Spektrum Industri
Vol. 21, No. 1, 2023, pp. 21-31
ISSN 1693-6590
http://journal3.uad.ac.id/index.php/spektrum

Relationship between Demographic and Employment Parameters with Job Stress Among Employees of an Oil Field in Western Iran

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ARTICLE INFO

Article history
Received March 17, 2023
Revised April 12, 2023
Accepted April 30, 2023

Keywords
Occupational Stress;
Job Stress;
Oil and Gas Industry;
Osipow Questionnaire

ABSTRACT

Reducing the workforce's health condition is one of the significant challenges in industries. Various studies have shown that efficiency in industries has a crucial relationship with the workforce's health level. In addition, the employee's health can be affected by different variables such as stress or other job parameters and the type of work system. The present study was conducted to analyze the relationship between these parameters and job stress in an oil field. This work was a cross-sectional and descriptive-analytic investigation. The statistical population included workers that were present for duty (About 250 People). The data were collected through Osipow Occupational Stress Questionnaire, and then analyzed using the SPSS Statistics software (Ver. 22). The results show that the level of education has a significant relationship with most subscales of the questionnaire. Marital status and work experience had the lowest effect on job stress. Determining stress levels based on the classification related to the job group and the type of shift work system is similar, and these variables on the subscales affected the workload (p-value=0.001) and responsibility (p-value=0.000). Also, the results show that among the job groups, logistics (score: 197.4) and security (score: 177) have the highest and lowest tension, respectively. The results of this study showed that the effect of occupational variables on the defined ranges in the occupational stress questionnaire is different. These differences show that occupational stress has a dynamic nature, and any changes in the environmental dimensions can change the level of occupational stress.

1. Introduction

One of the most important capitals of any organization is human resources (HR). The progress of organizations because of the maximum use of HR skills depends on their physical and mental health (Nadem et al., 2007). Job stress is the result of work-related stressors (Naseeb et al., 2019). The nature

of work is a vital factor in the level of stress (Membrive-Jiménez et al., 2022). The United Nations (UN) has called occupational stress a disease of the 20th century, and the World Health Organization (WHO) has called it an epidemic (Alefi et al., 2020). Occupational stress is harmful physical and mental responses (Babanataj et al., 2019). Occupational stress is usually due to a lack of coordination between job requirements and individual abilities, support resources, or needs (Lowenstein et al., 2004). Occupational stress is an emotional, cognitive, behavioral, and psychological reaction to harmful aspects of work and the workspace (Azemi et al., 2022). We can analyze the effects of occupational stress in three areas; physical, psychological, and behavioral consequences.

In the psychological domain, work stress causes work dissatisfaction and eventually leads to problems like depression and anxiety (Knezevic et al., 2011; Masath, 2023; Dodanwala & San Santoso, 2021). Studies show that occupational stress can lead to physical complications such as cardiovascular disorders, digestive and sleep disorders, also behavioral problems such as drug use, overeating or anorexia, and aggressive behaviors towards colleagues and family. Occupational stress may also, from the point of view of the organization, lead to work absence, leaving the job, and an increase in accidents (Hajiamini et al., 2011; Ghaedamini et al., 2022; Membrive-Jiménez et al., 2022; Saedpanah et al., 2023; Rostamzadeh et al., 2023).

From the study by Zameni et al, it can derive to, the occupational health in large industries can be influenced by different parameters. Assessing the interactions among these parameters in health investigation and the affecting factors is very significant. So, the health level in challenging industrial environments can be affected by shift work as a root cause. This root cause, along with job satisfaction, has a significant effect on increasing stress levels and reducing health levels (Zameni et al., 2021). Rani et al mentioned that, to manage the mental health state among workers, it is crucial to determine which psychosocial risk challenges donate to the onset of stress. Ultimately, to develop individually and organizationally mandated interventions, relevant psychosocial risk factors in organizations must be known (Rani et al., 2022). In addition, Mathisen believes that the organization might identify psychosocial hazards that creating workers' psychological and social pressures at the workplace, however; It is essential to have proper approaches to manage this type of hazard (Mathisen et al., 2022). Based on the Naji et al and Saleem et al studies, psychosocial hazards have a powerful and adverse consequence on organizations due to employee health and behavior. As a result, companies must have policies and mechanisms in place to deal with this kind of risk (Naji et al., 2022 and Saleem et al., 2022). In this regard, the organizations should provide avenues for managing environmental stressors among workers such as reconsider the living conditions, work resources, and requirements for shift schedule, health care, appreciation, and rewards (Rani et al., 2022).

The oil industry has a specific place in the oil producer countries (Askari et al., 2021). The high number of workers in this industry requires further study in the field of health at work (Zare et al., 2007; Askari et al., 2022). Investigations show that despite the importance of the oil and gas industry, limited studies have been conducted on occupational stress among oil and gas workers in Iran (Asadi & Hosseini, 2019). As a result, this cross-sectional descriptive study was conducted in the spring of 2023 to investigate the prevalence of occupational stress among employees of different occupational groups of an oil field in the west of Iran is in order to study sources of occupational stress.

2. Method

2.1. Osipow questionnaire

The steps of the study were carried out based on Fig. 1. In conducting the survey for each person, after introductions of study aims and assuring them that privacy issues are respected, data were collected. The data-gathering tool used in this study was the occupational stress revised questionnaire, developed by Osipow (Keikavoosi-Arani & Someah, 2021). The standard workplace stress questionnaire was first used by Osipow and his colleagues in 1987 (Najimi et al., 2012). It has been designated as an occupational stress measurement tool and is used in different studies in the world (Keikavoosi-Arani & Someah, 2021; Najimi et al., 2012; Decker & Borgen, 1993). The validity of

this method has been proven and its internal reliability by Cronbach's alpha is 87% (Najimi et al., 2012). This questionnaire contains 60 questions with five options based on the Likert spectrum (never, sometimes, often, usually, and most of the time) that measures job stress from 6 aspects such as; 1- Role workload (person's situation concerning the demands of the work environment), 2- role inadequacy (proportion of skill levels, education, individual characteristics with the needs of the work environment), 3- role duality (a person's awareness of the priorities of the work environment and evaluation criteria), 4- role scope (contradictions that a person has in terms of work conscience and evaluates the role that is expected of him/her in the work environment), 5-responsibility (a person's sense of responsibility in terms of the efficiency and well-being of others in the work environment) and 6-physical environment (unsuitable physical conditions of the work environment to which the person is exposed) (Keikavoosi-Arani & Someah, 2021; Najimi et al., 2012; Decker & Borgen, 1993).

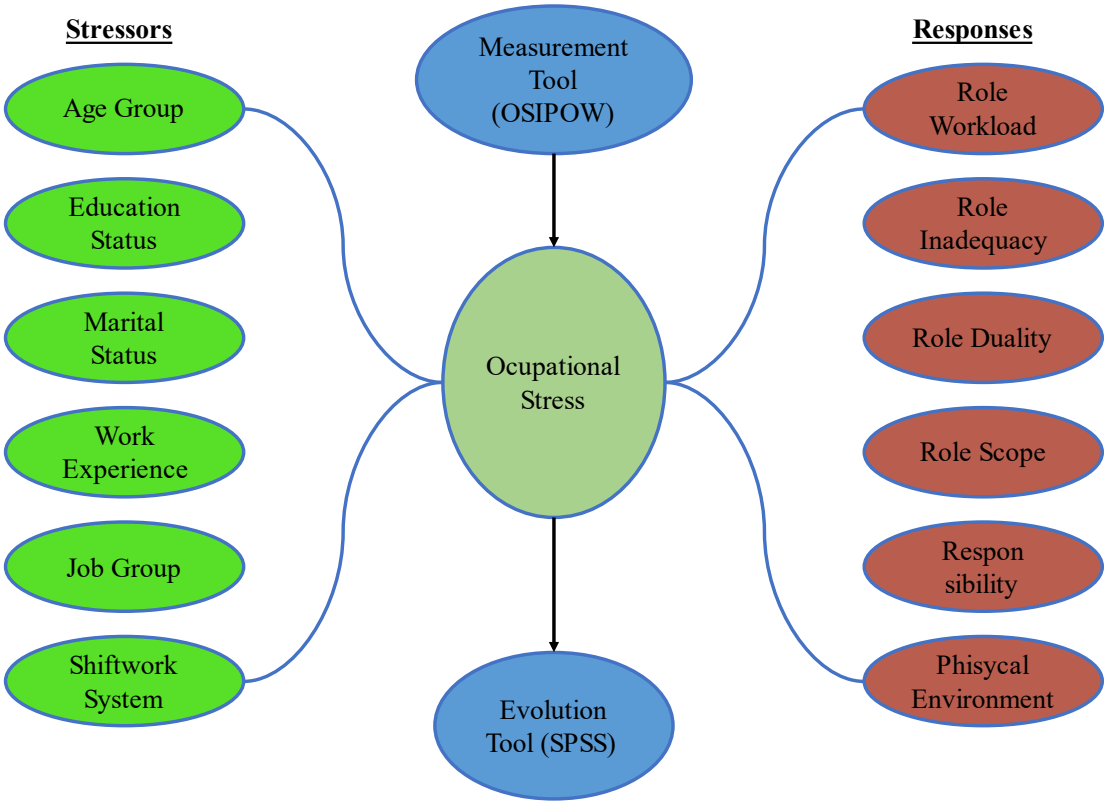

Fig. 1. Study steps flow diagram

2.2. Sampling and Sample Size Determining

According to equation (1), we calculated the sample size to be 149.08. We prepared the questionnaire online using Google Forms. The participants completed about 150 questionnaires after three working days. After reaching the required answers number, we downloaded the related document from the Google form platform and stopped receiving more answers.

$$n = \frac{\frac{z^2(pq)}{d^2}}{1 + \frac{1}{N}\left[\frac{z^2(pq)}{d^2} - 1\right]} \quad (1)$$

Where, N is the Society size, p is the trait distribution percentage in society, q is the percentage of people who do not have the trait under study, d is the difference between the real proportion of the trait in the society and the amount of the researcher's estimate for the existence of that trait.

Note:

- Considering that the amount of p and q was not known, we used their maximum value of 0.5.
- The statistic is $z = t$ and there is no problem if you use t instead of z. At the 5% error level, the value of z is equal to 1.96 and $Z2$ is equal to 3.8416.
- Sampling accuracy depends on the d factor. As a result, for the most accurate sampling, we used the maximum d value of 0.05.

2.3. Statistical analysis

In order to analyze data, we used of SPSS software (version 22). We used Cronbach's alpha test to measure the internal consistency of the questionnaire. We performed another analysis step in the following order after obtaining an alpha coefficient of 0.804.

a) Questions 1 to 10 express the role workload, so we converted the answers to these questions into a factor using dimension reduction. It was done in the same way for other answers and finally the answers were converted into 6 factors.
b) Using the Kruskal-Wallis test, we investigated the relationship between the factors and job stress.

3. Results and Discussion

This research classified the information of the participants in this study according to Table 1 based on age group, education level, marital status, work experience, job group, and type of shift work system. The age group of 25–35 years had the most participation in the study (97 people; 64.7%). The least number of participants was from the age group of more than 45 years (9 people; 6.0%). The level of education with a bachelor's degree was the most frequent, with the number of 80 people (53.3%). A Hundred nine of the participants were married (72.7%). Work experience between 5–10 years (94 people; 62.7%) had the highest frequency, and 15–20 years (4 people; 2.7%) had the lowest frequency. Among occupational groups, most participation was related to the health, safety, and environment (HSE) group (38 people; 25%). In total, 59 people (39.3%) in the 14-14 shift system and 11 people (7.3%) in the 5-5-5 shift system had the highest and the lowest participation related to this variable, respectively.

Table 1. Descriptive statistics of the demographic information

Categories		Frequency	Percent	Valid percent	Cumulative percent
Age group	**25-35 years old**	97	64.7	64.7	64.7
	35-45 years old	44	29.3	29.3	94.0
	More than 45	9	6.0	6.0	100
Education status	**Diploma**	9	6.0	6.0	6.0
	Associate degree	18	12.0	12.0	18.8
	Bachelor degree	80	53.3	53.3	71.3
	Master degree	37	24.7	24.7	96.0
	Doctorate degree	6	4.0	4.0	100
Marital status	**Single**	41	27.3	27.3	27.3
	Married	109	72.7	72.7	100
Work experience	**Less than 5 years**	30	20.0	20.0	20.0
	5-10 years	94	62.7	62.7	82.7
	10-15 years	22	14.7	14.7	97.3
	15-20 years	4	2.7	2.7	100
Job group	**Administrative**	12	8.0	8.0	8.0
	HSE	38	25.0	25.0	33.3
	Logistic	14	9.3	9.3	42.7
	Maintenance	37	24.7	24.7	67.3
	Operation	37	24.7	24.7	92.0
	Security	12	8.0	8.0	100
Shiftwork system	**14-14**	59	39.3	39.3	39.3
	20-10	34	22.7	22.7	62.0
	5-5-5	11	7.3	7.3	69.3
	7-7-14	46	30.7	30.7	100

Table 3 and Fig. 2 show that by calculating the total scores of all questionnaires, among occupational stressors, the lowest value is related to role duality (Score; 4117), and among other stressors, role inadequacy (Score; 5334), responsibility (Score; 5212), and role scope (Score; 4777), respectively, have created the most tension.

Table 2. Job variables effect on the questionnaire subscales

Variables	Test Results	Role Workload	Role Inadequacy	Role Duality	Role Scope	Responsibility	Physical Environment
Age Group	Kruskal-Wallis H	0.97	1.80	3.46	0.44	5.77	1.55
	df.	2	2	2	2	2	2
	Sig.	0.61	0.40	0.17	0.80	0.05	0.46
Education	Kruskal-Wallis H	12.27	20.67	15.73	23.12	19.34	4.83
	df.	4	4	4	4	4	4
	Sig.	0.01	0.000	0.003	0.000	0.001	0.35
Marital Status	Kruskal-Wallis H	1.02	4.68	0.43	1.18	1.26	0.03
	df.	1	1	1	1	1	1
	Sig.	0.27	0.03	0.50	0.27	0.26	0.84
Work Experience	Kruskal-Wallis H	3.35	4.20	4.47	4.60	10.03	3.37
	df.	3	3	3	3	3	3
	Sig.	0.34	0.24	0.21	0.20	0.018	0.33
Job Group	Kruskal-Wallis H	20.47	5.90	8.64	6.43	31.53	10.96
	df.	5	5	5	5	5	5
	Sig.	0.001	0.31	0.12	0.26	0.000	0.05
Shiftwork System	Kruskal-Wallis H	15.61	4.55	4.04	4.87	19.46	3.92
	df.	3	3	3	3	3	3
	Sig.	0.001	0.20	0.25	0.18	0.000	0.26

Table 4 and Fig. 3 show that the logistics (Score; 197.4) and security (Score; 177) among the examined job groups have the most and the least tension, respectively. Also, based on Fig. 4, the main factor causing job tension among logistics (Score; 37) and security (Score; 35.67) employees are role duality. Examining the job description of the employees of this unit based on the additional explanations of the participants in the study shows that these people do not have a proper understanding of the criteria of evaluation and prioritization by the organization, for example, the service employees in the logistics unit are dissatisfied with the unclear and variable expectations. In a study conducted by (Azadmarzabadi & Tarkhorani, 2007) the area of role duality is known to be a crucial stress factor. Still, the second and third priorities are different. They are role inadequacy (Score; 34.8) and role workload (Score; 32.6) for logistics employees, while among the security employees, the following priorities are physical environment (Score; 32.67) and the role inadequacy (Score; 29.92), respectively. The role duality among the logistics and security employees is the most significant job stressor. Also, according to Table 2, and based on the Kruskal-Wallis test, examines the significance of the effect of job variables on the questionnaire subscales.

The results showed that role inadequacy with a score of 5334 is the most effective cause of occupational stress in this study. Therefore, it seems that the participants in this study feel that they have the necessary ability to fulfill their role, and their skills and knowledge do not match their job needs (Keikavoosi-Arani & Someah, 2021). The results of the present study confirm the importance of role inadequacy among job stressors, in line with the Asadi et al. study in a gas refinery. Reported that role inadequacy has the most significant relationship between sleep quality and job stress (p-value; 0.001) (Asadi & Hosseini, 2019). Also, the results show that the second occupational stress factor is related to the area of responsibility (Score; 5212).

Spektrum Industri
Vol. 21, No. 1, 2023, pp. 21-31
ISSN 1693-6590

Table 3. Total scores related to occupational stressors

Likert range	Score	Role Workload (Q_1-Q_{10})			Role Inadequacy (Q_{11}-Q_{20})			Role Duality (Q_{21}-Q_{30})			Role Scope (Q_{31}-Q_{40})			Responsibility (Q_{41}-Q_{50})			Physical Environment (Q_{51}-Q_{60})		
		Frequency	Percent (%)	∑score	Frequency	Percent (%)	∑score	Frequency	Percent (%)	∑score	Frequency	Percent (%)	∑score	Frequency	Percent (%)	∑score	Frequency	Percent (%)	∑score
Never		324	21.6	324	258	17.2	258	221	14.7	221	318	19.2	318	258	17.2	258	265	17.7	265
SomeTimes		387	25.8	574	338	22.5	676	179	11.9	358	367	22.5	734	405	27.0	810	385	25.7	770
Often		246	16.4	792	205	13.7	615	173	11.5	519	210	12.0	630	203	13.5	609	151	10.1	453
Usually		273	18.2	1092	339	22.6	1365	354	23.6	1416	245	14.3	980	297	19.8	1188	206	13.7	824
Most of Time		267	17.8	1335	360	24.0	1800	564	37.6	2820	510	32.0	2550	337	22.5	1658	493	32.9	2465
Total		1497	100	4117	1500	100	4714	1491	100	5334	1650	100	5212	1500	100	4550	1500	100	4777

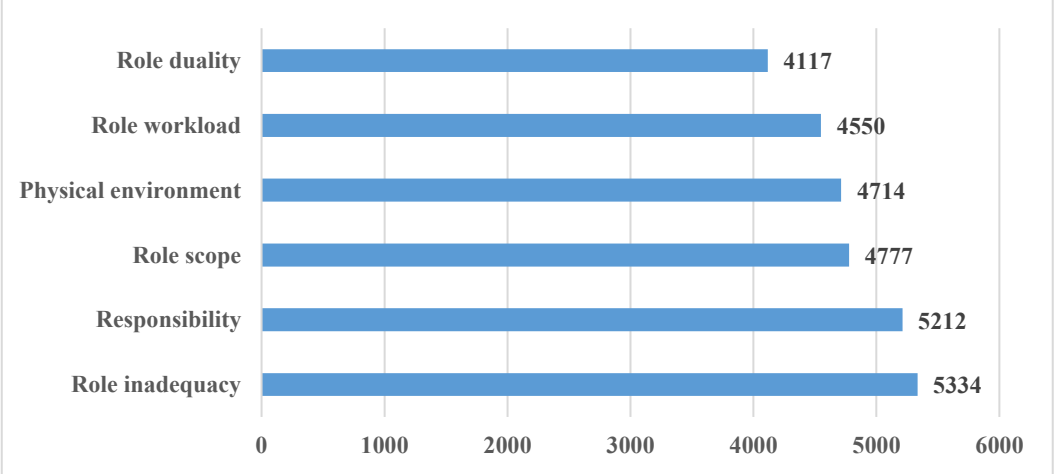

Fig. 2. Total scores related to occupational stressors

Table 4. Scores calculated for occupational stressors by different job groups

Job group	Role Workload	Role Inadequacy	Role Duality	Role Scope	Responsibility	Physical Environment	Average Total Score
Administrative	33.67±4.5	29.83±3.5	29.92±3.3	28.00±3.6	33.25±4.12	23.17±5.04	177.83±4.9
HSE	27.7±2.9	30.5±2	36.56±1.5	32.16±1.1	34.59±1.2	34.64±1.3	196.27±1.7
Logistic	32.6±2.3	34.8±2.5	37±2.6	30.6±0.3	31.4±0.3	30.9±0.3	197.4±1.4
Maintenance	28.95±2.5	31.38±2.48	36.05±2.7	28.89±1.5	29.97±1.3	32.65±2.5	187.89±2.1
Operation	26.1±3.3	32±3	35.2±3.4	28.8±1.6	27.6±2.3	30.8±2.7	180.6±2.7
Security	26.5±4.4	29.92±4.6	35.67±5.3	28.92±4.7	23.33±6.6	32.67±3.6	177±4.9

In the study conducted by (Garbarino et al., 2013) which examined the relationship between stress caused by work and mental health problems, in line with the present study, role inadequacy, and responsibility are identified as the most significant occupational stressors. As well as, the results show that the last occupational stress factor is related to the role duality area. In the study conducted by (Sepahvand et al., 2019) which investigated the relationship between job stress and demographic parameters, in line with the present study, role duality was determined as the last occupational stressor. Field investigations show that reducing the amount of stress in the role duality area can be caused by improving individuals' awareness of priorities, expectations of the work environment, and evaluation criteria. It seems that based on the instructions of the organization regarding the clarification of the

job description and the action to the employee's performance evaluation every three months has been effective in this field.

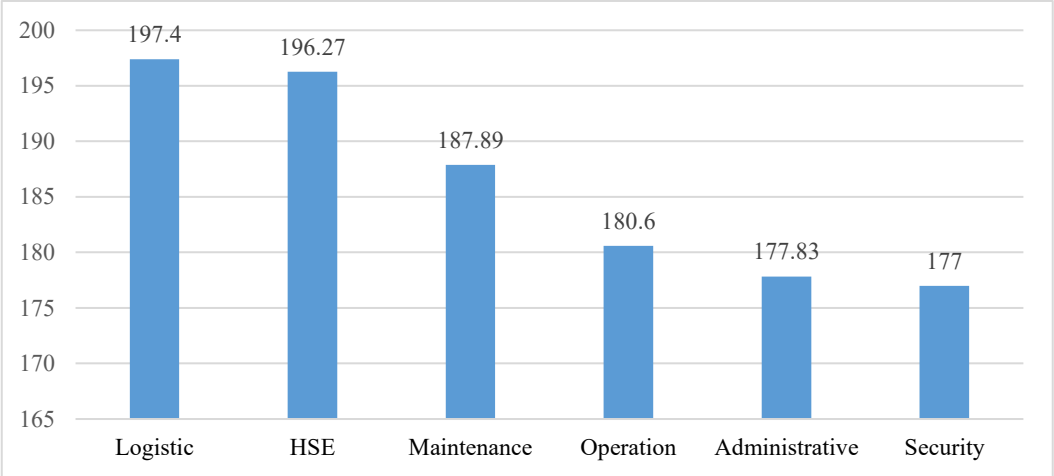

Fig. 3. Average total score calculated for occupational stressors by different job groups

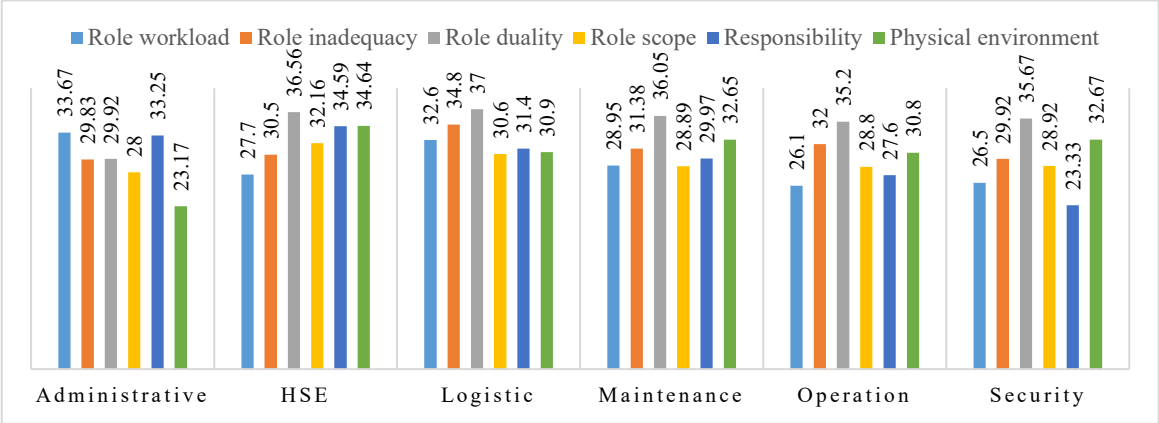

Fig. 4. Average total score calculated for occupational stressors by different job groups

The results show that the level of education has a significant relationship with subscales role workload (p-value = 0.01), role inadequacy (p-value = 0.000), role duality (p-value = 0.003), role scope (p-value = 0.000), and responsibility (p-value = 0.001). Similar studies show that there is a significant relationship between a person's perception of occupational stress and the level of education. For example, the study of (Hajiamini et al., 2011) confirms this correlation. In the present study, we did not observe, a significant relationship between age and job stress. The results of the studies by (Santana et al., 2012) and (Soori & Hatami Sadabadi, 2003) also confirm that there is no significant relationship between age and job stress. While (Azadmarzabadi et al., 2006) reported that job stress increases with age. Perhaps the reason for this issue in the current study was the small number of participants in age groups over 45 years old. The p-values of marital status (0.03) show a significant relationship between this variable with subscales of role inadequacy and responsibility. The significance of the relationship between stress and marital status has been reported differently in various studies, so in Sori et al.'s studeis (Soori & Hatami Sadabadi, 2003; Soori, Ali, & Nasrin, 2011), no significant relationship was found between marital status and any of the occupational stressors, but in a similar study, it was reported that the amount of stress is lower in married people (Azadmarzabadi & Tarkhorani, 2007). Like marital status, work experience (p-values; 0.018) has a significant relationship with role inadequacy and responsibility.

Although in the studies of (Asadi & Hosseini, 2019) and (Sepahvand et al., 2019) no significant relationship was reported between work experience and job stress. Finally, determining the stress level based on the classification related to the job group and the type of shift work system is similar to each other and shows the effect of these variables on subscales workload (p-value = 0.001) and responsibility (p-value = 0.000). According to the definitions, the area of responsibility shows the level of efficiency and well-being of the individual in the work environment, and the workload measures the individual's status regarding the demands of the work environment, (Saleem et al., 2022) the study results confirm the type of job group and the description of its related job duties there is a meaningful relationship with these two areas among the stress parameters. Also, the studies conducted by (Asadi & Hosseini, 2019) and (Sepahvand et al., 2019) the same as the results of the present study, confirm that increased working hours and shift work have a significant relationship with job stress. Also, studies findings by (Ma et al., 2015 and Cho et al., 2014) show that the average stress in shift workers is higher than others. In this regard, it can be said that shift workers, especially night shift workers, are exposed to adverse effects such as reduced sleep quality, increased anxiety levels, increased fatigue levels, and disturbed circadian rhythm due to irregular working hours. Therefore, job needs and workloads in these people are increased compared to others, and they are exposed to a higher level of job stress (Sguera et al., 2016).

4. Conclusion

The results of this study showed that the effect of occupational variables on the defined ranges in the occupational stress questionnaire is different. These differences show that occupational stress has a dynamic nature, and any changes in the work environment and other personal and social dimensions can change the level of occupational stress. Therefore, we recommend controlling job stress in a more specialized manner on the six dimensions declared and their integrated improvement methods. In addition, the examination of the relationship between occupational stressors indicated that the level of health among occupational groups is different due to shift work systems, and among the investigated parameters, education level and shift work system are two parameters that can be intervened. Therefore, organizations can provide the basis for increasing the mental health of employees by encouraging employees to continue their educations as well as focusing on improving shift work systems.

Study limitations: Only the employees present at the workplace completed the questionnaire.

Author Contribution: All authors contributed equally to the main contributor to this paper. All authors read and approved the final paper.

Funding: This research received no external funding.

Ethical approval: The study was approved by the Research Ethics Committee of the Faculty of Health and Neuroscience Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran (IR.SBMU.PHNS.REC.1401.886).

Conflict of interest: There are no conflicts of interest.

Acknowledgment: The authors especially appreciate and thank the participants of the study.

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