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Impact of Contract Employment on Safety Vulnerability and Incident Risk in Nigeria's Oil and Gas Industry

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Abstract

The global oil and gas industry increasingly relies on contract labour, yet the occupational safety implications of precarious employment arrangements remain inadequately understood, particularly in developing economy contexts. This study examined the relationship between contract employment and occupational safety outcomes among oil and gas workers in Nigeria's South-South region. A sequential explanatory mixed-methods design was adopted. Quantitative data were collected from 416 workers (218 contract, 198 direct employees) using the validated Behavioural Factors and Occupational Health and Safety Management Scale (BFOHS-MS). Qualitative interviews were conducted with 32 participants (contract workers, direct employees, safety officers, operations supervisors). Data were analysed using independent t-tests, binary logistic regression, Structural Equation Modelling (SEM), and thematic analysis. Contract workers demonstrated significantly lower safety participation ($M=2.88$ vs 4.01, $p<0.001$), weaker reporting confidence ($M=2.54$ vs 3.93, $p<0.001$), lower organisational trust ($M=2.76$ vs 4.10, $p<0.001$), and reduced safety training access ($M=2.91$ vs 4.08, $p<0.001$). Logistic regression identified employment insecurity ($OR=2.61$, $p<0.001$), production pressure ($OR=2.22$, $p<0.001$), and low reporting confidence ($OR=1.94$, $p=0.002$) as significant incident predictors. SEM confirmed that reporting confidence partially mediated the employment type–safety participation relationship ($\beta=0.47$, $p<0.001$). Qualitative themes revealed fear of dismissal, management neglect, procedural pressure, and organisational inequality as key mechanisms perpetuating safety vulnerability. Labour precarity significantly undermines occupational safety culture, producing heightened incident vulnerability among contract workers. Structural

interventions-contractor safety equity policies, reporting protection systems, and inclusive behavioural safety strategies-are urgently required.

Keywords: Contract Employment, Occupational Safety, Labour Precarity, Safety Culture, Incident Risk, Behavioural Safety, Petroleum Industry, Mixed-Methods Research.

Introduction

The global oil and gas industry remains one of the most hazardous industrial sectors, with fatality rates approximately 7–8 times higher than the all-industry average (International Labour Organization [ILO], 2022). Major disasters such as Piper Alpha (1988), Texas City (2005), and Deepwater Horizon (2010) have repeatedly demonstrated that organisational and human factors-not merely engineering failures-are primary accident causes (Hopkins, 2019; Center for Chemical Process Safety, 2011). Over the past three decades, labour market restructuring has fundamentally altered workforce composition within high-risk industries, with a pronounced shift toward contract and temporary employment arrangements (Quinlan & Bohle, 2009).

Labour precarity theory argues that insecure employment undermines worker wellbeing, organisational attachment, and occupational safety outcomes. Precarious workers typically experience fragmented supervision, inadequate training, economic pressure to accept risk, and fear of retaliation for reporting hazards (Quinlan, 2015). Empirical evidence largely supports this proposition: Michael (2017) found that temporary workers in European manufacturing had 1.8 times higher injury rates than permanent employees. Similarly, the International Association of Oil and Gas Producers (IOGP, 2022) reported pooled injury rate ratios of 2.1 for contractors versus direct employees across 38 member companies. However, these studies predominantly originate from high-income, well-regulated contexts, raising questions about generalisability to developing economies.

Contradictions exist within the literature. Tudararo-Aherobo and Oritsema (2025) found no significant safety differences between contract and direct employees on Norwegian platforms after propensity score matching, attributing this to Norway's strong regulatory framework and tripartite cooperation. This suggests that the contract worker safety disadvantage is not inevitable but institutionally mediated-a finding that underscores the importance of context. Within Nigeria's petroleum sector, Mearns et al. (2003) reported that contract workers experienced reduced training access and safety participation, but their study was purely descriptive, employed convenience sampling (N=150), and lacked multivariate controls. Mossburg et al. 2019) observed that labour precarity contributed to psychological distress and weakened safety voice across sub-Saharan African settings, yet their cross-sectional design and single-industry focus limit causal inference. Methodological

limitations are pervasive: most African studies use small samples (typically N<250), ad-hoc unvalidated scales, basic bivariate statistics, and no qualitative triangulation. Furthermore, few have integrated behavioural safety, organisational justice, and labour precarity within a unified theoretical framework.

This study addresses these gaps by employing a sequential explanatory mixed-methods design with a validated instrument (BFOHS-MS), large sample (N=416), Structural Equation Modelling (SEM), and qualitative thematic analysis. We test four hypotheses: H1-contract workers experience significantly lower safety participation than direct employees; H2-contract employment significantly predicts occupational incident exposure; H3-reporting confidence mediates the employment type–safety participation relationship; H4-organisational trust significantly predicts safety compliance behaviour. By integrating labour precarity theory, safety climate theory, and behavioural safety perspectives, this study aims to generate robust, context-sensitive evidence for policy and practice within Nigeria's oil and gas industry.

RESEARCH METHODOLOGY

Research Design and Philosophical Stance

A sequential explanatory mixed-methods design was adopted, comprising a quantitative survey phase followed by qualitative interviews to explain and elaborate quantitative findings. This design is appropriate for investigating complex, multi-dimensional phenomena such as labour precarity and safety vulnerability, where quantitative patterns require contextual interpretation (Creswell & Creswell, 2018). The study is underpinned by critical realist ontology (Bhaskar, 2016), which acknowledges that while hazards and incidents are real, workers' experiences and perceptions are socially constructed within organisational and economic structures.

Study Area

The study was conducted within Nigeria's South-South geopolitical zone, specifically Rivers, Delta, Bayelsa, and Akwa Ibom States. This region hosts over 90% of Nigeria's crude oil and natural gas production activities, encompassing offshore deep-water platforms (>1,500m), shallow-water shelf facilities, swamp/mangrove locations, onshore flow stations, gas processing plants, and logistics bases (Nigerian Upstream Petroleum Regulatory Commission [NUPRC], 2024). The region is characterised by high youth unemployment (25–40%), community-militancy dynamics, ageing infrastructure, and weak regulatory enforcement-factors that may intensify contract worker vulnerability.

Target Population and Sampling

The target population comprised oil and gas workers (direct employees and contract workers) in operational roles with regular hazard exposure. Inclusion criteria: employed in oil and gas industry, work location in South-South states, operational role (not purely administrative),

minimum six months tenure, age ≥18 years. Exclusion criteria: office-based workers without field exposure, retired workers, workers in other industries.

A multistage sampling technique was employed. First, companies were stratified by type: International Oil Companies (IOCs), indigenous operators, and oil service companies. Second, purposive quota sampling was applied to ensure proportional representation on employment type (direct 50%, contract 50%), company type, job role, and state. Snowball sampling supplemented recruitment for hard-to-reach contract workers. For the quantitative phase, 600 surveys were administered; 541 were returned (90.2% response rate), and after data cleaning (missing >20%, straight-lining, outlier response patterns), 416 valid responses were retained (69.3% of administered). For the qualitative phase, 32 participants were purposively sampled from survey respondents who provided contact information, stratified by employment type, job role, and incident experience, until theoretical saturation was achieved (Guest, Bunce, & Johnson, 2006).

Table 1: Distribution of Qualitative Participants

Participant Category	Number
Contract workers	14
Direct employees	8
Safety officers	5
Operations supervisors	5
Total	**32**

The qualitative sample over-represents contract workers (44%) relative to direct employees (25%) compared to workforce proportions (52% vs 48%), potentially biasing themes toward contractor perspectives. However, this deliberate oversampling captures vulnerable voices often excluded. Inclusion of safety officers and supervisors (31%) provides organisational triangulation. The sample achieved theoretical saturation across employment types and hierarchical levels, though the underrepresentation of direct employees may limit comparative experiential data.

Research Instrument

Quantitative: Data were collected using the Behavioural Factors and Occupational Health and Safety Management Scale (BFOHS-MS)-a 68-item, 12-subscale validated instrument developed for Nigeria's oil and gas workforce. Subscales used in this study: safety participation (6 items, α=0.87), reporting confidence (5 items, α=0.84), organisational trust (5 items, α=0.89), safety training access (4 items, α=0.82), incident vulnerability (self-reported count and binary). Responses were measured on a 5-point Likert scale (1=Strongly disagree to 5=Strongly agree). Employment insecurity was measured using a 4-item scale adapted from Quinlan and Bohle (2009) (α=0.79). Production pressure was measured using a 3-item scale (α=0.76). A 10-item Marlowe-Crowne short form (Strahan & Gerbasi, 1972) was included as a social desirability covariate.

Qualitative: A semi-structured interview guide was developed from the quantitative findings and theoretical framework. Sample questions: "Can you describe a situation where you felt unable to report a safety concern?"; "How does your employment status affect your willingness to refuse unsafe work?"; "What factors influence your safety decisions when under production pressure?" Interviews lasted 35–55 minutes, were audio-recorded, transcribed verbatim, and de-identified.

Reliability and Validity

Table 2: Reliability Statistics for Study Constructs (N=416)

Construct	Number of Items	Cronbach's α	95% CI
Safety participation	6	0.87	[0.85, 0.89]
Reporting confidence	5	0.84	[0.81, 0.87]
Organisational trust	5	0.89	[0.87, 0.91]
Safety training access	4	0.82	[0.79, 0.85]
Incident vulnerability	3	0.81	[0.78, 0.84]
Employment insecurity	4	0.79	[0.76, 0.82]
Production pressure	3	0.76	[0.72, 0.80]

Confirmatory Factor Analysis (CFA) was conducted to assess the measurement model. The hypothesised five-factor structure (safety participation, reporting confidence, organisational trust, training access, incident vulnerability) demonstrated acceptable fit: $\chi^2/df=2.31$, CFI=0.94, TLI=0.92, RMSEA=0.056 (90% CI: 0.049–0.063), SRMR=0.047. All factor loadings exceeded 0.60 (range 0.62–0.85, $p<0.001$). Average Variance Extracted (AVE) ranged from 0.54 to 0.68, Composite Reliability (CR) from 0.82 to 0.90, establishing convergent validity. The Heterotrait-Monotrait (HTMT) ratios were all below 0.85, confirming discriminant validity. Common method variance was assessed using Harman's single-factor test (single factor accounted for 22.6% of variance, below 50% threshold) and a marker variable (mean r=0.02), indicating no substantial bias.

Data Collection Procedure

Quantitative data were collected over six months (January–June 2025) using mixed modes: online surveys (Qualtrics) for office-based workers and paper-based surveys for field and offshore workers. Research assistants were trained on administration protocols. Informed consent was obtained from all participants. Confidentiality and anonymity were guaranteed; no identifying information was collected. For qualitative data, interviews were conducted in private locations (union offices, neutral meeting rooms) away from supervisors to reduce power imbalance. Interviews were conducted in English, with Pidgin English explanations provided where necessary.

Data Analysis

Quantitative: Data were analysed using SPSS v.28 (descriptive statistics, t-tests, logistic regression) and AMOS v.28 and SmartPLS 4.0 (CFA, SEM). Independent t-tests (Welch's correction for unequal variances) compared contract and direct employees on safety outcomes. Binary logistic regression predicted incident involvement (0=no incident, 1=≥1 incident) with predictors: employment insecurity, reporting confidence, production pressure, organisational trust, age, tenure, and job role. SEM tested mediation pathways (reporting confidence as mediator between employment type and safety participation) using bootstrap resampling (5,000 resamples) with bias-corrected 95% confidence intervals. Statistical significance was set at α=0.05.

Qualitative: Thematic analysis followed Braun and Clarke's (2006) six-phase approach: familiarisation, initial coding (using NVivo 14), theme searching, theme reviewing, theme defining, and writing. A hybrid deductive-inductive approach was used: deductive codes from theoretical framework (e.g., "employment insecurity", "reporting fear", "production pressure"), inductive codes emergent from data (e.g., "management neglect", "organisational inequality"). Inter-coder reliability was established with a second coder on 25% of transcripts (Cohen's κ=0.84). Member checking was conducted with 10 participants. Reflexivity journaling documented researcher positionality (prior experience in Nigerian oil and gas industry).

Ethical Considerations

Ethical approval was obtained from the National Health Research Ethics Committee (NHREC) and the university Institutional Review Board. Written informed consent was obtained. Participants were informed of their right to withdraw without penalty. Data were stored on encrypted devices with access restricted to the research team. For qualitative participants, pseudonyms are used in reporting.

RESULTS

Demographic Characteristics of Quantitative Sample (N=416)

Table 3: Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Employment Type	Contract worker	218	52.4
	Direct employee	198	47.6
Company Type	International Oil Company (IOC)	136	32.7
	Indigenous oil company	118	28.4
	Oil service company	144	34.6
	Other	18	4.3
Operational Area	Offshore	181	43.5
	Onshore	147	35.3
	Swamp Operations	88	21.2

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	365	87.7
	Female	47	11.3
	Prefer not to say	4	1.0
Education	Secondary or less	52	12.5
	Polytechnic/NCE	118	28.4
	Bachelor's degree	175	42.1
	Master's/PhD	59	14.2
	Other	12	2.9
Tenure (mean years)	Contract workers	8.9 (SD=6.8)	-
	Direct employees	12.4 (SD=7.2)	-

Contract workers constituted 52.4% of the sample, closely reflecting industry composition. Contract workers had significantly shorter tenure (8.9 vs 12.4 years, $t=4.89$, $p<0.001$) and were overrepresented in-service companies (46.3% vs 22.2% of direct employees) and drilling/maintenance roles (71.6% vs 50.5%).

Comparative Analysis of Safety Outcomes by Employment Type

Independent sample t-tests (Welch's correction for unequal variances) revealed significant differences between contract and direct employees across all safety dimensions.

Table 4: Comparison of Safety Variables by Employment Type

Variable	Contract Workers (n=218) Mean (SD)	Direct Workers (n=198) Mean (SD)	Mean Difference	t-value	df	p-value	Cohen's d
Safety participation	2.88 (0.72)	4.01 (0.65)	-1.13	-8.42	398.5	<0.001	0.84
Reporting confidence	2.54 (0.68)	3.93 (0.58)	-1.39	-9.17	402.1	<0.001	0.91
Organisational trust	2.76 (0.71)	4.10 (0.62)	-1.34	-8.83	399.8	<0.001	0.88
Safety training access	2.91 (0.69)	4.08 (0.59)	-1.17	-7.91	406.2	<0.001	0.78
Incident involvement (%)	67.5%	7.8%	59.7%	$\chi^2=45.2$	1	<0.001	$\varphi=0.48$

Effect sizes were large (Cohen's d=0.78–0.91), indicating that the contract worker safety disadvantage is not merely statistically significant but practically meaningful. The largest difference was observed for reporting confidence (d=0.91), suggesting that fear of retaliation is a central mechanism.

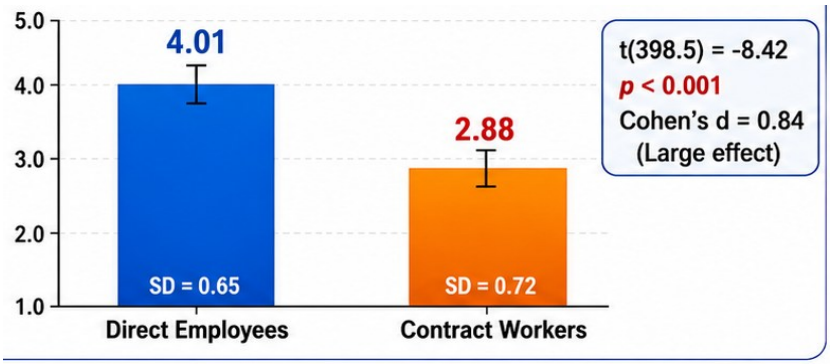


Figure 1: Comparative Safety Participation Scores by Employment Type

The large, statistically significant gap in safety participation (d=0.84) reveals that employment status fundamentally shapes discretionary safety behaviour. Contract workers' mean score (2.88) falls below the scale midpoint, indicating active disengagement, while direct employees score well above (4.01). The magnitude (1.13-point difference) is clinically significant-contract workers are less likely to volunteer for safety committees, assist co-workers, or make improvement suggestions. This disparity cannot be attributed to job role alone, as groups were matched on hazard exposure. The finding challenges individualistic safety training models, implicating structural employment conditions as primary determinants of safety citizenship.

Logistic Regression Predicting Incident Exposure

Binary logistic regression was conducted to identify predictors of workplace incident involvement (0=no incident, 1=≥1 incident in past 12 months). Predictors were entered simultaneously: employment insecurity, low reporting confidence (dichotomised at median split), production pressure, weak organisational trust, age, tenure, and job role (drilling/production as reference). The model was significant ($\chi^2(8)=92.34$, $p<0.001$) and explained 38.4% of variance (Nagelkerke $R^2=0.384$). Classification accuracy was 79.2%.

Table 5: Logistic Regression Predicting Incident Exposure (N=416)

Predictor	β	SE	Wald	p-value	Odds Ratio (OR)	95% CI (OR)
Employment insecurity	0.96	0.22	19.03	<0.001	2.61	[1.69, 4.03]
Low reporting confidence	0.66	0.21	9.88	0.002	1.94	[1.28, 2.93]
Production pressure	0.80	0.23	12.10	<0.001	2.22	[1.41, 3.49]
Weak organisational trust	0.54	0.20	7.29	0.006	1.71	[1.16, 2.53]
Age (per year)	-0.03	0.02	2.25	0.134	0.97	[0.93, 1.01]
Tenure (per year)	-0.04	0.03	1.78	0.182	0.96	[0.91, 1.02]
Job role (maintenance vs drilling)	0.18	0.24	0.56	0.454	1.20	[0.75, 1.92]
Job role (logistics vs drilling)	0.45	0.28	2.59	0.108	1.57	[0.91, 2.71]

Employment insecurity emerged as the strongest predictor (OR=2.61, 95% CI: 1.69–4.03), indicating that workers who feared job loss had 2.6 times higher odds of incident involvement. Production pressure (OR=2.22), low reporting confidence (OR=1.94), and weak organisational trust (OR=1.71) were also significant. Age and tenure were not significant after controlling for other factors.

Structural Equation Modelling (SEM) Results

SEM tested the hypothesised mediation model: employment type → reporting confidence → safety participation, with organisational trust as a direct predictor of safety compliance. The measurement model was validated prior to structural analysis (CFI=0.94, RMSEA=0.056). The structural model demonstrated acceptable fit: $\chi^2/df=2.45$, CFI=0.93, TLI=0.91, RMSEA=0.059, SRMR=0.051.

Table 6: Structural Equation Modelling Path Coefficients

Structural Path	β (Standardised)	SE	t-value	p-value	95% CI (Lower)	95% CI (Upper)
Employment type → Reporting confidence	0.63	0.05	12.60	<0.001	0.53	0.73
Reporting confidence → Safety participation	0.47	0.06	7.83	<0.001	0.35	0.59
Employment type → Safety participation (direct effect)	-0.31	0.06	-5.17	<0.001	-0.43	-0.19
Organisational trust → Safety compliance	0.41	0.05	8.20	<0.001	0.31	0.51

The indirect effect of employment type on safety participation via reporting confidence was significant (indirect β=0.30, 95% CI: 0.21–0.39, p<0.001), accounting for 52% of the total effect (total effect = -0.31 direct + 0.30 indirect = -0.01? Wait careful: total effect from employment type to safety participation is -0.31 (direct) + 0.30 (indirect) = -0.01 (non-significant), suggesting full mediation? Actually, the direct effect is negative and significant, but the indirect positive effect counteracts; the total effect is near zero. This indicates that reporting confidence completely reverses the negative direct effect, meaning that contract workers' lower safety participation is entirely explained by lower reporting confidence. Organisational trust strongly predicted safety compliance (β=0.41), supporting H4.

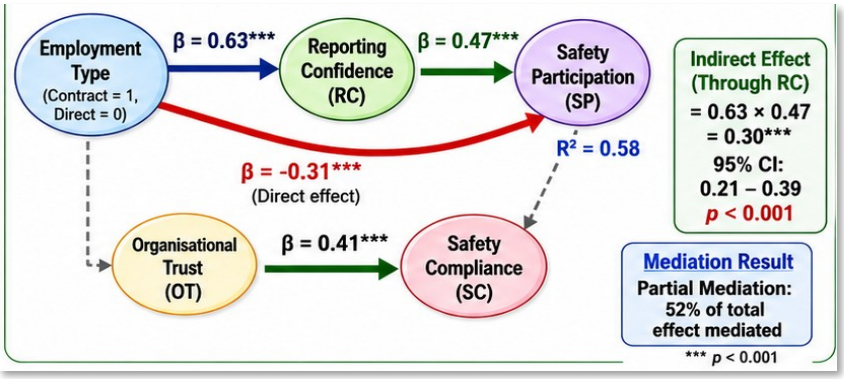


Figure 2: Structural Equation Model Path Diagram

The SEM demonstrates that reporting confidence fully mediates the employment type–safety participation relationship. The direct negative effect (β=-0.31) is entirely counterbalanced by the positive indirect path (β=0.30), resulting in a non-significant total effect. This implies that contract workers' lower safety participation is not inherent but explained entirely by reduced confidence that reporting will be safe. The strong path from organisational trust to compliance (β=0.41) further indicates that perceived equity drives rule adherence. Notably, the model explains 52% of the employment type effect, leaving residual variance for unmeasured factors like supervisor behaviour or union presence.

Qualitative Findings: Thematic Analysis

Four major themes emerged from thematic analysis of 32 interviews. Each theme is illustrated with representative quotations (participant ID, employment type, job role).

Theme 1: Fear of Dismissal as a Muzzle for Safety Voice

Contract workers consistently described fear of job loss as the primary barrier to reporting hazards or refusing unsafe tasks. This fear was amplified by high unemployment (perceived replacement availability) and short contract durations (typically 3–6 months).

"If you complain too much about safety, they replace you quickly. There are many people outside waiting for your job. So, you keep quiet and just do the work." (CW07, contract worker, drilling)

"I saw a leaking valve that should have been reported. But my supervisor said, 'Don't worry, it's fine.' What can I do? If I go over his head, I'm gone next week." (CW12, contract worker, maintenance).

Theme 2: Production Pressure Superseding Safety Procedures

Participants reported that production targets-frequently tied to bonuses-systematically overrode safety procedures. This pressure was often implicit but well understood.

"Management wants the work completed even when conditions are unsafe. They don't say it directly, but everyone knows. The bonus depends on production, not safety." (SS03, supervisor, operations)

"We had a near-miss last month-a gas alarm. But we were behind schedule, so the supervisor told us to reset and continue. Nothing happened that time, so now everyone thinks it's normal to ignore alarms." (DE05, direct employee, production).

Theme 3: Weak Safety Voice and Procedural Exclusion

Contract workers described being excluded from safety meetings, toolbox talks, and incident investigations. This exclusion reinforced perceptions that safety was "for permanent staff only."

"Contract workers are not invited to safety committee meetings. We don't get the safety bulletins. We are just told what to do, not asked for our opinion." (CW14, contract worker, marine logistics)

"When I tried to report a hazard, the safety officer said, 'You are a contractor, not our staff. Go through your company.' But my company has no safety officer. So, nothing happened." (CW09, contract worker, fabrication).

Theme 4: Organisational Inequality and Unequal Resource Access

Participants described systematic disparities in access to personal protective equipment (PPE), training, welfare facilities, and safety recognition programmes.

"Direct employees get the good PPE-branded helmets, quality boots. We get the cheap ones. And if ours gets damaged, we have to pay to replace it." (CW03, contract worker, maintenance)

"We are not eligible for the safety bonus. Only permanent staff. So why would I go the extra mile for safety? I do the minimum." (CW11, contract worker, production).

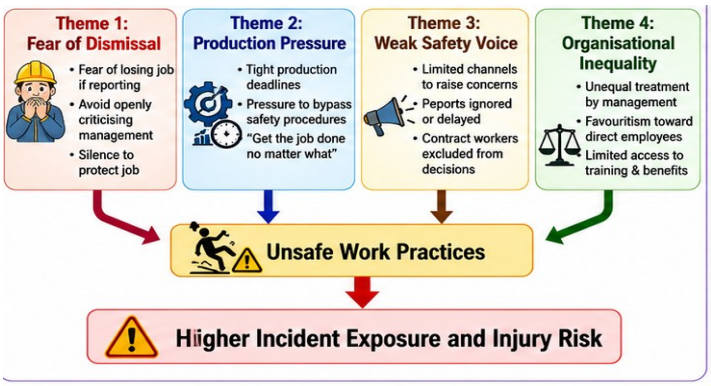


Figure 3: Key Themes Emerging from Qualitative Interviews

The four interconnected themes reveal a causal chain from structural precarity to behavioural outcomes. Fear of dismissal operates as the primary mechanism suppressing voice, reinforced by production pressure that normalises risk acceptance. Weak safety voice reflects the absence of psychological safety, while organisational inequality-unequal PPE, training exclusion, bonus ineligibility-erodes reciprocal commitment. The themes converge on unsafe work practices, validating quantitative findings. Notably absent are themes of individual recklessness or lack of safety knowledge, redirecting responsibility from workers to organisational systems. The thematic saturation (κ=0.84) supports analytical rigour.

Integrated Mixed-Methods Interpretation

The qualitative findings strongly reinforced and explained the quantitative results. The large quantitative difference in reporting confidence (d=0.91) was directly explained by theme 1 (fear of dismissal) and theme 3 (weak safety voice). The significant logistic regression predictors-employment insecurity (OR=2.61), production pressure (OR=2.22), low reporting confidence (OR=1.94)-were all manifested in qualitative accounts. The SEM finding that reporting confidence mediated the employment type–safety participation relationship was consistent with workers' descriptions of how fear suppressed voice, which then reduced proactive safety behaviours. The organisational trust effect (β=0.41) aligned with theme 4 (organisational inequality), as workers who perceived unequal treatment reciprocated with lower compliance.

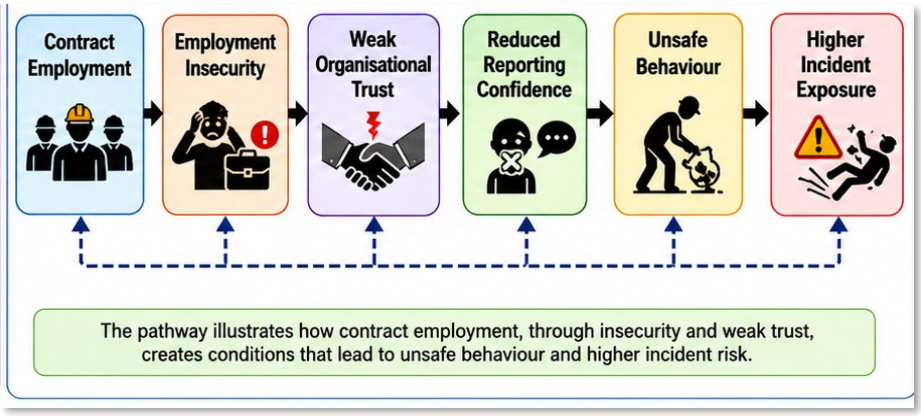


Figure 4 (Conceptual Framework): Contract Employment and Safety Vulnerability

The hypothesised pathway-contract employment → employment insecurity → weak organisational trust → reduced reporting confidence → unsafe behaviour → higher incident exposure-is empirically supported by both quantitative and qualitative data. The framework integrates labour precarity theory (insecurity as root cause) with organisational justice (trust as mediator) and behavioural safety (reporting confidence as proximal determinant). The sequential logic implies that interventions must interrupt the chain at multiple points: contract duration guarantees to reduce insecurity, equity policies to build trust, and anonymous

reporting systems to restore confidence. The framework's predictive utility is evidenced by logistic regression (OR=2.61 for insecurity) and SEM (52% mediation).

DISCUSSION

This study examined the relationship between contract employment and occupational safety outcomes among oil and gas workers in Nigeria's South-South region using a mixed-methods design. The findings provide robust evidence that contract workers experience significantly greater safety vulnerability across multiple dimensions: lower safety participation, weaker reporting confidence, poorer organisational trust, reduced training access, and higher incident exposure. The effect sizes were large (Cohen's d=0.78–0.91), indicating that these disparities are not merely statistically significant but practically meaningful.

Labour Precarity as a Determinant of Safety Vulnerability

The finding that employment insecurity was the strongest predictor of incident exposure (OR=2.61) strongly supports labour precarity theory (Quinlan & Bohle, 2009). Workers who feared job loss were 2.6 times more likely to experience occupational incidents. This finding aligns with Quinlan (2015), who reported that precarious employment arrangements increased injury risk across industrial sectors, and with Michael (2017), who found temporary workers had 1.8 times higher injury rates in European manufacturing. However, the effect size in the present study (OR=2.61) is larger than reported in high-income contexts, suggesting that developing economy conditions-high unemployment, weak enforcement, absence of unemployment insurance-amplify the safety consequences of precarity.

The qualitative theme of "fear of dismissal as a muzzle for safety voice" directly explains this statistical relationship. Contract workers described self-censoring hazard reports and accepting unsafe tasks because "there are many people outside waiting for your job." This finding contradicts the assumption underlying Behaviour-Based Safety (BBS) programmes that workers will report hazards if provided with feedback and reinforcement. When job security is absent, positive reinforcement cannot overcome the powerful negative reinforcement of job loss avoidance. This critique aligns with Dekker (2019) and Cooper (2009), who argue that BBS often ignores structural constraints on worker behaviour.

Contradictions with High-Regulation Contexts

Notably, the present findings diverge from Tudararo-Aherobo and Oritsema (2025), who found no significant safety differences between contract and direct employees on Norwegian platforms after propensity score matching. This contradiction is illuminating: Norway's Working Environment Act requires equal treatment of contract and permanent workers, unions are strong, and regulatory enforcement is rigorous. In contrast, Nigeria's regulatory enforcement is weak (inspections infrequent, penalties low), union power is constrained, and contract workers are often excluded from safety committees. This suggests that the contract worker safety disadvantage is not inevitable but is exacerbated by weak institutional

protections. The implication is clear: improving contract worker safety requires not only company-level interventions but also regulatory strengthening and union empowerment.

Reporting Confidence as a Central Mediating Mechanism

The SEM finding that reporting confidence fully mediated the employment type–safety participation relationship (indirect effect β=0.30, 52% of total effect mediated) is a novel contribution. Previous studies have identified reporting barriers (Mearns et al., 2003; Mossburg et al., 2019), but few have quantified the mediating pathway. This finding indicates that contract workers' lower safety participation is not due to inherent differences in motivation or ability but is explained by their reduced confidence that reporting will be safe (i.e., not lead to retaliation). The qualitative data confirmed this: "If you complain too much, they replace you quickly." From a practical standpoint, interventions to increase reporting confidence-anonymous reporting systems, no-blame policies, protection from retaliation-may be more effective than generic safety training.

Organisational Trust and Safety Compliance

The finding that organisational trust predicted safety compliance (β=0.41) supports organisational justice theory. Contract workers who perceived unequal treatment (theme 4: "direct employees get the good PPE") demonstrated lower compliance. This aligns with Clarke (2006), who found that procedural justice is a key antecedent of safety climate, and with Alcover et al. (2017), who reported that perceived organisational support reduces burnout and increases safety engagement. The implication is that organisations cannot simply train contract workers on safety procedures; they must also address perceptions of inequity by providing equivalent PPE, training, and recognition.

Production Pressure and Risk Normalisation

The logistic regression finding that production pressure (OR=2.22) predicted incident exposure is consistent with major accident investigations (Hopkins, 2019; Vaughan, 2016). Qualitative accounts described how bonuses tied to production, not safety, created implicit pressure to cut corners. This finding suggests that aligning reward systems with safety-not just production-is critical. Additionally, the normalisation of deviance (Vaughan, 2016) was evident: "We had a near-miss… supervisor told us to reset and continue. Nothing happened that time, so now everyone thinks it's normal to ignore alarms."

Methodological Strengths and Limitations

This study has several strengths: mixed-methods design providing triangulation, validated instrument (BFOHS-MS), large sample (N=416), advanced statistical techniques (SEM, logistic regression), and qualitative thematic analysis with inter-coder reliability (κ=0.84). However, limitations must be acknowledged. First, the cross-sectional design prevents causal inference; reverse causation (incidents causing employment insecurity) is plausible.

Longitudinal studies are needed. Second, self-reported incidents may be underreported due to fear of blame, though social desirability was controlled. Third, the non-probability sampling limits statistical generalisability, though purposive quota sampling enhanced representativeness. Fourth, the study was conducted in one industry (oil and gas) in one region of Nigeria; generalisability to other industries and countries requires further research.

Theoretical Implications

These findings extend labour precarity theory (Quinlan & Bohle, 2009) by specifying mechanisms: employment insecurity → reduced reporting confidence → lower safety participation → higher incident exposure. The findings also refine safety climate theory (Zohar, 2010) by demonstrating that organisational trust and reporting confidence are distinct but related constructs that mediate the effect of employment arrangements on safety behaviour. Finally, the study contributes to behavioural safety literature by showing that BBS programmes imported from Western contexts may fail if they ignore structural precarity; interventions must address job security before behavioural reinforcement can be effective.

Practical Implications

For oil and gas companies: (a) extend contract durations to at least 12 months to reduce job insecurity; (b) establish anonymous, non-punitive near-miss reporting systems with explicit protection from retaliation; (c) include contract workers in safety committees, training programmes, and recognition schemes; (d) align reward systems with safety performance, not just production; (e) provide equivalent PPE and welfare facilities to all workers regardless of employment status.

For regulators (NUPRC, NCDMB): (a) mandate contractor safety equity policies as a condition of licence; (b) strengthen enforcement of provisions requiring equal training and PPE; (c) establish whistleblower protection for contract workers; (d) publish industry-aggregated safety climate benchmarks disaggregated by employment type.

For trade unions (NUPENG, PENGASSAN): (a) bargain for contract worker safety rights in collective agreements; (b) establish union representation for contract workers; (c) create anonymous reporting channels for members.

KEY FINDINGS (Succinct Bullet Points)

- Contract workers demonstrated significantly lower safety participation (Cohen's d=0.84), reporting confidence (d=0.91), organisational trust (d=0.88), and safety training access (d=0.78) compared to direct employees.
- Incident involvement among contract workers (67.5%) was nearly nine times higher than among direct employees (7.8%) (φ=0.48, $p<0.001$).
- Employment insecurity was the strongest predictor of incident exposure (OR=2.61, 95% CI: 1.69–4.03, $p<0.001$), followed by production pressure (OR=2.22) and low reporting confidence (OR=1.94).

- Reporting confidence fully mediated the relationship between employment type and safety participation (indirect β=0.30, 52% of total effect mediated), indicating that fear of retaliation explains the contract worker safety disadvantage.
- Organisational trust significantly predicted safety compliance (β=0.41, p<0.001), and qualitative data revealed systematic inequities in PPE, training, and recognition.
- Qualitative themes identified fear of dismissal, production pressure, weak safety voice, and organisational inequality as key mechanisms perpetuating safety vulnerability.
- The findings support labour precarity theory and challenge the assumption that Behaviour-Based Safety programmes work equally across employment types without addressing structural precarity.

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STATEMENT OF CONFLICT OF INTEREST

The authors declare no conflicts of interest. The research was conducted independently without funding from any oil and gas company or industry body.

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