Evaluation of the Effect of Fatigue Management Practices on the Performance of Offshore Workers in Port-Harcourt, Rivers State

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Abstract
This study critically examined fatigue management practices and their influence on the performance outcomes of offshore workers in Port Harcourt, Rivers State, an environment globally recognized for its demanding conditions, long shift cycles, and heightened risk of fatigue-related incidents. Using a quantitative cross-sectional survey design, the study sampled 424 offshore employees across selected oil and gas companies, achieving a valid response rate of 95.0% (403 responses). Data were collected through a structured questionnaire covering fatigue management practices, policy awareness, compliance behaviour, fatigue levels, performance outcomes, and organizational barriers to implementation. Analysis was conducted using IBM SPSS version 26, employing descriptive statistics, composite index assessment, Pearson Product–Moment Correlation (PPMC), and Exploratory Factor Analysis (EFA). The findings revealed that while core fatigue management provisions such as sleeping facilities (mean = 3.71), mandatory rest breaks (3.60), and fatigue-related training (3.50) were rated highly, other practices, particularly shift schedule optimization (3.36), handover adequacy (3.12), and non-punitive reporting systems (3.26), were only moderately embedded. Awareness and compliance patterns showed similar inconsistencies: although workers demonstrated high awareness of policy existence (3.62) and training availability (3.55), awareness of reporting procedures (3.21) and detailed responsibilities (3.32) remained moderate. Composite analysis showed 36.2% of workers exhibiting high awareness–compliance alignment, while 49.1% fell into the moderate range. Fatigue levels were generally moderate across physical (3.60), cognitive (3.48), and mental domains (3.43), with a Karolinska Sleepiness Scale mean of 5.21 indicating normal-to-moderate sleepiness. Performance outcomes showed relatively strong productivity (3.49) and work quality (3.54) but moderate safety-related performance, especially alertness (3.32) and presenteeism (3.21, reverse-scored). A moderate, statistically significant correlation ($r = 0.412$, $p < 0.001$) confirmed that stronger fatigue management practices were associated with better performance outcomes. EFA revealed three dominant implementation challenges: resource and operational constraints, supervisory enforcement and leadership support, and reporting culture and communication barriers. The study concluded that while important fatigue controls are in place, significant gaps persist in scheduling, reporting culture, and supervisory enforcement. It recommended improved shift design, stronger reporting systems, targeted fatigue training, leadership-driven enforcement, and enhanced organizational support to promote safer, healthier, and more productive offshore operations in Nigeria.

Keywords: *Fatigue Management Practices, Performance of Offshore Workers*

1.1 Background to the Study

Fatigue is increasingly perceived as one of the most serious occupational risks affecting the high-risk sectors and especially offshore oil and gas (D'Antoine *et al*., 2023). Amin *et al*. (2024) suggest that fatigue is a multidimensional construct that can include physical fatigue, cognitive fatigue, and emotional fatigue, usually triggered by long amounts of work hours, irregular working schedules, and severe working conditions (Williamson *et al*., 2011; Bazazan *et al*., 2023). Invariably defined as burnout, fatigue has been defined as a negative occupational and psychological state that is accompanied by various symptoms, among them physical and emotional fatigue and loss of motivation (Faghih and Bahram, 2019). Furthermore, it is deemed to be an outcome of long-term work stress or a reaction of the body and mind to long-term exposure to job stress (Phillips, 2020). Professions in the petroleum industry have gained a status of being extraordinarily stressful (Frank, 2018). The employees of oil and gas companies are faced with unique problems that come with the petroleum plants, twenty-four-hour production pressures, and the rigours of extremely unfavorable working conditions under a limited set of resources (Baziz *et al*., 2023). This has led to the fatigue of oil and gas employees becoming an issue of high interest and concern, as it has both organizational and personal consequences. Therefore, in their analysis of offshore employees, Bazazan *et al*. (2023), who found the mean fatigue scores of 56.3 (SD: 13.9), stated that both physical workload and psychological strain significantly correlated with high-level fatigue. It is in line with previous research that Parkes (2015) had found, and it was observed that offshore workers who developed a habit of working long nights and then under intense psychological stress exhibited significant degradation in alertness and focus. This evidence helps to emphasize the fact that offshore employees are extremely susceptible to fatigue, which, on the one hand, may affect their well-being and performance. These risks can be even more pronounced in the Nigerian offshore oil industry, where the high productivity rates and the lack of turnover in the workforce lead to a situation where the critical analysis of fatigue management practices is required. The oil and gas sector is one of the most hazardous workplace industries in the world, characterized by extremely high degrees of stress (Khaksar *et al*., 2019). Longitudinal fieldwork has also shown that fatigue builds up in offshore settings despite the fact that the duration of sleep seems sufficient. Caldwell *et al*. (2019) followed the subjective fatigue, sleep habits, and psychomotor vigilance during day and night shifts and swing shifts and reported that the mean duration of sleep did not change considerably, but the reaction time of workers decreased markedly throughout the work shifts, which showed evidence of progressive fatigue. Correspondingly, Waage *et al*. (2014) found that long night shifts lead to poor sleep quality and delayed recovery, thus increasing the risk of fatigue. Taken together, these studies prove the fact that fatigue is not merely a result of the sleep duration but a result of the circadian misalignment, the intensity of workload and environmental stressors. This has been countermeasure in different ways, including the application of structured assessment systems like Fatigue Risk Assessment and Management in Engineering (FRAME) survey that are used to capture the various aspects of workload, mental strain, shifts and sleep disturbance more holistically than the previous self-report systems (Gander *et al*., 2011). The implication is that offshore organizations need to do more than merely rest scheduling to embrace holistic and evidence-based fatigue risk management systems.

The outcomes of poor fatigue management are not only limited to the health of individuals but also to the health and safety of the organization at large, as well as productivity. Phillips and

Sagberg (2014) concluded that the perception of hazards and response time of drivers in the transport industry was lower due to fatigue, which is also pertinent to the offshore sector, where changes in concentration may lead to disastrous events. More recently, Mohammadi et al. (2021) revealed that psychosocial stressors are linked to safety participation in oil and gas workers through fatigue, indicating that workers who have to live in shared quarters with inadequate privacy reported worse sleep quality and increased fatigue levels. On the same note, Parkes and Razavi (2018) emphasized that environmental stressors, including noise, vibration, and poor rest amenities in the offshore, contribute to fatigue and reduce the safety performance of workers. As an intervention, success has been demonstrated: Shandrow et al. (2020) tested the application of a Fatigue Risk Management System (FRMS) to a North Sea Floating Production, Storage and Offloading (FPSO) unit and found that the number of fatigue-related incidents decreased by a factor of 8 to 5 per cent following the intervention. These observations will help us understand that well-designed fatigue management policies to protect the workers are not only more effective at reducing the risk but also enhancing the efficiency of the operation and promoting a more powerful safety culture. The oil and gas industry has a significant impact on the economy of Nigeria, contributing to about 90 per cent of foreign exchange income and almost half of the government revenue (Nigerian National Petroleum Corporation, 2021; OPEC, 2022). Port Sokolowski is the center of the petroleum industry in Nigeria, and, accordingly, there are large multinational corporations, refineries, and offshore entrepreneurships, which stimulate the entire Nigerian national income and the development of the region (Ezirim et al., 2020). To remain at such a crucial contribution, offshore employees should always be able to produce at the required levels of performance because the downturns due to fatigue can put not only productivity and safety at work in danger but also the sustainability of the industry in general (Okolie & Omokhodion, 2020). The strategic positioning of Port in the middle of the Niger Delta makes it the hub of the offshore operations, but the employees have to suffer the twin pressures of the strict shift regimes and the harsh environmental and socio-environmental factors.

Although the world has improved, there is still a lack of empirical data on the practices of fatigue management in developing economies like Nigeria. Research in the Niger Delta area indicates that offshore employees have different problems, such as a low level of enforcement and compliance with occupational health regulations, inconsistency in company-level safety cultures, and infrastructural limitations, among others (Akinwale and Olusanya, 2016; Okolie and Omokhodion, 2020). In contrast to multinational companies, which tend to have an international safety framework, most of the local operators do not have an in-depth fatigue management policy, which subjects their employees to the increased risk of fatigue-related errors and loss of productivity. Moreover, the socio-economic background of Port Sardar (excessive workloads, economic pressures, and poor health monitoring systems) can also add to the issue. There is, therefore, an urgent necessity of critical review of current fatigue management practice, and its effectiveness and impact on performance outcomes in the offshore industry in Nigeria.

1.2 Statement of the Problem

It has been revealed that the application of fatigue risk management systems (FRMS) may facilitate a reduction in the number of incidents, safety culture, and productivity (Shandrow *et al*., 2020). Indicatively, Waage *et al*. (2014) revealed that employees in Norwegian offshore platforms who received evidence-based fatigue intervention initiatives reported a high quality of sleep and reduced incidents of accidents relative to other employees who did not receive the same

interventions. But in Nigeria, the adoption and effectiveness of the adoption of similar strategies is scanty. According to reports in the Niger Delta, the policies at the company level are diverse, whereby multinational operators tend to adopt global standards, whereas local companies do not have enough to meet due to cost factors, laxity in enforcing rules and regulations, and inadequate occupational health monitoring (Akinwale and Olusanya, 2016; Okolie and Omokhodion, 2020). This discrepancy causes disproportions in the safety of offshore employees and provokes the question of the effectiveness of current fatigue management measures in Port Harcourt, Rivers State. existence of fatigue and the dangers around it in the Nigerian offshore industry reveal the evident knowledge gap in research and practice. Fatigue is becoming a systemic risk, which is to be tackled proactively in the global arena, but in Nigeria, the concern of fatigue is shrouded by other occupational hazards like oil spills, explosions, and chemical exposure. Such a limited prioritization does not appreciate the fact that fatigue is usually a cause of the same accidents that are headline news (Williamson et al., 2011). Fatigue will keep undermining the well-being of workers, undermine the safety of the operation of offshore operations in Rivers State, and cripple the productivity of offshore operations in the long run unless dealt with. Thus, this research aims to critically assess how fatigue management practices can influence the performance of offshore employees in Port Harcourt, Nigeria.

1.3 Objective of the Study

The aim of the study was to critically evaluate the effect of fatigue management practices on the performance of offshore workers in Port-Harcourt, Rivers State, Nigeria. The objectives of the study were to;

i. Assess the extent to which fatigue management practices are implemented among offshore workers in Port Harcourt, Rivers State.
ii. Determine the level of offshore workers' awareness and compliance with fatigue management policies in Port Harcourt, Rivers State.

1.4 Research Hypothesis

HO_1: There is no statistically significant relationship between the fatigue management practices adopted and the performance outcomes of offshore workers in Port Harcourt, Rivers State, Nigeria.
Ha_1: There is a statistically significant relationship between the fatigue management practices adopted and the performance outcomes of offshore workers in Port Harcourt, Rivers State, Nigeria

2.0 Methodology

2.1 Research Design

This study adopted a quantitative research design with a cross-sectional survey approach. The choice of this design is informed by the study's objectives, which sought to examine the relationship between fatigue management practices and performance outcomes among offshore workers in Port Harcourt. A cross-sectional survey is particularly appropriate because it allows for the collection of data at a single point in time from a relatively large and diverse workforce, thereby enabling the assessment of prevailing practices, levels of awareness, compliance, and their associated effects on performance. Population for the Study

The study sample consisted of offshore oil and gas employees in Port Harcourt, Rivers State, Nigeria, who are actively involved in offshore drilling, production, maintenance, logistics, and safety operations on offshore platforms and related support infrastructure. The reason for choosing

this group is that they are the most vulnerable to challenges linked to fatigue, which can be attributed to long working hours, shift work, and the demanding offshore environment.

2.2 **Sample and Sampling Technique**

Cochran's formula for proportions (suitable for large or unknown populations) was used to determine the sample size. This is appropriate because the total population of offshore workers in Port Harcourt is not precisely known due to the rotational nature of offshore employment and the limited availability of comprehensive workforce data across companies. Cochran's formula is expressed as:

$$n_0 = \frac{Z^2 p(1-p)}{e^2} \quad 3.1$$

Where n_0 is the initial sample size, Z is the z-score for the chosen confidence level (1.96 for 95% confidence), *p* is the estimated population proportion (0.5 is used when the proportion is unknown to provide the maximum sample size), and *e* is the desired margin of error (0.05 for ±5%).

$$n_0 = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = \frac{3.8416 \times 0.25}{0.0025} = 384.16 \approx 385 \quad 3.2$$

To account for non-response bias, the sample size will be increased by 10%. Therefore, the total sample size for the study was approximately 424.

2.3 Sampling Technique

A multi-stage sampling approach was adopted to ensure representativeness across the diverse workforce engaged in offshore operations in Port Harcourt.

Stage 1 (Purposive sampling): This involved a purposive sampling technique, wherein 3 oil and gas companies in Port Harcourt with active offshore operations were selected. These companies were selected based on their prominence in the region, accessibility, and their significant role in offshore drilling, production, and logistics.

Stage 2 (Stratified sampling): Within the 3 selected companies, key operational departments such as drilling, production, maintenance, logistics, and safety were stratified. This stratification ensured the inclusion of workers across functional areas that directly relate to fatigue management and performance.

Stage 3 (Proportional sampling): A proportionate random sampling method was employed. Here, the size of each selected company and departmental stratum in the sample was directly proportional to the estimated workforce. Workers were then randomly selected from each stratum until the required total of 424 respondents was reached. This method ensured that the final sample accurately reflects the structural composition of the offshore workforce, thereby enhancing the validity and generalizability of the study's findings.

2.4 Data Collection Methods/Procedures

The primary source of data that was used in this study was through the administration of copies of a questionnaire (with closed-ended questions) to employees who work offshore with the companies of their choice in the Port Sector working under the oil and gas industry in Port Harcourt. The questionnaire was issued both physically and electronically, depending on the accessibility and availability of companies. It was done physically in pre-planned visits to the offshore bases and rotational camps, but electronically through safe online survey tools to contact respondents in rotation or in transit. Each of the questionnaires was accompanied by detailed instructions and guarantees of confidentiality to help boost response rates. The instruments were distributed and retrieved by a group of qualified research assistants, therefore maintaining close compliance with the sampling procedures. The filled questionnaire was looked at immediately to ensure that it was complete before it was accepted, thus minimising errors and non-response bias. This methodology helped in the procurement of precise and detailed data in an opportune manner. The instrument was divided into six structured sections, the first of which - Section A - included socio-demographic characteristics such as age, gender, marital status, education, job category, offshore experience and shift type. Section B assessed fatigue management practices using six items adapted from the HSE Fatigue Risk Index and previous occupational health investigations to cover facets of rostering practices, provision of rest breaks, accommodation quality, monitoring and reporting mechanisms and fatigue-related training. Section C measured awareness of fatigue policy through five items that investigated workers' knowledge of company procedures, induction sessions and communication of the fatigue risks. Section D investigated compliance with fatigue policy using six items based on known OHS compliance scales, focusing on compliance with prescribed rest periods, shift regulations and reporting protocols. Section E measured the levels of fatigue with a series of 7 items based on the Occupational Fatigue Exhaustion/Recovery (OFER) scale and the Karolinska Sleepiness Scale (KSS), to capture acute as well as chronic fatigue symptoms. Section F assessed performance outcomes using 6 items adapted from occupational performance indices assessing dimensions of productivity, safety compliance, cognitive functioning and attendance or presenteeism. Section G explored twelve possible barriers that may affect the implementation of fatigue management practices by offshore workers. Except for the socio-demographic section, all the items were answered according to a five-point Likert scale (1=strongly disagree to 5=strongly agree); as a result, the entire instrument was designed to be brief to minimize respondent fatigue and encourage high response rates (i.e., about 10-12 min to complete the entire instrument).

2.5 Validity and Reliability of the Instrument

The instrument was pretested among 10–20 offshore support staff in a Port Harcourt-based oil servicing company that operates offshore logistics, but was not included in the main study sample. The pretest evaluated clarity, appropriateness of wording, response time, cultural relevance, and ease of understanding. Feedback from participants was used to refine or eliminate ambiguous items before full administration. The questionnaire items were developed from established instruments such as the HSE Fatigue Risk Index and OHS compliance scales and were reviewed by occupational health experts to ensure that the items reflect the study objectives. Supervisory input will also be used to refine the items. Furthermore, items are grouped into theoretically defined constructs (e.g., fatigue management practices, fatigue, performance outcomes), which were validated through Exploratory Factor Analysis (EFA) during analysis. Internal consistency

reliability will be measured using Cronbach's alpha coefficient for each construct, with $\alpha \geq 0.70$ regarded as acceptable. Where relevant, split-half reliability will also be computed.

2.6 Method of Data Analysis

The completed questionnaires were coded, cleaned, and analyzed using IBM SPSS Statistics version 26. Data screening was first carried out to identify incomplete responses, out-of-range values, and inconsistencies in coding. Negatively worded items were reverse-coded where applicable, and composite indices were computed by averaging item scores within each construct (fatigue management practices, awareness, compliance, fatigue, and performance outcomes). Descriptive statistics (such as frequency, percentage, mean, and standard deviation) were used to summarize respondents' demographic characteristics and to describe the pattern and level of fatigue management practices, awareness, compliance, fatigue indicators, and performance outcomes across the sample. Results were presented using tables to show response distributions, weighted means, and rankings. To address the study objectives and support hypothesis testing, inferential statistics were applied at a 5% level of significance ($\alpha = 0.05$). Specifically, Pearson Product–Moment Correlation (PPMC) was used to test the relationship between Fatigue Management Practices (FMP) and Performance Outcomes (PO). This analysis tested the null hypothesis that there is no statistically significant relationship between fatigue management practices and performance outcomes among offshore workers in Port Harcourt. The decision rule adopted was to reject the null hypothesis (H01) where the p-value is less than 0.05; otherwise, the null hypothesis was not rejected. Where necessary, correlation coefficients were interpreted based on the strength and direction of association. Finally, to identify the underlying factors influencing the implementation of fatigue management practices, an Exploratory Factor Analysis (EFA) was conducted on the barrier/enabler items. The suitability of the dataset for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. Principal Component Analysis was applied as the extraction method, and Varimax rotation was used to achieve a clearer factor structure. Factors with eigenvalues greater than 1.0 were retained, and items with acceptable factor loadings were used to name and interpret the extracted dimensions. Outputs from the EFA were then used to explain the key organizational, supervisory, and cultural domains affecting fatigue management implementation in the offshore work setting

3.0 Data Presentation, Analysis, And Discussion of Findings

3.1 Demographic Profile of Respondents

Table 3.1: Demographic Characteristics of Respondents (N = 403)

S/N	Variable	Category	Frequency (n)	Percentage (%)
1	**Age**	<25 years	62	15.4
		25–34 years	158	39.2
		35–44 years	114	28.3
		45–54 years	52	12.9
		55+ years	17	4.2
2	**Sex**	Male	329	81.6
		Female	68	16.9
		Prefer not to say	6	1.5
3	**Marital Status**	Single	136	33.7

		Married/Partnered	245	60.8
		Other	22	5.5
4	**Highest Education**	Secondary	48	11.9
		Diploma	132	32.8
		Bachelor's degree	171	42.4
		Postgraduate	52	12.9
5	**Job Category**	Drilling	73	18.1
		Production	112	27.8
		Maintenance	84	20.8
		Logistics/Marine	69	17.1
		HSE	52	12.9
		Other	13	3.2
6	**Offshore Experience**	<1 year	27	6.7
		1–3 years	84	20.8
		4–6 years	126	31.3
		7–10 years	102	25.3
		>10 years	64	15.9
7	**Shift Type (This Hitch)**	Day shift	118	29.3
		Night shift	96	23.8
		Rotational (day/night)	189	46.9
8	**Company Type**	Multinational	261	64.8
		Indigenous	118	29.3
		Prefer not to say	24	6.0

Source: Field Survey, 2026

The age distribution of respondents in table 3.1 shows a workforce dominated by young and early middle-aged adults. The largest proportion of workers (39.2%) fell within the 25–34 years age range, indicating that offshore operations in Port Harcourt attract a relatively young and physically active workforce. This is consistent with the demanding nature of offshore work, which often requires physical resilience and stamina. Another sizable segment (28.3%) was between 35 and 44 years, reflecting the presence of more experienced personnel who have likely accumulated several years of technical and operational expertise. Workers aged 45–54 years accounted for 12.9%, while those aged 55 and above represented only 4.2% of the sample. The smallest group (15.4%) was under 25 years, suggesting that although younger workers do enter the offshore sector, most positions tend to be filled by individuals with some prior training or technical background.

Furthermore, the results reveal a substantial gender imbalance within offshore operations. Male workers made up 81.6% of the respondents, while female employees accounted for 16.9%, and a small proportion (1.5%) preferred not to disclose their gender. This distribution reflects long-standing trends in the oil and gas sector, where operational and technical roles are traditionally male-dominated due to historical, cultural, and occupational factors.

The distribution of educational levels indicates that offshore work in Port Harcourt requires a reasonably skilled workforce. The highest proportion of respondents (42.4%) held a Bachelor's degree, suggesting that many roles require formal training in engineering, geosciences, industrial safety, or related fields. A significant share (32.8%) possessed a Diploma, indicating the presence of technicians and mid-level professionals with specialized training. Respondents with Postgraduate qualifications accounted for 12.9%, reflecting a smaller but notable group of highly skilled

professionals in supervisory or technical positions. Only 11.9% had Secondary education, and this group likely consists of support personnel handling auxiliary operational tasks. This educational profile underscores the technical nature of offshore work, where adequate training and certification are essential for safe and efficient operations. Similarly, Experience levels were well distributed across the sample, providing a balanced mix of perspectives from both newer and long-serving employees. The largest group (31.3%) had 4–6 years of offshore experience, followed closely by workers with 7–10 years (25.3%). Together, these two categories constitute over half the sample, suggesting that many respondents have substantial hands-on familiarity with offshore conditions and the demands of rotational work schedules. Another 15.9% had more than 10 years of experience, showing that a significant portion of the workforce consists of seasoned professionals who have adapted to the rigours of prolonged offshore duties. Workers with 1–3 years of experience accounted for 20.8%, while newcomers with less than one year made up just 6.7%. This mix of experience levels enriches the dataset, as both fresh insights and deep-rooted professional perspectives are captured in the responses.

3.2 Fatigue Management Practices

Table 3.2: Fatigue Management Practices of Respondents (N = 403)

S/N	Statement	SA	A	N	D	SD	Weighted mean	Rank	Remark
1	Shift schedules minimise consecutive night duties	96 (23.8%)	148 (36.7%)	72 (17.9%)	60 (14.9%)	27 (6.7%)	3.36	4th	Moderately Adopted
2	Mandatory rest breaks are respected by supervisors	112 (27.8%)	156 (38.7%)	65 (16.1%)	44 (10.9%)	26 (6.5%)	3.60	2nd	Highly Adopted
3	Handover time is sufficient to avoid rushing or errors	78 (19.4%)	124 (30.8%)	88 (21.8%)	74 (18.4%)	39 (9.7%)	3.12	6th	Moderately Adopted
4	Sleeping quarters enable uninterrupted sleep	128 (31.8%)	152 (37.7%)	64 (15.9%)	40 (10.0%)	19 (4.7%)	3.71	1st	Highly Adopted
5	I have received training on fatigue risks and countermeasures	104 (25.8%)	160 (39.7%)	76 (18.9%)	44 (10.9%)	19 (4.7%)	3.50	3rd	Highly Adopted
6	There is a clear, non-punitive process to report fatigue	82 (20.3%)	132 (32.8%)	102 (25.3%)	60 (14.9%)	27 (6.7%)	3.26	5th	Moderately Adopted

Source: Field Survey, 2026

The detailed results in table 3.2 showed that the adequacy of sleeping quarters scored the highest $\bar{x}$ score of 3.71, suggesting that the majority of the respondents perceived their accommodation to

be conducive to uninterrupted sleep, an essential prerequisite in a physically demanding operational context. Enforced mandatory rest breaks achieved a close following $\bar{x}$ of 3.60, which reflects the perception of employees that the supervisors generally observe scheduled rest periods. Collectively, these two procedures can be classified under the 'highly adopted' category and therefore add to the notion that fundamental rest provisions are among the strongest organizational controls currently being used. Training on risks of fatigue also had a high level of adoption with a $\bar{x}$ of 3.50. This result suggests that employers provide at least a cursory structured introduction to fatigue-related hazards and corresponding mitigative strategies. Although the current data does not allow an in-depth evaluation of the quality and depth of the training, there is some indication from the feedback of the respondents that there was a recognition of having received formal instruction. Conversely, some of the critical practices showed low levels of uptake. The fact that reporting fatigue without punitive consequences ($\bar{x}$ = 3.26) shows that the reporting of such events has a reporting mechanism in place; however, employees may be reluctant to use such a mechanism - perhaps because of apprehensions surrounding blame, stigma, or organizational repercussions. Shift schedules aimed at reducing consecutive night duties had a moderate score ($\bar{x}$ = 3.36), indicating that shift scheduling interventions are implemented but are inconsistent in their effects. The item with the lowest rating related to the adequacy of time of handover ($\bar{x}$ = 3.12), which implies that there is a subset of workers who perceive shift change-overs as rushed, and there is potential for a loss of operational accuracy and recovery.

These findings suggest that, while offshore organizations have reasonably robust foundational fatigue controls in place, moderate-level domains - in particular, reporting culture, shift optimization and handover processes - require increased scrutiny. Should these less-than-optimal components go unaddressed, they can reduce the robustness of existing controls and limit the overall efficacy of fatigue management systems.

Table 3.3: Correlation Between Fatigue Management Practices and Performance Outcomes (n = 403)

Variables	Mean ± SD	R-value	p-value	Interpretation
Fatigue Management Practices (FMP)	3.42 ± 0.61	**0.412**	**0.000**	Moderate positive, statistically significant relationship
Performance Outcomes (PO)	3.40 ± 0.57	—	—	—

Decision: Relationship is significant at $p < 0.05$

Conclusion: Better fatigue management practices are associated with improved performance.

Table 3.3 presents the Pearson Product–Moment Correlation (PPMC) analysis conducted to test the study hypothesis on whether fatigue management practices are significantly related to performance outcomes among offshore workers in Port Harcourt. The analysis revealed a moderate, positive correlation between Fatigue Management Practices (FMP) and Performance Outcomes (PO) ($r = 0.412$, $p < 0.001$). This indicates that respondents who rated organizational fatigue controls more favorably (such as improved shift scheduling, protected rest periods, adequate recovery facilities, training, and clearer reporting support) also tended to report better performance in terms of productivity, safety compliance, alertness, and error avoidance.

Since the p-value is less than the 0.05 significance threshold, the relationship is statistically significant. Therefore, the null hypothesis (H01) that there is no statistically significant

relationship between fatigue management practices and performance outcomes is rejected, while the alternative hypothesis (H1) is supported. In practical terms, the result suggests that strengthening fatigue management systems is associated with improved worker performance, even though performance may also be shaped by other organizational and individual factors within offshore operations.

3.3 Discussion of Findings

The results in table 3.2 of the fatigue management practices reveal the presence of some controls on fatigue management foundation that are reasonably established and embedded, but others are still rather half-developed. The mean ratings of sleeping quarters and rest facilities had the top score (3.71), with mandatory rest breaks (3.60) and training on the risk of fatigue being second (3.50), and being under the highly adopted category. These findings correspond to the global fatigue management in offshore operations, which focuses on proper accommodation, guarded rest traditions, and training as the main organizational tasks (Casey *et al*., 2024).

But the rest of the fatigue management practices were adopted at a moderate level. The schedules that were developed to reduce consecutive night shifts and sufficient time to hand over to crew members also scored in the low-to-mid 3-point range, as did the non-punitive process of reporting fatigue (3.26). These comparatively lower scores indicate that, in spite of formal policies being there, their practical application may not be even. The same trend is observable in research on shift-working drivers and energy workers, in which more fundamental concerns, including rest space and routine breaks, receive higher ratings than flexibility in the schedule or mental safety over expressing fatigue (Lyubykh *et al*., 2022). In most organizations, operational demands, production goals, or workforce issues restrict the degree to which the rosters can, in fact, be optimized to mitigate the risk of fatigue.

Of great importance is the moderate rating of the fatigue reporting procedures. In a study by Vogus *et al*. (2020) on psychosocial safety climate and fatigue, employees are more inclined to share exhaustion and other support when they believe that the management will act positively instead of punishingly. The current results indicate that this trust is not necessarily completely built: even in those cases when there is a reporting process in place, on paper, workers are still afraid of being blamed, deprived of their income or having a negatively impacting career. This, practically, compromises the worth of other fatigue measures since the early warning measures (workers being told that they are not fit to work) are not fully used.

Correlation analysis in table 3.3 revealed that there was a statistically significant moderate, positive relationship between the practice of fatigue management and performance outcomes (r 0.412, p 0.001). This indicates that the workers who marked higher fatigue control, like better shift schedule, more reliable rest, favorable reporting and relevant training, also marked higher performance in terms of productivity, quality, safety compliance, and cognitive functioning. This trend fits perfectly into the JD -R model, which assumes that sufficient job resources not only do not eliminate the negative impact of job demands on strain but also directly promote engagement and performance (Gurubhagavatula *et al*., 2021).

The average power of the correlation, as opposed to a weak one, is evidence of fatigue management being a significant, yet not a unique, performance determinant. It is presumably affected by other factors such as personal coping strategies, job demands in general, organizational culture and psychosocial safety climate. The data on the road transport and other high-risk industries demonstrates that high job stress, the lack of supportive supervision, adequate staffing, and

effective communication contribute to elevated fatigue, burnout, and poor safety execution (Dumitriu *et al*., 2025). The positive relationship between practices that achieve higher rates of fatigue and better performance results is observed, which can be considered empirical evidence of policy discussions that the investments in rest facilities, the shift design, fatigue training, and open reporting systems are not considered as costs but as tools for creating sustainable productivity and safety of offshore operations.

4.1 Conclusion, Recommendations, And Implications

The main aim of the research was to evaluate the practice of fatigue management and the performance-related outcomes in offshore workers in Port Harcourt, Rivers State and to determine those factors that enable or hinder effective fatigue management practices. The results have shown that offshore employees are working under a challenging environment where moderate levels of physical, cognitive, and mental exhaustion are common, but most of them remain trying to ensure that they achieve acceptable productivity and quality levels. Based on the current fatigue-management systems, there were positive ratings of sleeping facilities and rest accommodation, no breaks were stopped in most cases, and the majority of workers were provided with some training on the risk of fatigue, as well as countermeasures. It was also unclear to many workers that there are formal fatigue policies and that the core group showed high levels of awareness and compliance. These aspects indicate that the understanding of fatigue management is an issue that has been accepted as significant and that there are some meaningful structures. Similarly, the statistically significant connection between fatigue-management practices and performance outcomes proves the fact that these organizational resources are important. The performance indicators, such as productivity, quality, safety compliance, and alert, are more favorable when the fatigue controls are stronger. This buttresses the argument that fatigue management can only be seen as a strategic investment and not as a welfare responsibility.

4.2 Recommendation

Base on the findings, the following recommendations were made:

i. Offshore companies need to reassess and reformulate the shift patterns according to the principles of fatigue-risk-management. The rotational plans must reduce night shifts in a row, have sufficient rest periods between the shifts, and be confirmed by employee participation to ensure that they are a possibility.

ii. Proper allocation of handover time should be formally instituted by the management at the onset and at the conclusion of the shifts, whereby workers are not compelled to hurry in the exchange of important information. The handover quality must be considered as a safety matter and not an added value.

iii. Firms need to have and, where appropriate, improve sleeping quarters to make sure that they encourage continuous rest. Work plans should include rest breaks, which should be respected even in times of production pressure by the supervisors.

iv. Training on fatigue must be realistic, situational and ongoing. It must be clear about the right of workers to report fatigue or stop work in cases when it is unsafe, and about their duty to take care of their own rest, and to use reporting channels.

v. Organizations need to streamline the fatigue-reporting processes and make them easier.

vi. It is recommended that offshore leadership enforce strict controls on overtime approval by declining deliberately overstretched overtime requests.

4.3 Contribution to Knowledge

The given study is context-specific empirical research on fatigue management among offshore workers in Port Harcourt, Nigeria. It provides numerical evidence of the Job Demands-Resources model of a high-risk offshore setting. It creates a quantifiable correspondence of awareness, compliance and behavioral consequences through an index of composite. It points out clear trends of an association between fatigue levels and the changes in productivity, safety performance, and alertness.

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