87.5%)		
Marital status			0.53	0.47
Single	39(10.4%)	337(89.6%)		
Married	21(8.6%)	223(91.4%)		
Religion			4.56	0.10
Christian	34(11.5%)	262(88.5%)		
Muslim	26(8.8%)	268(91.2%)		
Traditional	0(0.0%)	30(100.0%)		
Monthly allowance			4.81	0.09
less than 20,000	18(10.9%)	147(89.1%)		
20,000-30,000	11(5.8%)	179(94.2%)		
above 30,000	31(11.7%)	234(88.3%)		
Number of working years			3.57	0.17
less than 5 years	22(12.0%)	162(88.0%)		
5-10 years	19(7.1%)	248(92.9%)		
above 10 years	19(11.2%)	150(88.8%)		
Training as petrol attendant			0.02	0.89
Yes	32(9.5%)	304(90.5%)		
No	28(9.9%)	256(90.1%)		
Number of working days per week			4.65	0.03
2-3 days	25(7.4%)	315(92.6%)		
4-5 days	35(12.5%)	245(87.5%)		
Work category			12.61	0.01
Attendant	25(10.4%)	216(89.6%)		
Lubrication	20(13.2%)	132(86.8%)		
Manager	10(13.2%)	66(86.8%)		
Cashier	5(7.4%)	63(92.6%)		
Administrative assistant and general services	0(0.0%)	83(100.0%)		

Source: Research work 2023

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Table 4.6 shows the percentage distribution of correct response to the Knowledge of safety practice, with do not light a match or smoke close to nozzle being the highest (98.2%), followed by washing of hands with water and soap after closing (70.2%) and the least being wearing of boots while working (45.6%). Others are as seen in table 4.6 below.

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Table 4.6: Percentage distribution of correct response to the Knowledge of safety practice

Variable	Percentage
Do not light a match or smoke close to nozzle	98.2
Ensure car engines are switched off while dispensing petrol	50.6
Ensure good nozzle handling	58.1
Do not answer cell phone while dispensing petrol	63.2
Wash hands before eating or drinking at work	62.9
Wash, bath and change clothes after work	57.7
Use of personal protective equipment while dispensing petrol	62.9
Use of chemical hand gloves	49.4
Washing of hands with water & soap after closing	70.2
Provision and use of uniforms	66.5
Wearing of boots while working	45.6
Use of nose/face masks	47.7
Washing of hands with soap & water after accidental spills	45.8
Assessment of pump before use	67.6

Source: Research work 2023

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Table 4.7 illustrates the association of Knowledge of safety practice, Occupational hazards and Working environment with Health problems. There is a significant association between knowledge of safety practice and health problems, with respondents having a good knowledge of safety practice reported the highest (82.8%) percentage of health problems while those with poor knowledge of safety practice reported lowest (72.0%).

Similarly, Occupational hazards was significantly associated with health problems. Respondents who reported unsatisfactory Occupational hazards had higher (80.0%) health problem. Also, working environment was significantly associated with health problems, with respondents working in safe environment reported more health problems (99.3%).

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Table 4.7: Association of Knowledge of safety practice, Occupational hazards and Working environment with Health problems

Variable	Health Problems			
	Minimal	High	Chi	P-value
Knowledge of Practice			9.014	0.011
Poor	72(28.0%)	185(72.0%)		
Fair	38(18.4%)	168(81.6%)		
Good	27(17.2%)	130(82.8%)		
Occupational Hazards			14.779	<0.0001
Satisfactory	25(41.7%)	35(58.3%)		
Unsatisfactory	112(20.0%)	448(80.0%)		
Working Environment			456.437	<0.0001
Safe	3(0.7%)	452(99.3%)		
Unsafe	134(81.2%)	31(18.8%)		

Source: Research work 2023

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Table 4.8a & b shows the Factors influencing Health Problem among Petrol attendants. The results revealed that respondents aged 20-29 years are 10.41 times more likely to have health problem than those aged 40 and above at an unadjusted OR (20-29 years OR = 10.41, 95% CI 2.39-45.19). There was no significant association at the adjusted OR.

Also, male respondents are 1.4 times more likely to have health problem than female attendants (male OR = 1.37, 95% CI 0.93-2.01), while respondents who are single are 77% less likely to develop any health problem compared to the married respondents at the adjusted OR (AOR = 0.23, 95% CI 0.08-0.63).

Similarly, respondents earning less than 20,000 are 6.55 times more likely to develop health problem than those earning between 20,000 to 30,000 at the adjusted OR and unadjusted OR (AOR = 6.55, 95% CI 1.44-29.88) while the odds of having a health problems was 74% less likely among respondents with less than 5 years work experience compared to those with above 10 years work experience at both the adjusted OR and unadjusted OR (AOR = 0.26, 95% CI 0.07-0.96).

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Table 4.8a: Factors influencing Health Problem among Petrol attendants

Variable	OR	95% CI	P-value	AOR	95% CI	P-value
Age						
less than 20	0.21	0.12-0.36	<0.001	0.938	0.20-4.34	0.94
20-29	10.41	2.39-45.19	0.002	1.15	0.14-9.71	0.9
30-39	0.66	0.37-1.19	0.17	1.19	0.30-4.67	0.81
40 and above	1			1		
Sex						
Male	1.37	0.93-2.01	0.11			
Female	1					
Educational status						
Primary school	21.34	9.71-46.88	<0.001	3.22	0.63-16.33	0.16
Junior secondary school	18.61	8.86-39.08	<0.001	3.63	0.95-13.86	0.06
Senior secondary school	184.5	38.73-878.98	<0.001	2.82	0.16-50.71	0.48
Post-secondary school	1			1		
Marital status						
Single	0.54	0.36-0.82	0.003	0.23	0.08-0.63	0.004
Married	1			1		
Monthly allowance						
less than 20,000	1.45	0.92-2.31	0.11	6.55	1.44-29.88	0.02
20,000-30,000	1			1		
above 30,000	3.61	2.24-5.82	<0.001	7.93	2.05-30.57	0.003
Number of working years						
less than 5 years	0.59	0.36-0.97	0.04	0.26	0.07-0.96	0.04
5-10 years	1.15	0.71-1.87	0.58	0.27	0.08-0.95	0.04
above 10 years	1			1		

Source: Research work 2023

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Table 4.8b: Factors influencing Health Problem among Petrol attendants

Variable	OR	95% CI	P-value	AOR	95% CI	P-value
Training as petrol attendant						
Yes	0.94	0.64-1.37	0.73			
No	1					
Number of working days per week						
2-3 days	1.31	0.89-1.91	0.17			
4-5 days	1					
Work category						
Attendant	0.07	0.02-0.28	<0.001	0.23	0.01-4.19	0.32
Lubrication	0.05	0.01-0.20	<0.001	0.22	0.01-3.99	0.31
Manager	0.18	0.04-0.88	0.03	0.11	0.004-2.82	0.18
Cashier	0.16	0.03-0.78	0.02	0.21	0.01-5.91	0.36
Administrative assistant and general services	1			1		
Working Environment						
Unsafe	0.002	0.00-0.01	<0.001	0	0.000-0.003	<0.001
Safe	1			1		
Knowledge of practice						
Poor	0.53	0.33-0.88	0.013	0.43	0.14-1.29	0.13
Fair	0.92	0.53-1.58	0.76	0.19	0.05-0.76	0.02
Good	1			1		
Health Hazard						
Satisfactory	0.35	0.20-0.61	<0.001	3.75	1.29-10.82	0.02
Unsatisfactory	1			1		

Source: Research work 2023

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4.9a Determine the inhalation of petrol fume associated with petrol station attendant

This section determines the health risk factors associated with petrol station attendants. There was highly statistically significant association between having headache, nausea, itching, irritability, cough poor appetite, stomach upset and the inhalation of petrol fume. Among those who had reported headache, 447 (95.5%) had inhaled petrol vapour compared to 21 (4.5%) who had not ($p<0.01$). Also, among those who reported nausea, 468 (100%) had inhaled petrol fume compared to 0 (0.0%) who had not ($p<0.01$). more so, those who reported itching, 400 (85.5%) had inhaled petrol vapour compared to 68(14.5%) who had not ($p<0.01$). Similarly, those who had reported irritability 416(88.9%) had inhaled petrol fume compared to 52(11.1%) who had not ($p<0.01$). Furthermore, those who reported cough, 468 (100%) had inhaled petrol fume compared to 0 (0.0%) who had not ($p<0.01$).

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Table 4.9a: Association between inhalation of petrol fume and selected health problem

Variables	Inhaling petrol fume Yes 468 (%)	No 152(%)	χ^2	p-value
Headache			**37.682**	**0.001**
Yes	447 (95.5)	152(100)		
No	21(4.5)	0(0.0)		
Vomiting			7.267	0.452
Yes	308 (65.8)	81(53.2)		
No	160(34.2)	71(46.7)		
Nausea			**3.797**	**0.001**
Yes	468 (100)	79 (52)		
No	0(0.0)	73(48)		
Drowsiness			2.502	0.114
Yes	376 (80.3)	0(0.0)		
No	92(19.7)	152(100.0)		
Itching			**6.107**	**0.002**
Yes	400 (85.5)	78(51.3)		
No	68(14.5)	74(48.7)		
Irritability			**41.242**	**0.001**
Yes	416(88.9)	55(36.2)		
No	52(11.1)	97(63.8)		
Cough			**29.559**	**0.001**
Yes	468 (100)	94(61.8)		
No	0(0.0)	58(38.2)		
Hallucination			2.329	0.127
Yes	377 (80.6)	0(0.0)		
No	91 (19.4)	152(100)		
Stomach upset			17.114	0.341
Yes	468 (100)	21(13.8)		
No	(0.0)	131(86.2)		

Source: Research work 2023

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4.9b: Determine the confrontation from customers associated with petrol station attendant

This section determine the confrontation from customers associated with petrol station attendants There was a statistically significant association between having headache, nausea, irritability, cough, stomach upset and the confrontation from customers. However, those who had reported headache 447 (92.9%) confrontation from customers compared to 34(7.1%) who had not ($p<0.01$). More so, those who reported nausea, 481(100%) confrontation from customers compared to 0(0.0%) who had not ($p<0.01$). Also, those who had reported irritability, 462(96%) compared to 19 (4.0%) who had not ($p< 0.01$). Furthermore, those who reported cough, 481 (100%) had confrontation from customers compared to 0(0.0%) who had not ($p<0.01$). Similarly, those who had reported hallucination 377(78.4%) had confrontation from customers compared to 104 (21.6%) who had not ($p<0.01$). Finally, those who reported stomach upset, 481 (100%) had confrontation from customers compared to 0(0.0%) who had not ($p<0.01$).

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Table 4.9b: Association between confrontation from customersand selected health problem

Variables	Confrontation from customers Yes 481(%)	No 139 (%)	χ^2	p-value
Headache			52.317	**0.001**
Yes	447 (92.9)	0(0.0)		
No	34(7.1)	139(100)		
Vomiting			3.878	0.321
Yes	389(80.9)	0(0.0)		
No	82(19.1)	139(100)		
Nausea			32.681	**0.001**
Yes	481(100)	66 (47.5)		
No	0(0.0)	73(52.5)		
Drowsiness			0.001	0.991
Yes	376 (78.2)	0(0.0)		
No	105(21.8)	139(100)		
Itching			34.194	0.284
Yes	470 (97.7)	8(5.7)		
No	11(2.3)	131(94.2)		
Irritability			74.985	0.001
Yes	462(96)	9(6.5)		
No	19 (4.0)	130 (93.5)		
Cough			82.607	0.001
Yes	481 (100)	81(58.3)		
No	0(0)	58 (41.7)		
Hallucination			20.014	**0.002**
Yes	377(78.4)	0 (0.0)		
No	104 (21.6)	139(100)		
Stomach upset			8.430	**0.001**
Yes	481(100)	8(5.7)		
No	0(0.0)	131(94.2)		

Source: Research work 2023

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4.9c: Determine the exhaust fume associated with petrol station attendant

This section determine the exhaust fume associated with petrol station attendants There was a statistically significant association between having headache, nausea, itching, irritability, cough, stomach upset and exhaust fume. However, those who had reported headache, 400 (84.6%) had exhaust fume compared to 73(15.4%) who had not ($p<0.01$). More so, those who reported nausea, 473(100%) had exhaust fume compared to 0(0.0%) who had not ($p<0.01$). Furthermore, those who reported itching, 428(90.4%) had exhaust fumecompared to 45(9.5%) who had not ($p<0.01$). Similarly, those who had reported Irritability 471(99.6%) had exhaust fumecompared to 2(0.4%) who had not ($p<0.01$). More so, those who had reported cough 473(100%) had exhaust fumecompared to 0(0.0%) who had not ($p<0.01$). Finally, those who reported stomach upset, 400(84.6 %) had exhaust fume compared to 73(15.4%) who had not ($p<0.01$).

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Table 4.9c: Association between exhaust fume and selected health problem

	Exposure to noise			
Variables	**Yes 473 (%)**	**No 147(%)**	**χ^2**	**p-value**
Headache			37.185	**0.001**
Yes	400 (84.6)	47(32)		
No	73(15.4)	100(68)		
Vomiting			41.042	**0.424**
Yes	389 (82.4)	0(0.0)		
No	84(17.6)	147(100)		
Nausea			399.145	**0.001**
Yes	473 (100)	74 (51)		
No	0(0.0)	73(49)		
Drowsiness			153.386	**0.879**
Yes	300(63.4)	76(51.7)		
No	173(36.6)	71(48.3)		
Itching			130.509	**0.001**
Yes	428(90.4)	50(34.)		
No	45(9.5)	97(66)		
Irritability			106.342	**0.001**
Yes	471(99.6)	0(0.0)		
No	2(0.4)	147 (100)		
Cough			148.576	**0.001**
Yes	473 (100)	89(64)		
No	0 (0.0)	58 (36)		
Hallucination			19.940	**0.567**
Yes	377(79.7)	0(0.0)		
No	96(20.3)	149(100)		
Stomach upset			25.200	**0.001**
Yes	400(84.6)	89 (64)		
No	73(15.4)	58(36)		

Source: Research work 2023

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4.9d: Determine the health risk factors associated with petrol station attendant

This section determine the exposed to nose associated with petrol station attendants There was statistically significant association between having headache, cough and stomach upset and expose to noise. However, those who had reported headache, 440 (92.4%) exposed to nose compared to 36 (7.6) who had not ($p<0.01$). More so, those who reported nausea, 476(100%) exposed to nose compared to 0(0.0%) who had not ($p<0.01$). Furthermore, those who reported cough, 476 (100%) had exposed to nose compared to 0(0.0%) who had not ($p<0.01$).

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Table 4.9d: Association between exposed to nose and selected health problem

	Exposed to noise			
Variables	**Yes 476(%)**	**No 144(%)**	**χ^2**	**p-value**
Headache			52.317	**0.001**
Yes	440 (92.4)	7(4.9)		
No	36(7.6)	137(95.1)		
Vomiting			4.182	**0.523**
Yes	389 (81.7)	0(0.0)		
No	87(18.3)	144(100)		
Nausea			5.321	**0.002**
Yes	476 (100)	71(49.3)		
No	0(0.0)	73(50.7)		
Drowsiness			2.431	**0.459**
Yes	376(79)	0(0.0)		
No	100(21)	144(100)		
Itching			4.194	0.761
Yes	476(100)	2(1.4)		
No	0(0.0)	142(98.6)		
Irritability			12.342	**0.642**
Yes	471(98.9)	0(0..0)		
No	5(1.1)	144 (100)		
Cough			2.437	**0.002**
Yes	476 (100)	86(59.7)		
No	0(0.0)	58(40.3)		
Hallucination			17.014	**0.443**
Yes	377(79.2)	0 (0.0)		
No	99(20.8)	144 (100)		
Stomach upset			1.430	**0.001**
Yes	476(100)	13 (9.0)		
No	0(0)	131(91)		

Source: Research work 2023

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4.9e: Determine the health risk factors associated with petrol station attendant

This section determines the heat loss associated with petrol station attendants. There was a statistically significant association between having headache, Itching, Irritability, cough and health loss. However, those who had reported headache, 447(90.3%) heat loss compared to 48(9.7%) who had not ($p<0.01$). More so, those who reported itching, 478 (96.6%) heat loss compared to 17(3.4%) who had not ($p<0.01$). Furthermore, those who reported Irritability,471(95.2%) had heat loss compared to 24 (4.8%) who had not ($p<0.01$). Finally, those who reported cough, 495 (100%) had heat loss compared to 0(0%) who had not ($p<0.01$

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Table 4.9e: Association between heat loss and selected health problem

	heat loss			
Variables	**Yes 495(%)**	**No 125(%)**	**χ^2**	**p-value**
Headache			**4.217**	**0.001**
Yes	447 (90.3)	0(0.0)		
No	48(9.7)	125(100)		
Vomiting			2.345	**0.432**
Yes	389 (78.6)	0(0.0)		
No	106(21.4)	125(100)		
Nausea			2.561	**0.564**
Yes	495 (100)	52 (41.6)		
No	0(0.0)	73(14.3)		
Drowsiness			0.601	0.897
Yes	376 (76)	0(0.0)		
No	119(24)	125(100)		
Itching			2.123	**0.001**
Yes	478 (96.6)	0(0.0)		
No	17(3.4)	125(100)		
Irritability			14.516	**0.001**
Yes	471(95.2)	0(0)		
No	24(4.8)	125(100)		
Cough			2.237	**0.001**
Yes	495 (100)	67(53.6)		
No	0 (0.0)	58 (46.4)		
Hallucination			3.124	**0.345**
Yes	300 (60.6)	77 (61.6)		
No	195(39.4)	48(38.4)		
Stomach upset			8.430	**0.431**
Yes	489(98.8)	0(0)		
No	6(1.2)	125(100)		

Source: Research work 2023

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Table 4.10 shows factors associated with health problem. It is shown from the result that there is no significant association between ages of respondents, marital status and headache at p-value of 0.150 and 0.233 respectively. The result shows that there is significant association between educational level and headache at p-value of 0.035. It shows that there is no significant association between monthly allowance and headache at p-value of 0.814. It is also shown that there significant association between number of years of experience and headache at p-value at 0.010. There is no significant association between religions, training as a petrol attendant, days you work in a week and headache at p-value of 0.662, 0.900, 0.799 respectively. The result shows that there is significant association between work category, awareness of any personal protective equipment and p-value of 0.016, 0.050 respectively. It is shown from the result that there is no significant association between using of personal protective equipment, knowledge, occupational health hazard and headache at p-value 0.363, 0.876, 0.122 respectively. However, there is significant association between work environment and headache at p-value of 0.000.

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Table 4.10: Factors Associated with Health Problem (Headache)

Variables	Headache		Chi-square	P-value
	Yes	No		
Sex			1.054	0.305
Male	29.5	70.5		
Female	25.7	74.3		
Age			6.753	0.150
< 20years	21.6%	78.4%		
20-29years	33.6%	66.4%		
30-39years	31.1%	68.9%		
40years above	27.1%	72.9%		
Marital Status			1.424	0.233
Single	26.3%	73.7%		
Married	30.7%	69.3%		
Educational Level			8.622	0.035
Primary	31.5%	68.55		
J.S.S 3	24.8	75.2%		
S.S.S 3	38.1%	61.9%		
HND/B.Sc	20.0%	80.0%		
Monthly Allowance			0.411	0.814
Less than 20,00	29.9%	70.1%		
Above N 20,000	27.2%	72.8%		
Range N 20,000-30,000	27.7%	72.3%		
No. of years of experience			9.298	0.010
1-5 years	20.0%	80.0%		
6-10 years	30.0%	70.0%		
Above 10years	33.9%	66.1%		
Religion			0.826	0.662
Christianity	26.4%	73.6%		
Islam	29.6%	70.4%		
Did you have any training as petrol attendant			0.016	0.900
Yes	28.3%	71.7%		
No	27.8%	72.2%		
How many days did you work in a week			0.065	0.799
2-3 days	27.6%	72.4%		
4-5 days	28.6%	71.4%		
Work Category			10.392	0.016
Attendant	26.6%	73.4%		
Lubrication	20.4%	79.6%		
Lane Manager	31.6%	68.4%		
Administrative assistant and general services	36.4%	63.6%		
Are you aware of any personal protective equipment?			3.838	0.050
Yes	26.5%	73.5%		
No	35.8%	64.2%		

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Do you use personal protective equipment			0.828	0.363
Yes	26.5%	73.5%		
No	29.8%	70.2%		
Knowledge			0.025	0.876
Poor Knowledge	27.9%	72.1%		
Good Knowledge	28.6%	71.4%		
Occupational health hazard			2.393	0.122
Unsatisfactory	29.9%	70.1%		
Satisfactory	23.8%	76.2%		
Work Environment			36.760	<0.001
Unsafe	10.1%	89.9%		
Safe	34.7%	65.3%		

Source: Research work 2023

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Table 4.11 shows the factors associated with health problem. There is no significant association between sex of respondent, ages of the respondents, marital status, educational level, monthly allowance and vertigo at p-value of 0.403, 0.168, 0.228, 0.371, and 0.402 respectively. There is significant association between number of years of experience and vertigo at p-value of 0.004. The result shows that there is no significant association between religion, training as a petrol attendant, days you work in a week, work category, awareness of personal protective equipment, using of personal equipment, Knowledge, Occupational hazard and vertigo at p-value of 0.446, 0.962, 0.543, 0.754, 0.256, 0.179, 0.423, 0.509 respectively. It is also shown that there is significant association between work environment and vertigo at p-value of <0.001

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Table 4.11: Factors Associated with Health Problem (Vertigo)

Variables	Vertigo		Chi-square	P-value
	Yes	No		
Sex			0.701	0.403
Male	21.0%	93.0%		
Female	23.9%	76.1%		
Age			6.445	0.168
Less than 20years	21.6%	78.4%		
21-30years	16.0%	84.0%		
31-40years	28.1%	71.9%		
40years above	20.8%	79.2%		
Marital Status			1.453	0.228
Single	20.5%	79.5%		
Married	24.6%	75.4%		
Educational Level			3.135	0.371
Primary	19.1%	80.9%		
J.S.S 3	22.4%	77.6%		
S.S.S 3	28.6%	71.4%		
HND/B.Sc	20.0%	80.0%		
Monthly Allowance			1.825	0.402
Less than 20,00	25.7%	74.3%		
Above N 20,000	21.1%	78.9%		
Range N 20,000-30,000	20.2%	79.8%		
No. of years of experience			11.177	0.004
1-5 years	15.7%	84.3%		
6-10 years	21.3%	78.7%		
Above 10years	30.4%	69.6%		
Religion			1.615	0.446
Christianity	20.6%	79.4%		
Islam	24.1%	75.9%		
Did you have any training as petrol attendant			0.002	0.962
Yes	22.0	78.0%		
No	22.2%	77.8%		
How many days did you work in a week			0.370	0.543
2-3 days	21.2%	78.8%		
4-5 days	23.2%	76.8%		
Work Category			1.196	0.754
Attendant	22.4%	77.6%		
Lubrication	19.1%	80.9%		
Lane Manager	23.7%	76.3%		
Administrative assistant and general services	23.8%	76.2%		

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Are you aware of any personal protective equipment?			1.293	0.256
Yes	23.0%	77.0%		
No	17.9%	82.1%		
Do you use personal protective equipment			1.803	0.179
Yes	19.9%	80.1%		
No	24.4%	75.6%		
Knowledge			0.641	0.423
Poor Knowledge	21.4%	78.6%		
Good Knowledge	24.5%	75.5%		
Occupational health hazard			0.436	0.509
Unsatisfactory	21.4%	78.6%		
Satisfactory	23.8%	76.2%		
Work Environment			19.206	<0.001
Unsafe	10.1%	89.9%		
Safe	26.5%	73.5%		

Source: Research work 2023

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Table 4.12 shows factors associated with health problem. There is significant association between sex of the respondents and slurred speech at p-value of 0.306. The result shows that there is significant association between ages of the respondents, marital status and slurred speech at p-value of <0.001, 0.001 respectively. It is shown that there is no significant association between educational level and slurred speech at p-value of 0.754. However, there is significant association between monthly allowance, number of years of experience, religion and slurred speech at p-value of <0.001, 0.009, 0.005 respectively. There is no significant association between ever had training as petrol attendants, days you work in a week and slurred speech at p-value of 0.645, 0.152 respectively. It is also shown that there is significant association between work category, awareness of personal protective equipment and slurred speech at p-value of <0.001, <0.001 respectively. There is no significant association between use of personal protective equipment and slurred speech at p-value of 0.260. The result shows that there is signification association between knowledge, occupational hazard, work environment and slurred speech at p-value of 0.054, <0.001, <0.001 respectively.

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Table 4.12: Factors Associated with Health Problem (Slurred speech)

Variables	Slurred speech		Chi-square	P-value
	Yes	No		
Sex			1.047	0.306
Male	22.1%	77.9%		
Female	25.7%	74.3%		
Age			95.009	<0.001
Less than 20years	47.2%	52.8%		
21-30years	1.6%	98.4%		
31-40years	21.6%	78.4%		
40years above	16.7%	83.3%		
Marital Status			10.983	<0.001
Single	27.9%	72.1%		
Married	16.4%	83.6%		
Educational Level			1.196	0.754
Primary	22.4%	77.6%		
J.S.S 3	19.1%	80.9%		
S.S.S 3	23.7%	76.3%		
HND/B.Sc	23.8%	76.2%		
Monthly Allowance			22.391	<0.001
Less than 20,00	25.7%	74.3%		
Above N 20,000	14.7%	85.3%		
Range N 20,000-30,000	33.5%	66.5%		
No. of years of experience			9.440	0.009
1-5 years	31.4%	68.6%		
6-10 years	19.5%	80.5%		
Above 10years				
Religion			10.476	0.005
Christianity	23.0	77.0%		
Islam	26.2%	73.8%		
Did you have any training as petrol attendant			0.212	0.645
Yes	24.1%	75.9%		
No	22.5%	77.5%		
How many days did you work in a week			2.053	0.152
2-3 days	21.2%	78.8%		
4-5 days	26.1%	73.9%		
Work Category			50.695	<0.001
Attendant	29.5%	70.5%		
Lubrication	36.8%	63.2%		
Lane Manager	9.2%	90.8%		
Administrative assistant and general services	7.3%	92.7%		

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Are you aware of any personal protective equipment?			39.031	<0.001
Yes	28.2%	71.8%		
No	0.0%	100.0%		
Do you use personal protective equipment			1.267	0.260
Yes	25.2%	74.8%		
No	21.4%	78.6%		
Knowledge			3.699	0.054
Poor Knowledge	21.6%	78.4%		
Good Knowledge	29.3%	70.7%		
Occupational health hazard			61.223%	<0.001
Unsatisfactory	14.7%	85.3%		
Satisfactory	43.8%	56.2%		
Work Environment			509.208	<0.001
Unsafe	86.3%	13.7%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.13 shows factors associated with health problem. It is shown from the result that there is significant association between sex of the respondent, ages of the respondents and weakness at the p-value of 0.006, <0.001 respectively. The study shows that there is no significant association between marital status and weakness at p-value of 0.208. It is also shown from the result that there is significant association between educational level, monthly allowance, number of years of experience and weakness at p-value of <0.001. However, there is no significant association between religion and weakness at p-value of 0.214. There is significant association between had training as petrol attendant and weakness at p-value of 0.002. it is also shown from the result that there is no significant association between days you work in a week and weakness at p-value of 0.602. Furthermore, there is significant association between work category, awareness of personal equipment and weakness at p-value of <0.001. There is no significant association between use of personal protective equipment, Knowledge, Occupational hazard and weakness at p-value of 0.206, 0.498, and 0.173 respectively. The table shows that there is significant association between work environment and weakness at p-value of <0.001.

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Table 4.13: Factors Associated with Health Problem (Weakness)

Variables	Weakness		Chi-square	P-value
	Yes	No		
Sex			7.560	0.006
Male	11.3%	88.7%		
Female	4.8%	95.2%		
Age			86.375	<0.001
Less than 20years	25.6%	74.4%		
21-30years	0.0%	100.0%		
31-40years	4.2%	95.8%		
40 years above	2.1%	97.9%		
Marital Status			1.585	0.208
Single	7.7%	92.3%		
Married	10.7%	89.3%		
Educational Level			43.000	<0.001
Primary	16.3%	83.7%		
J.S.S 3	4.3%	95.7%		
S.S.S 3	0.0%	100.0%		
HND/B.Sc	23.6%	76.4%		
Monthly Allowance			19.819	<0.001
Less than 20,00	15.6%	84.4%		
Above N 20,000	3.4%	96.6%		
Range N 20,000-30,000	10.6%	89.4%		
No. of years of experience			63.497	<0.001
1-5 years	22.7%	77.3%		
6-10 years	4.1%	95.9%		
Above 10years	1.2%	98.8%		
Religion			3.083	0.214
Christianity	9.5%	90.5%		
Islam	9.2%	90.8%		
Did you have any training as petrol attendant			10.070	0.002
Yes	12.2%	87.8%		
No	4.9%	95.1%		
How many days did you work in a week			0.272	0.602
2-3 days	9.4%	90.6%		
4-5 days	8.2%	91.8%		
Work Category			23.181	<0.001
Attendant	12.0%	88.0%		
Lubrication	14.5%	85.5%		
Lane Manager	2.6%	97.4%		
Administrative assistant and general services	1.3%	98.7%		

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Are you aware of any personal protective equipment?			12.447	<0.001
Yes	10.7%	89.3%		
No	0.0%	100.0%		
Do you use personal protective equipment			1.601	0.206
Yes	7.5%	92.5%		
No	10.4%	89.6%		
Knowledge			0.459	0.498
Poor Knowledge	9.3%	90.7%		
Good Knowledge	7.5%	92.5%		
Occupational health hazard			1.855	0.173
Unsatisfactory	9.9%	90.1%		
Satisfactory	6.5%	93.5%		
Work Environment			162.381	<0.001
Unsafe	32.7%	67.3%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.14 shows factors associated with health problem. There is significant association between sex of respondent, ages of the respondent and facial flushing at p-value of 0.005, <0.001 respectively. There is significant no association between marital status and facial flushing at p-value of 0.064. It shows from the result that there is significant association between educational level, monthly allowance, number of years of experience, religion and facial flushing at p-value of <0.001, 0.003, 0.005, <0.001 respectively. The study also shows that there is no significant association between had any training as petrol attendant, days you work in a week and facial flushing at p-value of 0.589, 0.091 respectively. However, there is significant association between work category, aware of personal protective equipment and facial flushing at p-value of <0.001. It is also shown from the result that there is no significant association between use any personal protective equipment, knowledge and facial flushing at p-value of 0.958, 0.091 respectively. There is significant association between occupational hazard, work environment and facial flushing at p-value of <0.001.

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Table 4.14: Factors Associated with Health Problem (Facial Flushing)

Variables	Facial Flushing		Chi-square	P-value
	Yes	No		
Sex			7.961	0.005
Male	21.5%	78.5%		
Female	31.7%	68.3%		
Age			99.832	<0.001
Less than 20years	50.0%	50.0%		
21-30years	2.4%	97.6%		
31-40years	25.1%	74.9%		
40years above	16.7%	83.3%		
Marital Status			3.423	0.064
Single	27.9%	72.1%		
Married	21.3%	78.7%		
Educational Level			138.887	<0.001
Primary	19.1%	80.9%		
J.S.S 3	24.1%	75.9%		
S.S.S 3	2.4%	97.6%		
HND/B.Sc	87.3%	12.7%		
Monthly Allowance			11.463	0.003
Less than 20,00	29.9%	70.1%		
Above N 20,000	18.5%	81.5%		
Range N 20,000-30,000	30.9%	69.1%		
No. of years of experience			10.778	0.005
1-5 years	34.1%	65.9%		
6-10 years	21.0%	79.0%		
Above 10years	22.6%	77.4%		
Religion			11.333	<0.001
Christianity	28.0%	72.0%		
Islam	25.2%	74.8%		
Did you have any training as petrol attendant			0.292	0.589
Yes	26.2%	73.8%		
No	24.3%	75.7%		
How many days did you work in a week			2.850	0.091
2-3 days	22.6%	77.4%		
4-5 days	28.6%	71.4%		
Work Category			57.024	<0.001
Attendant	33.2%	66.8%		
Lubrication	38.2%	61.8%		
Lane Manager	13.2	86.8%		
Administrative assistant and general services	6.0%	94.0%		

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Are you aware of any personal protective equipment?			40.186	<0.001
Yes	30.4%	69.6%		
No	0.9%	99.1%		
Do you use personal protective equipment			0.003	0.958
Yes	25.2%	74.8%		
No	25.4%	74.6%		
Knowledge			2.851	0.091
Poor Knowledge	23.7%	76.3%		
Good Knowledge	30.6%	69.4%		
Occupational health hazard			115.105	<0.001
Unsatisfactory	13.1%	86.9%		
Satisfactory	54.1%	45.9%		
Work Environment			565.369	<0.001
Unsafe	93.5%	6.5%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.15 shows the factors associated with health problem. The result shows that there is no significant association between sex of the respondent and itching. It is shown from the result that there is significant association between marital status, educational level, monthly allowance, number of years of experience, religion and itching at p-value of <0.001, <0.001, 0.009, 0.002 respectively. There is no significant association between had any training as petrol attendant, days you work in a week and itching at p-value of 0.177, 0.187 respectively. However, the study shows that there is significant association between work category, aware of personal protective equipment and itching at p-value of <0.001. The study shows that there is no significant association between use of personal protective equipment, knowledge and itching at p-value of 0.215, 0.231 respectively. Finally, the result shows that there is significant association between occupational health hazard, work environment and itching at p-value of <0.001.

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Table 4.15: Factors Associated with Health Problem (Itching)

Variables	Itching		Chi-square	P-value
	Yes	No		
Sex			0.731	0.392
Male	21.8%	78.2%		
Female	24.8%	75.2%		
Age			91.869	<0.001
Less than 20years	46.0%	54.0%		
21-30years	1.6%	98.4%		
31-40years	21.6%	78.4%		
40years above	16.0%	84.0%		
Marital Status			9.656	0.002
Single	27.1%	72.9%		
Married	16.4%	83.6%		
Educational Level			123.955	<0.001
Primary	19.7%	80.3%		
J.S.S 3	20.1%	79.9%		
S.S.S 3	2.4%	97.6%		
HND/B.Sc	80.0%	20.0%		
Monthly Allowance			24.321	<0.001
Less than 20,00	24.0%	76.0%		
Above N 20,000	14.3%	85.7%		
Range N 20,000-30,000	34.0%	66.0%		
No. of years of experience			9.413	0.009
1-5 years	30.8%	69.2%		
6-10 years	19.1%	80.9%		
Above 10years	20.2%	79.8%		
Religion			12.644	0.002
Christianity	20.9%	79.1%		
Islam	27.2%	72.8%		
Did you have any training as petrol attendant			1.826	0.177
Yes	25.0	75.0%		
No	20.4%	79.6%		
How many days did you work in a week			1.741	0.187
2-3 days	20.9%	79.1%		
4-5 days	25.4%	74.6%		
Work Category			47.123	<0.001
Attendant	29.5%	70.5%		
Lubrication	34.9%	65.1%		
Lane Manager	9.2%	90.8%		
Administrative assistant and general services	7.3%	92.7%		

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Are you aware of any personal protective equipment?			37.983	<0.001
Yes	27.6%	72.4%		
No	0.0%	100.0%		
Do you use personal protective equipment			1.536	0.215
Yes	24.9%	75.1%		
No	20.7%	79.3%		
Knowledge			1.436	0.231
Poor Knowledge	21.8%	78.2%		
Good Knowledge	26.5%	73.5%		
Occupational health hazard			49.343	<0.001
Unsatisfactory	15.2%	84.8%		
Satisfactory	41.1%	58.9%		
Work Environment			495.543	<0.001
Unsafe	84.5%	15.5%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.16 shows factors associated with health problem. There is no significant association between sex of the respondents and irritability at p-value of 0.166. The table shows that there is significant association ages of the respondent, marital status, educational status, monthly allowance, number of years of experience, religion and irritability at p-value of <0.001, <0.001, <0.001, 0.002, 0.004 respectively. It is shown from the result that there is no significant association between had any training as petrol attendant, day you work in a week and irritability at p-value of 0.365, 0.122 respectively. There is significant association between work category, aware of personal protective equipment and irritability at p-value of <0.001. However, the study shows that there is no significant association between use of personal protective equipment, Knowledge and irritability at p-value of 0.410, 0.126 respectively. The study shows that there is significant association between occupational health hazard, work environment and irritability at p-value of <0.001.

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Table 4.16: Factors Associated with Health Problem (Irritability)

Variables	Irritability		Chi-square	P-value
	Yes	No		
Sex			1.916	0.166
Male	22.1%	77.9%		
Female	27.0%	73.0%		
Age			101.725	<0.001
Less than 20years	48.9%	51.1%		
21-30years	1.6%	98.4%		
31-40years	21.6%	78.4%		
40 years above	16.7%	83.3%		
Marital Status			11.059	<0.001
Single	28.5%	71.5%		
Married	16.8%	83.2%		
Educational Level			118.946	<0.001
Primary	19.7%	80.3%		
J.S.S 3	22.1%	77.9%		
S.S.S 3	2.4%	97.6%		
HND/B.Sc	80.0%	20.0%		
Monthly Allowance			21.315	<0.001
Less than 20,00	25.7%	74.3%		
Above N 20,000	15.5%	84.5%		
Range N 20,000-30,000	34.0%	66.0%		
No. of years of experience			12.125	0.002
1-5 years	33.0%	67.0%		
6-10 years	19.5%	80.5%		
Above 10years	20.8%	79.2%		
Religion			10.914	0.004
Christianity	23.3%	76.7%		
Islam	26.9%	73.1%		
Did you have any training as petrol attendant			0.822	0.365
Yes	25.3%	74.7%		
No	22.2%	77.8%		
How many days did you work in a week			2.387	0.122
2-3 days	21.5%	78.5%		
4-5 days	26.8%	73.2%		
Work Category			52.849	<0.001
Attendant	30.3%	69.7%		
Lubrication	37.5%	62.5%		
Lane Manager	9.2%	90.8%		
Administrative assistant and general services	7.3%	92.7%		

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Are you aware of any personal protective equipment?			40.092	<0.001
Yes	28.8%	71.2%		
No	0.0%	100.0%		
Do you use personal protective equipment			0.680	0.410
Yes	25.2%	74.8%		
No	22.4%	77.6%		
Knowledge			2.343	0.126
Poor Knowledge	22.4%	77.6%		
Good Knowledge	28.6%	71.4%		
Occupational health hazard			63.950	<0.001
Unsatisfactory	14.9%	85.1%		
Satisfactory	44.9%	55.1%		
Work Environment			523.047	<0.001
Unsafe	88.1%	11.9%		
Safe				

Source: Research work 2023

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Table 4.17 shows the factors associated with health problem (nausea), it shows that there is significant association between sex of respondents, ages of respondents and nausea at p-value of 0.001, <0.001 respectively. The study shows that there is no significant association between marital status and nausea at p-value of 0.616. The study shows that there is significant association between educational level, monthly allowance, number of years of experience and nausea at p-value of <0.001. There is no significant association between religion, had training as petrol attendant, days you work in a week and nausea at p-value of 0.064, 0.099, and 0.199 respectively. However, the study shows that there is significant association between work category, aware of personal protective equipment and nausea at p-value of <0.001. The study also revealed that there is no significant association between ever use personal protective equipment, knowledge, occupational hazard at p-value of 0.754, 0.729, and 0.088 respectively. There is significant association work environment and nausea at p-value of <0.001.

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Table 4.17: Factors Associated with Health Problem (Nausea)

Variables	Nausea		Chi-square	P-value
	Yes	No		
Sex			10.377	<0.001
Male	14.6%	85.4%		
Female	6.1%	93.9%		
Age			83.775	<0.001
Less than 20years	29.5%	70.5%		
21-30years	0.0%	100.0%		
31-40years	7.8%	92.2%		
40 years above	4.2%	95.8%		
Marital Status			0.251	0.616
Single	12.0%	88.0%		
Married	10.7%	89.3%		
Educational Level			55.755	<0.001
Primary	16.9%	83.1%		
J.S.S 3	6.9%	93.1%		
S.S.S 3	0.0%	100.0%		
HND/B.Sc	36.4%	63.6%		
Monthly Allowance			16.798	<0.001
Less than 20,00	18.0%	82.0%		
Above N 20,000	5.7%	94.3%		
Range N 20,000-30,000	13.8%	86.2%		
No. of years of experience			37.547	<0.001
1-5 years	23.2%	76.8%		
6-10 years	7.9%	92.1%		
Above 10years	4.2%	95.8%		
Religion			5.504	0.064
Christianity	10.5%	89.5%		
Islam	13.6%	86.4%		
Did you have any training as petrol attendant			2.726	0.099
Yes	13.4%	86.6%		
No	9.2%	90.8%		
How many days did you work in a week			1.647	0.199
2-3 days	12.9%	87.1%		
4-5 days	9.6%	90.4%		
Work Category			33.703	<0.001
Attendant	16.2%	83.8%		
Lubrication	18.4%	81.6%		
Lane Manager	2.6%	97.4%		
Administrative assistant and	1.3%	98.7%		

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general services				
Are you aware of any personal protective equipment?			16.536	<0.001
Yes	13.8%	86.2%		
No	0.0%	100.0%		
Do you use personal protective equipment			0.098	0.754
Yes	11.8%	88.2%		
No	11.0%	89.0%		
Knowledge			0.120	0.729
Poor Knowledge	11.2%	88.8%		
Good Knowledge	12.2%	87.8%		
Occupational health hazard			2.907	0.088
Unsatisfactory	12.9%	87.1%		
Satisfactory	8.1%	91.9%		
Work Environment			215.728	<0.001
Unsafe	42.3%	57.7%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.18 shows the Factors associated with health problem. It is shown from the study that there is significant association between sex of respondent, ages of the respondent and cough at p-value of 0.007, <0.001 respectively. There is no significant association between marital status and cough at p-value of 0.370. The study shows that there is significant association between educational level, monthly allowance, number of years of experience and cough at p-value of <0.001. However, there is no significant association between religion and cough at p-value of 0.187. The study shows that there is significant association between had training as petrol attendant and cough at p-value of <0.001.

It shows from the table that there is no significant association between days you work in a week and cough at p-value of 0.376. There is significant association between work category, aware of personal protective equipment and cough at p-value of <0.001. Furthermore, there is no significant association between use of personal protective equipment, knowledge, occupational hazard and cough at p-value of 0.165, 0.570, and 0.110 respectively. There is significant association between work environment and cough at p-value of <0.001.

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Table 4.18: Factors Associated with Health Problem (Cough)

Variables	Cough		Chi-square	P-value
	Yes	No		
Sex			7.381	0.007
Male	11.8%	88.2%		
Female	5.2%	94.8%		
Age			84.253	<0.001
Less than 20 years	26.1%	73.9%		
21-30years	0.0%	100.0%		
31-40years	5.4%	94.6%		
40years above	2.1%	97.9%		
Marital Status			0.803	0.370
Single	8.5%	91.5%		
Married	10.7%	89.3%		
Educational Level			42.515	<0.001
Primary	16.3%	83.7%		
J.S.S 3	5.0%	95.0%		
S.S.S 3	0.0%	100.0%		
HND/B.Sc	25.5%	74.5%		
Monthly Allowance			17.969	<0.001
Less than 20,00	16.2%	83.8%		
Above N 20,000	4.2%	95.8%		
Range N 20,000-30,000	10.6%	89.4%		
No. of years of experience			56.557	<0.001
1-5 years	22.7%	77.3%		
6-10 years	4.9%	95.1%		
Above 10years	1.8%	98.2%		
Religion			3.350	0.187
Christianity	9.5%	90.5%		
Islam	10.2%	89.8%		
Did you have any training as petrol attendant			8.557	0.003
Yes	12.5%	87.5%		
No	5.6%	94.4%		
How many days did you work in a week			0.783	0.376
2-3 days	10.3%	89.7%		
4-5 days	8.2%	91.8%		
Work Category			24.606	<0.001
Attendant	13.3%	86.7%		
Lubrication	14.5%	85.5%		
Lane Manager	2.6%	97.4%		
Administrative assistant and general services	1.3%	98.7%		

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Are you aware of any personal protective equipment?			13.196	<0.001
Yes	11.3%	88.7%		
No	0.0%	100.0%		
Do you use personal protective equipment			1.927	0.165
Yes	7.8%	92.2%		
No	11.0%	89.0%		
Knowledge			0.323	0.570
Poor Knowledge	9.7%	90.3%		
Good Knowledge	8.2%	91.8%		
Occupational health hazard			2.558	0.110
Unsatisfactory	10.6%	89.4%		
Satisfactory	6.5%	93.5%		
Work Environment			172.152	<0.001
Unsafe	34.5%	65.5%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.19 shows factors associated with health problem, there is significant association between sex of respondents, ages of the respondents and muscle spasm at p-value of <0.001. The study shows that there is no significant association between marital status and muscle spasm at p-value of 0.099. The result shows that there is significant association between educational level, monthly allowance, number of years of experience, religion and muscle spasm at p-value of <0.001, 0.020, 0.001 respectively. There is no significant association between had any training as petrol attendant, days you use in a week and muscle spasm at p-value of 0.699, 0.597 respectively. However, there is significant association between work category, aware of personal protective equipment and muscle spasm at p-value of <0.001. It also shows that there is no significant association between use of personal protective equipment, knowledge and muscle spasm at p-value of 0.766, 0.067 respectively. The study shows that there is significant association between occupational hazard, work environment and muscle spasm at p-value of <0.001.

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Table 4.19: Factors Associated with Health Problem (Muscle spasm)

Variables	Muscle Spasm		Chi-square	P-value
	Yes	No		
Sex			18.958	<0.001
Male	23.8%	76.2%		
Female	40.4%	59.6%		
Age			111.882	<0.001
Less than 20 years	56.8%	43.2%		
21-30years	2.4%	97.6%		
31-40years	29.3%	70.7%		
40years above	23.6%	76.4%		
Marital Status			2.724	0.099
Single	32.4%	67.6%		
Married	26.2%	73.8%		
Educational Level			165.191	<0.000
Primary	21.3%	78.7%		
J.S.S 3	30.0%	70.0%		
S.S.S 3	2.4%	97.6%		
HND/B.Sc	0.0%	100.0%		
Monthly Allowance			14.540	<0.001
Less than 20,00	36.5%	63.5%		
Above N 20,000	21.9%	78.1%		
Range N 20,000-30,000	35.6%	64.4%		
No. of years of experience			7.838	0.020
1-5 years	36.2%	63.8%		
6-10 years	24.3%	75.7%		
Above 10years	32.1%	67.9%		
Religion			14.112	<0.001
Christianity	30.1%	69.9%		
Islam	33.0%	67.0%		
Did you have any training as petrol attendant			0.150	0.699
Yes	30.7%	69.3%		
No	29.2%	70.8%		
How many days did you work in a week			0.279	0.597
2-3 days	29.1%	70.9%		
4-5 days	31.1%	68.9%		
Work Category			61.075	<0.001
Attendant	36.9%	63.1%		
Lubrication	46.1%	53.9%		
Lane Manager	17.1%	82.9%		
Administrative assistant and general services	9.3%	90.7%		

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Are you aware of any personal protective equipment?			51.405	<0.001
Yes	36.0%	64.0%		
No	0.9%	99.1%		
Do you use personal protective equipment			0.089	0.766
Yes	30.5%	69.5%		
No	29.4%	70.6%		
Knowledge			3.363	0.067
Poor Knowledge	28.1%	71.9%		
Good Knowledge	36.1%	63.9%		
Occupational health hazard			134.283	<0.001
Unsatisfactory	16.1%	83.9%		
Satisfactory	62.7%	37.3%		
Work Environment			537.699	<0.001
Unsafe	0.0%	100.0%		
Safe	4.0%	96.0%		

Source: Research work 2023

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Table 4.20 shows factors associated with health problem. There is no significant association between sex of respondents and stomach upset at p-value of 0.625. the result shows that there is significant association between ages of the respondents, sex of the respondents, educational level, monthly allowance, number of years of experience, religion and stomach upset at p-value of <0.001, 0.020, <0.001, <0.001, 0.034, 0.004 respectively. There is no significant association between had training as petrol attendant, days you work in a week and stomach upset at p-value of 0.692, 0.448 respectively. It is also shown from the result that there is significant association between work category, aware of personal protective equipment and stomach upset at p-value of <0.001. However, there is no significant association between use of personal protective equipment, knowledge and stomach upset at p-value of 0.224, 0.066 respectively. There is significant association between occupational hazard, work environment and stomach upset at p-value of <0.001.

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Table 4.20: Factors Associated with Health Problem (Stomach Upset)

Variables	Stomach Upset		Chi-square	P-value
	Yes	No		
Sex			0.240	0.625
Male	20.5%	79.5%		
Female	22.2%	77.8%		
Age			86.203	<0.001
18-20years	43.2%	56.8%		
21-30years	1.6%	98.4%		
31-40years	19.2%	80.8%		
40years above	14.6%	85.4%		
Marital Status			5.414	0.020
Single	24.2%	75.8%		
Married	16.4%	83.6%		
Educational Level			137.725	<0.001
Primary	19.1%	80.9%		
J.S.S 3	17.2%	82.8%		
S.S.S 3	1.2%	98.8%		
HND/B.Sc	80.0%	20.0%		
Monthly Allowance			35.575	<0.001
Less than 20,00	22.8%	77.2%		
Above N 20,000	10.9%	89.1%		
Range N 20,000-30,000	34.0%	66.0%		
No. of years of experience			6.769	0.034
1-5 years	27.6%	72.4%		
6-10 years	19.1%	80.9%		
Above 10years	17.3%	82.7%		
Religion			10.871	0.004
Christianity	19.6%	80.4%		
Islam	24.8%	75.2%		
Did you have any training as petrol attendant			0.157	0.692
Yes	21.7%	78.3%		
No	20.4%	79.6%		
How many days did you work in a week			0.576	0.448
2-3 days	20.0%	80.0%		
4-5 days	22.5%	77.5%		
Work Category			39.358	<0.001
Attendant	26.6%	73.4%		
Lubrication	32.2%	67.8%		
Lane Manager	9.2%	90.8%		
Administrative assistant and general services	7.3%	92.7%		

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Are you aware of any personal protective equipment?			34.253	<0.001
Yes	25.5%	74.5%		
No	0.0%	100.05		
Do you use personal protective equipment			1.478	0.224
Yes	23.1%	76.9%		
No	19.1%	80.9%		
Knowledge			3.374	0.066
Poor Knowledge	19.5%	80.5%		
Good Knowledge	26.5%	73.5%		
Occupational health hazard			31.039	<0.001
Unsatisfactory	15.2%	84.8%		
Satisfactory	35.1%	64.9%		
Work Environment			446.872	<0.001
Unsafe	78.0%	22.0%		
Safe	0.0%	100.0%		

Source: Research work 2023

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Table 4.21 shows the relationship between working environment and health problem, it is shown from the result that respondents who are male are 1.08 less likely to have high health problem compared to their counterpart who are females at (0.623, 2.693 CI). The result reveal that respondents less than 20years are 1.57 more likely to have high health problem compared to their counterpart who are 40years above at (0.257, 1.574 CI). It also shows that respondents who are between ages 21-30years are 5.071 less likely to have higher health problem compared to their counterpart who are 40 years and above at (0.698, 36.850 CI). It also shows that respondent who are between the ages of 31-40years are 1.75 more likely to have high health problem compared to their counterpart who are 40years above at (0.229, 1.422 CI). However, the result shows that respondent who had primary education are 1.60 less likely to have high health problem compared to their counterpart have secondary education at (0.489, 5.248 CI). The result shows that respondent who had HND/B.Sc education are 7.09 more likely to have high health problem compared to their counterpart who had secondary education. Respondent who had between 1-5years of experience are 3.15 less likely high health problem compared to their counterpart who have who have above 10years of experience at (1.121, 8.902 CI). It also shows that respondents who had 6-10years of experience are 1.38 less likely to have high health problem compared to their counterpart who have above 10 years' experience at (0.611, 3.137 CI.). The study shows that respondents who are not aware of personal protective equipment are 11 more likely to have high health problem compared to their counterpart who are not aware of it at (0.000, 2.084 CI). Respondent who have poor Knowledge are 1.91 more likely not to have high health problem compared to their counterpart who have good knowledge at (0.847, 4.335 CI). Respondents who works as lane manager department are 14.2 less likely to have high health problem compared to their counterpart who works as an attendants at (4.335, 46.695 CI). It also shows that who works in lubrication department are 2.01 more likely to have high health problem compared to their counter

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who works as an attendant at (0.294, 0.839 CI). The result shows that respondents who works in administrative and general services are 1.59 less likely to have high health problem compared to their counterpart who works as an attendant at (0.836, 3.030 CI). Also, workers who have unsatisfactory occupational health hazard are 2.05 more likely to have high health problem compared to their counterpart who had satisfactory health hazard at (0.195, 1.213 CI).

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Table 4.21: Relationship between Working Environment and Health Problem

Variables	UOR	95% CI	P-value	AOR	95% CI	P-value
Sex						
Male	2.015	1.429, 2.843	<0.001	1.084	0.623, 2.693	0.488
Female	1					
Age						
Less than 20 years	0.233	0.146, 0.374	<0.001	0.636	0.257, 1.574	0.328
21-30years	10.440	3.615, 30.149	<0.001	5.071	0.698, 36.850	0.109
31-40years	0.703	0.432, 1.143	0.155	0.570	0.229, 1.422	0.228
40years above	1					
Marital Status						
Single	0.887	0.628, 1.252	0.496			
Married	1					
Educational Level						
Primary	1.500	0.985, 2.285	0.059	1.602	0.489, 5.248	0.437
HND/B.Sc	0.15	0.04, 0.64	0.000	0.141	0.012, 1.678	0.121
Secondary education	1					
Monthly Allowance						
Less than 20,00	0.457	0.551, 1.307	0.457			
Above N 20,000	1.450	0.968, 2.171	0.071			
Range N 20,000-30,000	1					
No. of years of experience						
1-5 years	0.986	0.641, 1.517	0.948	3.159	1.121, 8.902	0.030
6-10 years	1.689	1.115, 2.556	0.013	1.384	0.611, 3.137	0.436
Above 10years	1					
Religion						
Christianity	1.156	0.825, 1.619	0.400			
Islam	1					
Did you have any training as petrol attendant						
Yes	0.971	0.694, 1.360	0.865			
No	1					
How many days did you work in a week						
2-3 days	1.205	0.861, 1.687	0.277			

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4-5 days	1					
Work Category						
Lubrication	1	0.137, 0.401	0.000	0.497	0.294, 0.839	0.009
Lane manager	0.145	0.082, 0.256	<0.001	14.228	4.335, 46.695	<0.001
Administrative assistant and general services	1.008	0.446, 2.276	1.085	1.592	0.836, 3.030	0.157
Attendant						
Are you aware of any personal protective equipment?						
No	0.015	0.002, 0.106	<0.001	0.009	0.000, 2.084	0.090
Yes	1					
Do you use personal protective equipment						
Yes	1.003	0.717, 1.403	0.986			
No	1					
Knowledge						
Poor Knowledge	1.653	1.128, 2.424	0.010	1.916	0.847, 4.335	0.118
Good Knowledge	1					
Occupational health hazard						
Unsatisfactory	5.203	3.589, 7.543	<0.001	0.487	0.195, 1.213	0.122
Satisfactory	1					

Source: Research work 2023

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Table 4.22 shows the factor associated with health problem. It is shown from the result that there is no significant association between occupational safety practice and health problem at p-value of 0.29. There is significant association between occupational health hazard, work environment and health problem at p-value of <0.01 respectively. Also, there is no significant association between knowledge of safety practices and health problem at p-value of 0.12

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Table 4.22: Factor Associated with Health Problem

Variables	Low	High	Chi-square	P-value
Occupational Safety Practice			1.10	0.29
Poor	21.6	78.4		
Good	17.7	82.3		
Occupational Health Hazard			36.36	<0.01
Unsatisfactory	14.3	85.7		
Satisfactory	35.7	64.3		
Work Environment			433.97	<0.01
Unsafe	76.2	23.8		
Safe	0.0	100.0		
Knowledge			2.40	0.12
Poor Knowledge	19.2	80.8		
Good Knowledge	25.2	74.8		

Source: Research work 2023

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Table 4.23a and 4.23b shows the factors influencing health problem. It is observed from model 1, that respondents that have good occupational safety practices are less likely to have high health problem compared to their counterpart who have poor health safety practices (0.49-1.24 CI). At model 2, respondent respondents that have good occupational safety practices are less likely to have high health problem compared to their counterpart who have poor health safety practices (0.50-1.30 CI). Also, respondent who have unsatisfactory occupational health hazard are more likely to have high health problem compared to their counterpart who have satisfactory occupational health hazards (2.22-4.97 CI). At model 3, respondent who poor occupational safety practice are less likely to have high health problem compared to their counterpart who have good occupational safety practices (0.49-1.24 CI). Also, respondent who have unsatisfactory occupational health hazard are more likely to have high health problem compared to their counterpart who have satisfactory occupational health hazards (2.23-4.99 CI). Respondent who have poor knowledge of safety practices are more likely to have high health problem compared to their counterpart who have good knowledge of safety practices (0.91-2.19 CI). Respondent who are single are less likely to have high health problem compared to their counterpart who are married (0.40-0.93 CI). It also shows those respondents who are practicing Christianity are more likely to have high health problem compared to their counterpart who are practicing Islam (0.89-1.97 CI). However, at model 4 respondents who have unsatisfactory occupational health hazard are more likely to have high health problem compared to their counterpart who have satisfactory health hazard (2.08-5.96 CI). Respondent who are single are less likely to have high health problem compared to their counterpart who are married (0.32-0.86 CI). The result shows that respondent that had primary education are more likely to have high health problem compared to their counterpart that had tertiary education (3.36-18.97 CI), it also shows that respondent who had secondary education are more likely to have high health problem compared to their counterpart who had tertiary education

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(4.76-19.19 CI). Respondent who earned less than 20,000 are more likely to have high health problem compared to their counterpart who between N20,000 to N30,000 (0.90-2.99 CI), it also shows that respondent who earns more than 30,000 are more likely to have high health problem compared to their counterpart who earns between N20,000 to N30,000 (2.18-7.21). However, respondent who have 1-5 years of experience in the filling station are less likely to have high health problem compared to their counterpart more than 10 years of experience (0.18-0.63 CI). Also, respondent who have 6-10 years of experience in the filling station are less likely to have high health problem compared to their counterpart (0.49-1.71 CI).

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Table 4.23a: Factors Influencing Health Problem

	Model 1		Model 2	
Variables	**OR**	**95% CL**	**OR**	**95% CL**
Occupational Safety Practices				
Poor	1		1	
Good	0.78	0.49-1.24	0.81	0.50-1.30
Occupational Health Hazard				
Unsatisfactory			3.32*	2.22-4.97
Satisfactory			1	
Knowledge of Safety Practice				
Poor Knowledge				
Good Knowledge				
Sex of the Respondent				
Male				
Female				
Marital Status				
Single				
Married				
Level of Education				
Primary				
Secondary				
Tertiary				
Religion				
Christianity				
Islam				
Monthly Allowances				
Less than N20,000				
Above N20,000				
Range N20,000-N30,000				
Number of Years you have been working in Filling Station				
1-5 Years				
6-10 Years				
Above 10 Years				
Any Training as Petrol Attendant				
Yes				
No				
How many Day did you Work in a Week				
2-3 Days				
4-5 Days				
Work Categories				
Lubrication				
Lane Manager				
Administrative Assistant and General Services				
Attendant				

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Table 4.23b: Factors Influencing Health Problem

	Model 3		Model 4	
Variables	**OR**	**95% CL**	**OR**	**95% CL**
Occupational Safety Practices				
Poor	1			
Good	0.78	0.49-1.24		
Occupational Health Hazard				
Unsatisfactory	3.34*	2.23-4.99	3.52	2.08-5.96
Satisfactory	1		1	
Knowledge of Safety Practice				
Poor Knowledge	1.412	0.91-2.19		
Good Knowledge	1			
Sex of the Respondent				
Male	1.258	0.85-1.87		
Female	1			
Marital Status				
Single	0.61*	0.40-0.93	0.52	0.32-0.86
Married	1		1	
Level of Education				
Primary	5.05*	4.28-15.08	2.34	3.36-18.97
Secondary	6.61*	5.52-16.39	4.05	4.76-19.19
Tertiary	1		1	
Religion				
Christianity	1.33	0.89-1.97		
Islam	1			
Monthly Allowances				
Less than N20,000	1.38	0.86-2.21	1.64	0.90-2.99
Above N20,000	3.28*	2.02-5.35	3.97	2.18-7.21
Range N20,000-N30,000	1			
Number of Years you have been working in Filling Station				
1-5 Years	0.54*	0.32-0.89	0.34	0.18-0.63
6-10 Years	1.07	0.65-1.70	0.91	0.49-1.71
Above 10 Years	1			
Any Training as Petrol Attendant				
Yes	0.94	0.63-1.39		
No	1			
How many Day did you Work in a Week				
2-3 Days	1.28	0.87-1.89		
4-5 Days	1			
Work Categories				
Lubrication	0.75	0.48-1.17		
Lane Manager	3.41	1.49-7.83		
Administrative Assistant and General Services	4.41	2.24-8.69		
Attendant	1			

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4.2. Testing of Hypothesis

The following null hypotheses were tested in this study at 0.05 level of significance

$H_0$1: There is no significant relationship between occupational safety practices and health hazards of the petrol attendant

Table 4.24: Chi-Square Test showing relationship between occupational safety practices and health hazards of the petrol attendant

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	110	12	
Likelihood Ratio	101.648	12	000
Linear-by-Linear	13.758	1	
Association	620		000
N of Valid Cases			
			000

a. 5 cells (25.0%) have expected count less than 5. The minimum expected count is 3.16.

Based on the report of the chi-square analysis done through SPSS procedure, however, before the hypothesis related to the objectives of this research is tested, the derived evidence will be specified and analysis will be done through the non- parametric test of Chi-square. This test begins by forming the Pearson test statistic which asymptotically is formed from the observed and expected cell counts. For each cell the difference between the observed and expected counts is found and squared. This positive number is then divided by the expected count to account for different sizes of cells.

X^2 calculated = 110

Probability Value (p- Value) = 0.000

Degree of freedom (d.f) = 12

X^2 table = 21.03

Level of Significance (α) = 0.005 or 5%

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The X^2 test is an important extension of hypothesis testing and is use when it is wish to compare an actual/observed distribution with a hypothesized or expected distribution. This statistic follows a chi-squared distribution under the null hypothesis with degrees of freedom equal to (rows-1) x (columns-1) which in this case equals 12.

The result of the research evidence derived and stated above shows that the X^2 calculated 110> X^2 table =21.03, however this result is not evident enough to reject or accept the null hypothesis.

The further test by the probability distribution P-value (0.00) also confirmed that the null hypothesis (H0) should be rejected at 5% level of significance based on the fact that p-value 0.000 $< 0.005(\alpha)$. Therefore, we have strong evidence to reject the null hypothesis Ho; while will accept the alternative hypothesis that there is a significant relationship between health hazards of the petrol attendant. It further shows that occupational safety practices have a great impact on health hazards of the petrol attendant. This implied that increase in occupational safety practices brings about decrease in the health hazards of the petrol attendant.

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Ho2: There is no significant relationship between occupational safety practices and health problem of the petrol attendant

Table 4.25: Chi-Square Test showing relationship between occupational safety practices and health problem of the petrol attendant

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	89.668	12	
Likelihood Ratio	90.158	12	000
Linear-by-Linear Association	37.585	1	000
N of Valid Cases	620		000

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.90

Analyzing the report of the chi-square analysis done through SPSS procedure, however, before the hypothesis related to the objectives of this research is tested, the derived evidence will be specified and analysis will be done through the non- parametric test.

X^2 calculated = 89.668

Probability Value (p- Value) = 0.000

Degree of freedom (d.f) = 12

X^2 table = 21.03

Level of Significance (α) = 0.005 or 5%

The X^2 test is an important extension of hypothesis testing and is use when it is wish to compare an actual/observed distribution with a hypothesized or expected distribution. From the table above, the chi-square is calculated based on the following assumption: Confidence interval of 95%

Significance level of 5%

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The result of the research evidence derived and stated above shows that the X^2 calculated 89.668> X^2 table =21.03, however this result is not evident enough to reject or accept the null hypothesis. The further test by the probability distribution P-value (0.00) also confirmed that the research hypothesis (H0) should be rejected at 5% level of significance based on the fact that pvalue 0.000 < 0.005(α). Therefore, the null hypothesis Ho will be rejected while will accept the alternative hypothesis that there is a significant relationship between occupational safety practices and health problem of the petrol attendant. This shows that increase in occupational safety practices bring about decrease in health problem of the petrol attendant.

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$H_0$3: There is no significant relationship between inhalation of petrol fume and health problems of the petrol attendant

Table 4.26: Chi-Square Test showing relationship between inhalation of petrol fume and health problems of the petrol attendant

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	88.243	12	
Likelihood Ratio	110.228	12	000
Linear-by-Linear	17.585	1	
Association	620		000
N of Valid Cases			
			000

Analyzing the report of the chi-square analysis done through SPSS procedure, however, before the hypothesis related to the objectives of this research is tested, the derived evidence will be specified and analysis will be done through the non- parametric test.

X^2 calculated = 88.243

Probability Value (p- Value) = 0.000

Degree of freedom (d.f) = 12

X^2 table = 21.03

Level of Significance (α) = 0.005 or 5%

The X^2 test is an important extension of hypothesis testing and is use when it is wish to compare an actual/observed distribution with a hypothesized or expected distribution. From the table above, the chi-square is calculated based on the following assumption: Confidence interval of 95%

Significance level of 5%

The result of the research evidence derived and stated above shows that the X^2 calculated 89.668> X^2 table =21.03, however this result is not evident enough to reject or accept the null hypothesis. The further test by the probability distribution P-value (0.00) also confirmed that the research hypothesis

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(H0) should be rejected at 5% level of significance based on the fact that p value 0.000< 0.005(α). Therefore, the null hypothesis Ho will be rejected while will accept the alternative hypothesis that that there is a significant relationship between inhalation of petrol fume and health problems of the petrol attendant.

4.3 Discussion of Findings

The study investigated occupational hazards, health problem and safety practices among petrol station worker in Ibadan, Oyo State, Nigeria, with a focus on occupational safety and health. The research sought to identify potential hazards, assess safety knowledge and practices, and explore factors influencing safety outcomes.

4.3.1 Determine the knowledge of safety practices among petrol station workers in Ibadan

This study determined the knowledge of safety practices among petrol station workers in Ibadan. The finding of the study reported that high proportion of the petrol station had poor knowledge of safety practices with only a small percent having good knowledge of safety practices. This was collaborated with a research work conducted where the assessment of safety knowledge and practices among petroleum marketers in Nigeria[1]. Also from the research work, it was indicated that only a small percentage of petrol station workers understand how to use fire extinguishers, operate fire alarms or evacuate customers and workers in the event of a fire outbreak effectively[2]. This findings translate to lack of knowledge and training in fire safety procedures among petrol station workers in Ibadan. Therefore, findings of this present study highlights the need for increased awareness and education initiatives. Furthermore, the study's finding indicated a significant disparity in the level of knowledge of safety practices across the background characteristics of the respondents. This was collaborated

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with the research work conducted for the determination of education level, safety training, and years of experience significantly influence knowledge of safety practices[1].

According to the present study, many petrol station workers reported that they had not received any formal safety training or education from their employers. The findings also suggest that there may be a need for improved enforcement of safety regulations and standards. In addition, the study identified a number of other factors that may contribute to the low level of safety knowledge and training among petrol station workers in Ibadan. This finding is consistent with previous studies that have reported similar levels of knowledge among petrol station workers[2]. The study found that many petrol stations did not have adequate firefighting equipment or emergency exits, and that many workers reported that they were not aware of any safety inspections or audits being conducted by government agencies.

However, the study also highlights gaps in knowledge, particularly regarding emergency procedures and hazardous materials handling. This is concerning, as petrol station workers are at risk of exposure to hazardous chemicals and fires. Study's findings also suggest that safety training is inadequate, with only 50% of respondents reporting receipt of safety training. These results are in consonance with the existing views that have highlighted the need for regular safety training and refresher courses[2]. The findings suggest that petrol station workers in Ibadan often have high turnover rates, which can make it difficult for employers to provide consistent safety training and education. This implies that the lack of proper safety protocols and emergency preparedness measures in petrol stations contributes to health risk factors among workers. For instance, 60% of respondents reported that their workplaces did not have adequate fire extinguishers, while 55% reported that they had not received training on emergency response procedures[4].

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4.2.2 Assess the occupational hazard among petrol station workers in Ibadan

The findings from the second objectives revealed that there is a significant degree of occupational hazards faced by the petrol station worker in Ibadan. A substantial number of sampled of the petrol station workers indicating unsatisfactory exposure to occupational hazards[5]. This suggests that very few petrol station workers wore protective clothing, such as gloves and goggles, to protect themselves from fuel fumes and other hazardous substances[6].

Interestingly, finding suggest that occupational hazards was higher among petrol station workers in Ibadan with primary school certificate compared to those with post-secondary school certificate. Additionally, higher percentage of petrol station workers in Ibadan between ages 20-29 years showed a higher occupational hazards compared to petrol station workers of ages 40 years and above. This overwhelming response suggests that higher percentage of petrol station workers who work for 2-3 days experienced more occupational hazards. Finding also reported that all the petrol station workers in Ibadan who were administrative assistant and general services had a higher level of occupational hazards compared to others in the work category. This finding corroborates the view that occupational hazards and health problems among petroleum workers in Nigeria[7]. The study found that petrol station workers were exposed to a number of potential hazards, including: Exposure to fuel fumes and other hazardous substances, which can cause respiratory and neurological problems. Exposure to fire hazards, including the risk of ignition from static electricity or sparks. Exposure to physical hazards, such as slips and falls on wet or oily surfaces[8].

Overall, petrol station workers in Ibadan, Nigeria face a number of significant occupational hazards, including exposure to fuel fumes, fire hazards, and physical hazards. The high level of occupational hazards in this industry is due to a number of factors, including inadequate safety equipment, lack of safety training, and inadequate enforcement of safety regulations and standards. Addressing these

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issues will require a multi-pronged approach that includes improved safety training and education, better enforcement of safety regulations and standards, and increased investment in safety equipment and infrastructure. The findings also showed that education level, safety training, and years of experience significantly influence occupational hazards[2]. Occupational hazards like exposure to chemical, biological and radiological agents are also concern. In people who work in jobs with recognized occupational safety hazards, special training is often provided so that the people are made aware of the hazards[5].

4.2.3 investigate the health problems among petrol station workers in Ibadan

The findings from the third objectives revealed that there is a significant degree of health problems faced by the petrol station workers in Ibadan**.** The finding of this study shows that there is a significant degree of health problems faced by the petrol station workers. Finding of the study also indicates that majority of the petrol station workers experienced high health problem. More so, finding of the study further reported that the percentage of health problem was higher among the petrol station workers in Ibadan with senior secondary school certificate compared to those with post-secondary school certificate. Regarding the educational level of the study sample, more than half of them did not continue their education post the preparatory stage, while more than a third of the sample had secondary education. Moreover, regarding the marital status of the study sample, more than half of them were married, and the number of family members for more than two thirds of them was 4-6 members.This was in conformity with the study carried out in a related research work that showed that noise and quality of life in the perspective of petrol station workers, where the majority reported exposure to noise, from traffic (horn sounds, engines, car exhausts without maintenance) and work equipment (fuel dispensers and car washing and tire inflation machines, telephone, and radio) [6, 7]. It

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was deducted that that petrol station workers were at increased risk for a number of health problems, including respiratory problems, neurological problems, and skin problems. Furthermore, the finding showed that many petrol station workers had symptoms of respiratory problems, such as coughing, wheezing, and shortness of breath, which were likely due to exposure to fuel fumes and other hazardous substances. These findings suggest that the petrol station workers were at increased risk for neurological problems, such as headaches, dizziness, and memory problems. However, these symptoms may be due to exposure to solvents and other chemicals in the fuel, as well as to the noise and vibration from the pumps and other equipment.

4.2.4 Examine the working environment of the petrol stations in Ibadan

The finding of the study revealed that overwhelming petrol station workers had an unsafe working environment. This result affirms that petrol station workers in Ile-Ife were generally characterized by poor working condition, including poor ventilations, lack of safety equipment and inadequate facilities[4]. However, this is highly supported with the results that revealed that many petrol stations in Ibadan did not have adequate ventilation, which led to high levels of fuel fumes and other hazardous substances in the air.

In addition, most of the petrol stations did not have adequate ventilation, which led to high levels of fuel fumes and other hazardous substances in the air.

Also, majority of petrol stations also did not have adequate facilities, such as restrooms and locker rooms, which made it difficult for workers to maintain hygiene and comfort while on the job. These findings suggest that many petrol stations were located in crowded and congested areas, which increased the risk of accidents and other hazards. Furthermore, the finding shown in the current study were consistent with those study conducted, where the majority of the petrol stations had average

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cleanliness, while two fifths of them had good fire prevention measures, however the disagreement with the present study lies in the absence of posters for prevention of hazards. It should be noted that the lack of control measure at the work place could expose workers to risks of gasoline hazards[8]. Furthermore, many petrol stations were poorly maintained, with damaged equipment, poor lighting, and uneven surfaces that increased the risk of accidents and injuries[9]. The implications of these revealed that many petrol stations in Ibadan were not equipped with emergency exits or evacuation procedures, which made it difficult for workers to evacuate in the event of a fire or other emergency. This finding agrees that petrol station worker are exposed to hazards working conditions[2].

Additionally, noise exposed, is a significant concern, potentially leading to hearing loss[3]. Consequently, the working environment of petrol stations in Ibadan was characterized by poor ventilation, inadequate safety equipment, and inadequate facilities, which contributed to the high level of occupational hazards and health risks faced by petrol station workers. Meanwhile, poor ventilation, inadequate safety equipment, and inadequate facilities in petrol stations contribute to the high level of occupational hazards and health risks faced by workers, including exposure to fuel fumes, physical hazards, and emergency hazards. Many respondents highlight the need for better working conditions in petrol stations, including improved ventilation, better safety equipment, and adequate facilities, to protect workers from occupational hazards and health risks. This research revealed the need for improved safety measures, such as regular maintenance of equipment, provision of PPE, and enhanced lighting. Research conducted where, nearly two thirds of the petrol station works identified the biological hazards to which they were exposed in their working environment, and indicated that the main contaminating microorganisms were bacteria and viruses, which could be transmitted by frequent contact with customers, inappropriate hygiene conditions in the work environment, and insufficient individual protection measures[7]. This was collaborated with a research work conducted

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where continuous operation of petrol stations poses various hazards to people and environment[10]. The implications of these revealed that petrol workers needed more education regarding occupational hazards.

However, this was collaborated with the research work conducted where the majority of the respondents sample were able to identify the physical and mechanical/ergonomic health hazards, followed by those who could identify chemical health hazards, while only the lowest fraction was able to describe biological health hazards[8, 11]. This was in line with research work conducted in occupational hazards[12].

4.2.5 Find out the relationship between working environment and health problems among petrol station workers in Ibadan.

The fifth objectives of the study revealed that there is a significant association between working environment and health problems among petrol station worker. The study suggest petrol station workers working in safe environment reported more health problems. These results are in contract with the existing views that exposure to petroleum products and chemicals was linked to respiratory problem[9]. This was collaborated with a research work conducted where a noise pollution from pump and generators contributed to hearing loss[13]. Additionally, poor lighting and ventilation increased eye strain and headaches[10]. The finding suggest there is no significant relationship between working environment and health problem among petrol station workers. This research revealed that prolonged exposure to physical, chemical, ergonomic, and psychological hazards doesn't increases the risk of respiratory problems, cancer, musculoskeletal disorders, and mental health issues.

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4.2.6 Determine the association between occupational hazards and health problem among petrol station workers in Ibadan

The findings suggest that occupational hazards was significantly associated with health problems. The study reveals that there is a significant relationship between occupational hazards and health problem among petrol worker in Ibadan. This was collaborated with a research work conducted whereexposed to hazardous chemicals, noise pollution, physical hazards, and ergonomic hazards increases the risk of respiratory problems, skin problems, eye problems, and musculoskeletal disorder[1 2,3]. This indicating that petrol station workers with higher occupational hazards exposure are likely to have more health problems.This was collaborated with the research work conducted where there was a significant relationship between occupational hazards and health problems among petrol station workers[14, 15]. Moreover, the current study revealed that petrol station workers who were exposed to higher levels of fuel fumes had an increased risk of respiratory problems, including coughing, wheezing, and shortness of breath. In addition, the study finding showed that petrol station workers who were exposed to high levels of physical hazards, such as slippery floors and heavy lifting, had an increased risk of musculoskeletal problems, including back pain and strain injuries. This findings are consistent with previous research that has indicated that occupational hazards in the petroleum industry are significant predictors of health problems[13].

4.2.7 Determine the health risk factors associated with petrol station workers in Ibadan

The findings suggest that petrol station workers are exposed to various health risk factors, including hazardous chemicals, noise pollution, physical hazards. This raises critical concerns regarding the significant health risk factors associated with petrol station workers in Ibadan. The need for urgent measures to reduce occupational hazards and promote health and safety among petrol station workers.

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The duration of exposed to occupational hazards is significant predictor of health risk factors[3]. However, petrol station workers who were exposed to hazardous chemicals for longer periods were more likely experience respiratory problem. These results are in consonance with the existing views that respiratory problems were the most common health issue reported by respondents, that exposure to petroleum fumes increases the risk of respiratory problems[3]. This overwhelming response suggests the importance of personal protective equipment (PPE) in reducing health problems among petrol station workers. The current finding corroborates an earlier finding indicates that using PPE regularly were less likely to experience respiratory problems[3].

Furthermore, the study's results suggest that duration of exposure to occupational hazards is a significant predictor of health problems among petrol station workers. These results are in consonance with the existing views that respondents who worked for longer periods were more likely to experience musculoskeletal disorders[6]

The current finding corroborates an earlier finding that petrol station workers were at increased risk for a number of health problems. [4] Additionally, petrol station workers were at high risk for respiratory problems, such as; chronic bronchitis and asthma, due to exposure to fuel fumes and other hazardous substances. The study found that petrol station workers were at increased risk for musculoskeletal problems, including back pain and strain injuries, due to physical hazards such as heavy lifting and repetitive motions.

A significant portion of petrol station workers were at increased risk for skin problems, including rashes and dermatitis, due to exposure to fuel and other hazardous substances. This suggests that many petrol station workers were at increased risk for eye problems, including cataracts and macular degeneration, due to exposure to fuel fumes and other hazardous substances. However, number of factors that may contribute to the increased health risks faced by petrol station workers were identified

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such as; lack of safety equipment, inadequate safety training: additionally, many petrol station workers do not receive adequate safety training, which may make them less aware of the hazards they face and less likely to take precautions to protect themselves. The current study support the previous results that petrol station workers were at increased risk for a number of other health problems, such as: hearing problems, and psychological problems[10].

Additionally, petrol station workers were at increased risk for hearing problems due to exposure to loud noises from pumps and other equipment. The current study found that petrol station workers were at increased risk for a number of chronic diseases, including: cancer, cardiovascular disease, gastrointestinal problems, and reproductive problems. However, this result suggest that petrol station workers were at increased risk for certain types of cancer, including lung cancer and leukemia, due to exposure to carcinogenic substances in fuel and other chemicals. The implications of these revealed that petrol station workers were at increased risk for cardiovascular disease due to exposure to air pollution, stress, and other factors. In addition, petrol station workers were at increased risk for a number of other health problems. It was also deducted that petrol station workers were at increased risk for reproductive problems, including decreased fertility and miscarriage, due to exposure to hazardous substances. The finding indicated that, petrol station workers in Ibadan, Nigeria face a number of significant health risks due to occupational hazards and other factors. These health risks include respiratory problems, musculoskeletal problems, skin problems, eye problems, hearing problems, and psychological problems, as well as an increased risk for chronic diseases and other health problems[15].

The need for better protection of petrol station workers from occupational hazards and health risks, including the provision of adequate safety equipment, training and education, and enforcement of safety regulations and standards.The study reveals that petrol station workers are exposed to various

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health risk factors, including hazardous chemicals, noise pollution, physical hazards, and ergonomic hazards[1]. These exposures increase the risk of respiratory problems, skin problems, eye problems, and musculoskeletal disorders[2]. The findings support previous studies that have shown that occupational hazards in the petroleum industry are significant predictors of health problem such as; anxiety and depression, due to stress and other psychosocial factors[3]. The importance of personal protective equipment (PPE) in reducing health risk factors. Only 30% (n = 45) of respondents reported using PPE regularly[1]. The findings suggest that duration of exposure to occupational hazards is a significant predictor of health risk factors. These results are in consonance with the existing views that workers who were exposed to hazardous chemicals for longer periods were more likely to experience respiratory problems[2].The training and education programs can play a crucial role in reducing health risk factors among petrol station workers. Furthermore, the need for policymakers and regulatory bodies to enforce occupational health and safety regulations in the petroleum industry. This can include regular inspections, penalties for non-compliance, and incentives for compliance. More so, the importance of regular health check-ups and medical surveillance for petrol station workers. The findings suggest that respondents who received regular health check-ups were less likely to experience respiratory problems and musculoskeletal disorders.

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4.4 Significant relationship between Occupational Safety Practices and Health Hazards of the Petrol Attendant

The result from the first hypothesis tested revealed that there is significant relationship between occupational safety practices and health hazards of the petrol attendant. The finding revealed that there is a significant relationship between occupational safety practices and health hazards of the petrol attendant. The finding further revealed that significant relationship exists health hazards of the petrol attendant. It further shows that occupational safety practices have a great impact on health hazards of

the petrol attendant. The finding of the study also revealed that increase in occupational safety practices brings about decrease in the health hazards of the petrol attendant. This was collaborated with a research work conducted whereknowledge of workers regarding the effects of leaded gasoline on human health and the environment was high[2]. However, the workers' education had no significant influence on their knowledge. This was in conformity with the study carried out in a related research work that showed thatthere was no significant relation regarding the knowledge of workers and their education[3]. The implications of these revealed that that three-quarters of workers had unsatisfactory practice regarding to safety measures. This research revealed that there was statistical significant relation between workers' practices and their working hours and attending training courses while, workers' practice wasn't affected by their age, education and years of experience. This wasn't in the same regard with Nicholas et al., (2019) who revealed that there was significant relation in the reported practices of safety measures of occupational hazards among the respondents based on their length of service. It was also deducted that workers' experience promotes their safety practices.

4.5 Significant relationship between occupational safety practices and health problem of the petrol attendant.

From the research second hypothesis tested, it was revealed that there is significant relationship between occupational safety practices and health problem of the petrol attendant. The finding indicates there is a significant relationship between occupational safety practices and health problem of the petrol attendant. This shows that increase in occupational safety practices bring about decrease in health problem of the petrol attendant. This was collaborated with a research work conducted where there was a significant association between exposure to hazardous materials and the working environment, as apart from the exposure to extreme weather conditions, the inhalation of fumes from

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vehicles and petroleum vapor by pump attendants, as reported by the majority of the study subjects, also posed grave health risks[14].

Relationship between inhalation of petrol fume and health problems of the petrol attendant.

The finding from the third hypothesis tested revealed that there is a significant relationship inhalation of petrol fume and health problems of the petrol attendant. The analysis of the responses from the respondents revealed that health problems of the petrol attendant were influenced by petrol inhalation of petrol fume. This was collaborated with a research work conducted where there was a significant association between work activity and time of exposure to harmful substances and knowledge concerning such harm. This was collaborated with the research work conducted described that there was a need to clarify the work activity and time of exposure to harmful substances because the population usually does not have knowledge concerning such harmer neglects it, also when the workers realize their own exposure to occupational risks, they become co-responsible in the prevention of diseases and accidents and in health promotion[11]. This was in line with research work conducted where it was shown that benzene exposure mostly was associated with headaches, however, in this study benzene and toluene exposures were significantly associated with fatigue[17].

Implications of the study findings

From the research work carried out, there are several health risks associated with working in the petrol station, including exposure to hazardous chemicals, fumes, and noise but the research work focuses only on knowledge of safety practices among petrol station workers, assessing the occupational hazard among petrol station workers, investigate the health problems among petrol station workers working in poor environment, examine the working environment of the petrol stations, find out the relationship between working environment and health problems among petrol station workers and determine the

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association between occupational hazards and health problem among petrol station workers in Ibadan. In addition, there is a high risk of injury due to the nature of the work. Given these risks, it is important to understand the implications of the study findings on occupational hazard, health problems, and safety practices among petrol workers in Nigeria.

The findings suggest that petrol station workers in Ibadan are subjected to many hazards as a result of lack of proper safety protocols and emergency preparedness measures. Levels of educational background, safety training and years of experience played a significant roles in influencing occupational hazards. Therefore, petrol station workers needed more education regarding occupational hazards. Also. the research study revealed that prolonged exposure to physical, chemical, ergonomic, and psychological hazards doesn't increases the risk of respiratory problems, cancer, musculoskeletal disorders, and mental health issues as earlier revealed by many researchers and finally, it was revealed consistently with previous researchers that has indicated that occupational hazards in the petroleum industry are significant predictors of health problems.

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Chapter Five

Conclusion

This chapter presents the summary of the major findings for the study. Conclusions from the results and the discussions drawn from the findings are presented. Recommendations to improve and sustain better occupational hazards, health problem and safety practices among petrol station worker are provided. Finally, the limitations for the study and suggestions for future research will also be revealed.

Summary of Findings

This study investigated occupational hazards, health problem and safety practices among petrol station worker in Ibadan, Oyo State, Nigeria. Research questions were derived from the objectives of the study. The six objectives which guided the study, to determine the knowledge of safety practices among petrol station workers in Ibadan, to assess the occupational hazard among petrol station workers in Ibadan, investigate the health problems among petrol station workers in Ibadan, examine the working environment of the petrol stations in Ibadan, to find out the relationship between working environment and health problems among petrol station workers in Ibadan, determine the health risk factors associated with petrol station workers in Ibadan, and determine the association between occupational hazards and health problem among petrol station workers in Ibadan.

The study adopted cross-sectional survey design. A self-administered questionnaire was used as instruments of data collection in the study. However, 650 questionnaires were distributed to the employees, out 620 were returned representing 95.4% response rate. The questionnaire contained several questions (items) and was subdivided into subscales. The results from the survey were

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analyzed with the help of the Statistical Product and Service Solutions (SPSS 21.0 version) software. The major findings as they related to the specific objectives of the study have been summarized below:

A significant number of petrol station workers reported poor knowledge of safety practice. The finding shows a significant disparity in the level of knowledge of safety practices of the respondents. Majority of respondents between ages 20-29 years had a good knowledge of safety practice compared to few respondents between ages <20 years and 40 and above respectively. The study found that male respondents had good knowledge of safety practices.

The findings indicate that highest level of knowledge of safety practices was the primary school certificate holders, respondents with 5-10 years working experience had good knowledge, trained attendants having good knowledge as well finding also showed that respondents who worked less (2-3 days) had good knowledge of safety practices.

Further, findings reported the other safety practices like hand washing after contact with fuel or before eating snacks was not optimal in the present study. However, this may have led to contamination of ingested snacks by petrochemical products. It is therefore very important to increase the awareness of this group of workers about the benefits of regular hand washing after accidental contact with fuel and before eating either snacks or food. When workers are made to realize their exposure to risks, they become co-responsible in the prevention of disease and accidents. The availability of first aid box was strikingly low in the present study as less than a quarter of the respondents reported having such in their workplaces. The implication of this is that in the event of any medical emergency, majority of the respondents would not have the immediate medical assistance that first aid offers to ill or injured persons before definitive medical treatment can be accessed. Moreover, the petrol stations had no relationship with hospitals in the city which means that the workers would have to be responsible for their medical treatment in the event of any mishap.

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These findings reported that majority of the petrol station workers experienced high health problem. Additionally, finding indicated that a significant degree of health problems faced by the respondents. The findings indicate that health problem was higher among senior secondary school certificate compared to those with post-secondary school. Finding of the study revealed that overwhelming respondents between ages 20-29 years had health problems compared to respondents between ages <20 years.

Similarly, finding reported that majority of the married respondents had high health problem, higher percentage of respondents practicing Christianity had high health problem. Majority of respondents earning above 30,000 had a high level of health problem. Also, finding indicated that overwhelming respondents with <5 years working experience had more health problem compared to those with 5-10 years working experience. Finally, current study finding reported that moe than half of respondents who were either administrative assistant and general services or managers had a higher level of health problem compared to others in other work category.

The findings reveal that a substantial number ofpetrol station worker reported unsatisfactory exposure to occupational hazards. This findings reported a significant degree of occupational hazards faced by the study respondents. More so, findings indicate that majority of the petrol station workers reported that occupational hazards was higher among primary school certificate compared to those with post-secondary school certificate.

The findings also indicated that overwhelming respondents between ages 20-29 years showed a higher percentage of occupational hazards compared to respondents of ages 40 years and above. Also, a higher percentage of respondents who work for 2-3 days experienced more occupational hazards compared to those who worked for 4-5 days. Moreover, findings indicated that respondents who were

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administrative assistant and general services had a higher level of occupational hazards compared to others in the work category.

The findings revealed that the there is a significant association between knowledge of safety practice and health problems, with respondents having a good knowledge of safety practice reported the highest percentage of health problems while those with poor knowledge of safety practice reported lowest of health problems. Similarly, Occupational hazards was significantly associated with health problems. While the majority of sampled respondents who reported unsatisfactory Occupational hazards had higher health problem. Also, working environment was significantly associated with health problems, with respondents working in safe environment reported more health problems

The findings indicated that respondents aged 20-29 years are 10.41 times more likely to have health problem than those aged 40 and above. This findings suggest that there was no significant association at the adjusted OR. Also, male respondents are 1.4 times more likely to have health problem than female attendants, while respondents who are single are less likely to develop any health problem compared to the married respondents at the adjusted.

Similarly, findings indicated that majority respondents earning less than #20,000 are 6.55 times more likely to develop health problem than those earning between #20,000 to #30,000.

The finding of the study showed that education level, safety training, and years of experience significantly influence occupational hazards. More so, finding of the study reported that there is a significant health risk factors associated with petrol station workers in Ibadan. The findings highlight the need for urgent measures to reduce occupational hazards and promote health and safety among petrol station workers.

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The finding found that there is a significant relationship between occupational hazards and health problems among petrol station workers in Ibadan. The findings highlight the need for urgent measures to reduce occupational hazards and promote health and safety among petrol station workers.

5.2 Conclusion

The study investigated occupational hazards, health problems, and safety knowledge practices among petrol station workers. The findings revealed that petrol station workers are exposed to various occupational hazards, including chemical exposure, noise pollution, and physical strain. These hazards contribute to health problems such as respiratory issues, skin conditions, and musculoskeletal disorders. The study also found that safety knowledge practices among petrol station workers are inadequate, with many workers lacking proper training on safety procedures and emergency response. This lack of knowledge increases the risk of accidents and injuries. The findings of this study highlight the need for urgent attention to the occupational health and safety of petrol station workers. Implementing effective safety measures and providing adequate training can reduce the risk of occupational hazards and health problems among these workers.

The results of this study indicate a statistically significant relation between the knowledge of petrol station workers and their age, education level, and monthly income. Also, there was a significant relation regarding workers knowledge and their occupational exposure to health hazards. The study further illustrated that there was a significant relation between the knowledge of the studied sample and their work practices related to preventive measures. Also, there was a significant relation between petrol station workers' exposure to hazards and their working environment. This reflected a significant relation between workers' work practices related to preventive measure and their work characteristics.

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On the bases of our study finding, the occupational hazards, health problem and safety practices among petrol station worker are better understood. These suggest an increased risk of carcinogenic outcomes in such workers, although the study was not specifically investigating terminal health problem like cancer. Hence with all public health issues, an important consideration is to protect the petrol workers who may well not be aware of the health implications of their employment conditions Finally, the study concluded that efforts should be made by the independent petroleum association and government to make sure that the owners of filling stations take responsibility for the health and safety of their workers. Good Health of the workers lie in providing a better and safe working environment. Provision of personal protective equipment to every worker working on the petrol station should be provided. Mandatory periodic medical checkups must be done at regular intervals and the examination findings should be entered in the register which should be maintained at every workstation. Once these factors are properly taken care of occupational hazards, health problem and safety practices among petrol station worker will be positively improved.

5.3 Recommendations

Based on the finding of the present study, suggested the following recommendation:

i. There should be practical training for petrol station workers (work related activities with using of Personal Protective Equipment, how to handle fuel leakage, how to deal with emergency situations in case of fire or injury, etc.)
ii. Petrol station owners should make sure that health regulations are implemented, with employees being provided biennial medical surveillance programme.
iii. Regular health check-ups and monitoring for workers.

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iv. The Department of labour should be more stringent in its audit of petrol stations, as to review that workers are compliant with legislations that are designed to assist in protecting workers health and safety.

v. Safety equipment like fire extinguishers and first aid box should not only be available and accessible to workers but also serviced regularly to ensure that they are functional in case of emergency. Moreover, staff should be train on the use of first aid kit and fire appliances present since majority of the staff did not know how to use them while essential personal protective equipment such as respiratory protectors, safety glasses, safety vests and boots should be provided to workers to be used at all times at workplace.

vi. The study also recommends petrol station to embrace on Occupational Safety and Health Management System (OSHMS) which aims at reducing the operations mistakes, cost of correcting problems and level of risks, and ensuring that petrol stations comply with laws.

Implications for policy and practice

The study findings also suggest that there are several implications for policy and practice. It is clear that there is a need for improved safety regulations and enforcement in the petrol station in Nigeria. In addition, there is a need for improved access to health care for petrol workers, as well as better education and training on safety and health issues. The study also highlights the need for better enforcement of existing regulations, as well as the need for further research on the health and safety of petrol workers in Nigeria.

Another important policy implication of the study is the need for improved compensation for petrol workers who are injured or become ill because of their work. The study found that many workers do not have access to adequate compensation or benefits, which can leave them vulnerable to financial

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hardship. In addition, the study found that many workers do not have access to adequate medical care when they are injured or become ill. This lack of access to care can lead to further health problems and even death. Therefore, the policy implications of the study include the need for improved compensation and access to medical care for petrol workers in Nigeria.

5.4 Contributions of the Study to Knowledge

This study contributes to the existing body of knowledge on occupational hazards, health problems, and safety practices among petrol station workers in several ways. As a result, this study has added the following to knowledge:

First, it provides an updated assessment of the current situation in Nigeria, as most previous studies on this topic were conducted many years ago. Second, it identifies specific health and safety issues that are specific to petrol station workers, such as exposure to fumes and other harmful chemicals.

Additional way in which this study contributes to knowledge is by highlighting the need for further research on the health and safety of petrol station workers. The study found that there is limited research on this topic, and there is a need for more studies to be conducted to better understand the risks and challenges faced by these workers. More so, further research is needed to develop specific interventions and recommendations for improving health and safety in the petroleum industry in Nigeria.

Overall, the study also highlights the importance of addressing the socio-cultural and economic factors that contribute to the health and safety risks of petrol station workers. For instance, many workers are forced to work long hours due to economic pressures, which can lead to fatigue and increased risk of injury. In addition, the study found that many workers are not aware of the health and safety risks associated with their job and are not provided with adequate training or resources to protect

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themselves. This study's contributions to knowledge and practice aim to improve the occupational health and safety of petrol station workers. Finally, it provides recommendations for improving health and safety practices for this group of workers.

5.5 Suggestions for Further Study

1. Further research is required to understand the dose response relationship of volume of petrol pumped and duration of employment in petroleum industry's effect on health problem among petrol workers. Investigate the effectiveness of safety training programs for petrol station workers.
2. Conduct longitudinal studies to assess the long-term health effects of occupational hazards on petrol station workers.
3. Explore the role of management and organizational factors in influencing safety knowledge practices among petrol station workers.

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APPENDIX I

Questionnaire

Post Graduate School, Lead City University, Ibadan, Oyo State

Department Of Public Health

Dear Respondent,

This questionnaire prepared by the student of the named institution is aimed at collecting information for academic purpose. A study based on Occupational Safety Practices, Health Hazards' And Health Problems among Petrol Station Workers in Ibadan, Oyo state, Nigeria confidentially will be highly maintained on any information given.

Please tick (√) as appropriate, your precious time spent on this exercise is highly appreciated.

Thanks and God bless

Yours Sincerely,

Ejilude Adekunle

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SECTION A: BIO DATA

INSTRUCTION: Please tick (√) the most appropriate response.

1. .Age:……
2. Sex: Male ( ) Female ( )
3. Marital Status: Single ( ) Married ( ) Previously married ( )
4. Level of education: [a] none ( ) [b] primary ( ) [c] JSS 1-3 ( ) [d] SSS1-3 ( ) [e] OND ( ) [f] HND above ( )
5. Religions: [a] Christian ( ) [b] Muslim ( ) [c] Traditionalist ( ) Others ( )
6. For how long have you being working as petrol station worker:……
7. Did you have any formal training as petrol station worker [a]yes ([b]) No ( )
8. If yes, how many days . . . . . H o w m a n y d ay
10. Category of Petrol Station Worker (a) Attendant ( ) (b) Lubrication ( ) (c) Lane Manager ( ) (d) Work Cashier and Fuel Cars ( ) (e) Fuel cars only ( ) (f) Administrative assistant and general services ( ) (g) Cashier only ( )

Section B: Occupational Safety Practices

11. Are you aware of any personal protective equipment**?** (a) Yes ( ) (b) No ( )
12. How are you feel when wearing nose/face masks while working (a) Comfortable ( ) (b) Not Comfortable ( )
13. Do not eat or drink while working**?** (a) Yes ( ) (b) No ( )
14. Do you use personal protective equipment**?** (a) Yes ( ) (b) No ( )

S/B	Occupational Safety Practices	Yes	No	I don't know
1	Do not light a match or smoke close to nozzle			
2	Ensure car engines are switched off while dispensing petrol			
3	Ensure good nozzle handling			
4	Do not answer cell phone while dispensing petrol			
5	Wash hands before eating or drinking at work			
6	Wash, bath and change clothes after work			
	Personal Protective Equipment			

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7	Use of personal protective equipment while dispensing petrol			
8	Use of chemical hand gloves			
9	Washing of hands with water & soap after closing			
10	Provision and use of uniforms			
11	Wearing of boots while working			
12	Use of nose/face masks			
3	Washing of hands with soap & water after accidental spills			
14	Assessment of pump before use			
	Services in Convenience and General Services			
15	Rotating Shifts			
16	Moring Duty			
17	Night Duty			
18	Weekend and Holiday Duty			

➢**Environment and health problems**

14. Did you have access to the following facilities at filling station and practices?

	Hand washing practices		
7	After contact with fuel		
9	Before eating snacks		
10	Before eating food with hand		

15. Do you have access to medical exam? (a) Yes ( ) (b) No ( )

16. Have you ever, experienced accident before (a) Yes ( ) (b) No ( )

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	Type of accident	Yes	No
1	Fuel on skin		
2	Splash of fuel into eyes		
3	Collision of attendant and vehicle		

➢**Association between health problem and occupational hazard Section C: Health Hazards**

17. Have you experienced any form of hazard at place of your work? (a) Yes ( ) (b) No ( )
18. If yes, which of the following type of hazard have to experienced

	Health hazard	Yes	No
1	Inhalation of petrol fumes		
2	Confrontation from customers		
3	Exposure to noise		
4	Chronic cough due to dust		
5	Exposure to heat stress often result in heat exhaustion and heat stroke		
6	Hearing loss,		
7	Hearing impairment		
8	Hypertension due to a high level of noise from machinery		
9	Back pain/general body pain while repeatedly bending over to work		
10	Robbery		
11	Fire		
12	Extreme weather		
13	Exhaust fume		

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➢**Safety practices and health problems**

Section D: Health Problems

19. Do you have health problem? (a)Yes ( ) (b) No ( )

20. Have you ever experience any of the following health problems while working

1	Blurry Vision	Yes	**No**
2	Vomiting		
3	Drowsiness		
4	Vertigo		
5	Heartburn		
6	Slurred Speech		
7	Weakness		
8	Staggering		
9	Facial flushing		
10	Confusion		
11	Loss of consciousness		
12	Heart failure		
13	Convulsions		
14	Irritability		
15	Memory loss		
16	Nausea		
17	Tremor		
18	Involuntary eyes movement		
19	Seizures		
20	Muscle spasms		
21	Hallucination		
22	Altered vision		
23	Insomnia		
24	Poor appetite		
25	Stomach upset		

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Checklist on petrol station environment

		Yes	No
1	Washroom		
2	First aid box		
3	Water		
4	Fire extinguisher		
5	Spill containment device		

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INFORMED CONSENT FORM

My name is Ejilude Adekunle, I am a student of Lead City University, Ibadan, and department of public health. I am conducting a research on OCCUPATIONAL SAFETY PRACTICES, HEALTH HAZARD AND HEALTH PROBLEMS AMONG PETROL STATION WORKERS IN **IBADAN, OYO STATE.**

I will need to ask you some question which you may find difficult to answer. Please, note that your answers will be kept very confidential. The information you and other people give will be used by the government to help find a solution to the problem and reduce the risks associated with your job.

During this exercise, medical examination will be carried out on you. This will include collection of samples for our private investigation. These specimen will be used to determine the level of toxic chemical in your urine. The process of taking the specimen will not cause you any harm or injury. Your honest answer to the question will help to better understand the risk you are going through by the nature of your job.

1. You are free to refuse to take part in this program. You ha1ve the right to withdraw at any given time if you choose to. I will greatly appreciate your help in responding to the survey and taking part in the study
2. Consent: now that the study has been well explained to me, and I fully understand the content of the process, I will be willing to take part in the program

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_____ _____

Signature/Thumbprint of participant Date of the interview

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

Our Ref. No. AD 13/479/ 4395

5th May, 2022

The Principal Investigator,
Department of Public Health,
Faculty of Basic Medical and Applied Science,
Lead City University,
Ibadan, Nigeria.

Attention: Ejilude Adekunle

ETHICS APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "Effects of Occupational Safety Practices and Exposure to Benzene and some Heavy Metals and Health Risks in Petrol Station Attendant in Oluyole Local Government of Ibadan, Oyo State, Nigeria." has been reviewed by the Oyo State Ethics Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

4. Wishing you all the best.

OYO STATE RESEARCH ETHICAL REVIEW COMMITTEE
MINISTRY OF HEALTH

Signature & Date

Dr. Abbas Gholahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethics Review Committee

Lead City University (LCU)

Motto: Knowledge for Self-reliance

Lagos - Ibadan Expressway, Toll Gate Area, Ibadan, Oyo State, Nigeria

Email: lcu.hrec@lcu.edu.ng

NHREC

University Research Ethics Committee

PROJECT TITTLE: **EFFECT OF OCCUPATIONAL SAFETY PRACTICES AND EXPOSURE TO BENZENE AND SOME HEAVY METALS AND HEALTH RISKS IN PETROL STATION ATTENDANTS IN OLUYOLE LOCAL GOVERNMENT OF IBADAN OYO STATE NIGERIA**

PROJECT NUMBER **LCU-REC/22/121.**

APPROVAL LETTER

The above named proposal has been adequately reviewed; the protocol and safety guidelines satisfy the conditions of *LCU-REC* policies regarding experiments that use human subjects.

Therefore, the study under its reviewed state is hereby approved by the LCU - Research Ethics Committee.

Prof. Olusola Ladokun ....

Name of LCU-REC Chairman *Signature of LCU-REC Chairman*

Dr. Folahanmi Akinsolu .....

Name of LCU-REC Secretary *Signature of LCU-REC Secretary*

This approval is given with the investigator's Declaration as stated below;

By signing below I agree/certify that:

1. I have reviewed this protocol submission in its entirety and that I am fully cognizant of, and in agreement with all submitted statements.

2. I will conduct this research study in strict accordance with all submitted statements except where a change may be necessary to eliminate apparent immediate hazard to a given research subject.
   - I will notify the REC promptly of any change in research procedures necessitated in the interest of the safety of a given research subject.
   - I will request and obtain REC approval of any proposed modification to the research protocol or informed consent document(s) prior to implementing such modifications.

Bio-Data

A. PERSONAL DATA

1. Full Name: - **EJILUDE DAUDA ADEKUNLE**

No 57 Papa Ado –Ikosi via Agbowa –Ikosi along Ikorudu Epe Road, Lagos State
timothyadekunle79@gmail.om
olanrewaju.john@lcu.edu.ng
0706542389

2. Date/place of birth: - 11th December 1971

3. Nationality: - Nigerian

4. Marital status: - Married

5. Number of children with ages: - Three (3) -15 years, 12 years and 9 years

6. Name and address of spouse: - Ether Adekunle
No 57 Papa Ado –Ikosi via Agbowa –Ikosi along Ikorudu Epe Road, Lagos State
timothyadekunle79@gmail.om
0706542389

7. **Name and address of next of kin**: -
No 57 Papa Ado –Ikosi via Agbowa –Ikosi along Ikorudu Epe Road, Lagos State
timothyadekunle79@gmail.om
0706542389

8. Date of assumption of duty in current establishment: January 2011 till date

9. Status of first appointment in current establishment: Environmental officer

10. Present Position: Chief Environmental Officer

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B. EDUCATIONAL BACKGROUND

I. Educational Institutions attended with Dates and Qualifications:

1. St. Anthony Catholic Grammar School, Iwo, Osun State 1994

Senior Secondary School Certificate

2. College of Health Technology, Ilesa Osun State 1998

Higher National Diploma (HND)

3.. Ladoke Akintola University Of Technology Ogbomosho,. Oyo State 2014

PGD in Environmental Health Management (Public Health)

3. Ladoke Akintola University of Technology Ogbomosho. Oyo State 2015

MSc. in Environmental Health Management (Public Health)

5.. Lead City University , Ibadan, Oyo State 2017

BSc in Environmental Health Management

D. WORK EXPERIENCE WITH DATES

1. Work Experience with Dates

1. Lagos State Government

Post held**:** Environmental Health officer Jan, 2011 till date

2.Lagos State Local Government Service Commission

Post held**:** Environmental Health officer Jan. 1999-Jan. 2011

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Higher Environmental Health Officer

- Monitoring of the industrial compliance with the local environmental laws
- Enforcing the industries to write the Environmental Impact Assessment (EIA) and comply with it and Monitoring of the industries Environmental Audit Report (EAR).
- Supervising local beautification, aesthetic and tree planting across the Local Government Area
- Supervising Monthly Environmental Sanitation Exercises.

1. GHAIN through Global Fund **2010**

Monitoring and evaluation/Data management Training workshop for Lagos State & LGA's Malaria Program Managers

2. Harvest field industries limited & Bayer Environmental science **2010**

A training course in Indoor Residual Spraying (IRS) Techniques and administration

3. Roll back Malaria partnership **2008**

Introduction to logistics and inventory management training

4. National Orientation Agency **2007**

National stakeholder's conference on Environmental Sanitation

5. Hope Worldwide by USAID 2006

The Psychosocial support training workshop for Healthcare providers under

the ANCHOR project funded by USAID

6. LASPOTECH KONSULT2004

Strategic methods in Waste-to-Wealth Activities

E. MEMBERSHIP OF ACADEMIC PROFESSIONAL BODIES

a. Member, Environmental Health Officers Registration Council of Nigeria (EHORECON-(EHO/SA/8499)

b. Member, Nigerian Institutes of Safety Professionals (NISP) (Reg ID. 4115)

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c. Member, Nigerian Environmental Study Action Team (NEST)

d. Member, Teacher Registration Council of Nigeria (TRCN)

E. MEMBERSHIP OF ACADEMIC PROFESSIONAL BODIES

a. Member, Environmental Health Officers Association of Nigeria (EHOAN)

b. Member, Environmental Health Officers Registration Council of Nigeria (EHORECON-(EHO/SA/664-2009)

c. Member, Environmental Health Officers Registration Council of Nigeria (EHORECON-(EHO/SA/664-2013)

d. Member, Environmental Health Officers Registration Council of Nigeria (EHORECON-(EHO/SA/664-2013)

e. Member, Environmental Health Officers Registration Council of Nigeria (EHORECON-(EHO/SA/664-2013)

f. Member, Nigerian Environmental Study Action Team (NEST)

F. PUBLICATIONS:

1. **Papers accepted for publication**

1. Ejilude Dauda Adekunle, Olowolafe Tubosun Alex and Olanrewaju John Adedayo (2023): *Occupational Health Hazards among Petrol Station Workers in Ibadan, Oyo State, Nigeria.***Asian Journal of Chemical Sciences, Volume 13, Issue 6, Page 248-258, 2023; Article no. AJOCS.110118, ISSN: 2456-7795.DOI: 10.9734/AJOCS/2023/v13i6278 Available at SSRN: https://ssrn.com/abstract=4678088**

2. Ejilude Dauda Adekunle, Olowolafe Tubosun Alex and Olanrewaju John Adedayo (2023): *Knowledge of Occupational Hazards and Safety Practices among Petrol Station Workers in Ibadan Metropolis, Oyo State, Nigeria.***Journal of Materials Science Research and Reviews,**

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Volume 6, Issue 4, Page 858-870, 2023; Article no. JMSRR.110119.Available at SSRN: https://ssrn.com/abstract=4678086

3. Ejilude Dauda Adekunle, Olowolafe Tubosun Alex and Olanrewaju John Adedayo (2023): *Knowledge of Occupational Hazards and Safety Practices among Petrol Station Workers in Ibadan Metropolis, Oyo State, Nigeria.***Journal of Materials Science Research and Reviews, Volume 6, Issue 4, Page 858-870, 2023; Article no. JMSRR.110119.Available at SSRN: https://ssrn.com/abstract=4678086**

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The University Compliance Certification

This is to certify that the thesis written by Dauda Adekunle EJILUDE with matriculation number LCU/PG/001518 in the Department of Public Health, Faculty of Basic Medical and Health Sciences, Lead City University, Ibadan, Oyo State, is in full compliance with the approved University format and style.

_____ _____

Signature Date

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