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Original Research Article

Knowledge, Attitude and Compliance with Occupational Health and Safety Practices among Pipeline Products and Marketing Company (PPMC) Staff in Lagos

Joseph Oluwatoyin Adebola

Chief Health Sister, Medical Department, Nigerian National Petroleum Corporation (NNPC)

E-mail: teejayb2@yahoo.com
Tel: +2348039743069

Abstract

Safety and health have become an integral component in the workplace as employers, labour unions and others engage in trainings and procedures to ensure compliance with safety standards and also to keep a healthy work-force. The oil and gas industry is one of the leading industries where a great portion of workforces are employed. The risks of injuries are higher in such industry compared to other engineering related fields although the injuries encountered are more severe. Hence, safety is considered a high priority for most companies working in this field. Nevertheless, serious injuries are still a challenge for the development of the industry. This study was carried out to assess the Knowledge, attitude and compliance with occupational health and safety practices among staff of Pipeline and Product Marketing Company (PPMC), Lagos. The findings from the study were used as recommendations to the management of the organization to maintain the level of compliance amongst the compliant staffs and how to increase it among those who are non- compliant, to reduce occupational accidents in the work place.

Keywords: Occupational health, Safety Practices, Petroleum Company Staff, Nigeria.

INTRODUCTION

According to ILO (International Labour Organization), occupational health is aimed at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. It also covers the prevention amongst workers of departures from health caused by their working conditions, the protection of workers in their employment from risks resulting from factors adverse to health and the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities. Occupational health, though advocates the adaptation of work to man and of each man to his job, remains neglected in most developing countries under the pressure of overwhelming social, economic, and political challenges. The goal of occupational health which is prevention of ill health can be achieved through health education, specific protection, early diagnosis and treatment, disability, limitation and rehabilitation.

Safety and health in the workplace has become an integral component of occupational health as employers, labour unions and Government agencies in general carry out a series of techniques, trainings and procedures to ensure compliance with safety standards. Naturally, a need for safety is an intrinsically human concern; the primary need is therefore for safety measures to be in place to prevent injury to the staff members while protecting the equipment and environment at the same

time. Hazards inherent in a workplace ideally should be identified, documented, monitored and managed. However, in reality, hazards not eliminated entirely are subjected to control measures which minimize the effects. Workplace settings vary widely in size, sector, design, location, work processes, workplace culture, and resources. In addition, workers themselves are different in terms of age, gender, training, education, cultural background, health practices, and access to preventive health care. This translates to great diversity in the safety and health risks for each industry sector and the need for tailored interventions. Oil industry as a workplace is discussed in this study and focus is on the Pipeline and Product Marketing Company staff members.

Crude oil has had deeper impact on the global development than any other single natural resource in recorded history. Oil was discovered in Nigeria in 1956 and today, she ranks as the leading oil and gas producer in Africa and 6th largest oil exporter in the world. Despite the huge gains accrued to the discovery, the risk and health related effects like pollution and workplace accidents linked with evolution of petroleum refining and other subsidiary processes created the need for health and safety management procedures and safe work practices. The inflammable nature of the petroleum products, exposures to high sophisticated machineries and equipments, heavy metal toxicity, environmental health hazards and other injurious effects opens the workers and attendants to a high risk and work related accidents, hence there is need to assess the staff's level of knowledge and ways of minimizing the risks associated with the hazards.

Statement of Problem

In Nigeria, there has been an overdependence on petroleum products for both financial and economic growth which has lead to the repeated exposure of workers in the oil industry to health and environmental hazards. There are records in the oil industry of accidents and near misses. These accidents are often investigated but reports are not made public and often time, recommendations are not followed through. Governments unconcerned attitude towards Occupational safety have also baffled Occupational professionals. Furthermore, occupational health is absent where it is most needed, particularly given that clear empirical links exist between good occupational health practices, a healthier labour force, and improved productivity. Indeed, workplace interventions such as proper occupational hygiene and ergonomic practices have been presented as one of the tools to break the cycle of poverty, because these improve productivity, salaries, and, consequently, living conditions.

Globalization and industrialization especially in the Oil and Gas sector leads to an influx of technologies hence an increase in the occupational hazards attached to them due to machineries and production processes, especially across the Sub-Saharan Africa. The rising trend of occupational accidents is imminent if appropriate safety measures are not adopted. Hazards from petroleum products are dangerous and they can be categorized into physical, mechanical, biological, chemical and psychosocial.

Managing health and safety at work, the health of workers in the work environment and external environment in developing countries like Nigeria can be difficult when technical and financial resources are limited. Injuries and workplace hazards can also be linked with employees' negative perception of their psychosocial work environment. Staff members are the most important link in safety measures documentation and control. This study is therefore aimed at assessing the level of knowledge attitude and compliance with good occupational health and safety practices among staff in the oil depot of Atlas –Cove and Ejigbo.

Justification of the Study

Human resources are the most valuable asset of any organization. Considering the importance of the Oil sector in Nigeria, the compliance of staff members with hazard control, assessing their attitude towards the measures and their level of knowledge towards safety and hazard control measures will ensure continual safety and existence of staff and the company.

Records of occupational diseases are poor, primarily because industries do not report cases to the relevant government agency. Though a survey of occupational diseases reported in the literature suggests that conjunctivitis, chronic bronchitis, dermatitis, musculoskeletal disorders and injuries are common workplace health problems. However this report is not exclusive to all sectors. This study is geared towards assessing the level of knowledge on Occupational health and bringing to fore, the attitude and compliance with safety practices among staffs of the Oil Industry.

Reports of involvement of human activities in manufacturing processes from developed to developing countries has added a new dimension on the health front. Globalization of manufacturing practices is resulting in cross border transition of the work force from one country to another causing a lot of stress in terms of cultural conflicts, new health and environmental hazards and other psychosocial problem especially when oil expatriates and staff members are involved.

More so, petroleum products are potential for damage to the surrounding communities, lives, property, fire, explosion and environmental pollution. The safety of the staff members is therefore of utmost importance. The findings from this study shall assist in creating a baseline in identifying the hazards and compliance among staff

members with good occupational health and safety practices. It will also help identify factors that determine their level of knowledge, attitude and compliance with safety standards.

Aim of the Study

The aim of the study is to determine the knowledge, attitude and compliance with occupational health and safety practices among staff members of Pipeline Products and Marketing Company (PPMC) of Nigerian National Petroleum Corporation, Lagos State, South-West Nigeria.

Objectives

1. To identify the health hazards among staff of Nigerian National Petroleum Corporation (PPMC).
2. To determine the knowledge of Nigerian National Petroleum Corporation (PPMC) Staff about occupational health and safety practices.
3. To assess the attitude of staff of Nigerian National Petroleum Corporation (PPMC) towards occupational health and safety.
4. To assess the compliance of staff of Nigerian National Petroleum Corporation (PPMC) with occupational health and safety practices.

METHODOLOGY

Study Background

PPMC is a subsidiary of NNPC and has its headquarters in Abuja. The activities include: wholesale, marketing and movement of petroleum products including base oils, paraffin wax and bitumen/asphalt; transportation of crude oil to the refineries through pipelines and evacuation of petroleum products from the refineries through the use of pipelines and costal tankers. The Pipelines Product and Marketing Company was set up with the objective to provide excellent customer services by transporting crude oil to the refineries and moving white petroleum products to the existing and future markets efficiently and at low cost, through a safe and well maintained network of pipelines and depots. It is also part of the objectives of the company to profitably and efficiently market refined petroleum products in the domestic, as well as export markets especially in the ECOWAS sub-region, provide marine services and also maintain uninterrupted movement of refined petroleum products from the local refineries. It has its network spread all over the country, so also are the staffs. To further enhance the activities every state has either a depot or pump station to enable the movement of petroleum products through the tankers to the end users in the filling stations. Ejigbo depot is located in the Ejigbo area of Lagos while the Atlas cove depot is located on an Island called Tarkwa-Bay, in Lagos state. The administrative headquarters is at Mosimi in Ogun state.

Atlas cove depot: It is situated on an island called Takwa Bay, in Lagos state. The only means of transportation is by speed boat. Its administrative headquarters is at Mosimi, in Ogun- state.

Activities include receiving finished products that is imported by Nigerian National Petroleum Corporation from the vessels that bring them into the country. They store these products in the storage tanks also known as tank farms. These products are now pumped through pipelines to the Mosimi depot for further storage and final distribution to end users through the marketers. The products are transported via tankers to the filling stations.

There are five departments made up of Maintenance, Health, Safety and Environment, Operations, medical and administrative. The staff strength is 131 and the staffs run a two weeks on and two weeks off shift. There are some soldiers and mobile policemen who are on twenty four hours duty to prevent pipeline vandalisation.

Ejigbo depot

This is situated in the Ejigbo local government area of Lagos state. The administrative headquarters is also in Mosimi, Ogun state.

Their activities include receiving petroleum products from Mosimi through the pipelines. This depot is also involved with selling of petroleum products received to marketers.

The depot also has the following departments namely operations, Health, Safety and Environment, maintenance, sales, and administrative.

The maintenance department ensures that there are no line breaks while we also have a combined team of soldiers and mobile policemen on twenty four hours patrol. The loading of tankers is done from the top and so the loaders are exposed to hazard of falling from height.

The staff strength in Ejigbo depot is also 130 and they run 7.30 to 4.30 straight shift with Saturdays and public holidays inclusive.

Study design

A descriptive cross-sectional study was carried out to assess knowledge, Attitude and Compliance with Occupational health and safety practices among staff members of Pipeline Products and Marketing Company (Atlas Cove and Ejigbo Depots).

Study population

This comprised of all staff of the Operations, Maintenance, Health Safety and Environment and Medical departments of Atlas Cove and Ejigbo depots (PPMC) in Lagos.
The study was carried out at the Ejigbo and Atlas- Cove depots

Sample size estimation

The minimum sample size is calculated using the following formula.

$$n = \frac{z^2 pq}{d^2}$$

Where:
n = Minimum estimated 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. (0.78)
q = 1-p (1-0.78=0.22)
d = Permissible error of estimation (0.05)
1.96^2 x 0.78 x0.22 /0.05^2 = 263.69 = 264
Using the sample size correction factor formula: nf = n/ (1+(n/N)
Where n (the initial sample size) = 264, N is the sample population =142
Therefore, N_f (the corrected sample size = 264 /[(1+ (264/142)]
N_f =264 / (1+1.872) =264/ 2.872
N_f =91.91
Compensation for invalid data and non- response is 10%,
Sample size = 91.9 + 0.1 (91.91) = 101.1
The corrected sample size is therefore 101.

No further sampling was done as all the staff in the study sites were used. Details of shifts, working hours, cycles and other relevant information were also sought to ensure that all staff were given equal opportunities of enrolments.
Total population of 142 were recruited for the study.

Inclusion criteria

All Staffs of Nigerian National Petroleum Corporation (PPMC,) who were present at the time of study.

Exclusion criteria

Ad hoc staffs, (that is staff from other locations who were on one assignment or the other and are not PPMC Staff in these locations) were excluded from the study.

Data collection tools and techniques

Both qualitative and quantitative data was collected. A semi- structured self administered pre- tested questionnaire (pre-tested in Mosimi Depot, Ogun –State) was used for collection of Quantitative Data. The questionnaire had six sections. Section A (Socio-Demographic characteristics) Section B (identification and knowledge of hazards.) Section C. (Knowledge of hazard control methods). Section D was on attitude, Section E on practice and Section F on Compliance. The questionnaire was pretested at the Pipeline and Product Marketing Company, Mosimi depot in Ogun State. Qualitative data collection technique was used which includes an observation (check list). Three post graduate students from the department of Community health and Primary care were trained on the objectives of the study and data collection. The data collection was carried out from July to August 2013. The adapted version of the Occupation, Health and Safety questionnaire (OHS) was used to measure the workers' compliance with safety standards. A section of the questionnaire is appended to capture respondents' knowledge and attitude towards occupational health and safety practices.

Qualitative data collection

The tool used was a check list. Four departments participated in the study, namely operations, maintenance, Health, safety and environment and then medical/office. The departments were visited during the working hours when operation was in progress, to observe the compliance with occupational safety and health practices. This was done daily and marked on the observation checklist. This activity continued throughout the four weeks of study

Data analysis

Data entry and analysis was done using Epi-info 2002 windows version (3.5.1). Knowledge, Attitude and Compliance were graded by using a scoring system. There were 5 broad questions on knowledge, 9 questions on attitude and 13 questions on practice and 11 questions on compliance and each question carried 1 mark. Knowledge was graded in percentage as 0-39% (≤ 6 marks) being poor, 40-59% (7-9 marks) fair, and ≥ 60% (10-16 marks) as good. However, Attitude was scored using a 5 point likert scale adapted from a previous study on KAC on oil and gas workers. Strongly agreed=4, agree = 3, disagree = 2, strongly disagree=1,

Table 1. Socio demographic characteristic of respondents

	Frequency (%) n= 142
Age (yrs)	
21-30	23 (16)
31-40	34 (24)
41-50	43 (30)
51-60	12 (9)
Non response	30 (21)
(Mean = 31±17.98yrs)	
Sex	
Female	31 (22)
Male	109 (77)
Non response	2 (1)
Marital status	
Married	109 (77)
Never married	32 (22)
Non response	1 (1)
Level of education	
Secondary	2 (1)
Post Secondary	135 (95)
Non response	5 (4)

Indifference=0, and scores ≥ 7marks (60%) was denoted as good attitude. All questions on practice and compliance were scored 1 mark each for yes and 0 mark for no, and rated in percentage as 0-39% (≤ 8 marks) being poor, 40-59% (9-11 marks) fair, and ≥ 60% (12-20 marks) as good. The data obtained was presented as tables and figures, Chi-square (X^2) test was used to test for association between variables at P value <0.05.

Ethical considerations

Ethical approval was obtained from The LUTH Ethics and Research Board. Permission was also obtained from the depot managers of Ejigbo and Atlas Cove before the commencement of the study. Participation of the study population was voluntary and all participants signed an informed written consent form.

RESULTS

Respondents had a mean age of 31±17.98 years; the proportion of males 109 (77%) was higher than the females. 31 (22%) of the respondents were married. Majority of the respondents had post-secondary education. (Table 1)

Half of the respondents, 71(50%) work in Ejigbo depot, the mean length of service was 9.8±8.1 years however almost half 66(47%) of these respondents work in the operations department. (Table 2)

Majority of the respondents had never smoked cigarette 118(83%), while 63(44%) of the respondents had never drank alcohol.

The major hazards identified in the depot were fumes 129 (90.8%), smoking cigarette 125 (88%) and noise 102 (71.8%). About three-quarter 108 (76.1%) of the respondents were aware of the hazards in the depot, respondents who had worked for more than 15years complained that they needed a change of environment 6 (4.2), while 67 (47.2%) identified machines with high powered force as a mechanical hazard. There is a high level of knowledge among the respondents on occupational hazards. (Table 4)

About two-thirds 97 (68.3%) of the respondents know that there is a program to identify and control hazard. Almost all 139(97.9%) of the respondents identified functional fire trucks as hazard control measures, 127(89.4%) and 94(66.2%) respondents know that adequate water supply and personal protective equipment respectively are hazard control methods. Also 130(91.5%) know that constant power supply is a control method of hazards. (Table 5)

Majority 128(90.9%) of the respondents had good knowledge of hazard control methods. (Table 6)

About one-quarter 39(27.5%) of the respondents are afraid to register hazard concerns, while more than three-quarter 110(77.5%) agreed that they are satisfied with the conduct of fire drills. About 31(21.8%) agreed that the regulation regarding hazard control in the depot is strict.

Table 2. Respondents' employment details

	Frequency (%) n=142
Location of depot in PPMC	
Atlas Cove	62 (44)
Ejigbo	71 (50)
Non Response	9 (6)
Department In PPMC	
Health, Safety and Environment	29 (20)
Maintenance	22 (16)
Operations	66 (47)
Medical	19 (13)
Non response	6 (4)
Length of service (yrs)	
Less than 5yrs	39 (28)
5-10yrs	46 (32)
More than 10yrs	52 (36)
Non response	5 (4)
(Mean = 9.8±8.1yrs)	

Table 3. Alcohol and Smoking history of respondents.

	Frequency (%) n=142
Smoking History	
Never Smoked	118 (83)
Current Smoke	16 (11)
Former smoker	43(30.3)
Non-response	8 (6)
Alcohol History	
Current drinker	33 (23)
Former drinker	44 (31)
Non drinker	63 (44)
Non-response	2 (1)

Table 4. Respondents awareness and knowledge of occupational hazards in the work place

Hazards at work	Correct response Frequency (%)N=142
Awareness 0f Hazards at Work	
Petroleum products are harmful	68 (47.9)
Knowledge Of Hazards At Work	
Use of mobile phones in the depot	116 (81.7)
Physical	
Excessive heat or cold	70(49.3)
Light	54(38.0)
Humidity	55(38.7)
Radiation	51(35.9)
Noise	102(71.8)
Vibration	91(64.1)
Violence	55 (38.7)
Wet Floors	99 (69.7)
Clustered environment	93 (65.5)

Table 4. Continue

Chemical	
Lead	40 (28.2)
Mercury	6 (4.2)
Nickel	5 (3.5)
Asbestos	8 (5.6)
Benzene	43 (30.3)
Petroleum fumes	109 (76.8)
Mechanical	
Sharp edge Machine	51 (35.9)
Pointed edge machine	46 (32.4)
Machine with high powered force	67(47.2)
Machine with human anthropometry	23 (16.2)
Psycho- Social	
Worker/Worker relationship	44 (31.0)
Worker /Management (Corporate) relationship	35 (24.6)
Boss/subordinate relationship	43 (30.3)
Long hours of work	79 (55.6)
Others (working more than 15years in the Ejigbo depot)	6 (4.2)

Table 5. Respondents' awareness and knowledge of hazard control methods

Knowledge of hazard control method in the depot (multiple response allowed)	Correct response Frequency (%) n=142
Aware of a hazard control program	97 (68.3)
Fire alarm in the premises	131 (92.3)
Functional fire trucks	139 (97.9)
Functional sump pit	126 (88.7)
Constant power supply	130 (91.5)
Adequate water supply	127 (89.4)
Register for integrity check	83 (58.5)
Provision of safe tank isolation valves.	84 (59.2)
Clear identification of tank capacities	90 (63.4)
Remotely operated shut off valves	45 (31.7)
Automatic tank contents gauge system	76 (53.5)
Adequate/appropriate PPE e.g ear muffs, face masks, boots, etc	94 (66.2)
Others e.g Fire blankets and Apron	6 (4.2)

Table 6. Overall Respondents' Knowledge of hazards control methods

Item	Frequency (%)
Good	128(90.1)
Poor	14(9.9)
Total	142(100)

Table 7. Respondents' attitude towards occupational hazards and safety practices

Item	Strongly Agree n (%)	Agree n (%)	Neutral n(%)	Disagree n(%)	Strongly Disagree n (%)	Total n (%)
Afraid to register hazard concerns	16 (11.3)	23(16.2)	16 (11.3)	52(36.6)	26(18.1)	133(95.3)
Satisfied with the conduct of fire drills.	36 (25.4)	74(52.1)	2 (1.4)	21 (14.8)	0(0.0)	133(95.3)

Table 7. Continue

Hazard control regulation is strict.	12 (8.5)	31 (21.8)	18 (12.7)	54 (38.0)	18(12.7)	133 (95.3)
Satisfied with the no smoking policy.	84 (59.2)	45 (31.7)	4 (2.8)	2 (1.4)	0(0.0)	135(95.1)
Hazard control measures are adequate.	29 (20.4)	64 (45.1)	11 (7.7)	22 (15.5)	6(4.2)	132(84.5)
Motivated to comply with the hazard control initiatives.	39 (27.5)	62 (43.7)	11 (7.7)	13 (9.2)	3(2.1)	128(90.2)
Periodic medical examination is necessary.	88(62.0)	39 (27.5)	5 (3.5)	0(0.0)	0(0.0)	132 (93)
Satisfied with the no phoning policy.	40 (28.2)	71 (50)	8 (5.6)	10 (7.0)	1(0.7)	130(91.)
Housekeeping in the depot is effective.	49 (34.5)	48 (33.8)	12 (8.5)	20 (14.1)	0 (0.0)	129(90.8)

Table 8. Overall Attitude towards Occupational Hazards and safety practices

Item	Frequency (%)
Positive	121 (85.2)
Negative	21 (14.8)
Total	142 (100)

Table 9. Respondents occupational safety practices

Item	Frequency			
	Yes (%)	No (%)	Non Response (%)	Total n (%)
Company conducts fire drills	132 (93.0)	2 (1.4)	8 (5.6)	142 (100)
Company conducts fire drills monthly	109 (82.6)	23 (17.4)	10 (7)	142 (100)
Trained on safety control measures	108 (76.1)	22 (15.5)	12 (8.5)	142 (100)
Trainings are done at least every 3 months	58 (53.7)	22 (16.7)	62 (43.7)	142 (100)
Handing over of duty	105 (73.9)	21 (14.8)	16 (11.3)	142 (100)
Handover on monthly basis	57 (40.1)	48 (35.1)	37 (26.1)	142 (100)
Attend fire drills	121 (85.2)	12 (8.5)	9 (6.3)	142 (100)
The use of personal protective equipment provided	112 (78.8)	23 (16.2)	7 (4.9)	142(100)
The use of personal protective equipment provided always	78 (54.9)	34 (23.9)	30 (21.1)	142(100)
The use of personal protective equipment as recommended	107 (75.4)	24 (16.9)	11 (7.7)	142(100)
Report any unsafe procedure or situation	118 (83.1)	12 (8.5)	12 (8.5)	142(100)
The use of safety/ operating manual provided for procedures	102 (71.8)	20 (14.1)	20 (14.1)	142(100)

Majority 101(71.2%) agreed that they are adequately motivated to comply with the hazard control initiatives of the depot, while 39(27.5%) of them agreed that the periodic medical examination of depot staff is necessary. (Table 7)

A high proportion of the respondents 121(85.2%) have

Table 10. Respondents' compliance with safety procedures

Item	Frequency			
	Yes (%)	No (%)	Non Response (%)	Total n (%)
Comply with safe work practices e.g fire drill, health talks or training	131 (92.3)	1 (0.7)	10 (7)	142(100)
Get feedback about the hazards and hazard control methods in the company	107 (75.4)	14 (9.9)	21(14.7)	142(100)
Comply with hazard control measures in the depots	28 (19.7)	8 (5.6)	106(74.6)	142 (100)
Comply with the use of PPE	113 (79.6)	10 (7.0)	19(13.4)	142 (100)
Attend fire drills as scheduled	128 (79.6)	6 (4.2)	8(5.6)	142(100)
Comply with periodic medical examination	130 (91.5)	7 (4.9)	5(3.5)	142 (100)

Table 11. Overall Ranking of Respondents' Compliance with Occupational Hazards and Safety

Item	Frequency (%)
Positive	122 (85.9)
Negative	20 (14.1)
Total	142 (100)

Table 12. Relationship between department and compliance with occupational safety

Department	Compliance with occupational safety		Total
	Good Freq (%)	Poor Freq (%)	
Health Safety and Environment	0 (0)	29 (100)	29 (100)
Maintenance	0 (0)	22 (100)	22 (100)
Medical/Office	6 (32)	13 (68)	19 (100)
Operations	2(4.3)	64 (95.7)	66 (100)
Non Response			6 (100)
Total	8 (36.3)	134 (63.7)	142 (100)
df=9, (*f*=0.00)			

a positive attitude towards occupational hazards. (Table 8)

Almost all 132(93%) of respondents say the company conducts fire drills, more than three-quarters 108(76.1%) have been trained on safety control measures, less than half 57(40.1%) of them hand over duties on monthly basis, 121(85.2%) have attended fire drills conducted in the company. Over three-quarters 112(78.8%) of the respondents have used the personal protective equipment provided, majority 118(83.1%) report any unsafe procedure or situation and a relatively high proportion 102(71.8%) use the safety/operating manual provided. (Table 9)

Most 131(92.3%) of the respondents comply with safe work practices, about three-quarters 107(75.4%) get feedback about hazards and control methods in the company. Most 128(79.6%) of the respondents attend fire drills as scheduled and comply with the use of personal protective equipment respectively, whereas only 130(91.5%) do periodic medical examination. (Table 10)

A high proportion of respondents 122(85.9%) have a positive compliance with occupational hazards and safety procedures. (Table 11)

Compliance with Occupational safety is generally poor among the respondents across all departments except Medical/office department 6 (32%). There is a statistical significant relationship between DEPARTMENT and COMPLIANCE at 95% level of significance $p \leq 0.05$. It was also observed that staffs in the Operations and Medical/Office departments exhibited the highest proportion of compliance. (Table 12)

The knowledge of occupational hazards was very high

Table 13. Relationship between education status and level of knowledge of occupational hazard among oil workers

		Knowledge		Total
		Good	Poor	
Edu	NR	3 60.0%	2 40.0%	5 100.0%
	Secondary	2 100.0%	0 0.0%	2 100.0%
	Technical	123 100.0%	12 0.0%	135 100.0%
Total		128 90.1%	14 9.9%	142 100.0%

Table 14. Relationship between educational status and occupational safety practice

Educational Status	Occupational Safety Practice		Total
	Good Freq (%)	Poor Freq (%)	
Secondary	0 (0)	2 (100)	2 (100)
Post secondary	118 (87.4)	17 (12.6)	135 (100)
Non Response	4 (80)	1 (20)	5 (100)
Total	122(85.9)	20 (14.1)	142 (100)
df=3, p=0.001 (Fishers *f*=12.89)			

Table 15. Relationship between education status and compliance with occupational safety among oil workers

		Compliance		Total
		Negative	Positive	
Edu	NR	2 40.0%	3 60.0%	5 100.0%
	Secondary	0 0.0%	2 100.0%	2 100.0%
	Post Secondary	7 6.4%	128 100.0%	135 100.0%
Total		9 6.3%	133 93.7%	142 100.0%

among respondents with post secondary education 128 (90.1%). (Table 13)

There is a statistical significant relationship between Educational Status and Knowledge of Occupational Hazard ($p = 0.04$) at 95% level of significant $p \leq 0.05$. X= 8.2, $f = 0.003$, $df = 3$.

Occupational safety practices are poor among respondents with secondary education 2 (100%) and relatively low 17 (12.6%) in respondents with post secondary education. There is a statistical significant relationship between Educational Status and Practice at 95% level of significance $p \leq 0.05$. (Table 14)

Compliance was quite high among those with post secondary education 133(93.7%)

There is a statistical significant relationship between Educational Status and Compliance ($p = 0.01$) at 95% level of significant $p \leq 0.05$. X= 11.37, $f = 0.004$, $df = 3$. (Table 15)

Chi-square value (X^2) = 6.64 $f = 0.18$, df =4, p-value= 0.16. Respondents have a positive compliance to occupational safety practices in all the groups. There is no statistical significant relationship between Length of Service and Compliance with Occupational Safety at 95% level of significant $p \leq 0.05$

Observer's checklist for workers' compliance with safety standards

Table 19 shows the observation of the use of protective equipments among the respondents in Ejigbo depot and Atlas Cove depot. From Ejigbo depot, it was observed that over half of the respondents 62(87.3%) use

Table 16. Relationship between length of service and compliance

		Compliance		Total
		Negative	Positive	
Duration	Less than 1YR	2 (25.0)	6(75.0)	8 (100)
	1-3YRS	2 (7.4)	25(92.6)	27(100)
	3-6YRS	0 (0)	23(100)	23(100)
	More than 6YRS	5 (6.3)	74 (93.7)	79(100)
	NR	0(0)	5(100)	5(100)
Total		9 (6.3)	133 (93.7)	142 (100)

Table 17. Location- Ejigbo Depot

S/N	Observation	YES	NO
	Face Masks	√	
	Helmet	√	
	Goggles		√
	Earmuffs		√
	Apron	√	
	Safety Boots	√	
	Hand Gloves	√	
	Fire Blanket		√

Table 18. Location- Atlas Cove Depot

S/N	Observation	YES	NO
	Face Masks	√	
	Helmet	√	
	Goggles	√	
	Earmuffs		√
	Apron	√	
	Safety Boots	√	
	Hand Gloves	√	
	Fire Blanket		√

Table 19. Compliance with safety measures in Ejigbo and Atlas Cove depot

Occupational Safety Equipments	Compliance (Ejigbo) Freq (%) (n = 71)	Compliance (Atlas Cove) Freq (%) (n = 71)
Loaders wear face masks while on duty	62 (87.3)	49 (85)
Staff members wear helmet when necessary	59 (83)	41 (70)
Loaders wear goggles while on duty	45 (63)	23 (40)
Staff members use earmuffs especially in noise laden environment	62 (87.3)	51 (88)
All staff wear apron during duties	23 (33)	24 (42)
Staff members wear safety boots	62 (87.3)	51 (88)
All staff wear hand gloves for procedures	68 (96)	53 (92)
There are fire blankets in the loading bay	57 (80)	43 (74)

face masks, ear muffs and safety boots especially at the operations and maintenance department. Few respondents however reported using Apron 23 (33%) while a high proportion use hand gloves 68 (96%). It was also observed that compliance with the use of PPE was higher among staff in operations department compared with maintenance department. On the other hand, from the result on the use of protective equipments among the respondents in Atlas Cove depot, majority of the respondents 51 (88%) use ear muffs and safety boots while 49 (85%) of respondents use face masks. A high proportion of respondents 53 (92%) use hand gloves while few respondents 23 (40%) however were observed using goggles.

DISCUSSION OF FINDINGS

This study assessed the knowledge, attitude and compliance with occupational health and safety practices among staff of Pipeline and Product Marketing Company (Atlas Cove and Ejigbo Depots). One hundred and forty two (142) staffs took part in the study.

Results showed that the mean age of the respondents was 31±17.98yrs which was slightly lower than that of a study carried out in Kaduna with a mean age of 32±19.87 yrs. There were more males in the depots constituting 77% of the respondents. Also, 77% of the respondents were married while 22% were never married, this also conformed to the Kaduna study of which majority of the respondents 90% were also males and 78% had completed tertiary education (Aliyu and Saidu; 2011). A high proportion of the respondents (95%) had post secondary education which is as a result of the company's policy on minimum educational level at the point of entry. This finding corroborates a study that shows that level of education influences worker health and safety in the workplace (Gyekye and Salminen; 2005). Also, level of education has been shown to provide the appropriate skills needed to achieve social status and make healthy lifestyle choices, hence a high level of education increases the awareness of occupational safety, this supports the findings in this study which shows that knowledge was very high among respondents with post secondary education, 128 (90.1%). On the other hand, a study found out that workers who had tertiary education were less likely to regularly use personal protective equipment compared to those with secondary education thus debunking the claims by other studies (Paramasivain, 2007). On the contrary, this study found out that those with post-secondary education 118 (87.4%) also had good occupational safety practices.

The level of knowledge of occupational hazards among respondents was high, 128 (90.9%) of the respondents had good knowledge of hazard control methods. The respondents identified fumes in the depot 129 (90.8%), smoking in the depot 125 (88%) and noise 102 (71.8%) as major hazards. On physical hazards, a high proportion of respondents 99(69.7%) identified wet floors while 93 (65.5%) recognized clustered environment as hazards. Respondents identified petroleum fumes 109 (76.8%) as a chemical hazard while 43 (30.3%) reported that Benzene is also a major chemical hazard. A study of gas station workers corroborates these findings where workers reported occupational accidents, and 74.2% reported fuel contact with the eyes, the study concluded that staff members tend to relate risks with the occurrence of occupational accidents as an indicator of the dangerous nature of their work environment (Aliyu and Saidu; 2011, Antonsen; 2009). Respondents also identified machine with high powered force 67 (47.2%), Sharp edge machine 51 (35.9%) and pointed edge machine 46 (32.4%) as major mechanical hazards. Psycho social hazards were also identified by the respondents and they included long hours of work 79 (55.6%) and worker relationship 44 (31%). Management-worker relationship has been found to influence workers' perception of safety laws and productivity at work. A study on the workers' views on occupational safety and health in the workplace from Sub Saharan Africa reported that workers complained that they are often ignored due to various management styles and a shortage of safety regulations, allowing for little reflection for worker contribution. As a result, the plight of workers is left in the hands of health and safety professionals, industrial hygienists, academics and industrial managers while workers' perceptions on the subject are seldom considered (Graham; 2008). In the same vein, another study from Khuzestan Petrochemical Company revealed that management commitment, actions for safety, workers' knowledge and compliance to safety had the highest correlation coefficient with ergonomic behaviours hence could serve as a model for ergonomic behaviour forecasting. A similar study in North Central Nigeria identified noise 67 (26.1%), 25 (9.6%) heat and 60 (23.2%) electric shock as a hazards (Osagbemi 2010), which is also in consonance with other studies amongst cement workers, who identified dust, heat, milling machines and smoke as major hazards in their factory (Ezeonu and Edogu; 2005, Hafiz and Mark; 2010).

Some workers who had spent more than fifteen years in their present location claimed that they needed a change due to the fact that they have been doing the same routine work over the years but in another study in United Arab Emirates, majority 66.7% of workers had spent more than 20years in their current work (Hafiz and Mark, 2010). A study among sawmill workers found out that workers who spend more than 8 hours a day doing the same job over the years, experience stress which is somehow in line with the findings in this study, about workers who have spent more than fifteen years doing the same routine work (Osagbemi, 2010).

On employments details, fifty percent 71 (50%) of the respondents were from Ejigbo depot while 58 (41%) of respondents were from Atlas Cove depot. A high proportion of the respondents 66 (47%) came from the Operations department in all the depots while HSE (Health, Safety and Environment) constitute 29 (20%) of the respondents. A large proportion of the respondents 52 (36%) had spent more than 10 years at the depot while 39 (28%) of respondents had spent less than 5 years at the depot. The mean number of years spent in Service was however 9.8±8.1yrs. A study reported that compliance with preventive measures was found to be good among those who were recently employed in the industry. This implies that staffs may become complacent in their usage of safety precautions and PPEs while on duty as their service year increases but on the contrary, this study revealed that even staffs who had spent more than 6years 74 (93.7%) complied with occupational

safety measures.

Awareness of control programme and knowledge of hazards control methods

A high proportion of respondents (68.3%) had a high level of awareness of hazards control in the depot. Majority of the respondents identified functional fire trucks (97.9%) and constant power supply (91.5%) as the major hazard control points in the depot. Other important areas observed included fire alarm in the depot premises (92.3%), adequate water supply (89.4%) and functional sump pits (88.7%). Along the same vein, findings from a comparative study of a public and private depot in Lagos Nigeria, the workers in the private depot identified constant power supply (79.1%), fire alarm (68.6%), adequate water supply (86.4%) and functional fire trucks (80.7%) while staff of the public depot identified fire alarm (80.7%), constant power supply (87.5%), adequate water supply (86.4%) amongst others as hazard control methods (Bassey, 2012).

A high proportion of respondents agreed that safety practices are essential in the depot and must be carried out by all staff members. Such practices included conducting fire drills (93%), training on safety control measures (76.1%), using personal protective equipment (78.8%), reporting unsafe procedures (83.1%) and using operating manuals (71.8%). This compares with the study in India where the respondents knew that the use of personal protective equipment was a safety practice (Nosheen and Vikram, 2002).

Respondents' attitude towards occupational hazards and safety

A high proportion of respondents (85.2%) had a positive attitude towards occupational hazards. Seventy four (52.1%) respondents agreed that they were satisfied with the conduct of fire drills in the depot while (59.2%) of respondents strongly agree with the no-smoking policy in the depot. About (45.1%) respondents agreed that they were motivated to comply with the hazard control initiatives while (62%) of respondents strongly agreed that periodic examination is necessary in the depot. Furthermore, (50%) respondents agreed that they were satisfied with the 'No phoning policy' in the depot while (34.5%) strongly agreed that housekeeping in the depot is effective. Overall, (85.2%) of respondents had a positive attitude towards occupational hazards, unlike in a study carried out in Nairobi on attitude and practices of health workers regarding needle stick injuries, despite knowing the risks the frequency of needle stick injury was higher among respondents. This reflects careless attitude towards work. Another study in Vietnam to assess the knowledge and attitude of workers to protect themselves from the health effects associated to sulphur dioxide exposure, amongst 403 craftsmen interviewed, results showed good knowledge levels and good attitude scores as low as 3.72% and 4.22% respectively (Truong, 2009).

Respondents' compliance with safety procedures

Compliance with safety practices was high among the respondents. A high proportion of respondents (92.3%) reported complying with safe work practices, (75.4%) got feedbacks on hazard control methods, (79.6%) complied with the use of PPE, (79.6%) attended fire drills while (91.5%) respondents do the periodic medical examinations. However, only 28 (19.7%) respondents agreed that the facility implements a monitoring programme to ensure compliance with hazard control measures in the depots. Overall, 122 (85.9%) respondents had a positive compliance with occupational hazards and safety. A study carried out in Oyo state to assess the knowledge, attitude and compliance reported that compliance with preventive measures was found to be good among those who were more recently employed in the industry (Onajole, 2004). This is contrary to the finding in this study which shows that 79(93.7%) of those who have spent more than 6years had a good compliance with occupational safety practices.

Form the test of association between department and compliance with occupational safety, a statistical significant relationship was observed at 95% ($p \leq 0.05$) level of significance where p=0.001. This implies that compliance with occupational safety practices is not at the same level across all departments i.e. Medical and Operations departments had the highest proportion of positive compliance.

Report on Observation/Checklist on the practice and attitude of staff with hazard control methods in Ejigbo and Atlas Cove Depot

The observation checklist for Ejigbo depot showed that staffs adhere to the use of PPEs such as Face masks (87.3%), Helmet (83%), Goggles (63%), earmuffs (87.3%), safety boots (87.3%), hand gloves 68 (96%) and fire blankets (80%). However, only a few staffs (33%) wear aprons during duties this was in contrast with the findings in a study in Kaduna, where the workers were aware of the hazards yet they did not wear their personal protective equipments (Aliyu and Saidu, 2011). Another study in the United Arab Emirates also revealed that despite the workers knowledge of the hazards, the use of personal protective equipment was very poor.

The observation checklist from Atlas Cove depot also revealed that compliance with the use of protective equipments was low among the respondents compared

to respondents from Ejigbo depot. Staff members reported using Face masks (85%), Helmet (70%), Goggles (40%), earmuffs (88%), apron safety boots (88%), hand gloves (92%) and fire blankets (74%). All these findings are in line with a study in Ilorin where the non-use of personal protective equipment was as high as (56.9%) and the reason given was that they were discomforting as revealed in this study (Osagbemi; 2010).

The checklist was used to observe the practice of hazard control methods and where possible, records were examined to ascertain the usage of PPEs and other safety practices in the departments. Safety signs and PPE symbols like helmet face masks nose masks, boots and other safety wears were displayed at strategic locations in both depots. This is to ensure compliance with the safety measures. Machines which are to be controlled manually or remotely had warning signs and symbols pasted on them. Fire exit pathways were also created in closed areas to prevent choking and overcrowding. This is in accordance with World Health Organisation standard for occupational health safety practices.

From the Loading bay, loaders are expected to wear face masks as protective equipment. Compliance was high in both depots as over 80% of staff members wore face mask while on duty. The use of helmet was also high among the workers in both depots. Majority of workers operating machines and tankers wore helmet while others outside the loading range wore only the safety suit provided. The use of safety goggles was however very low in Atlas Cove depot compared to Ejigbo which had 63% compliance rate. Only loaders were seen wearing the goggles as expected by the safety policy. Earmuffs were used by staff members in noise laden environment. Although the use of Apron was generally poor in both depot, the use of safety boot was however high among the respondents. This is to ensure that slips, falls and accidents are reduced among the staff members. A high proportion of the respondents were also seen using hand gloves in both depots. Equipment and fire fighting tools seen in the depot included fire extinguishers, fire blankets and others. These finding corroborates the findings of the studies carried out amongst cement workers in the South- Eastern Nigeria, where workers were provided with personal protective equipments but failed to put them on. Their excuse was that they were discomforting and only used them when compelled (Ezeonu and Edogu, 2005).

Another study in Edo and Delta States also revealed that 96.7% of the workers failed to use personal protective devices while another study in Lagos showed that the compliance with the use of personal protective devices was associated with sex and education (Onajole; 2004, Paramasivain; 2007).

CONCLUSION

The study assessed knowledge, attitude and compliance with occupational health and safety practices among staff of Pipelines and Product marketing company in Lagos.

The staffs were able to identify various hazards available in the depot. The hazards included Physical such as excessive heat or cold, light (glare or darkness) humidity, radiation, noise etc. The chemical hazards-lead, mercury, benzene, petroleum fumes, Mechanical hazards included sharp edged machine, pointed edged machine, machine with high powered force, psycho-social relationships which included worker-worker and worker-management relationships, long hours of work and workers' consideration in formulating company's policy. Staff members identified various hazard control measures available in the depot such as Fire extinguishers placed at strategic places, fires and smoke detectors in the buildings, functional sump pit and constant power and water supply. They also identified personal protective equipments which include ear muffs, face masks, safety boots, and safety vests and so on.

Their knowledge of occupational hazards and control measures was also very high while they showed a positive attitude towards hazard control measures by complying with the safety precautions of using PPE especially during loading at the depot. Compliance with hazard control was however higher among staff members in Atlas cove depot compared to Ejigbo although no significant difference was observed in their adherence to PPE usage. Challenges as observed by staff included lack of management commitment to safety practices and lack of adequate funding of safety programmes and equipments. Others included unavailability of needed advanced safety tools and equipments, PPEs, re-trainings and non-conducive working environment.

RECOMMENDATION

The following recommendations were made based on the findings of this study. These recommendations will improve the compliance of staff members with hazard control methods in the depot.

Management

1. Funding of safety programmes, re- training of staff to maintain the present level of knowledge and facilities should be improved upon.
2. The policy of the company should include regular and broad based safety training to all staff and a reward system for compliant staffs of the depot.
3. Appropriate and modern PPEs should be provided for staff members in the depot to improve compliance.
4. There should be supportive supervision of all staff of

the depot to comply with hazards control methods.
5. There should be regular conduct of safety audit of the depots and follow up of the audit outcome by the management team.

Employees

1. Staff members should report all accidents and near misses to the management.
2. Staff members should report all safety problems for actions.
3. Staff members should be proactive and professional in the depot especially the public depot.
4. Staff members should endeavour to comply with safety precautions in the company.

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