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Psychosocial Hazards among Field Workers in the Construction Industry Across Demographic Groups in Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study explores how psychosocial hazards affect safety outcomes, particularly across demographic characteristics in the construction industry in Rivers State, Nigeria. Questionnaires were distributed to workers in the construction companies in Rivers State to get their responses on psychosocial hazards such as workload, role clarity, social support, and organizational culture. A questionnaire-based survey also collected data on the demographic variables of the workers. Two-hundred and ninty-five respondents had a complete and usable questionnaire. Pearson correlation coefficients and Principal Component Analysis (PCA) were used to understand the relationship between the psychosocial factors with the safety outcome and the relationship with demographic variables. The result revealed that male workers faced higher stress, accidents, and near misses,

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while females grappled with role ambiguity but reported better social support. The results from correlation analysis revealed that higher workload correlated with increased accidents and near misses. Adequate equipment and suitable environment equate with positive job performance, positive organisational culture leads to low accident rates. Also, clear job roles were linked to improved performance and fewer accidents. Psychosocial hazards have not gained high attention in most industries, but with the improvements in this field of research, safety of workers holistically will be attained.

Keywords: Psychosocial hazards; safety outcomes; construction workers; workload; role clarity; social support; organizational culture; gender differences; Job performance; Nigeria.

1. INTRODUCTION

The construction industry is a major source of employment in Nigeria, characterized by demanding working conditions that can negatively impact employees' psychological well-being. Psychosocial hazards, which refer to potential threats in the workplace that can cause psychological or physical harm, are particularly salient in this sector [1]. Specific psychosocial risk factors prevalent in construction include high workload, lack of control over work processes, role ambiguity, job insecurity, and work-life imbalance[2,3]. These hazards disproportionately affect construction workers in Nigeria, who face additional challenges like skills shortages, inadequate training and enforcement of occupational safety regulations, and high rates of workplace injuries [4,5].

Psychosocial hazards tend to affect construction workers based on their demographic characteristics differently. Gender and ethnicity tend to moderate psychosocial hazards experienced among construction workers differently. Women face stresses balancing work and family obligations, while men struggle with pressures to succeed and social norms against expressing vulnerability [6]. Vermeulen and Mustard [7] in their study found that high levels of social support usually experienced by female workers at the workplace tend to eliminate psychological distress for women, but not for men. Additionally, Goldenhar et al. [8] found that a higher level of social support experienced by female workers at the workplace was related to a higher level of job satisfaction. Kennedy [9] discovered that ethnic tensions in the workplace tend to manifest in the form of discrimination, bullying, and conflict.

Prolonged exposure to psychosocial hazards can lead to physical illnesses like cardiovascular disease, mental health issues like depression, and behaviors like substance abuse [10,11]. Preventive strategies involve assessing and modifying organizational and management practices contributing to these risks [3]. This study aims to examine the prevalence and drivers of psychosocial hazards among construction workers across demographic factors in Rivers State, Nigeria.

2. METHODS

The research design for this study is broadly captured in a flowchart (Fig. 1). This is self-explanatory as it captures formulation of research, hypothesis listing, study variables, survey/questionnaire distribution, data analysis, results and conclusion.

2.1 Participants

The participants in this survey consisted of construction workers in Rivers State, Nigeria. Purposive sampling techniques was used to determine the Local Government Area (LGA) based on the administrative and operational hub for several multinational, indigenous oil and gas companies, which explains the proliferation of construction and fabrication activities in these areas and 3 companies for the research using some criteria such as economic commonality, spatial conformity and staffing culture. The sample size of 295 was determined based on the population size. The diverse participant pool allows for a comprehensive exploration of psychological risk hazards in the construction industry, considering the range of demographic factors and occupational roles within the surveyed population.

2.2 Instrument

The instrument utilized in this study aimed to gauge the Psychological Risk Hazard and Safety Outcomes among construction workers. Each participant was asked to rate their agreement or disagreement with these statements on a five-point Likert scale (1 = Never to 5 = Always). The construct used in measuring the psychosocial

hazards and safety outcomes is explained as follows.

Environment/Equipment: This construct measures the state of the working environment and equipment the participants are exposed to. Seven items were used in evaluating this construct. An example of an item is " My work does not expose me to high levels of sound(noise) from machines ".

Workload/Schedule: This construct measures the work intensity, pressure, and rigid work schedules associated with working on construction sites. Six items were used in measuring the Workload/Schedule. An example of an item is " I have to work at a high pace throughout the day."

Role organisation: This construct measures the clarity, compatibility, and adequacy of job roles within an organization. Seven items were used in measuring the role organization. An example of an item used is " I know exactly which areas my job covers."

Work-life interface: This dimension measures employee's work demands and responsibilities and their personal/family life outside of work. Five items were used in measuring this construct. An example of an item is " I feel that my work requires so much of me that it has a negative effect on my private life ".

Social aspects: This construct measures the social support received from immediate supervisors and co-workers. Eight items were used in measuring this construct. An example of an item is " I get sufficient levels of social support from colleagues toward problem-solving."

Organizational culture: This construct measures cultural norms and practices at the workplace. Four items were used in measuring this construct. An example of an item is " My organization has a working Effort-Reward system."

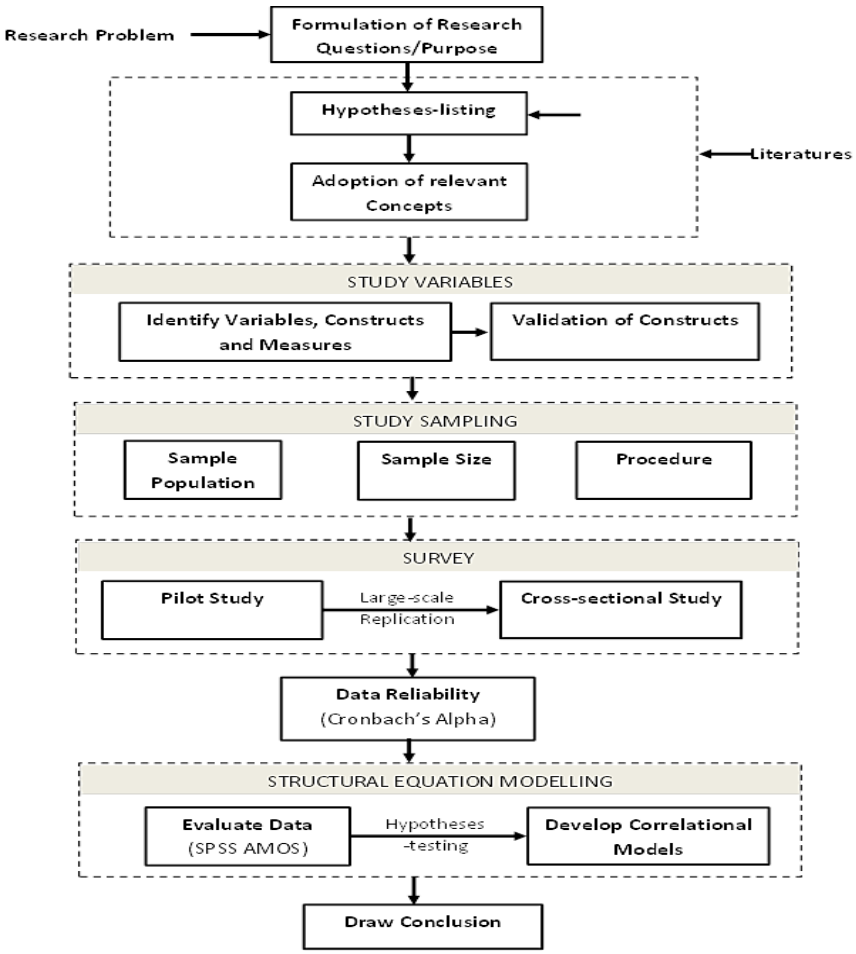

Fig. 1. Methodical frameworks to research design

Near miss: This construct measures the near-miss occurrence that took place at the workplace. Three items were used in measuring this construct. Example Item: " I have been involved in a near-miss situation at the workplace."

Accidents/Injuries: This dimension measures accidents and injuries occurrences at the workplace. Three items were used in measuring this construct. Example Item: " I have sustained injury due to my work."

Absenteeism: This construct measures absenteeism from work. Example Item: "Frequent absenteeism negatively affects my psychological well-being at work."

Job performance: This dimension measures an individual's effectiveness in fulfilling job responsibilities and achieving key performance indicators. Example Item: " I feel motivated and involved working in my organization."

2.3 Data Analysis and Procedures

The data obtained from the online survey were first coded based on the Likert scale in SPSS version 26. Composite scores were computed for each psychological risk hazard and safety outcomes construct. Descriptive statistics (mean and standard deviation) were used in evaluating the general respondents' view on the psychological risk hazard and safety outcomes construct. The reliability of each construct was assessed using Cronbach's alpha to ensure internal consistency. Pearson correlation analysis was used to explore relationships between psychosocial hazards and safety outcomes. Principal Component Analysis (PCA) which is a dimension reduction technique was utilized to establish the links between psychosocial hazards and demographic characteristics. Analysis of Variance (ANOVA) was employed to detect statistically significant differences among groups concerning psychological risk hazard and safety outcomes.

3. RESULTS

The result of the demographic characteristic of the respondents is presented in Table 1. Majority of the respondents comprising 82.4% of the respondents identified as male, reflecting the prevalent male-dominated nature of the construction industry. Females constituted just 17.6% of the respondents. Regarding educational qualifications, 61% of the respondents held secondary school leaving certificates. Respondents with tertiary degrees constituted 39% of the respondents. The distribution of respondents based on work experience indicated that 46.4% of the respondents had two to three years of experience, while 35.6% reported five years of experience. Those with over five years of experience constituted 18% of the respondents.

The reliability of the instrument was evaluated using Cronbach's Alpha and the values range from 0.652 to 0.866, indicating the internal consistency and reliability of the instrument. The constructs measuring environmental/equipment risk hazard, role organization, and job performance exhibited very good reliability, with Cronbach's Alpha values exceeding 0.8. Organizational culture, work-life interface, and accident/injuries demonstrated good reliability, with values ranging from 0.7 to 0.8. Although the constructs for workload/schedule, social aspects, near miss, and absenteeism had slightly lower Cronbach's Alpha values (less than 0.7), they still suggested good reliability. Overall, all constructs exhibited good to very good reliability.

Table 1. Demographic characteristics of all respondents to the questionnaire from the study alignments

Demographic Criteria	Gender	Frequency	Percentage (%)	Cumulative Percentage (%)
Gender	Male	243	82.4	82.4
	Female	53	17.6	100
Highest Qualification	Secondary Level	180	61.0	61.0
	Tertiary Level	115	39.0	100
Work Experience	2 to 3 years	137	46.4	46.4
	4 to 5 years	105	35.6	82.0
	5 years above	53	18.0	100.0

Number of respondents = 295

The mean response from the respondents regarding the psychosocial risk hazard and safety outcome constructs is presented in Table 2. For the psychosocial risk hazard constructs, the mean response for Environment/Equipment is 3.22, indicating a slight agreement among construction workers in Rivers State regarding good environmental and equipment conditions in their workplace. Participants reported that they had adequate lighting, low exposure to noise, and the provision of appropriate equipment and materials at their workplace.

The mean response for Workload/Schedule is 3.76, suggesting agreement that respondents often face unfavorable workloads/schedules, including high-paced work and time pressure, leading to strain and insufficient time to complete tasks. Regarding the Role Organisation construct, the mean response is 3.14, indicating agreement that roles are not always clearly defined within the organization. For Work-Life Interface, the mean response is 3.84, signifying agreement that respondents struggle to balance work and personal life due to job demands, affecting their ability to coordinate private affairs. The mean response for Social Aspects is 2.77, implying sometimes workers receive social support from colleagues, bosses, and the organization. In the Organisational Culture construct, the mean response is 2.64, indicating agreement that the company's management sometimes practices and upholds good organizational culture. For the safety outcome constructs, the mean response for Near Miss is 3.42, indicating frequent experiences of near misses during task execution. For Accident/Injuries, the mean response is 3.04, suggesting that respondents sometimes sustain injuries while executing tasks. In terms of Absenteeism, the mean response is 2.80, indicating rare instances of absenteeism among the respondents. Lastly, the mean response for Job Performance is 2.0, reflecting relatively low job performance among the workers.

For the relationship between the psychosocial factor and safety outcome, the result of the Pearson Correlation is presented in Table 3. The correlation coefficients for Environment/Equipment with near-miss, accidents/injuries, and absenteeism were not statistically significant, implying no discernible relationship between environmental and equipment factors and the specified safety outcomes. There was a positive relationship between EE with job performance, implying that adequate and conducive working conditions result to better job performance. Workload/schedule displayed a statistically significant positive correlation of NM, AC, and AB. This indicates a positive relationship, suggesting that an increased work schedule is associated with a higher frequency of near misses, accidents, and absenteeism. There was a negative relationship between workload/schedule and job performance. An increase in the workload/schedule results in a reduction in job performance. Role organization exhibited statistically significant negative correlations with AC. A higher level of RO was associated with a slightly lower level of accidents and vice versa. RO has a significant positive relationship with job performance, indicating that if there is no ambiguity in the job role of the worker then there would be higher job performance. The correlation coefficients for the work-life interface with AC and AB were not statistically significant, indicating an absence of a significant relationship between the work-life interface and the specified safety outcomes. WL had a positive relationship with accident and a negative relationship with job performance. Workers that indicated having a poor work-life balance indicated to have more injuries and lower job performance at their workplace. Social aspect demonstrated a statistically significant positive correlation with JP. This suggests that when support is received from supervisor and coworker it leads to a better job performance. Organizational culture displayed no statistically significant correlation with NM, AB, and JS. This implies that organizational culture does not have a discernible relationship with the specified safety outcomes. OC had a significant negative relationship with accidents, which implies that if the company has a high safety culture and norms it would result in fewer accidents. The positive correlation between NM and AC was statistically significant, indicating an increase in near misses is associated with an increase in accidents, and vice versa. There was a positive correlation between NM and AB which was statistically significant. The correlation between JP and NM was statistically significant (-0.21), indicating a negative relationship. Higher job performance is associated with a slightly lower level of near misses.

Table 4 outlines the outcomes of the Bartlett Sphericity test and Kaiser-Meyer-Olkin (KMO) test, crucial for assessing the appropriateness of

the data for Principal Component Analysis (PCA). The highly significant Chi-square value (1530.945) from the Bartlett Sphericity test indicates a sufficient correlation between variables for PCA. The KMO value of 0.638 suggests an adequate sampling size for PCA. The result from the test provided sufficient evidence to state that the PCA is appropriate for the dataset.

Table 5 presents eigenvalues and the proportion of variance before and after Varimax rotation. PC1 has the highest eigenvalue (2.75), explaining 24.97% of the total variance. PC2 follows with an eigenvalue of 2.46, contributing 22.40% of the total variance. Cumulatively, the first two components explain 47.37% of the variance. Subsequent components contribute 12.13%, 9.33%, 8.90%, and 7.01% to the total variance. Based on Eigenvalue-one criteria, the first four principal components were retained as they had an eigenvalue greater than one. The cumulative proportion of variance retained by the four principal component was 68.83%. The Varimax rotation was applied to the initial solution for ease of interpreting the factor loading.

Table 6 exhibits factor loadings for each variable on the identified components (D1-D4). Factor loadings represent the correlation between variables and components. Variables with high factor loading are retained on a particular principal component. A variable with a factor loading greater than 0.45 is considered high enough to load on a particular component. Notable examples include EE with a high factor loading of 0.935 which loaded on principal component 1 (D1). Factor loadings assist in identifying variables strongly linked to each component, offering insights into the data's underlying structure.

Table 2. Mean response by respondents to Psychosocial risk Hazard and Safety outcomes construct

Psychological risk hazard and Safety outcomes construct	Mean	St. Dev	Coef. Var	Skewness
Environment/Equipment (EE)	3.22	0.75	23.39	0.29
Workload/schedule (WS)	3.76	0.43	11.36	-0.66
Role organisation (RO)	3.14	0.67	21.35	0.25
Work-life interface (WL)	3.84	0.38	9.78	-0.64
Social aspects (SA)	2.77	0.43	15.47	0.93
Organisational culture (OC)	2.64	0.38	14.45	0.10
Near miss (NM)	3.42	0.59	17.12	-0.50
Accident/injuries (AC)	3.08	0.62	20.23	-0.09
Absenteeism (AB)	2.80	0.63	22.36	-0.14
Job performance (JP)	2.00	0.69	34.18	0.62

Table 3. Relationship between Psychological risk Hazard and Safety outcomes

Variables	EE	WS	RO	WL	SA	OC	NM	AC	AB	JP
EE	1.00									
WS	-0.06	1.00								
RO	0.85	0.01	1.00							
WL	-0.18	0.25	-0.17	1.00						
SA	0.43	0.10	0.33	-0.13	1.00					
OC	0.06	-0.10	0.04	0.00	-0.17	1.00				
NM	-0.07	0.95	0.01	0.24	0.10	-0.10	1.00			
AC	-0.11	0.26	-0.12	0.08	0.28	-0.17	0.27	1.00		
AB	0.09	0.22	0.08	0.11	0.30	-0.09	0.27	0.37	1.00	
JP	0.56	-0.18	0.47	-0.21	0.52	0.00	-0.21	0.11	0.01	1.00

Values in bold are different from 0 with a significance level alpha=0.05

Table 4. Bartlett Sphericity test and Kaiser-Meyer-Olkin test

Statistical Test	Statistic	Value
Bartlett's sphericity test	Chi-square (Observed value)	1530.95
	Chi-square (Critical value)	73.311
	DF	55
	p-value	< 0.0001
	Alpha	0.05
Kaiser-Meyer-Olkin	KMO	0.638

Table 5. Eigenvalue and proportion of variance

		Before Varimax Rotation		After Varimax Rotation	
Components	Eigenvalue	Variability (%)	Cumulative Variability (%)	Variability (%)	Cumulative Variability (%)
PC1	2.75	24.97	24.97	23.517	23.517
PC2	2.46	22.40	47.37	20.029	43.546
PC3	1.33	12.13	59.50	14.772	58.318
PC4	1.03	9.33	68.83	10.507	68.825
PC5	0.890	8.900	78.232	8.900	78.232
PC6	0.701	7.014	85.246	7.014	85.246

Table 6. Factor loading

	D1	D2	D3	D4
EE	0.935	-0.017	-0.035	0.009
WS	-0.002	0.946	0.105	0.027
RO	0.905	0.074	-0.093	-0.045
WL	-0.252	0.448	-0.120	0.130
SA	0.547	0.019	0.559	0.278
OC	0.115	-0.031	-0.317	-0.542
NM	-0.014	0.949	0.130	0.011
AC	-0.131	0.190	0.807	0.021
AB	0.080	0.281	0.656	-0.108
JS	0.699	-0.288	0.276	0.103
Age	0.062	0.039	-0.038	0.861
Gender-Male	-0.080	0.044	0.101	0.010
Gender-Female	0.080	-0.044	-0.101	-0.010
ExperienceLevel-5 years above	-0.014	0.017	-0.053	0.331
ExperienceLevel-4 to 5 years	0.017	0.061	0.049	-0.006
ExperienceLevel-2 to 3 years	-0.006	-0.072	-0.006	-0.249
EducationalQualification-Tertiary level	0.019	-0.017	-0.004	-0.013
EducationalQualification-Secondary level	-0.019	0.017	0.004	0.013

The relationship between the demographic characteristics and social hazards is presented in the biplot shown in Fig. 2. The result from the biplot showed that male workers had a higher level of workload/schedule, work-life balance, near misses, and accidents than female workers. The result also showed that female workers had a higher level of role ambiguity, social support, and job performance. In terms of educational status, workers with secondary school certificates had slightly higher levels of workload/schedule, work-life balance, near misses, and accidents than workers with tertiary certificates. On the other hand, workers with tertiary degrees had slightly higher levels of role ambiguity, social support, and job performance. In terms of working experience, it was observed from the biplot that workers with 4 to 5 years of working experience had slightly higher workloads/schedules, work-life balance, near misses, and accidents than other groups of working experience.

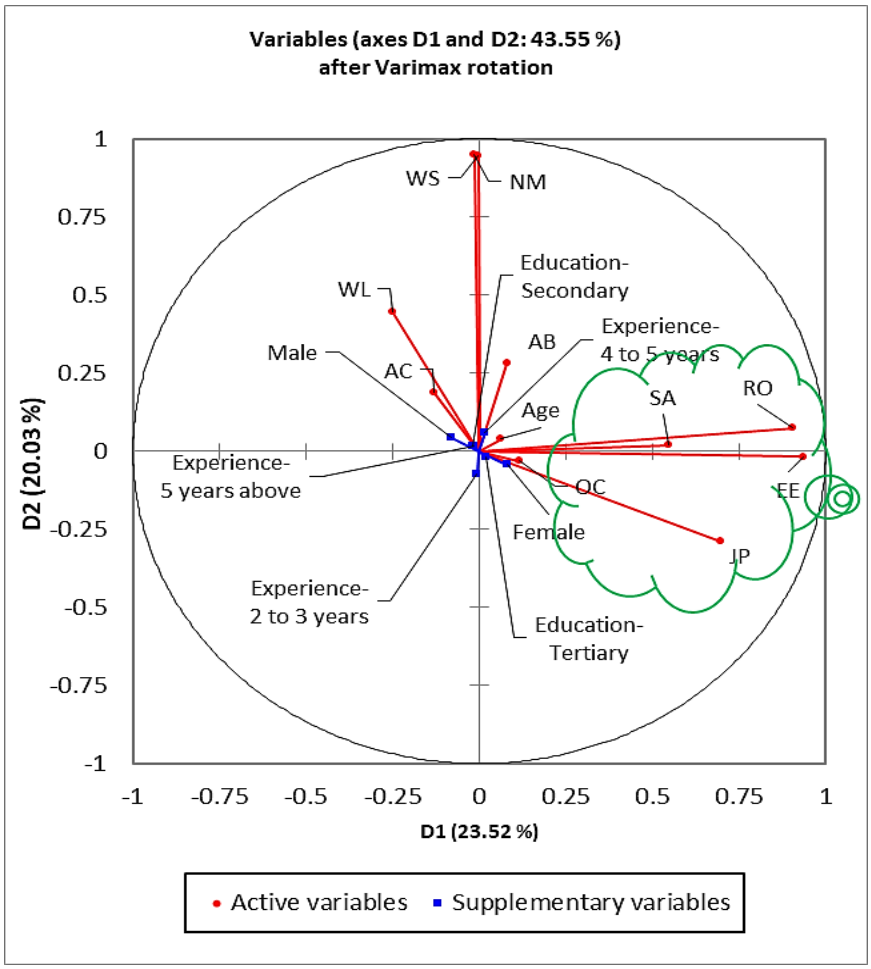

Fig. 2. Biplot showing the relationship between the psychological risk Hazard and Safety outcomes construct

4. DISCUSSION

The predominant male representation in our sample aligns with the industry's widely acknowledged male dominance. Interestingly, males reported higher work-related challenges, such as work overload and safety incidents, compared to their female counterparts. This echoes existing research on the heightened job demands and safety risks faced by men in construction, emphasizing the need for tailored interventions to address gender-specific challenges [12]. On the contrary, females reported higher role ambiguity, emphasizing the need for clearer role definitions for women in non-traditional occupations [13].

The study uncovered a significant association between high workloads, time pressures, and increased near misses, injuries, and absenteeism. These findings substantiate the job demands-control model [14], underscoring the imperative of mitigating excessive job demands to enhance safety outcomes in the construction sector. Noteworthy was the correlation between role ambiguity and higher accident rates, emphasizing the critical role of clear policies, defined roles, and responsibilities in minimizing psychosocial hazards. This aligns with prior research linking role stressors to increased safety incidents in construction [15,16,17]. The study highlighted that higher social support was linked to improved job performance, reinforcing the understanding that supervisor support enhances motivation and safety compliance [18]. Strengthening social resources in the workplace emerges as a potent psychosocial intervention. While the effects of organizational culture were modest, the variance from studies emphasizing its strong influence on safety behaviors in construction warrants further exploration. This discrepancy suggests that cultural influences may manifest differently across diverse contexts, urging a nuanced investigation.

The findings accentuate the pervasive psychosocial hazards faced by construction workers and their direct associations with safety outcomes. This underscores the urgency of targeted interventions to mitigate risks within this vulnerable workforce.

5. CONCLUSION

This study aimed to understand the psychosocial hazards and safety outcomes among construction workers particularly across demographic characteristics in Rivers State, Nigeria. Findings from the study revealed that male construction workers reported higher work-related stressors and safety incidents, emphasizing the need for targeted interventions to address the distinct vulnerabilities faced by male construction workers. Conversely, females faced challenges related to role ambiguity, underlining the importance of clarifying roles and responsibilities for women in non-traditional occupations. Work-related factors such as high workloads and time pressures were identified as critical contributors to near misses, injuries, and absenteeism. The study also highlighted the impact of role ambiguity on safety incidents, emphasizing the need for clear policies and well-defined roles and responsibilities to minimize psychosocial hazards. The identified associations between psychosocial hazards and safety outcomes underscore the need for targeted interventions and comprehensive safety measures to protect the well-being of construction workers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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