Occupational health hazards among petrol station workers in Ibadan, Oyo State. Nigeria

Abstract

When a consumer comes to the gas station to buy fuel, the attendants are their initial point of contact. Petrol station employees deal with a variety of risks and health issues on the job. This study was carried out to ascertain the health risks, occupational safety practices, and health issues among gas station workers in Ibadan, Oyo State. Africa

This intervention study was conducted with all willing attendants that operate at Ibadan's filling stations. A semi-structured interviewer-administered English-language questionnaire was used to gather data. STATA 12.1 software was used for data analysis after structured interviewer-administered questionnaires were used to gather data. Both descriptive and inferential statistics were used in the analysis. A 5% threshold for significance was used.

The study involved 620 respondents in total for both genders, the mean age of the responders was 29.4 ± 4.6 years. The inhalation of petrol fumes, customer confrontation, and noise exposure were among the hazards that were reported. Dust-related chronic cough; heat stress that frequently leads to heat exhaustion and heat stroke; hearing loss; hypertension from excessive equipment noise; back and general body ache from bending over repeatedly at work; robbery; fire; harsh weather; and exhaust fume incidence. Health problems reported included headache, blurry vision, vomiting, drowsiness, vertigo, heartburn, slurred speech, weakness, staggering, facial flushing, itching, loss of consciousness, heart failure, convulsion, irritability, memory loss, nausea, tremor, involuntary eye movement, cough, muscle spasms, hallucination, altered vision, insomnia, poor appetite and stomach upsetfactor associated with health problem.The results, which have a p-value of 0.29, demonstrate that there is no meaningful correlation between occupational safety practices and health issues. Occupation-related health hazards, work

environment, and health problems are significantly correlated, with p-values of less than 0.01. Additionally, there is no significant correlation (p-value of 0.12), between understanding of safety procedures and health issues.

In conclusion, the study found that attendants at fiilling stations were subjected to a variety of risks and health issues. Poor hand washing techniques, first aid box availability, PPE awareness and use, and medical assessment procedures were all present. The Independent Petroleum Marketers Association and other relevant parties should endeavor to guarantee that filling station owners assume accountability for the well-being and security of their employees.

Keywords: Petrol station workers; Occupational hazards; Health problems; Safety practices; Ibadan, Nigeria

1. INTRODUCTION

Due to inadequate medical examination procedures, hand washing protocols, first aid box availability, and awareness of personal protective equipment (PPE), petrol station attendants face a number of risks and health issues while on the job. The Independent Petroleum Marketers Association and other relevant parties need to endeavor to guarantee that filling station owners assume accountability for the well-being and security of their employees[1]. Petrol pump filling workers face severe health hazards as a result of their working conditions, hence immediate protective measures are needed. Implementing safety measures properly requires a medical check as well as appropriate training. In this study, workers at petrol pumps were subjected to a range of occupational risks and health issues. There were inadequate hand washing practices, first aid box availability, medical evaluation procedures, and education regarding occupational health dangers and the usage of personal protective equipment (PPE). To guarantee that filling station owners accept accountability for the health and safety of their employees, the Independent Petroleum Marketers Association and other relevant parties should work

together[2].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"[3]."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"[3,4].

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[5]. 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 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[5,6]. 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[6]. "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"[7]. 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' behaviour are what make up the work environment and later influences how the worker's safety is either favourably or unfavourably[8].

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 inspection and enforcement, industry adherence to management systems and self-regulation, or all three[8]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%)"[9].

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., TotalEnergiesGaz&Electricité Holdings, and Eni International 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–IkotAbasi Pipeline (forming the Eastern Network) are Nigeria's principal networks for the transportation of natural gas via pipelines"[9].

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[9]. 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[11].

"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"[12]. "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"[7].

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

1.1 Main Objective

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.

1.2 Specific Objectives

The specific objectives are to;

i. establish occupational health and safety practices evident in petrol stations.
ii. document factors that influence occupational health and safety practices in the selected petrol stations.
iii. assess the existing safety policies and regulations for petrol stations and
iv. document health risk and safety management systems in place in the selected petrol stations and determine if they comply with existing safety regulations

1.3 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?

2. MATERIALS AND METHODS

2.1 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 Yoruba, as well as various communities from other parts of the country.

2.2 Target population

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, 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 (130) 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.

2.3 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 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 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: National Population Commission (2006)

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.

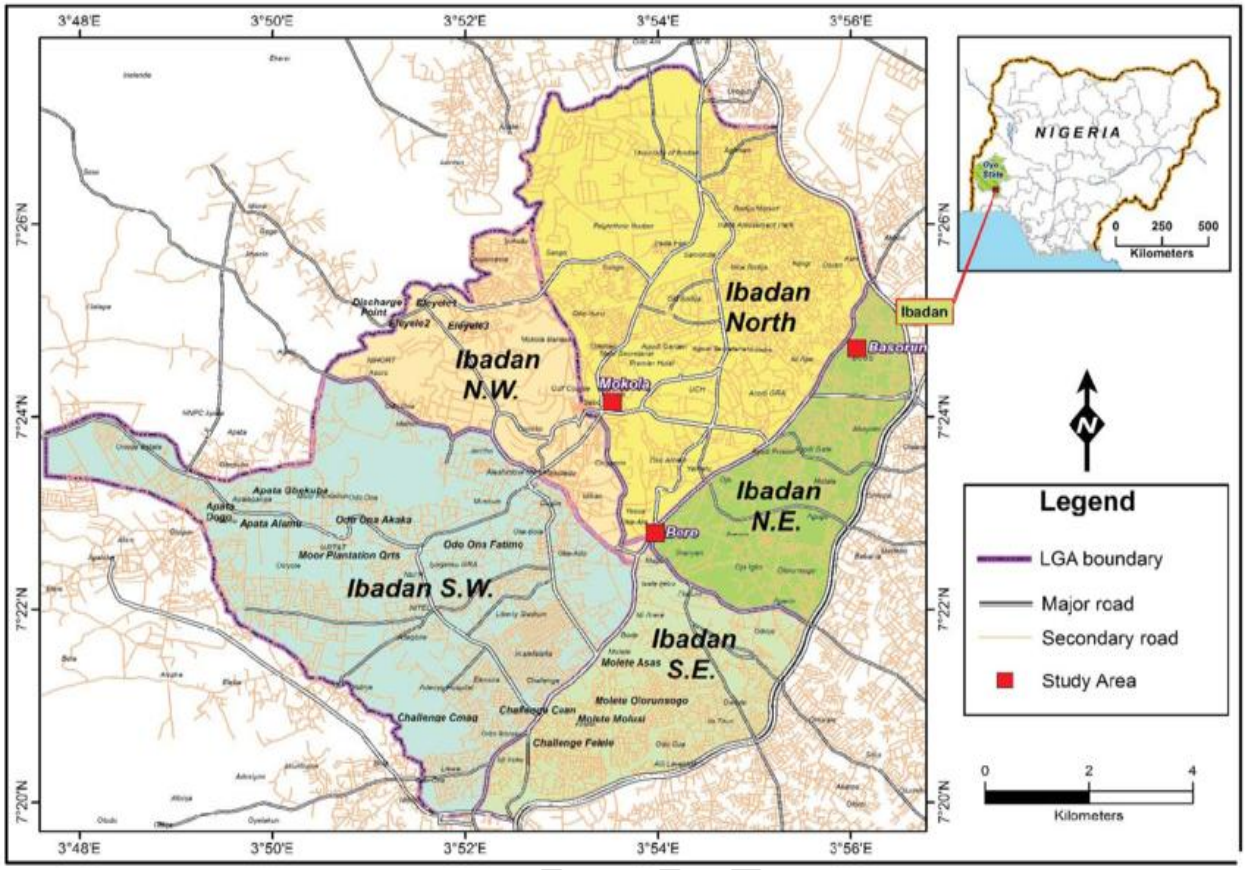

Fig 1: Map of Ibadan

2.4 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. This is supported by Morris, (2015) who stated that "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". 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

six hundred and fifty (650) consecutive petrol attendants. Therefore, 650 petrol station attendants were recruited for the study.

2.5 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.

2.6 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 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.

3.0 Results and Discussion

3.1 Background Characteristics of the Respondents

Table 2 shows the background characteristics of the respondent. Majority () of the respondents are male while only 37.1% are females. Respondents aged <20 years had highest percentage (28.4%) while only 1.3% were 50 years and above. Majority (60.6%) of the respondents were

single while 39.4% are married. Almost half (48.9%) of the respondents had JSS3 education while only 4.2% had OND education. The study shows that 47.7% of the respondent are practicing Christianity, 47.4% are practicing Islam while only 4.8 are traditionalist. Majority of the respondents earn above 20,000 per month, while 26.9% respondent earns less than 20,000 per month. 43.1% of the respondents have 6-10 years of experience while only 27.1% had above 10years of experience. The result shows that 54.2% of the respondents said they had training as petrol attendant; while only 45.8% said they did not have any training as a petrol attendant. Majority of the respondents works 2-3 days in a week, while only 45.2% works 4-5 days in a week. It is also shown from the result that majority of the respondents are working as attendant while only few works in fuel cars only.

Table 2: Background Characteristics of the Respondent

Variables	Frequency	Percent
Sex		
Male	390	62.9
Female	230	37.1
Age		
<20	176	28.4
20-29	125	20.2
30-39	167	26.9
40-49	144	23.2
50 and above	8	1.3
Marital status		
Single	376	60.6
Married	244	39.4

Level of education		
Primary education	178	28.7
JSS3	303	48.9
SS3	84	13.5
OND	26	4.2
HND /BS.c	29	4.7
Religion		
Christian	296	47.7
Muslim	294	47.4
Traditionalist	30	4.8
Monthly allowance		
Less than N 20,000	167	26.9
Above N 20,000	265	42.7
Range N 20,000- N 30,000	188	30.3
Number of years you have been working in filling station		
1-5 years	185	29.8
6-10 years	267	43.1
Above 10 years	168	27.1
Did you have any training as petrol attendant		
Yes	336	54.2
No	284	45.8

How many day did you work in a week		
2-3days	340	54.8
4- 5days	280	45.2
Work category of petrol station worker		
Attendant	241	38.9
Lubrication	152	24.5
Lane Manager	76	12.3
Cashier and Fuel Cars	48	7.7
Fuel cars only	20	3.2
administrative assistant and general services	83	13.4

Table 3: Percentage Distribution of Health Problem among Petrol Station Workers

Variables	**Yes**	**No**
Headache	446(71.9%)	174(28.1%)
Blurry vision	373(60.2%)	247(39.8%)
Vomiting	387(62.4%)	233(37.6%)
Drowsiness	376(60.6%)	244(39.4%)
Vertigo	483(77.9%)	137(22.1%)
Heartburn	308(49.7%)	312(50.3%)
Slurred Speech	475(76.6%)	145(23.4%)

Weakness	565(91.1%)	55(8.9%)
Staggering	349(56.3%)	271(43.7%)
Facial flushing	463(74.7%)	157(25.3%)
Itching	478(77.1%)	142(22.9%)
Loss of consciousness	376(60.6%)	244(39.4%)
Heart failure	352(56.8%)	268(43.2%)
Convulsion	392(63.2%)	228(36.8%)
Irritability	472(76.1%)	148(23.9%)
Memory loss	268(43.2%)	352(56.8%)
Nausea	549(88.5%)	71(11.5%)
Tremor	375(60.5%)	245(39.5%)
Involuntary eye movement	418(67.4%)	202(32.6%)
Cough	562(90.6%)	58(9.4%)
Muscle spasms	434(70.0%)	186(30.0%)
Hallucination	377(60.8%)	243(39.2%)
Altered vision	264(42.6%)	356(57.4%)
Insomnia	155(25.0%)	465(75.0%)
Poor appetite	174(28.1%)	446(71.9%)
Stomach upset	489(78.9%)	131(21.1%)

Figure 2. shows the percentage distribution of health problem, only 20.60% of the respondents have low health problem

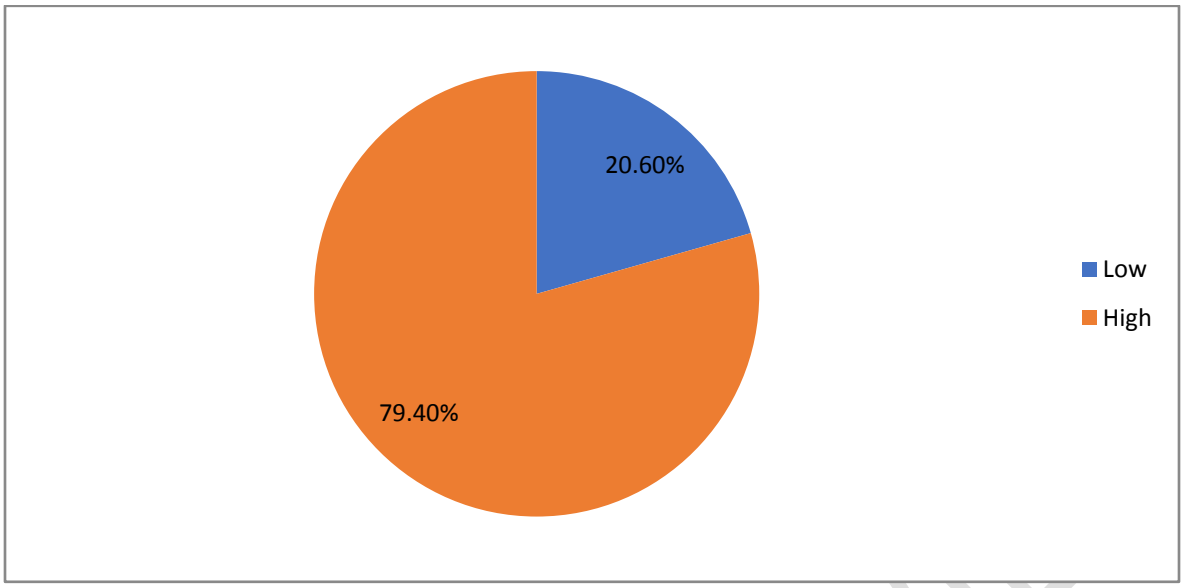

Figure 2: Percentage Distribution of Health Problem

4.0: Summary of Findings

The major findings of this study are summarily presented below:

1. The study showed that the petrol station attendants experienced various health problems since commencement of work as petrol station attendants.
2. The finding of the study showed that there was a statistically significant association between having headache, nausea, itching, irritability, cough poor appetite, stomach upset and the inhalation of petrol fume.

5.0 Conclusion

The study established that petrol station worker's attendants in this study were exposed to various hazards and health problems. Awareness and use of PPE, hand washing practices, availability of first aid boxes and conducting of medical examinations were all poor. Efforts should be made by the independent petroleum marketers association and other stakeholders to ensure that the owners of filling stations take responsibility for the health and safety of their workers. Petrol station workers were exposed to various health problems. Use of PPE was lacking and no periodic medical examinations were carried out for the workers. The risk factors

associated with adverse health symptoms, included no prior health and safety training and eating food during working hours close to the fuel dispensing areas. These risky behaviors need to be mitigated.

The results of this study indicate that there was a significant relation regarding worker's knowledge and their occupational exposure to health hazards.

6.0 Recommendations

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

1. Petrol station owners should conduct health risk assessments in their petrol stations.
2. Petrol station owners should make sure that health regulations are implemented, with employees being provided biennial medical surveillance programme.
3. There should be more stringent hierarchy of control measures in place that include provision of personal protective equipment.
4. 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 worker's health and safety.

7.0 Contribution to the Knowledge

The review of literature showed that there is paucity of empirical study on occupational hazards, health problem and safety practices among petrol station worker in Nigeria. As a result, this study has added the following to knowledge:

1. First, the outcome of this study has indicated that, there was high level of awareness of use of PPE among petrol station workers, in addition, the study observed that "No smoking" safety sign was strictly observed by all Staff and clients while "switch off phone" safety sign was hardly observed as use of mobile phones at the forecourt was a common practice nearly to all the petrol stations.

2. Furthermore, empirical results from the study has proven that workers had low to moderate knowledge on health effects, also had advance knowledge on health risks associated with petroleum products.
3. Petrol station attendants were of the perception that some of the safety rules including warning sign “No mobile phones”, “Turn off engine while refueling” and “use of recommended containers” was hard to practice.
4. Fuel splash on the skin was reported to be the most frequent accident incidence. But the biggest contributing factors to major accidents in petrol station are the ignorance and carelessness of petrol station staff.

8.0 Suggested areas for further research

Assessment of health status of petrol workers should be further investigated

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