Psychosocial Risk Factors and Stress in an Oil Company in the Republic of the Congo: A Cross-Sectional Study

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Abstract

Introduction: Occupational stress is a significant health concern in the workplace, constituting a prevalent psychosocial risk. Due to its specific nature, the oil industry is perceived as a high psychosocial risk zone. This study aimed to correlate the perceived stress level with the identified psychosocial risk factors (PSRFs) among employees of an oil company in Congo-Brazzaville. **Materials and Methods:** This was an analytical cross-sectional study conducted between July and September 2021 among employees of an oil company. They were recruited during their routine medical check-ups. Data were collected using the Perceived Stress Scale (PSS10) and the Copenhagen Psychosocial Questionnaire (COPSOQ), respectively to assess stress and identify PSRFs. **Results:** Out of the sample, 203 workers were included. The majorities were males (81.3%), and the average age of participants was 39.5 ± 9.62 years. The frequency of perceived stress was 39.4%, and 40% of the workers were exposed to at least 3 PSRFs. A positive correlation was observed between perceived stress and workload ($r = 0.37$, $p < 0.001$), emotional demands ($r = 0.36$, $p < 0.001$), and conflicts between work and family life ($r = 0.42$, $p < 0.001$). Conversely, good equity ($r = -0.41$, $p < 0.001$), trust in management ($r = -0.25$, $p < 0.001$), positive self-assessment of health ($r = -0.33$, $p < 0.001$), and strong organizational commitment ($r = -0.50$, $p < 0.001$) were identified as protective factors. The identified PSRFs explained 44% of the total variance. **Conclusion:** The study revealed that employees of this company exhibited a high level of stress. The detrimental impact of certain PSRFs was highlighted. A

multidisciplinary intervention appears imperative to address these inherent risks in their professional environment.

1. Introduction

The industrial world, with its operational demands and often hostile environments, exposes its workers to a multitude of risks, ranging from direct physical dangers to more insidious hazards related to psychological harm. The oil industry, with its offshore platforms, pipelines, and refineries, is at the forefront of this issue. Not only do employees face inherent physical risks associated with hydrocarbon handling, but they must also cope with work situations that can induce intense and prolonged stress [1].

The concept of "psychosocial risks" encompasses a variety of hazards related to work design, organization, and management, as well as the broader economic and social contexts of work [2]. Psychosocial risk factors (PSRFs) may include, for example, excessive workloads, conflicting demands, or a lack of clarity in job roles. In the case of the oil industry, workers may feel isolated when offshore for extended periods or under pressure due to the enormous financial and safety stakes associated with their work [3]. These risks, if not managed or mitigated, can lead to physical and psychological symptoms of stress. Work-related stress, according to the World Health Organization, occurs when there is an imbalance between the perceived demands of the task and the individual's perceived resources to cope with it [4]. The consequences can range from psychological disorders, such as depression or anxiety, to physical illnesses like hypertension or heart disease [5].

In Africa, where economic dynamics are rapidly changing, sectors like the oil industry play a pivotal role in the development of many nations. Congo-Brazzaville, rich in oil resources, is no exception to this reality. Oil production is a cornerstone of the Congolese economy, accounting for a significant portion of its national revenue [6]. However, the rapid expansion of this industry raises concerns about the well-being and health of employees, which are of paramount importance, not just for productivity, but also for socio-economic stability. All of this can influence the perception and experience of work-related stress in this specific context.

However, despite the significance of the subject, there are very few studies on the relationship between psychosocial risks and perceived stress in Congo-Brazzaville, and particularly within the oil industry. Thus, this article aims to provide more data by correlating the level of perceived stress with specifically identified psychosocial risk factors among workers at an oil company in Congo-Brazzaville.

2. Materials and Methods

2.1. Study Framework, Type, and Population

The study was conducted within an oil company in Congo-Brazzaville. This was a cross-sectional analytical study with data collection carried out prospectively from July to September 2021, spanning a total duration of 3 months. The study population, selected through comprehensive sampling, included all workers, whether on fixed-term or open-ended contracts, who had completed their annual medical check-up during the study period. The recruitment process for the workers was carried out following the model of the Medical Observatory for Stress, Anxiety, and Depression (MOSAD) [7]. We included all workers who were seen for the annual periodic examination and who consented to participate in the survey by completing various mental health evaluation questionnaires, specifically those pertaining to stress, anxiety, depression, and psychosocial risk factors. The sample size, determined by convenience, comprised all the workers who met the defined selection criteria.

2.2. Study Methods

2.2.1. Data Collection and Outcome Measure

Data collection was carried out using the Perceived Stress Scale (PSS10) [8] and the Copenhagen Psychosocial Questionnaire (COPSOQ) [9].

The PSS10 assesses the perception of stress over the preceding month using a five-point Likert scale [8]. This scale consists of 10 items, of which five are positively phrased and five are negatively phrased. Responses are scored from 0 to 4, where 0 indicates "never", 1 signifies "almost never", 2 "sometimes", 3 "fairly often", and 4 "very often". Thus, individual scores obtained on the PSS10 can range from 0 to 40. A PSS10 score of 13 or lower is interpreted as an absence of stress, whereas a score of 14 or higher indicates the presence of stress.

The COPSOQ identifies psychosocial risk factors (PSRFs) in the workplace [9]. It also utilizes a five-point Likert scale and consists of 30 items. These items cover five main domains: quantitative demands, organizational and interpersonal relationships, autonomy, health and well-being, and professional experience. Exposure to 3 or more PSRFs is considered high. The presence of a PSRF was noted as "positive" and its absence as "negative".

2.2.2. Study variables

The study data, collected from the questionnaire, primarily included the dependent variable, namely perceived stress, both as a quantitative variable (PSS10 score) and as a dichotomized qualitative variable (absence and presence of perceived stress), and secondarily, the independent variables, notably the various psychosocial risk factors (PRFs).

2.3. Statistical Analysis

Data analysis was conducted using R Studio, version 4.1.0. Qualitative variables were presented as frequencies. For continuous quantitative variables, they were

described using the mean, standard deviation, as well as maximum and minimum values. The linear correlation test (r) utilizing the Student's t-test was employed to compare two quantitative variables. To compare two qualitative variables, the chi-square test was utilized. A test was considered significant when the p-value was less than 0.05.

The multiple linear regression model was used to explore the relationship between the dependent variable (quantitative) and other independent variables (quantitative and qualitative). The β constant indicated the weight and direction of the relationship in the case of a regression. The model was deemed significant if the overall Fisher's test displayed a p-value less than 0.05. In the presence of a relationship between two variables, a logistic regression was applied, with the calculation of the odds ratio to determine the measure of the association.

2.4. Ethical Consideration

The authorization to conduct this research was granted by the ethical committee of the Faculty of Health Sciences at Marien Ngouabi University, as part of a Master's thesis in Public Health, in March 2021. The confidentiality of the information was ensured through the anonymity of the survey sheets. Informed consent was obtained from the participants in advance.

3. Results

3.1. General and Socio-Professional Characteristics of the Population

During the study period, 203 workers from the oil company were included, representing 28.9% of all employees (n = 703). The observed ages ranged from 25 to 61 years, with a mean age of 39.5 ± 9.6 years. The sex ratio (F/M) was 0.23. Most workers were married (66.5%), managerial staff (56.2%), and local workers (90.6%). They were 37.9% working in the oil fields (on/offshore).

Table 1 summarizes all the epidemiological parameters of the studied population.

3.2. Frequency of Perceived Stress

Out of the entire studied population, 80 workers (or 39.4%) had a PSS10 score equal to or greater than 14, thus indicating a state of stress, with an average score of 18.59. On the other hand, for the 123 workers (or 60.59%) whose PSS10 score was equal to or less than 13, the average score was 8.98.

3.3. Psychosocial Risk Factors

Le The COPSOQ identified, in the studied sample, psychosocial risk factors (PSRF) related to work pace (63.5%), decision latitude (60.1%), emotional demands (67.5%), and conflict between work and family life (50.2%). The details are presented in Table 2.

High exposure to PSRF (presence of at least 3 factors) was observed in 82 workers, representing 40% of the sample.

Table 1. Distribution of workers by socioprofessional characteristics.

Variables	Frequencies (N = 203)	Percentage (%)
Age (years)		
<30	7	3.4
[30; 40[	108	53.2
[40; 50[	69	34.0
[50; 60[	18	8.9
≥60	1	0.5
Gender		
Male	165	81.3
Female	38	18.7
Marital status		
Single	63	31.0
Married	135	66.5
Divorced	5	2.5
Professional role		
Managerial	114	56.2
Non-managerial	89	43.8
Status		
Expatriate	19	9.4
Local workers	184	90.6
Work location		
Administrative Offices	126	62.1
Site (on/offshore)	77	37.9

Table 2. Distribution of workers according to the frequency of psychosocial risk factors (PSRFs).

Domains	PSRFs	
	Negative n (%)	Positive n (%)
Quantitative constraints		
Workload	127 (62.6)	76 (37.4)
Work pace	74 (36.5)	**129 (63.5)**
Organization and interpersonal relations		
Predictability	135 (66.5)	68 (33.5)
Recognition	129 (63.5)	74 (36.5)
Equity	120 (59.1)	83 (40.9)
Role clarity	160 (78.8)	43 (21.2)
Supervisor leadership quality	146 (71.9)	57 (28.1)

Continued

Supervisor social support	139 (68.5)	64 (31.5)
Employee-Management trust	163 (80.3)	40 (19.7)
Colleague social support	126 (62.1)	77 (37.9)
Trust among colleagues	184 (90.6)	19 (9.4)
Autonomy		
Decision latitude	81 (39.9)	**122 (60.1)**
Opportunities for advancement	136 (67)	67 (33)
Health and well-being		
Self rated health	202 (99.5)	1 (0.5)
Emotional demands	66 (32.5)	**137 (67.5)**
Work-family conflict	101 (49.8)	**102 (50.2)**
Job insecurity	128 (63.1)	75 (36.9)
Work experience		
Meaning of work	184 (90.6)	19 (9.4)
Organizational commitment	144 (70.9)	59 (29.1)
Job satisfaction	162 (79.8)	41 (20.2)

3.4. Bivariate Analysis

3.4.1. Psychosocial Risk Factors and Perceived Stress

The findings from the correlation coefficient analysis revealed a slight yet statistically significant positive correlation between the mean scores of perceived stress and the COPSOQ psychosocial risk factors (PSRFs) pertaining to workload, emotional demands, and Work-family conflict. This correlation was negligibly positive between the mean score of the PSRF "work pace" and the average score of the PSS10.

A slight statistically significant negative correlation was observed between the mean scores of PSRFs and those of the PSS10 for the following PSRFs: predictability, recognition, equity, Employee-Management trust, self-rated health, and organizational commitment. This correlation was negligibly negative in terms of role clarity, supervisor leadership quality, social support from the supervisor and colleagues, trust among colleagues, meaning of work, and job satisfaction.

No statistically significant correlation was identified between, on the one hand, the mean score of the PSS10, and on the other hand, the mean scores of the following psychosocial risk factors: decision latitude l, opportunities for advancement, and job insecurity.

The mean scores of perceived stress were found to exceed 14 in instances where PSRFs were present, barring the instance of the "opportunities for advancement" risk factor. Details are delineated in Table 3 and Table 4.

3.4.2. Perceived Stress and Presence of at Least 3 PSRFs

Among workers who displayed at least three work-related PSRFs, 52 of them, or

Table 3. Correlation between the average perceived stress scores and the average scores of psychosocial risk factors (quantitative constraints, organization, and interpersonal relations).

PSRFs		Perceived stress	r (p)
		Average PSS10 Score (SD*)	
Quantitative constraints			
Workload	Positive	14.8 (6.7)	0.37 (<0.001)
	Negative	11.6 (5.3)	
Work pace	Positive	14.0 (5.8)	0.22 (<0.001)
	Negative	11.3 (6.3)	
Organization and interpersonal relations			
Predictability	Positive	15.3 (6.5)	−0.35 (<0.001)
	Negative	11.4 (5.3)	
Recognition	Positive	14.5 (6.3)	−0.31 (<0.001)
	Négatif	11.8 (5.7)	
Equity	Positive	14.9 (6.9)	−0.41 (<0.001)
	Negative	11.3 (4.9)	
Role clarity	Positive	15.4 (6.6)	−0.28 (<0.001)
	Negative	12.1 (5.7)	
Supervisor leadership quality	Positive	15.0 (5.8)	−0.26 (<0.001)
	Negative	11.9 (6.0)	
Supervisor social support	Positive	14.2 (6.0)	−0.19 (0.007)
	Negative	12.1 (6.0)	
Employee-Management trust	Positive	16.2 (7.3)	−0.41 (<0.001)
	Negative	11.9 (5.4)	
Colleague social support	Positive	14.7 (5.8)	−0.16 (0.020)
	Negative	12.2 (6.1)	
Trust among colleagues	Positive	17.0 (7.1)	−0.25 (<0.001)
	Negative	12.3 (5.8)	

*SD: Standard deviation.

Table 4. Correlation between the average perceived stress scores and the average scores of psychosocial risk factors (autonomy. professional experience. and health and well-being).

PSRFs		Perceived stress	r (p)
		Average PSS10 score (SD*)	
Autonomy			
Decision latitude	Positive	14.3 (6.0)	−0.22 (0.198)
	Negative	12.0 (6.1)	

Continued

Opportunities for advancement	Positive	13.6 (6.8)	−0.35 (0.118)
	Negative	12.3 (5.6)	
Health and well-being			
Self-rated health	Positive	27.0 (0.0)	−0.33 (<0.001)
	Negative	12.7 (6.0)	
Emotional demands	Positive	14.0 (5.9)	0.36 (<0.001)
	Negative	10.6 (6.0)	
Work-Family conflict	Positive	14.9 (6.5)	0.42 (<0.001)
	Negative	10.6 (4.6)	
Job insecurity	Positive	14.0 (6.0))	−0.09 (0.195)
	Negative	12.3 (5.9)	
Work Experience			
Meaning of work	Positive	16.8 (7.3)	−0.29 (<0.001)
	Negative	12.4 (5.8)	
Organizational commitment	Positive	15.6 (6.4)	−0.50 (<0.001)
	Negative	11.6 (5.5)	
Job satisfaction	Positive	16.0 (7.0)	−0.29 (<0.001)
	Negative	12.0 (5.5)	

*SD: Standard deviation.

65%, showed signs of stress. This association was statistically highly significant ($p < 0.001$). The presence of more than three PSRFs increased the risk of perceived stress among workers by a factor of six (Table 5).

3.5. Multivariate Analysis Using Multiple Linear Regression

Multiple linear regression analysis identified seven PSRFs statistically correlated with perceived stress ($p < 0.001$; F-test). On one hand, there were those that increased (positive β sign) the perception of stress, namely workload, emotional demands, and conflict between work and family life. On the other hand, there were those that decreased (negative β sign) the perception of stress, such as equity, trust between the employee and management, positive self-assessment of health, and organizational commitment. Overall, 44% (R^2) of the PSRFs explained the level of perceived stress among the workers in this company (Table 6).

4. Discussion

The present study, conducted in line with the model proposed by the Medical Observatory of Stress, Anxiety, and Depression (MOSAD) [7], offers substantial insights into occupational stress in the oil sector.

The rate of perceived stress in our sample was 39.4%, which is notably higher than the 17.1% rate observed among workers in a Malaysian oil company during

Table 5. Bivariate analysis of the relationship between the presence of at least three psychosocial risk factors and perceived stress.

Variables		Stress perçu			
		Present	Absent	OR [IC95%]	pvalue
PSRFs	Present	52 (63.3%)	30 (36.6%)	5.75 [3.11 - 10.67]	<0.001
	Absent	28 (23.1%)	93 (76.9%)		

Table 6. Multiple linear regression between psychosocial risk factors and perceived stress.

PSRFs	Perceived stress			
	t(p)	β	R^2	F-Test
Workload	**3.06** (0.002)	**0.77**		
Equity	−2.52 (0.012)	−0.76		
Employee-Management trust	−2.18 (0.030)	−0.64		
Self-rated health	−2.70 (0.007)	−1.48	**44%**	<0.001
Emotional demands	**2.19** (0.029)	**0.79**		
Work-Family conflict	**3.04** (0.003)	**1.08**		
Organizational commitment	−2.82 (0.005)	−1.16		

the COVID-19 pandemic [10], a period that coincided with our study. This rate, however, remains significantly lower than the figures reported in several African studies, specifically those by Manga *et al.* [11] [12] in Cameroon, which noted frequencies of 51.7% and 71.8%, and a study in Benin where a frequency of 81.8% was reported [13]. This vast range of frequencies suggests a disparity potentially linked to methodological differences, including the measurement tools employed. The sensitivity of the PSS10, which we opted for, might differ from that of the Karasek questionnaire used in other research, hence accounting for the variation in frequencies. Cultural distinctions, social norms, and organizational policies concerning mental health might also influence these rates. For instance, in certain cultures, occupational stress may be underreported due to the societal stigma surrounding mental health issues. Additionally, the specific sector of employment can be a determining factor. Our research primarily involved individuals working in the oil sector, a field known for its high demands and often challenging work environments, which might foster elevated stress levels.

Psychosocial factors, delineated by the National Institute of Health Research (INRS) as being associated with job demands, social support, perceptions of injustice or mistreatment, and role clarity within an organization [14], demonstrate a significant correlation with perceived stress. As indicated by a systematic review published in BMJ Global Health in 2021, elevated job demands are linked with mental distress and burnout [15], affirming our results. Živković *et al.* [16] accentuated the significance of psychosocial factors, such as inadequate support from supervisors and peers, as primary sources of stress.

Within the oil and gas industry, Benson *et al.* [17] pinpointed psychosocial risks in about 18% of employees, underscoring the sector's relevance in studies focusing on stress factors. This data aligns with our analysis, wherein 63.3% of the individuals experiencing stress were exposed to at least three psychosocial risk factors. Research conducted by Korneeva *et al.* [18] and D'Antoine *et al.* [19] emphasized the influence of organizational culture factors, harassment, intimidation, and deficient social support on the stress endured by workers, particularly in sectors like logging and oil. The specific demands of this industry, including isolated settings and non-standard schedules, necessitate customized preventive strategies [20] [21].

Cultural variances, societal norms, and corporate policies represent variables potentially affecting the prevalence of stress [18] [22]. In certain cultures, stress incidents might be underreported due to the stigma attached to mental health issues.

Regarding the repercussions of stress factors on holistic health, our findings concur with those of Chen *et al.* [23] [24], illustrating that deteriorated mental health is significantly related to various occupational stress sources, including conflicts between work and personal life and adverse work surroundings.

Moreover, the COVID-19 pandemic, not considered in our study, could serve as a psychosocial risk factor, given that the participants in our study were subject to pandemic-induced restrictions. Kulip *et al.* [10] remarked that the pandemic has heightened professional stress levels, particularly within the oil sector.

Concerning the practical implications of our study, initiating targeted preventative actions appears imperative. These measures might encompass managerial training on identifying stress symptoms, enhancing team dialogue, and promoting a balance between work and personal life.

Our conclusions underline the necessity for continuous evaluation of psychosocial factors in professional environments, particularly in high-risk sectors such as the oil industry. This approach would facilitate more efficient preventive interventions, spanning from stress management training programs to broader adjustments in working conditions.

Finally, although the non-probabilistic convenience sampling facilitated acquiring a sizable sample for trustworthy analyses, it's worth mentioning that the study's three-month timeframe might influence the generalizability of the results.

5. Conclusion

The current study unveils a pronounced level of occupational stress within the organization, intensified by psychosocial risk factors such as heightened workload, escalating emotional demands, and conflicts arising between professional duties and family responsibilities. These results highlight the pressing need to prioritize well-being in the workplace, especially in sectors with high demands such as the oil industry.

Our investigation accentuates the imperative necessity to roll out cohesive and multidisciplinary approaches to alleviate these stress factors. The objective of such interventions should be to preserve the mental health of the workforce while upholding organizational productivity and efficiency. Neglecting to address these critical issues risks depleting the company's valuable human capital and undermining its performance, potentially having grave repercussions on its profitability and standing in the industry.

Acknowledgments

Authors' Contributions

EAE contributed to the study's concept and design, manuscript writing and revision, and supervised the study. MNN was involved in the concept, design, data acquisition, and analysis. AY, PAG, and JGK contributed to manuscript editing and review. All authors have read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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