



# Understanding job stress in The Iranian oil industry: A qualitative analysis based on the work systems model and macroergonomics approach

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## ARTICLE INFO

### Keywords:

Work-related stress  
Macroergonomics  
Sociotechnical system theory  
Organization ergonomics  
Work schedules

## 1. Introduction

Oil production in the Persian Gulf makes a significant contribution to the global energy supply. The Iranian economy has been heavily dependent upon its oil industry off its south coast for almost 100 years. It continues to provide a significant source of employment. The oil industry here, as elsewhere in the world, requires a skilled workforce that is committed to operating effectively in some of the most harsh and hazardous working conditions on earth (Burke and Richardsen, 2011). In the Persian Gulf the work is typically outdoors, in very hot and humid weather conditions. In addition, the use of high-risk equipment and exposure to harmful petroleum gases and vapors, means the use of personal protective equipment (PPE) is mandatory whilst working. Work schedules are seven consecutive day shifts of 12 h at work, then seven consecutive night shifts of 12 h at work. After 14 work shifts there is a return transfer for 14 days 'rest' at home. Generally, employees live hundreds of miles away and are transferred to work by shuttle aircraft. This requires several hours travelling on two 'rest' days. Accommodation whilst at work is confined in space and affords limited privacy. Typically, employees with permanent employment status have better pay and support conditions than those on fixed term contracts.

Human resources provide the means for an organization to achieve its goals. It follows that understanding work-related stressors, and any

## ABSTRACT

The aim of this study was to understand why and how working in the oil industry causes job stress. Using the work-systems model as a guiding framework, we conducted 15 in-depth interviews with employees of an oil company located on an island in the Persian Gulf to investigate work system-related stressors. The interviews were audio-taped, and qualitative content data analysis was carried out continuously and simultaneously with data collection over a 12-month period. 1118 meaning codes were extracted which could be understood through fourteen categories of stressor associated with the five themes of the work system. Employees reported the job was stressful primarily because of organizational structural problems and management attributes, although aspects of living and working on the small island were also difficult. These results provide direction for intervention that can dovetail with risk assessment of occupational health of workers.

associated reduction of employees' work ability and performance, could lead to interventions that improve efficiency, and ameliorate potentials for economic losses (Mokarami and Toderi, 2019). Skilled workers are a valuable resource and there is a strong business case for ensuring good working conditions for maximizing productivity (Al-Ali et al., 2019). Equally, it is good for business to support best health in an offshore workforce to minimize absenteeism and emergency evacuations (Gibson-Smith et al., 2015). Nevertheless, the stress literature suggests that there are aspects of working in the oil industry that could be inherently stressful (Azadeh et al., 2013; Berthelsen et al., 2015; Burke and Richardsen, 2011; Hoboubi et al., 2017; Parkes, 2012).

There is no consensus in quantitative studies regarding type and extent of job stress levels in the oil industry. For example, some authors have found higher stress levels in offshore workers compared to onshore workers, which has been attributed to the working conditions, and being apart from family support and social support for significant periods (Cooper and Sutherland, 1987; Parkes, 1998). There are challenges with contrasting these two types of population, as there are strict medical and fitness criteria associated with selection for working in the physically demanding oil industry. This points to a healthy worker effect, and probably a survivor sample in most study populations. Some support for this view is found in a prospective survey of 741 Norwegian offshore workers (Nielsen et al., 2013). Prevalence rates of psychologi-

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cal distress were low at both time points (9% and 8%) relative to other research which suggest that 20% of workers will report occupational stress (Smith, 2000).

There are relatively few qualitative studies examining the experience of working in the oil industry which may elucidate *how* this work may be stressful. Addressing this gap in the literature is important as stress-related psychosocial work factors play a role in development of serious health and occupational problems, including cardiovascular diseases, musculoskeletal disorders, gastrointestinal disorders, sleep disturbances, depression, physical-mental fatigue, and job burnout (Cooper and Quick, 2017), reduced work ability (Mokarami et al., 2017) reduced quality of life (Mokarami et al., 2016), and decreased performance and productivity, sickness absence, and job turnover (Imtiaz and Ahmad, 2009).

The work systems model, as a macroergonomics approach (Mokarami and Toderi, 2019; Steege and Dykstra, 2016), provides an appropriate conceptual framework to capture the complex experience of working in the Persian Gulf (Kalteh et al., 2020). Smith and Carayon-Sainfort (1989) described the work system as comprising five interdependent components: organizational factors, task, technology, environment, and the characteristics of the individual worker.

*Organization factors* is concerned with the structure and governance of the workplace, and associated rules, programs and projects to achieve its goals. The way in which an organization trains and supports its employees for the work they do is associated with stress and performance outcomes (Smith and Carayon, 1995). Organizational factors also include the climate and culture of a company, including aspects of teamworking and participation in organizational training and supportive practices (Carayon, 2009).

*Task* draws upon the demands of a job (physical workload, cognitive workload, time pressures), job content (skills required, repetitiveness), and control over the way one can work. All can be stressful if not appropriately managed.

*Technology* and tools, when well designed, available and applied appropriately can support skill utilization and increase motivation. However, poor design, and availability of tools, and insecurity when new technologies are introduced can increase stress.

*Environment* refers to the characteristics of the physical environment (temperature, noise level, light level, workplace layout, general air quality) that impact upon the ability to work effectively.

*Individual characteristics* concerns the health status, personality, anthropometrics, qualifications and experience, motives and goals, that influence work, and how one copes with pressures that arise from the other four components of the work system.

These five components each impose “loads” that cause physiological and psychological reactions. Where the load imposed on an individual by components of the work system exceeds that individual's capacity to cope – either physiologically or psychologically, then a stress response is triggered. Chronic triggering of the stress response leads to harm to health for the individual (Sapolsky, 2004), and in turn, through poor productivity, sickness absence, and turnover, harm to the organization (Mackay et al., 2004).

Accordingly, the purpose of this study was to gain a comprehensive understanding of job stress in the oil industry. This would be achieved through in-depth interviews with a judicious sample of employees working in the oil industry in the Persian Gulf, with targeted questions based on the work systems model (Carayon, 2009). The use of this model as a framework for the qualitative investigation allows a guided approach using directed content analysis to examine the data (Hsieh and Shannon, 2005). Key objectives were to provide an experiential description of the five components of the work systems model, and an interpretation of the impact of participants' experiences towards understanding job-stress in the oil industry. This study adds to the literature as, to our knowledge, there are no qualitative examinations of job-

stress based a macroergonomics approach in the oil industry in the Persian Gulf.

## 2. Methods

### 2.1. Ethics

The study was approved by the Ethics Committee of Shiraz University of Medical Sciences (IR.SUMS.REC.1397.301). This was not an insider research study. Potential participants were provided with information about the goals and procedure of the research, which included confidentiality and anonymity of their contribution. Written consent was obtained. No payment was made to participants.

### 2.2. Context and participants

The study was conducted in an oil company based on an island off the south coast of Iran in the Persian Gulf. At the time of the study, the company had 791 employees, 90% of whom were male. Most employees had skilled status and were required to complete training courses each year for continued professional development. The goal of recruitment was to maximize heterogeneity in terms of age, marital status, role, tenure, and education level.

Generally, the first sample in the interview process is considered as the rich information unit and the key informant (Spradley, 1979). In this study, the key informant was a Health & Safety supervisor with 10-years job tenure. This participant had front-line responsibility for risk assessment of potential harm, both physical and psychological of workers in this organization. This participant was a good key informant because they were required to have a wider knowledge of the work than any individual front-line worker would have. Fourteen further participants were interviewed. These were selected from those who responded to the study invitation to maximize heterogeneity in line with recruitment strategy. Aligned with the general demographic, of the fifteen participants in total, thirteen were male. Median age was 37 years (range 28–60 years). Eleven were married and four were single. All participants had higher qualifications: five to Diploma level, five had a Bachelors' degree, four had achieved a Masters' degree and one had a PhD. All participants were qualified for their job roles. There was a full range of years of experience: median job tenure was 10 years (range 2–37 years). Eleven participants had permanent employment status, and four had a temporary contract.

### 2.3. Procedure

A semi-structured interview guide (see Appendix 1) based on the work system model elements (Carayon, 2009; Smith and Sainfort, 1989) was developed to examine psychosocial stressors associated with the working in the Iranian oil industry. Interviews were conducted in a private and quiet room on site over 40–100 min, and audio recorded. Each participant was asked five questions to investigate their experience of the organization, the work environment, the job, tools and technology required, and personal circumstances. Probes were asked after each question was answered to encourage in-depth responses that included examples where possible (Olson, 2016). A summary of responses given by a participant was reported back to them after each question during their interview. Where there was ambiguity or lack of precision in an answer, for example, the use of “sometimes”, the interviewer sought more information or an example. The aim was to enrich the response, not to provide an interpretation for the interviewee to confirm or otherwise.

2.4. Data analysis

The data analysis process was carried out continuously and simultaneously with data collection over a 12-month period using the qualitative content analysis approach proposed by Graneheim and Lundman (2004). Recordings of the interviews were listened several times and each file transcribed verbatim (in Persian), with the caveat that any identifying information was removed from the numbered transcripts to ensure confidentiality. Transcripts were re-read several times to verify each transcription was the same as the corresponding audio file, then the voice recordings were deleted.

Directed content analysis is steered by a theoretical framework. In this investigation, the analysis focused on the five elements of work described by Smith and Sainfort (1989), and the goal was to identify and code instances of work that related to stress for participants. The written transcription of each interview was considered as a unit of analysis. The words, and sentences provided by the participants that contained significant and relevant points were selected as meaning units, and initial codes were extracted. A classification of codes into categories related to aspects of the work system was carried out from the first interview and each code was compared to the previous ones.

The categories were reviewed and compared by the research team several times and this continuous comparison during the analysis process led to further development of categories and codes. After twelve interviews, it was clear that no new codes were emerging, and we had data saturation. Nevertheless, three additional participants were interviewed for confirmation. 1118 initial codes were extracted from the 15 interviews. The continuous process of integrating similar codes with identical meaning loads produced 399 compacted codes which were put into 14 categories and 48 subcategories. Finally, the obtained codes and the corresponding categories were classified into five themes that corresponded with the five elements of the work system: person, organization, task, environment, and tools and technology (Carayon, 2009; Smith and Sainfort, 1989) (See Table 1).

2.4.1. Trustworthiness

One of the major issues of qualitative research is to determine the extent to which the reported results are a reflection of reality. As suggested by Graneheim and Lundman (2004), credibility, dependability, and transferability were taken into account to determine the reliability, trustworthiness and authenticity of our data. Credibility was achieved via long-term involvement in data collection (twelve months), and from seeking verification from participants that the interview texts and the extracted codes were accurate (and revising as necessary). The analysis process was then validated through a review of the code and category relevance to the work system model by sixteen appropriate experts (ergonomics, occupational health, organizational behavior, and organizational psychology). Their complementary and confirmatory opinions were utilized. Dependability was achieved by using a single semi-structured interview guide for all the interviews and robust coding and classification rules throughout the process of data analysis. We sought transferability through following the maximum heterogeneity and variation principle in sampling. Finally, data collection continued until the data saturation stage was achieved and confirmed by all research team members. Translation of the quotes used in this manuscript from Persian to English took place at the drafting stage, so whilst true to meaning, these are not verbatim quotes.

3. Results

What follows is a description of the five pre-determined themes and their categories and subcategories, including exemplar quotes to elucidate how working in the oil industry is stressful. Quotes are followed by information of participant to provide context (Gender: male (M) or female (F), age (years), and position).

**Table 1**  
Categories, subcategories, and sample codes from the qualitative content analysis.

Themes	Categories	Subcategories	Sample codes	
Organizational Factors	Work schedule	Work-life conflict due to the work schedule	Problems of meeting the family's emotional needs	
		Work problems due to the work schedule	Problem of working and living with colleagues	
		Inconsistency in work due to the work schedule	Problems of interruptions in work	
		Educational system	Inadequacy and inefficiency of training	Inadequate job training for new employees
	Team working	Problems of educational effectiveness	Problems of efficiency	Mismatches between training and job demands
			Organizational commitment	Being harmful
		Safety culture	Failure to perform tasks	
	Valuing employees	Interference and trouble	Organizational culture	Absence of a safety culture among co-workers
			Giving employees due worth	Being blamed for colleagues' faults
		Structural Problems	Acknowledging employees' efforts	Considering employees as temporary elements
			Attention to employees' experiences	Ignoring efforts and performances
	Task	Work programs and rules	Work programs and rules	Devaluating experience in delegating positions
			Organizational justice	Poorly organized programs
			Organizational positions	Inequality in job benefits
Employment system			Assigning non-specialists to high positions	
Socio-supportive climate		Job security	Inadequate pre-employment tests	
		Promotion in job and organization	Fear of job loss	
		Efficiency of activities	Not making progress in the organization	
Welfare and financial facilities		Social relationships among colleagues	Efficiency of activities	Lack of skilled workforce
			Understanding and supporting employees	An atmosphere of jealousy among colleagues
		Relations between the boss and subordinates	Lack of attention to employees' requests	
Management attributes	Services and welfare facilities	Services and welfare facilities	Lack of kindness between the boss and subordinates	
		Communiting problems	Impoverished living spaces	
	Income and job benefits	Isolation from family		
Job demands	Personality characteristics	Personality characteristics	Inadequate income	
		Ability and merit	Vengefulness	
		Interference and trouble	Lack of expertise	
Quantitative physical demands	Interference and trouble	Quantitative physical demands	Negative attitude towards educated subordinates	
		High physical workload	High physical workload	

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Table 1 (continued)

Themes	Categories	Subcategories	Sample codes
Person	Job characteristics	Cognitive demands	Job requirements beyond knowledge capacity
		Job control	Responsibility without authority
		Role ambiguity	Unclear job description
		Role conflict	Expecting employees to perform duties beyond their roles
		Task (skill) variety	Monotonous and repetitious tasks
	Personal characteristics	Ability to withstand problems	Flexibility in the face of problems
		Interest in the work	Unwillingness to upgrade skill and knowledge level
		Personality-behavioral	Irrational evaluation of rights
		Personality traits	Being neurotic
		Work knowledge level	Inability to act decisively in job decisions
Environment	Work and life problems on the island	Satisfaction with being useful	Feeling of wasting time and life
		Inappropriate weather conditions on the island	Hot and humid weather
		Psychological problems of life and work on the island	Negative impact of island's environment on morale
	Environment hazards	Work environment health risks	Tough and harmful work environment
		High-risk work environment	High risk of explosion at work
Tools and technologies	Tools and equipment	Inefficiency of tools and equipment	Low quality equipment and devices
		Availability of tools and equipment	Shortage of equipment
		Personal protective equipment (PPE)	PPE not commensurate with the dangers of tasks

### 3.1. Organization

One of the biggest stressors was the company's work schedule. Critically, the stress seemed to emerge not from the long, hard 12-h shifts, but from the system of 14 days working on the island, and 14 days home leave. Whilst typical of offshore working, coping with these schedules of work, and a partitioned lifestyle, and coping with hassles according to whether at work or whether at home, and inability to support and be supported by family when at work was the challenge:

*When at work employees must fulfil their job requirements, even when family problems arise. Here, employees can hardly access their families, and they are focused on issues in their work environment. There is nothing you can do if your family has a problem.* (M, 37, Health & Safety).

Commuting problems were two-fold. First, travelling back and forth to the island was arranged, but in their own time; and second, the volatile weather conditions on the island meant that flights could be cancelled or postponed causing stress due to not getting on the flight to get to work.

The organizational structure was a fundamental problem for most participants regardless of role. Stress was derived from a lack of conformity with rules, negligence of work procedures, failure to set objectives in job planning, and ineffectiveness of the performance appraisal system. For example:

*There is no unity of command here. In other words, we are not dealing with one particular individual. We have different opinions in the organization. I mean, it's not like five people reach a common opinion on a sub-*

*ject. Everyone has different ideas, and this is really confusing. There have been many times when we have got halfway through a project and then had to withdraw. We start doing it differently from scratch, get to 70% complete, and then we are stopped again. This takes a lot of energy and is really annoying.* (M, 41, Education).

*The performance appraisal system is inefficient. Only 15% in each department can be ranked as excellent, 20% as very good, 30% as good, and the rest should be ranked as weak. So, if there are ten great people in a department, you don't know what to do and how to evaluate them.* (F, 35, Technical Engineering).

Participants expressed challenges towards different characteristics of their managers:

*He says that he has nothing to do with the rules. This is the way he likes it. What he wants is right.* (M, 31, Systems Management and Productivity).

*He is appointed as the manager, but he doesn't understand this. I don't know why. He was not appointed based on his competency and has no experience in the requirements of the job. He doesn't have the expertise and because of that, most jobs have to be repeated several times. Many jobs that must not be carried out are performed, and sometimes a lot of money is wasted because of his lack of expertise.* (F, 35, Technical Engineering).

And evaluation of employee efforts and performance emerged as distinct stressor:

*When you retire after 30–40 years of work here, you are like a soldier who has done his two years military service and is now leaving. They say "go away! We don't know you anymore".* (M, 60, Water and Power).

*They don't appreciate the quality of the work we do here. There has never been a meeting to talk about work quality. No one has ever said "Well done!" Or that everybody is satisfied. I've never seen that.* (M, 41, Education).

The company had an extensive and purposeful continuing professional development system. This included educational programs for new employees, as well as short- and long-term training courses to improve all employees' capabilities in this high skill, high hazard work. However, participants reported problems with the quality and suitability of the training courses, and challenged their effectiveness and adequacy:

*Training does not cover all work-related issues. And when training is provided, you cannot guarantee that the trainers are really well-prepared and have addressed the need for training! For example, a worker is sent abroad for education, and gives a report when he comes back, but he is practically the same! No improvements are made. This is not only the case in our company, but a problem for many oil companies in Iran. The training – no matter whether it is local or foreign – does not deal with the issues.* (M, 36, Mechanic).

Participants did not consider that their compensation adequately reflected the demands of the job, and skills and time commitment made of them. Associated with this was another organizational stressor – teamworking. Employees needed to collaborate to meet required targets. It was common for participants to report issues related to poor peer support and motivation.

*If a co-worker can do something, he won't do it, won't even try to do it. Of course, not all employees are like this, but some of them are. About 30% of my colleagues are like this and just want to see the next morning. They have the knowledge and expertise, but they have no motivation to do the work.* (M, 36, Naval Operations).

Some participants noted that lack of opportunity for promotion leading to a mismatch between employees' position and their expertise was a problem for them:

*I've been working here for several years, but they won't give me a promotion. They say that as I don't have an engineering degree the system will not allow it.* (M, 42, Water and Power).

*There is no higher position in the department than mine, except for the Head of Department. So, I must stay in this position until I retire. This means that I can only get temporary promotions through doing floating jobs.* (F, 30, Research and Development).

In addition, employees reported that they could not effectively approach the organization to resolve any issues they had:

*There are very obvious problems here, but no one can talk about or do something about them. Even when you do talk about them, they say 'like it or lump it', or 'you can quit the job'. Sadly, this is the truth.* (F, 35, Technical Engineering).

### 3.2. Task

High physical and mental job demands were the norm for all participants. They described how these took their toll on both physical and mental health:

*Many people in this job get fed up with the work after 4–5 years because they get really tired and have to put up with a lot of physical pressure.* (M, 31, Systems Management and Productivity).

*Sometimes, the mental demands are beyond my abilities. I'm not a know-it-all. My knowledge is limited.* (M, 37, Health and Safety).

In addition, interviewees explained how job characteristics – including job autonomy, ambiguity, role conflict, and repetitive work – caused stress:

*We are like soldiers ordered by superior authorities. For example, they order us to carry bricks from one point to another. It's like we cannot think! One must be absolutely submissive here. The expert body has no authority and must only act out the decisions from on high.* (F, 30, Research and Development).

*There is a huge difference between what is specified as your duty and what you practically do.* (F, 35, Technical Engineering).

### 3.3. Person

Participants noted problems related to individual characteristics, such as personality type, attitude towards work, and individual abilities.

*There are problems here anyway and it depends on the flexibility of individuals to cope with them. If someone is flexible, they can adapt to work in any situation but sadly some people have not managed to do this here.* (M, 50, Inspection: corrosion of metals).

*I myself am a tough, strict person and I've been brought up this way. I like everything to be organized and when I face disorder, it's really tough for me. It really bothers me mentally.* (F, 35, Technical Engineering).

Participants also observed that one's physical ability to do the work may decrease with ageing:

*We lag behind the knowledge of modern world. We're getting older but don't have enough experience. Most of our work is based on trial and error.* (M, 40, Mechanics).

### 3.4. Physical environment

Very stressful for participants was the weather in the Persian Gulf:

*Doing the physical work here is really tough. The heat and humidity can reach 60% and sometimes higher than 70% from April to almost October.* (M, 28, Naval Operations).

Constant awareness of critical environmental hazards constituted another stressor in this category. For example:

*Here, we have about 40 huge oil storage tanks. The smallest mistake, even talking on mobile phones in certain places where individuals have to use their cell phones, can lead to an incident.* (M, 36, Naval Operations).

To offset recruitment and retention problems reported in the oil industry elsewhere (Dickey et al., 2011) this organization paid their employees highly enhanced rates compared to onshore city jobs, as well as

providing accommodation and food when on the island for two-week periods. Nevertheless, participants had problems with this:

*The accommodation is so old and dirty. In terms of welfare facilities, I think this is very poor. The food, welfare facilities, and rooms are all terrible. The food is terrible, and the dormitories are dilapidated.* (F, 35, Technical Engineering).

Participants reported various challenges associated with the isolated island environment which related to very limited access to social facilities compared to those available to them onshore. Some also mentioned feelings of loneliness. Improved telecommunications on the island in recent years have provided participants with some knowledge of family circumstances when away. However, home problems that arise when away on the island can escalate both objectively and in the mind. Also reported, *We cannot have intimate relationships with colleagues. Lots of rumors are spread and issues arise.* (M, 50, Inspection: corrosion of metals)

### 3.5. Tools and technology

There was some resignation from participants in terms of challenges regarding the shortage and inefficiency of their tools and equipment:

*Sanctions have exerted a huge impact on companies recently. One of our problems is deterioration of the equipment. All facilities are old and have lost their efficiency in a way. Oil rigs .... corrosions.... Corrosions are high in the southern regions of the country and humidity and temperature create risks. All of this is disturbing.* (M, 37, Health & Safety)

That is, it was a fact of daily life in Iran, as well as work life in the Persian Gulf that the US sanctions affected the availability of tools and equipment. In some sense, whilst shortages and inefficient tool caused pressure, the fact that the sanctions, threatened the prosperity of the Iranian oil industry and themselves outshone this point, even if participants expressed their concerns in regard to unsuitable PPE:

*The company only buys cheap and poor-quality personal protective equipment.* (M, 37, Health & Safety).

## 4. Discussion

The goal of this qualitative study was to achieve a comprehensive understanding of why and how oil production can be stressful, using a macroergonomics approach and adopting the work systems model (Carayon and Smith, 2000) as a framework. The five themes that were established from our findings provide an important insight into these working conditions.

First, it is important to note that all fifteen of the healthy employees that participated in this research reported stressors in their work. Many of the codes and themes that emerged from the interviews were endorsed by most of the participants, and data saturation of themes was achieved by the time we had completed twelve interviews. To ensure a rigorous approach, and replication of findings in this new context, we carried out a further three interviews and no new codes were added.

We found a greater number of codes and categories, and thus a greater number of stressors, associated with organizational factors. For most participants the 2-week (7 days and 7 nights) offshore tours, with long days commuting for onshore breaks in their own time, were described as a challenge. This work schedule has previously been reported as stressful in the oil industry in other areas (Brešić et al., 2007; Parkes, 2012) and in the wind industry (Mette et al., 2018). In her extensive review, Parkes (2012) suggested that these shifts persist in the industry, despite being disliked by workers, because there were operational benefits. In this study work-schedules were stressful though disruption to the work-family interface, and from inability to switch off from work after a shift when still in the workplace with work colleagues. Separation

from home and family support when a difficulty arose at home was anxiety provoking. It could also exacerbate quarrels.

Other organizational stressors revolved around the need to work in teams, and poor management of those teams. This issue appears to be a persistent problem in the oil industry. O'Dea and Flin (2001) suggested that workforce involvement in decision-making was important to developing responsible teams. This is an area that could be developed, particularly when highly skilled personnel feel like their expertise is not appreciated, as indicated here. Similarly, management style and valuing employees both play a vital role in motivation and job satisfaction, and as has been previously reported, these aspects of the organization are important, as when inadequate, they are linked to work-related stress and poor organizational performance (Yuen et al., 2018). Poor training and lack of opportunities for career development also contributed to distress for the participants.

Working in the oil industry has been described as physically and mentally demanding in various contexts (Chen et al., 2009; Harun et al., 2014). This qualitative investigation confirmed high physical and mental job demands to be the norm for all participants, and that these took their toll on both physical and mental health. Job demands have previously been identified as work-related stressors that should be risk-assessed (Cousins et al., 2004) and interventions can be put in place to ameliorate harm to health – accepting that this, in turn, is related to organizational structure and supportive governance.

The work-system model acknowledges that there are personal characteristics that determine stress and coping outcomes, including personality, physical health and fitness, education and skills and experience, in particular. Oil industry work, with its physical demands, shiftwork, and technical skills required, cannot be tolerated by everyone. Nevertheless, judicious recruitment can ensure a good person-environment fit for many aspects of the role. Whilst flexibility was noted as an important aspect of coping with stressors, it was acknowledged by older workers in our sample that ageing had affected their work ability. Nevertheless, this could be a reflection of shiftworking, as much the physical tasks associated with offshore work (Parkes, 2012), even if those who elaborated on this point had physically demanding roles.

The physical environment was the second largest source of stressors. Working and living for extended periods on the island formed one of the stressor subcategories. Another was the weather in the Persian Gulf. The literature indicates the weather is a challenge for almost all forms of work in the oil industry, it is simply the type of weather that differs. Interestingly, a study of stress and coping for employees on offshore windfarms, which absolutely depend on high winds for their business, does not mention the weather as a stressor beyond the constant ship movements causing sleep disturbances (Mette et al., 2018). This suggests a place for managing expectations to manage environmental stressors. With respect to this suggestion, it is important to add that challenges of living and working in confined spaces were seen as an organizational stressor by some employees. They reported that they could not effectively approach the organization to resolve some environmental issues.

In this study, participants did not consider that their compensation adequately reflected the demands of the job, skills and time commitment made of them, and conditions they were living in. Ultimately, this stress can be explained by a lack of rewards associated with commitment to the business: effort-rewards imbalance (Siegrist, 1996). There is scope for ameliorating some of this distress through ensuring facilities are clean and well-maintained. This, and provision of suitable and sufficient leisure facilities for rest periods is associated with job satisfaction, and lower levels of work-related stress (Harun et al., 2014).

Regarding the final theme, there was some acceptance of stressors in this domain by participants. There was a resignation from the Iranian participants in terms of stressors regarding the shortage and inefficiency of working with the tools and equipment. These were attributed to sanctions on the nation, outside of the control of the organization.

Nevertheless, appropriate tools, and new technologies, when applied appropriately can enhance job satisfaction, as well as production and performance (Carayon and Smith, 2000).

A limitation of this research is that it was conducted in one Iranian organization, and the main value of our findings are confined to the significant oil industry in the Persian Gulf. In addition, only a small number of women took part in the research, although the proportion was an appropriate reflection of offshore working (Mette et al., 2018). Nevertheless, we suggest that some of our findings can be generalized, if there remains a need for contextualization. It remains that work in the oil industry is stressful, and this has a negative impact on employee health and well-being, and this in turn, will impact on organizational health and well-being (Mackay et al., 2004). Our study provides direction for intervention that will dovetail with risk assessment of occupational health of workers.

## 5. Conclusion

This study was the first to investigate experiences of working in the oil industry based a macroergonomics approach in the Persian Gulf to determine how it is stressful. The qualitative approach and directed content analysis were suitable to tease out the drivers of stress previously reported in this area (Hoboubi et al., 2017). This knowledge is important because the oil industry provides substantial strategic, military, and economic rewards here, and efficient oil production is essential for trade routes and for energy. Despite the importance of the oil industry, establishing an effective organizational response to difficulties arising from working in a hazardous environment has posed problems (Woolfson et al., 2013). This is made manifest in poor worker well-being (Nielsen et al., 2013), and it remains that stress in this industry has a negative impact on performance (Cannon-Bowers and Salas, 1998) and accident rates (Woolfson et al., 2013). Key findings were that the specific work-schedules were highly stressful for all workers, and whilst there may be good business sense for these, there were shortcomings in making this way of working rewarding. Top-down management emerged as an issue in other organizational stressors too, and we recommend that greater involvement of these highly skilled employees in decision-making to increase control of the way they work will reduce the stress reported. Future work should explore support systems can be enhanced to ameliorate pressures, and the coping strategies utilized by employees to survive in this stressful occupation.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.apergo.2021.103407>.

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