Novateur Publications
International Journal of Innovations in Engineering Research and Technology [IJIERT]
ISSN: 2394-3696 Website: ijiert.org
Volume 12, Issue 6, June– 2025

EFFECT OF SAFETY PREPAREDNESS ON SAFETY PERFORMANCE OF PETROL STATIONS IN SELECTED STATES IN THE NIGER DELTA

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Article History: Received on:16/03/2025
Accepted on: 05/06/2025

DOI: https://doi.org/10.26662/ijiert.v12i6.pp11-29

Abstract
This study was carried out to examine the effect of safety preparedness on safety performance of petrol stations operating in selected states in the Niger Delta. Two variables were used to operationalize safety preparedness, namely tangible and intangible safety preparedness. Two variables were also used to capture safety performance, namely near-miss occurrence and accident occurrence. The study adopted cross-sectional and correlational research designs. Multi-stage sampling technique was used to sample petrol stations operating in three states in the Niger Delta (Akwa-Ibom, Bayelsa and Rivers States) while Taro Yamane formula was used to calculate sample size of 440 petrol station attendants from the study population. Structured questionnaire designed based on 5-point Likert scale and checklist designed based on Department of Petroleum resources (DPR) regulations, were used for data collection while reliability of the instruments was determined using Cronbach alpha index. Descriptive statistics and regression were used for the data analysis. The results of descriptive statistics revealed that the safety preparedness of the petrol stations was good (tangible factors had 66.67% availability, intangible factors had weighted average (WA) = 3.12 > 3.00) and safety performance of the petrol stations was good (WA= 3.47 > 3.00). The regression revealed that the safety preparedness has positive and significant impact on safety performance of the petrol stations (B = 3.122, p-value = 0.000 < 0.05). It was, therefore, concluded that improvement of safety preparedness enhanced the safety performance of the petrol stations.

Keywords: Safety Preparedness, Safety Performance, Petrol Stations, Niger Delta

1. Introduction

Every safety conscious organization, including petrol stations, usually set aside some safety measures and safety practices, to counter any safety emergency like fire outbreak and other accidents and near-misses. The integration of all safety details, safety related activities and practices carried out, installed or instituted by any organization to prevent safety emergency situations are referred to as safety preparedness factors (Rohde *et al.,* 2010). Safety preparedness, in petroleum related companies like petrol stations, depend on two factors.

First, availability of suitable and appropriate knowledge about danger and harmful effects of petroleum products and secondly, having substantial and adequate safety measures put in place against possible dangers and hazards which will then translate to appropriate attitude to the health risks associated with exposure to these products. For instance, the first safety preparedness measures for petrol stations, is to ensure that they are sited in such a way that they are not under high tension electricity. The second safety preparedness factor is to ensure that accesses are positioned in places where they will cause less congestion and less danger. Other safety preparedness includes presence of escape doors, availability of fire functional extinguishers, fire safety signages and other safety signages, safety trainings, emergency response drills and other safety related motivations. There are safety preparedness measures required to ensure smooth and safe operations of the petrol stations in Nigeria. Unfortunately, most petrol station in Nigeria are not substantially safety prepared which usually led to series of accidents and incidents in petrol stations in Nigeria, particularly in the Niger Delta for instance (Rohde *et al.,* 2010).

Therefore, there are two main forms of safety preparedness factors: Tangible safety preparedness factors and intangible safety preparedness factors. Tangible safety preparedness factors are visible and palpable safety preparedness factors that are easily noticed and observed in any organization which are installed or instituted in cases of safety emergency. As concerned this current study, which focused on petrol stations, some tangible safety preparedness factors were: Availability of safety signages, availability of functional fire extinguishers, maintenance of storage tanks and dispensing pumps, presence of panic alarms, use of close circuit television (CCTV), availability of mechanical protection structures for vulnerable structure like fuel tanks and LNG storage tanks and keeping escape routes and fire exists clear. While Intangible safety preparedness factors are invisible and impalpable safety preparedness factors that are not easily noticed and not usually observed in any organization which are also instituted in the organization to curb, prevent and control safety emergencies. As concerned this current study focused on petrol stations, some intangible safety preparedness factors were: Safety training, safety culture and safety climate.

Over the years, several regulations on health and safety have been implemented by Nigerian Upstream Petroleum Regulatory Commission (NUPRC) to reduce the occurrence of these kind of accidents in petrol stations and to improve occupational health and safety performance of petrol stations operating in Nigeria. Despite the implementation of these regulations, accidents still occur. Several authors have reported that the underlying cause of accidents in major petroleum-related industry such as petrol stations was human error (Grier & Sidnell, 2010; Rasmussen, 1980; Theophilus *et al*., 2017). According to Rasmussen (1980) human errors are specific acts that can either directly (active errors) or indirectly (latent errors) cause an accident. Studies have also investigated the role of human error in accident causation and suggested different models to measure and manage human error (Theophilus *et al*., 2017). Safety performance is also fundamental to the operation of the petroleum related industry like petrol stations. Researchers have shown much interest in safety performance because of its importance in assessing safety conditions in any organization or system (Borman & Motowildo 1993; Clarke, 2006; Neal et al. 2000). Safety performance can be measured at the organizational level by considering the number of occupational accidents or injuries that took place at work.

In the last few decades, petrol stations in Nigeria, including those in the Niger Delta have experienced series of fire accidents. For instance, according to Vanguard Newspaper of 22nd September 2020, there was fire outbreak at AP petrol station in Iwofe road Port-Harcourt. According to an eye-witnessed who spoke to the Vanguard correspondent; the fire outbreak was caused by leakage in a tanker that was dispensing petrol to the petrol station which was ignited by open plug head of a motor bike that came to refill in the petrol station. The inferno lasted for hours before the fire-service operative came to their rescue because the operatives and staff

of the petrol station did not have basic knowledge on how to tackle fire-outbreak. Though there was no human casualty, but the entire petrol station was burnt down by the fire before the arrival of the fire-service personnel. There are other cases of fire incidents in petrol stations at Akenfa, a suburb of Yenagoa, in Bayelsa State and also in NNPC Mega Station along Ikot Ekpene Road in Uyo, Akwa Ibom State.

A closer investigations of these three aforementioned fire accident cases which involved three different petrol stations sited in three states in Niger Delta, Rivers, Bayelsa and Akwa-Ibom revealed that the remote and immediate causes of these accidents, and inability to resolve the fire situation without substantial loss of properties could be traced to poor safety preparedness and bad behaviour of workers towards safety; The first case in Rivers State occurred because the workers and management of the petrol station were careless because they were supposed to inspect the tanker for any leakage and take necessary measures in terms of keeping safe distance from dispensing pumps before offloading the tankers. The second case in Bayelsa State occurred due to insensitivity and carelessness of the workers because they must have observed the condition of the generator on several occasions but ignored it and finally the case in Akwa-Ibom State occurred out of carelessness and insensitivity of the pump attendant.

Generally, it could be observed that these fire incidents could have been handled without substantial loss of properties, if the petrol stations were safety prepared in terms of availability of functional fire extinguishers, training of the workers on fire safety, placing suitable safety signages and others. The question now is, can we conclude that safety performance of petrol stations as it concerns preventing fire related accidents and injuries, is related to the safety preparedness of the management of the petrol stations? Therefore, this study seeks to answer this question by investigating the relationship between safety preparedness and safety performance of the petrol stations operating in the Niger Delta.

2. Material and Methods

2.1 Research Design

The research design adopted for this study was a combination of cross-sectional and inferential design. Cross sectional design was adopted to determine the opinion of the respondents on the level of safety preparedness (tangible and intangible safety preparedness factors) and the opinion of the respondents on the level of the safety performance of the petrol stations. This research design was suitable and also appropriate for this section of the research because in cross sectional, the researcher measured only the response, opinion, level of exposures or perception of the study respondent or participants using quantitative data obtained from them and thereby determined the degree or level of the opinion, response, exposure or perception of the respondent or participants without expressing any form of relationship between the variables being studied. Inferential design was also adopted for this study to ascertain; the effect of safety preparedness (intangible preparedness factors) on safety performance (Accident occurrence and near-miss occurrence). The latter being the dependent variable while the former was the independent variable.

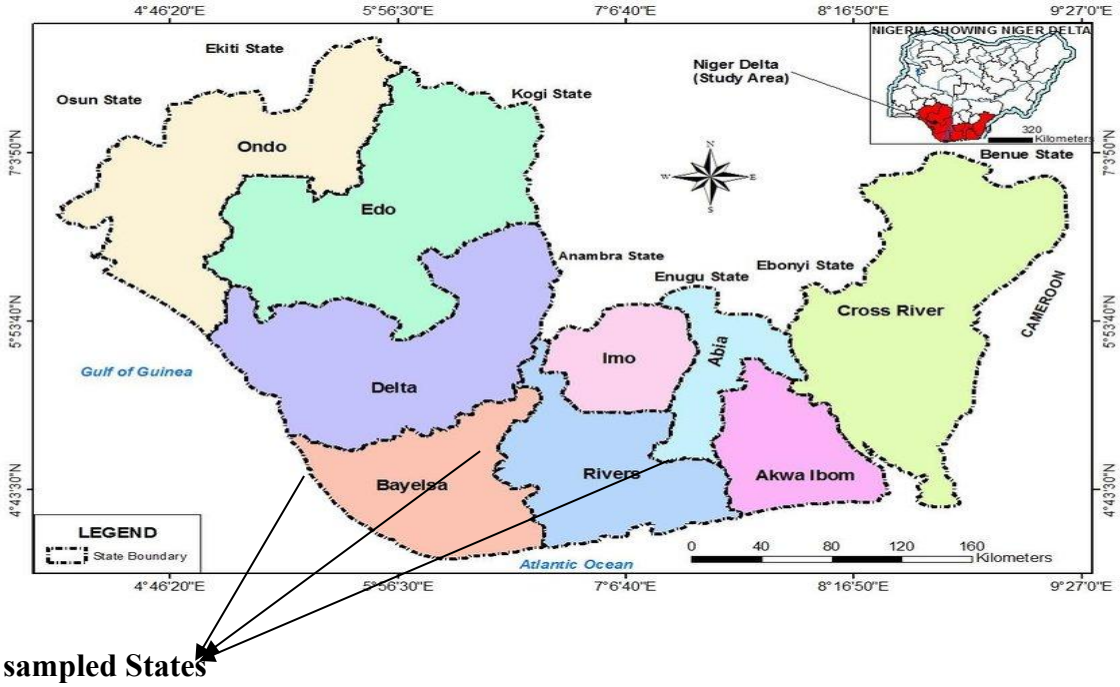
2.2 Study area

This study was focused on the nine Niger Delta States of Nigeria (See Figure 1). The petrol stations located in some selected states were considered in this study. According to Hogan (2013), the Niger Delta is the delta of the Niger River sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria, consisting of nine oil producing states.

Niger Delta is Nigeria's centre for oil and gas exploration activities and home to Nigeria's MOA prolific oil and gas zones. The region has a land area of 70,000km^2, representing about 7.5% of the total land mass of

Nigeria (Akalonu, 2019). In terms of coordinates, the region lies between lat. $5^{o}19^{1},20.40^{11}$N of the equator and long $6^{o}28^{1},8.99^{11}$E of the Greenwich meridian line. The region is densely populated with more than 40million people living in it and bounded on the south by the Gulf of Guinea within the Atlantic Ocean and on the east by Cameron (Akalonu, 2019). Predominant occupation of the people is farming and fishing, see Figure 1.

The choice of this region was because of the high concentration of petrol stations in this region and continued fire accidents that frequently occur in these petrol stations within this region with associated high-risk of loss of lives and properties or injuries to workers and customers of these petrol stations, thus there was a need to assess their level of safety preparedness to these fire emergencies and how the safety preparedness of the petrol stations affected their safety performance in terms of accidents and near-miss occurrences.



The three sampled States

Figure 1: Map of Niger Delta showing the three sampled states

2.3 Population of the Study

The population of this study comprised all the licensed and registered petrol stations operating in Niger Delta States. According to Department of Petroleum resource (DPR) (2021), there are over seven thousand registered petrol stations operating in Nigeria. However, the number of petrol stations operating in the Niger Delta according to DPR (2021) are presented in Table 1. Thus, from Table 1, the population of this study were 1245 petrol stations.

Table 1: Number of petrol stations in Niger Delta states (DPR, 2021)

SN	States	Number of licensed Petrol stations
1	Abia	143
2	Akwa-Ibom	167
3	Bayelsa	63
4	Cross-river	153
5	Delta	174
6	Edo	149
7	Imo	119
8	Ondo	93
9	River state	184
	Total	**1245**

2.4 Sampling Technique

Because of the geographical scope of this study as well as the inconsistency in the number of workers operating in the study area, the multistage sampling technique was adopted, and it involved the following stages.

1. **Stage one:** Random sampling technique was used to sample three states out of the nine states in the study area. the state considered were Akwa-Ibom, Bayelsa and Rivers.
2. **Stage two:** Purposive sampling technique was used to select the state capitals of the three states sampled in stage one which includes, Uyo (Akwa-Ibom State), Yenagoa (Bayelsa State) and Port Harcourt (Rivers State). The choice of the capital cities was because majority of the petrol stations are usually sited in the state capitals because of the massive economic and administrative activities that are mostly witnessed in the state capitals which usually required huge fuel energy consumptions.
3. **Stage three:** Purposive sampling technique was used to sample only registered petrol stations operating in the three state capitals both government-owned and private owned.

2.5 Sample size determination

From the three states sampled in stage one, Akwa-Ibom, Bayelsa and Rivers and considering Table 1, there were 414 petrol stations within the three sampled states. If each of the petrol stations had at least 5 employees, then the population of the sampled petrol stations became 2070, so using the Taro Yamane sample size determination formula expressed in Equation (1):

$$n = \frac{N}{(1+N)(\varepsilon)^2} \qquad (1)$$

where n is the sample size, N is the population under study (2070), ε is the margin of error (which is 0.05 at 5% level of significance respectively). Then, the sample size is 400, adding 10% of the sample size to cover for possible error in filling of the questionnaire, the final sample size became 440. This sample size was distributed to the three sampled states proportionate to the number of petrol stations in the state, thus, Rivers State with 184 petrol stations was allotted 196 respondents, Akwa-Ibom State with 167 petrol stations was allotted 177 respondents while Bayelsa State was allotted 67 respondents since they had the least number of petrol stations at 63.

2.6 Instrument for Data Collection

Data were collected using well-structured questionnaire and Checklist. Instructions were fully explained to the respondents before completion of the questionnaire. The questionnaire used in this study was designed to have three sections (A, B and C). Section A was used to obtain information on demographic of the respondents, Section B was used to obtain data on intangible safety preparedness indicators, while section C was used to obtain information on safety performance of the petrol stations. The checklist was designed using the NUPRC report on safety practices and safety procedures in petrol stations on the tangible safety preparedness indicators. The questionnaire was designed based on Five-point Likert Scale of strongly Agreed (SA), Agreed (A) Undecided (UN) disagreed (D) and strongly disagreed (SD) with weighted value of 5, 4, 3, 2 and 1, respectively.

2.7 Validity/ Reliability of Study Tool

The face and content validity of the instruments was validated by experts. Test and pre-test reliability of the study instruments were carried out with sample size of 10% and their reliability were ascertained using Cronbach alpha reliability test. A Cronbach alpha coefficient of a scale above 0.70 is considered "Suitable" for the research (Nunnally & Bernstein, 1994). Table 2 shows the reliability of the study instrument based on the Cronbach alpha coefficient.

Table 2: Reliability of the research instruments used in the study

Instruments	Sections/items	Cronbach's Alpha Coefficient	Remark
Questionnaire	Section B (10 items)	0.724	Reliable
	Section c (10 items)	0.716	Reliable
Checklist	15 Items	0.850	Reliable

2.8 Methods of Data Analysis

The standard statistical tools were used to analyse the data that were collected. The descriptive statistical methods (means, percentages, weight average) and regression analysis were the methods for analysis. Descriptive statistic was used to determine the level of safety preparedness and safety performance which involved quantifying the opinion or perception of the respondents on the construct that were concerned with the level of safety preparedness and safety performance while regression models were used to determine the effect of safety preparedness variables on safety performance variables.

2.8.1 Model Development

Multi-linear regression models were developed to capture the effect and impact of safety preparedness indicators on the safety performance indicators. The safety preparedness indicators are safety training (ST), safety climate (SC) and safety culture (SCU) while the safety performance accident occurrence (ACO) and near-miss occurrence (NMO). The overall form of mufti-linear regression model is presented below.

For Near-miss occurrence and accident occurrence:

$$NMO = \int(ST, SC, SCU) \quad (2)$$

$$ACO = \int(ST, SC, SCU) \quad (3)$$

Combining the indicator to form a unit for safety performance (SP) and safety preparedness (SPR) gave:

$SP = \int(ST, SC, SCU)$ (4)

Introducing the constant of linearity and formulating the model gave:

$NMO = \beta_1 ST + \beta_2 SC + \beta_3 SCU + K$ (5)

$ACO = \beta_1 ST + \beta_2 SC + \beta_3 SCU + K$ (6)

$SP = \beta_1 ST + \beta_2 SC + \beta_3 SCU + K$ (7)

where $\beta_1 \ldots \ldots \ldots \beta_n$ are coefficient of the independent factors and K is constant of the model

3. Results and discussion

3.1 Level of Safety Preparedness of the Petrol Stations in the Niger Delta

The **l**evel of safety preparedness of the petrol stations in the Niger Delta was expressed in two forms in this study, namely the intangible safety preparedness factors and tangible safety preparedness factors.

3.1.1 Level of Intangible Safety Preparedness of the Petrol Stations in the Niger Delta

The intangible safety preparedness factors were captured using three major concepts, namely safety training, safety climate and safety culture. These three concepts were operationalized in the questionnaire using ten items such that the first four items captured safety training, the next three items captured safety climate while the last three items covered safety culture. Table 3 shows the results of the response of the respondents on the level of these various intangible safety preparedness factors. The first four items (1 to 4) covered the results of the response of the respondents on safety training. The result revealed that the respondents disagreed to the first two items covering the regularity and sufficiency of the safety training offered to petrol station attendants which suggests that the safety trainings offered by majority of the petrol stations in the Niger Delta were insufficient and not carried out regularly. The respondent agreed to the last two items covering the suitability and importance of the safety trainings offered by the management of the petrol stations which suggests that majority of the respondents agreed that the safety trainings offered by the management of the petrol stations were suitable for the job and important in helping them avoid accidents and incidents in their various stations. The next three items five (5) to seven (7) covered the safety climate and the results revealed that the respondents agreed to the first item which covered the nature of safety-related communication between the petrol station attendants and the management which suggests that there was good communication between the management and petrol station attendants concerning safety related issues. The respondents were undecided in the second item which covered the willingness of the management of the petrol stations to regularly communicate safety and health related issues to the petrol station attendants. The respondent disagreed on the last item which covered the willingness of the management to accept safety-related suggestions from the pump attendants which means that majority of the petrol station management do not allow or accept safety-related suggestions and inputs from the pump attendants.

The last three items (8 to 10) covered the response of the respondents on the safety culture of the petrol stations, and the results revealed that the respondents agreed on the first item which was concerned with the awareness of management safety policies. The results revealed that respondents disagreed on the second item concerning regular safety pep-talk before resumption of work on daily bases. This result suggests that majority of the pump attendants disagreed on conduction of regular safety pep-talk before resumption of work by the management. The respondents agreed to the item which supposed that “Safety issues are given high priority in by the workers and managers of the petrol stations”.

Table 3: Level of intangible safety preparedness of the petrol stations in the Niger Delta

S/N	Safety Preparedness Items	SD.	D.	UN	A.	SA	WA	Remark
1	Safety trainings are done regularly in the petrol station	219.00 53.80%	0.00 0.00%	0.00 0.00%	71.00 17.4%	117 28.70%	2.68	Disagreed
2	The safety training done in the petrol station are sufficient	200.00 49.10%	53.00 13.02%	5.00. 0.00%	24.00 5.89%	130.00 31.99%	2.72	Disagreed
3	The safety training done in the petrol station are suitable for my work	125.00 30.77%	53.00 13.02%	5.00. 1.22%	24.00 5.89%	200.00 49.10%	3.13	Agreed
4	The knowledge I acquired from safety trainings help me avoid accidents and incidents	115.00 28.25%	50.00 12.28%	5.00. 1.22%	27.00 6.66%	210.00 51.59%	3.24	Agreed
5	There are good communications between the manager and workers about health and safety issues	47.00 11.55%	0.00 0.00%	0.00 0.00%	177.00 43.49%	183.00 44.96%	4.10	Agreed
6	The manager always talks to us about health and safety matters in the petrol stations	47.00 11.55%	175.00 43.00%	0.00 0,00%	105.00 25.80%	81.00 19.65%	3.00	Undecided
7	The management of the petrol stations encourages suggestions on how to improve health and safety	183.00 44.96%	177.00 43.49%	0.00 0.00%	10.00 2.45%	37.00 9.09%	2.86	Disagree
8	The workers and manager are aware of safety policy.	105.00 25.80%	45.00 11.32%	10.00. 2.25%	27.00 6.66%	220.00 54.05%	3.32	Agree
9	The workers and manager involve in regular safety morning pep-talk before resuming work	173.00 42.50%	170.00 41.76%	7.00 1.71%	20.00 4.9%	37.00 9.09%	2.91	Disagree
10	Safety issues are given high priority in by the workers and managers of the petrol station	120.00 29.48%	50.00 12.28%	5.00. 1.22%	22.00 5.41%	210.00 51.59%	3.21	Agreed
	Mean of weighted Average						3.12	Agreed

3.1.2 Level of Tangible Safety Preparedness of the Petrol Stations in the Niger Delta

The tangible safety preparedness level of the sampled petrol stations was assessed using checklist which contained fifteen items on the vision safety design of the petrol stations which showed the level of safety preparedness. In this study, eighty-two petrol station were used from the three states used in this study such that thirty-one (31) petrol stations were used in Akwa-Ibom, thirty-eight (38) in Rivers State and thirteen (13) in Bayelsa state. Table 4 shows the results of the descriptive statistics analysis carried out on the data collected in the study. The result showed that majority of the petrol stations (91.50%) were built at recommended distance of at least 1.5 meters from the edge of the road to the closest pump station while only few (8.50%) failed to comply to this safety rule.

The outcome of the checklist revealed that all the petrol stations sampled were located away from high tension electricity power line and has separate entrance and exit pathways. The checklist assessment revealed that majority of the petrol stations (95.13%) has adequate fencing system of at least 1.5 meter while only very few (4.87%) do not have adequate fencing of up to 1.5 meters. It was also observed that 57.32% of the petrol stations have functional earthling systems while 42.68% do not have functional earthling systems, and that all the petrol stations used underground tank systems while majority (92.68%) had leakage detection systems while only few (7.32%) do not have the leakage detection systems. It was observed that majority of the petrol stations (82.95%) do not have working CCTV that monitors and records activities in the petrol stations which only very few (17.05%) had functional CCTV to monitor and record activities in the petrol stations, and majority (60.98%) also had functional fire extinguishers while few (39.02%) do not have.

It was also noticed that only few (28.05%) petrol stations had fire protection systems (smoke detection) while most (71.95%) of the petrol stations do not have and majority (54.87%) of the petrol stations do not have a list of emergency numbers positioned in areas where they are visible to people while few (45.13%) of the petrol stations had a list of emergency numbers positioned in areas where they were visible to people. The results also revealed that all the petrol stations have emergency entrances and exits that were free from obstacles while only few (24.40%) petrol stations had muster points while majority (75.60%) do not have muster points. The results also showed that majority (68.29%) of the petrol stations do not have general fire alarm systems while only few (31.71%) do have general fire alarm system. Finally, the results revealed that majority (85.37%) of the petrol station had safety warning signages in the petrol stations placed in visible positions for people to see and were easily understood to anybody while only few (14.63%).do not have safety warning signages in the petrol stations

Overall, it could be stated that petrol stations within the Niger Delta was safety prepared because majority of the petrol stations were safety prepared in Ten (10) out of the fifteen (15) tangible safety preparedness items considered which represent 66.67%. Therefore, there was an appreciably high level of tangible safety preparedness among the petrol stations in the Niger Delta. Hence, it can be stated that the level of safety preparedness was good in terms of both the tangible and intangible safety preparedness indicators.

These results aligned with the work of Ogbonna and Nwaogazie (2015) who carried out a study on safety preparedness in workplaces in Port Harcourt, Nigeria. The study was carried out to determine the level of safety preparedness among workers and the level of safety practice in workplaces in Port Harcourt. The results revealed that 65 out of 100 respondents confirmed knowledge of safety preparedness and practice in their workplaces. The study also concurred with work of Wanjiruwambugu (2013) who carried out a study on assessment of safety preparedness at Jomo Kenyatta International Airport Nairobi, Kenya in which the study has established that most of the respondents (89.7%) were safety prepared by being aware of the locations of fire emergency in their work place and 90.7% of the respondents were also safety prepared by being aware of firefighting appliances in their workplace needed to be used in case of fire and 91.2% could locate the appliance .

Table 4: **Level of tangible safety preparedness of the petrol stations in the Niger Delta**

A	Safety Preparedness Factors	NO	YES	Remark
1	Distance from edge of road to closest pump is above 1.5 meters	7.00 8.50%	75.00 91.50%	Good
2	The petrol station is located away from high tension cable right of way	0.00 0.00%	82.00 100.00%	Good
3	The petrol station has separate entrance and exist pathway	0.00 0.00%	82.00 100.00%	Good
4	The petrol station has adequate fencing system of at least 1.5 meter	4.00 4.87%	78.00 95.13%	Good
5	The petrol station has functional earthling system	35.00 42.68%	47.00 57.32%	Good
6	The petrol station uses underground fuel storage system	0.00 0.00%	82.00 100.00%	Good
7	The petrol station has suitable tank leakage detection system	6.00 7.32%	76.00 92.68%	Good
8	There are working CCTV that monitors and records activities in the petrol station	68.00 82.92%	14.00 17.08%	Poor
9	The fire extinguishers are available and functional	32.00 39.02%	50.00 60.98%	Good

10	Fire protection system (smoke detectors) is available in the petrol stations	59.00 71.95%	23.00 28.05%	Poor
11	List of emergency numbers are positioned where they are visible to people	45.00 54.87%	37.00 45.13%	Poor
12	Emergency entrance and exist are free from obstacles.	0.00 0.00%	82.00 100%	Good
13	Muster point is available in the petrol station	62.00 75.60%	20.00 24.40%	Poor
14	There is general fire alarm system	56.00 68.29%	26.00 31.71%	Poor
15	Safety warning sign in the petrol station are placed in visible positions for people to see and are easily understood to anybody	12.00 14.63%	70.00 85.37%	Good

3.2: Level of Safety Performance of the Workers Operating in Petrol Stations in the Niger Delta

The safety performance of the petrol stations operating in the Niger Delta region was investigated using questionnaire distributed to the respondents who were petrol station pump attendants in the petrol stations within the three sampled states in the Niger Delta. The questionnaire contained ten (10) items covering the two major aspects of lagging safety performance which were accident occurrence and incident occurrence. The first five items (1-5) captured the accidents occurrence while the last five (6-10) covered incident occurrence.

Table 5 shows the response of the respondents on the safety performance of the petrol stations. The results on the first items (1-5) capturing response of the respondents on accidents occurrence in their workplace revealed that the respondents agreed to all the five items which covered the role of sufficiency of safety resources, good communication, encouragement of suggestion in safety issues and safety prep-talk in prevention of accidents. The results of the last five items (6-10) capturing response of the respondents on incident occurrence in their petrol stations revealed that the respondents agreed to the first four items which covered the role of sufficiency of safety resources, good communication and encouragement of suggestion in safety issues in prevention of incident occurrence in the petrol stations but they were undecided on the last item which covered the role of safety prep-talk in prevention of incident occurrence in the petrol stations.

This study aligned with work of Al-Shehri (2015) carried out study to ascertain how demographics, personality traits and attitudes are linked to safety behaviours in different workplaces and their roles in nuclear power plants (NPPs) thus, basically, he carried out this study to explore the roles of personality and attitudinal factors on safety performance and stated that safety performance of the NPP are good based on reduced number of accidents and human error. On the contrary, this study did not align with the study by Pourmazaherian et al. (2021) carried out to ascertain and explore how personality of construction workers affects safety performance whose aim was to review and identify the dimension of personality traits that are more affective in predicting accident for construction industry to minimize accident occurrence. They concluded that the accident occurrence of the construction firm was high which translate to poor safety performance.

Table 5 Level of safety performance of the workers operating in petrol stations in the Niger Delta

/N	Safety Performance Items	SD.	D.	UN	A.	SA	WA	Remarks
1	Sufficient safety resources are made available by management and that has reduced occurrence of near-miss in the petrol station	90.00 22.10%	200.00 49.10%	36.00 8.80%	34.00 8.40%	47.00 11.50%	3.62	Agreed
2	Management has made necessary provisions for safety at my workplace and that has reduced near-miss occurrence	197.00 48.40%	82.00 20.10%	34.00 8.40%	94.00 23.10%	0.00 0.00%	3.94	Agreed
3	The good safety communication between management and workers has reduced occurrence of near-miss	70.00 17.20%	207.00 50.90%	0.00 0.00%	94.00 23.10%	36.00 8.80%	3.44	Agreed

4	My manager encourages suggestions on how to improve safety and health and that has reduced occurrence of incident in the Petrol station	129.00 31.70%	118.00 29.00%	3.00 0.70%	105.00 25.80%	52.00 25.80%	3.41	Agreed
5	My manager often talks to me about health and safety matters on site and that has minimized chances of near-miss occurrence.	117.00 28.70%	0.00 0.00%	0.00 0.00%	71.00 17.4%	219 53.80%	3.68	Agreed
6	Sufficient safety resources are made available by management and that has reduced accident in the petrol station	130.00 31.99%	53.00 13.02%	5.00. 0.00%	24.00 5.89%	200.00 49.10%	3.12	Agreed
7	Management has made necessary provisions for safety at my workplace and that has reduced experiences of accidents in the petrol station	125.00 30.77%	53.00 13.02%	5.00. 1.22%	24.00 5.89%	200.00 49.10%	3.13	Agreed
8	The good safety communication between the manager and the workers has reduced possibility of accident in the petrol station	115.00 28.25%	50.00 12.28%	5.00. 1.22%	27.00 6.66%	210.00 51.59%	3.24	Agreed
9	The good safety communication between manager and workers has reduced chances of accident in the petrol station	47.00 11.55%	0.00 0.00%	0.00 0.00%	177.00 43.49%	183.00 44.96%	4.10	Agreed
10	My manager encourages suggestions on how to improve safety and health and that has reduced cases of accident in the petrol station.	47.00 11.55%	175.00 43.00%	0.00 0,00%	105.00 25.80%	81.00 19.65%	3.00	Undecided
	Mean weighted average						3.47	Agreed

3.3 Impact of Safety Preparedness on the Safety Performance of Petrol Stations in the Niger Delta

The multiple linear regression analysis was used to examine the impact of safety preparedness (SPR) on the safety performance (SP) of the petrol stations in the Niger Delta. Safety preparedness was operationalized using safety training (ST), safety climate (SC) and safety culture (SCU) while safety performance was operationalized using near-miss occurrence (NMO) and accident occurrence (ACO). Three separate models were developed to have a complete detailed understanding of the impact of safety preparedness on safety performance. The three models used near-miss occurrence, accident occurrence and safety performance as dependent variables and the three construct of safety preparedness: safety training (ST), safety climate (SC) and safety culture (SCU), as independent variable

3.3.1 Regression Model for the Impact of Safety Preparedness Constructs on Near-miss Occurrence

Table 6a shows that the model was suitable in predicting the dependent variable (near-miss occurrence) given the corresponding changes in the independent variables (safety training, safety climate and safety culture) with model p-value equal to 0.017 which is less than 0.05 significant level. The R-square value of 0.160 also showed that 16.00% change in the dependent variable (near-miss occurrence) is as a result of change in the independent variables (safety training, safety climate and safety culture) while the other 84.00% were as a result of change in other factors and variables that were not captured in the current model.

Table 6b show the model coefficients and their individual significance to the entire model. The results revealed that the coefficient of safety training, safety climate and safety culture in the multi-linear model are -2.108, -2.084 and -1.030 respectively and the p-values supposed that all the coefficient are significant; safety training (ST) ($p=0.029<0.05$), safety climate (($p=0.011<0.05$) and safety culture (SCU) ($p=0.017<0.05$). This means that a unit increase in safety training, safety climate and safety culture would trigger significant 2.108, 2.084 and 1.030 drop or decrease in near-miss occurrence. Equation (8) shows the mathematical expression of the model

$$\mathbf{NMO} = -\mathbf{2.108\,ST} - \mathbf{2.084SC} - \mathbf{1.030SCU} + \mathbf{2.854} \quad \textbf{(8)}$$

where NMO is Near-miss occurrence, ST is safety training, SC is safety climate, and SCU is safety culture. These results aligned with the work of Carol et al. (2014) who conducted empirical study on "Relationships between safety culture and safety performance of building repair, maintenance, minor alteration, and addition (RMAA) works" aimed at ascertaining possible relationships between safety culture and safety performance of RMAA works and to offer recommendations on ways to improve RMAA safety. And the results revealed that Higher RMAA safety climate was positively associated with a lower incidence of self-reported near misses and injuries which translates to high safety performance. It also concurred with work of Selahattin (2013) who conducted empirical research on the Marble Workers investigated the relationships among safety culture, working conditions, occupational accidents, and injuries. The results revealed significant relationships between safety culture and occupational accident and incidents in the organization which translate to safety performance.

Table 6a: Model summary for safety preparedness constructs and near-miss occurrence

Model	R	R Square	Adjusted R Square	Sig
NMO	0.125	0.160	0.018	0.017

Table 6b: Model coefficients for safety preparedness constructs and near-miss occurrence

Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
NMO	(Constant)	2.854	0.524	5.451	0.000
	ST	-2.108	0.059	-1.824	0.029
	SC	-2.084	0.166	-3.509	0.011
	SCU	-1.030	0.285	-.104	0.017

3.3.2 Regression Model for the Impact of Safety Preparedness Constructs on Accident Occurrence

Table 7a shows that the model was suitable for predicting the dependent variable (Accident occurrence) given the corresponding changes in the independent variables (safety training, safety climate and safety culture) with model p-value equal to 0.031 which is less than 0.05 significant level. The R-square value of 0.112 also showed that 11.20% change in the dependent variable (accident occurrence) is as a result of change in the independent variables (safety training, safety climate and safety culture) while the other 89.80% were as a result of change in other factors and variables that were not captures in the current model.

Table 7b shows the model coefficients and their individual significance to the entire model. The results revealed that the coefficient of safety training, safety climate and safety culture in the multi-linear model are -1.005, -1.084 and -2.023 respectively and the p-values supposed that all the coefficient are significant: safety training (ST) ($p=0.042<0.05$), safety climate (($p=0.016<0.05$) and safety culture (SCU) ($p=0.007<0.05$), This means that a unit increase in safety training, safety climate and safety culture would trigger significant 2.108, 2.084 and 1.030 drop or decrease in accident occurrence. Equation (9) shows the mathematical expression of the model

$$\mathbf{ACO = -1.005ST - 1.048SC - 2.023SCU + 3.103} \quad \textbf{(9)}$$

where ACO is Accident occurrence ST is safety training, SC is safety climate and SCU is safety culture.
This also agree with work of Dilaver *et al.* (2016) who carried out another research titled aimed at determining relationship between safety culture, safety performance and job satisfaction and to show how safety culture increases safety performance through job satisfaction. It was also found that significant relationships exist between safety culture and safety performance. The outcome of this current study contradicts the work of Sadia *et al.* (2015) who carried out empirical research titled "Impact of safety culture on safety performance: Evidence from textile dyeing industries of Pakistan" to examines the relationship between safety culture and safety performance using mediating role of safety motivation and moderating role of safety training in textile dyeing industries of Pakistan. Findings of the study revealed that safety culture does not result to safety performance in textile dyeing and safety training does not moderate the relationship between safety culture and safety performance.

Table 7a: Model summary for safety preparedness constructs and accident occurrence

Model	R	R Square	Adjusted R Square	Sig
ACO	0.101	0.112	.115	0.031

Table 7b: Model coefficients for safety preparedness constructs and accident occurrence

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
ACO	(Constant)	3.103	0.648	4.787	0.000
	ST	-1.005	0.073	-2.072	0.042
	SC	-1.048	0.205	-2.233	0.016
	SCU	-2.023	0.353	-3.067	0.007

3.3.3 Regression Model for the Impact of Safety Preparedness Constructs on Safety Performance.

Table 8a shows that the model was suitable for predicting the dependent variable (safety performance) given the corresponding changes in the independent variables (safety training, safety climate and safety culture) with model p-value equal to 0.001 which is less than 0.05 significant level. The R-square value of 0.265 also showed that 26.50% change in the dependent variable (safety performance) is as a result of change in the independent variables (safety training, safety climate and safety culture) while the other 72.50% were as a result of change in other factors and variables that were not captures in the current model.
Table 8b show the model coefficients and their individual significance to the entire model. The results revealed that the coefficient of safety training, safety climate and safety culture in the multi-linear model are 2.051, 2.066 and 1.003 respectively and the p-values supposed that all the coefficient are significant; safety training

(ST) (p=0.003<0.05), safety climate ((p=0.002<0.05) and safety culture (SCU) (p=0.041<0.05), This means that a unit increase in safety training, safety climate and safety culture would trigger significant 2.051, 2.066 and 1.003 increase in safety performance. Equation (10) shows the mathematical expression of the model.

$$\mathbf{SP = 2.051ST + 2.066SC + 1.003SCU + 3.979} \quad \textbf{(10)}$$

where SP is safety performance ST is safety training, SC is safety climate and SCU is safety culture.

The outcome of this current study contradicts the work of Sadia *et al.* (2015) who carried out empirical research titled "Impact of safety culture on safety performance: Evidence from textile dyeing industries of Pakistan" to examines the relationship between safety culture and safety performance using mediating role of safety motivation and moderating role of safety training in textile dyeing industries of Pakistan. Findings of the study revealed that safety culture does not result to safety performance in textile dyeing and safety training does not moderate the relationship between safety culture and safety performance.

The study agreed with work carried out by Zierold and Anderson (2006), which consisted of both a descriptive analysis and a chi-square analysis and found that more than half of the participants agreed with the statement that safety training is helpful in preventing injuries and near-miss incidents in the workplace. It also agreed with the work of Kaminiski (2001) who discovered that safety training had an inversely proportional relationship with the number of injuries that occurred in small manufacturing firms in the United States. These results aligned with work of Kinn et al. (2000) who conducted research in Ohio to determine the impact that safety training and orientation had on reducing the risk of injury among plumbers and pipe fitters. They compared the training records of six different businesses with the "recordable" injury data that was collected by the Occupational Safety and Health Administration during the years 1996 and 1998. They showed a substantial correlation between employee safety training and enhance improvement in reducing incidence of injuries. These findings are comparable to those that were discovered by Dong et al. (2004) in their research on construction workers in the United States. They discovered that safety training plays a significant role in lowering the number of employees' compensation claims, which

Table 8a: Model Summary for safety preparedness constructs and safety performance

Model	R	R Square	Adjusted R Square	Sig
SP	0.168	0.265	0.223	0.001

Table 8b: Model coefficients for safety preparedness constructs and safety performance

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
SP	(Constant)	3.979	0.531	5.611	0.000
	ST	2.051	0.060	3.855	0.003
	SC	2.066	0.168	3.393	0.002
	SCU	1.003	0.289	2.011	0.041

Dependent Variable: SP

3.3.4 Regression Model for the Impact of Safety Preparedness on Safety Performance.

Table 9a shows that the model was significant in predicting the dependent variable (safety performance) given the corresponding changes in the independent variables, safety preparedness (SPR) with model p-value equal to 0.001 which was less than 0.05 significant level. The R-square value of 0.225 also showed that 22.50% change in the dependent (safety performance) variable was as a result of change in the independent variable (safety preparedness) while the other 77.50% were as a result of change in other factors and variables that were not captures in the current model.

Table 9b shows the model coefficients and their individual significance to the entire model. The results revealed that the coefficient of safety preparedness (SPR) in the simple linear model was 3.122 and the p-values supposed that the coefficient of safety preparedness was significant (p=0.000<0.05). This means that a unit increase in safety preparedness would trigger a significant 3.122 increase or rise in safety performance. Equation (11) shows the mathematical expression of the model.

$$\boldsymbol{SP = 3.122SPR + 2.067} \qquad \textbf{(11)}$$

where SP Safety Performance and SPR safety preparedness.

Hence, the second null hypothesis which states that **"**safety preparedness of the petrol stations had no statistically significant impact on the safety performance of petrol stations in Niger Delta, Nigeria" is rejected and the alternate hypothesis is accepted which states that safety preparedness of the petrol stations had statistically and significant impact on the safety performance of petrol stations in Niger Delta, Nigeria".

The outcome of this current study contradicts the work of Sadia *et al.* (2015) who carried out empirical research titled "Impact of safety culture on safety performance: Evidence from textile dyeing industries of Pakistan" to examine the relationship between safety culture and safety performance using mediating role of safety motivation and moderating role of safety training in textile dyeing industries of Pakistan. Findings of the study revealed that safety culture does not result to safety performance in textile dyeing and safety training does not moderate the relationship between safety culture and safety performance.

Table 9a: Model Summary for safety preparedness and safety performance

Model	R	R Square	Adjusted R Square	Sig
SP	0.138	0.225	0.223	0.001

Table 9b: Model coefficients for safety preparedness and safety performance

Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
SP	(Constant)	2.867	0.295	9.707	0.000
	SPR	3.122	0.074	11.297	0.000

Dependent Variable: SP

The findings agreed with work carried out by Zierold and Anderson (2006), which consisted of both a descriptive analysis and a chi-square analysis and found that more than half of the participants agreed with the statement that safety training is helpful in preventing injuries and near-miss incidents in the workplace. It also aged with the work of Kaminiski (2001) who discovered that safety training had an inversely proportional relationship with the number of injuries that occurred in small manufacturing firms in the United States. These results aligned with work of Kinn et al. (2000) who conducted research in Ohio to determine the impact that safety training and orientation had on reducing the risk of injury among plumbers and pipe fitters. They compared the training records of six different businesses with the "recordable" injury data that was collected by the Occupational Safety and Health Administration during the years 1996 and 1998. They showed a substantial correlation between employee safety training and enhance improvement in reducing incidence of injuries. These findings are comparable to those that were discovered by Dong et al. (2004) in their research on construction workers in the United States. They discovered that safety training plays a significant role in lowering the number of employees' compensation claims, which indicates a reduction in the number of accidents and injuries that occur on the job

4. Conclusions

The effect of safety preparedness and safety performance of petrol stations operating in selected states in the Niger Delta has been investigated and the outcome revealed that safety preparedness of the petrol stations in the Niger Delta was significantly good in terms of the intangible factors such as safety training, safety climate and safety culture as well as the tangible factors such as availability of functional fire extinguishers and availability of suitable leak detection systems. The finding also revealed that Petrol stations operating in the Niger Delta had good safety performance in terms of low accident and near-miss occurrence. Furthermore, it was revealed that safety preparedness of the petrol stations had positive and significant effect on safety performance which translate to improved reduced accidents and near-miss occurrences in the face of improved safety preparedness of the petrol stations in the Niger Delta.

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