

**COMPLIANCE WITH OCCUPATIONAL SAFETY PRACTICE
AMONG PETROL STATION PUMP ATTENDANTS IN KADUNA
STATE, NIGERIA**

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DECLARATION

This thesis is my original work and has not been presented for a degree or any award in any other university.

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DEDICATION

I dedicate this work to almighty God, to my Parents Dr. Goldin Kakwi and Mrs. Jerisha Kakwi, and to Kenyatta University for the knowledge and service rendered to me.

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ABBREVIATION AND ACRONYMS

AOR:	Adjusted Odds Ratio
BTEX:	Benzene, Toluene, Ethylbenzene, Xylene
CI:	Confidence interval
DOSHS:	Directorate of Occupational Safety and Health Services
DPR:	Department of Petroleum Resources
IARC:	International Agency for Research on Cancer
ILO:	International Labor Organization
LGA:	Local Government Area
NBS:	National Bureau of Statistics
NUPENG:	Nigerian Union of Petroleum and Natural Gas workers
OR:	Odds Ratio
OSH:	Occupational Safety and Health
OSHA:	Occupational Safety and Health Act
PMS:	Premium motor spirit
VOC:	Volatile organic compound
WHO:	World Health Organization

DEFINITION OF OPERATIONAL TERMS

- Accident:** An unplanned and unwanted occurrence that results in damage, injury or loss.
- Demography:** Can be defined as the characteristics of the human population.
- Filling station:** It is an outlet a building, equipment or land utilised in dispensing or selling fuel.
- Hazard:** A dangerous condition that increases susceptibility of suffering injury or interruption of order.
- Health hazards:** All elements in a working environment that contributes to deterioration of employees body conditions.
- Health:** Is the state of physical, mental and social, well being and not merely the absence of disease and infirmity.
- Near miss:** When an unplanned event occurs resulting in no injuries or damage but has the potential for such.
- Occupational Health:** Identification and mitigation of hazards that may interfere with social, physical and mental wellbeing of employees in the workplace.
- Pump attendants:** Workers at Premium Motor Spirit pumps, diesel pumps and kerosene pumps that assist in the dispensing for petrol fuel to buyers in filling stations.
- Safety:** Is a state of being protected from harm through controlling identified hazards to achieve the minimum level or risk that might lead to injury.
- Safe practice:** Also known as a good safe practice, are those protocols which deal with safety and may vary between industries or sectors

ABSTRACT

Petrol pump attendants in Kaduna encounter numerous hazards at the pump. This constitutes the most important threat to their survival at the workplace. Unfortunately, there are very few researches evaluating compliance with safe practices among pump attendants in Kaduna South, Nigeria. Therefore; the study objectives were to assess the compliance levels with safe practice, to establish pump attendant's knowledge and attitude on safe practice and to determine the factors associated with the compliance rate. The study adopted a cross-sectional survey design. Two-stage cluster sampling technique was utilized to select 27 filling stations, of which, 212 petrol pump attendants were interviewed as respondents. Data were collected using an interviewer-administered questionnaire. Descriptive statistics including percentages and frequencies were utilised in summarizing the data. Findings of the study show that the level of compliance with safe practices in terms of fire extinguisher usage (76.9%) and use of PPE (77.8%) was good. However, other safe practices have been neglected. Knowledge was generally good, especially in terms of PPE usage (92%), fire extinguisher (99.1%), and the use of spill kits (64.6%). Pump attendant's also had a positive attitude towards compliance. Inferential analysis revealed that level of education (AOR 3.331, CI 95% 1.771-6.264), work experience (AOR 1.905, CI 95% 1.028-3.529) and attitude (AOR 5.216, CI 95% 1.458- 18.665) are the best predictors for compliance with safe practice. Therefore, the study concludes that pump attendants have a good knowledge and a positive attitude regarding safe practices, but recommends that education and training of pump attendants should be prioritized in order to boost compliance rate which was found to be poor. Department of Petroleum Resources (DPR) should enforce the adoption of safety regulations in order to improve compliance by both managers and pump attendants.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The safety of workers stands as an indicator of success in every occupation and can also show the life expectancy of employees. Workers are expected to be in an environment that is free from hazards such as accidents and diseases that may threaten their survival (Neema, 2013). Nonetheless, accidents and diseases still occur and currently the leading contributor to safety risks workers face in the occupations (Vwila *et al.*, 2015). Occupational safety and health (OSH) ensure the promotion and maintenance of social, physical and mental well-being of employees in all workstations (International Labour Organization, 2014).

Statistics have shown that globally, over two hundred and seventy million accidents and one hundred and sixty million occupational diseases occur at the workplace annually, with 2.3 million resulting in deaths and over 2.8 trillion dollars' worth of losses incurred (Iraj *et al.*, 2016). Records also show that globally, over two million people working in petrol filling stations are exposed to benzene every year. The compound is both carcinogenic and among the leading substances that threaten human health (Lidmary *et al.*, 2017). In the United States, there are 7400 fires and explosions occurring at their gasoline stations annually (Afolabi, Olajide, Omotayo, 2011). Despite the improvements in the field of OSH aimed at protecting workers, occupational hazards still create serious problems for the workers in developing countries.

Challenges faced by most establishments in safeguarding the health and safety of workers have been associated with the inability of employers and workers to effectively comply with safety measures (Nnedinma *et al.* 2014). Best safe practices such as the use of Personal Protective Equipment, spill kits, portable fire extinguisher, recording

of accidents and reporting of hazards can go a long way in preventing injuries, accidents, and diseases at the workplace (Mirza *et al.*, 2012)

Akinwale and Olasunmbo (2016) emphasized on the International Labor Organization (ILO) mandates, which demand governments and employers to ensure a hazard free workplace because most developing countries still face challenges of non-compliance with safe practices. Fire load is a major safety concern in filling stations because it increases their susceptibility of suffering from fire or explosion related accidents. Consequently, attendants in the stations are at the highest risk of suffering injuries due to existence of fire, accidents transportation and explosion accidents (Eyayo, 2016). Despite several studies in the past, pump attendants still complain of headache, nausea, dizziness, constipation, indigestion, and vomiting (Abou El-Magd *et al.*, 2010). These symptoms which are evidence of exposure may be a result of non-compliance with safety measures as observed in many petrol filling stations. Therefore, the existence of many hazards in a single installation makes the petroleum industry an area that require further research attention in Occupational safety and health.

The striking difference between filling stations in developing country such as Nigeria and those in developed countries is that for the former, attendants are employed to fuel the vehicles while in the latter, it is a self-service operation (Ahmed *et al.*, 2014). This may be due to inadequate technological know-how and also because of the need to create jobs for many unemployed youths in the country. Work-related fatality in petrol filling stations is rarely recorded or reported in the literature. This has posed a great challenge in getting a coherent OSH databank and has also created difficulty in checking occupational health contributions on workplace safety.

1.2 Statement of the Problem

Urbanization has prompted the many numbers of cars on roads and small-scale businesses that run on petrol fuel in Kaduna state. Hence, the high demand of fuel has elevated it to be among the most lucrative in Kaduna State. In his study, Dogara (2017) reported the location of petrol stations also contribute to occupational hazards faced by petrol pump attendants. Dogara (2017) discovered that eighty-six percent (86%) of the filling stations in Kaduna were located on major roads, this predisposes pump attendants to hazards such as car accident (Dogara (2017)).

The petroleum industry employs many pump attendants in the petroleum sector in Kaduna state. Since petrol contains volatile organic compound (VOC) such as benzene, it is therefore harmful to human consumption. Unfortunately, each day, pump attendants in Kaduna are exposed to this compound and also to other various hazards including accidents, injuries, explosions, and fire outbreak at the filling station. Despite a few studies done in the past, pump attendants still complain of headache, nausea, dizziness, constipation, indigestion, and vomiting (Periago and Prado, 2005).

According to Aguwa *et al* (2014) these are symptoms peculiar with exposure to chemicals found in petrol fuel among petrol station pump attendants in Aba, southeast Nigeria (Aguwa *et al.*, 2014). This exposure could be largely due to non-compliance with safe practices by pump attendants in Kaduna. Furthermore, non-compliance, as observed amongst pump attendants in Kaduna state, has incapacitated efforts, in the adoption of good safety practices. This level of non-compliance has predisposed pump attendants to the various hazards they face. Unfortunately, this area of research has been under-examined by previous studies, and even though it is evident that pump attendants are still facing series of threats to life, as observed in various petrol filling stations in

Kaduna, recording of accidents or reporting of hazards is almost non-existent in previous researches. Also, none of the previous research accounted for the effects of variables like age and gender, work experience and level of education on the level of compliance.

1.3 Justification

Despite countless ILO (2009) statutory provisions and expectations of the Department of Petroleum Resources (DPR), petrol filling stations pump attendants in Kaduna still face serious health challenges. These pump attendants are not only exposed to health problems but, they are also at risk of hazards such as fire explosions. This major gap exists because there are not many pieces of research done on this topic in Kaduna. Therefore, there is a need to conduct a study and bring out the importance of complying with safe practices.

This study, which focused on, evaluating the level of compliance among pump attendants, will shed light on basic mitigation strategies that could curb non-compliance among petrol pump attendants. This study will help people understand ways to tackle the challenges hindering compliance and this study gives an insight into the factors associated with compliance. Findings of this research will serve as a guideline for overcoming non-compliance, by giving management a roadmap of who to employ as pump attendant, and what safe practices need to be encouraged. This will improve compliance rate, reduce disease and accident rates, and maximize productivity.

1.4 Research Questions and Hypothesis

1.4.1 Research Questions

1. What is the status of compliance to safe practices among attendants in the petrol stations in Kaduna?

2. What is the level of knowledge regarding compliance to safety practices among attendants in the petrol filling stations in Kaduna?
3. What is the attitude towards compliance with safety practices among attendants in the petrol filling stations in Kaduna?
4. What factors are associated with compliance with safety practices among attendants in filling stations in Kaduna?

1.4.2 Null Hypothesis

There is no significant association between gender, age, level of education, work experience, knowledge, and attitude with compliance with safety practices among pump attendants in petrol stations in Kaduna State

1.5 Research objectives

1.5.1 General Objective

To evaluate compliance to safety practices among pump attendants in petrol stations in Kaduna State

1.5.2 Specific Objectives

1. To evaluate the status of compliance with safe practices among pump attendants in petrol stations in Kaduna
2. To establish the level of knowledge on safety practices among attendants in filling stations in Kaduna
3. To assess the attitude toward compliance to safety practices among attendants in filling stations in Kaduna
4. To determine factors associated with compliance to safety practices among attendants in filling stations in Kaduna

1.6 Significance of the study

Findings of this study will have a positive impact on organizational approaches, particularly in hazard management in petrol filling stations. This study will sensitize management and staff on the essence of compliance to safety practices for a Healthy life. The study will enable managers and policy agencies to focus more attention to ensure compliance with regulations, and it will also serve as a baseline to policy makers and other researchers. Other organizations will directly benefit from the findings of this study by adopting the concept of health and safety regulations in all aspects of their businesses, in order to maximize productivity and boost company profit. Evaluation of safety practices is essential in ensuring compliance to safety regulations as this will enhance the safety of attendants in filling stations in Kaduna state. It is also crucial in ensuring the effectiveness of occupational safety and health practice for modification of a better health and safety system

1.7 Limitation

With regards to information bias, some respondents might have had a preconceived idea about the study topic and did not want to respond honestly. Qualitative data such as focus group discussions was not employed in this study. Even though most of the respondents have had some sort of education, language barrier might have affect information gathered because some respondents found it easier to communicate in Hausa language.

1.8. Delimitation

The study participants have assured confidentiality of information provided and guaranteed that the information will only be used for academic purposes.

1. 9 Conceptual Framework

The dependent variable being compliance constitutes the outcome to be achieved when various safety measures are in place. For this study, routine and non-routine safe practices peculiar in petrol filling station such as the use of PPEs, spill kits, fire extinguishers, reporting hazards and recording accidents and near miss determined whether pump attendants are compliant with safe practices or not. Other independent variables include age and sex, socio-demographic factors like level of education and years of work experience. Age and gender have the potential to influence one's ability to practice the safety culture. Also, an individual's experience in a job can build up the confidence and ability to learn new ways of preventing hazards in a work environment (Dwight *et al.*, 2003). This means that the richer the experience of pump attendant in working at the pump the better his or her demeanour to practice safety culture. It is believed that a person's level of education can influence his/her behaviours either positively or negatively. Knowledge and Attitude were also considered as independent variables in this study. According to Damian *et al* (2008), knowledge and attitude on safety practice are linked to increased productivity in industries and reduce accidents to a considerable rate.

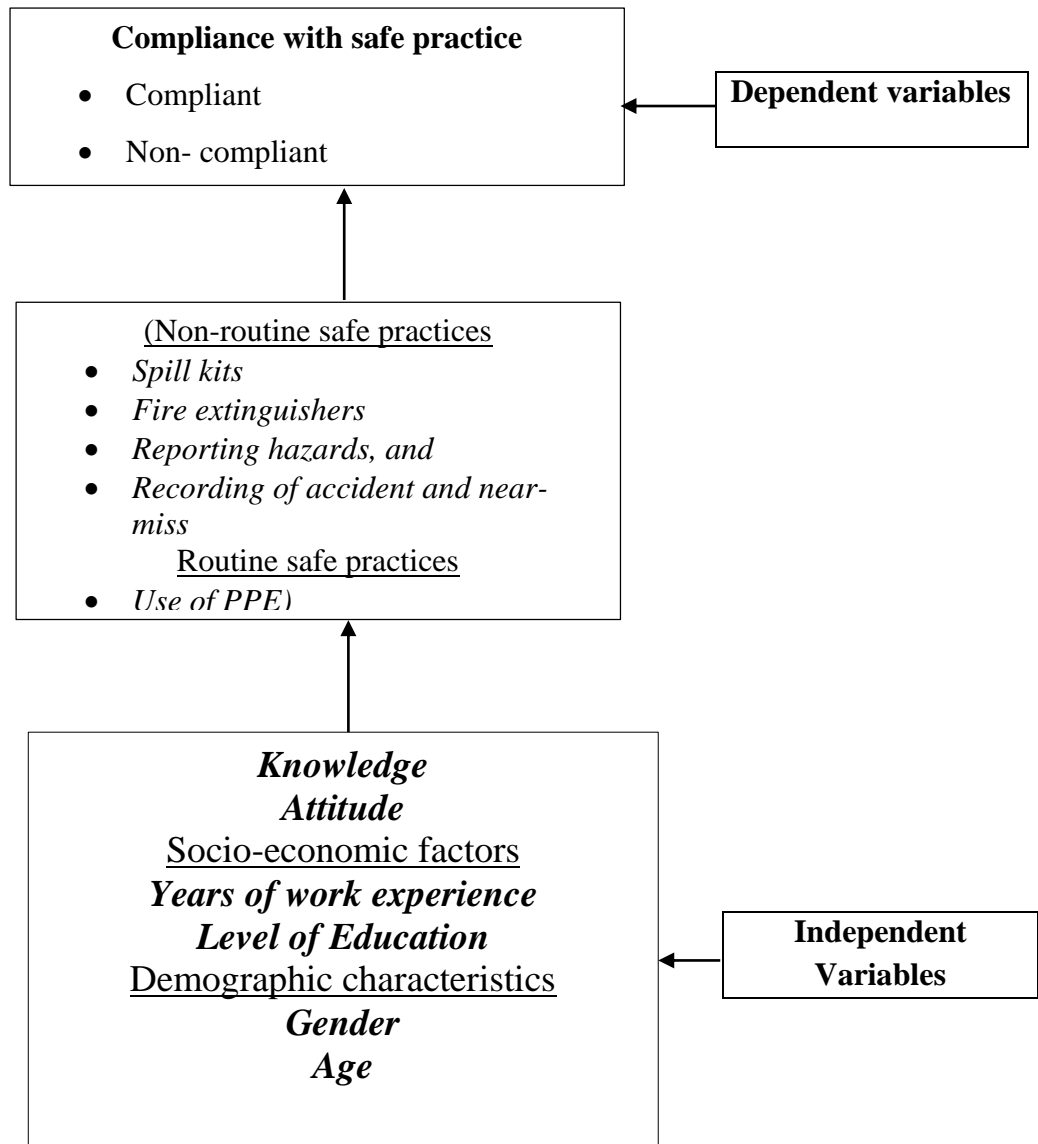


Figure 1.1: Conceptual framework

Source: developed by the researcher from a literature review

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter comprises a review of literature together with empirical concepts applicable to this study. Literature was guided by the specific objectives.

2.1 An overview of Occupational safety and health practice

Occupational injuries are a key source of health complications affecting the working population. Consequently, Occupational Safety and Health (OSH) focus on promoting a hazard-free working environment (Vwila *et al.*, 2015). Occupational Health and Safety is perceived as both proactive and preventive approach that entails hazard identification and mitigation, risk assessment and treatment of workplace in an effort to provide workers with a safe working environment (Adeaga, 2015). The International Labour Organization, established in 1919 main aim is promoting a safe, descent and healthy working environment. Several years ago, the ILO formulated a policy comprising international instruments and guidance documents to build capacity in constituent nations and major organizations appropriately manage workplace hazards (ILO, 2009).

Unfortunately, Nigeria is still facing a series of challenges with functioning bodies that are meant to supervise and deliver sanctions to workplaces that are found to be non-compliant to regulations (Illoh, 2016). Even though the petroleum regulatory agency of Nigeria has given statutory responsibility of ensuring compliance with petroleum laws, regulations, and guidelines in the oil and gas sector, to other departments such as DPR, some petroleum marketers hardly abide by this regulation. Hence the reasons why most pump attendants are at risk of occupational hazards. Some of the guidelines of the DPR which includes, ensuring that the health and safety and environment regulations

conform to national and international best oil field practice have hardly been evaluated Akinwale & Olanunmbo, (2016).

According to the DPR (2017), management at every petrol filling station is required to train and educate their employees on the importance of maintaining workplace safety. DPR (2017) further adds that effective training and education of employees necessitate the identification of training needs through assessment of existing workplace. Furthermore, it is important that the training should incorporate aspects such as emergency procedures and spillage control during dispensing that involves quick assessment of hazard situations and identification of the appropriate mechanism to deal with the danger (Yerevan, 2008). Other elements included in the training are the role of authority in dealing with emergencies, assessment of customer behaviours and recognition of unacceptable practices.

Irajat *al.* (2016) suggested that the most effective way to limit occupational accidents is to improve OSH performance, by establishing an OSH management strategy, as a long-term strategy. The labour organization has been able to achieve this by coming up with Occupational safety and health management strategies, like encouraging workers to participate in risk assessment activities and using OSH data to prepare OSH programs (Illoh, 2016). Workers involvement in OSH activities and measuring performance using lagging indicators has provided solutions for controlling accidents and improving the organizations OSH performance (Illoh, 2016). Unfortunately, many factors have affected the successful outcome of OSH strategies in Kaduna, Nigeria.

According to the factories Act Cap 126, every employer must have a system in place for managing workplace health and safety, which will serve to reduce, illnesses, injuries, or fatalities and together with ensuring compliance to the General Duty Clause and

Occupational Safety and Health Act (OSHA) standards. The program should be tailored to address hazard issues at the workplace. This can be achieved by conducting an assessment of the entire workplace to identify potential hazards that might lead to employees suffering from injuries.

Nnedinma *et al.* (2014) in the study found that despite the tremendous growth in number of workplaces, most of them do not conform to the OSH regulations. The situation necessitated a raft of interventions including the Workman's Compensation Act of 2004 that was amended to the Employee's Compensation Act in 2011. Other legal approaches followed include the Safety, Health and Welfare Bill of 2012 that was passed in 2011 but the president has not assented to it yet, a move that will signify the repeal of the Factories Act of 2004 (Nnedinma, *et al.*, 2014)

2.2 Safety and health hazards in petroleum

Petrol is the most popular and is used in low and medium-duty vehicles and other systems due to its low boiling point and higher combustibility compared to other types of fuel like diesel. The ease of conversion of the fuel to vapour makes it a major source of hazard involving inhalation of the fumes (Awasthi *et al.*, 2016). Ethylbenzene, xylenes and toluene as derivatives for Benzene are the elements produced during production of this fuel (Periago and Prado, 2005). According to Moolla (2015), BTEX is classified as a group I carcinogen by WHO and it is known to cause major Health hazards among petrol pump operators. Workers inhale gasoline vapors and also expose their hands and arms when they are not properly covered with protective clothing, thereby increasing contact with BTEX compounds (Alves, *et al.*, 2017). Exposure to these harmful substances may cause an itchy feeling or burning in the eyes, nervous system, throat and skin. (Awasthi *et al.*, 2016). A study involving assessment of BTEX Concentrations in Air Ambient Gas

Stations in Brazil discovered that there was high concentration of benzene compound which ranged between 40-378 times above the National Institute for Occupational Safety and Health (NIOSH) recommended limit. The exposure to harmful gases contributed to a rise in risk of developing cancer and other occupational diseases for workers in the filling stations (Cruz, *et al.*, 2017)

There is higher exposure to petrol substances in petrochemical industries steel, core and oven particularly among workers involved in the transport of the commodity (El-Magd. *et al.*, 2010). The high concentration of benzene compound in filling stations is attributed to evaporation during handling, storage and distribution and from car exhaust fumes (El-Magd *et al.*, 2010). Other risks that petrochemical workers face are accidents/injuries, fires, explosion and accidents during transit and adverse ergonomic issues like back pain (Eyayo, 2016).

2.3 Compliance with workplace safe practices

It is important that every organizations undertakes and evaluation of the working environment to ensure worker safety and compliance with regulations. It is, therefore, necessary to evaluate workplace safe practice to measure the extent to which objectives have been met. Akeem *et al* (2016) posits that there are two dimensions to safety behaviour that is imitativeness and carefulness. Carefulness is concerned with workers complying with safety rules while imitativeness focuses on the actions taken by the workers to improve the safety situation. (Akeem *et al.*, 2016). Therefore, it is of paramount importance that every pump attendant works towards securing his/her safety at petrol filling stations.

Vwila *et al.* (2015) reported that there are numerous difficulties in terms of compliance with regulations in many companies irrespective of its size. Many companies identified

inadequate resources, lack of awareness of laws and policies and deficiency in safety management culture within establishment as reasons for non-compliance (Vwila *et al.*, 2015). In Kenya for example, Edward (2014) reported that management of industries in Thika ensures that employees comply with the OSH measures through strict supervision. Management also ensures employees understand the importance of OSH measures through the education program and ensures this policy is kept by introducing sanctions on defaulters (Edward, 2014). But there is no documented evidence of such practices in industries in Nigeria. Therefore, there is a need to explore the challenges against compliance facing the petroleum industry in Nigeria. Moreover, Nnedinma *et al.* (2014) encourage the organization to "champion OSH enforcement, as it is beneficial to them". The burden of OSH improvement in Nigeria is on the government, educational authorities, organizations and trade unions (Nnedinma, *et al.*, 2014).

One of the most important roles of management in an establishment is to ensure employees are well educated and trained on ways to prevent the occurrences of accidents, injuries, and diseases at the workplace (Edward, 2014). In petrol stations, pump attendants are exposed to various hazards. Afolabiet *al.* (2011) reported that trained workers in petrol filling stations are more compliant to safe practices when compared to non-trained workers

According to Occupational Safety and Health Administration (OSHA) (2016), house-keeping such as use of spill kits, fire prevention such as use of fire extinguisher, reporting and recording of accidents and illnesses are non-routine procedures to control hazards, while routine procedures for managing exposure to hazard at the pump include the use of Personal Protective Equipment (PPE). Mirza *et al.* (2012) recorded that house-keeping deals with all the activities related to cleanliness of facility, materials, equipment, and

elimination of hazardous conditions. In this study, the elements of good safe practice under house-keeping are the use of spill kits, which when applied appropriately will prevent fire outbreak in an event of petrol spill at the dispensing area. The use of appropriate spill kits is not given a high priority like correct signage in most filling stations in Nigeria. An example can be seen in some filling stations in Kaduna State, where a high percentage of the filling stations do not have adequate spill kits, neither are the workers trained on how to utilize them (Yunusa *et al.*, 2016). According to Mirza *et al.* (2012), spill kits are important because, in an event of a chemical spill on the floor of the work area, containment of spilled chemical can be managed as quickly and as safely as possible, which can greatly prevent hazards.

Fire hazards occur where house-keeping is poor, and such occurrences could be avoided by implementing various strategies such as good floor surface maintenance by keeping the work area free from oil or grease, safe and free passage to firefighting equipment such as the portable fire extinguisher (Mirza *et al.*, 2012). The aim of fire prevention is to maintain a good and pleasant workplace, and this has proven to be effective in preventing fire incidents. According to the National Fire Protection Association (NFPA) (2017), 80% of fires can be diminished by the use of a portable fire extinguisher. According to Roger (2007), managers must provide training when employees are recruited, the training should be repeated periodically and when changes occur in the workplace. Also, according to Akinwale & Olasunmbo, (2016), workplace hazards in Nigeria are primarily due to inadequate training on safety precautions and poor knowledge of Occupational safety and health. Pump attendants should be able to identify hazards, assess and control risks arising from the handling of dangerous substances (Yerevan, 2008).

Equally important is the recording and reporting occupational injuries and illnesses, including events that did not result in an injury known as near-miss plays an important

role in preventing future injuries and illnesses at the workplace (OSHA, 2016). According to OSHA (2016), the employer is mandated to establish a reasonable procedure for employees to report work-related injuries and illnesses promptly and accurately. Each employee must be informed of the procedures for reporting work-related injuries because this is an important factor in the control of hazards (OSHA, 2016).

The use of Personal protective equipment (PPE) such as gloves, special uniforms/ apron, and safety boots are crucial to the safety of pump attendants. Alves (2012) also agrees that PPE puts a barrier between the employer and the hazard and contributes to a safe workplace by protecting workers against health and safety risk at the workplace. The use of PPE is shown to be of great importance in a recent study on gas attendants in Brazil, where the workers highly regard the use of boots and apron as a protective measure against exposure to benzene through skin contact (Alves *et al.*, 2017). In another study in Kenya, James and Irene (2012) found that there is a need for improvement in the use of PPE. This is because most of the pump attendants in the filling stations do not regard the use of PPE as an important preventive measure against exposure to petroleum substances (Agnes, 2010; James *et al.*, 2012). This shows that the level of compliance with this safety measure is considerably low.

According to James *et al.* (2012), this is a common challenge in developing countries including Nigeria, therefore it is important for management to motivate employees about the advantages of safe practices for an effective safety and health systems in the country.

OSH risks are attributed to negligence on the part of the employers or employees, inadequate knowledge on OSH issues and inadequate training. They are the factors contributing to the high number of workplace risks. According to Akeem *et al.* (2016), the high rate of OSH risks shows the need for adequate investment in OSH intelligence

programmes, with the primary focus on the prevention of hazards and occupational injuries.

According to Nnedinma, *et al.* (2014), owners of a petrol station, have duties to ensure they identify hazards and assess and control risks arising from the storage and handling of dangerous goods. They also have duties to consult with health and safety representatives and provide employees with induction, information, training, and supervision on the same (Nnedinma, *et al.*, 2014)

2.4 Knowledge of workplace safe practice

Worker are the primary concern driver for the ILO's approach towards promoting workplace safety and health due to their high vulnerability. It also emphasizes that Safety and health specifications should be advocated and given priority over performance standards (ILO, 2009). Afolabiet *et al.* (2011) reported that pump attendants are aware of safety measures like the use of fire extinguishers. Similarly, Ahmed *et al.* (2014) demonstrated that pump attendants in Minna have a high level of knowledge on safety measure at the filling station. According to Marta *et al.* (2014), gas station workers in Brazil responded positively to having a good knowledge of the use of safety equipment like gloves, apron, mask, boots, work clothes and safety glasses to minimize the risk of hazards (Marta *et al.*, 2014). From these previous researches, it is clear that pump attendants have attained some level of knowledge on safety measures at the workplace. A study by Irajat *al.* (2016) shows that the performances of companies who are certified with respect to Occupational safety and health practices were significantly better than their counterparts who are not certified.

2.5 Workers Attitude towards compliance with workplace safe practices

Attitude indicates a person's positive or negative feelings toward some stimulus object, and many researchers believe safety culture is one of the crucial factors that set the tone for ensuring employees safety within an organization. A positive attitude towards compliance with safety legislation has been shown to increase productivity in industries by reducing accidents to a considerable rate (Damian, *et al.*, 2008). Also securing employee compliance with work-place policies can be an important factor in ensuring successful coordination within organizations. O'Toole (2001) recorded that the reduction in injuries experienced by employees was impacted by the positive employee perceptions of some certain factors including the commitment to safety practice. The study also showed that employees' attitudes and perceptions help to drive this behaviour (O'Toole, 2001). This means that, if training and educational sessions are focused to influence the attitude and perceptions of pump attendants on safety, there will be a great impact in the reduction of accidents and injuries in petrol stations.

2.6 Influence of demography on workplace safe practice

Demographic factors can serve as key indicators in development planning. Many researchers have suggested that differences in demographic variables can influence workers' performance either positively and negatively. For example, Dwight *et al.* (2003) observed that demographic attributes including gender and age can be an important variable in the organizational analysis. This implies that the demographic structure of an organization could be a driving force for effective risk communication, decision making, and task performance (Dwight *et al.*, 2003). Suzanne *et al.* (2010) reported that a team that is more diverse in terms of age and gender may be more successful than a homogeneous team.

Dwight *et al.* (2003) also reported that the proportion of men and women in an organization, influence the nature of social interaction and reflect a reality that is distinct from the mere aggregation of individual-level responses (Dwight *et al.*, 2003). This could mean that a combination of workers with different demographic characteristics such as age and gender can influence compliance with safety practice.

2.7 Socio-Economic influence on workplace safe practice

Socioeconomic status deals with characteristics such as level of education, work experience that people acquire from society. According to the American Psychological Association (2017), socioeconomic status like lower educational achievement can ultimately affect one's physical and mental health negatively. Work experience, on the other hand, is regarded as one of the most relevant characteristics for predicting performance in an organization, and it has been linked to risk-taking and safety management (Gyekye and Salminen, 2010). Previous studies have reported conflicting results on compliance with safety and work experience. Zeitlin (1994) observed that compliance with safety is higher among the inexperienced workers, but Paul and Maiti (2007) reported that there is hardly any difference in the level of compliance with safety practice, as both experienced and inexperienced workers are likely to disregard safety policies

2.8 Theoretical framework

This study was based on the Health Belief Model (HBM). HBM is one of the most widely used models to explain and predict why an individual does not or does take preventive health measures (Jones, *et al.*, 2015). According to Rosenstock & Stretcher (1997), the HBM suggest that Pump attendants will take action to prevent accidents or serious diseases if they regard themselves as susceptible to hazard such as disease or

disability (perceived severity), if they believe that a particular course of action like ensuring adequate training, safety equipment like PPEs are made available to them, would reduce the susceptibility or severity or lead to other positive outcomes (perceived benefits), and if they perceive few negative attributes related to the health action, (perceived barriers). HBM also suggests that specific cues to action, such as factors in pump attendant's environment, can impact the final action they take (Allan2009, Suleiman, *et al.*, 2015). Cue to action indicate issues that will trigger the decision-making process to in a person in the hope to alter behaviour and adjust variables showing a person's private factors that influence whether they are to adopt the new behaviour (Jones, et el., 2015). Self-efficacy refers to the level pump attendants are confidentt in their ability to successfully perform a behaviour (compliance), it signifies their valuation of their chances of attracting the disease, accident and injury (Wayne 2019)

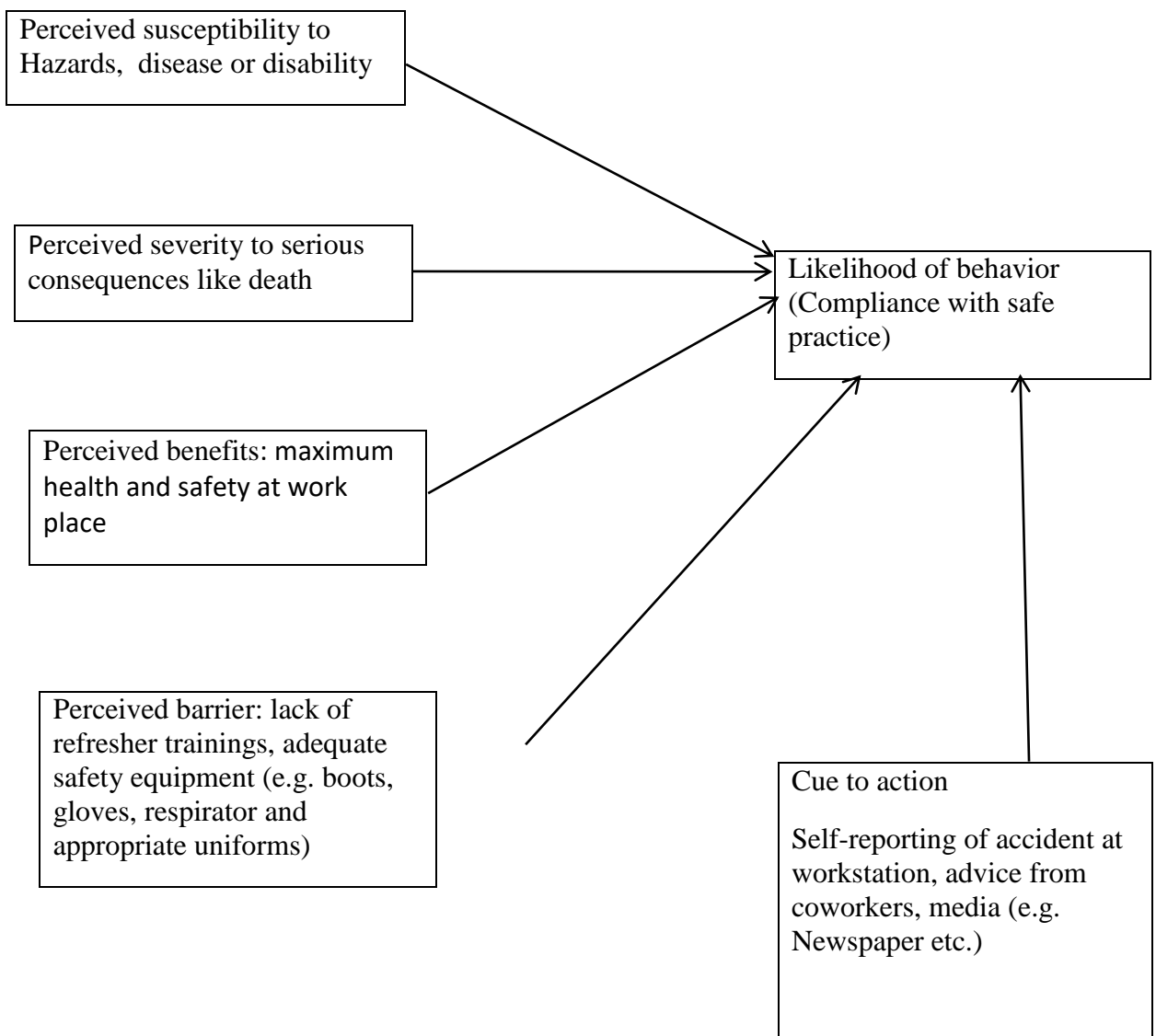


Figure 2.1: Theoretical framework

(adapted and modified from Keurst, *et al.*, 2016).

2.9 Summary and research gap

The lack of technical support or guidance on the implementation of OSH practice has largely contributed to the Occupational Safety and Health accidents in workplaces. Although very few studies were carried out on safety in petrol stations, those that exist (Afolabiet *al.*, 2011, Ahmed *et al.*, 2014 and Edward 2014, Yunusa *et al.* 2016) show that most filling stations do not comply with safety standards. Unfortunately, these studies did not explore the reasons non-compliance was recorded in those filling stations, neither were demographic and socio-economic factors given any priority.

Therefore, this study investigates the rationale for compliance with safe practice in order to find a lasting solution. In another study in Aba, South East Nigeria, safety measures like reporting of hazards and recording of accidents and near misses were scarcely mentioned as an important precaution in hazard management (Aguwaet *al.*, 2014).

The studies above and several others do not intensively show if a relationship exists between compliance with safety measures and demographic or socioeconomic variables. This study will evaluate the effectiveness of other safety measures missed out in this previous research.

CHAPTER THREE: MATERIALS AND METHODS

3.0 Introduction

This chapter highlights methodology details appropriate for the study.

3.1 Research Design

The study adopted a cross-sectional survey design (Chris and Diane, 2004). This design was appropriate for this study because it is also suitable for collecting quantitative data at one point in time on Occupational Health and Safety condition within the petroleum industry in Kaduna state.

3.2 Variables

3.2.1 Dependent Variable

The dependent variable was in compliance with routine and non-routine safe practices. Pump attendants were considered to be compliant if they had not missed practicing any of the safe practices required for petrol filling station according to the DPR mandate (2016), in accordance with the Factories Act of 2004 which the DPR enforces.

3.2.2 Independent Variables

Independent variables were pump attendants age, gender, level of education, and years of work experience, knowledge and attitude of pump attendants.

3.3 Location of the Study

This study was carried out in Kaduna State Nigeria; it is located on 1° latitude (10-11°N) and 1° longitude (7-8°E). Kaduna South is one of the third largest Local Government areas (LGA), out of twenty-three LGAs in the state. The population is over 467,907 people (NBS, 2016). Total number of registered petrol stations in Kaduna South LGA is approximately eighty-eight. Out of which, 30 petrol stations were

randomly selected in nine districts around various areas of the LGA as shown in the map (Appendix VI). This also gave the researcher a cumulative number of respondents who participated in each of the petrol stations. Kaduna South is also one of the LGA having the largest transport system which has prompted the establishment of filling stations in the area. This has made this location suitable for study.

3.4 Study and Target population

Study population, were all the petrol pump attendants working in petrol stations across Kaduna State. This is the population where the sample is drawn. In this case the Kaduna state. Target population is the population where the results can be generalized. Therefore, the target population in this study was pump attendants in petrol stations in Nigeria.

3.5 Inclusion Criteria and Exclusion Criteria

3.5.1 Inclusion Criteria

Pump attendants who gave consent to participate in the study and those who are more than 18 years old were included in the study. Since petrol stations managers admitted to training pump attendants prior to working at the petrol station, pump attendants who have worked in the petrol station for at least one month were included in the study. This was to ensure that respondents were familiar with work place safe practices.

3.5.2 Exclusion Criteria

The study will also exclude any pump attendant who is not a resident of Kaduna South.

3.6 Sampling Technique and Sample Size

3.6.1 Sampling Techniques

The cluster sampling method which was used to select petrol stations Kaduna South was selected due to its unique characteristics in the study, this consist of number of petrol filling stations in the area and also it is the area with a large number of pump attendants who are at risk of petroleum related accidents and diseases. A list of the clusters (petrol stations) was constructed and 30 clusters were randomly selected from the list. All pump attendants in the 30 randomly selected petrol stations participated in the study giving a total number of 212 participants.

3.6.2 Sample Size

The population of pump attendants in Kaduna South is less than 10,000 thus Cochran (1963) formula was used to determine the sample size ($n = Z^2pq/ d^2$). Where:

n = minimum desired sample size

z = is the score for the desired confidence interval 95% (1.96)

p = Prevalence value of compliance with safety measures as reported from a similar study carried out in Kaduna state, Nigeria is 0.78 (Adebola, 2014)

$q = 1 - p = 0.22$

d = level of significance. This value at 95% confidence level is given as 0.05

Therefore;

$$n_0 = \frac{1.96^2 \times 0.78 \times 0.22}{(0.05)^2} = 264$$

The researcher introduced the finite population correction formulae below. This is in order to adjust the sample size to the desired sample, Hence;

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

Where n_0 is the initial sample size = 264

N is the study population = 702

$$\frac{264}{1 + (264-1)/702} \quad n = 191.9 = 192$$

Compensation for invalid data and non- response was 10%, Sample size $192 + 0.1 (192)$
 $= 211.2 = 212$

All pump attendants in the selected area of study were included in the study. The research sought attendant detail such as to streamline the data collection process and provide all the attendants with equal opportunity to participate in the study.

3.7 Data collection tools

The mixed method research approach was used to collect both qualitative and quantitative data using the questionnaire and observation checklist (Appendix II and III). The questionnaire with closed-ended questions was administered to the respondents at the petrol filling stations. Data was also collected using observation checklist. The checklist was used to assess the use of equipment such as protective gears by workers, the condition of spill kits and fire extinguisher. The checklist was adopted and modified from “a guide for service station operators” under the Work Health and Safety Act 2011. The guide serves to promote compliance to regulations among fuel retail outlet operators. Research assistants were trained to administer the interviewer questionnaire to pump attendants and to also make use of the checklist to record observations around the dispensing area

3.8 Pre-Testing

Data collection tools were pretested through a test-retest method in a Zaria which is a similar study population that was not included in the main study. Three (3) petrol filling

stations were purposively sampled, and the instruments were pretested with 22 pump attendants.

3.8.1 Validity

Data collections tools were reviewed by supervisors and experts to ensure validity. In addition, the whole proposal was reviewed by supervisors to ensure internal validity. To ensure external validity the participants were randomly selected from the study population.

3.8.2 Reliability

The findings of the pre-test study were used to revise and refine the tool. Data collection was supervised throughout the study by the researcher to ensure reliability. This process ensured accuracy, completeness, and consistency of the data collected.

3.9 Data collection technique

Interviewer questionnaire administered to participants were marked with an identification number to monitor the return and response rates. Under this study, a series of the question were supplied by the researcher and research assistants to the respondents at the petrol filling stations. The close-ended questions offered a set of alternative answers. The researcher together with the research assistants wrote down what some of the respondents replied to each of the questions. Each of the filling stations visited were also observed for PPEs, fire extinguisher, and spill kit.

3.10 Data analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS version 22). Descriptive statistics such as frequencies, percentages were used to summarize data. Knowledge, Attitude, and Compliance were graded by using a scoring system. This scoring system was adopted from a similar study carried out by Adebola (2014)

in Lagos. There were 6 broad questions on knowledge, 6 questions on attitude and 5 questions on compliance. All questions on compliance were scored 1 mark each for yes and 0 marks for no, and rated in percentage as 0-60% (≤ 3 marks) being non-compliant and more than 61% (≥ 4 marks) as compliant. Knowledge questions were scored 1 mark each for yes and 0 marks for no and rated in percentages as 0-60% (≤ 2 marks) being poor, and $\geq 61\%$ (3-5marks) as good. The attitude was also scored using a 2-point scale and rated in percentages as, 0-60% (≤ 2 marks) having a negative attitude, and $\geq 61\%$ (3-5marks) as having a positive attitude. Logistic regression was used to determine predictors of compliance with safe practices.

3.11 Logical and Ethical Consideration

Approval to carry out the research was sought from Kenyatta University Graduate School. Ethical clearance was sought from Kenyatta University Ethical Review Committee. Permission to conduct the study was obtained from the controller, Department of Petroleum Resources Zonal Office Kaduna State. Authority was sought verbally from Managers of each petrol filling station visited. Verbal and written consent was sought from pump attendants before participating in the study. Confidentiality was emphasized and guaranteed throughout the study. Respondents voluntarily participated in the study.

CHAPTER FOUR: RESULTS

4.1 Demographic and Socio-Economic Characteristics of the Respondents

Out of the 212 respondents that were interviewed, 75 percent of them were males while females were 25 percent. Age of the respondents in this study varied from 33.5% in age group 18-23 and 66.5% in age group 24-29. One hundred and thirty-four respondents (63.2%) had completed their education up to secondary and 78 respondents (36.8%) had attended at least collage. One hundred and nineteen respondents (56.1%) had twelve-year experience working at the pump while 93 respondents (43.9%) had more than twenty-four months' experience working at the pump (Table 4.1).

Table 4.1: Descriptive findings on Gender, age, level of education and years of experience

Variables	Freq. (N=212)	Percentage (%)
Gender		
Male	159	75.0
Female	53	25.0
Age(years)		
18-23	71	33.5
24-29	141	66.5
Level of education		
Up to Secondary	134	63.2
Up to tertiary	78	36.8
Duration of experience		
1 year	119	56.1
More than 1 years	93	43.9

4.2 Level of Compliance with safe practices among pump attendants in petrol stations in Kaduna

Sixty-one respondents (28.8%) reported hazard at the pump in order to prevent accidents in future. Sixty respondents (28.3%) record accidents and near-miss at the pump for risk assessment. One hundred and sixty-three respondents (76.7%) used

portable fire extinguisher. One hundred and two respondents (48.1%) used spill kits (sandbox) in an event of a spill at dispensing area to prevent chemical hazards. One hundred and sixty-five respondents (77.8%) wore personal protective equipment all the time to ensure safety at the pump (Table 4.2)

Table 4.2: Compliance with safe practices at the pump

Variables	Frequency	(%)
Reporting of hazards		
Yes	61	28.8
No	151	71.2
Total	212	100
Recording accidents and near-miss at the pump for risk assessment		
Yes	60	28.3
No	152	71.7
Total	212	100
Use of the portable fire extinguishers appropriately in order to reduce the chances of fire or an explosion		
Yes	163	76.9
No	49	23.1
Total	212	100
Use of spill kits (sandbox) in an event of a spill at the dispensing area to prevent chemical hazards		
Yes	102	48.1
No	110	51.9
Total	212	100
wearing of personal protective equipment at all times to ensure my safety at the pump		
Yes	165	77.8
No	47	22.2
Total	212	100

4.3 Knowledge on Safe practices among pump attendants in petrol stations in Kaduna

Two hundred and eight respondents (98%) revealed that they are familiar with workplace safe practice. One hundred and ninety-five respondents (92%) are familiar with the use of protective clothing and equipment. Only eighty-two respondents (38.7%) are familiar with reporting hazard. Also, only seventy-seven respondents (36.3%) knew how to record accidents and the near miss. Two hundred and ten respondents (99.1%) were familiar with the use of fire extinguisher. One hundred and

thirty-seven (64.6%) of the respondents are familiar with the use of spill kit as safe practice at the pump. One hundred and thirty-three respondents (63%) had undergone training prior to working at the pump.

Table 4.3: Level of knowledge on safe practices among pump attendants in petrol stations in Kaduna

Basic Information	Yes	(%)	No	(%)
Familiarity with workplace safe practice	208	98.0	4	2.0
Use of protective clothing and equipment (gloves, safety boot, coveralls, special uniforms, etc)	195	92.0	17	8.0
Reporting of potential hazards	82	38.7	130	61.3
Recording of accidents and near-miss	77	36.7	135	63.7
Appropriate use of fire extinguishers in case of a fire	210	99.1	2	0.9
Prompt use of spill kits (sandbox)	137	64.6	75	35.4
Having any form of safety training prior to working at the pump	133	63.0	79	37.0

4.4 Attitudes towards compliance with safe practice among pump attendant in petrol stations in Kaduna

One hundred and fifty respondents (70.8%) agreed with the statement that, recording of accidents at the pump is important for risk assessment; nineteen respondents (29.2%) disagree with this statement. One hundred and sixty-one respondents (76.0%) agreed that, reporting hazards at the pump will prevent the future accident. Fifty-one respondents (24.0%) disagreed with this statement. Two hundred and seven respondents (97.7%) agreed that the appropriate use of portable fire extinguisher reduces the chance of fire and explosions at the pump while five respondents (2.3%) disagreed with this statement. One hundred and seventy-seven respondents (83.5%) agreed that, using spill kits (sandbox) when fuel spill at the dispensing area prevents hazards. Thirty-five respondents (16.5%) disagreed with the opinion. Two hundred and

four respondents (96.2%) agreed that wearing of personal protective equipment at all times ensures their safety at the pump; eight respondents (3.8%) disagreed with the opinion, Table 4.4.

Table 4.4: Respondent attitude toward compliance with safe practices among pump attendants in petrol stations in Kaduna

Variables	Frequency	Percentage (%)
Recording of accidents at the pump is important for risk assessment		
Agree	150	70.8
Disagree	62	29.2
Total	212	100
Reporting hazards at the pump prevent the occurrence of accidents in the future		
Agree	161	76.0
Disagree	51	24.0
Total	212	100
Making use of the portable fire extinguisher appropriately will reduce the chances of fire and explosions at the pump		
Agree	207	97.7
Disagree	5	2.3
Total	212	100
Utilizing spill kits (sandbox) when petrol spill at the dispensing area prevents hazards		
Agree	177	83.5
Disagree	35	16.5
Total	212	100
Wearing personal protective equipment at all times will ensure my safety at the pump		
Agree	204	96.2
Disagree	8	3.8
Total	212	100

4.5 Inferential analysis

Pearson chi-square test was conducted for study variable, for gender and level of education was ($\chi^2 = 3.11, p = 0.078$) therefore there is no significant relationship between gender and compliance with safe practice among pump attendants in Kaduna. Pearson chi-square value for age and compliance was ($\chi^2 = 7.24, p = 0.007$) this shows that there is a significant association between age and level of compliance with

safe practice. Pearson chi-square test of the association between level of education and compliance was ($\chi^2 = 49.30, p = 0.001$), hence, there is a significant association between the level of education and level of compliance with safe practice among pump attendants in Kaduna. Pearson chi-square test of the association between work experience and level of compliance was ($\chi^2 = 10.40, p = 0.001$) hence there is a significant relationship between work experience and level of compliance with safe practice among pump attendants in Kaduna. Pearson chi-square test of the association between level of knowledge and level of compliance was ($\chi^2 = 13.63, p = 0.001$), hence, there is a significant relationship between level of knowledge and level of compliance with safe practice among pump attendants in Kaduna. Pearson chi-square test of the association between attitude and level of compliance was ($\chi^2 = 9.93, p = 0.002$), hence, there is a significant relationship between attitude and level of compliance with safe practice among pump attendants in Kaduna (Table 4.5).

Table 4.5: Test of association

		Practice		Total	χ^2	Df	p-Value
		No	Yes				
Gender	Male	86	73	159	3.11	1	0.078
	Female	36	17	53			
Age	18-23	50	21	71	7.24	1	0.007
	24-29	72	69	141			
Level of education	Up to Secondary	94	40	134	23.67	1	0.001
	Tertiary	28	50	78			
Work experience	0-12	80	39	119	10.40	1	0.001
	≥ 12 years	42	51	93			
Knowledge	Poor	17	0	17	13.63	1	0.001
	Good	105	90	195			
Attitude	Negative	21	3	24	9.93	1	0.002
	Positive	101	87	188			

4.5.1 Magnitude of association: Bivariate Analysis

Unadjusted odds ratio for each of the study variable was also computed to find out the magnitude and direction of association between study variables. Results in table 4.6 below show that age, level of education, work experience, and attitude were significantly associated with of compliance with safe practice among pump attendants.

Table 4.6: Measures of association at bivariate analysis

	Unadjusted Odds Ratio	95%CI		<i>p</i> – Value
		Lower	Upper	
Age	2.282	1.243	4.188	0.007
Level of education	4.196	2.321	7.588	0.001
Work experience	2.491	1.423	4.359	0.001
Attitude	6.030	1.739	20.90	0.002

4.5.2 Magnitude of association: Multivariate Analysis

The researcher also seeks to find more solid relationship between the multiple variables and response variable in this study. This is in order to determine the best predictor of the relationship between dependent and independent variable, and whether variable A or variable B confound with this relationship. The advantage of this analysis is to give a more realistic picture into which the study variable presents as most significant in this study. From the table below, we can see from the adjusted odds ratio that the factor that best associates with compliance with safe practice in this study is level of education (3.331), work experience (1.905) and attitude (5.216), table 4.7

Table 4.7: Magnitude of association at multivariate analysis

	Adjusted Odds Ratio	95%CI		<i>p</i> – Value
		Lower	Upper	
Level of education	3.331	1.771	6.264	0.000
Work experience	1.905	1.028	3.529	0.040
Attitude	5.216	1.458	18.665	0.011

CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Discussion

The result of the study shows that the majority (75%) of the respondents are men. This is similar to a study conducted in Minna, where the findings showed that a majority (82%) of filling station pump attendants are men (Ahmed *et al.*, 2014). It is clear that most men perform risky tasks which expose them to harmful petroleum substances and other risk duties performed at the petrol station, therefore, men may be in great danger of facing safety issues at the filling station, compared to women who are fewer in number.

The results of the study also show that the majority (66.5%) of the respondents are between the ages of 24-29 years. This finding is similar to a study conducted by Afolabi *et al.* (2011) which shows the median age of respondents to be 24 years. This could mean that workers, especially young adults are susceptible to safety and health hazards at workplaces because of their little experiences in facing danger at the workplace endanger their safety and health at the workplace.

The study considered the level of education of pump attendants and according to Neema (2013), individual level of education is a crucial element in determining an individual's perception of occupational safety and health. People with high levels of education have a good chance to secure their health and safety at workplaces. This means that higher educational attainment of pump attendants is associated with significant improvement in pump attendant's working conditions including securing his or her personal safety and health at the workplace. Findings from this study show that (63.2%) respondents had completed their education up to secondary school. This finding corroborates with

a study done in Brazil that shows 119 (67.4%) pump attendants have completed their education up to secondary school (Marta *et al.*, 2014). Level of education is directly proportional with acquisition of skills necessary to achieve higher social status and in making healthy lifestyle choices. That is, education serves to create awareness regarding issues of safety which has coincided with the findings of this study which shows that pump attendants with a higher level of education had more knowledge on occupational safety.

Results from this study also show that 119 (56.1 %) of the respondents had worked at the petrol filling station for at least one year and thus, respondents were more experienced on how occupational safety and health issues are handled in petrol stations.

5.1.1 Level of Compliance with safe practices among pump attendants in petrol stations in Kaduna

With regard to compliance with safe practices, a large proportion (82.5%) of the respondents had a high level of compliance with the use of portable fire extinguisher in case of fire outbreak at the pump. Also, high proportions (72%) of pump attendants were making use of personal protective equipment such as safety uniforms, although only special uniforms were used for protection. This is quite different from the recent study on gas attendants in Brazil, where Alves *et al.* (2017) reported that pump attendants in Riachão do Jacuibe had a 100% compliance rate in terms of the use of overall as PPEs at the filling station, and the workers highly regard the use of boots and apron as a protective measure against exposure to chemicals through skin contact (Alves *et al.*, 2017).

Similarly, the proportion of respondents that complied with reporting hazards at the pump was 28.8%. Recording of accidents and near miss also has a low percentage (28.3%) of compliance among respondents. Pump attendants are also not compliant

with the use of spill kits as findings showed the compliance rate to be (48.1%) Pump attendant's low capacity for compliance could be as a result of inadequate training on safe practice prior to employment, which is one of the issues reported by pump attendants in this study. Another reason could be due to ineffective law enforcement which promotes the lack of effectiveness on the part of the employers. This poor adoption of safety regulations is leading to inadequate knowledge and skills on safe practices. Although management reported that pump attendants are trained prior to employment, study respondents complained that the training did not cover some of the basic safe practices like the recording of accident, reporting of hazard, use of spill kits or appropriate use of PPE, which is why records show quite a low capacity for compliance with such measures. Achieving safety in the workplace requires strict compliance to rules and regulations. Thus, all employers must put in place appropriate frameworks to facilitate their compliance to rules regarding safety at the workplace but enforcing this can be challenging.

5.1.2 Knowledge on Safe practices among pump attendants in petrol stations in Kaduna

Knowledge of a concept is a critical basis for personal reflection regarding the necessity for the expected requirement (Neema, 2013). Understanding requires flexible thinking to achieve proficiency in a certain concept (Perkins and McGinnis, 1996). From the general information provided by the respondents on their understanding of safety practice, the study findings showed that pump attendants in petrol filling stations demonstrated poor understanding of safe practices such as reporting of accidents which has only 38.7% positive response and recording of potential hazards which has 36.7%. However, use of portable fire extinguisher has 99.1% positive response, likewise knowledge on use of spill kits (63.0%) and PPE (92.0%). This finding is similar to

results of a previous study by Afolabi *et al.* (2011) where 94% of pump attendants were aware of safety measures like the use of fire extinguishers.

Pump attendants also demonstrated their understanding of use of spill kit (sand box), results showed that 64.6% of the respondents are aware of the use of spill kits. This is a very much different from the result of a previous studies, where Afolabi *et al.* (2011) reported 18% of pump attendants had knowledge on safety measure such as the use of spill kit (sad box) at the filling station. It is safe that the majority of pump attendants who are having a good understanding of some of the safe practices need to be motivated in few areas such as in, reporting of hazards and recording of accidents and near-miss at the pump. This practice has been taken for granted by both managers and pump attendants.

5.1.3 Attitudes towards compliance with safe practice among pump attendant in the petrol stations

According to Damian, *et al.* (2008), a positive attitude towards compliance with safety legislation has been shown to increase productivity in industries by reducing accidents to a considerable rate. Attitude, which was categorized as positive and negative, demonstrated to be significantly associated with the compliance rate among respondents. Generally, the findings of this study show that pump attendants have a positive attitude towards safe practice such as the use of PPE (96.2%), Spill kits (83.5%), reporting of potential hazards (76.0%), recording of accidents and near miss (70.8%), and the use of fire extinguisher (97.7%) in the petrol filling station. This study shows that despite the unavailability of some safety equipment such as spill kits, fire extinguisher, and appropriate PPE as observed during data collection, workers at petrol filling stations acknowledge the importance of such safe practice. Also, management of some of the petrol filling stations revealed that, as it was easy for respondents to

admit that reporting of hazards and recording of accidents and near miss is effective in the prevention of disasters at the filling station, that was the same attitude they had towards knowledge, this means that with the right education and training, compliance rate can be better than it is.

5.1.4 Factors associated with compliance with safe practice

Pearson's chi-square analysis was conducted in order to investigate the association that exists between study variables. The statistical result indicates that knowledge $p = 0.001$, attitude $p = 0.002$, level of education $p = 0.001$ and work experience $p = 0.001$ were significantly associated with compliance with safe Practice. Gender and age of pump attendants was not associated with the compliance rate. It was also observed that the best predictor of compliance among pump attendants were level of education (AOR 3.331, CI 1.771-6.264), work experience (AOR 1.905, CI 1.028-3.529) and attitude (AOR 5.216, CI 1.458- 18.665).

5.2 Conclusion

The study concludes that pump attendants have a low capacity for compliance with safe practice at filling stations in Kaduna. Knowledge on safe practices among pump attendants in Kaduna was generally good, especially in terms of PPE usage (92%), fire extinguisher (99.1%), and the use of spill kits (64.6%). Majority of the pump attendants had a positive attitude towards compliance with safe practices at the pump. Based on the findings of the study, level of education, work experience and attitude have a positive influence on compliance with safe practices.

5.3 Recommendation

5.3.1 Recommendation from the study

Based on the findings of this study, compliance is greatly influenced by pump attendant's knowledge and attitude. This is why the researcher suggests that in order to boost compliance, health surveillance should be a top priority in all petrol filling stations. Also, Pump attendant should be encouraged and educated on the importance of reporting of hazards, recording of accidents and use of spill kits should be prioritized. Provision and use of appropriate PPE such as boots, hand gloves, a face mask should be made a mandatory measure based on DPR regulation. This is because many of the pump attendants think PPEs are the special uniforms they wear to work only. Management is also advised to provide adequate training of these pump attendants on the appropriate use of such PPEs, so as not to get exposure to harmful substance. Adequate spill kits should be provided at all dispensing pumps. Management should also ensure maintenance of the same, to ensure it is not used as a trash can, as observed during data collection. Fire extinguishers should be serviced at the appropriate time.

The study shows that pump attendant's education encouraged knowledge on safe practice. Hence, refresher training needs to take center stage in ensuring pump attendants have adequate understanding of safe practice. Officers should also ensure that pump attendants who have worked for longer periods get refresher training. Practices such as reporting of hazards and reporting of accidents should be emphasized during training and adopted by every employee and employer in all petrol stations in Kaduna should be made mandatory.

Since the attitude of pump attendants towards compliance with safe practices is critical in the adoption of safe practices. It is advised that trainings should be focused on influencing a positive attitude among pump attendants. Copies of training manual/

pamphlet are to be made available to workers, as this will serve as an encouragement to pump attendants in and out of duty.

In order to further boost the level of compliance with safe practices, the study also recommends that managers should not be influenced by their personal feeling or opinions when considering whom to hire to work as pump attendant. This is because the findings of this study show that pump attendants who have attained higher level of education and have more experience on the job do well in complying with safe practices at the pump. This high level of education of pump attendants undeniably explains why they are compliant with safe practice; this is because education has created a means for people to expand their knowledge as well as their understanding of the world and likewise important areas of the work environment. Occupational safety and health Officers should advocate health education of pump attendants. This can enhance the safety of pump attendants at filling stations across the country.

5.3.1 Recommendation for further studies

A larger study in future should find out the causes of poor enforcement in terms of safety practices, especially in regards to safety of workers, to know whether the problem is the law itself or the enforcers.

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APPENDICES**Appendix I: Consent Form**

Dear Respondent,

My name is Josephine Kakwi. I am a postgraduate student studying for the Master of Science degree in Occupational Health and Safety (MSc) Kenyatta University, Nairobi Kenya. Attached to this letter is a questionnaire that collects data on research titled "Evaluating compliance with safety practice among petrol station pump attendants in Kaduna South, Nigeria. I kindly request your assistance in the filling of this questionnaire.

You are requested to provide the required information. I assure you that any opinion and information obtained in regard to this study shall be treated with utmost confidentiality and shall be used only for the intended research and that no individual responses shall be reported.

Do you agree to participate in this study?

Yes []

No []

If yes,

Signature/Thumb.....Date.....

Appendix II: Questionnaire

Name/code of petrol station

Date of interview

Section 1: Demographic characteristics and socioeconomic factors

Kindly, fill all the questions either by ticking (√) in the boxes or writing in the spaces provided.

1. Age? please specify _____
2. Gender/ Sex 1.Male [] 2. Female [] 3. Other [] please specify

3. How long have you been working as a pump attendant? please specify

4. Indicate your highest level of education 1. Primary school [] 2.Secondary []
3.Diploma [] 4. Degree [] 5. Other [] please specify _____
5. How many hours do you work each day? please specify _____

Section 2: Knowledge on Safe Practice

Kindly respond to all the following questions by ticking (√) boxes or writing in the space provided.

6. Are you familiar with workplace safety practice? (a) Yes [] (b) No []
Which of these practices will ensure workers Health and Safety?
7. Use of protective clothing and equipment (gloves, safety boot, coveralls, special uniforms, etc)? (a) Yes [] (b) No []
8. Reporting of potential hazards? (a) Yes [] (b) No []
9. Recording of accidents and near-miss? (a) Yes [] (b) No []
10. Appropriate use of fire extinguishers in case of a fire? (a) Yes [] (b) No []

11. Prompt use of spill kits (sand box) in an event of a fuel spill? (a) Yes [] (b)

No []

12. Others, please state _____

13. Did you under go any form of safety training prior to working at the pump?

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

Section 3: Attitude towards compliance with safe practice

The statements below aim to evaluate one's attitude toward a particular safe practice. Kindly respond to all the following statements by ticking (√) boxes

		YES	NO
15	complying with routine and non-routine Safe practices at the pump will help safeguard my health and that of my colleagues at the pump		
16	Recording accidents at the pump are important for risk assessment		
17	I believe reporting hazards at the pump prevent accidents in future		
18	Making use of the portable fire extinguisher appropriately will reduce the chances of fire and explosions at the pump		
19	Utilizing spill kits (sandbox) when fuel spill at the dispensing area prevents hazards		
20	Wearing personal protective equipment at all times will ensure my safety at the pump		

Section 4: Compliance with safe practices

The table below contains some common non-routine and routine safety practices, I will like you to tick (√) whether you SA (strongly agree) A (Agree) D (Disagree) SD (strongly disagree) or not sure with this statement.

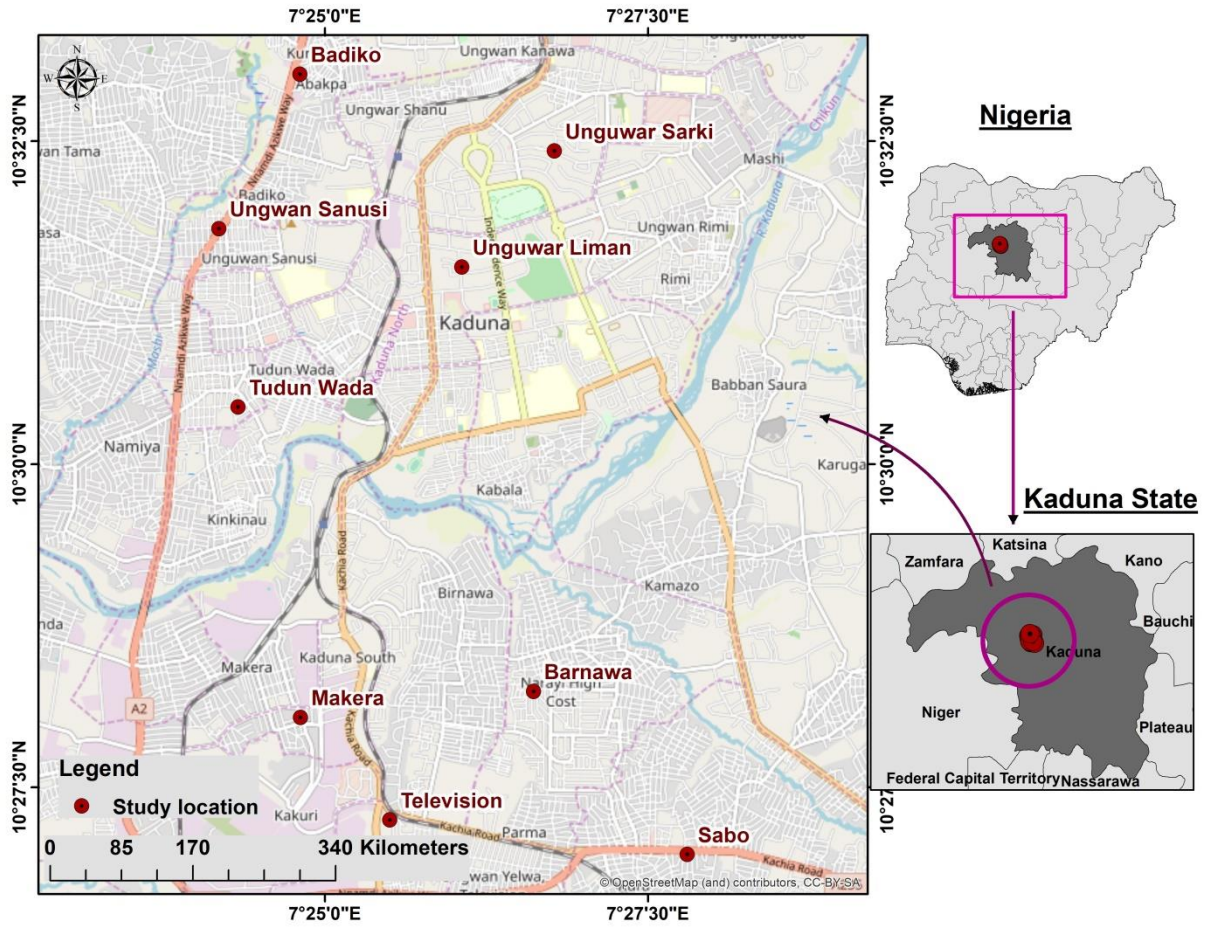
		YES	NO
21	I comply with routine and non-routine Safe practices at the pump to safeguard my health and that of my colleagues at the workplace		
22	I always record accidents and near-miss at the pump for risk assessment		
23	I Report Hazard at the pump in order to prevent accidents in future		
24	I make use of the fire extinguishers appropriately in order to reduce the chances of fire or an explosion		
25	I employ the use of spill kits (sandbox) in an event of a spill at the dispensing area to prevent chemical hazards		
26	I wear personal protective equipment at all times to ensure my safety at the pump		

Appendix III: Service Station Operator's Checklist

Location: Date:/...../.....

	Prompting question	Yes/No	Comment
1	FIRE EXTINGUISHERS: Are they clearly visible?		
	A minimum of 2 x 9 kg ABE (powder) type extinguishers must be available in the dispensing area.		
	Is the fire extinguisher charged and ready for use? The needle in the pressure gauge of all fire extinguishers is in the green area.		
	A yellow maintenance tag is attached and embossed with a date mark of the last inspection which is within the previous 6 months?		
2	SPILL KIT: Is there a spill kit easily accessible to the dispensing area?		
	Does the spill kit contain as a minimum, several kilograms of absorbent material, a shovel a broom and a container to collect waste material for ready-to-go use?		
	Ensure it has not been used as a rubbish bin- clear any extraneous material.		
	Where site-specific spill containment equipment is made available such as drain covers, are they in good condition and accessible?		
3	PPE: are pump attendants having any protective equipment on?		
	Hand protection? e.g gloves,		
	Respiratory protection? e.g nose mask		
	Body protection? e.g apron, special uniforms with long sleeves		
	Foot protection? e.g Boots		

Appendix IV: Map Showing Locations of Petrol Stations in Kaduna South



Appendix V: Approval of Research Proposal



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Website: www.ku.ac.ke

Internal Memo

FROM: Dean, Graduate School

DATE: 6th November, 2018

TO: Josephine Daniel Kakwi
C/o Environmental and Occupational
Health Department.

REF: Q22F/CTY/PT/38391/2016

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

=====
This is to inform you that Graduate School Board, at its meeting of 11th October, 2018, approved your Research Proposal for the M.P.H. Degree entitled "Compliance with Safe Practices among Petrol Station Pump Attendants in Kaduna State, Nigeria".

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

JULIA GITU
FOR: DEAN, GRADUATE SCHOOL

CC. Chairman, Environmental and Occupational Health Department

Supervisors:

1. Dr. Anthony Wanjohi
Department of Environmental and Occupational Health
Kenyatta University
2. Dr. Rosebella Iseme
Department of Population, Reproductive Health and Community Resource Management
Kenyatta University

JG/rwm

Appendix VI: Research Authorization Letter**KENYATTA UNIVERSITY
GRADUATE SCHOOL**E-mail: dean-graduate@ku.ac.keWebsite: www.ku.ac.keP.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: Q22F/CTY/PT/38391/2016

DATE: 6th November, 2018

Director General,
National Commission for Science, Technology
& Innovation
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR JOSEPHINE DANIEL KAKWI – REG. NO. Q22F/CTY/PT/38391/2016

I write to introduce Ms. Josephine Daniel Kakwi who is a Postgraduate Student of this University. She is registered for M.P.H degree programme in the Department of Environmental and Occupational Health.

Ms. Kakwi intends to conduct research for an M.P.H Proposal entitled, “Compliance with Safe Practices among Petrol Station Pump Attendants in Kaduna State, Nigeria”.

Any assistance given will be highly appreciated.

Yours faithfully,


PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

Appendix VII: Letter of Introduction**MINISTRY OF PETROLEUM RESOURCES****DEPARTMENT OF PETROLEUM RESOURCES**

24, GOBARAU ROAD, G.R.A, KADUNA

P.M.B. No:.....

Telephone:.....

Website: www.dpr.gov.ng



Ref. No: DPR/KD/ROM/M/2019/14

Date: 8th November, 2018

The Chairman,
IPMAN Kaduna,
NNPC/PPMC Depot,
Kaduna State.

Dear Sir,

LETTER OF INTRODUCTION: JOSEPHINE KAKWI DANIEL Q22F/CTY/PT/38391/2016

The above subject matter refers.

Miss. Josephine Daniel Kakwi is a Master's student of Kenyatta University currently carrying out a research study on Petrol Filling Station, kindly assist by way of making information available for her to aid her research work on "Compliance with safe practices among station pump attendants in Kaduna State".

However, be informed that her scope of work at the petrol stations is limited to data gathering and, nothing more.

Accept the esteem regards of the Department.

Yours faithfully,

FOR: Department of Petroleum Resources,

A handwritten signature in blue ink, appearing to read 'A. Hiyasa', written over a horizontal line.

A. Hiyasa

For: Zonal Operations Controller