Assessment of Work-Related Stress among Algerian Oil and Gas Industry Workers: Insights and Preventive Strategies

Samia Chettouh [1], Khemissi Benaroua [2], Hassen Mamache [3]
[1]Laboratory of Research in Industrial Prevention (LRPI), Institute of Health and Industrial Safety, University of Batna 2 (Algeria)
[2,3] PT Pertamina International EP
The Author's E-mail: samia.chettouh@yahoo.com[1], khemissi.benaroua@yahoo.co.uk[2], hassmamache@gmail.com[3]

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Abstract
This research aims first to assess work-related stress and examines the relationships between work-related stress responses in Algerian oil and gas company employees according to age, labor contract, marital status, and having children. Second, the research provides a preventive action plan to promote employees' quality of life.
Cross-sectional data from an oil and gas company relating to 146 employees was used. Work-related stress was measured by the Siegrist questionnaire. The descriptive statistics mean, standard deviation (SD), T-test, F-test, and P-value were used.
The results revealed that employees with fixed-term contracts were the most stressed, with a mean effort-reward imbalance ratio of 1.523. Work-related stress was also significantly related to marital status ($F = 7.208$, $p < 0.0001$), and this was more apparent for employees with children. In contrast, a weak significant relationship between work-related stress and age ranges was demonstrated in our study ($F = 2.668$, $p = 0.049$).
Algeria's oil and gas employees experienced moderate stress; the results highlight that the type of labor contract and marital status were identified as sources of inequality in the exposure of oil and gas sector employees to work-related stress. This first study conducted in Algeria proposes an intervention plan to prevent long-term work-related stress among these employees.

Keywords: Work-related stress, ERI questionnaire, prevention action plan.

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1. Introduction

Work-related stress has become an increasingly prevalent issue in modern workplaces, significantly affecting employees' well-being and organizational performance [1]. In the oil and

gas industry, work-related stress is a multifaceted challenge that arises from the unique and demanding nature of the sector [2]. The oil and gas industry is known for its complex operational environments, often involving hazardous tasks, long working hours, and stringent safety regulations [3]. These conditions can lead to high levels of stress among employees. Moreover, the sector is susceptible to external factors such as fluctuating oil prices and global market dynamics, which can result in job insecurity and added pressure. In this context, the physical and mental well-being of workers can be compromised, impacting their overall job satisfaction, performance, and safety [4]. Therefore, understanding and addressing work-related stress within oil and gas companies is not only crucial for the health and well-being of employees but also essential for maintaining operational efficiency, safety, and long-term sustainability in this vital industry [5, 6]. Work-related stress is a pervasive concern that has garnered attention from researchers, organizations, and policymakers worldwide [5].

The Algerian oil and gas industry stands as a vital pillar of the nation's economy [7], providing employment to a substantial workforce. The exploration of work-related stress within the context of Algerian occupational settings has gained prominence in recent years. The primary focus has been on the healthcare and teaching sectors, such as the most recent studies conducted by Scherer et al., 2018, Chaib & Yahia, 2020, Larib & Boucheriba, 2021, Mohammed et al., 2022, Mordi et al., 2023, Bennouna et al., 2023, Houmri et al., 2023 [8-14] these studies offer valuable insights that extend to the oil and gas industry. Despite the significance of the Algerian oil and gas industry and its substantial workforce, it is noteworthy that there is a notable absence of prior research or empirical studies addressing the issue of occupational stress within this specific sector. To date, limited scholarly attention has been directed toward understanding work-related stress, its determinants, and its potential consequences among employees in the Algerian oil and gas field.

To bridge this gap, this research delves into the assessment of work-related stress among employees in Algerian oil and gas companies and proposes a comprehensive action plan aimed at improving their quality of life. The primary objective of this study is twofold. Firstly, it seeks to assess the levels of work-related stress experienced by employees in Algerian oil and gas companies. Secondly, it aims to investigate the relationships between work-related stress responses and various demographic factors, including age, labor contract type, marital status, and whether employees have children. Understanding these relationships is crucial for tailoring effective interventions to reduce work-related stress and enhance employees' overall quality of life.

To achieve these objectives, we conducted a cross-sectional study involving 146 employees from an oil and gas company in Algeria. Work-related stress was evaluated using the Siegrist questionnaire, a well-established tool for assessing stress in the workplace. Data analysis included descriptive statistics such as mean and standard deviation, as well as statistical tests like the T-test, F-test, and P-value, to uncover significant patterns and associations within the dataset.

Our research findings unveiled valuable insights into the work-related stress experienced by Algerian oil and gas employees. Notably, employees with fixed-term contracts exhibited the highest levels of stress, as indicated by a mean effort-reward imbalance ratio of 1.523. Furthermore, marital status emerged as a significant factor influencing work-related stress, with substantial differences observed, particularly among employees with children. In contrast, the study revealed a weaker, yet still significant, relationship between work-related stress and age ranges.

The findings of this study shed light on the moderate levels of stress experienced by Algeria's oil and gas employees. Moreover, it underscores the importance of labor contract type and marital status as key sources of inequality in the exposure of employees in the sector to work-related stress. As the first study of its kind conducted in Algeria, this research sets the stage for the development of an intervention plan aimed at mitigating long-term work-related stress among employees in the oil and gas industry.

In subsequent sections of this paper, we will delve into a detailed analysis of the data, discuss the implications of our findings, and present a comprehensive prevention action plan tailored to the specific needs of Algerian oil and gas companies. This action plan aims to enhance employees' well-being, reduce stress-related challenges, and ultimately contribute to a healthier and more productive workforce.

2. Materials and methods

Work-related stress can harm all aspects of a person's life [15]. It is the result of disturbances to the equilibrium between the demands that employees are exposed to and the resources they have access to [16, 17]. According to recent studies conducted from 2020 to 2022, such as [18, 19], work-related stress may have become chronic; this fact can damage people's emotional, mental, and physical well-being, making it almost impossible to maintain a good work-life balance and hampering a company's ability to grow and succeed. The most common effects of work-related stress are as follows [18, 20, 21]:

- Physical symptoms: such as fatigue, muscular tension, headaches, heart palpitations, sleeping difficulties, gastrointestinal upsets, dermatological disorders, etc.
- Psychological symptoms: such as depression, anxiety, encouragement, irritability, pessimism, etc.
- Intellectual effects: such as loss of concentration, lack of motivation, difficulty with the thought process, loss of memory, poor decision-making, etc.
- Behavioral effects such as substance misuse, decreased libido, inappropriate display of behavior, isolation, unpunctuality, etc.
- Effects on the organization: such as high absenteeism, high labor turnover, poor timekeeping, poor performance and productivity, low morale, poor motivation, increased employee complaints, increased ill-health, accidents, and incidents reports.

Work-related stress can be caused by various factors, such as long hours, heavy workload, job insecurity, conflicts with co-workers or bosses, constant change, and threats to job security [22].

It is essential for employers to recognize work-related stress and take steps to ensure that employees are not subjected to unnecessary stressors. Some techniques to help manage work-related stress include identifying stressors, developing coping strategies, and seeking support from colleagues or managers. In such situations, there are several possible attitudes: assessing, managing, and reducing work-related stress, which not only offers immediate benefits but can have very real effects on employees' lives. To assess work-related stress, we have mainly based our study on one of the major ergonomic models of work stress, the Siegrist model.

2.1. The Effort–Reward Imbalance Questionnaire

Siegrist's model focuses on the recognition of work and considers work as an opportunity to provide for the emotional and motivational needs of the worker within a social framework [23]. This model is based on the hypothesis that a work situation characterized by a combination of high effort and low reward can lead to pathological emotional or physiological reactions [24]. The ERI questionnaire is a model that has received special attention in recent occupational stress research [25-30]. In this study, we used the long version of the questionnaire, which contains six items measuring effort, eleven items measuring reward, and six items measuring over-commitment [24, 31].

To identify ERI, the effort-reward ratio is calculated as follows [24, 32, 33]:

$$ER = k\frac{E}{66 - R} \qquad (1)$$

Where: *E* and *R* are the effort and reward scores, respectively;

k is a correction factor for different numbers of items in the nominator (11 items of the extrinsic rewards) and denominator (six items of the extrinsic efforts). In our case, $k = \frac{11}{6}$ [32].

ERI is present when $ER \neq 1$, with $ER < 1$ indicating an imbalance in favor of rewards and $ER > 1$ indicating an imbalance in favor of effort [24, 32, 33].

2.2. Work-related stress prevention approach

Given the magnitude of psychosocial risks and work-related stress, which constitutes a major public health challenge, employers are required to assess and prevent occupational psychosocial risks [34]. In Algeria, the implementation of measures aimed at improving the health and safety of employees is formalized in the Occupational Risk Assessment Process (Decree 02-427, dated 7 December 2002) [35]. Based on the ERI model results, a prevention process must be established to control the problem of work-related stress, which affects a large number of employees [36-39]. This preventive approach consists of reducing stress sources in the workplace by intervening specifically in work organization, social relationships, working conditions, etc.

3. Results

3.1. Company background

This study was conducted in PERTAMINA, an Indonesian oil and natural gas company associated with Sonatrach (Algerian oil and gas Company). This association is named Menzel

Lejdmat North (MLN). The MLN field is located south of the city of Ouargla, about 100 km from the Hassi Berkine field [40].

3.2. Quantitative analysis

We use the Siegrist questionnaire to investigate the existence of a statistically significant relationship between work-related stress in the oil and gas company and the age ranges, labor contracts, and marital statuses of the employees.

To achieve this objective, the study addresses the following hypotheses:

- H_0 1: There is no significant difference in work-stress levels due to the age range of the employees.
- H_0 2: There is no significant difference in work-stress levels due to the marital status of the employees.
- H_0 3: There is no significant difference in work-stress levels due to the employees' types of labor contracts.

The survey included 250 employees of the PERTAMINA-MLN company. The questionnaires were distributed in the different units over about two months to cover as many employees as possible in a uniform way. From 250 questionnaires distributed, 160 were collected, 13 of which could not be used because they were insufficiently or incorrectly answered. 147 employees participated in the questionnaire, representing a response rate of 58.8%; 99.3% of these respondents were men and 0.3% were women. Due to their small number (One woman), women were excluded from the present analysis to control some confounders. The individual characteristics of the survey sample are presented in Table 1.

Table 1. Individual characteristics of the survey sample

Characteristics		n	%	Mean	SD
Sex	Men	146	100	-	-
Age	20 to 29 years	7	4.80	27.429	1.917
	30 to 39 years	60	41.10	34.917	2.979
	40 to 49 years	59	40.41	43.356	2.857
	50 years and over	20	13.69	53.600	3.292
Marital status	Married	118	82.82	-	-
	Single	28	19.18	-	-
Labor contract	Fixed-Term Contract	96	65.75	-	-
	Open-Ended Contract	50	34.25	-	-
Children	Yes	106	89.83	-	-
	No	12	10.17	-	-

When investigating stress and other measures of coping and mental health, it is common for researchers to compare results by gender, especially since most studies indicate that women's

stress is much higher than men's [41, 42]. This gender difference is explained by women's predisposition to anxiety and stress, women's intolerance and poor compatibility, and women's willingness to acknowledge stress. In our case, the study sample is composed of men only, so gender analysis is excluded from our study. This is shown in Table 1. The employees range in age from 23 to 60 years in four categories, with an average age of 40.527 years (Standard Deviation (SD) = 7.51); 10% are between 30 and 39 years old, 40.41% are between 40 and 49 years old, while older employees (50 and older) represent 13.69%. Concerning the category of the type of labor contract, the sample included both fixed-term contracts (FTC), with a greater percentage of 65.75%, and Open-Ended Contracts (OEC), with 34.25%. The sample also included the category of marital status. The sample included 82.82% of married employees, of which 89.83% had children and 19.18% single employees.

Work-related stress was assessed with the ERI model. Employees were asked to express their level of agreement with four or five negative emotions for the 23 items. The ERI used in this study contains 23 items that are grouped into two main sections:

- First section: 17 items measuring the situation-specific model component, as measured by the scales' Extrinsic effort' (six items, 1-6) and 'Extrinsic rewards' (11 items, 7-17). Extrinsic rewards were composed of three subscales: 'Esteem' (five items, 710 and 15), 'Job instability' (two items, 11 and 13), and 'Job promotion and salary' (four items, 12, 14, 16 and17) [33, 43];
- Second section: Six items, measuring the person-specific model component 'Over-commitment' (18, 19, 20 reversed, 21, 22 and 23) [33].

The ERI has a very good level of pertinence and reliability [32, 43, 44]. To ensure this, the psychometric properties of the ERI were calculated for the current study using the same study sample for easier access. The following elements were assessed:

The discriminatory validity of the scale was calculated after arranging the sample scores in descending order, taking 27% values from the lower and upper groups, and applying the T-test [44, 45] (see Table 2).

Table 2. Discriminative validity of the Effort Reward Imbalance model.

Parameters	n	Mean	Standard Deviation	T-test	Degrees of Freedom (DF)	Level of Significance
Lower class	39	29.487	10.261	8.830	76	0.05
Upper class	39	57.282	27.135			

Table 2 shows that the lower-class mean was 29.487 with an SD of 10.261; the upper-class mean was 57.282 with an SD of 27.135. The DF was estimated at 76, and the T-test was equal to 8.830, which is a statistically significant value at a 0.05 Level of Significance. These results show that the questionnaire can discriminate; thus, it is valid [44].

Cronbach's alpha, a statistic calculated from pairwise correlations between items and ranging between negative infinity and one, is widely used to determine internal consistency reliability, which is an indicator of the adhesion of the questions to the same construct. [46-49]. In this study, all Cronbach's-α values are satisfactory, with α=0.907 (very good) on the effort scale, 0.911 (very good) on the reward scale, and α=0,742 (good) on the overcommitment scale [31, 47, 48, 50].

3.2.1. Extrinsic effort

Figure 5 shows that 52% of employees had an effort scale score higher than the average of 17.178. The results show that the highest score on the effort scale (29) is for two married employees with FTCs. It can be observed that the responses to Item 1, Item 3, Item 4, and Item 6, which represent 'workload', 'responsibility', 'overtime', and 'work demands, have high ratings. 72% of employees confirmed that they had an increased workload, 55% of employees had increased responsibility, 78% of employees felt that they had to work overtime, and 75% of employees admitted that their work had become more demanding.

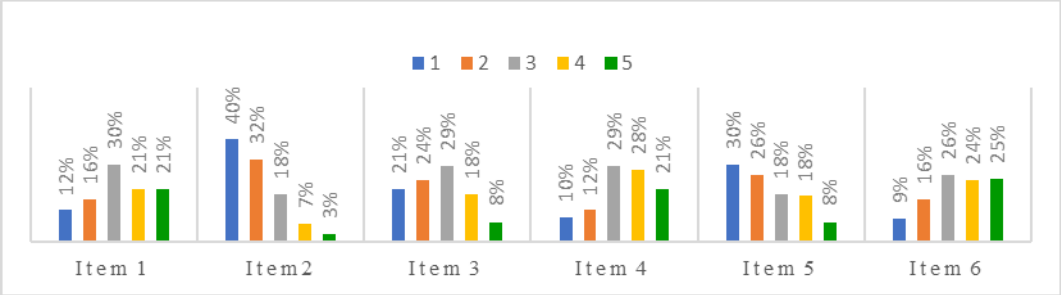

Figure 5. Percentage of responses to the extrinsic effort scale items

3.2.2. Extrinsic rewards

In our study, the reward scale has a mean of 24.315 and a standard deviation of 9.380. On the reward scale, 44.52% of the scores exceed the scale mean, including two employees with a score of 55, which is the highest score on the reward scale. It is clear from Fig. 6 that the estimation problems presented by items Item 7, Item 10, and Item 15 are well managed and do not influence the employees' stress levels. On the 'promotion' sub-scale, 64% of the employees are satisfied with their promotion, and 55.8% are satisfied with their salary. Meanwhile, for the 'job instability' sub-scale, represented by Item 11 and Item 13, Figure 8 shows that 66% of employee responses indicate the presence of work-related stress.

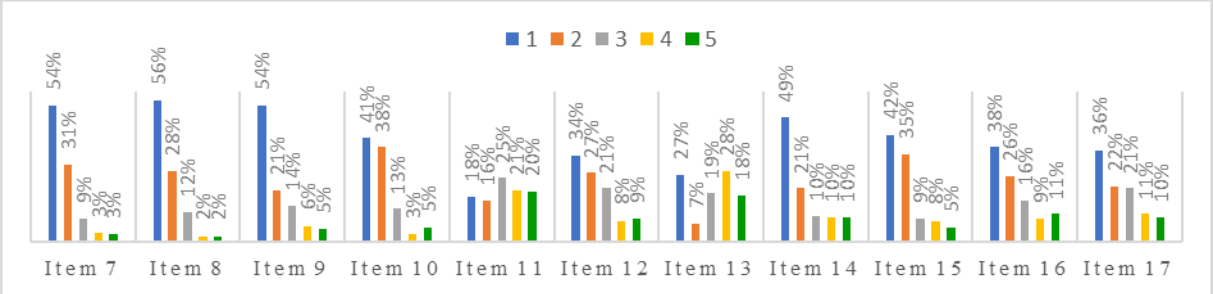

Figure 6. Percentage of responses to the extrinsic reward scale items

The 'over-commitment' scale mean is 14.808, and the standard deviation is 2.973. The results indicate that 56.849% of employees have an above-average over-commitment score (see Figure 7). The highest percentages are associated with item 20, with 68%, and item 21, with 77%.

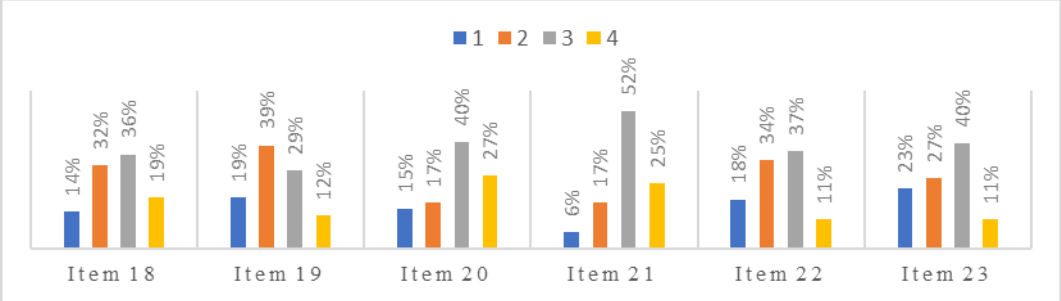

Figure 7. Percentage of responses to the overcommitment scale items

Siegrist's Effort–Reward scale was used to calculate the effort-reward ratio, R. R was computed for every respondent according to Formula (1) [32, 51]. In this study, the R mean was 0.756, and the SD was 0.175. The distribution of R is shown in Figure 8. A value above 1 indicates a large amount of unrewarded effort. In our sample, 35.61% of participants have an R greater than 1 (see Figure 8).

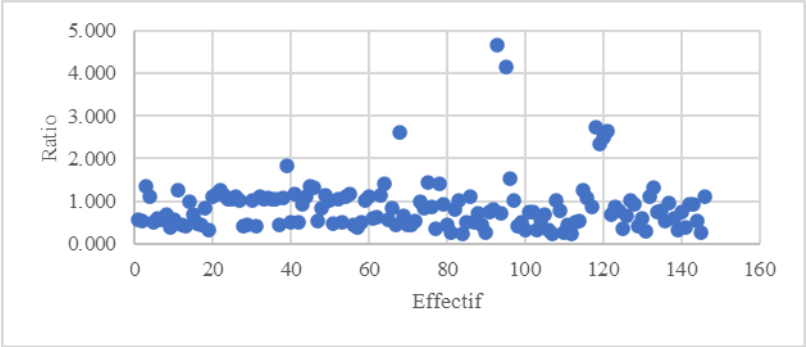

Figure 8. Results distribution of the ratio Effort-Reward Imbalance

Descriptive and inferential statistical analyses were conducted to test the hypotheses' validity. The mean and SD of the R scores for each category were calculated using the SPSS package (see Table 3).

Table 3. Comparison of different socio-demographic characteristics Effort-Reward Imbalance scores.

Characteristics		Extrinsic effort	Esteem	Promotion and salary	Job instability	Extrinsic rewards	Over-commitment	Ratio
Age	20 to 29 years	17.317 ±5.483	5.428 ±0.786	7.857 ±3.804	4.857 ±1.676	18.142 ±3.804	17.517 ±2.636	0.609 ±0.176
	30 to 39 years	18.200 ±5.287	9.35 ±4.620	9.183 ±4.155	6.166 ±2.756	24.666 ±9.719	14.816 ±3.148	1.113 ±0.768

	40 to 49 years	18.440 ±5.685	10.220 ±4.054	9.898 ±4.024	6.389 ±2.491	26.581 ±9.449	14.932 ±2.696	1.273 ±0.555
	50 years and over	13.9 ±4.018	6.9 ±3.596	6.500 ±2.724	5.551 ±2.605	18.950 ±6.778	14.500 ±3.546	0.567 ±0.239
Marital status	Married	17.932 ±5.423	9.915 ±4.380	9.584 ±3.923	6.211 ±2.627	27.694 ±9.629	14.686 ±3.137	1.415 ±0.572
	Single	14.000 ±4.118	6.071 ±2.355	6.75 ±3.787	5.678 ±2.450	18.500 ±5.827	17.321 ±2.195	0.611 ±0.612
Labor contract	OEC	18.7 ±4.790	7.776 ±4.078	7.380 ±3.504	3.461 ±2.012	13.600 ±8.295	13.920 ±3.269	0.556 ±0.111
	FTC	15.089 ±4.817	9.916 ±4.305	9.906 ±4.049	9.489 ±1.602	29.291 ±8.577	15.277 ±2.727	1.523 ±0.228
Children	Yes	17.934 ±5.484	10.971 ±4.528	9.616 ±3.977	6.233 ±2.676	25.803 ±9.880	13.663 ±3.182	1.065 ±0.694
	No	17.909 ±5.029	7.393 ±2.693	9.272 ±3.495	6.000 ±2.190	24.636 ±6.975	14.909 ±2.773	0.685 ±0.277

Analysis of variance was used, as presented in Table 4, to test for significant differences in means between categories of baseline characteristics.

Table 4. Significant relationship study between the variables and the level of work-related stress.

Variable		n %	Mean ± SD	T-test	Critical T	F	Level of Significance
Age	20 to 29	7	0.609±0.176			2.668	**0.049***
	30 to 39	60	1.113±0.768				
	40 to 49	59	1.273±0.555				
	50 years and over	20	0.567±0.239				
Labor contract	FTC	50	1.415±0.572	3.954	1.982	1.054	**0.000***
	OEC	96	0.611±0.612				
Marital	Married	118	1.353±0.211	5.305	1.979	7.208	**0.000***

status	Single	28	0.556±0.228				
Has children	Yes	107	1.065±0.694	2.682	2.042	0.524	**0.002***
	No	12	0.685±0.277				

* Statistically significant values

Table 4 presents significant differences in the mean level of work-related stress between different age ranges, labor contracts, marital status, and having children. By referring to Table 4, we can deduce that the level of work-related stress was weakly statistically significant with age ranges ($p = 0.049$). In addition, the work-related stress levels of the age range 30 to 39 years and 40 to 49 years was statistically significantly higher than the age ranges of 20 to 29 years and 50 years and over. In contrast, the work-related stress level of employees who have FTCs was statistically significantly higher than the employees who had OECs ($p = 0.000$). Similarly, the work-related stress level of married employees was statistically significantly higher than that of single employees ($p = 0.000$). Furthermore, we find a statistically significant relationship between having children and the level of work-related stress (R) ($p = 0.002$).

4. Discussion

This study examined relationships between work-related stress and age ranges, labor contracts, marital status, and having children for PERTAMINA employees. The survey was conducted on 146 employees aged between 23 and 60 years. All the participating employees were men; 34.25% of them had OECs, and 65.75% had FTCs. In the sample, 19.18% of employees are single, the rest are married, and 89.83% of them have between one and seven children (see Table 1).

We evaluated the discriminative validity of the ERI model in Table 2; the result shows that the ERI is valid. The Cronbach's α values of the three ERI scales were considered appropriate [52] and very satisfactory, which indicates the reliability of the study tool. Thus, the results showed that ERI meets the main psychometric requirements and confirmed previous results, such as those [51].

Figure 5 shows that efforts due to 'workload', 'responsibility', 'overtime', and 'work demands' are high. These outcomes can be attributed to an upsurge in daily operational requirements stemming from workforce shortages. A considerable number of employees were unable to report to their workplaces due to various reasons, such as remote work arrangements and transportation issues, leading to these challenges in the work environment.

Figure 6 presents a reward scale, including the three subscales. The 'Recognition' subscale effectively showcases the implementation of good practices. A policy emphasizing the recognition of employee efforts has been instrumental in fostering mutual assistance among supervisors, managers, and employees in the execution of various tasks. This approach underscores the significance of acknowledging employees' efforts and recognizing leadership qualities among supervisors.

Employees are also encouraged to perceive their work as being recognized and valued. In contrast, the 'job instability' sub-scale (Figure 6) reveals the presence of work-related stress,

primarily stemming from employees with fixed-term contracts (FTCs) feeling uncertain about their job security. They observe colleagues in various companies facing job losses due to reduced business activities and lockdown measures.

The 'over-commitment' scale is depicted in Figure 7. The results reveal that 56.849% of employees have an over-commitment score above the average threshold. Several contributing factors account for this observation, including the reduction in leave periods and the extension of on-site work durations.

Table 3 also presents an unexpectedly high level of overcommitment observed for employees aged between 20 to 29 years (17.517 ± 2.636) and single employees (17.321 ± 2.195; generally, these represent the same category). Over-commitment can reflect the expectations of a highly competitive work environment or a personal style of coping with demands established during an individual's primary socialization [50].

Formula (1) was used to calculate the ERI ratio, the results of which are shown in Figure 8. Descriptive information on efforts, rewards, over-commitment, and ERI ratios are shown in Table 3. The mean score of the ERI ratio of PERTAMINA employees was 0.756, which means that, in general, employees do not have an imbalance between their efforts and perceived rewards. However, in our study, 35.61% of the employees had an ERI ratio exceeding 1. This means that they have an imbalance between their efforts and perceived rewards (see Figure 8). The survey showed that 92.30% of the imbalanced employees are married and have an FTC, of whom two employees had an R greater than 4. R is a relationship between efforts and rewards, so the imbalance may be due to high efforts or a deficit of rewards. In our case, the highest ratios are found among employees with FTCs, aged between 30 and 49 years old, married with children (see Table 3). This is also supported by the results in Table 4.

To clarify the stress level, we need to determine whether the characteristics of age, type of labor contract, and marital status have an influence. We examined this question under the hypothesis that there were no significant differences in work-related stress levels due to age, type of labor contract, marital status, or having children.

As shown in Table 4, our study demonstrated a weakly significant difference between the work-related stress levels of the employees in different age ranges in favor of employees aged 30–49 years. This is the age range facing the greatest future challenges, and most of these employees have high work and family responsibilities (over 70% are married and have children). In contrast, employees aged 50 years and over had almost the lowest R (0.567). This indicates that the stress level of the employees in this company decreased with age. This can be explained by the emotional control and experience that are acquired over time. For employees under 29, the average R does not exceed 0.609 ± 0.176. This could be explained by a reduced duration of exposure to stress compared to older colleagues and the fact that this category generally has fewer family and professional responsibilities. Alternatively, it may be attributable to the low severity of effort-reward imbalance among the studied subjects.

There was a highly significant difference between the work-related stress levels of the employees with FTCs and those with OECs in favor of employees with FTCs. This category has a relatively high reward score due to its high' job insecurity' score of 9.489. This is explained by the repeated thoughts of employees in this category that they are at risk of losing their jobs each time the expiration date of their contracts approaches. This is especially the case in the face of procedures to reduce staff since the outbreak of the pandemic and the fact that they are seeing their peers in other companies losing their jobs.

The current study revealed a highly significant influence of marital status on the ERI in favor of married employees with children; this is due to the high 'promotion' and 'salary' scores. This could be explained by the greater responsibilities of married employees compared to single employees. They have the responsibility of supporting their families. In addition, they face the stress resulting from the possibility that their families might become infected while they are apart, given the great difficulty of leaving work assignments early to visit family.

5. Establishment of a Prevention Action Plan

Creating an effective action plan to prevent work-related stress among employees in the oil and gas industry requires a comprehensive approach that addresses the unique stressors and challenges within this sector. Here is a structured action plan to help mitigate and prevent occupational stress:

5.1. Organizational measures

Work-related stress situations must be identified when proposing preventive measures to support employees experiencing difficulties. In our case, there are six stress factors:

- Workload;
- Social relationships and support in difficult times;
- Working relationships;
- Working time;
- Job insecurity;
- Conflicts of values.

5.1.1. Workload

- Integrating the implementation of the organization of work and defining the possibilities of rotating teams on site;
- Being vigilant to recognize a sudden work overload linked to the resumption of activity;
- Adapting the arrival and departure times of employees who use public transport;
- Recognizing the additional workload in daily activities linked to the implementation of health measures;
- Helping managers to coordinate their teams at a distance or in a hybrid format and defining connections; times and methods for monitoring remote activity;
- Reconciling professional and personal life.

5.1.2. Social relationships and support in difficult times

- Recognizing the special efforts and adaptability of each employee in this new and unexpected situation;
- Maintaining connections if employees continue to work at a distance or are absent;
- Restoring the role and place of each employee in the workgroup;
- Accompanying supervisors in their support and coordination functions;
- Paying particular attention to employees with specific family constraints, such as support and childcare activities, taking care of parents, and supporting vulnerable people.

5.1.3. Working relationships

- Equipping management with primary mediation tools to defuse potential tensions related to working in a deteriorating situation;
- Establishing regular debriefing sessions to adjust processes;
- Ensuring that there is a link between on-site employees, teleworkers, and employees with other arrangements;
- Informing employees about continued and suspended activities;
- Regulating possible tensions between employees.

5.1.4. Working time

- In case of a reduction in working time, implementing sufficient breaks and special surveillance to identify potentially burnt-out employees;
- Communicating and increasing sensitivity to the need to be more flexible in the management of working time to be able to cope with inevitable adjustments in schedules, absences, postponements of tasks, and so on;
- Communicating about new decision-making processes by reassuring the employees concerned to prevent them from feeling they have been side-lined from their usual tasks;
- Establishing short training sessions to help employees to complete non-routine tasks;
- Regularly updating teams to avoid organizational dysfunction, such as task duplication or misunderstandings regarding the validation of decisions.

5.1.5. Job insecurity

- Transparently informing employees about the economic statement of the company;
- Regularly communicating with employees with FTCs to reassure them about the renewal of their contracts;
- Avoiding isolation, loss of meaning, demotivation, and even a feeling of abandonment for those who remain at a distance from work, the site, and their workgroup;
- Involving employees in organizing the recovery and its follow-up.

5.1.6. Conflicts of values

- Evaluating the difficulties encountered on-site and in remote working;
- Redefining quality criteria when in degraded mode with employees;
- Encouraging everyone to be useful at their level;

- Evaluating lessons learned to give meaning to what has been experienced (and to recreate a sense of camaraderie);
- Establishing consultation forums on subjects and decisions related to ethics, the adaptation of work-quality criteria, and health and safety in the context of a degraded mode.

6. Conclusion

The purpose of this paper is to highlight the categories of employees most exposed to work-related stress in oil and gas companies. These are, in particular, employees with FTCs and married employees with children. The relationship to age was less consistent and restricted to employees aged 30 to 49 years old. This study also shows that workload, lack of rewards, lack of support in difficult situations, and job insecurity are common problems shared by most employees that contribute to increased work-related stress.

An action plan composed of health and organizational preventive measures is proposed, serving as a tool to improve the quality of life at work of employees in the oil sector. The findings of this study can inform managers of new interventions to decrease work-related stress at the PERTAMINA company. These results can also serve as a reference for other companies in the oil and gas sector.

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Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Chen M, Ran B, Gao X, Yu G, Wang J, Jagannathan J. Evaluation of occupational stress management for improving performance and productivity at workplaces by monitoring the health, well-being of workers. Aggression and Violent Behavior, 2021: p. 101713.

[2] Walinga J,Rowe W. Transforming stress in complex work environments: Exploring the capabilities of middle managers in the public sector. International Journal of Workplace Health Management, 2013. 6(1): p. 66-88.

[3] Lu H, Guo L, Azimi M, Huang K. Oil and Gas 4.0 era: A systematic review and outlook. Comput. Ind., 2019. 111: p. 68-90.

[4] Lu H, Huang K, Azimi M, Guo L. Blockchain technology in the oil and gas industry: A review of applications, opportunities, challenges, and risks. Ieee Access, 2019. 7: p. 41426-41444.

[5] Gbemre T, Organizational Strategies to Reduce Workplace Stress in Oil and Gas Companies in Nigeria. 2022, Walden University.
[6] Ladipo D,Wilkinson F, More pressure, less protection. in Job insecurity and work intensification. 2001, Routledge. p. 20-50.
[7] Nakhle C. Towards good governance of the oil and gas sector in the MENA. United Nations Economic and Social Commission for Western Asia, 2017.
[8] Chaib A,Yahia B. The Proactive Coping Inventory for Professional Stress In light of some variables, a field study on a sample of high school teachers in the state of Tlemcen/Algeria. Journal of Educational & Psychological Sciences, 2020. 21(03).
[9] Larib S,Boucheriba M. Quality of Work Life among Medical Staff in Algeria's Healthcare Sector. Milev Journal of Research and Studies, 2021. 7(1): p. 369-386.
[10] Scherer MDdA, Conill EM, Jean R, Taleb A, Gelbcke FL, Pires DEPd, Joazeiro EMG. Challenges for work in healthcare: comparative study on University Hospitals in Algeria, Brazil and France. Ciencia & saude coletiva, 2018. 23: p. 2265-2276.
[11] Bennouna A, Boughaba A, Mouda M, Djabou S. Examining the mediating effect of job satisfaction on the relationship between leader-member exchange and safety behavior among Algerian healthcare workers. Leadership in Health Services, 2023.
[12] Houmri N, Adamou A, Bairi A, Khezzani B, Gharghout A, Hamad B, Hadef L. Hormonal and lipid disruption because of stress among teachers of the university of el-Oued, Algeria. Archives of the Balkan Medical Union, 2023. 58(4): p. 319-325.
[13] Mohammed L, Mohamed G, Djame M. A comparative study of psychological burnout levels among teachers of physical education and sports in middle and secondary stages (Algeria-El Bayadh). Fizičko vaspitanje i sport kroz vekove, 2022. 9(2): p. 44-57.
[14] Mordi C, Ghoul M, Adekoya OD, Ajonbadi HA, Work-Life Balance Among Medical Doctors in Public Hospitals in Algeria. in Managing Human Resources in Africa: A Critical Approach. 2023, Springer. p. 105-132.
[15] Bailey TS, Dollard MF, Richards PA. A national standard for psychosocial safety climate (PSC): PSC 41 as the benchmark for low risk of job strain and depressive symptoms. J. Occup. Health Psychol., 2015. 20(1): p. 15.
[16] Bakker AB,Demerouti E. The job demands-resources model: State of the art. J. Manag. Psychol., 2007. 22(3): p. 309-328.
[17] Huang GD, Feuerstein M, Sauter SL. Occupational stress and work-related upper extremity disorders: Concepts and models. Am. J. Ind. Med., 2002. 41(5): p. 298-314.
[18] Hassard J, Teoh KR, Visockaite G, Dewe P, Cox T. The cost of work-related stress to society: A systematic review. J. Occup. Health Psychol., 2018. 23(1): p. 1.
[19] Restrepo J,Lemos M. Addressing psychosocial work-related stress interventions: A systematic review. Work, 2021. 70(1): p. 53-62.
[20] Harshana P. Work related stress: A literature review. Annals of Social Sciences Management studies, 2018. 2(3): p. 1-7.

[21] Shirom A. The effects of work stress on health. The handbook of work and health psychology, 2003. 2: p. 63-82.
[22] Bartram D,Turley G. Managing the causes of work-related stress. In Practice, 2009. 31(8): p. 400-405.
[23] Siegrist J, Effort-reward imbalance model. in Stress: Concepts, cognition, emotion, and behavior. 2016, Elsevier. p. 81-86.
[24] Stanhope J. Effort–reward imbalance questionnaire. Occup Med, 2017. 67(4): p. 314-315.
[25] Weyers S, Peter R, Boggild H, Jeppesen HJ, Siegrist J. Psychosocial work stress is associated with poor self-rated health in Danish nurses: a test of the effort–reward imbalance model. Scand. J. Caring Sci., 2006. 20(1): p. 26-34.
[26] Wege N, Li J, Siegrist J. Are there gender differences in associations of effort–reward imbalance at work with self-reported doctor-diagnosed depression? Prospective evidence from the German Socio-Economic Panel. Int. Arch. Occup. Environ., 2018. 91(4): p. 435-443.
[27] Sipos S,Kittel F. Quantification du stress d'une population de sapeurs-pompiers. Arch. Mal. Prof. Envr., 2008. 69(1): p. 31-38.
[28] Siegrist J, Shackelton R, Link C, Marceau L, von dem Knesebeck O, McKinlay J. Work stress of primary care physicians in the US, UK and German health care systems. Soc. Sci. Med., 2010. 71(2): p. 298-304.
[29] Eller NH, Nielsen SF, Blønd M, Nielsen ML, Hansen ÅM, Netterstrøm B. Effort reward imbalance, and salivary cortisol in the morning. Biol. Psychol., 2012. 89(2): p. 342-348.
[30] Dragano N, Siegrist J, Nyberg ST, Lunau T, Fransson EI, Alfredsson L, Bjorner JB, Borritz M, Burr H, Erbel R. Effort–reward imbalance at work and incident coronary heart disease: a multicohort study of 90,164 individuals. Epidemiology (Cambridge, Mass.), 2017. 28(4): p. 619.
[31] Siegrist J, Li J, Montano D. Psychometric properties of the effort-reward imbalance questionnaire. Department of Medical Sociology, Faculty of Medicine, Duesseldorf University, Germany, 2014: p. 1-14.
[32] Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, Peter R. The measurement of effort–reward imbalance at work: European comparisons. Soc. Sci. Med., 2004. 58(8): p. 1483-1499.
[33] Siegrist J. Adverse health effects of high-effort/low-reward conditions. J. Occup. Health Psychol., 1996. 1(1): p. 27.
[34] Bucelli M, Paltrinieri N, Landucci G. Integrated risk assessment for oil and gas installations in sensitive areas. Ocean Eng., 2018. 150: p. 377-390.
[35] Algérie JO, Décret exécutif no 02-427 du 7 décembre 2002 relatif aux conditions d'organisation de l'instruction, de l'information et de la formation des travailleurs dans le domaine de la prévention des risques professionnels. 2002.
[36] Ipsen C,Jensen PL. Organizational options for preventing work-related stress in knowledge work. Int. J. Ind. Ergon., 2012. 42(4): p. 325-334.

[37] Zoni S,Lucchini RG. European approaches to work-related stress: a critical review on risk evaluation. Saf. Health Work., 2012. 3(1): p. 43-49.
[38] Zwetsloot G, Leka S, Kines P. Vision zero: from accident prevention to the promotion of health, safety and well-being at work. Policy Pract. Health Saf., 2017. 15(2): p. 88-100.
[39] Elketroussi Henni H. Plan de mise en oeuvre de l'Evaluation des Risques Professionnels au niveau du groupe SONATRACH. Revue de l'Algerian Petroleum Institute, 2010. 4(1): p. 15-20.
[40] Benaroua K, Analysis of industrial risks and environmental impacts with the Bow-Tie method, in Institute of health and Industrial Safety. 2016, University of Batna 2: Algeria.
[41] Suzuki A,Akamatsu R. Sex differences in relationship between stress responses and lifestyle in Japanese workers. Saf. Health Work., 2014. 5(1): p. 32-38.
[42] Stroud LR, Salovey P, Epel ES. Sex differences in stress responses: social rejection versus achievement stress. Biol. Psychiatry, 2002. 52(4): p. 318-327.
[43] Tsutsumi A, Ishitake T, Peter R, Siegrist J, Matoba T. The Japanese version of the Effort-Reward Imbalance Questionnaire: a study in dental technicians. Work & stress, 2001. 15(1): p. 86-96.
[44] Niedhammer I, Siegrist J, Landre M, Goldberg M, Leclerc A. Psychometric properties of the French version of the Effort-Reward Imbalance model. Rev. épidémiol. santé publique, 2000. 48(5): p. 419-437.
[45] Korkmaz Ö. A validity and reliability study of the Online Cooperative Learning Attitude Scale (OCLAS). Comput Educ., 2012. 59(4): p. 1162-1169.
[46] Magnavita N, Tripepi G, Di Prinzio RR. Symptoms in health care workers during the COVID-19 epidemic. A cross-sectional survey. Int. J. Environ. Res. Public Health, 2020. 17(14): p. 5218.
[47] Green SB, Yang Y, Alt M, Brinkley S, Gray S, Hogan T, Cowan N. Use of internal consistency coefficients for estimating reliability of experimental task scores. Psychon Bull Rev, 2016. 23(3): p. 750-763.
[48] Heo M, Kim N, Faith MS. Statistical power as a function of Cronbach alpha of instrument questionnaire items. BMC Med. Res. Methodol., 2015. 15(1): p. 1-9.
[49] Magnavita N, Soave PM, Ricciardi W, Antonelli M. Occupational stress and mental health among anesthetists during the COVID-19 pandemic. Int. J. Environ. Res. Public Health, 2020. 17(21): p. 8245.
[50] Babamiri M, Siegrist J, Zemestani M. The factorial structure and psychometric properties of the Persian Effort-Reward Imbalance questionnaire. Saf. Health Work., 2018. 9(3): p. 334-338.
[51] Niedhammer I, Siegrist J, Landre M-F, Goldberg M, Leclerc A. Étude des qualités psychométriques de la version française du modèle du déséquilibre efforts/récompenses. Rev. épidémiol. santé publique, 2000. 48(5): p. 419-438.
[52] Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. Res. Sci. Technol., 2018. 48(6): p. 1273-1296.