The Complexity of Occupational Stress Risk Factors among Seafarers

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ABSTRACT

Occupational stress refers to harmful physical and emotional responses that arise when job demands exceed a worker's capacity, resources, or needs. Prolonged exposure to such demands may adversely affect both mental and physical health. Previous studies indicate that seafarers are up to twice as vulnerable to stress-related risk factors compared with other occupational groups, potentially increasing the risk of illness and workplace accidents. This systematic literature review aimed to comprehensively identify risk factors associated with occupational stress among seafarers. Literature was retrieved from Scopus, PubMed, and Google Scholar using the keywords "work stress," "risk factors," "health and stress," "psychosocial," "job stress," "stressors," "seamen," and "seafarers," combined using the Boolean operators "OR" and "AND." A total of 261 articles were identified and screened using the PRISMA flow diagram. Selected studies were critically appraised using the Joanna Briggs Institute (JBI) quality assessment tools. Of the 21 full-text articles assessed, eight met the inclusion criteria for systematic review. The findings identified 14 occupational stress risk factors among seafarers: age, gender, education level, marital status, smoking status, years of service, employment status, excessive workload, low workload, job-related boredom, job demands, time pressure, interpersonal relationships, and job security. In conclusion, occupational stress risk factors among seafarers are multifaceted and diverse, encompassing individual, occupational, and psychosocial dimensions. Comprehensive and multi-stakeholder interventions are therefore essential to effectively prevent and manage work-related stress in this population.
Keywords: occupational stress; risk factors; seafarers

INTRODUCTION

Stress is a condition in which individuals experience anxiety, alertness, and tension over a certain period, thereby affecting their emotional state. This condition generally persists for a specific duration and may be triggered by both external and internal factors [1]. In the field of occupational health, one form of stress occurring in the workplace is work-related stress. Occupational stress refers to harmful physical and emotional reactions that arise when job demands are not aligned with a worker's capabilities, resources, or needs. Persistent exposure to such demands not only affects mental well-being but may also deteriorate physical health, potentially leading to injuries and workplace accidents [2].

The consequences of occupational stress can be categorized into three types of symptoms. First, physiological symptoms, indicating that stress may cause metabolic changes, increased heart rate and respiration, elevated blood pressure, headaches, and even trigger heart attacks. Second, psychological symptoms, commonly manifested as job dissatisfaction, anxiety, boredom, tension, irritability, and procrastination. Third, behavioral symptoms, where individuals experiencing stress may show decreased productivity, absenteeism, turnover, and changes in eating habits, smoking, alcohol consumption, stuttering, restlessness/anxiety, and irregular sleep patterns [3]. Workplace stressors can be grouped into four main categories: individual, organizational, job-related, and extra-organizational factors [4].

There are three levels of occupational stress prevention. Primary prevention focuses on addressing stress at its source, such as redesigning jobs to reduce excessive workload, increasing worker control over tasks, and improving organizational structures and management processes. Secondary prevention emphasizes modifying individual responses, for example through coping and resilience training, early stress screening or monitoring, and access to counseling services. Tertiary prevention targets the management of health impacts, including developing rehabilitation and work reintegration programs, providing advanced clinical services for affected workers, and ensuring gradual return-to-work with sustained support [5].

Various instruments for measuring occupational stress have been developed and widely applied in research. These instruments assess individual perceptions, job-related factors, and external influences beyond work. Examples include the ASSET (An Organizational Stress Screening Tool), developed to evaluate stress risk in organizational settings by measuring exposure to common stressors [6]; the JCQ (Job Content Questionnaire), designed to assess psychosocial aspects of work [7]; the DASS (Depression Anxiety Stress Scale), commonly used to measure depression, anxiety, and stress [8]; the JSS (Job Stress Survey), developed to evaluate different sources of job-related stress [9]; the Quality of Worklife Questionnaire, aimed at assessing quality of working life [10]; the NIOSH Generic Job Stress Questionnaire, developed based on theoretical frameworks of occupational stress [11]; and the COPSOQ III (The Copenhagen Psychosocial Questionnaire), developed by Kristensen and Borg in 1995 to evaluate and improve psychosocial work conditions [12]. The Work Stressor Questionnaire is another self-report instrument used to assess levels of occupational stress and contributing factors.

Data from the Labour Force Survey reported by the Health and Safety Executive identified 440,000 cases of work-related stress in the United Kingdom, with an incidence rate of 1,380 cases per 100,000 workers. This indicates that more than one-third of work-related illnesses are attributable to psychosocial pressures in the workplace. In Indonesia, occupational stress is also a serious concern. The National Basic Health Research conducted by the Ministry of Health reported a 9.8% prevalence of emotional mental disorders among individuals aged 15 years and above, including symptoms of stress, anxiety, and mild to moderate depression. It was further reported that 35% of occupational stress cases may result in fatal outcomes and approximately 43% contribute to lost working days [13].

One occupation particularly vulnerable to stress is seafaring. Survey findings indicate that seafarers are twice as likely to be exposed to psychosocial risk factors affecting health and safety compared with land-based workers. Seafarers typically work for six months onboard followed by one month ashore. During each working period, they perform four shifts of four hours each, which may lead to prolonged isolation at sea, with limited shore access primarily during cargo loading and unloading. Additionally, stress may arise from the transportation of hazardous materials, posing risks both during navigation and cargo handling operations [14].

Given these conditions, identifying the risk factors associated with occupational stress among seafarers is essential. Therefore, a literature review was conducted to examine the various risk factors related to occupational stress in this population, as an effort to anticipate and prevent stress-related outcomes among seafarers.

METHODS

This study employed a systematic literature review design to re-examine a specific topic by focusing on a single research question that was systematically identified, appraised, and synthesized according to predefined criteria, based on high-quality evidence relevant to the research

objective. The data used in this study were secondary data, obtained not through direct observation but from previously published studies conducted by other researchers. The stages of the review included searching for relevant literature, selecting specific sources, identifying key information, and developing an outline. The PICOC framework was applied to formulate the review concept. Seafarers as population, occupational stress as intervention and risk factors related to occupational stress as outcome.

Data synthesis aimed to categorize extracted data with similar characteristics according to the measured outcomes in order to address the research objective. Literature meeting the inclusion and exclusion criteria was compiled and summarized, including the authors' names, year of publication, study title, methodology, and key findings. The literature summary was organized into a table arranged alphabetically and by year of publication.

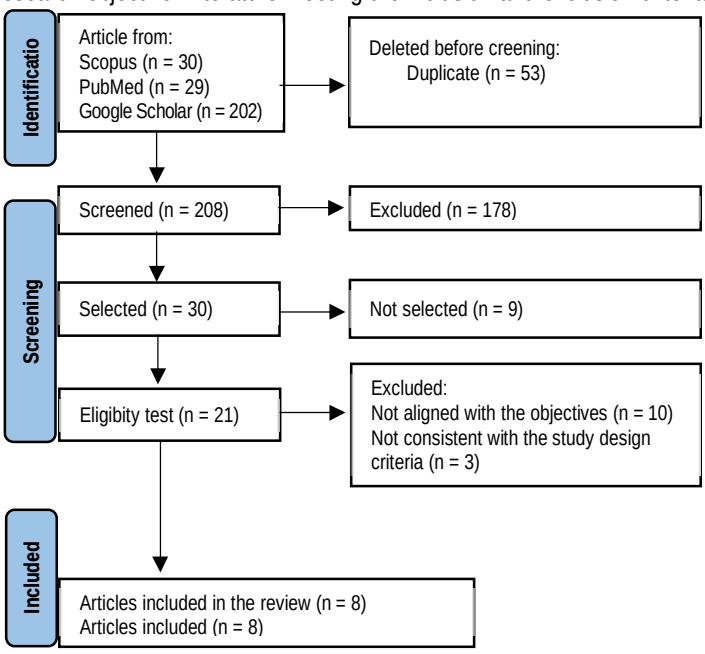

Figure 1. PRISMA flow diagram for article selection

The literature was screened based on predefined inclusion and exclusion criteria. The inclusion criteria comprised articles published between 1985 and 2021, considering the limited number of studies addressing occupational stress risk factors among seafarers, and those aligned with the selected keywords. The exclusion criteria included articles that were not available in full text, not written in Indonesian or English, not quantitative research, or not relevant to the topic.

Literature was retrieved from Scopus, PubMed, and Google Scholar using the keywords "work stress," "risk factors," "health and stress," "psychosocial," "job stress," "stressors," "seamen," and "seafarers," combined using the Boolean operators "OR" and "AND" to ensure relevant results. A total of 261 articles were identified and subsequently screened using the PRISMA flow diagram for study selection. The PRISMA checklist was applied to guide the selection process in accordance with the objectives of the literature review. The selected articles were then critically appraised using the Joanna Briggs Institute (JBI) quality assessment instrument. Of the 21 articles critically reviewed, eight were deemed eligible for inclusion in the final analysis (Figure 1).

RESULTS

The results of the literature review were synthesized using a narrative approach by grouping similar extracted data concerning occupational stress risk factors among seafarers. The reviewed studies indicate that occupational stress in seafarers is influenced by multiple risk factors. Fourteen risk factors were identified: age, gender, education level, marital status, smoking status, years of service, employment status, excessive workload, low workload, job-related boredom, job demands, time pressure, interpersonal relationships, and job security.

Table 2. Results of article review

No.	Authors	Title	Objective	Method	Results
1	Fereshteh Baygi, Nami Mohammadian Khonsari, Arash Agoushi, Saeed Hassani Gelsefid, Armita Mahdavi Gorabi and Mostafa Qorbani [15]	Prevalence and associated factors of psychosocial distress among seafarers during COVID-19 pandemic	To determine the occurrence of stress among seafarers and its risk factors	Cross-sectional study, sample of 470 seafarers	Overall, 439 of 470 seafarers (mean age 35 years) experienced depression, anxiety, stress, general psychological disorders, and poor perceived health. Multivariate analysis showed that longer duration onboard increased depression by 20%. Non-officer seafarers experienced significantly lower anxiety and stress compared to officers; however, concerns about job security among non-officers contributed to increased occupational stress.
2	Ana Sliskovic and Zvjezdan Penezi [16]	Lifestyle factors in Croatian seafarers as relating to health and stress on board	To examine lifestyle-related stress risk factors and physical and mental health symptoms	Cross-sectional study, sample of 530 seafarers (mean age 38 years)	Sleep deprivation, high smoking rates, and unhealthy dietary patterns were more prevalent at sea than at home. Stress risk factors onboard were associated with insufficient sleep and unhealthy eating habits.
3	Niamh Doyle, Malcolm MacLachlan, Alistair Fraser, Ralf Stilz, Karlien Lismont, Henriette Cox, Joanne McVeigh [17]	Resilience and well-being amongst seafarers: cross-sectional study of crew across 51 ships	To identify factors associated with stress among seafarers	Cross-sectional study, sample of 387 seafarers (98% male)	Duration at sea was associated with perceived stress. Higher resilience, longer seafaring experience, and greater workplace support were significantly associated with lower stress levels. Monotonous work and high boredom contributed to occupational stress.
4	Anna Carotenuto, Angiola M. Fasanaro, Ivana Molino, Fabio Sibilio, Andrea Saturnino, Enea Traini, Francesco Amenta [18]	The Psychological General Well-Being Index (PGWBI) for assessing stress of seafarers on board merchant ships	To identify seafarers with the highest stress levels and related risk factors	ANOVA analysis; sample of 162 male seafarers working on seven tankers	Engine department personnel and contract employees showed higher stress levels compared to deck crew. Engine crew also reported lower job satisfaction and self-control than deck crew.
5	R.S. Bridger, K. Brasher, A. Dew, S. Kilminster [19]	Job stressors in naval personnel serving on ships and in personnel serving ashore over a twelve month period	To compare stress conditions at baseline (Phase 1) and after 12 months (Phase 2)	Cross-sectional study, sample of 4,949 personnel	In Phase 1, the primary stressor was inability to disengage from work (excessive workload), contributing more to seafarers than shore personnel. In Phase 2, low workload, lack of autonomy and control, and dissatisfaction with living conditions predicted stress among seafarers.
6	Marcus Oldenburg, Hans-Joachim Jensen, Ute Latza and Xaver Baur [20]	Seafaring stressors aboard merchant and passenger ships	To identify stress risk factors among seafarers compared with shore workers	Cross-sectional study, sample of 134 seafarers	Key stress risk factors included gender, marital status, separation from family, time pressure, long working hours, heat exposure, and inadequate qualifications among crew members. Seafarers worked long hours, leading to high time-pressure stress.
7	Brice Lodde, Dominique Jegaden, David Lucas, Michel Feraud, Yves Eusen, Jean-Dominique Dewitte [21]	Stress in Seamen and Non Seamen Employed by the Same Company	To compare stress risk factors between seafarers and non-seafarers	Chi-square test comparing 74 seafarers and 74 non-seafarers	Significant differences were found in job pressure and social support between groups. Among seafarers, education level, decision-making autonomy, job pressure, psychological stress, and interpersonal relationships influenced occupational stress.
8	Anna-Liisa Elo [3]	Health and stress of seafarers	To examine high stress conditions among seafarers and associated risk factors	Chi-square test; sample of 591 seafarers	Seafaring occupations showed higher stress levels compared to other occupations due to noise, heat, waves, and onboard environmental conditions. Engine crew experienced the highest stress due to hot and isolated working environments. Differences by age and job category were not highly significant.

DISCUSSION

Based on the review findings, fourteen occupational stress risk factors among seafarers were identified: age, gender, education level, marital status, smoking status, years of service, employment status, excessive workload, low workload, job-related boredom, job demands, time pressure, interpersonal relationships, and job security.

Research on age as a variable associated with occupational stress has expanded considerably. Several studies indicate that older workers often face greater job pressure than younger workers due to physical limitations, increased health risks, gaps in adapting to new technologies, and higher levels of responsibility. Age-related physical changes and life-stage transitions—from childhood to adolescence, young adulthood, middle age, and older age—may also trigger stress and even depression due to physical and psychological adjustments [15,22].

Gender-related characteristics have also been associated with occupational stress. Most studies explain that gender differences in biological form, traits, and functions often influence the allocation of roles, tasks, and responsibilities in the workplace, thereby contributing to variations in stress levels between men and women [20,22].

Education level has been reported as a contributing factor to both organizational performance and individual coping capacity. Education reflects an individual's efforts to develop attitudes, cognitive patterns, and behaviors beneficial for future challenges, whether through formal or non-formal institutions. Higher educational attainment is generally associated with greater maturity in decision-making and the ability to manage complex problems, which influences workers' capacity to adapt to job demands [21,23].

Harmonious marital relationships and spousal support can help prevent or reduce stress levels. Several studies conclude that strong emotional support from partners or family members plays a crucial role in minimizing the negative impacts of work, making workloads more tolerable for individuals [20,24].

Smoking habits have been identified as a risk factor for occupational stress among seafarers. A study by Sliskovic and Penezi reported higher smoking rates onboard compared to at home. Seafarers experiencing high stress levels tended to smoke more frequently, indicating an association between smoking and occupational stress. High smoking intensity also poses long-term health risks [16].

Length of service is commonly associated with increased experience and job understanding, which may enhance the ability to cope with workplace stressors. Workers are entitled to protection from psychosocial risks as part of occupational safety and health (OSH) efforts. However, prolonged service may also lead to stress due to repetitive and monotonous routines, resulting in boredom. The longer an individual works, the greater the responsibilities and workload, which, combined with limited variation or refreshing activities, may exacerbate stress [17,25].

Employment status differentiates permanent from contract workers. Several studies indicate that employment status influences stress levels, particularly regarding job security. Permanent employees generally report lower stress levels than temporary employees due to greater employment stability and future certainty [18,26].

Excessive workload (work overload) occurs when job demands exceed an individual's capacity. Many studies report that overly heavy workloads create pressure and negatively affect performance outcomes. Conversely, low workload—when job demands are below a worker's capacity—can lead to boredom, frustration, and reduced creativity and productivity [19,27].

Job-related boredom arises from repetitive and monotonous routines. If not properly managed, boredom may negatively affect employee performance. Workers experiencing boredom are more likely to develop mental strain, fatigue, emotional disturbances, and concentration difficulties, which may ultimately result in occupational stress [17,26].

Job demands exceeding an individual's coping capacity may also trigger stress. Unrealistic daily targets, pressure to work continuously at a rapid pace, and the threat of punishment for unmet targets—without corresponding rewards for achievement—create a high-pressure environment that increases stress levels [21,28].

Time pressure is one of the primary stressors experienced by seafarers. A study by Oldenburg reported that time pressure and fast-paced activities were mentioned 30 times as the most important stress factor, with approximately 44% of respondents rating time pressure as highly stressful. This burden is particularly pronounced among ship officers who carry significant safety and operational responsibilities, compounded by substantial administrative tasks. Long and irregular working hours further intensify fatigue and health risks, making time pressure a critical contributor to occupational stress [20].

Interpersonal relationships involve reciprocal interactions characterized by mutual dependence. Workers who maintain positive interpersonal relationships are more likely to collaborate effectively and avoid workplace conflicts. Studies indicate that workers with poor interpersonal relationships are twice as likely to experience occupational stress compared to those with harmonious relationships. Sudden changes in interpersonal dynamics may also create psychological pressure due to the need for rapid adaptation [21,29].

Job security refers to workers' psychological perceptions regarding the continuity of their employment within an organization. It reflects the extent to which companies provide certainty through promotion opportunities and long-term career development. Studies suggest that job security enhances well-being and reduces stress arising from uncertainty about future employment [3,30,31].

This study has several limitations. First, most reviewed literature originated from developed countries with healthcare systems different from Indonesia, limiting contextual relevance. Second, the literature covered publications from 1985 to 2021 due to limited research specifically addressing seafarers' occupational stress risk factors. Third, differences in work environments between Indonesia and other countries may limit generalizability, and family-related factors outside the workplace were insufficiently explored.

Future research is recommended to focus on literature published within the last 5–10 years. Additionally, greater exploration of family-related stress risk factors among seafarers is needed to complement workplace-focused findings and provide comprehensive input for companies in developing appropriate intervention strategies.

CONCLUSION

Occupational stress among seafarers is influenced by multiple interrelated risk factors. Fourteen key risk factors were identified: age, gender, education level, marital status, smoking status, years of service, employment status, excessive workload, low workload, job-related boredom, job demands, time pressure, interpersonal relationships, and job security. Therefore, comprehensive stress management strategies involving companies, families, and healthcare institutions are essential to effectively prevent and manage occupational stress among seafarers.

Ethical consideration, competing interest and source of funding

-As this study was a systematic literature review utilizing secondary data from previously published articles, ethical approval was not required. However, all sources were appropriately cited and analyzed in accordance with established academic and research integrity standards.

-There is no conflict of interest related to this study.
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