

Relationship Between Safety Management Practices, Safety and Health Representatives, and Safety Behaviour of Workers in Selected Nigerian Oil and Gas Companies

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Abstract

This paper examined the relationship between safety management practices, safety and health representative committee, as well as how this relationship can influence positive safety behaviours among oil and gas workers in Nigeria. The sample size comprised 131 systematically chosen oil and gas workers in Rivers State, Nigeria. PLS-SEM programme (SmartPLS 3.1) was used to analyse the responses from the respondents. The results obtained revealed that the direct linkages between safety management practices, safety and health representatives, and safety behaviours were all favourably significant. Also, the study found that with better management support, as displayed by safety management practices, the workers positively perceived the functionality of their safety and health representatives committee. It was concluded that safety management techniques are critical to the corporate presence of safety and health representatives committee and, as a result, changes in worker safety behaviour.

Keywords: Safety management practices, Safety and health representatives committee, Safety behaviour, Oil and gas companies, Rivers State

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1. Introduction

Safety and health representatives in the workplace play an essential role as they act as a prized link between employers and employees to ensure safe work practices (Sittig et al., 2018). Safety and health representatives can be effective in promoting safe work practices in the workplace and the work environment at large. Furthermore, safety and health representatives and trade unions are often established for the benefit of their members, with safety and health being key components (Ngwama, 2016). A productive and valuable employee is one who is in good health. Conversely, an unhealthy worker is a liability that interferes with the organization's profit margin. Safety and health representatives have been pushing for companies to prioritize the improvement in employees' working conditions.

A variety of circumstances may affect the efficacy of safety and health representatives in carrying out their legally required functions and obligations. For instance, specialized understanding about their actual role/position has the capability of making safety and health representatives more effective in the workplace (Hall et al., 2006; Shaqiri, 2020). Globally, workers' representation

for workplace safety and health has been a function of legal and legislative arrangements and rights, which in turn can empower safety and health representatives in performing their tasks. A typical example is in Great Britain and Nigeria, where safety and health representatives perform their job roles under the Health and Safety at Work Act 1974, and the Factories Act 1990.

Influential power, position power, information and knowledge powers, coercive power, interpersonal power, and personal power are some of the other characteristics that might impact how well people accomplish their responsibilities (Antonsen, 2009). Ollé-Espluga et al. (2015) and Walters et al. (2016) have identified management support/safety management practises, skilled knowledge from professionals, support from coworkers, unions' support, and their ability to influence the workplace safety committee as important for safety and health representatives. Regrettably, even with workplaces that have safety and health representatives, accidents continue to occur.

The oil and gas industry still records high unsafe conditions leading to unpleasant occurrences such as injuries, accidents and fatalities. The level of

safety performance indicators have remained questionable. International Labour Organisation (ILO) estimates that, yearly, 250 million workers are involved in accidents and 300,000 are usually killed. Also, ILO noted that at least 335,000 fatal injuries are as a result of work-related accidents. Yearly, two million fatalities are recorded as a result of bad, and very habitually illegitimate working conditions of concern to labour leaders and a threat to the global labour force. In the oil and gas industry alone about 100,000 workers are killed in accidents on sites on an annual basis. These eventualities are usually caused by failure to manage risks, forthright carelessness from employers and/or not involving workers and their representatives in the safety management process of their organizations. The influence of safety and health representatives and their ability to ensure the safety and health of workers and the workplace has been given minimal managerial and research attention. The drive for trade unions and workers representative teams to stimulate better working conditions is diminishing due to declining membership, and failure of management practice. Hence, work-related accidents and diseases continue to be a serious problem across diverse socio-demographic and work settings.

This paper assessed the performance of safety and health representatives in the Nigerian Oil and Gas industry to identify their effectiveness in the workplace in relation to improvements in workplace safety. Also, the paper aimed to detect the barriers safety and health representatives might experience whilst performing their work and to ascertain those factors that enabled them to work effectively according to their legal duties and responsibilities.

2. Materials and methods

2.1 Study area

The study was conducted among oil and gas workers in oil and gas servicing companies in Rivers State. Rivers State was selected as the study area of this research because it produces more than 60% of Nigeria's crude oil and gas output. The state accounts for one of the highest numbers of oil & gas and related industry workers, and in fact plays host to the only gas liquefaction plant in Nigeria.

2.2 Population of the study

The population of this study consisted of oil and gas workers in Rivers State, estimated as 30, 000 workers in both upstream and downstream oil and gas operations. Specifically, this study focused on employees who are highly exposed to workplace

hazards and are at high risk of occupational accidents. For example, drillers, electricians, engineers, mechanics, riggers, scaffolders, welders, and other support staff. They constituted the population of the study.

2.3 Calculation of sample size

As a rule of thumb, sample size between 30 and 500 could be considered effective depending on the type of sampling design and research question investigated (Roscoe, 1975). However, in multivariate research, the sample size should be several times larger, preferably 10 times, than the variables of the study. For this study, a sample size of between 370 – 380, based on Krejcie and Morgan (1970) formula (Equation 1), for an estimated population size of 30,000 oil and gas workers was deemed as adequate.

$$s = \frac{X^2 NP(1-P)}{e^2(N-1)+X^2P(1-P)} \quad (1)$$

where s is the require sample size, X^2 is the table value of Chi-Square for 1 degree of freedom at the desired confidence level, N is the population size, P is the population proportion (assumed to be 0.5 since this would provide the maximum sample size), and e is the degree of accuracy expressed as a proportion (0.05). Because there are 6 independent and dependent variables in the present study, the required sample size should be at least 70 or more, and hence, between 370 - 380 subjects are deemed an appropriate size. An area sampling was used because it is the most popular type of cluster sample used when the design comprises geographic clusters (Sekaran, 2016). In this study, the geographic clusters are the oil and gas companies in Rivers State.

2.4 Methods of data collection

This study adopted the administration of questionnaire as the method of data collection. This is because it allows respondents to answer questions in the questionnaire using a stated range of scales. The copies of questionnaire were personally administered and retrieved based on convenience on the Human Resources (HR) department of the randomly selected companies. The questionnaire used has been widely validated and noted to be reliable. Notwithstanding, reliability test was conducted, and it indicated that all of the construct measurements fulfilled the minimum reliability requirement of 0.70 as suggested by Nunnally (1978).

2.5 Methods of data analysis

The data collected from questionnaire survey and interviews were subjected to descriptive and quantitative analysis using simple bar charts, pie charts, tables, and percentages. Mean score index and standard deviation were also used to evaluate the effects of safety management practices on workers perception on the functionality of safety and health representatives and safety behaviours on a five (5) point Likert-type scale. The data were analysed using SPSS version 21.0 software.

3. Results

3.1 Response rate

A total of 400 copies of questionnaire were administered, out of which only 141, representing 35.3% of the sample size were returned (Table 1). This response rate aligns with the World Development Bank (1997) recommendation that a response rate of 30% in any survey research particularly in African countries is adequate. However, out of the 141 returned copies of

questionnaire, only 131 were valid, while a total of 10 copies of questionnaire were invalid. Therefore, a total of 131 copies of questionnaire representing 32.7% were finally used in this study.

Table 1: Questionnaire administrated and retrieved

Questionnaire	Response
No. of distributed	400
No. returned	141
Invalid no.	10
No. of valid	131
Valid response rate	32.7%

3.2 Demographic of respondents

Table 2 shows the demographic of the respondents in this study. The gender indicates that the oil and gas company is a male dominated sector. The age shows that the sector has more of the young adults. These young adults are majorly married having diploma qualifications with one to ten years work experience.

Table 2: Descriptive analyses of the demographic of the respondents

Demographic	Frequency	Percentage
Gender:		
Male	101	77.1
Female	30	22.9
Total	131	100.0
Age:		
Less than 30	37	28.2
31-43	68	51.9
44-65	26	19.8
Total	131	100.0
Marital Status:		
Single	43	32.8
Married	65	49.6
Other	23	17.6
Total	131	100.0
Qualification:		
Secondary education	18	13.7
Diploma	72	55.0
University	27	20.6
Postgraduate	14	10.7
Total	131	100.0
Experience:		
1-10	121	92.4
11-24	9	7.6
25 and above	0	0
Total	131	100.0

3.3 Factor analysis on safety management practices (SMP)

All items representing SMP were submitted to SPSS for factor analysis with principal component analysis with a varimax rotation in order to determine how many factors actually measured the variable. Although, 16 items were initially submitted for factor analysis, based on an eigenvalue of above 1.0, only 14 items were

retained and selected for further analysis. The two items were excluded as a result of cross loading. In addition to that, all components had a reliability of above 0.60. The items selected for the factor analysis account for 66.1 percent of the variance and are much higher than 50 percent indicating acceptable survey instrument construct validity (Hair Jr et al., 2020), with each item associated with Eigenvalue greater than 1.0 (Table 3).

Table 3: Output of factor analysis on safety management practices

Parameter	Value
Eigenvalue	7.93
Percentage of variance explained (%)	66.1
Kasier-Meyer-Olkin	0.881
Bartlett's test of sphericity approx. chi square	1977.078
Df	231
Sig	0.00

3.4 Correlation analysis

To determine the strength and direction of the relationship among the variables utilized in this study, a Pearson correlation analysis was conducted. The result indicated that safety training and communication correlates with safety and health representatives committee at $r = 0.328$, $p < 0.01$. Others are as indicated in Table 4. Hence the problem of multicollinearity is not a concern.

The strengths of correlations between two variables (independent and dependent) were determined. From Table 5, it is observed that the factors of safety management practices is positively significant but with small correlations with safety behaviours. Also, safety and health representatives committee and safety behaviour are significantly correlated, but with medium correlations.

Table 4: Correlation analysis

	Variables	SFTC	ESMI	EAP	SRP	SHRC	SP
Independent variables	Safety Training and Communication	1					
	Employee Safety Motivation and Incentives	0.154	1				
	Employee Assistance Programs	0.305	0.434	1			
	Safety Rules and Procedures	0.333	0.427	0.575	1		
Dependent variable	Safety and Health Representatives Committee	0.328	0.483	0.576	0.420	1	
	Safety Performance	0.222	0.491	0.446	0.441	0.602	1

Table 5: Strength of correlations between variables

Type of the relationship	Correlations	Strength
Safety Training and Communication	0.22**	Small
Employee Safety Motivation and Incentives	0.10	Small
Employee Assistance Programs	0.17*	Small
Safety Rules and Procedures	0.03	Negligible
Safety and Health Representatives Committee	0.49**	Medium
Safety Performance	0.37**	Medium

4. Discussion

A positive significant relationship between safety management practices and safety behaviours was found. This is an indication that the elements of safety management practices examined in this study have the capacity of positively shaping how workers behave safety-wise. Thus, a deduction can be made that with good safety management practices, workers are bound to behave in safe manners. Such management practices include safety training and communication, employee safety motivation, employee assistance programs, and safety rules and procedures.

Also, it was found that safety management practices have a significant relationship with safety and health representatives. This is an indication that with good safety management practices, safety and health representatives will function effectively. Succinctly put, the safety management practices practiced in the company were enough to positively shape the workers' thought on the functionality of their safety and health representatives committee. This finding is similar to previous findings (Walters et al., 2016; Bennett, 2015; Harris, 2012).

Furthermore, it was found that there is a significant relationship between safety and health representatives and safety behaviour. The implication of this finding is that safety and health representatives, with good management support are likely to perform those tasks optimally and safety behaviours will improve. That is, a positive safety behaviour is a function of the functionality of their safety and health representative's commitment to ensuring the safety of workers and the workplace. This has been found in previous studies (Kim and Cho, 2020; Sedano et al., 2014).

In summary, this study has established that the functionality of safety and health representatives in improving the safety behaviours of their workers and the safety of the work site, is hugely dependent on the level of support they get from management through safety management practices.

5. Conclusion

The relationship between safety management practices, safety and health representatives committee and the ability of this relationship in positively shaping the safety behaviours of oil and gas workers in Rivers State, Nigeria was investigated. It was found that improvements in the safety behaviours of workers in the oil and gas industry is a function of the effectiveness of their safety and health representatives. Also, the effectiveness of safety and health representatives is a function of management support. Therefore, it is concluded that safety behaviours can be improved when management deliberately supports the activities of safety and health representatives.

References

- Ajmal, M., Isha, A.S.N., Nordin, S.M. and Al-Mekhlafi, A.B.A. (2022) Safety-management practices and the occurrence of occupational accidents: Assessing the mediating role of safety compliance. *Sustainability*, 14(8): 4569.
- Antonsen, S. (2009) The relationship between culture and safety on offshore supply vessels. *Safety science*, 47(8): 1118-1128.
- Arokodare, M.A. and Asikhia, O.U. (2020) The moderating effect of external environment on the relationship between strategic entrepreneurship and performance of selected oil

- and gas service firms in Lagos and Rivers States, Nigeria. *Review of European Studies*, 12, 85
- Bennett, D. (2015) Health and Safety after the Robens Report of 1972.
- Gbakon, K. and Ojaraida, L. (2020) The Nigeria gas landscape: Implications for economic development. In SPE Nigeria Annual International Conference and Exhibition (p. D013S018R004). SPE.
- Gignac, G.E. and Ooi, E. (2022) Measurement error in research on financial literacy: How much error is there and how does it influence effect size estimates. *Journal of Consumer Affairs*, 56(2): 938-956.
- Hair Jr, J.F., Howard, M.C. and Nitzl, C. (2020) Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of business research*, 109, 101-110.
- Hall, A., Forrest, A., Sears, A. and Carlan, N. (2006) Making a difference: Knowledge activism and worker representation in joint OHS committees. *Industrial Relations*, 61(3): 408-436.
- Harris, L.A., Olsen, K.B. and Walker, R.J. (2012) Role typology for health and safety representatives. *Employee Relations*.
- Imagha, O.A., Akpaotor, U.A., Akpan, S.V. and Atakpo, E.U. (2023) Exploring the influence of Work Environment on Employees' Commitment in Selected Oil Servicing Firms in Rivers State, Nigeria. *International Journal of Economics and Business Management*, 9(10): 145-171.
- Kim, K. and Cho, Y.K. (2020) Effective inertial sensor quantity and locations on a body for deep learning-based worker's motion recognition. *Automation in Construction*, 113: 103126.
- Krejcie, R.V. and Morgan, D.W. (1970) Determining sample size for research activities. *Educational and psychological measurement*, 30(3): 607-610.
- Ngwama, J.C. (2016) Framework for occupational health and safety in Nigeria: the implication for the trade union movement. *Journal of Economics and Sustainable Development*, 7(11): 98-109.
- Nunnally, J.C. (1978) *Psychometric theory*. New York, NY: McGraw-Hill.
- Ollé-Espluga, L., Vergara-Duarte, M., Belvis, F., Menéndez-Fuster, M., Jódar, P. and Benach, J. (2015) What is the impact on occupational health and safety when workers know they have safety representatives. *Safety science*, 74: 55-58.
- Roscoe, J.T. (1975) *Fundamental Research Statistics for the Behavioural Sciences*, 2nd edition. New York: Holt Rinehart & Winston.
- Sedano de la Fuente, V., Lopez, M., Gonzalez, I., Alcantara, O. and Ritzel, D. (2014) The impact of economic crisis on occupational injuries. *Journal of Safety Research*, 48: 77-85.
- Sekaran, U. and Bougie, R. (2016) *Research methods for business: a skill-building approach* (7th ed.). Haddington: John Wiley & Sons.
- Shaqiri, A. (2020) Participation of employees and their representatives in the Occupational Safety and Health (OSH).
- Sittig, D.F., Belmont, E. and Singh, H. (2018) Improving the safety of health information technology requires shared responsibility: It is time we all step up. In *Healthcare*, 6(1): 7-12.
- Tetzlaff, E.J., Goggins, K.A., Pegoraro, A.L., Dorman, S.C., Pakalnis, V. and Eger, T.R. (2021) Safety culture: a retrospective analysis of occupational health and safety mining reports. *Safety and health at work*, 12(2): 201-208.
- Walters, D., Johnstone, R., Quinlan, M. and Wadsworth, E. (2016) Safeguarding workers: A study of health and safety representatives in the Queensland coalmining industry, 1990-2013. *Industrial Relations*, 71(3): 418-441.