International Journal of Scientific and Management Research
Volume 9 Issue 3 (March) 2026
ISSN: 2581-6888
Page: 46-54

Analysis of Factors Associated with The Incidence of Burnout Among Offshore Workers

Sutrisno[1*], Budiman[2], & Novie E. Mauliku[3]
[1]Master of Pubic Health Study Program, Faculty of Health Science and Technolgy Jenderal Achmad Yani University of Cimahi, **Indonesia**
[2]Lecturer of Pubic Health Study Program, Faculty of Health Science and Technolgy Jenderal Achmad Yani University of Cimahi, **Indonesia**
[3]Lecturer of Pubic Health Study Program, Faculty of Health Science and Technolgy Jenderal Achmad Yani University of Cimahi, **Indonesia**
DOI - http://doi.org/10.37502/IJSMR.2026.9304

Abstract

Burnout is a condition of physical and emotional exhaustion characterized by negative attitudes toward work, including emotional exhaustion, depersonalization, and reduced personal accomplishment. This condition affects cognitive and behavioral functioning and has important implications for occupational safety and health (OSH). This study aimed to analyze factors associated with burnout among offshore workers aboard the Belait CSS-2 vessel. A cross-sectional design was used with 133 workers selected through proportionate random sampling. Data were collected using validated instruments, including the Job Demands–Resources (JD-R), Job Stress Scale (JSS), Quantitative Workload Inventory (QWI), and Maslach Burnout Inventory–General Survey (MBI-GS). Data were analyzed using Chi-square tests and multiple logistic regression at a 95% confidence level. There were no significant associations were found between burnout and age (p=0.538), sex (p=0.502), education (p=0,094), marital status (p=0,980), tenure (p=0,566), job type (p=0,934), family distance (p=0,308), or working hours (p=0,871). Significant associations were observed between burnout and job demands ($p < 0.001$), job stress ($p < 0.001$), and workload (p=0,002). Simultaneously, job demands (p=0,0001) and job stress (p=0,0001) were identified as strong predictors of burnout.
Job demands emerged as the most dominant predictor of burnout among offshore workers. OSH practitioners implement systematic measures to identify and control physical and mental fatigue among workers.

Keywords: burnout; occupational safety and health; offshore; workers; job demands

1. Introduction

Offshore workers are at elevated risk of fatigue and burnout due to high job stress and workload, which affect not only physical health but also mental well-being.1 Burnout is a syndrome encompassing emotional exhaustion, depersonalization, and reduced personal accomplishment; it commonly occurs among individuals engaged in intensive work with other people.2 Although data on the prevalence of occupational burnout in Indonesia remain scarce, evidence from other settings is concerning. The National Safety Council of the United States reports that 13% of workplace injuries are associated with fatigue and that approximately 97% of workers are exposed to at least one fatigue risk factor at work. Surveys of industrial workers

in the United States have indicated burnout prevalence of roughly 58%.3 In Indonesia, 91 cases of occupational disease and 370,747 work-related accidents were recorded in 2023.

According to the International Association of Oil & Gas Producers (IOGP), physical and mental fatigue among offshore personnel arises from elevated job demands such as long working hours, rotating shifts, extreme environmental conditions, and social isolation that limit physical and psychological recovery. Fatigue impairs cognitive capacity by slowing reaction times, reducing concentration, and degrading decision-making, thereby increasing the likelihood of operational errors.5 Prior research has identified several predictors of burnout, including: (1) organizational factors such as work overload, emotional labour, lack of autonomy and influence at work, role ambiguity and conflict, inadequate supervision, perceived injustice, insufficient perceived social support, and adverse working hours; and (2) individual factors such as personality traits and coping strategies. Socio-demographic characteristics (e.g., age, sex, marital status) have also been investigated as possible predictors, although findings are often inconsistent.

Workload has been shown to have a significant positive association with burnout: higher workload increases stress and fatigue, raising the risk of burnout.8 Conversely, satisfaction with or an appropriate fit of workload tends to be negatively associated with burnout.9 Other studies report that age, sex, occupation, job type, seniority, and marital status can significantly influence burnout levels.

A preliminary pilot assessment using the Maslach Burnout Inventory — General Survey (MBI-GS) was conducted with 20 randomly selected workers; the mean MBI-GS score was 50.85 out of a possible 96, corresponding to a severe level of burnout. Given these concerns, the present study aims to identify the most dominant factor contributing to burnout among offshore workers aboard the Belait CSS-2 vessel.

2. Material and Methods

This observational study employed a cross-sectional design and was conducted from 1 September to 30 November 2025 aboard the Belait CSS-2 vessel. The study population comprised 200 offshore workers; a sample of 133 workers was selected using probability proportional-to-size random sampling stratified by job category (Client, Catering, Scaffolder, Outstation, Coiled Tubing Unit, and Marine Crew). Ethical approval was obtained from the Health Research Ethics Committee, Faculty of Health Science and Technology (FITKes), Universitas Jenderal Achmad Yani Cimahi (Approval No. 110/KEPK/FITKes-Unjani/IX/2025; 23 September 2025).

Research data collection was carried out using the following questionnaires:

1.1 Demographic questionnaire

A structured demographic questionnaire was administered to collect information on age, sex, marital status, work tenure, job type, distance from family, and working hours.

1.2 Job Demands–Resources Questionnaire (JD-R)

The JD-R instrument included 23 items measuring various dimensions of job demands (work pressure, cognitive demands, emotional demands, role conflict, and hassles). The scale demonstrated good internal consistency, with Cronbach's alpha coefficients of 0.848

for job demands and 0.849 for job resources.11 Responses were recorded on a 5-point Likert scale: 1 = "never", 2 = "sometimes", 3 = "usually", 4 = "often", and 5 = "very often.

1.3 Job Stress Scale Questionnaire (JSS)

The Job Stress Scale consisted of nine items assessing two dimensions: time stress (perceived continual pressure) and anxiety (work-related worry). Validation studies reported average item-to-item correlations < 0.50 and a Cronbach's alpha ≈ 0.81.12 In this context the instrument yielded a mean score of 72.89 ± 13.592 and demonstrated reliability with Cronbach's alpha = 0.863.13 Items were rated on a 5-point Likert scale: 1 = "strongly disagree", 2 = "disagree", 3 = "undecided", 4 = "agree", and 5 = "strongly agree."

1.4 Quantitative Workload Inventory (QWI)

The QWI assessed perceived workload using five items addressing task quantity, the effort required, and time available for task completion. Confirmatory factor analysis performed on a large sample (n = 3,368) indicated excellent model fit (GFI = 0.993; CFI = 0.979; RMSEA = 0.060; χ^2 = 52.515). Item loadings ranged from 0.507 to 0.833 (all $p < 0.001$) and R^2 values were between 0.402 and 0.694.14 Response options were provided on a 5-point frequency scale: 1 = "less than once a month or never", 2 = "once or twice a month", 3 = "once or twice a week", 4 = "once or twice a day", and 5 = "several times a day."

1.5 Maslach Burnout Inventory-General Survey (MBI-GS)

The MBI-GS is a 16-item instrument measuring three burnout dimensions: exhaustion, cynicism, and professional efficacy. Confirmatory factor analyses reported that the instrument's items are valid and the overall scale demonstrated acceptable fit; no items required elimination.15 Reliability testing yielded Cronbach's alpha coefficients of 0.83 (frequency) and 0.84 (intensity) for the total scale. Subscale reliabilities were: exhaustion (α = 0.89 frequency; 0.86 intensity), professional efficacy (α = 0.74 frequency; 0.74 intensity), and cynicism (α = 0.77 frequency; 0.72 intensity).16 In addition, the MBI-GS has been reported to achieve very high internal consistency (α = 0.963) in similar worker populations.17 Items were rated on a 7-point frequency scale: 0 = "never", 1 = "a few times a year", 2 = "once a month or less", 3 = "a few times a month", 4 = "once a week", 5 = "a few times a week", and 6 = "every day."

Bivariate associations were tested using the Chi-square test. Multivariate analysis was conducted using multiple logistic regression to examine the simultaneous effects of independent variables on burnout. All statistical tests were evaluated at a 95% confidence level (α = 0.05).

3. Result and Discussion

The relationships between participant characteristics, study variables, and the occurrence of burnout among offshore workers aboard the Belait CSS-2 are summarized in Table 1.

Table 1 Relationship between Characteristics and Variables with Burnout Incidence (n = 133)

No.	Variables	Burnout				Total		p_{value}	OR (95% CI)
		Moderate		High					
		n	%	*n*	%	*n*	%		
1.	Age								
	Not at Risk	53	73,6	19	26,4	72	100	0.538	1,095 (0,876 – 1,369
	At Risk	41	67,2	20	32,8	61	100		
	Total	94	70,7	39	29,3	133	100		
2.	Gender								
	Male	93	71	38	29	131	100	0.502	1,420 (0,354 – 5,702)
	Female	1	50	1	50	2	100		
	Total	94	70,7	39	29,3	133	100		
3.	Education								
	Higher Education	35	81,4	8	18,6	43	100	0.094	1,242 (1,009 – 1,527)
	Primary Education	59	65,6	31	34,4	90	100		
	Total	94	70,7	39	29,3	133	100		
4.	Marital Status								
	Single	15	68,2	7	31,8	22	100	0.980	0,958 (0,703 – 1,305)
	Married	79	71,2	32	28,8	111	100		
	Total	94	70,7	39	29,3	133	100		
5.	Work Period								
	> 6 years	39	67,2	19	32,8	58	100	0.566	0,917 (0,732 – 1,149)
	≤ 6 years	55	73,3	20	26,7	75	100		
	Total	94	70,7	39	29,3	133	100		
6.	Type of Work								
	Client, Catering, Scaffolder, Outstation	53	69,7	23	30,3	76	100	0.934	0,970 (0,778 – 1,208)
	Coiled Tubing Unit, Marine Crew	41	71,9	16	28,1	57	100		
	Total	94	70,7	39	29,3	133	100		
7.	Family Distance								
	Near (≤ 1 day)	73	68,2	34	31,8	107	100	0.308	0,845 (0,673 – 1,061)
	Far (> 1 day)	21	80,8	5	19,2	26	100		
	Total	94	70,7	39	29,3	133	100		
8.	Working Hours								
	≤ 30 Hours	62	69,7	27	30,3	89	100	0.871	0,958 (0,763 – 1,202)
	> 30 Hours	32	72,7	12	27,3	44	100		
	Total	94	70,7	39	29,3	133	100		
9.	Job Demands								
	Low	54	90	6	10	60	100	0.0001	
	Moderate	32	69,6	14	30,4	46	100		
	High	8	29,6	19	70,4	27	100		
	Total	94	70,7	39	29,3	133	100		
10.	Job Stress								

	Low	42	85,7	7	14,3	49	100	0.0001
	Moderate	39	84,8	7	15,2	46	100	
	High	13	34,2	25	65,8	38	100	
	Total	94	70,7	39	29,3	133	100	
11.	Workload							
	Low	41	77,4	12	22,6	53	100	0.002
	Moderate	39	79,6	10	20,4	49	100	
	High	14	45,2	17	54,8	31	100	
	Total	94	70,7	39	29,3	133	100	

Table 1 shows that there were no significant associations between burnout and the following worker characteristics: age (p=0,538), sex (p=0,502), education (p=0,094), marital status (p= 0,980), tenure (p=0.566), job type (p=0,934), distance from family (p=0,308), and working hours (p=0,871). In contrast, significant associations were observed between burnout and job demands ($p < 0.001$), job stress ($p < 0.001$), and workload (p=0,002).

Table 1 Multivariate Modeling of Burnout Incidence in Offshore Workers

No.	Variables	β	p_{value}	*OR* (95% CI)
1.	Job Demands			
	Low	-		-
	Moderate	1,708	0.0001	5,517 (1,661 – 18,318)
	High	2,751		15,653 (3,835 – 63,891)
2.	Job Stress			
	Low	-		-
	Moderate	0,668	0.0001	1,951 (0,547 – 6,956)
	High	2,475		11,876 (3,337 – 42,270)
3.	Workload			
	Low	-		-
	Moderate	-0,590	0.583	0,554 (0,172 – 1,783)
	High	-0,126		0,882 (0,229 – 3,401)
	Constant	-3,095		

Multivariate results presented in Table 2 indicate that several variables retained a statistically significant role in predicting burnout when examined simultaneously. Specifically, job demands and job stress emerged as significant predictors of increased probability of burnout ($p < 0.05$). Workers exposed to moderate job demands had 5.5 times greater odds of experiencing burnout compared with those reporting low job demands, while workers exposed to high job demands had 15.6 times greater odds (reference = low demands). In addition, workers with high job stress exhibited 11.9 times greater odds of burnout compared with workers with low job stress. By contrast, workload did not show a statistically significant association with burnout in the multivariate model ($p > 0.05$).

Overall, these findings identify job demands as the most dominant variable in the model, exerting the largest influence on burnout risk compared with the other covariates, as evidenced by its strength of association and statistical significance.

The present study found a significant association between job stress and burnout among offshore workers. Time-related stress was reported as the most prominent dimension of job stress experienced by these workers, reflecting prolonged periods of perceived pressure. This pattern appears to be driven in part by high operational demands placed on the workforce to meet production targets and maintain competitiveness; additionally, leave or vacation may only be taken while on shore, meaning that personnel remain on duty without leave throughout offshore rotations (typically one-month shifts), which exacerbates sustained time pressure.

The observed relationship between job stress and burnout is consistent with previous research. For example, Wu et al. (2021) reported significant associations between burnout, job stress, and workload among employees.18 Elshaer et al. (2018) similarly found that job stress was associated with emotional exhaustion and reduced personal accomplishment, although not with depersonalization.19 Woranetipo and Chavanovanich (2021) also reported positive associations between workload and burnout, particularly for emotional exhaustion and cynicism.

Tang and Li (2021), in a study of 1,638 workers, demonstrated that greater job stress was associated with higher levels of emotional exhaustion and depersonalization and with lower perceived personal accomplishment, indicating that increasing job stress exacerbates all core dimensions of burnout.

Stress is a state of tension that creates imbalance between physical and psychological functioning and can adversely affect emotion, cognition, and overall well-being. Job stress denotes work-related stressful experiences; when sustained, it undermines emotional stability, self-confidence, and sense of achievement.

The study also identified a significant positive relationship between workload and burnout: as perceived workload increased, so did the prevalence and severity of burnout. Operational roles that require rapid and intense effort, such as catering staff who must prepare meals quickly to meet the nutritional needs of the crew, and coiled tubing unit personnel who undertake physically demanding drilling tasks are particularly vulnerable. These findings align with Carvalho et al. (2019), who reported significant relationships between workload and both physical and psychological fatigue.

Failure to address job stress and workload has consequences for performance and organizational outcomes. Murali et al. (2018) found that excessive workload negatively impacts employee performance and is positively associated with time pressure, reduced motivation, and role ambiguity.

Taken together, these results indicate that job stress and workload are important predictors of burnout in offshore settings, although exposure varies across occupational roles and individual coping capacities. Different professions within the offshore population experience distinct stressors, and individual differences in coping strategies moderate the impact of these demands.

Critically, job demands emerged as the single most dominant factor influencing burnout in this study. This observation is consistent with Lee et al. (2024), who reported that emotional demands, role conflict, and workplace disruptions are significantly related to burnout.26 Bakker and de Vries (2021) characterize job demands as tasks and obligations assigned to workers to increase productivity within specified timeframes; excessive engagement with such demands can produce physiological and psychological strain, precipitating burnout and

reducing motivation and performance.27 Ardiani et al. (2024) likewise documented a positive and significant effect of job demands on burnout risk.

According to the Job Demands–Resources (JD-R) model, excessive job demands deplete psychological resources and lead to burnout when compensatory resources (e.g., social support, job autonomy, adequate rest, recognition) are insufficient.

The working conditions aboard Belait CSS-2 characterized by long shifts, isolation, and intensive operational tasks create a relatively homogeneous exposure to high job demands across workers, which amplifies cumulative strain (e.g., sleep disruption, repeated acute cognitive or physical demands) and thereby increases burnout risk.

4. Conclusion

This study concludes that job demands are the most dominant factor associated with burnout among offshore workers on the Belait CSS-2 vessel. Job stress and workload are also related to burnout, although job demands showed the strongest and most consistent effect in multivariate analysis. Interventions that systematically identify and mitigate excessive job demands and work-related stress are therefore recommended to protect worker well-being and operational safety.

Acknowledgements

We gratefully acknowledge the crew of the Belait CSS-2 for their cooperation during data collection and thank Jenderal Achmad Yani University of Cimahi for academic guidance and support.

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