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Prevalence and Frequency of Psychological Stress Indicators Among Occupational Workers in the Oil and Gas Industries in Port-Harcourt

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Abstract

This study focused on comparing the occupational stress levels of Oil & Gas workers with those of civil servants while also exploring potential risk factors. A total of 447 personnel from two Oil & Gas companies in Port Harcourt and surrounding areas, along with staff from the Rivers State Civil Service Commission (the control group), were randomly selected and surveyed using self-administered structured questionnaires. The collected data were analysed using standard statistical software. The findings revealed that workers in the Oil & Gas sector reported higher levels of occupational stress compared to civil servants. Additionally, the psychological health characteristics among Oil & Gas employees significantly differed from those in the civil service. Nevertheless, the impact of psychosocial factors related to job tasks was similar for both groups. Key risk factors contributing to occupational stress included the psychosocial aspects of their roles, environmental conditions, and individual psychological health. Regular evaluations, at least annually, should be conducted to address job elements that may lead to psychological and emotional stress, such as the risk of verbal and physical abuse and the legal responsibilities associated with their positions.

Keywords: ***Oil and Gas, Civil, Psychological Stress, Health, Port Harcourt.***

Introduction

The oil and gas industry are one of the most demanding and hazardous work environments globally. Workers in this sector face numerous stressors, including high job demands, hazardous conditions, long working hours, and job insecurity. Port Harcourt, a significant hub of oil and gas operations in Nigeria, provides a unique context for studying the prevalence and frequency of psychological stress indicators among industry workers. This review explores existing literature, focusing on research conducted since 2014, to provide insights into psychological stressors, their prevalence, and associated outcomes in this sector. Research consistently highlights those workers in the oil and gas industry are at an increased risk of psychological stress due to the high-pressure work environment. Stressors such as extended work shifts, isolation on offshore rigs, and exposure to potential accidents exacerbate psychological strain. Additionally, Benson *et al.*, [1] added that the psychological toll of witnessing or experiencing near-miss incidents has been associated with post-traumatic stress disorder (PTSD) symptoms among these workers.

Studies have documented a high prevalence of psychological stress indicators among oil and gas workers. For example, research by Esitikot *et al.*, [2] in Niger Delta region reported 21% said work stress leads to negative workers' health and fatigue/burnout; 16% participants said reduced profitability. 11% participants said increased workplace hazard, project delays and impaired judgement. While 5% participants said increased workplace injuries and reduced worker efficiency. Similarly, Cookey-Gam *et al.*, [3] found that depression and burnout were prevalent among workers, with a higher occurrence in offshore operations compared to onshore roles. These psychological indicators were closely linked to high job demands and low job control.

The frequency of stress-related symptoms among oil and gas workers varies depending on job roles and the nature of assignments. Offshore workers, for example by Cookey-Gam *et al.*, [3], reported experiencing stress indicators daily due to isolation and demanding work conditions. Moreover Esitikot *et al.*, [2], contract workers in the industry frequently experience stress related to job insecurity and financial instability. The frequency of these symptoms often correlates with the duration of employment and exposure to occupational hazards. Several factors contribute to the prevalence and frequency of stress indicators among oil and gas workers in Port Harcourt, these are:

i. Job demands and workload in Eziechi [4].
ii. Workplace hazards in Lu *et al.* [5].
iii. Work-Life imbalance in Eziechi [4].
iv. Economic instability in Babalola *et al.*, [6].

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While the prevalence of psychological stress is high, several studies have identified coping mechanisms and interventions. For instance, Cookey-Gam *et al.* [7], stated that organizational support, counselling programs, and stress management training have shown promise in mitigating stress levels. Additionally, Cookey-Gam *et al.*, [3] stated that implementing shorter shifts and providing mental health resources have been recommended as effective strategies for reducing stress indicators among oil and gas workers.

The prevalence and frequency of psychological stress indicators among oil and gas workers in Port Harcourt are alarmingly high, driven by occupational hazards, economic instability, and demanding work conditions. The existing literature underscores the urgent need for industry stakeholders to implement targeted interventions, including improved work schedules, mental health resources, and supportive policies, to address this pervasive issue. Future research should focus on longitudinal studies to better understand the long-term impact of stress on workers and the effectiveness of implemented interventions.

Methodology

The study was conducted in the Port Harcourt metropolis of Rivers State, Nigeria which includes the Greater Port Harcourt region covering Port Harcourt, Obio/Akpor, Ikwerre, Etche, Oyigbo, Eleme, Okrika and Ogu/Bolo Local Government Areas of Rivers State in The Tide [8]. National Bureau of Statistics [9] added that Port Harcourt metropolis has a population of more than 1,000, 000 based on the 2006 National Population Commission figures. Satellite imagery of the study area is shown in Figure 1. A sizeable population of Port Harcourt and its environs are either civil servants or employees of one or the other multinational company by Rivers State Ministry of Health [10].

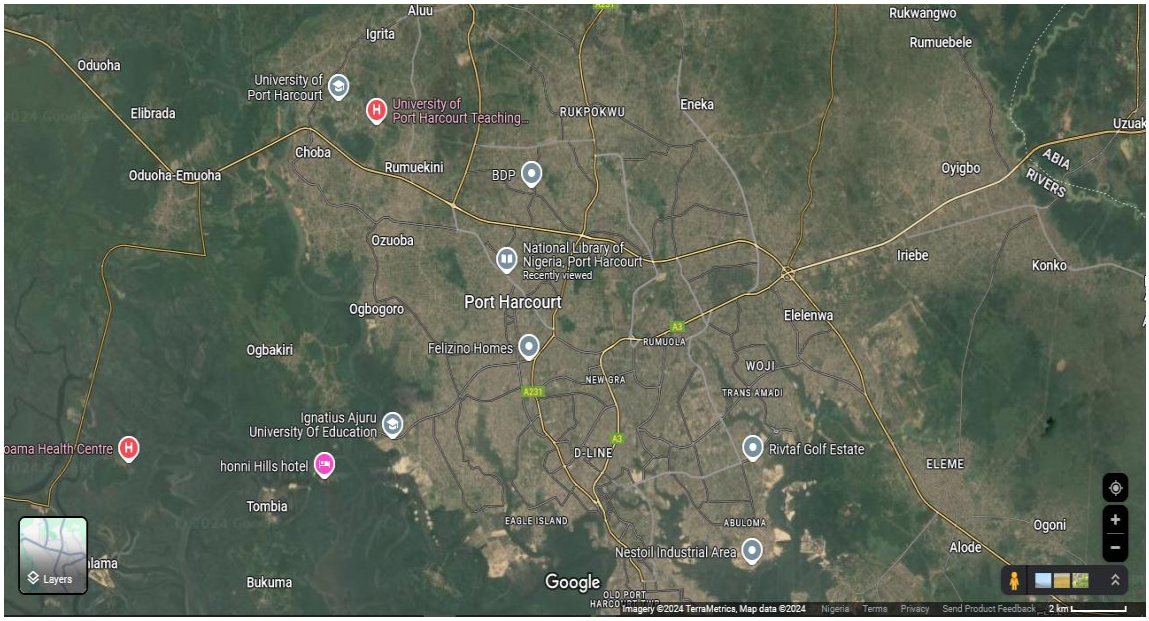

Figure 1: Satellite Imagery of Study Area (Google, 2024)

Data Collection

Primary and secondary data were used in this study. The primary data were obtained by means of administered questionnaires and interviews with workers of the case study firms and the Rivers State Civil Service.

Sample and Sampling Technique

A random sampling technique was used, giving a population size of 220. To collect the data, semi-structured questionnaires were prepared. Prior to questionnaire administration, conversations were held with selected respondents to explain the objective of the study. The selection of respondents was from 2 Oil & Gas operating companies located in Port Harcourt and environs in Rivers State, Nigeria. The respondents from the case study 1 firm comprised 72 females and 85 males; those from the case study 2 firm comprised 42 females and 124 males; those from the control firm comprised 128 females and 46 males.

Inclusion and Exclusion Criteria

The criteria for including participants in the study were: (1) within the legal working age (above 18 years); (2) working in the Oil & Gas sector (and the Rivers State Civil Service); and (3) resident in Port Harcourt and environs. The following groups of people were excluded from taking part in the study: (1) pregnant women were excluded because their physiological signs and symptoms were different from those of the general population. The physically challenged were also excluded from the study.

The Rivers State Civil Service was chosen as control because it is made up of workers from various units/departments employed in different sectors of the economy (for example, health, education, and engineering). The study participants were duly informed of the aim of the study including its objectives, and their consent was obtained prior to administering the study questionnaire. Questionnaire respondents were assured of their anonymity; they were not required to provide their names.

Nature and Sources of Data

Primary and secondary data were used in this study. The primary data were obtained by means of administered questionnaires and interviews with workers of the case study firms and the Rivers State Civil Service. Secondary data were obtained from existing literature on occupational stress among workers. The purpose was to examine research findings on the issue, identify gaps in the literature, determine the appropriate research focus to fill the identified gap, and design research methodology to accomplish the task. The consulted literature includes research articles published in journals available in print and on the internet, books, and web searches.

Methods of Data Collection

Self-administered questionnaires were the main tools for primary data collection. Close-ended questions were used as this made the

questionnaire easy for respondents to complete; 'yes/no' or 'not sure' questions were used. Open-ended questions were avoided as they are unsuitable for statistical analysis. The format of the questionnaire was in line with the standard for assessing occupational stress (as contained in the NIOSH Generic Job Stress Questionnaire).

The study questionnaire was piloted (between October 2015 and November 2015) prior to field data collection on randomly selected persons from the target population and individuals with experience in questionnaire design. The initial questionnaire was distributed via email and print among 12 persons out of whom 7 completed and provided feedback. The feedback was mainly on how respondents perceived certain questions and this informed their response. There was a misunderstanding in differentiating between "fairly often" and "sometimes" as degrees of frequency of experiencing symptoms of stress. The issue was clarified through email, face-to-face and telephone communication. Once understood, respondents went on to complete the questionnaires. Feedback was also received on questionnaire format, logical arrangement of questions and vagueness. The feedback from this preliminary activity was used to improve the final product that was subsequently administered starting March 2016. The questions in the final version of the questionnaire were therefore constructed to be clear and unambiguous as well as unbiased.

The questionnaires were mostly delivered online as attachments in email. Online delivery made it easier to reach more people. A few survey forms were printed and distributed. A total of 660 questionnaires were distributed with 553 returned. The returned questionnaires were sorted of which 56 were rejected because they were incomplete or responses were unclear. Those who submitted incomplete questionnaires were thanked for their time. They were not requested to complete fresh forms. The administered questionnaire assessed the respondents' job situation, any potential/actual work hazards, the physical work environment, and general health (including feelings about themselves). The questions were grouped into 2 sections:

- Socio-demographic information;
- General job information;
- Jobs situation;
- Work hazards;
- Physical environment;
- Non-work activities;
- Feelings about self;
- General health; and
- Health conditions.

Data Analysis

The data collected by means of the questionnaires were subsequently sorted and entered into Microsoft Excel statistical software for the generation of descriptive tables and charts as well as the calculation of statistical parameters. The rating scale is shown in Table 1.

Table 1: Rating Scale

Psychosocial Characteristics				
Rating	Never (0)	Occasionally (1)	Fairly often (1.5)	Very often (2)
Physical Environment				
Rating	TRUE (1)		FALSE (0)	
NON-WORK ACTIVITIES				
Rating	NO (0)		YES (1)	
Psychological Health (Feelings About Self)				
Parameter Rating	Strongly disagree (0)	Disagree (0.5)	Agree (1)	Strongly agree (1.5)
Psychological Health (Recent Experiences)				
Rating	Sometimes (1–2 days) (1)	Rarely (< 1 day) (0.5)	Occasionally (3–4 days) (1.5)	Most times (5–7 days) (2)
Medical Health				
Rating	Never (0)	Occasionally (1)	Fairly often (1.5)	Very often (2)
Health Conditions				
Rating	TRUE (1)		FALSE (0)	

Results

A total of 660 questionnaires were distributed (220 for each of the 2 case study firms and the control group). 447 questionnaires were properly filled and returned with a response rate of 67.73%. The questionnaire assessed conditions that were likely to lead to occupational stress among respondents such as psychosocial characteristics of the job, physical environmental conditions, and non-work activities that could exacerbate occupational stress, as well as psychological and general medical health of respondents. The findings of the study that pertain to occupational stress and risk factors are discussed in the succeeding sections.

Stressful Conditions

The rates for psychosocial characteristics, psychological health (feelings about self), psychological health (recent experiences), and medical health were subsequently adjusted to be accommodated within a range of 0 - 1. The adjusted values were then used as the final scores for the respective parameters. A summary of the values for the evaluated parameters (except medical health and health conditions) is shown in Table 2. Further, Pearson's (linear) correlation coefficient for associations among the parameters was also determined.

Table 2: Stressful Conditions

Parameter	Case Study 1	Case Study 2	Control
	Mean (SD)	Mean (SD)	Mean (SD)
Psychosocial characteristics	0.38 (0.19)	0.32 (0.13)	0.31 (0.19)
Physical environment	0.26 (0.09)	0.21 (0.09)	0.19 (0.11)
Non-work activities	0.50 (0.16)	0.38 (0.14)	0.49 (0.22)
Psychological health (feelings about self)	0.14 (0.02)	0.13 (0.01)	0.12 (0.03)
Psychological health (recent experiences)	0.10 (0.05)	0.14 (0.02)	0.11 (0.05)

Psychosocial characteristics

The mean value of psychosocial characteristics of respondents' jobs was highest for Case Study 1 and least for the Control Group (**Figure 2**). For all 3 groups, the values of psychosocial characteristics showed positive correlations with each of psychological health (feelings about self), psychological health (recent experiences), medical health, and health conditions.

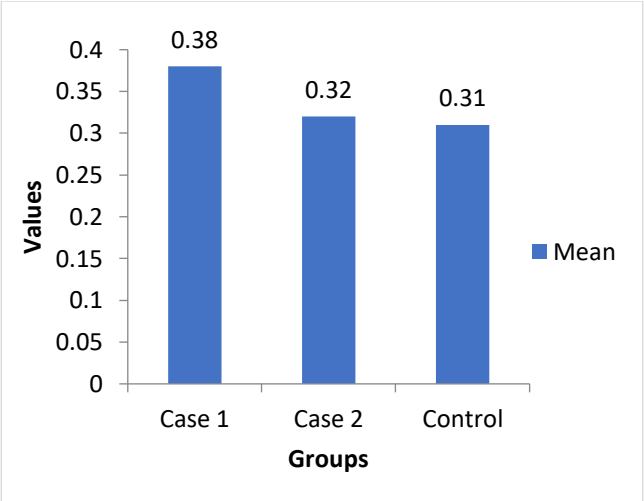

Figure 2: Mean Values of Psychosocial Characteristics

Physical environment

The mean value for physical environmental conditions at the respondents' workplace was highest for Case Study 1, and least for the Control Group (**Figure 3**). For all 3 groups, the values of physical environmental conditions showed positive correlations with non-work activities.

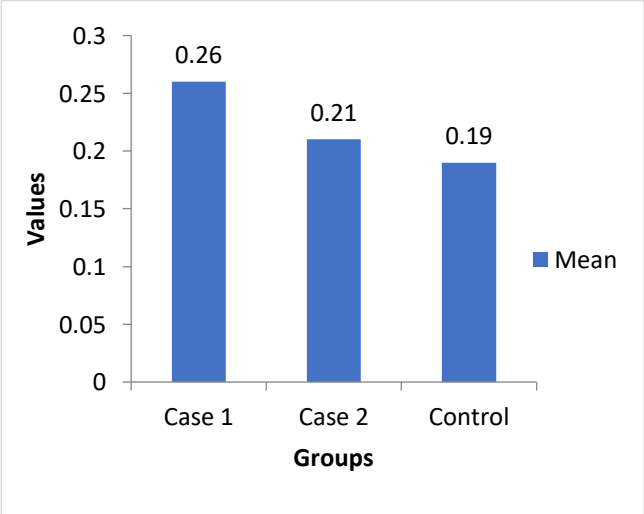

Figure 3: Mean Values of Physical Environmental Conditions

Non-work activities

The mean value for non-work activities that respondents engaged in, was highest for Case Study 1, and least for Case Study 2 (**Figure 4**).

For all 3 groups, the values of non-work activities showed positive correlations with physical environmental conditions.

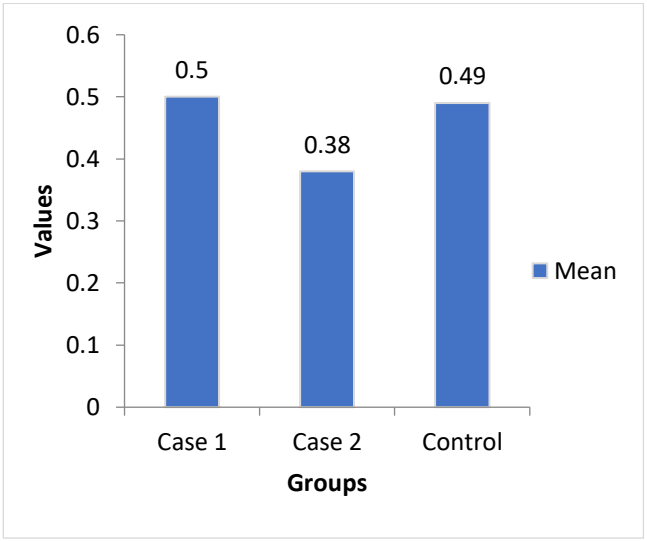

Figure 4: Mean Values of Non-work Activities

Psychological health (feelings about self)

The mean value of psychological health (feelings about self) was highest for Case Study 1, and least for the Control Group (**Figure 5**). For all 3 groups, the values of psychological health (feelings about self) showed positive correlations with those of psychosocial characteristics.

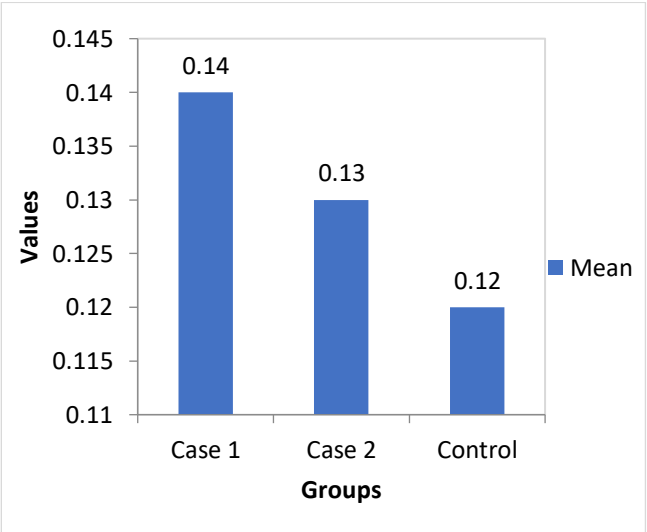

Figure 5: Mean Values of Psychological Health (Feelings about Self)

Psychological health (recent experiences)

The mean value for psychological health (recent experiences) was highest for Case Study 2, and least for Case Study 1 (**Figure 6**). For all 3 groups, the values of psychological health (recent experiences) showed positive correlations with those of psychosocial characteristics.

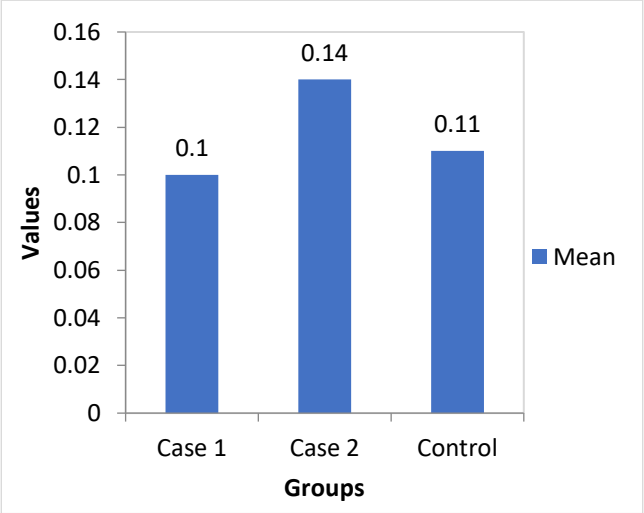

Figure 6: Mean Values of Psychological Health (Recent Experiences)

Discussion

According to the study's findings, workers in the oil and gas industry the case study firms were more stressed than public servants, who made up the control group. Cookey-Gam *et al.*, [3] and Finian [11] stressed that workers in the oil and gas sector have been found to have high levels of occupational stress; offshore workers are particularly affected. There have also been reports of high-stress levels among civil service workers. According to Ebiama [12], the prevalence of stress among employees was high and the major sources were environmental and work-related factors. It is understandable why low productivity in Nigeria might be directly attributed to the high rate of stress among civil personnel.

Psychosocial characteristics

According to the respondent's answers to the research questionnaire, the physical and psychosocial aspects of the employees' workspace and work environment are probably factors in the occupational stress they endured. Additional factors that are likely to contribute to occupational stress include the employee's length of service, contract type (full-time, part-time, or variations), prior job history (which may be used to identify inexperienced workers), and level of employment. Due to the small amount of information respondents provided regarding their work shifts and job rotation patterns, their contributions to occupational stress were not further investigated. Though Cookey-Gam *et al.*, [3], suggested to identify health problems associated with the oil and gas business early on, a yearly health surveillance program should be set up. These symptoms, as well as the more general ones associated with work stress, should be properly monitored by health surveillance. The other issues that the research questionnaire explored were either mostly after-effects of stressful conditions or demographic information (that was considered) unrelated to stress factors.

The findings of the study indicate that the psychosocial characteristics of employees' jobs (whether in the Oil and Gas industry or civil service) contribute to the experience of occupational stress. This implies that the impact of psychological traits was the same in the civil service and the oil and gas sector; none seemed to provide better working circumstances in this area. Murugan [13] reported similar findings for the contribution of psychosocial characteristics of work to affect stress; the primary cause of poor performance at work is psychological disorders. The productivity of the business and the employer's performance vary according to the severity of the disease. Mental stress, loneliness, sadness, anxiety, marital issues, the death of a loved one, negative thoughts, grief, fear, addiction, self-harm, attention-deficit hyperactivity disorder (ADHD), learning difficulties, and other mental illnesses are the main causes of psychological diseases.

Physical environment

The study's conclusions show that workers' experiences of occupational stress were not exacerbated by the physical surroundings of their work environments in the oil and gas sector. This was not the case for the control group organization, where physical environmental circumstances had a positive correlation with occupational stress as assessed by overall medical health. The findings imply that workers in the oil and gas sector had better working circumstances than those in the civil service, which may account for the relationships seen.

Non-work activities

The mean value for non-work activities that respondents engaged in was higher in one of the case studies firms of the Oil & Gas industry. The values of non-work activities differed significantly among employees of the Oil & Gas firms and the Civil Service. The values showed positive correlations with physical environmental conditions.

Effects of Occupational Stress on Employees' Performance

In an effort to evaluate the impact of occupational stress on employees' performance, the psychosocial aspects of their workplace were contrasted with their recent experiences of psychological stress. Whether the respondents' jobs primarily involved providing direct service to particular groups of people or client populations, whether they were subject to verbal abuse and threats of physical harm from clients, whether they were physically assaulted at work, and whether they were exposed to legal liability from their jobs were among the questions on psychosocial characteristics. It was decided to compare recent experiences of psychological stress and psychosocial traits because it was thought that the experiences including how frequently they occurred would have an impact on how well individuals performed at their occupations at the time.

Generally, as the psychosocial characteristics of employees' work environment deteriorated, they indicated experiencing psychological stress; and this likely could have reduced the quality of performance at their jobs. Thus, the effect of psychosocial characteristics on employee performance was the same in the Oil & Gas industry and civil service. Adagbabiri and Okolie [14], reported human resource management strategies have a favourable and statistically significant impact on organizational performance, as the study found.

Psychological health (feelings about self)

The mean value of psychological health (feelings about self) was higher among employees of the Oil & Gas firms. The values of psychological health (feelings about self) differed significantly among employees of the Oil & Gas firms and the Civil Service. The values showed positive correlations with values of psychosocial characteristics.

Psychological health (recent experiences)

The mean value for psychological health (recent experiences) was higher in one of the case studies firms of the Oil & Gas industry. The values of psychological health (recent experiences) differed significantly among employees of the Oil & Gas firms and the Civil Service. The values showed positive correlations with those of psychosocial characteristics.

Conclusion and Recommendation

The effect of psychological traits was the same in the civil service and the oil and gas sectors; neither seemed to provide better working circumstances in this area. Employees reported feeling psychologically stressed as the psychosocial aspects of their workplace declined, which probably could have affected the calibre of their work output. Employees' experiences of occupational stress were not exacerbated by the physical surroundings of their work environments in the oil and gas sector. For Civil Service personnel, however, this was not the case. There is a need to improve the psychosocial environment at work. At least once a year, an evaluation should be conducted to determine whether components of the job such as the possibility of verbal and physical abuse, as well as the legal ramifications of the position can cause psychological and emotional stress in employees.

List of abbreviations

PTSD: Post-Traumatic stress disorder; ADHD: Attention - deficit hyperactivity disorder; IRB: Institution Review Board

Declarations

Ethics approval and consent to participate

The Centre for Occupational Health Safety and Environment (COHSE) Institute of Petroleum Studies at the University of Port Harcourt ensures ethical integrity in this study by obtaining informed consent, maintaining participant confidentiality, and adhering to guidelines approved by the Institution Review Board (IRB). Participants' rights and welfare are prioritized throughout the research process.

Data Availability

Data was collected and analysed based on the stated methods and materials and the findings were generated accordingly. The manuscript incorporated all the data and there are no additional files left out.

Conflicts of Interest

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

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