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Pattern of Psychosocial Challenges among Oil & Gas Workers: A systematic review

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Abstract

This paper highlights the patterns of psychosocial challenges confronting O&G workers that result in mental health issues worldwide through a systematic review of notable academic databases. This study integrated multiple research designs, and the review was based on the publication standard, namely RepOrting standards for Systematic Evidence Syntheses (ROSES). Thematic analysis was undertaken, and four emerging themes were identified: 1) demographic factors, 2) personality, 3) psychosocial risks, and 4) health conditions. The findings contributed to several theoretical and practical implications, which are essential for researchers in the O&G field and policymakers.

Keywords: psychosocial risks; personality; well-being; oil & gas

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1.0 Introduction

The psychosocial hazards have been acknowledged as risks that need to be managed and rigorous promotion of mental health issues among workers is essential (ILO, 2016). Psychosocial hazards are associated with the style in which work is coordinated, planned, and overseen. Thus, effective communication on job content, work organization and management, and control over the work environment is crucial. Failure in tackling these issues could contribute to workers' health and safety hazards while at work. Naji et al. (2020) maintained that workers could cultivate a safety culture that included tackling the workers' psychological health to mitigate psychosocial threats. Human resources can therefore be a useful resource in monitoring employee performance and encouraging creative thinking in their daily work practices while keeping safety and health practices intact. The psychosocial hazards might seem to be intangible. However, its presence in the most situation could reduce the productivity and performance of the workers, some of whom might have mental health issues. Thus, what are the patterns of psychosocial hazards in the O&G industry? To What extent does the literature discuss psychosocial hazards associated with mental health issues in the O&G industry? There are limited studies that systematically review this subject, including identifying patterns and clustering them into themes. With the above argument, this paper is presented to discover the patterns of psychosocial challenges among O&G workers by employing systematic literature review procedures.

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2.0 Literature Review

The oil & gas (O&G) setting is demanding, stressful and potentially dangerous (Parkes, 1998; Mette et al., 2017). The nature of the work of O&G employees in remote locations and challenging geographical environments expose them to more vulnerability and high risk (Sherchan et al., 2018). Employees are vulnerable to chemical hazards such as toxic, corrosive, carcinogenic, asphyxiating, irritant, and stimulating substances; physical hazards such as noise, vibration, radiation, and excessive temperature; biological hazards such as viruses, parasites, and bacteria; ergonomic hazards such as manual handling activities, repetitive motions, and awkward postures; and psychosocial hazards (exhaustion, irregular working hours, isolated site locations (Lippel, 2011)). These hazards can be conceived as major threats to the physical and mental health of employees (Sherchan et al., 2018). O&G is a competitive and money-making industry. Some countries perceive the industry as their primary income generator. However, neglecting the mental well-being of the hands and legs of the industry should not be taken lightly.

3.0 Method

A systematic literature review (SLR) was conducted to discuss the pattern of mental health problems among O&G workers worldwide. SLR captures and synthesizes research findings applicable to each cycle phase through organized, straightforward, and replicable techniques (Elliot et al., 2017).

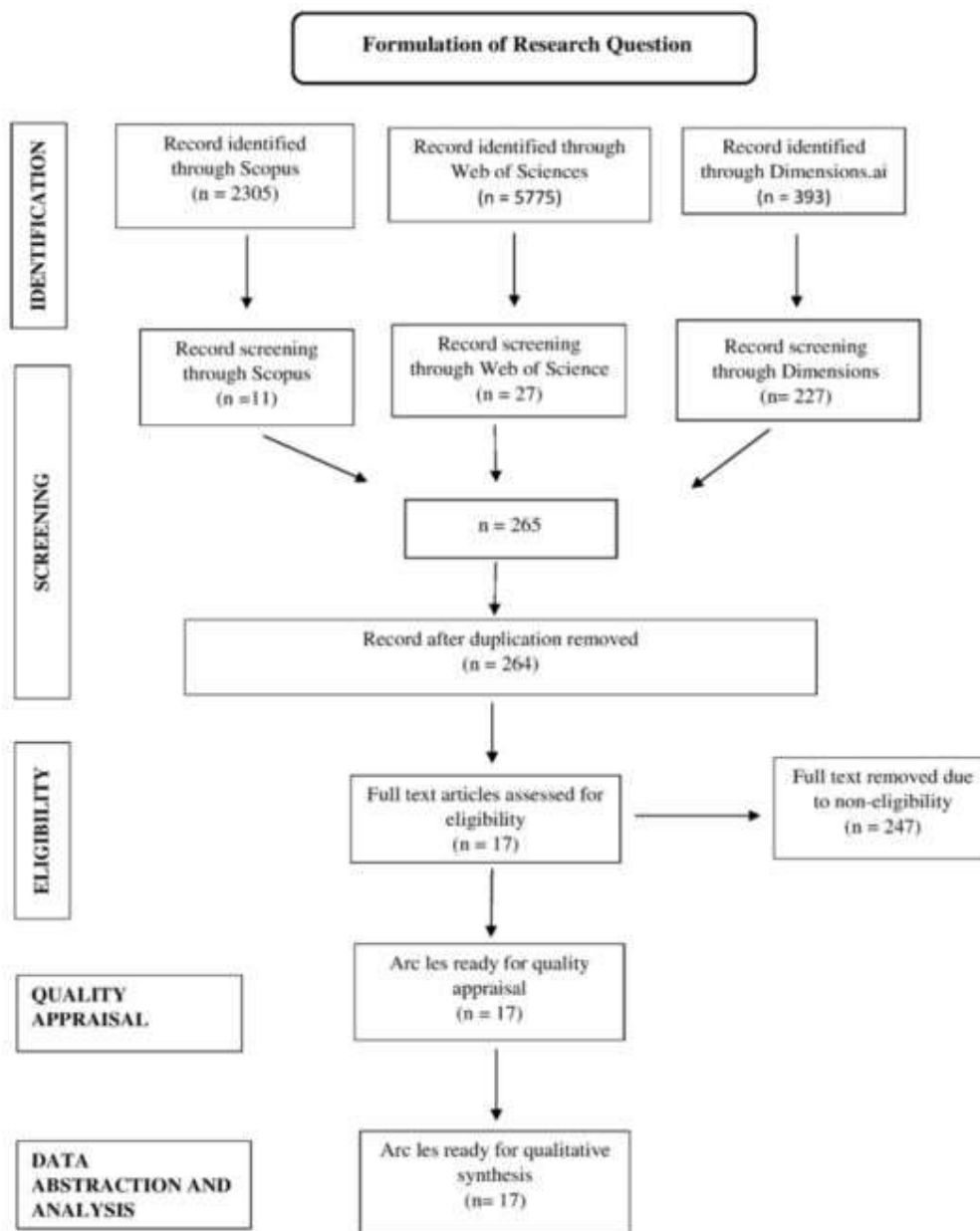


Figure 1: Systematic searching process

This study was conducted using the ROSES review protocol. ROSES or RepOrting standards for Systematic Evidence Syntheses are explicitly designed for systematic review and mapping in the environmental management field (Haddaway et al., 2015). The reason for choosing ROSES rather than PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is because of the several justifications based on the table produced by Haddaway et al. (2015). First, ROSES provides a higher standard of reporting that requires summarizing data in a checklist, summary, and flowchart. Second, the search requires a quality assessment that postulates higher standards for decision-making when the article standards are below par. The results of the search include mixed-methods comprising qualitative and quantitative methods. Hence, the third reason for using ROSES is that it accommodates other types of syntheses, which incorporate both methods. The objective of ROSES is to invite researchers to guarantee they offer the correct data with the right degree of detail. In light of this review protocol, the authors begin their SLR by formulating appropriate research questions for the reviews. Next, the authors clarify the systematic searching strategy, which comprises three principal sub-measures: identification, screening (inclusion and exclusion criteria), and eligibility. The authors then move on to the quality assessment of the selected articles, revealing the technique used to ensure the quality of the articles being assessed. In guaranteeing the quality of the content of articles', the remaining articles were presented to two experts for quality evaluation. As Petticrew and Roberts (2006) proposed, the experts should rank the remaining articles into three quality classes to be specific: high, moderate, and low. Only articles ordered as high and moderate ought to be reviewed. The experts focused on the methodology of the articles to decide the rank of the quality. For articles to be included in the review, both authors mutually agreed that the quality should be basically at a moderate level. The result from the quality appraisal was the inclusion of 17 articles. Finally, the authors explain how the data are abstracted for review and analyze and validate the abstracted data. Figure 1 shows the process flow of adapting the ROSES diagram.

4.0 Results

The authors managed to obtain 17 relevant articles. Based on thematic analysis, four themes were developed, namely, demographic factors, personality, psychosocial risk factors, and health conditions. Table 1 shows the summary of search results.

Table 1: Summary of search results

No	Country	Author	Method	Demographics factors	Personality	Psychosocial risk factors	Health condition
1	Italy	Gabriele et al. (2018)	QN				✓
2	China	Gu et al. (2020)	QN	✓	✓		
3	China	Jiang et al. (2017)	QN			✓	
4	China	Li et al. (2019)	QN			✓	
5	USA	Mette et al. (2017)	QL			✓	
6	USA	Mette et al. (2018)	QL			✓	
7	China	Ning et al. (2018)	QN	✓	✓	✓	
8	Croatia	Pavicic et al. (2019)	QN	✓		✓	
9	Norway	Reknes et al. (2018)	QN		✓		
10	Iran	Yazdanirad et al. (2021)	QN		✓		
11	Iran	Bazazan et al. (2019)	QN			✓	✓
12	Iran	Choobineh et al. (2015)	QN	✓		✓	✓
13	China	Jiang et al. (2012)	QN	✓		✓	✓
14	Italy	Ljosa et al. (2011)	QN			✓	
15	Iran	Rasoulzadeh et al. (2015)	QN	✓		✓	
16	Iran	Bazazan et al. (2014)	QN	✓			
17	Iran	Bazazan et al. (2019)	QN				✓

Note: QL – Qualitative; QN - Quantitative

4.1 Demographic factors

Regarding demographic factors, the present study examined the effects of demographic characteristics of workers in the 12-hour shift in the O&G organization. The main results showed that, except for some cases, there were no significant effects in this regard. Demographic parameters included age, body mass index (BMI), marital status and the number of children, education level, and shift work experience. Several studies resulted in an inarguable and conflicting relationship between age and fatigue (Bazazan et al., 2014). On the other hand, Gu et al. (2020) identified that the effect of occupational category, shift work, and night duty were all associated with depressive symptoms among demographic and working variables. They also discovered that 63.2% of the petroleum workers had shown depressive symptoms.

Apart from that, Ning, Guan and Liu (2018) conducted a study on 1,200 field oil workers who had been in service for at least one year. The result was then divided into two groups which were the positive symptoms group and the normal group. By comparing the occupational stress between these two groups, it was discovered that the normal group scored higher on personal strain than did the control group. Individuals who had less self-care and greater reactions to occupational stress were susceptible to psychological problems such as depression and anxiety.

Additionally, Pavicic et al. (2019) proved that O&G industry workers appeared to suffer from anxiety and depression more frequently than the general population. Findings showed that based on demographic factors, out of 29% of 2435 offshore workers, 15% reported anxiety symptoms, while 18% had experienced symptoms of depression.

Besides depression and anxiety, shift work has been associated with mental health problems of petrochemical workers. A study conducted by Choobineh et al. (2012) discovered that the prevalence rate of health problems in shift workers was higher than in day workers, with significant differences in gastrointestinal and musculoskeletal symptoms. Furthermore, Rasoulzadeh et al. (2015) investigated the relationship between fatigue and psychological distress among shift workers and discovered that there was a relatively weak impact of demographic characteristics on fatigue and psychological distress.

With the transformation of the medical model, mental health has received increasingly more attention. A study conducted by Jiang et al. (2020) recognized that the incidence of psychological abnormalities among different ethnic groups, ages, types of work, length of service, professional titles, shift work and marital status was statistically significant ($p < 0.05$).

4.2 Personality

Gu et al. (2020), whose study used the moderating effect of self-efficacy, stated that perceived organizational support (POS) was found to have a significantly negative correlation with depressive symptoms and that self-efficacy mitigated the relationship between POS and depressive symptoms. Their study also discovered that self-efficacy was negatively related to depressive symptoms and may attenuate the relationship between POS and depressive symptoms. It was found that O&G workers had a higher sense of self-efficacy, and were more effective in reducing their depressive symptoms at a lower POS level.

In addition to this, Reknes, Harris, and Einersen (2018) found that workplace bullying consistently predicted mental health problems in those affected. They also discussed the hardy personality which is related to the mental health of workers. The findings from their research proved that individual hardiness levels appeared to influence whether or not workers suffered negative health effects as a result of bullying. High hardiness was discovered to be a resilience factor that protected against increased anxiety symptoms when exposed to workplace bullying (Reknes et al., 2018).

In addition, a study by Ning et al. (2018) found that personality traits influence the psychology of oilfield workers. The Eysenck Personality Questionnaire (EPQ) included extraversion (E), neuroticism (N), and psychoticism (P). Results run through the structural equation model showed that 0.189 personality traits of workers influenced their psychological distress.

4.3 Psychosocial risk

Psychosocial aspects of the O&G work environment concern the living conditions such as confined spaces, limited privacy, limited opportunities for leisure activities and retreat as well as the recurrent absences of the workers from home (Mette et al., 2018). A study conducted by Jiang et al. (2017) identified the occupational stress and mental health found in China's O&G workers. However, the study discovered no statistically significant differences in the incidence of mental health problems based on gender. This finding could be attributed to the unique work environment, the various tasks performed by employees and the various methods available for mental health screening.

In research conducted by Li, Gao and Liu (2019), they discovered a significant correlation between occupational stress and sleep among the O&G workers. Sleep disorders were more common on fixed day shifts, regular shifts and irregular shifts. The prevalence of sleep disorders was influenced by professional titles. The low stress group had the lowest incidence of sleep disorders, while the high stress group had the highest incidence of sleep disorders.

A study conducted by Mette et al. (2017) was particularly about the wind offshore industry. The results of the study were based on socio-demographics and working conditions. In summary, employees and experts perceived the majority of job demands to fall under the categories of work organization and new forms of work, with the fewest expressed under the category of social relations.

A study by Ning, Guan and Liu (2018) aimed to investigate psychological stress and its determinants in Xinjiang oil field workers. Some results of the study showed that there were positive incidences of psychological stress in the field for oil workers in Xinjiang. Social support, occupational role, personal strain response, personality and occupational burnout were the main factors that influenced psychological stress in these workers. Occupational role, personality and occupational burnout were among the factors that had a relatively strong predictive power for psychological stress reactions.

Pavicic et al.'s (2019) research, on the other hand, focused on the prevalence of depression and anxiety symptoms among offshore workers and the main stressors that led to symptoms of these disorders. The results of this study showed that 15% of offshore workers reported anxiety symptoms and 18% reported depression symptoms. This is comparable to the prevalence of anxiety and depression in the general population, which is estimated to be between 10 and 20 percent.

According to Bazazan et al. (2019a), shift work is unavoidable in many industries with continuous material processing, such as petrochemical plants. Shift work should be seriously considered as it has negative consequences for workers. The study population showed a relatively high prevalence of psychological complaints (especially social dysfunction) and fatigue (especially general fatigue). In general, 43.4% of those polled reported a mental health issue. This study discovered that eight-hour shift workers in the studied areas faced a significant risk of mental health and fatigue.

Despite the eight-hour shift schedule of O&G workers, Choobineh et al. (2012) conducted a similar study but with a prolonged working schedule which was a 12-hour shift. The findings revealed that health problems were more prevalent in shift workers than day workers. However, the differences were only significant in gastrointestinal and musculoskeletal disorders. In addition to shift work, logistic regression analysis revealed that other variables such as extended work time, type of employment, second job, and job unit were associated with health problems.

The study by Jiang et al. (2020) that focused on the mental health risk factors among O&G workers in China found a prevalence of mental health problems among O&G workers based on age, nationality, type of work, and length of service, professional title, shift work and marital status. The assessment of mental health risk factors revealed that shift work, occupational stress, and high payment/low return all had an impact on mental health.

On another note, Ljosa, Tyssen, and Lau (2011) highlighted that psychosocial work factors including night work, demands, control and support, and shift work-home interference had significant effects on mental distress among Norwegian O&G workers. The results also revealed that the level of mental distress was higher among men than women. Among the reasons associated with mental distress were high scores on quantitative demands, a low level of support, and a high level of shift work-home interference.

On the other hand, a case study among shift workers of an Iranian petrochemical plant by Rasoulzadeh et al. (2015) stated that shift work was a well-known occupational health hazard in both developed and developing countries. Prolonged working hours, day or night rotation, circadian rhythm, sleep disorders, and family and social problems were the most serious complications of shift work. The results showed that fatigue and psychological distress were frequent among 12-hour shift workers.

4.4 Health conditions

The study conducted by Bazazan et al. (2019a) aimed to examine the effect of a posture correction-based intervention (with a biofeedback device) on the occurrence of musculoskeletal and fatigue among control room operators in a petrochemical plant in Iran. A study conducted by Bazazan et al. (2019b) found a relatively high prevalence of mental health complaints (particularly social dysfunction) and fatigue (especially general fatigue). This study revealed that eight-hour shift workers in petrochemical industries were exposed to a considerable risk of mental health and fatigue. In general, 43.4% of participants reported a mental health problem. A moderate correlation was found between fatigue and mental health ($r=0.58$). The stepwise regression model revealed that fatigue was significantly related only to "anxiety and insomnia" and "severe depression". Improving the ergonomics and health aspects of the workplace was recommended by this study in order to reduce related risk factors.

Another study conducted by Choobineh et al. (2012) reported the 12-hour shift schedule-related health problems among Iranian petrochemical workers. The results showed that health problems in shift workers were more prevalent than in day workers; however, the differences were significant only in gastrointestinal ($p= .001$) and musculoskeletal disorders ($p= .002$). Other health problems experienced by shift workers were cardiovascular and psychological issues.

Jiang et al. (2019) discovered that the incidence of psychological problems among occupational groups is becoming more serious. The study was conducted using a cross-sectional survey on mental health of 3,631 oil workers in Karamay, Xinjiang. The correlation between the Monoamine Oxidase A (MAOA) gene and mental health was analysed. The somatisation score of the MAOA gene rs6323 was significantly different among different genotypes ($p< 0.05$). It could be considered that somatisation scores were different among different genotypes of rs6323.

5.0 Discussion and Research Implications

This paper aimed to explore the patterns of mental health issues among O&G workers. The review was deemed important as it maps the underlying psychosocial factors that could threaten workers' well-being. Four themes were identified, namely, demographic factors, personality, psychosocial risks, and health conditions. The findings on demographic factors identified that age, BMI, being single, low social level and education, and the type of work assigned was associated with fatigue and stress among O&G workers. Typically, fatigue and stress affected the energy level and alertness which was essential while at work. Workers who had fatigue would have difficulties focusing on and handling O&G facilities that often pose workplace hazards.

Similar to Hope et al.'s (2010) findings, workplace hazards could affect workers' sleep quality as they exacerbate anxiety. Sleep loss was also related to occupational accidents and poor health outcomes. Additionally, separation from family and friends imbued them with loneliness and aggravated heated arguments at home, especially with married couples. However, based on the findings, the marriage did not have a high impact on stress as the workers were able to manage activities with their loved ones while at home. One reason that supports this finding is that O&G offers a higher salary compared to other engineering industries and workers are willing to sacrifice family

time for the sake of getting the desired earnings to send back home (Wright & Griep, 2019). In this sense, workers and their family members have established a mutual understanding of the work and family.

The findings also highlighted the psychosocial risk that relates to health conditions. Occupational stress is an important social determinant of health that negatively impacts workers as a result of the rapid development of society, science, technology, and the organization of the labor process, as well as changes in ways of life (Martinez et al., 2015; Weinberg & Creed, 2000). The results of psychosocial factors included the work shift and work environment, explicit work circumstances (i.e., climate change, unexpected postponement, work processes, and time pressure), task intensity, and long working hours. Meanwhile, health conditions highlighted musculoskeletal and physical pain, mental health issues, arterial pressure, and high blood pressure. The O&G environment exposes workers to workplace accidents, injuries, and living remotely and in confined spaces for extended periods (Mokarami et al., 2021).

There are numerous work arrangement debates on O&G workers that headline psychosocial effects (Anwer et al., 2021; Chandrasegaran et al., 2020; Ferguson et al., 2020; Hope et al., 2010; Mokarami et al., 2021). For example, Bergh et al.'s (2018) analysis showed that there was a significant association between job resources and job demand with work-related stress, while there were considerable differences between onshore and offshore stress levels. On a similar note, engineering field workers, such as construction workers, were also exposed to psychosocial risk factors (high job demands, low job satisfaction and stress) that upset their physical build through the development of musculoskeletal disorders (Anwer et al., 2021).

Aside from the challenges of the physical work environment, poor relationships between supervisors and workers can also lead to physical consequences. Guzman et al. (2022) believe that supervisor support mitigates risk because they know how to manage risk and has procedures for dealing with dangerous situations. In a similar vein, living spaces, especially at the oil rig, have become among the sources of stressors; hence, the organization should look into this environmental stressor to ensure that workability and performance are at the optimal level (Mokarami et al., 2021).

The findings of this systematic literature review have several implications. Firstly, an assessment of physical workplace hazards should be performed carefully as they potentially incur operational costs for the organization and stress to the workers. In this sense, all potential hazards and risks should be addressed and assessed by human factor engineering, which highlights the potential human error in equipment designs and implementation (Chandrasegaran et al., 2020). Secondly, the organization might identify psychosocial hazards that induce workers' psychological and social tensions at the workplace. It is essential to have top-down and bottom-up feedback and approaches to address this type of hazard. Promoting workers' voices might not only foster genuine evaluation of workplace hazards but also reduce risk factors at the oil rig (Mathisen et al., 2022). It also supports room for improvement at the organizational end.

Thirdly, the organization should provide avenues for managing expectations to handle environmental stressors among workers. Concerning this proposal, it is important to reconsider the living conditions, work resources, and requirements for shift schedule, health care, appreciation, and rewards for the O&G industry. In this regard, organizations should extend their support for workers' well-being. Finally, the keywords of this study should be expanded and grey literature not included in this paper might be considered.

6.0 Conclusion

To manage the mental health state among the workers, it is necessary to identify which psychosocial risk challenges contribute to the onset of stress. Ultimately, to develop individually and organizationally directed interventions, it is necessary that relevant psychosocial risk factors in organizations are known. Recently, Fan et al have suggested some psychosocial factors such as job control, job security, and social support are also associated with a greater likelihood of workers' experiencing positive mental well-being in terms of satisfaction and purpose in life, personal growth, social contribution and integration. This study implicates the double value of workplace policies and practices that improve psychosocial working conditions, reduce work related stress and improve mental well-being in general, for example, by giving workers greater job control or social support. In conclusion, several psychosocial challenges were established, confirming the multifactorial aetiology of mental health.

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Paper Contribution to Related Field of Study

The contribution of this paper in relation to the field of study of Organizational Behavior. There will be a knowledge contribution to the organization, academician as well as the students in the field of Organizational Behavior. The findings would help to add new information on the psychosocial factors and their implications on the workers' mental health.

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