

ASSESSMENT OF SAFETY OPERATIONS AMONG OIL AND GAS WORKERS IN RIVERS STATE, NIGERIA

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ABSTRACT

This study on Assessment of Safety Operations among Industrial Workers in Rivers State has general objective which is to assess the safety operations among oil and gas workers in Rivers State, Nigeria. The descriptive study design was used in this survey study. There are about 162, 000 industrial workers in Rivers State while the population size was 400 workers. The simple random sampling technique was used to select the companies from the three senatorial districts of Rivers State, Nigeria. The companies were listed on ballot papers and four (4) companies were randomly selected from the three senatorial districts. The simple random and systematic sampling techniques were used to select the workers in their respective companies. The first workers from the selected companies were randomly selected by the position of their respective department, while the subsequent workers were systematically selected after every 2 workers were assessed. The descriptive statistical method was used in the statistical analysis. Mean and standard deviation analysis methods were used to assess each of the specific objectives. The data obtained from the study questionnaire were analysed using IBM –SPSS statistics version 22.0 package. Findings from the socio- demographic characteristics of study shows that most of the workers were above 30 years of age and mostly dominated by 258 (64.5%) males while 218 (54.5%) of the workers attained tertiary education. The response question “safety operations among workers in oil and gas industries in Rivers State’ showed a grand mean of 3.47, which implies that workers in the oil and gas industries in Rivers State carry out operations in the industry safely. The potential sources of industrial accidents and injuries showed a grand mean of 3.47 which implies that there is a significant association between levels of knowledge of workers and sources of accidents in the oil and gas industries. Sources of hazards in oil and gas industries in Rivers State include: explosion, fire, chemical exposure, electrocution, rig collapse and complication. The causes of industrial accidents in oil and gas industries in Rivers State showed a grand mean of 3.54 which is significant and include spill of synthetic – based drilling fluid, blowout and fire and equipment failure and negligence of safety rules while working in the industry. From the study Strategies adopted by workers and management to prevent accidents and injuries in oil and gas industries showed a grand mean of 3.39, which implies that the workers and management in oil and gas industries in Rivers State have adopted strategies to prevent accidents and injuries. Based on the findings of this study, it is concluded that workers in the oil and gas industry in Rivers State carry out their work safely. Therefore, it is recommended that there should be mandatory safety briefing by the Health, Safety and Environment Officers of the safety department to workers before each day’s work. There should be constant monitoring by Department of Petroleum Resources to ensure that all safety rules are followed.

Keywords: Safety Operations, Oil and Gas Industries, accidents and injuries, explosion, fire, Synthetic – base drilling spill, chemical exposure, safety strategies.

Introduction

Background to the Study

Safety operations among industrial workers describe the implementation of safety goals, and all the policies of the industries which ensure that management of industries provide workers with a safe work environment. The work environment of oil and gas industry could likely be faced with accelerating changes in technology, economic and social developments which could be changing the operational procedures and the daily life of industrial workers who are exposed to a wide range of hazards.

According to Astrumba, Ohazu, Abut and Amine (2013), loss of working hours, low productivity and loss of human and material resources due to negligence of safety and industrial safety education programme have become causes of problems in manufacturing industries. Conducive working environment greatly reduces potential sources of industrial accidents as stated by Astrumba *et al.* (2013). Safety is therefore the state of being safe, the conduction of protection against physical, social, spiritual, financial damage, error, accidents, harm or any other event that could be considered non – desirable. Furthermore safety as described by Michael (2016) means being protected from anything that is likely to cause danger, risk and injury to personnel or damage to property. Safety also means a complete understanding of work and fully understanding every step that must be taken to achieve the task safely. It means realizing that mistakes could be costly to workers, the company. He further stated that Safety means good judgment, never relying on luck and being prepared to cope with unexpected situations. Safety means being alert when carrying out even routine tasks.

The assessment of safety operations among industrial workers evaluates how safe the industrial workers perform their work in the work environment. This entails the implementation of policies that would provide industrial workers with safe work environment, construct routine/regular work place inspection, provide Personal Protective Equipment, develop and implement safety work procedures and rules.

According to Segun and Yahaya (2010), mill workers suffer the highest injury rate of 83% while moving logs to mill from log yard or stack. They further reported that injuries occurring to body area of saw mill industrial workers include: upper limb injuries (Neck and head, arm, wrist, hand and shoulder) 68%, back and lower back injuries 58%, and less prominent lower limb (Legs, knees and ankle) injuries at 13%.

Kelly (2016) stated in 2014, the U.S. Occupational Safety and Health Administration reported the Oil & Gas fatality rate was seven times greater than the rate for all U.S. industries. The Centers for Disease Control and Prevention (2015) reported that “during 2003–2013, the number of work-related fatalities in the oil and gas extraction industry increased to 27.6%, with a total of 1,189 deaths.”

Canadian Association of Petroleum Producers (2017) also reported that the “petroleum industry in Canada experienced eight fatalities in 2013, with four more fatalities than in 2012, in spite of the overall decline in injury frequency.” The International Labour Organization

(2015) also reported that “the challenge for the oil and gas industry was the ability to quickly and effectively respond to potential vast and serious incidents.”

According to Kelly (2016), the seven incidents that should not be overlooked in the oil and gas industry were: vehicle accidents, struck-by, caught-in & caught-between, explosions and fires; falls, confined spaces, chemical exposures and working in remote locations. Many organizations still use outdated check-in procedures to ensure the ongoing safety of employees. The use of this antiquated approach has proven that it is not capable of responding fast enough, in real time and to make a difference for lone workers. There is a need to provide technology that improves emergency response times in industries. Kelly (2016) further stated that the adoption of a safety monitoring program that incorporates active monitoring outweighs manual check-in processes or spot-checks and greatly improves the industries’ ability to respond to safety incidents at any moment. Therefore, the use of automatic detection technology can likely improve the outcome for any worker who has suffered a workplace injury, health event or physical assault during the harsh seasons and cannot call for help (Kelly, 2016).

The ILO’s international labour standards provide the minimum legal framework for promoting Occupational Safety and Health (OSH). The ILO Constitution sets forth the principle that workers should be protected from sickness, disease and injury arising from their employment. The ILO’s instruments on OSH promote tripartite collective efforts by governments, employers and workers to build, implement and continuously strengthen a preventative safety and health culture. Tripartism is a key component for effective OSH regimes in the oil and gas industry (International Labour Organization, 2015).

The International Organization for Standardization (ISO) provides universal voluntary industrial standards (Jain, 2010). The ISO also sets universal voluntary industrial standards for the oil and gas industry. ILO standards on OSH provide essential tools for governments, employers and workers to establish such practices and to provide for maximum safety and health at work. The driving force behind ILO work in the area of OSH is the instruments that specifically regulate the main principles for managing or preventing exposure to occupational hazards and the associated means and methods for achieving this.

Atsumbe, *et al.*, (2013) lamented that loss of working hours, low productivity and the loss of human and material resources due to negligence of safety and industrial safety education programme have become an incessant problem in manufacturing industries and these accidents have really affected the wellbeing of workers. Lots of accidents and injuries that occur in industries may likely occur because of lack of safety awareness.

Strict adherence to standard operational and application of safety education programme in the industry are likely very essential components which cannot just be ignored by workers in the industry but must be enforced to the fullest to prevent injuries to workers, loss of life and damage to materials, tools, equipment and machines. However, the likelihood of non - strict adherence to industrial safety has become a major challenge in the oil and gas industry of Nigeria and developing countries because of its effects on overall productivity and production cost.

There is a need to safeguard the health and wellbeing of industrial workers, industrial equipment property and the environment.

Statement of the Problem

The frequent occurrence of accidents and injuries such as construction fires, loss of limbs, ocular injuries and other hazards among industrial workers in Rivers State is of great concern to the society because these accidents and injuries are preventable but there is a likelihood that safety operational procedures and standards are not likely followed and implemented. The use of personal protective equipment may likely have been ignored. The recommended safety operational polices and standard for industrial workers should have being implemented. Hence the need to assess the knowledge of industrial workers as it concerns safety operations and the strategies adopted by workers to prevent the frequent occurrence of accidents and injuries among industrial workers in River State necessitates this study.

General Objective

The general objective of the study is to assess the safety operation among industrial workers in River State.

Specific Objectives

In order to achieve the general objective of this study, the specific objectives are:

1. To assess the safety operations in oil and gas industries in Rivers State.
2. To assess the potential sources and causes of industrial accidents and injuries among workers in the oil and gas industries in Rivers State.
3. To assess the levels of knowledge of workers in the specific hazards and health risks associated with safety operations in the oil and gas industries in Rivers State.
4. To assess the strategies adopted by the workers and management to prevent accidents and injuries in the oil and gas industries in Rivers State.

Materials and Methods

Study Design

This was a survey study which used the descriptive study design.

Land Area of Rivers State

The total area of the state was 11,077 km² and the density was 635.89 per km²

Study Population

According to National Bureau for Statistics (2015), total average workers in oil and gas industry is 68.3 million persons in Nigeria. However, there are no records of population of workers in the oil and gas industry in Rivers State.

Sample Size and Sampling Methods

Sample Size

In order to determine the population of workers in industries who are adopting the standard operating procedures, an estimate was made in such a way that it was at an appropriate 95%

confidence level. The population size was 400 workers which was calculated by using the formula stated by Susan, Nigel and Ano (2015).

Sampling Methods

The simple random sampling technique was used to select the companies from the 3 senatorial districts for the study. The companies were listed on ballot papers and four (4) companies were randomly selected from the three senatorial districts, since the companies have similar safety operational characteristics. While the simple random and systematic techniques were used to select the individual workers for assessment in their respective companies. The first worker in the selected companies was randomly selected by the position of their respective departments while the subsequent workers were systematically selected after every 2 worker assessed.

Instrument for Data Collection

400 structured questionnaires were distributed to workers in the above sample industries in River State. The questionnaires consist of sections A – E; which encompassed the four study objectives.

Validity of Instrument

The instrument for the study was validated by both face and construct validities, which was used to assess the extent of systematic error. The instrument was measured by subjective assessment which was made and used to measure the safety operations in the oil and gas industry in Rivers State. The questionnaire was prepared by the researcher and approved by the supervisors.

Reliability of Instruments

A test - retest questionnaire will be used to test the reliability of the questionnaire. The chamber - test of 70% was considered reliable. The questionnaire was initially administered to 20 respondents in Port Harcourt Flour Mill PLC; and the process was repeated one month later in which 400 forms of questionnaire were administered to workers selected from Indorama Eleme Petrochemical Limited, Hamik energy LTD., Haliburton Energy Services Nigeria LTD and Greenville Oil and Gas LTD.

Method of Data Collection

The 400 forms of questionnaire was administered to respondents selected from Indorama Petrochemical Eleme Limited, Hamik energy LTD., Haliburton Energy Services Nigeria LTD and Green Ville Oil and Gas LTD in Rivers East, Rivers South East and Rivers West Senatorial Districts of Rivers State, by the researcher after an informed consent was obtained. The literate respondents were allowed to fill the questionnaires themselves but the non – literate respondents, the questions were asked by the researcher in local languages and their responses were filled by the researcher. Each questionnaire took about 20 minutes to be completed.

Method of Data Analysis

The descriptive statistical tool analysis was used to analyze the data in which the mean and standard deviation were used to assess each of the specific objectives.

The data obtained from the questionnaire was analyzed using IBM –SPSS Statistics Version 22.0 package and Microsoft Excel 2016.

Ethical Consideration/Informed Consent

The FUT0, School of Health Technology Research committee approved this research. Written Consent of Management of Indorama Petrochemical, Hamik energy LTD., Haliburton Energy Services Nigeria LTD and Greenville Oil and Gas LTD were obtained.

Results

Socio – Demographic Characteristics of Respondents

In figure 1 below more than half of the respondents fall between the age group of 30 – 39 years. The age of workers in the oil and gas industries in Rivers State is above 30 years.

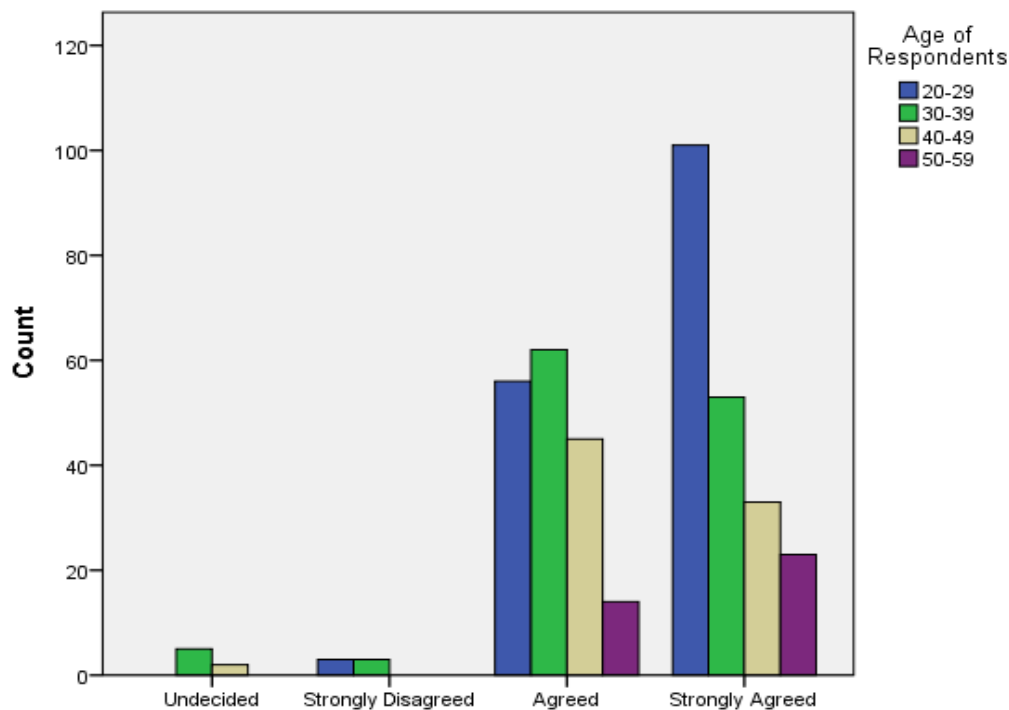


Figure 1: Age of Respondents in the oil and gas industries in River State.

In figure 2 below majority of the respondents were males despite the risky and hazardous nature of operations in the oil and gas industry.

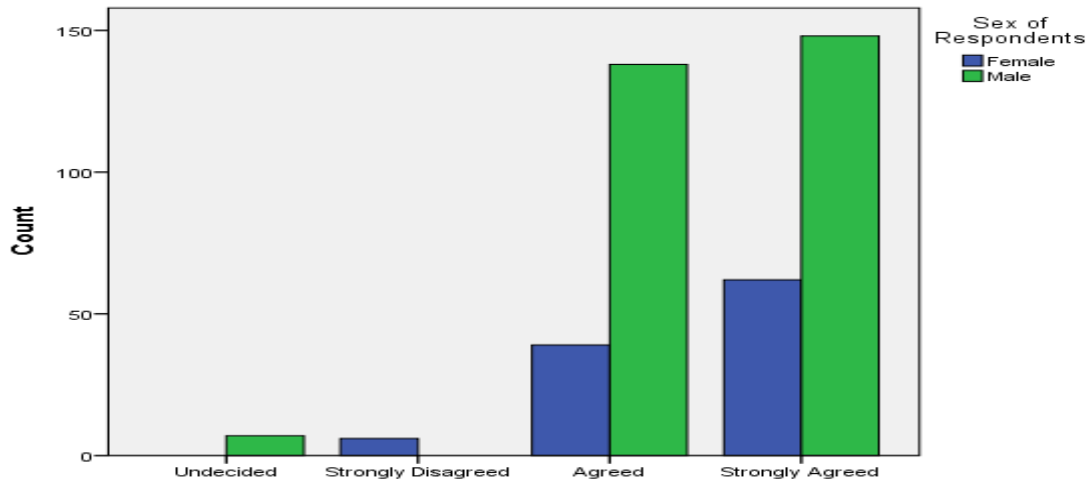


Figure 2: Sex of the Respondents in the oil and gas industries in Rivers State

In figure 3 below, workers who have tertiary education carry out their duties more safely.

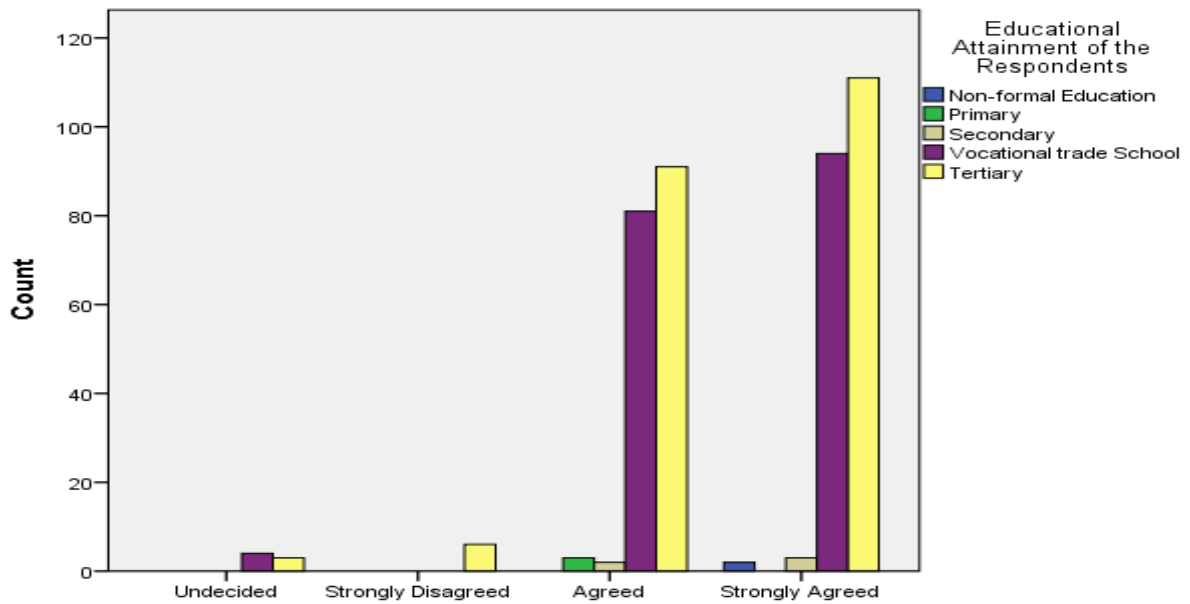


Figure 3: Educational Attainment of the Respondents in the oil and gas industries in Rivers State.

Table 1 below shows results from responses from safety operations in oil and gas industries in Rivers State, which had a grand mean of 3.5.

Safety Operations in the Oil and Gas Industry in Rivers State

Table 1: Result from Responses on Safety Operations in the oil and gas industries in Rivers State

S/N	Response Questions	Mean	Std.	SE
1	Safety operation include: organization’s safety, attitude, behavior	3.68	.699	.035
2	The success of oil and gas industries depends on management’s long term commitment to protect workers from accidents and injuries on the job.	3.67	.585	.029
3	There are good written safety, goal and objectives which are implemented in the oil and gas industries.	3.57	.588	.029
4	People are designated with the task to coordinate, implement, and administer the standard operational procedures in oil and gas industries.	3.42	.860	.043
5	Safety operations among oil and gas workers include: understand and eliminate potential job hazards, conduct job hazard analysis, compliance with standard safety requirements, and safety operational procedures.	3.44	.740	.037
6	Safety requirements include: provision of safe working conditions, assurance of employee that they may voice safety concerns without reprisal, correction of hazards etc.	3.56	.676	.034
7	Oil and gas industries make commitment to continuous improvement of all aspects of safety for their workers.	3.41	.758	.038
8	Oil and gas industries that understand the importance of safety will not make decision based solely on cost.	3.43	.676	.034
9	The Total Case incident Rate (TCR) as a common method used to report workplace injuries.	3.62	.669	.033
10	The Personal Protective Equipment is used to prevent accidents and injuries among workers in oil and gas industries.	3.50	.701	.035
11	Personal protective and lifesaving equipment are matters that require the attention of workers.	3.46	.742	.037
12	Signs and signals when identified by workers can prevent accident and injuries.	3.24	.795	.04
	Grand mean	3.5		

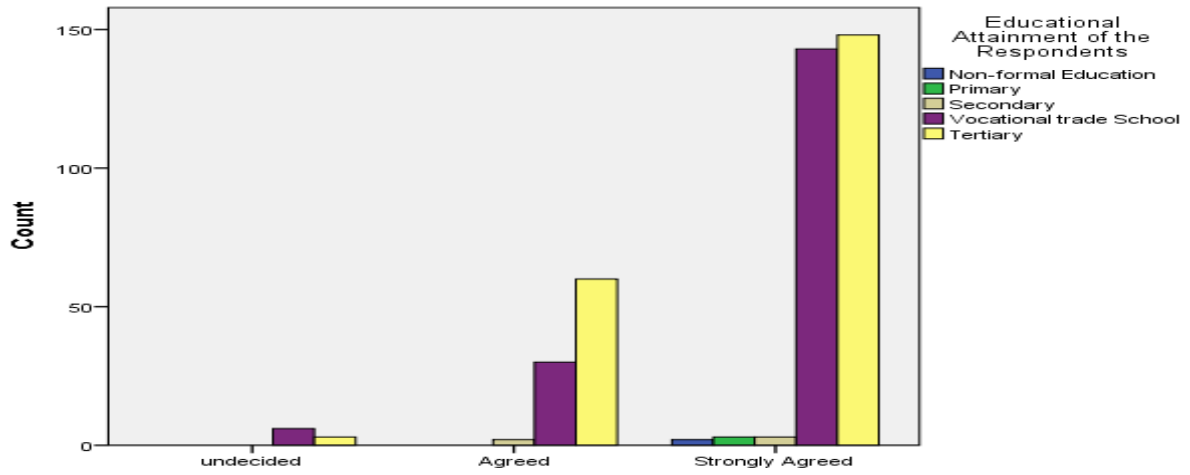


Figure 4: Safety operations include; organization's safety, attitude, behaviour etc.

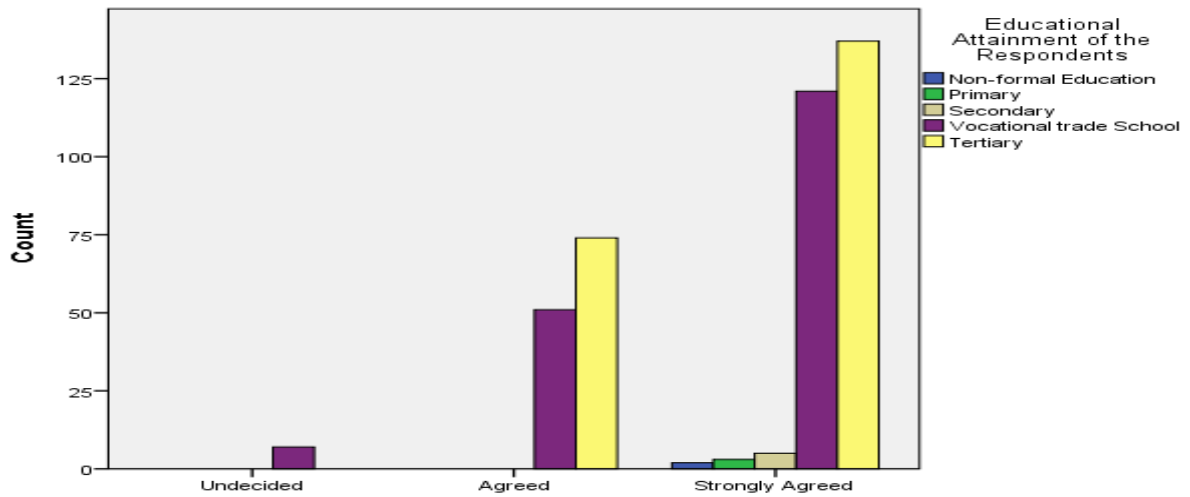


Figure 5: The Total Case Incident Rate (TCR) method used to report work place injuries

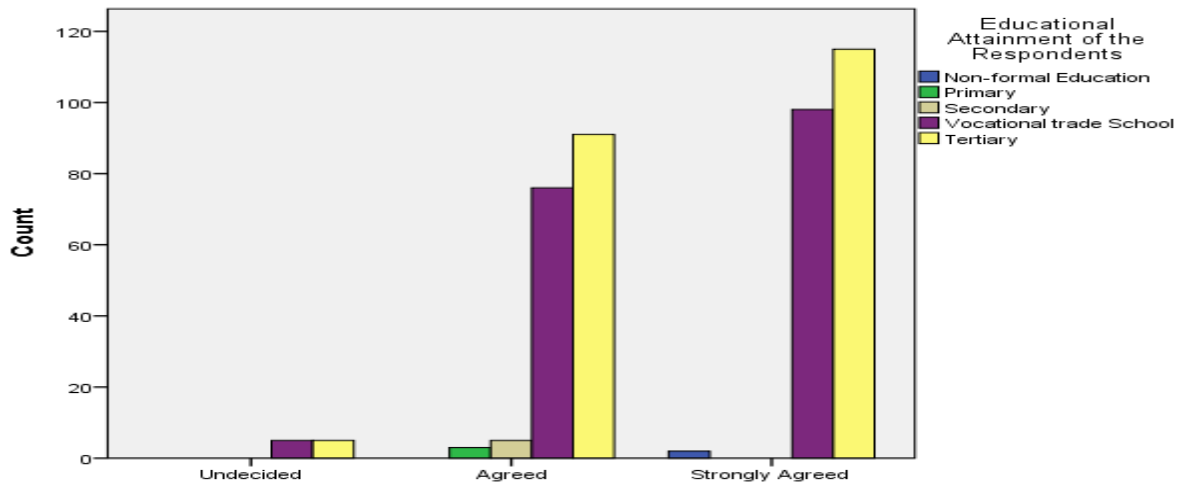


Figure 6: Personal protective and lifesaving equipment are matters that require the attention of workers.

Potential Sources of Industrial Accidents in Oil and Gas Industry in Rivers State

Table 2 below shows results from responses on potential sources of industrial accidents in oil and gas industrials in Rivers State with a grand mean of 3.47.

Table 2: Result From Responses on Potential Sources of Industrial Accidents in Oil and Gas Industries in Rivers State

S/N	Response Questions	Mean	Std.	SE
1	Sources of hazards in the oil and gas industries include: explosion and fires, becoming caught, chemical exposures, electrocution, rig collapse and complication.	3.61	.848	.042
2	Lack of signs, signals and barricades	3.54	.800	.040
3	Improper use of mechanical aids such as jigs and fixtures	3.50	.657	.033
4	Special lifting devices whose maximum load capacities are exceeded are potential sources of accidents and injuries.	3.37	.772	.039
5	Floors, aisles, and inside passageways that are not kept clean are sources of accidents.	3.37	.762	.038
6	Poor Handling of industrial equipment accident.	3.41	.662	.033
7	Poorly constructed workshop/laboratory buildings	3.47	2.224	.111
8	Improper illustration in the factories is a source of accident.	3.36	.953	.048
9	Poor safety awareness, education and safety training	3.62	.779	.039
Grand Mean		3.47		

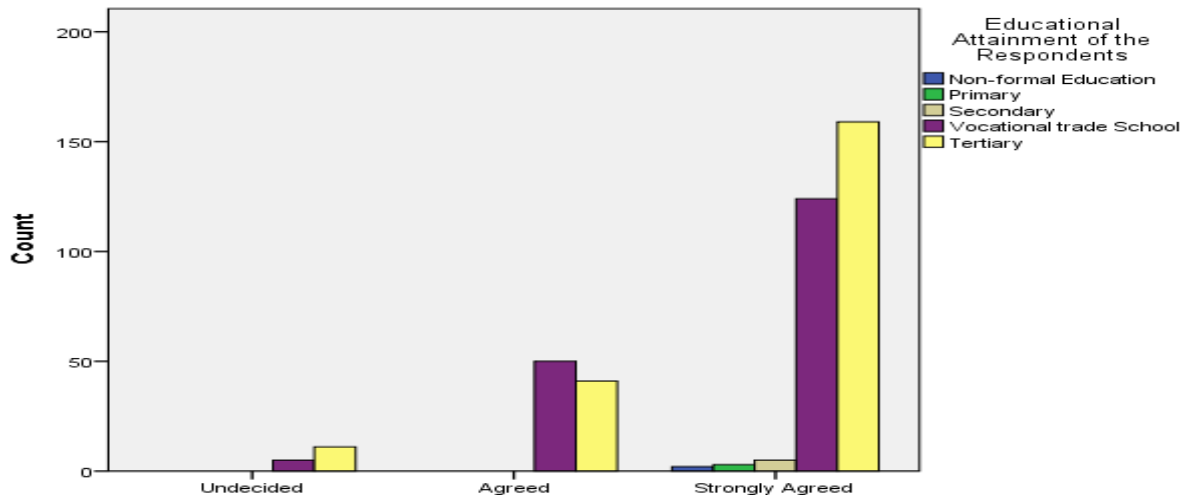


Figure 7: Explosion and fires, etc. as sources of hazards in the oil and gas industry

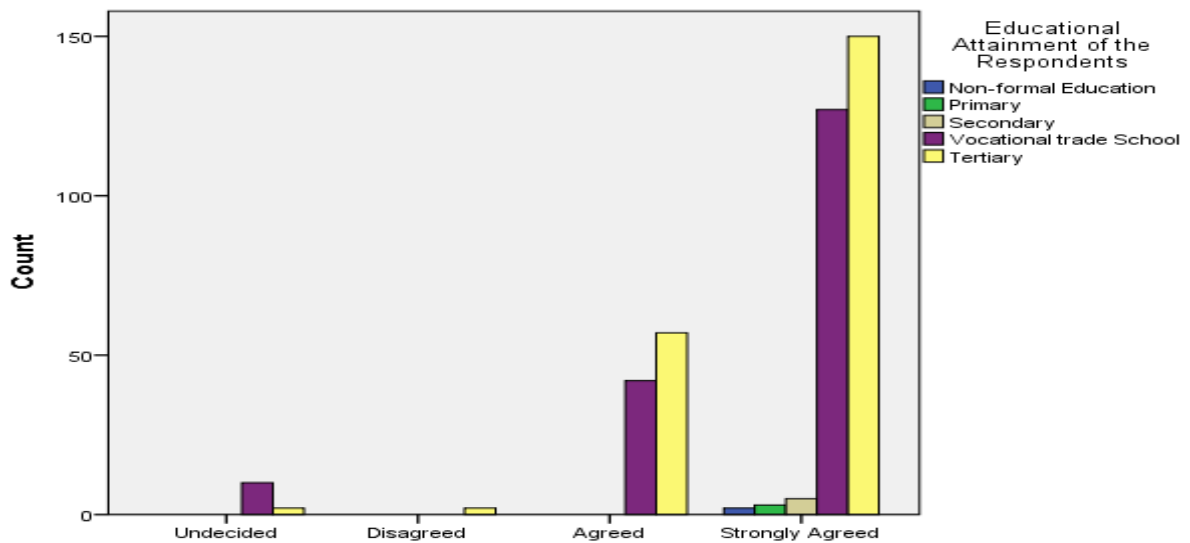


Figure 8: Poor safety awareness, education and safety training as sources of accidents and injuries.

Potential Causes of Industrial Accidents in Oil and Gas Industry in Rivers State

Table 3 below shows the responses on the potential causes of industrial accidents in oil and gas industries in Rivers State, with a grand mean of 3.54.

Table 3: Result From Responses on Potential Causes of Industrial Accidents In Oil And Gas Industry In Rivers State.

S/N	Response Questions	Mean	Std.	SE
1	Common cause of accidents in the oil and gas industries include: Spill of Synthetic-Based Drilling Fluid, Blowout and Fire and Equipment Failure	3.58	.696	.035
2	Negligence to safety rules while working in the industries is cause of accident in oil and gas industries.	3.50	.621	.031
Grand Mean		3.54		

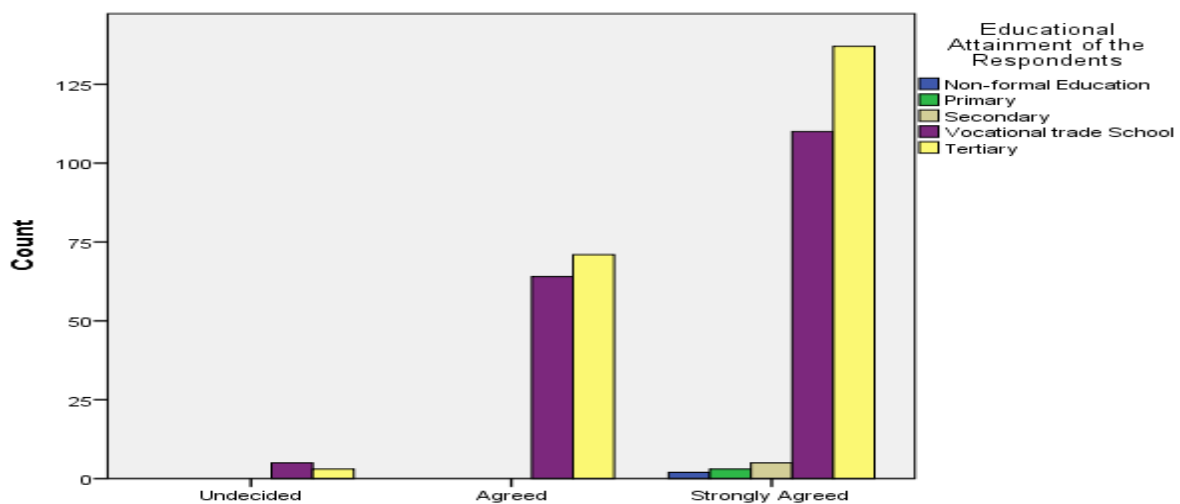


Figure 9: Common causes of accidents in the oil and gas industries

Levels of Knowledge of Workers on Specific Hazards and Health Risks Associated With Safety

Practice Employed In the Oil and Gas Industry in Rivers State.

In table 4 below the results from responses on levels of knowledge of workers on specific hazards and health risks with safety practices employed in the oil and gas industries in Rivers State are shown. The grand mean was 3.42.

Table 4: Result from Responses on Levels of Knowledge of workers on specific hazards and health risks associated with safety practice employed in the oil and gas industries in Rivers State

S/N	Response Questions	Mean	Std.	SE
1	Workers familiarity with safety regulations	3.65	.686	.034
2	Recognizing and controlling hazards	3.57	.759	.038
3	Hazards in oil and gas industries.	3.55	.666	.033
4	Obstacle – Free working environment.	3.30	.898	.045
5	Newly employed workers refresher courses on accidents prevention.	3.37	.749	.037
6	Old employed workers need refresher courses on safety regulations.	3.39	.724	.036
7	On the job training as the best safety method	3.31	.901	.045
8	First aid and medical attention training.	3.42	.692	.035
9	General safety and health provisions for reducing accidents in the industry.	3.26	.985	.049
10	Occupational health and environmental control are needed to reduce accidents	3.38	.979	.049
11	Personal protective and lifesaving equipment require attention of workers.	3.42	.911	.046
12	Signs and signals identification by workers can reduce accidents	3.43	.837	.042
Grand Mean		3.4		

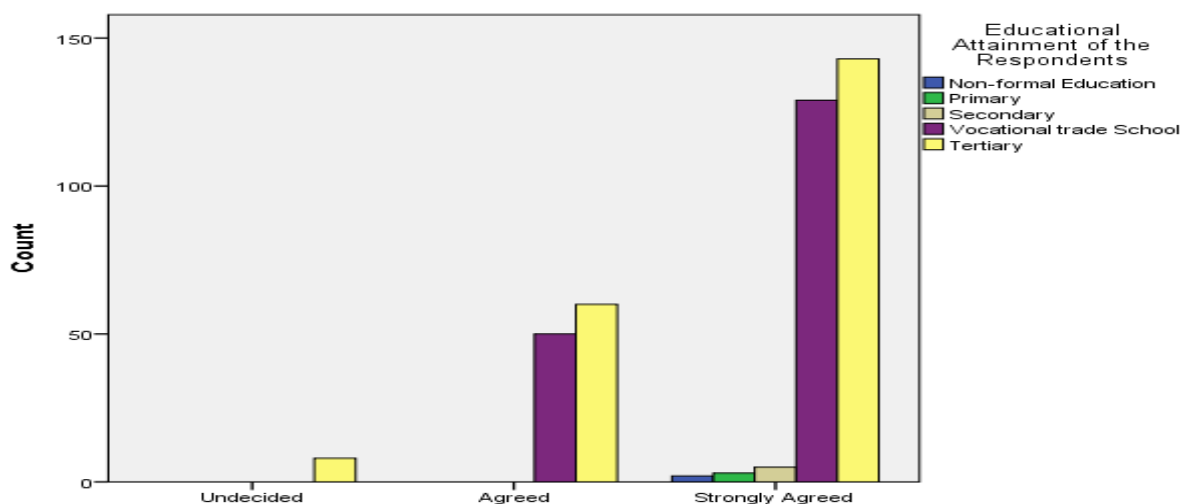


Figure10: Workers familiarity with safety regulations.

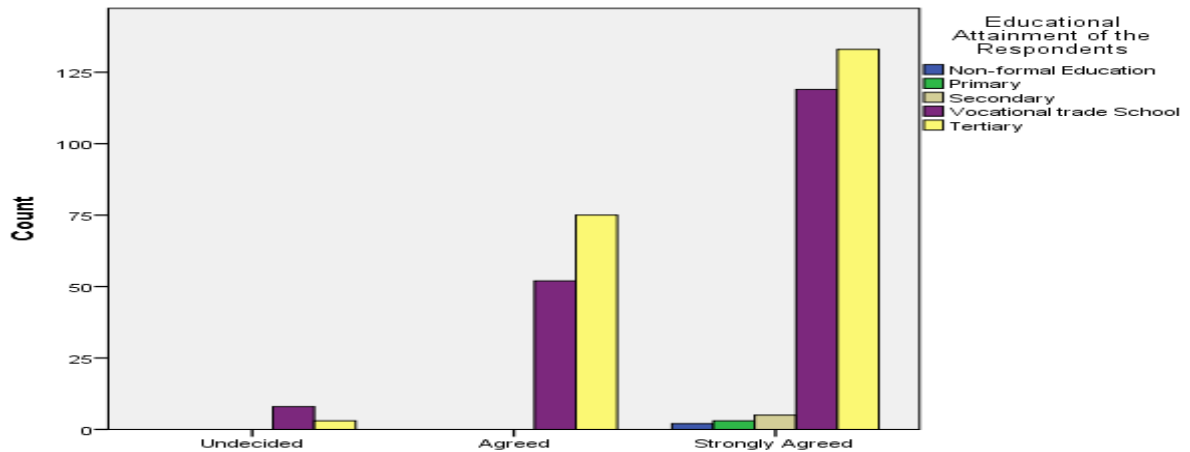


Figure 11: Recognizing and controlling hazards.

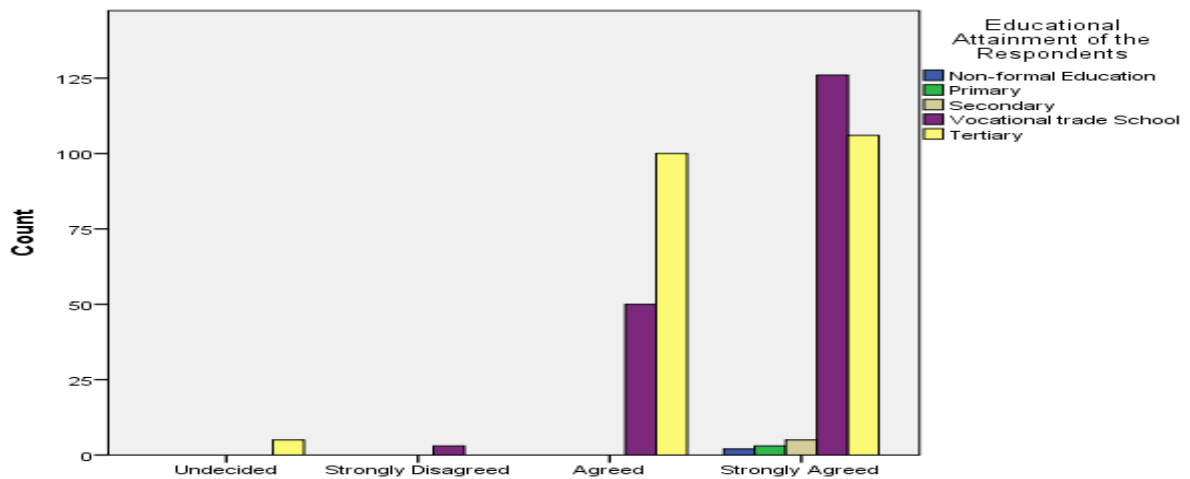


Figure 12: Hazards in oil and gas industry.

Strategies Adopted by the Workers and Management to Prevent Accidents and Injuries in the Oil and Gas Industry in Rivers State

In table 5 below, the results from strategies adopted by workers and management in the oil and gas industries in Rivers State are shown with a grand mean of 3.39.

Table 5: Results From Responses On Strategies Adopted By The Workers And Management To Prevent Accidents And Injuries In The Oil And Gas Industries In Rivers State.

S/N	Response Questions	Mean	Std.	SE
1	Safety and accident prevention procedures	3.18	1.260	.063
2	Safety education programme through the use of public relation activities.	3.51	.890	.044
3	Safety education programme for workers enforcement of the regulations.	3.41	1.041	.052
4	Accident prevention and safety education programme seminars.	3.42	.728	.036
5	Lectures on safety programme.	3.30	.983	.049
6	Safety instructions by the industrial based teachers.	3.36	.853	.043
7	Suggestion boxes as tools for preventing accidents.	3.32	.984	.049
8	Safety education programme through constant coaching of the workers	3.43	.798	.040
9	Public lecture by safety experts	3.44	.989	.049
10	Field trips and conferences on safety	3.51	.923	.046
Grand Mean		3.39		

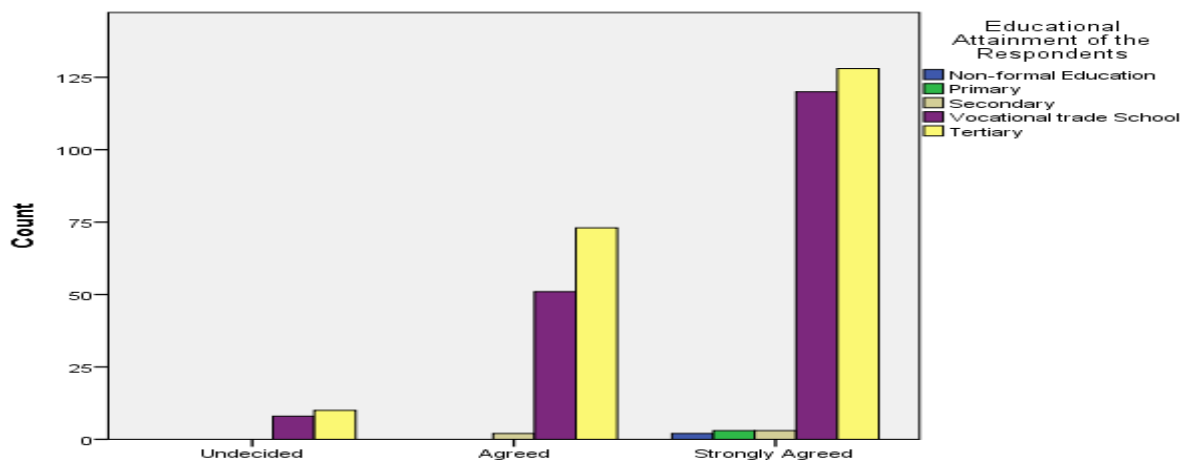


Fig.13. Safety education programme done through the use of public relation activities

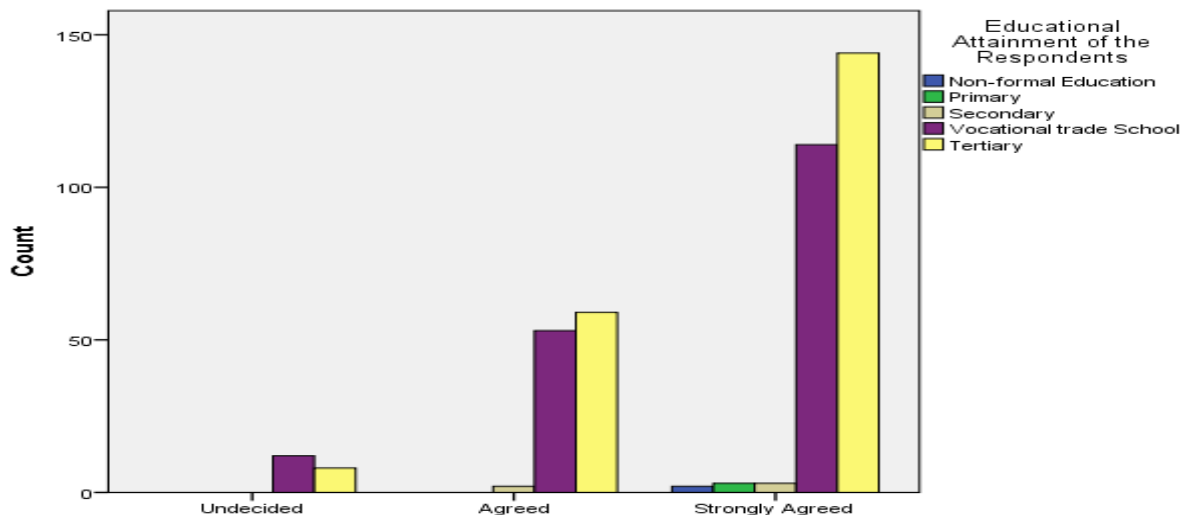


Fig.14. Field trips and conferences on safety as strategies for prevention of accidents and injuries

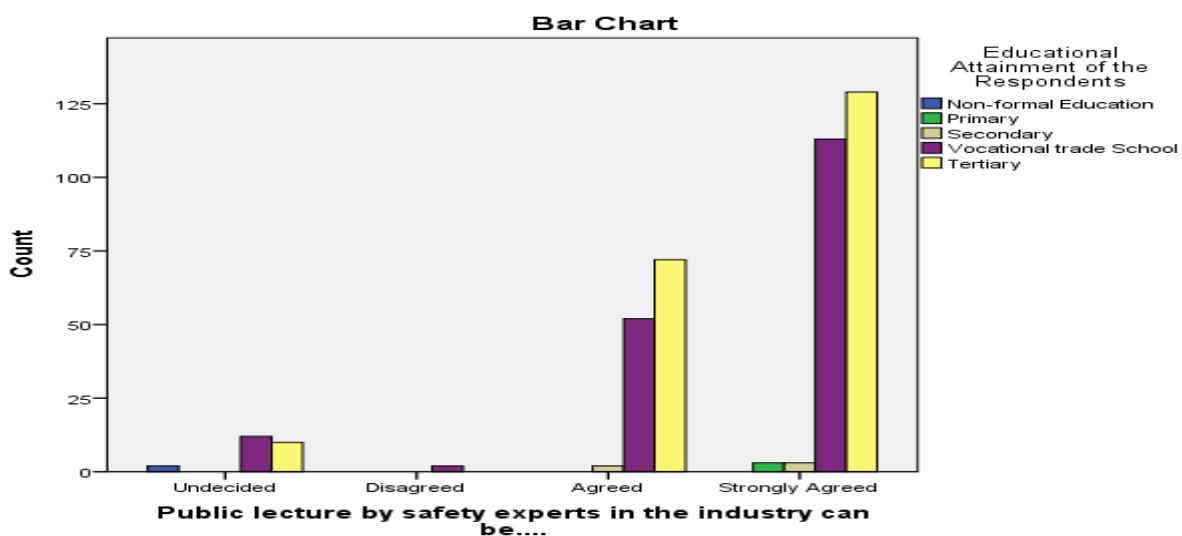


Figure 15. Public lecture by safety experts in the industry as accident and injuries preventive strategies

Discussion

The socio – demographic characteristics of the respondents showed that the mean age of the respondents were 35.5 and were in the 30 – 39 years age group as shown in fig. 1. More than half of respondents were above 30 years of age. The mean age (30 year of age) of respondents in this study is similar to what was found among artisanal miners in rural communities in South West, Nigeria, where the mean age were above 30 years of age. But it was lower than the mean age of respondents of sawmill workers in Kwara State, Nigeria that were 37.7. This implies that the age of respondents in the oil and gas industry in Rivers State were of the youthful age and are likely to discharge their duties safely. Majority, 258 (64.5%) of the respondents were males while 142 (35.5%) were females as shown in (fig. 2). The male dominance in this study was similar to that of artisanal miners in the rural communities in South West and sawmill

workers in Kwara State, Nigeria. This implies that more males work in the oil and gas industry in Rivers state, Nigeria despite the risky and hazardous nature of the job.

Out of the 400 respondents, 218 (54.5%) of the respondents attained tertiary education (fig. 3). While 182 (45.5%) of the respondents attained vocational education. The number of respondents that attained tertiary education in this study were higher than the number of respondents in the study of artisanal miners in the rural communities in South West, that were 58 (49.2) as was carried out by Babatunde *et al.* (2013).

The study further (Table 1) showed a mean of 3.57 for the response question ‘*there are good written safety, goal and objectives which are implemented in the oil and gas industries in Rivers State.*’ This mean of 3.57 implies that workers in the oil and gas industries in Rivers State carry out operations in the industry safely.

The standard deviation shows that responses do not vary much. The grand mean of 3.5 that was gotten in table 2 is statistically significant because it is above the coded mean of 2. This grand mean of 3.5 is in favour of the hypothesis that stated that there are “*safety operations in oil and gas industries in Rivers State*”. However, this result is different from the study of Achaw and Boateng (2012) which reported that there were poor safety practices in the oil and gas industry in Ghana.

Table 2 above shows results from response objective 2 on potential sources of industrial accidents and injuries in oil and gas industries in Rivers State; it shows a grand mean of 3.47. The standard deviation also shows that the responses do not vary much. This grand mean of 3.47 favours the hypothesis that states that there is a statistical significant association between levels of knowledge of workers and sources of accidents and injuries in the oil and gas industries in Rivers State. The sources of hazards in the oil and gas industry had mean 3.61, which implies that explosion, fires, becoming caught, chemical exposures, electrocution, rig collapse and complication are sources of hazards in oil and gas industries in Rivers State. The response question “*poor safety awareness, education and safety training*” had a mean of 3.62, which favours the study hypothesis which states that poor safety awareness, education are sources of accidents and injuries in oil and gas industries in Rivers State. This study does not conform to the study of Achaw and Boateng (2012) in their study of safety practices in the oil and gas industries in Ghana, which reported that oil and gas companies performed badly in the provision of safety education and training for workers.

Table 3 above shows results from responses on the objective 2; ‘causes of industrial accidents in oil and gas industrial accidents in oil and gas industry in Rivers State’. Responses from the study question of causes of industrial accidents and injury show a grand mean of 3.54 which is statistically significant. As shown in the table, the response question has a mean of 3.58, which implies that the causes of accidents and injuries in oil and gas industry in Rivers State include spill of synthetic – based drilling fluid, blowout and fire and equipment failure. Table 4 further revealed that negligence to safety rules while working in the industries is a cause of accidents in the oil and gas industry in Rivers State. This finding is in line with the study of Babatunde *et al.*, (2013), which reported that workers are exposed to various physical chemical/dust inhalation and hazards as causes of industrial accidents.

Table 4 above, shows results from responses on level of knowledge of workers on specific hazards and health risks associated with safety practices employed in the oil and gas industries in Rivers State as stated in objective 4. The response questions shows a grand mean of 3.42 which is statistically significant, implies that oil and gas workers have high knowledge on specific hazards and health risks associated with safety operations employed in the oil and gas industry in Rivers state. This finding of high level of knowledge by workers on specific hazards and health risks associated with safety operations employed in the oil and gas industry Rivers State is similar to another study done by Kayode *et al.* (2014), where all respondents interviewed were aware of the use of personal protective equipment among small scale arc welders. The response question on “*workers need to be familiar with industrial accident*” shows a mean of 3.65 which entails that workers are familiar with safety regulation in the oil and gas industries in Rivers State. The response question on “*personal protective and lifesaving equipment are matters that require attention of workers*” showed a high mean of 3.42, which implies that workers have high knowledge on the use of personal protective equipment.

In table 5 above, the result from responses on strategies adopted by workers and management to prevent accidents and injuries in the oil and gas industries in Rivers State is shown with a grand mean of 3.39. This finding is dissimilar from the study done by Batunde *et. al.* (2013) on a rural community in South West, Nigeria which showed prevalence of lack of use safety practices among artisanal miners. The grand mean of 3.39 which is above the coded mean of 3 indicates that there are strategies adopted by workers and management to prevent accidents and injuries in the oil and gas industries in Rivers State. The response question on “*safety education programme is done through the use of public lecture relation activities*” has a mean of 3.51, which implies that oil and gas industries in Rivers State adopt safety education as a strategy to prevent accident and injuries. The response question on “*field trip and conferences on safety are necessary to prevent accidents*” shows a mean of score of 3.51; this implies that oil and gas industry in Rivers State adopts the practice of field trips and use of conferences on safety operation to prevent accidents.

Conclusion

Oil and gas workers in Rivers State carry out their operations under standard operational procedures. The workers in the oil and gas industry in Rivers state are above 30 years of age, while the male dominated the workforce. Workers with tertiary education carry out their duties more safely by adopting the recommended standard safety procedures. The sources of accidents and injuries in the oil and gas industry in Rivers State include: explosions and fires, chemical exposures etc., while the causes of industrial accidents in the oil and gas industry in Rivers State include: spill of synthetic – based drilling fluid, blowout and fire, equipment failure and negligence to safety rules while working in the industry.

There are high level of knowledge on sources and causes of accidents and injuries among workers in the oil and gas industries in Rivers State. Workers and management in the oil and gas industries in Rivers State have adopted strategies for prevention of accidents and injuries through the use of personal protective equipment, implementation of safety goals and objective

and provision of training for their workers on standard safety operations procedures, among others.

Contribution to Body of Knowledge

Based on the findings of this study, there is imbalance representation of male – female ratio [288 (64.5%): 142 (35.5%)], because the males are more than females in the oil and gas industries in Rivers State. Hence, there is a need for more qualified females to be recruited into the oil and gas industries in Rivers State.

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