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Life Saving Rules; a bedrock for incident prevention and improved organizational performance

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Abstract: The intent of the implementation of incident prevention programs such as Life Saving Rules (LSR) is to prevent injury, reduce accident rates and improve organizational performance. The present study assessed the implementation of life saving rules as an incident prevention program and its impact on Occupational Health and Safety performance of six Oil and Gas companies operating in the Niger Delta region of Nigeria. Three objectives were drawn up and focused on: determining the difference in the level of implementation and compliance with LSR; ascertaining the level of awareness of LSR among workers and evaluating the impact of the implementation of life saving rules on the occupational health and safety performance records of the selected Oil and Gas companies. Cross sectional research design was adopted for this study and purposive sampling technique was employed to select the population of study using survey method and interview for data collection. The data retrieved from the questionnaire survey were analyzed with descriptive statistics and presented in counts, means, standard deviation and Analysis of variance (ANOVA) while Microsoft software (NVIVO) was used to summarize feedback from the interview. The results from the study showed that implementation and compliance level to LSR vary significantly across petroleum companies at 0.05 significant level. This implied that companies that do not implement LSR differ significantly in the implementation and compliance from those that implement LSR. The awareness level and OHS performance records of the companies also differ from one another at the probability level of 95%. The interview disclosed that since the implementation of LSR there is significant reduction in incident rates. In conclusion the study revealed that companies that implemented LSR had less incidents and better performance over time when compared with companies that do not implement LSR programmes. This level of implementation and observed positive performance were due to enhanced compliance, high level of awareness across the selected companies. Finally, the study recommends that Oil and Gas companies that do not implement life saving rules adopt and implement this program to prevent/ reduce incident rates and improve their organizational performance.

Background: Life Saving Rules (LSR) like other incident prevention programs are aimed at managing working evironment, process and workers for the purpose of preventing or reducing injuries and losses in the workplace. Since the roll out of LSR in 2012 by the International Oil and Gas Producers Association (IOGP) and its adoption and implementation by various Oil and Gas companies in several countries, the IOGP has reported decrease in fatality, minor and major accident rates and improved performance record. While this may seem to be the case in other countries, the Nigerian Oil and Gas industry has reported an increase in the number of fatalities and accidents within this industry with work at height, lifting operations. dropped objects, transportation of goods and personnnel and violation of permit to work procedures been identified as major contributors to high profile incidents. Until now many industries are yet to realize the relationship between compliance to LSR, accident prevention and improved performance.

Several studies have been carried out to evaluate the effectiveness of various incident prevention programs and their impact on performance records in the Oil and Gas and other industries and regions and the findings from these studies have recommended ways to examine occupational health and safety program implementation barriers, improve occupational health and safety challenges, promote good safety culture and improve OHS performance.

It is against this background that this study was initiated to examine life saving rules; a bedrock of incident prevention and improved organization performance across Oil and Gas companies in the Niger Delta.

Materials and Methods: Cross sectional research design was adopted for this and purposive sampling technique employed to select six Oil and Gas companies operating in the Niger Delta region of Nigeria. Sample size of 260 was obtained using Taro Yamane sample size determination formula. A well-structured questionnaire were administered to the workers of the selected Oil and Gas companies and retrieved for data analysis. Data were analyzed using Microsoft Excel and Statistical Packages for Social Sciences (SPSS) version 20. Also interview sessions were conducted with HSE professionals of the companies that implement LSR within the study

population and the data obtained was analyzed using Microsoft Nvivo Pro software (2018) and thematic analysis.

Results: The implementation and compliance with LSR vary significantly amongst Oil and Gas companies in the study, the level of awareness also significantly varies, similarly, the safety performance records vary significantly amongst companies in the study.

Conclusion: Oil and Gas Companies that implemented LSR had better implementation and compliance level, higher awareness level and better safety performance records than companies that did not implement LSR.

Key Word: **Oil and Gas; Life Saving Rules; performance records; Niger Delta; incident prevention.**

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I. INTRODUCTION

The continuous occurrence of accidents among global industries especially in the Oil and Gas sector has been attributed to the absence or poor implementation of occupational health and safety programs such as Life Saving Rules (LSR)[1,2]. Despite the implementation of various occupational health and safety programs, organizations across different sectors continue to record huge losses due to increase in the rate of job-related illness and injuries.

According a report issued by the International Labour Organization (ILO) in 2015, over 2.3 million occupational accidents occurred annually around the world and it is estimated that over 600 deaths occurred daily[3].

The Oil and Gas sector is among one of the many industries characterized by numerous hazardous exposures with recorded reoccurrence of catastrophic impact on workers and their families, caused litigation and high insurance premium to employers and poor reputation to the organization.

Currently, the Nigerian Oil and Gas sector, which is the main revenue earner falls within one of the riskiest industries globally. According to DPR (2016)[4] 255 deaths and several work-related injuries were recorded between 2010-2016 in this industry, with majority of cases pointing to high risk activities such as work at height, confined space entry, falling objects, fires and explosion with several findings of these accidents been attributed to human error. This is a clear indication that the foundation for majority of accident prevention programs should be tailored towards modifying human behavior.

The International Oil and Gas Producers Association (IOGP) developed a set of safety rules often referred to as Life Saving Rules (LSR) which it requested all its members to implement with the intention to keep everyone safe by ensuring that they follow the same rule. These rules seek to prevent serious injury and fatality from those who engage in high risk activities such as confined space entry, work at height, welding and movement of goods and personnel etc. these rules focus on modifying worker and supervisor behaviour in the workplace by raising awareness of activities which are most likely to result in fatalities (IOGP, 2018)[5]. These rules also highlight simple actions individuals can take to protect themselves and others. Each rule is linked to controls and barriers which if used properly can prevent or avoid fatal accidents and it is interpreted that 67 percent of fatal accidents that occurred in the oil and gas would be have prevented by implementing Life Saving Rules (Siva &Nihal, 2015)[19].

Several studies have been carried out to evaluate the effectiveness of various incident prevention programs and their performance records and the finding from these studies have recommended ways to improve occupational health and safety challenges, promote good safety culture and improve safety performance.

It is against this background that this study was initiated to examine Life Saving Rules as a bedrock for incident prevention and improve organizational performance. To achieve this aim, the study set out three objectives; to determine the difference in the level of implementation and compliance with LSR, to ascertain the level of awareness of life saving rules and to evaluate the impact of the implementation of life saving rules on the occupational health and safety performance records of the selected oil and gas companies. Also, three corresponding hypotheses were formulated in the Null form which states that; there is no significant difference in the implementation and compliance of LSR across companies, awareness of LSR does not significantly vary and that the OHS performance records does not differ significantly among selected oil and gas companies in the study.

A conceptual framework model of the implementation of life saving rules and OHS performance was developed for the study. The model proposed four elements of the implementation of safety program such as management/leadership commitment, employee participation, hazard identification, assessment and control and training (OSHA, 2016)[18] as Independent or predictor variable, awareness, perception and consequence management as moderating variable and OHS performance (leading and lagging indicators) as dependent or criterion variable.

As management strives to provide safety rules/programs in order to improve job/workplace safety, employees must also be ready to understand and comply with these rules and participate in these programs and also employers must support employees through training and education to improve their safety knowledge.

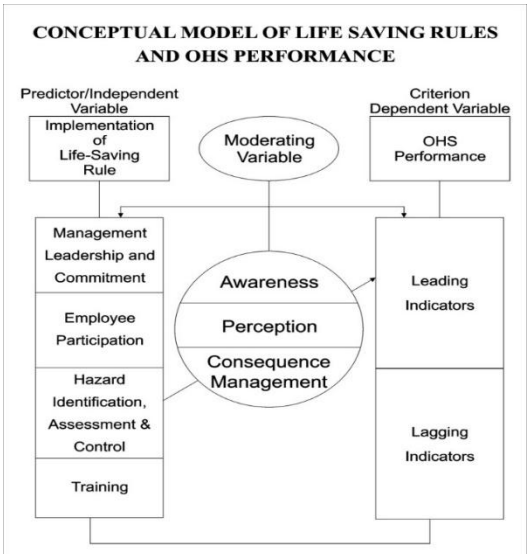

Figure 1. Conceptual framework of the implementation of life-saving rules and OHS performance**.**

The framework takes a linear relationship between the predictor variable on the left-hand side and criterion variable at the right-hand side, while the mediating variable is at the centre.

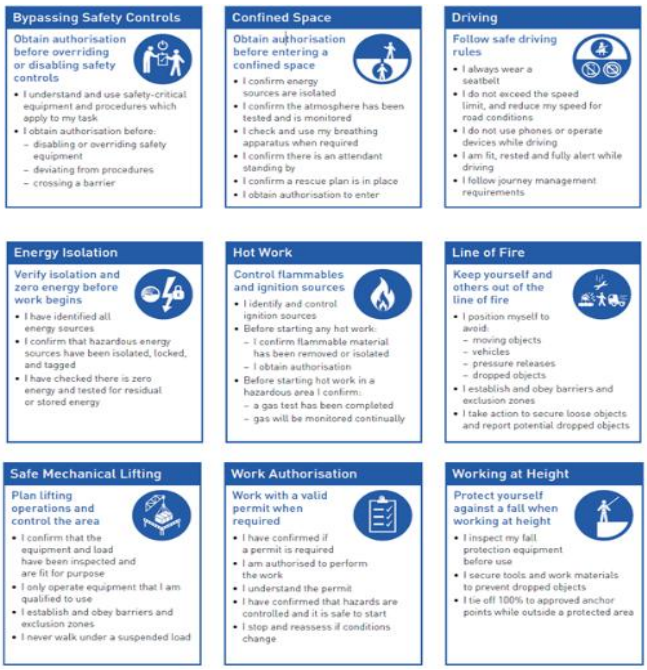

Figure 2: Pictorial of IOGP nine Life Saving Rules (IOGP, 2013)[6.]

II. MATERIAL AND METHODS

A cross-sectional survey method was adopted for this study. Through purposive sampling technique, six Oil and Gas companies were selected for this study. The six O & G companies selected for this study carry out their activities in the Niger Delta region of Nigeria. This region is famous for the exploration and production of petroleum products. It is one of the world's largest tertiary delta systems and extremely prolific hydrocarbons provinces globally. The Niger delta region is richly endowed with both renewable and non-renewable natural resources and has been one of the most studied basins because of the occurrence of vast deposits of petroleum resources and the current production of all Nigeria's Oil and Gas is derived from this region. The region is

situated at the apex of the Gulf of Guinea on the west of the coast of Africa and on the Nigeria's south-south geological zone and home to some thirty one million people that occupies a total area of 7500km^2 and makes up 7.5 percent of Nigeria's land mass. The Niger Delta region consists of nine (9) states, namely; (Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Ondo, Imo and Rivers) and 185 local government areas. (See Figure 3)

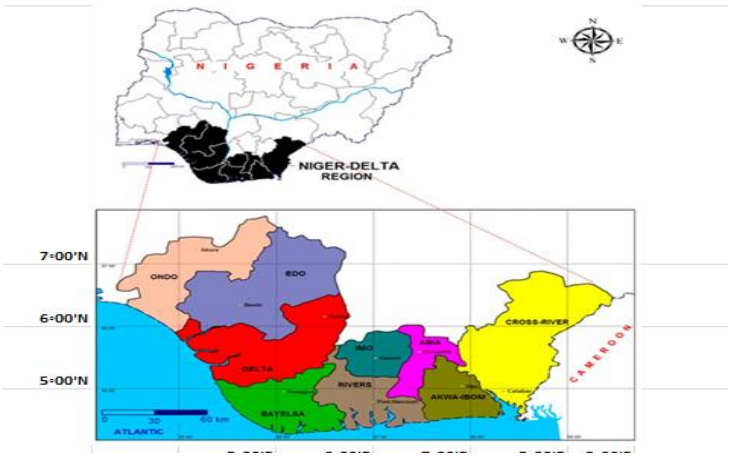

Figure 3– Map of Nigeria showing the oil producing states in the Niger Delta region
Source: Modified after (Nzeadibe, Egbule, Chukwuone & Agwu, 2012)[7]

Study Duration: September 2017 to November 2020.
Sample size: 260 participants.
Sample size calculation: The sample size was calculated using Taro Yamane formula for sample size determination. The population size of 743 gave a sample size of 260 and the number of the copies of questionnaire administered to each company was mathematically determined using proportional allocation technique. See Table 1

COMPANY	AREA OF OPERATION	IMPLEMENT LSR	NUMBER OF EMPLOYEES	SAMPLE SIZE
A	ONSHORE	YES	184	64
B	ONSHORE	YES	110	39
C	ONSHORE	NO	125	44
D	OFFSHORE	YES	106	37
E	OFFSHORE	YES	120	42
F	OFFSHORE	NO	98	34
TOTAL			743	260

Table .1 – Showing area of operation, numerical strength of companies and sample size

The names of the six Oil and Gas companies selected for this study were not mentioned throughout the course of the project and were labelled A, B C, D, E, and F respectively. Companies A, B and C carry out their activities onshore while companies D, E and F carryout that operations offshore. Furthermore, companies A, B, D and E implement Life Saving Rules while companies C and F does not implement LSR.

Inclusion criteria:
1. The study considered Oil and Gas workers for both onshore and offshore operations such as, drillship, rigs, installation/platform workers

Exclusion criteria:
1. Filling station attendants and oil refining company workers

Procedure methodology

After written introductory letter was obtained from the university and consent obtained from the selected Oil and Gas companies, a well-structured questionnaire were administered to the personnel of these companies and data retrieved used for data analysis. The questionnaire comprised of a 5-point Likert scale rated (5-strongly

agree, 4- agree, 3-strongly disagree, 2-disagree and 1-undecided) and made up of sections A -D. Section A contains, socio-demographic characteristics, section B, contains statements of elements of the implementation and compliance to safety programs such as Management commitment, Worker participation, Hazard identification/assessment and control and training. Section C comprised of referents on Awareness, and perception of Life Saving Rules, while section D comprised of statements on OHS performance (leading and lagging indicators)

The interview sessions were conducted with Health and Safety professionals, managers, supervisors, and line heads of the selected oil and gas companies in the study that implement Life Saving Rules (A, B, D and E).

Statistical analysis

Data retrieved from the questionnaire survey was analyzed using Microsoft Excel and SPSS version 2.0. Analysis of Variance (ANOVA) test was used to test hypothesis while Post Hoc test was further used to confirm where the differences occurred between groups. Data was analyzed using frequency, percentage and central tendency. For a factor to be considered significant, the total mean should be greater or equal to the grand mean. Also, the hypotheses were tested at 95% confidence level interval/ 0.05 level of significance.

Responses obtained from the participants of the interview conducted were analyzed with Nvivo software (2018) and thematic analysis.

III. RESULT

Socio-demographic data of the study population

The socio-demographic profile of respondents were gender, age, work experience, job category, level of education and area of operation (see Table 2). There were a total of 80.6% male and 19.4% female respondents. 14.3% respondents were aged 18-25years, while 25.8% were aged between 26 and 35 years and 34.5%, 21.4% and 4.0% respondents were aged between 36 and45 years, 46 and 55 years, 56 years and above respectively. 9.9% earned post graduate degree, 66.3% had earned tertiary education, while 22.4% and 4 1.6% had earned secondary and primary education respectively. 0.4% respondents were directors/CEOs and 2.4% were managers, while 7.5%, 2.8% and 86.9% respondents were supervisors, line-head/foremen and workers respectively. 39.3% respondents indicated that they have work experience between less than 5 years, 38.5% respondents had worked between 5- 10 years; while 17.1% indicated that they have work experience between 11 and 15years. Also, 4.0% respondents had worked between 16 and 20 years and 1.2% respondents had worked between 21 years and above respectively. However, this has no influence on the outcome of the study but could be used as reference for future studies

Table no 2: showing Socio-demographic data of the study Population

Demographic details	Frequency	Percentage	Demographic details	Frequency	Percentage
Gender			**Educational Level**		
Male	203	80.6	FSLC	4	1.6
Female	49	19.4	GSCE/SSCE	56	22.2
Total	252	100	BSC/HND	167	66.3
Age			P.G Degree	25	9.9
18-25	36	14.3	Total	252	100
26-35	65	25.8	**Job Title**		
36-45	87	34.5	Director/CEO	1	0.4
46-55	54	21.4	Manager	6	2.4
56 and Above	10	4.0	Supervisor	19	7.5
Total	252	100	Line Head/Foreman	7	2.8
Job Experience (Years)			Worker	219	86.9
< 5	99	39.3	Total	252	100
5-10	97	39.3	**Area of Operation**		
11-15	43	17.1	Onshore	143	56.7
16-20	10	4.0	Offshore	109	43.3
21and Above	3	1.2	Total	252	100
Total	252	100			

Table no 3: showing summary of means and grand means of the referents for management leadership and commitment. From the table companies A, B, D & E that implements LSR have higher values than companies C & F that does not implement LSR. Also, companies A, B, D& E means are greater than the grand means. This implies that companies A, B, D, E agree with statements while C & F disagreed**.**

Table no. 3: shows means and grand means of respondents for management leadership and commitment

REFERENTS	COMPANIES WEIGHTED MEAN						GRAND MEAN
	A	B	C	D	E	F	
1	4.34	4.18	2.81	4.09	4.34	2.27	3.67
2	4.41	4.36	2.74	4.60	4.61	3.93	4.11
3	4.28	4.31	2.47	4.37	4.46	3.33	3.87
4	3.97	4.36	2.84	4.17	4.17	3.36	3.81
5	4.34	3.95	1.95	4.51	4.54	2.64	3.66
6	4.21	4.87	2.12	4.63	4.59	2.45	3.81
7	4.48	4.28	2.33	4.29	4.34	2.45	3.70
8	3.95	4.46	2.91	4.03	4.61	2.85	3.80
9	4.39	4.10	2.53	4.69	4.61	2.21	3.76
10	4.25	4.41	3.02	4.89	4.66	2.94	4.03
11	4.56	4.41	3.02	4.89	4.66	2.94	4.08
12	4.48	4.64	2.93	4.29	4.46	1.94	3.79
13	4.64	4.59	2.07	4.78	4.78	2.61	3.91
14	4.26	4.37	2.40	4.34	4.54	2.45	3.73
15	4.49	4.23	2.72	4.37	4.46	3.64	3.98
Total	**4.34**	**4.37**	**2.57**	**4.46**	**4.52**	**2.80**	**3.84**

Table no. 4 showing summary of means and grand means of the referents for worker participation. From the table companies A, B, D & E that implements LSR have higher values than companies C & F that do not implement LSR. Also, companies A, B, D& E means are greater than the grand means. The implication of this is that companies A, B, D, E agreed with the statements while C & F disagreed.

Table no. 4: shows means and grand means of respondents for worker participation.

STATEMENTS	COMPANIES WEIGHTED MEAN						GRAND MEAN
	A	B	C	D	E	F	
1	4.49	4.31	3.35	4.49	4.37	3.12	4.02
2	4.28	4.97	3.02	4.43	4.54	3.48	4.12
3	4.49	4.31	2.37	4.57	4.61	3.33	3.95
4	4.67	4.38	1.63	4.40	4.59	3.58	3.88
5	4.57	4.28	2.49	4.29	4.29	2.88	3.80
6	4.70	4.59	2.72	4.57	4.51	2.48	3.93
7	4.26	4.54	2.47	4.43	4.44	2.58	3.79
8	4.51	4.23	3.05	4.46	4.59	3.09	3.99
9	4.70	4.69	2.72	4.46	4.54	3.52	4.11
10	4.56	4.23	2.84	4.71	4.71	3.52	4.09
11	4.28	4.97	3.23	4.63	4.54	3.45	4.18
12	4.49	4.21	3.33	4.69	4.61	3.33	4.11
Total	**4.50**	**4.47**	**2.77**	**4.51**	**4.53**	**3.19**	**4.00**

Table no. 5 showing summary of means and grand means of the referents for hazard identification assessment and control. From the table companies A, B, D & E that implements LSR have higher values than companies C & F that do not implement LSR. Also, companies A, B, D& E means are greater than the grand means. The implication of this is that companies A, B, D, E agree with the statements while C & F does not.

Table no. 5: shows means and grand means of respondents for Hazard Identification Assessment and Control

STATEMENTS	COMPANIES WEIGHTED MEAN						GRAND MEAN
	A	B	C	D	E	F	
1	4.59	4.46	3.44	4.74	4.68	2.91	4.14
2	4.52	4.41	3.16	4.71	4.37	3.33	4.08
3	4.70	4.59	3.35	4.29	4.46	3.15	4.09
4	4.66	4.46	3.44	4.47	4.68	3.61	4.26
5	4.52	4.59	3.28	4.60	4.37	3.61	4.16
6	4.48	4.31	3.44	4.69	4.61	3.79	4.22
7	4.61	4.49	3.02	4.74	4.68	3.12	4.11
8	4.70	4.69	3.30	4.37	4.46	3.39	4.15
9	4.66	4.56	3.09	4.51	4.68	3.18	4.25
10	4.56	4.21	3.93	4.69	4.61	3.18	4.19
11	4.66	4.56	3.51	4.66	4.68	3.48	4.26
Total	**4.61**	**4.48**	**3.36**	**4.59**	**4.57**	**3.34**	**4.17**

Table 6 showing summary of means summary of means and grand means of the referents for training. From the table companies A, B, D & E that implements LSR have higher values than companies C & F that do not implement LSR. Also, companies A, B, D & E means are greater than the grand means. The implication of this is that companies A, B, D, E agree with statements while C & F do not. Companies C & F requires more training on life saving rules.

Table no. 6: shows means and grand means of respondents for training

REFERENTS	COMPANIES WEIGHTED MEAN						GRAND MEAN
	A	B	C	D	E	F	
1	4.70	4.49	2.88	4.20	4.46	3.18	3.98
2	4.56	4.10	2.86	4.69	4.18	2.64	3.84
3	3.98	4.51	2.56	4.26	4.39	2.85	3.76
4	4.70	4.21	3.12	4.29	4.46	3.88	4.16
5	4.70	4.59	2.93	4.69	4.63	3.79	4.22
6	4.26	4.54	2.49	4.57	4.63	2.88	3.89
7	4.56	4.21	2.67	4.49	4.61	3.33	3.98
8	4.70	4.69	2.70	4.69	4.63	3.18	4.09
9	4.26	4.64	2.88	4.69	4.54	2.67	3.95
10	4.56	4.31	2.70	4.69	4.46	3.12	3.97
Total	**4.50**	**4.23**	**2.78**	**4.53**	**4.50**	**3.15**	**3.98**

Table no. 7 presents the difference in the implementation and compliance with LSR among the selected petroleum companies in the study area. The table showed that the calculated F statistics of 603.03 is greater than the critical value of 2.21 at 0.05 level of significance. Hence, the null hypothesis which states that there is no significant difference in the implementation and compliance with LSR among the selected petroleum companies in Nigeria is rejected while the alternate hypothesis which states there is, is accepted. The implication here is that implementation and compliance with LSR among the selected petroleum companies varies in the study area.

Table no. 7: shows Difference in the level of implementation and compliance across companies

ANOVA

Implementation and compliance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2561.330	5	512.266	603.036	.000

Within Groups	3244.159	3819	.849		
Total	5805.489	3824			

Table no 8 showing the Post-hoc test (Duncan statistics) for the variation in the implementation and compliance with LSR among the selected petroleum companies in the study area. As shown in the table it is lucid that companies C and F which do not practice LSR recorded lower values, while companies A B D & E which practice LSR recorded higher values. This indicates that the level of compliance and implementation with LSR is higher in these companies. Companies A, B and D are similar in their practice and implementation of LSR just as companies D and E are also similar. Companies C and F stand alone in their implementation of LSR with lower mean values indicating the need for exposure to life saving rules.

Table 8. shows the Post-hoc test for the variation in the implementation and compliance with LSR among the companies in the study.

Duncan

		Subset for alpha = 0.05			
companies	N	1	2	3	4
C	645	2.2612			
F	495		2.4768		
A	930			4.3269	
B	600			4.3633	
D	525			4.4229	4.4229
E	630				4.5016
Sig.		1.000	1.000	.085	.135

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 611.958.

Table no. 9 showing summary of means and grand means of the referents for the level awareness. From the table companies A, B, D & E that implements LSR have higher figures than companies C & F that do not implement LSR. Also, companies A, B, D & E means are greater than the grand means. This implies that companies A, B, D, & E agree with statements while C & F do not. Companies C & F needs to improve on the awareness of the application of life saving rules among its workers.

Table no. 9: shows summary of means and grand means of respondents for the level of awareness of life saving rules

	COMPANIES WEIGHTED MEAN						GRAND
REFERENTS	**A**	**B**	**C**	**D**	**E**	**F**	**MEAN**
1	4.70	4.69	3.09	4.37	4.27	3.03	4.02
2	4.66	4.56	3.02	4.74	4.51	3.33	4.14
3	4.56	4.31	2.88	4.77	4.39	2.91	3.97
4	4.66	4.56	3.67	4.74	4.61	2.94	4.19
5	4.56	4.31	3.30	4.69	4.51	3.18	4.09
6	4.66	4.56	3.30	4.74	4.61	2.82	4.11
7	4.67	4.69	3.07	4.69	4.54	2.52	4.03
8	4.66	4.69	3.19	4.69	4.63	3.45	4.22
9	4.23	4.64	2.88	4.69	4.61	3.15	4.03
10	4.56	4.31	3.19	4.69	4.54	3.09	4.06
11	4.52	4.31	3.16	4.69	4.61	2.91	4.03
Total	**4.59**	**4.51**	**3.16**	**4.68**	**4.53**	**3.03**	**4.08**

Table no. 10 presents the variation in the awareness of LSR among workers in the selected petroleum companies in the study area. The table shows that the calculated F statistics of 367.30 is greater than the critical value of 2.21 at 0.05 level of significance. Hence, the null hypothesis which states that there is no significant difference in the level of awareness of LSR among the selected petroleum companies in Nigeria is rejected

while the alternate hypothesis which states there is, is accepted. The implication here is that level of awareness with LSR among the selected petroleum companies varies in the study area.

Table no. 10: Variation in the awareness of life saving rules among workers in the companies in the study.

ANOVA

Awareness

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1263.445	5	252.689	367.300	.000
Within Groups	1925.608	2799	.688		
Total	3189.053	2804			

Table no 11 showed the Post-hoc test (Duncan statistics) for the variation in the awareness of LSR among the selected petroleum companies in the study area. The table showed that companies C and F which do not practice LSR recorded lower values, while companies A B D & E which practice LSR recorded higher values. This indicates that the level of awareness of LSR is higher in these latter companies. Companies B, D and E are similar in their awareness level of LSR just as companies A and D are similar. Companies C and F are stand alone in their level of awareness with lower mean values. The implication of this is that companies C and F need to improve in their level of awareness of LSR.

Table no. 11: Post Hoc test of the variation in the awareness of life saving rules among workers in companies in the study.

Awareness

Duncan

Companies	N	Subset for alpha = 0.05			
		1	2	3	4
F	363	2.0303			
C	473		2.1586		
B	440			4.4977	
E	462			4.5108	
A	682			4.5748	4.5748
D	385				4.6805
Sig.		1.000	1.000	.191	.056

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 448.769.

Table no.12 showing summary of means and grand means of the referents for the leading indicators for OHS performance records. From the table companies A, B, D & E that implements LSR have higher values than companies C & F that do not implement LSR. Also, companies A, B, D& E means are greater than the grand means. The implication of this is that companies A, B, D, E agree with the statements while C & F does not.

Table no. 12: shows Summary of means and grand means of respondents for the variation in the impact of the implementation LSR on OHS performance

a. Leading indicators

REFERENTS	COMPANIES WEIGHTED MEAN						GRAND MEAN
	A	B	C	D	E	F	
1	4.56	4.28	3.16	4.37	4.61	3.45	**4.07**
2	4.56	4.46	3.47	4.63	4.61	3.39	**4.19**
3	4.69	4.64	3.21	4.26	4.44	2.55	**3.96**
4	4.59	4.69	3.79	4.71	4.41	3.64	**4.30**
5	4.21	4.54	3.12	4.60	4.39	3.21	**4.01**

Total	4.52	4.52	3.35	4.51	4.49	3.25	**4.11**

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Table no 13 showing summary of means and grand means of the referents for the lagging indicators for OHS performance records. From the table companies C & F means are greater than the grand means. The implication of this is that companies C & F agree with the statements while A, B, C & E does not.

Table no 13: shows Summary of means and grand means of respondents for the variation in the impact of the implementation LSR on OHS performance

b. Lagging indicators

REFERENTS	COMPANIES WEIGHTED MEAN						GRAND MEAN
	A	**B**	**C**	**D**	**E**	**F**	
1	2.39	2.69	1.91	2.08	2.34	2.21	**2.40**
2	2.29	2.31	2.53	2.62	2.46	2.27	**2.41**
3	2.46	2.69	2.49	2.09	2.36	2.79	**2.46**
4	2.70	1.97	2.67	2.28	2.34	2.09	**2.34**
5	2.29	2.31	2.62	2.10	2.48	2.82	**2.52**
Total	2.42	2.40	**2.44**	2.23	2.39	**2.43**	**2.43**

Table no. 14 Presents the variation in the Occupational Health and Safety (OHS) performance records of the selected oil and gas companies in the study area. The table showed that the calculated F statistics of 6.12 is greater than the critical value of 2.21 at 0.05 level of significance. Hence, the null hypothesis which states that there is no significant difference in OHS performance records of the selected petroleum companies in Nigeria that implement LSR and the ones that do not implement LSR is rejected while the alternate hypothesis which states that there is, is accepted. The implication here is that OHS performance records of the selected oil and gas companies that implement LSR and the ones that do not implement LSR varies in the study area.

Table no. 14: shows the variation in the OHS performance records of companies in the study.

ANOVA

OHS Performance Records

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	425.183	5	85.037	6.121	.000
Within Groups	2417.367	174	13.893		
Total	2842.550	179			

Table no.15 show the Post-hoc test (Duncan statistics) for the variation in the Occupational Health and Safety (OHS) performance records of the selected oil and gas companies in the study area. As shown in the table, companies A, B, C & D which practice LSR recorded lower values, while companies C&F which do not practice LSR recorded higher values. This indicates that the incident numbers are higher in these companies. Companies A, B, D and E are similar in their OHS performance records with lower mean values indicating that they had lower numbers of incidents overtime, while companies C and F are similar in their OHS performance records with higher mean values indicating that they their incident numbers are higher within the observed time.

Table no. 15: shows Post hoc test for the variation in the OHS performance of companies in the study. Implementation and compliance

Duncan

companies	N	Subset for alpha = 0.05			
		1	2	3	4
C	645	2.2612			
F	495		2.4768		
A	930			4.3269	
B	600			4.3633	

D	525			4.4229	4.4229
E	630				4.5016
Sig.		1.000	1.000	.085	.135

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 611.958.

IV. DISCUSSION

The first objective of the study sought to determine the difference in the level of implementation and compliance of LSR across the companies in the study. This objective used the four elements of the implementation of safety program (management leadership/commitment, worker participation, Hazard identification, assessment & control and training) to evaluate the variation in the level of implementation and compliance with LSR.

Tables 3, 4, 5 and 6 shows the means and grand means of the four elements of the implementation of LSR evaluated. The tables showed that companies A, B, D and E that implement LSR had means that are greater or equal to the grand means, while companies C & F that does not implement LSR recorded lower means. The findings reveal that companies that implement LSR had better implementation & compliance level than companies that do not implement LSR.

Also, table 7 showed that there is significant difference in the level of implementation and compliance with LSR among the companies in the study. Furthermore, table 8 showed that companies that implement LSR had higher mean values that companies that do not implement LSR. The implication of this is that companies that implement LSR had better implementation and compliance to LSR. This is in consonance with the findings of Lance, (2014)[8] & Johnston, (2018)[9] who reported that the implementation of safety programs such as LSR increases top to down personnel involvement in ensuring that the common goal of accident prevention is achieved. Also, the report of Agyekum et al, (2018)[10] supports these findings that the implementation of safety program drives management to display commitment publicly and this can impact in variety of areas including employee attitudes and safety performance. Furthermore, Gonzales & Teodoro (2016)[11] supports the above findings when they reported that implementation of safety programs such as Life saving rules encourages workers to participate in hazard identification and awareness and influences their perception which in turn improve safety performance, productivity and quality of work.

According to Vinodkumar & Bhasi (2010)[12], employee participation in safety programs such as risk assessment are very important as they help create awareness of hazards and risks, identify who might be harmed and put control measures in place.

Malaay.et al (2015)[13]; Al Haadar & Panuwatwanich (2011)[14] revealed in their reports that effective safety programs include trainings and noted that such safety trainings improve employee retention as well as compliance with health and safety requirements at work which leads to positive attitude and safety behaviours.

The second objective sought to ascertain the level of awareness of Life Saving Rules among workers of the companies in the study.

Table 9 indicated that there was some level of difference in the level of awareness of LSR among companies in the study area. The companies recorded various means. However, tables 10 and 11 suggests that there was significant difference between the companies that implemented LSR and the ones that do not implement LSR as companies A, B, D & E that implemented LSR had higher mean values than C&F.

This finding agrees with Sherrad & Day (2001)[15] who revealed that implementation of health and safety programs will increase awareness of work place hazards and noted that all employees across the industry levels require this to build the capacity within the industry to improve, sustainability, productivity and health and safety. Similarly, Agyegum et al, (2018) postulates that training received during implementation health and safety programs such as LSR could increase workers knowledge on how to protect themselves from injuries that are bound to occur in the workplace and improve safety performance.

The third objective sought to evaluate the difference in the OHS performance records of the companies in the study.

Table 12 showed the leading indicators of companies in the study. The table revealed that companies A, B, D and E that implement LSR recorded means higher than or equal to the grand means, while companies C & F that do not implement LSR recorded lower mean. Also, table 13 presents the lagging indicators of companies in the study. The table showed that companies C & F that do not implement LSR recorded means that are higher than or equal to the grand means while companies A, B, D & E that implement LSR recorded lowers. The implication of this is that companies A, B, D & E that implement LSR had better OHS performance record than companies C & F. Again, table 14 suggest that there was significant difference in the performance records between companies that implement LSR and the ones that do not implement LSR. Furthermore, table

15 revealed that companies that do no implement LSR recorded higher values than companies that implement LSR. This suggests that companies that do not implement LSR had more incidents than companies that implement LSR. This could be because of lack of management commitment or non-implementation of health and safety program like LSR. This finding corroborates with IOGP (2018); who reported that there has been a decline in fatality and other accident rates since LSR was introduced and implemented across the oil and gas industry. Furthermore, Abihud (2013)[16] reported that there was a tangible impact of health and safety program on organizational safety performance. These findings are consistent with the outcome study of Ulinfun (2002)[17], who also found that successful implementation of health and safety program reduced incident rates by 51%, decreased lost workday rates by 12% and recordable injuries by 48% thereby improving occupational health and safety performance record.

Summary of interview using Microsoft Nvivo Software.

The interview explored respondents' views on how Life Saving Rules (LSR) program is being implemented, it's benefits, use and suggestions on ways to improve safety performance in the selected oil and gas companies in the study.

Summary of the responses are presented in themes (headings) and sub themes below;

Implementation of Life saving Rules: respondents stated that LSR is introduced and communicated during personnel HSE induction, organizations' safety awareness campaigns, safety meetings and risk assessment sessions through posters, pocket cards, videos, HSE induction manuals etc. Respondents also mentioned that consequence management is applied in the implementation of life saving rules where compliance behaviour is appreciated and rewarded and noncompliance behaviour/violations are punished.

Importance/benefits of implementing life saving rules: Respondents noted that the implementation of LSR has impacted positively in their organizations safety performance records by reducing the risk and number of injuries and accidents, boost employees moral/commitment towards their job and increase employers confidence/commitment to Health, Safety and Environment.

Suggestion towards increasing the level of awareness of life saving rules and ways to promote the program in the industry: Respondents suggested the use of Awareness, Interest, Desire and Action (A.I.D.A) tool or model in the implementation of Life saving rules where employees are given the opportunities to participate actively in the program and their performance appraised periodically for continuous improvement. Also, effective application of consequence management approach should be introduced and enforced.

V. CONCLUSION

The study established that companies that implemented Life Saving Rules (LSR) had better implementation and compliance level. This means that they had better management/leadership visibility and commitment, high level of workers participation in safety program, better understanding of hazard, and its control and had engaged in more health and safety trainings. Also, the study found that workers of the companies that implemented LSR had better awareness of their roles in keeping the workplace safe. Furthermore, companies that implemented LSR had fewer incidents and better Occupational Health and Safety performance records.

In conclusion, effective implementation of safety programs such as LSR can prevent/ reduce injury in the workplace and improve Organizational performance.

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