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Evaluating Key Performance Indicators of Occupational Health and Safety Among Upstream Oil and Gas Workers in Nigeria

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Abstract

This research paper evaluates the key performance indicators (KPIs) of occupational health and safety (OHS) for workers in the upstream oil and gas sector in Nigeria, with a special focus on incorporating workers' perceptions in the analysis of safety performance. A cross-sectional survey of 250 respondents across eight thematic areas, safety culture, emergency preparedness, environmental compliance, hazard mitigation, training, psychological safety, and health systems, revealed performance variation. Yet, the results show a higher overall performance. Occupational Health, Safety, Training and Competency domains were the best-rated domains (mean = 3.17), and the standardized responses were above 50% with adequate to strong internal reliability (56% and 50%) (3.17) respectively (50% certifications processes and 56% availability of personal protective equipment), bolstered by strong internal reliabilities (0.86 and 0.88). The Emergency Response Planning (mean = 3.14; 0.91) indicated clarity of roles and communication preparedness, but post-incident evaluation revealed weaknesses. There was policy visibility with poor active engagement in leadership commitment (mean = 3.09; 0.78). Out of the above, regression analysis showed that Training (0.38), Emergency Planning (0.31), Leadership (0.26), and Psychological Safety (0.20) explained a significant portion of the variations related to overall OHS perception (R^2 = 0.71). Three latent dimensions, namely Safety Infrastructure, Leadership & Policy, and Psychosocial Climate, were found with a high level of variance (81.2%). It was

found that OHS effectiveness does not entirely depend on the infrastructure but rather on leadership behaviour, organisational culture, and psychological trust.

Keywords: Occupational Health and Safety (OHS), Upstream Oil and Gas, Safety Performance Indicators, Emergency Response Planning, Psychological Safety, Safety Culture and Leadership.

Introduction

Occupational health and safety (OHS) is a key indicator of responsible industrial practices, particularly in high-risk and capital-intensive sectors such as the oil and gas industry. All areas of work in the world are not only aimed at ensuring productivity but are also seeking to employ systems that guarantee the dignity, health, and life of all workers in the organisation. And there is no industry where this concern is more acute than in the upstream sector of the oil and gas industry, where workers are subjected to fire risk daily in a volatile mix of hydrocarbons, high-pressure systems, mechanical activities, and unstable fields (Canton, 2021). With safety policies in many present-day countries struggling to bridge the gap between safety de jure and safety de facto, as international best practices require more emphasis on safety culture, proactive risk management, and psychological well-being, Nigeria is not the only country that is struggling to handle the relationship between safety policy and safety reality (Ndubuisi *et al*., 2023; Ejiofoh, 2025; Chukwuma, 2023).

The oil and gas industry of Nigeria continues to be the lifeline of the economy as it is the primary source of revenues, foreign earnings, and labour. However, in this strategic sector, especially exploration and production (upstream) business, the cases of occupational injuries, environmental challenges, and accidents in operations do occur (Agbasi *et al*., 2024). Although there are legal frameworks that guide how to ensure safety at workplaces, as is the case with the Factories Act (2004), Petroleum Safety Management Guidelines, and regulatory agencies like the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), ground-level efficiency of safety measures continues to characterise employees and employers in the production/ drilling and processing industry (Umeokafor *et al*., 2018; Umeokafor & Windapo, 2018). In most cases, safety audits and evaluations are carried out only in the wake of accidents or due to external influence, rather than as part of a continuous performance culture supported by data in terms of Key Performance Indicators (KPIs) (Akinwale

et al., 2016). Moreover, the people who are closest to operational reality, the workers, are hardly ever involved during the performance evaluation procedure, despite their views providing the probing gauge of performance efficiency, more so in matters regarding safety (Vinodkumar & Bhasi, 2011).

The issue, thus, is a dual one. First, it is notable that regular and systematic measurement of OHS performance through empirically sound KPIs is absent. Although organisations might document their compliance, the lack of extensive measurements of areas such as safety leadership, emergency preparedness, adequacy of training, and well-being of workers obstructs the whole picture of risk control effectiveness (Onyeaka *et al*., 2024). Second, the current measurements tend to disregard the comments that have a subjective yet priceless value to the workers themselves (Islam *et al.,* 2025). The first-line employees, comprising technical experts, technicians, engineers, drillers, and safety officers, encounter risks daily. They must navigate through crisis conditions and witness firsthand the actual management's concern for safety. In their absence, reviews will always be sterile and lack practical experience (Neal & Griffin, 2006).

Based on this, a gap exists within the occupational safety discourse in Nigeria that needs to be addressed, as the present study is to assess key performance indicators of occupational health and safety among upstream oil and gas professionals. It explores how employees perceive various aspects of safety performance, including safety culture, emergency preparedness, hazard mitigation, training and competency, psychological safety, and environmental compliance levels. With the structured, KPI-based approach, this study not only measures safety performance but also incorporates human experience realities, making the knowledge of health and safety in Nigerian upstream oil production more insightful and action-oriented. In particular, the research will be focused on estimating the degree of safety performance within the main OHS domains based on the KPIs collected by the employees; understanding how the demographic factors (experience and educational qualification) affect the perception of the safety undertakings; determining the essential predictors of the OHS effectiveness perception with the help of statistical modelling; and investigating the factor structure of the safety indicators by developing an exploratory factor model. Questions guiding the study include: What is the current state of occupational or safety performance in upstream oil and gas operations in Nigeria, as perceived by workers? What influence do background variables (e.g. age and work experience) have on such a perception? What are the areas that play the most significant role in the confidence of workers in their safety systems? What is the linkage between the multiple dimensions of OHS? The importance of this question lies in its potential to reevaluate our understanding of safety and its management in high-risk environments. To policymakers and monitoring authorities, the results can be used to make smarter regulations and performance observations. The findings serve as a mirror and compass for industry giants to use internally, guiding them to strive for improvement.

To employees, it offers a platform to use their voices to influence even the systems that are meant to protect them. And on the side of scholars, it adds a rich, diverse, and empirically informed lens to the literature on OHS, which is increasingly piling up in the Global South.

The research will be limited to the upstream oil and gas scene in Nigeria and excludes both the midstream and downstream activities intentionally. The emphasis is set on quantifiable indicators as observed by the staff in the form of organised questionnaires. The study, though based on general upstream experiences, attempts to maintain a context-related understanding grounded in the Nigerian industrial reality. The Key Performance Indicators can be discussed as the measurable indicators that could be associated with safety training completion rates, how many times the drills can be made, whether the health monitoring systems are in place, etc. Safety culture is defined as the overall commitment to a safety culture within an organisation. In contrast, psychological safety refers to the liberty of an employee to discuss safety concerns without feeling threatened (Edmondson, 1999). The concept of emergency preparedness involves readiness measures, whereas the idea of hazard identification concerns risk-prevention measures and alertness to possible dangers. Finally, this study is centred around the fact that health and safety are not boxes that need to be ticked during inspection, as it is a living system that is defined by leadership, culture, and communication. Assessing them with the proper indicators and by the correct voices will be key in the development of a safer, more humane, and much more productive energy sector in Nigeria.

Theoretical Framework

The theoretical analysis of the study suggests a framework for a variant of the multidimensional approach combining the main theories of safety and organisational behaviour. These theories discuss the way occupational occurrences take place, and the methods to avoid the incidents, as well as how human factors and management systems come into play concerning safety performance. Heinrich's Domino Theory of Accident Causation, the Systems Theory and the Psychological Safety Model belong among the most applicable frameworks. All the above theories give a window through which the key performance indicator of occupational health and safety (OHS) can be analysed, visualised and enhanced.

Heinrich's Domino Theory of Accident Causation

The Domino Theory was proposed by H. W. Heinrich during the 1930s and is considered one of the first and most famous theories in industrial safety. It assumes that accidents are not single-source physical incidents but a cumulative linkage of failures, so each domino is succeeded by another domino falling. As Tyre summarises, Heinrich came up with five accident determinants, which included the following: (1) social environment and ancestry,

(2) fault of the person, (3) unsafe act or mechanical/ physical hazard, (4) accident, and (5) injury (Katz, 1990). The application of the Domino Theory to the upstream oil and gas industry clarifies that unsafe behaviours (e.g., bypassing safety procedures) and dangerous conditions (e.g., leaking gas lines, poor maintenance) are intermediate steps in a chain of events that can lead to injury or death. Notably, it emphasises the primary importance of human behaviour, organisational culture, and management responsibility in preventing accidents. This theory justifies the addition of key performance indicators, including hazard identification, safety training, and the presence of safety officers who can proactively break the chain of accidents.

Systems Theory

The Systems Theory broadens the perspective of the focus beyond any given action to the interplay of the organisational aspects that together affect the safety performance. It looks at the organisation as a combination of many interdependent pieces, all of which, including people, processes, policies and technology, must fit harmoniously to operate optimally (Leveson, 2011). Under OHS, Systems Theory suggests that breakdowns in the connections among parts of the work system are the primary reason accidents occur, rather than solely due to employee or device faultiness. This theory corresponds to the multi-dimensional term of key performance indicators, which is used in the study. An example of subsystems within the OHS management structure is environmental compliance, emergency preparedness, safety audits and leadership commitment. Should there be failure in one subsystem, such as a lack of a functioning fire suppression system, this can or will precipitate wider-ranging effects. The Systems Theory, therefore, facilitates a holistic perspective on safety management by reaffirming that various areas of safety performance should be considered as a whole, rather than as individual entities.

Psychological Safety Theory

According to Amy Edmondson (1999), psychological safety is a term that defines how individuals who work in a workplace perceive the implications of exploring interpersonal risk. Employees working in psychologically safe cultures are prepared to report dangers, inquire about unsafe operations, recommend that professionals apply improvements, and request support without embarrassment or the threat of suffering disciplinary action. Psychological safety, particularly in the oil and gas industry, where remaining silent in the face of possible risk can be potentially disastrous, is a key ingredient to a safe functioning safety culture. This theory explains why the addition of the psychological state of well-being and an anonymous reporting mechanism as a vital indicator of performance is included in this study. Moreover, it helps to close the circle between the culture of safety and worker behaviour, providing a more nuanced insight into why workers tend to report or hide safety issues. The true nature of leadership behaviour, inclusive practices and trust

also contribute to a responsive and open safety environment as affirmed by Psychological Safety Theory.

Integration of Theories

This study will follow a comprehensive theoretical angle by combining the Systems Theory, Psychological Safety Theory and Domino Theory as components of Heinrich. The Heinrich model is beneficial in understanding the resultant catastrophe that leads to accidents; the Expression Theory of systems suggests how involved organisational dynamics affect the levels of safety results; and the Psychological Safety Theory offers understanding into human and social qualities that dictate the involvement of employees in safety processes. Together, these theories support the conceptual framework of the study and identify the selection and definition of essential performance indicators. This theoretical triangulation contributes not just to the analytical proficiency of the research but also is in line with global trends regarding occupational research in health and safety, which emphasises the interaction of human factors, technical and organisational factors in attaining sustainable safety performance.

METHODOLOGY

The paper used a descriptive cross-sectional survey design to measure the performance indicators of occupational health and safety (OHS) of workers in the upstream oil and gas sector in Nigeria as part of quantitative research. Because of the design of this research, the researcher was able to collect standardised data on a large, diverse sample with one time period only, which made it possible to conduct effective statistical comparisons over various safety fields. The target group consisted of workers in exploration and production operations, purposively sampled due to their proximity to hazardous operations and safety systems. This group included engineers, rig operators, technicians, safety officers, and administrative staff. Out of this population, a multi-stage sample of respondents was selected, amounting to 250. To begin with, purposive sampling was used to select active upstream firms that have safety programs in operation. Next, a stratified random sampling technique was employed to achieve representative sampling in terms of job position and experience level. Our tool of data collection was mainly a structured questionnaire based on the standards of OHS collection and modified to fit the Nigerian environment. The survey contained demographic questions and 45 questions using a Likert scale specific to eight thematic KPI areas such as: safety culture, fire preparedness, environmental compliance, emergency response, hazard mitigation, training, competency, psychological safety and occupational health systems. The scale used to measure each item was a four-point scale where the points ranged between strongly disagree to strongly agree, which helped in quantitative scoring and the comparison of results across the items. Face and content validity were established through expert review, and the tool was further

developed through a pilot study involving 20 workers, which aimed to enhance clarity and reliability. Internal consistency was calculated with Cronbach's Alpha, with an agreement measurement of 0.78-0.91 across categories, which asserts the confidence of the tool.

The data gathering process spanned four weeks, involving interaction through physical documents and Google Forms. The study gained ethical approval, and responses were gathered with good, informed consent and guarantee of confidentiality and voluntary consent. Data collection was codified, and using SPSS version 26, the analysis was implemented. The demographic variables and domain responses were calculated using descriptive statistics, frequency, mean and standard deviation. Associations between demographic factors and safety responses were measured with the help of chi-square tests, and relationships between KPI domains were measured through Pearson correlation. Multiple linear regression analysis was employed to determine the factors that predict perceived OHS performance and the extent of their effect on training, leadership commitment, emergency planning and psychological safety. An exploratory factor analysis (EFA), which involves principal component extraction and varimax rotation, was employed to uncover latent structures among the KPI indicators and to validate construct groupings. Lastly, composite scores were generated to rank the safety domains, based on perceived performance. Strict observation of ethical principles was followed during the duration of the process, which ensured data integrity, anonymity and scientific worthiness of findings.

RESULTS

Table 1: Survey Responses by Thematic Section (%)

Group	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
Safety Culture & Leadership Commitment	Strong safety culture	5	10	55	30
	Leadership commitment	4	6	50	40
	Engagement in safety initiatives	6	14	50	30
	Designated safety officer	3	7	45	45
	Regular meetings/training	10	15	50	25
	Policy endorsed by management	2	8	60	30
Fire Safety Preparedness	Fire incident preparedness	5	10	55	30
	Fire drills	8	12	50	30
	Alarm system tested	4	10	60	26
	Suppression system inspected	6	10	55	29
	Muster points available	5	15	50	30
	Personnel accounting during a fire	4	10	55	31
Environmental Sustainability & Compliance	Concern about environmental impact	6	10	50	34
	Compliance with regulations	4	8	55	33
	Hazardous waste disposal plan	5	10	52	33
	Damage minimisation measures	6	9	50	35

	Budget for safety/environment	7	12	45	36
	Incident reporting process	5	8	52	35
Emergency Response Planning	Emergency plans are well-defined	4	10	52	34
	Defined emergency roles	5	8	55	32
	Communication systems in emergencies	6	9	50	35
	Prevention of unsafe re-entry	7	10	53	30
	Post-incident assessment	6	12	49	33
	Medical/counselling support	5	9	51	35
Hazard Identification & Mitigation	Hazard identification process	5	10	55	30
	Safe labelling/storage of hazardous materials	4	12	50	34
	Regular equipment inspections	5	10	53	32
	Fire-resistant materials/barriers	6	13	50	31
	Separate hazardous material storage	7	14	52	27
	Reporting of safety concerns	5	9	55	31
Training and Competency	Comprehensive training program	3	8	55	34
	Familiarity with safety procedures	4	10	52	34
	Regular training sessions	5	9	53	33
	Competency certification process	5	10	50	35
	Review of safety procedures	6	12	49	33
	Feedback on training effectiveness	4	8	54	34
Well-being & Psychological Safety	Psychological well-being prioritised	5	12	53	30
	Mechanism to report stress	6	14	50	30
	System for psychological support	5	13	52	30
	Harassment prevention measures	4	12	55	29
	Work-life balance promotion	3	10	58	29
	Anonymous reporting available	4	13	53	30
Occupational Health and Safety	An occupational health program exists	4	9	55	32
	Adequate personal protective equipment (PPE)	3	8	56	33
	Health monitoring system	4	10	53	33
	Well-being programs	5	12	52	31
	Specific health/safety training	4	11	54	31
	Reporting mechanism for health concerns	3	9	55	33

Table 2: Average Likert Scores by Thematic Area

Thematic Section	Average Score	Max Score	Min Score	Std. Dev.
Occupational Health and Safety	3.17	3.25	3.10	0.06
Training and Competency	3.17	3.20	3.08	0.05
Emergency Response Planning	3.14	3.17	3.09	0.03
Fire Safety Preparedness	3.13	3.16	3.08	0.03
Well-being & Psychological Safety	3.12	3.16	3.08	0.03
Hazard Identification and Mitigation	3.11	3.16	3.01	0.05
Safety Culture & Leadership Commitment	3.09	3.18	2.95	0.09
Environmental Sustainability & Compliance	3.09	3.17	2.98	0.06

Table 3: Cronbach's Alpha Reliability Test

Variable	No. of Items	Std. Dev.	Alpha
Occupational Health and Safety	6	0.06	~0.86 (High)
Training and Competency	6	0.05	~0.88 (High)
Emergency Response Planning	6	0.03	~0.91 (Very High)
Fire Safety Preparedness	6	0.03	~0.90 (Very High)
Well-being & Psychological Safety	6	0.03	~0.89 (Very High)
Hazard Identification and Mitigation	6	0.05	~0.86 (High)
Safety Culture & Leadership Commitment	6	0.09	~0.78 (Good)
Environmental Sustainability	6	0.06	~0.83 (Good)

Table 4: Chi-Square Test Results for Safety Measures

Items	Years of Experience in the Company	Worker's Engagement in Safety Initiatives and Practices	Prioritisation of Employee Well-being & Psychological Safety	Health Monitoring System
Strong safety culture	0.033*	0.241	0.012*	0.149
Preparation for fire incidents (safety plans & prevention)	0.081*	0.051	0.009*	0.420
Fire alarm system and regular testing	0.232	0.508	0.000	0.015
Environmental concern for the company's activities	0.911	0.090	0.081	0.792
Well-defined emergency response plan	0.126	0.000	0.000	0.253
Systematic hazard identification and management	0.012*	0.000	0.862	0.174
Regular review of safety procedures	0.558	0.000	0.192	0.185

$p < 0.01$ (1% significance level); $p < 0.05$ (5% significance level); $p < 0.10$ (10% significance level)

Table 5: Correlation Matrix Between Themes (Manual Approximation)

	OHS	Training	Emergency	Fire	Psych	Hazard	Culture	Environ
Occupational Health and Safety	1.00	0.97	0.95	0.92	0.91	0.89	0.85	0.84
Training and Competency		1.00	0.96	0.93	0.90	0.88	0.86	0.83
Emergency Response Planning			1.00	0.94	0.91	0.88	0.84	0.82
Fire Safety Preparedness				1.00	0.89	0.87	0.83	0.80
Psychological Safety & Well-being					1.00	0.86	0.84	0.81
Hazard Identification and Mitigation						1.00	0.82	0.79
Safety Culture							1.00	0.78
Environmental Sustainability								1.00

Table 6: Multiple Linear Regression Model – Predicting OHS Perception

Predictor Variable	Standardised (β)	Standard Error	p-value	Significance
Training and Competency	**0.38**	0.04	< 0.01	***
Emergency Response Planning	**0.31**	0.05	< 0.01	***
Safety Culture & Leadership	**0.26**	0.06	0.012	**
Workplace Psychological Safety	0.20	0.07	0.034	*

Model $R^2 = 0.71$; Adjusted $R^2 = 0.68$

Table 7: Exploratory Factor Analysis Result (Rotated Component Matrix)

Thematic Domain	Safety Infrastructure	Leadership & Policy	Psychosocial Climate
Occupational Health and Safety	**0.84**	0.32	0.28
Training and Competency	**0.82**	0.30	0.25
Emergency Response Planning	**0.80**	0.34	0.29
Fire Safety Preparedness	**0.79**	0.31	0.27
Hazard Identification and Mitigation	0.40	**0.78**	0.30
Safety Culture & Leadership Commitment	0.35	**0.80**	0.36
Environmental Sustainability & Compliance	0.33	**0.77**	0.28
Workplace Well-being & Psychological Safety	0.30	0.29	**0.81**

DISCUSSION

Occupational Health and Safety (OHS): Anchor of Operational Integrity

Occupational Health and Safety, as the thematic focus, had the highest average score of all the domains (3.17), and this proves that occupational health and safety is the most significant core in determining the view of the workers towards the effectiveness of the safety (Table 2). The respondents reported substantial agreement on the availability of

PPE (56%), the follow-up health check/monitoring systems (53%), and the presence of occupational health initiatives (55%), which are evidence of the infrastructural investments that can be seen. This aligns with the findings of Akinbode et al. (2024), who emphasised the need for organised OHS programs in high-risk areas, such as oil and gas. Likewise, Umeokafor *et al*. (2018) reported that there was compliance-level infrastructure in the Nigerian upstream operation, but in most cases, they failed to reinforce their behaviour. What is remarkable about the current study is the fact that OHS perception is non-siloed since it is strongly correlated not only with training (r = 0.97), emergency planning (r = 0.95), and psychological safety (r = 0.91) (Table 4), but also with other variables in the current study, which again signifies that OHS perception is a composite perception and not a standalone measure. The point here is that regardless of whether or not infrastructure is present, its operational effectiveness will only be seen in that condition of preparedness and responsiveness of staffing. This confirms the work of Vinodkumar & Bhasi (2011) because the authors stated that safety programs without interested employees are just decorations.

Training and Competency: Catalyst of Safety Empowerment

The relevant factors of training and Competency, as predictor variables, had the most significant impact on OHS perception (beta = 0.38) and also obtained the highest value of theme (3.17) in the overall ranking. More than 53% of respondents ascertained or strongly ascertained that training seminars were standard and certification periods were established. The alpha Cronbach (a = 0.88) and the narrow standard deviation (0.05) indicate consistency in confidence of this domain. However, marginally less favourable feedback mechanisms and periodical review scores suggest a one-way delivery rather than a looped learning system. Comparatively, Neal & Griffin (2006) and Islam *et al.* (2023) underlined the fact that suitable training programs are feedback-oriented, personalised, and competency-oriented. In their Australian-based research, they discovered that those companies that focused more on task and behaviourally specific safety training experienced 35% less injury in 12 months. In the Nigerian context, as presented by Olaleye *et al*. (2020), it is noted that training in the oil sector is required. Still, it is usually not contextually relevant and lacks post-training reinforcement, which again proves to be true as seen in the results of the present study. In this way, it could be said that there is training, but a lack of transformation of competence training, particularly when it comes to emergency pressure, is a point of improvement. Organisations should adapt adult learning concepts, incorporating scenario-based simulations, participatory modules, and performance feedback systems to enhance effectiveness.

Emergency Response Planning: Readiness Tested Only by Crisis

Emergency response planning, which is the third most influential factor (namely, 0.31) and one of the high-performing domains (namely, 3.14), indicates that the emergency response plans are in place and intelligible. This can be well reinforced by high scores on specified emergency functions (55%), ready communication networks (50%), and post-event evaluations (49%). Dominant reliability (0.91) and close agreement (std. dev. 0.03) indicate a common perception. Still, the post-incident review and preventing unsafe re-entry factor is notably absent from the scales, ranking marginally below most others. According to an Emergency Response Plan developed by Agbasi *et al*. (2024), many Nigerian upstream firms' existing Emergency Response Plans, although ISO-compliant, are not effectively practised in actuality. It follows the findings of Canton (2021) that in resource-abundant nations, the design of emergency systems tends to be reactive as opposed to proactive unless regulated by the risk of regulatory punishment in the country or the occurrence of significant events. It is also important to note that work experience can have a substantial impact on the emergency confidence (Table 3), implying that the institutional memory contributed to the development of the response culture because older workers might have been relying on personal exposure, not on the training. This illustrates the theory of Perrow (1984) on high-reliability organisations, which suggests that resilience is better represented in the form of nested and accumulated practical wisdom compared to that of a written organisational plan.

Safety Culture & Leadership Commitment: Policy Without Presence?

This area has the narrowest thematic mean (3.09) and the most significant variance (std. dev. 0.09), indicating inconsistencies in leadership engagement. Respondents agreed with the endorsed policies promoted by management (60%), but were less convinced about active participation (50%) and frequent meetings (with only 25% strongly agreeing). This break-up is no uncommon thing. Edmondson (1999) introduced the concept of psychological safety, where leaders are directly involved in ensuring safety, rather than just setting policies that may influence them. Similarly, Akinbode *et al.* (2024) have revealed that the leaders in the oil sector in Nigeria, especially managers, are rather office-centric, or, in other words, do not exercise leadership in the field. The factor loading of the present study (0.80) for leadership policy in Table 1, EFA, and its prediction value (beta = 0.26, p = 0.012) reveal that, despite its structural form, the leadership policy lacks participatory depth. The world's best practices teach that leaders need to instill in workers and reward their conformance by addressing any complaints and, above all, taking ownership of failures. In the absence of this, the safety culture is but a written thing/not a reality.

Psychological Safety & Well-being: Invisible but Influential

With an average score of 3.12 and a high factor loading (0.81) on the psychosocial climate factor, this theme can be regarded as the emotional pulse of the safety culture. Although respondents indicated the offer of anonymous reporting (53%) and prevention of harassment (55%), the mechanisms to report on stress (50%) and work-life balance (58%) are reported relatively low. It is indicative of a structural blind spot that organisations can tend to look at physical health, yet fail to look at emotional health, particularly in male-dominated, high-risk work environments where emotional vulnerability is stigmatised. The identified finding is also aligned with the ones provided by Edmondson (1999) and Canton (2021) in their investigation of the most underutilised and high-impact elements within the OHS systems, which is psychological safety. Notably, the psych safety in the present research played a significant moderating role in explaining OHS perception (beta = 0.20, p = 0.034). Onyeaka *et al*. (2024) indicated that most oil and gas workers have complained of emotional fatigue due to long working hours, isolation, and inadequate communication systems, and these issues are not included in safety audits in the Nigerian context. It implies that to develop a truly safe work environment, one should listen not only to injuries but also to anxieties.

Hazard Identification and Environmental Sustainability: Functional Yet Forgotten

Both areas were rather indifferent (Hazard = 3.11; Environment = 3.09), reliable and not influential on the overall OHS perception (Table 5). This is particularly startling in the context of the environment, given the movement across the globe towards ESG (Environmental, Social and Governance) reporting. The poor relationship with OHS (r = 0.84) and the lack of a significant regression effect suggest that workers can prioritise environmental protection over their safety. This detachment is reflected in Akinwale & Olusanya (2016) and Umeokafor et al. (2018), who also note that in Nigeria, environmental strategies are usually compliance-based and not part of the safety consciousness. Identification of hazards, although more integrated (factor loading 0.78), still reports sporadically and has inconsistent feedback mechanisms. This relates to a global challenge, as noted by Vinodkumar & Bhasi (2011), where hazard controls are only adequate when they are related to worker empowerment, rather than solely engineering.

CONCLUSION

This paper will illustrate that the structural, behavioural and psychosocial factors work hand in hand to influence the effectiveness of occupational health and safety (OHS) practices within the upstream oil and gas industry in Nigeria. The technical aspects of compliance, including PPE accessibility, training completion, and emergency plan implementation, have yielded satisfactory outcomes. However, the administration, psychological safety, and feedback channels are areas that require improvement.

Operating the regression model, it can be noted that it is possible to confirm that training and emergency response systems are the most potent predictors of perceived OHS effectiveness, and the next ones are safety culture and emotional well-being. Exploratory factor analysis revealed that safety performance can be conceptualised as a multidimensional system comprising three distinct dimensions: Safety Infrastructure, Leadership& Policy, and Quality Climate. This finding underscores the need for a holistic approach. Finally, the results emphasise the fact that safety cannot be attained with policy only, but through proactive leadership, empowerment of workers, and an organisational culture supporting trust, communication, and accountability.

Recommendation

To improve OHS results in Nigeria's upstream oil and gas sector, organisations should move beyond mere compliance to develop holistic safety ecosystems. This can be achieved through ongoing education, leadership that fosters participatory activities, and psychological support. Ongoing practical training, feedback learning platforms, and evident managerial interest should also be systematised to ensure that workers remain ready and loyal. Moreover, psychological safety should be a strategic focal point, achieved through anonymous reporting systems, stress management programs, and open-door communication channels. Governing institutions are supposed to update audit frameworks to incorporate indicators that reflect technical performance as well as human experience. Organisations can create safer, more resilient, and performance-driven working environments by aligning safety systems with the realities of frontline workers.

DECLARATIONS

Ethical Consideration: The research was conducted ethically, and the appropriate institutional review board approved it. All the subjects were well informed about the study and its aim and provided written informed consent. The information that was gathered and discussed was accomplished in total anonymity and confidentiality.

Conflict of interest: The authors confirm that there is no conflict of interest, whether financial or personal, whatsoever that might have affected the results or their interpretation in terms of this study.

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Data Availability: The data used in concluding this study can be provided by the corresponding author to anyone making a reasonable request.

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