



Role of demographic variables in investigating occupational stress of disaster and emergency medical management center

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Abstract:

BACKGROUND: Emergency medical services face stressful environments such as departments dealing with injuries and sick patients that pose challenging situations for the healthcare staff. This present study investigates the role of demographic variables in investigating occupational stress of disaster and emergency medical management center in 2021.

MATERIALS AND METHODS: This present descriptive study selected a sample size of 200 medical personnel associated with disaster and emergency medical management center in Iran, according to the inclusion chosen criteria. The study used a tool consisting of two parts, including demographic information and a job stress Health and Safety Executive (HSE) standard questionnaire. The study selected respondents through Cochran's sample size formula using stratified random sampling with a cross-sectional research design for data collection. This present study has analyzed received data using performed the descriptive and inferential information (*t*-test and one-way ANOVA) at a significance level $P < 0.05$. The participants of the survey were males only.

RESULTS: The study results specified that the mean age of respondents was 30.14 ± 5.96 . The study results exhibited that the mean score of total occupational stress was 3.41 ± 0.26 . The results showed the highest (4.34 ± 0.35) and the lowest (2.72 ± 0.86) stress levels were related to role dimensions.

CONCLUSIONS: The study findings revealed a significant relationship between stress level and participants' age, marital status, educational level, type of base, workplace, and the number of work hours per month. Emergency medical personnel experience a high level of occupational stress. Senior managers can use similar studies to implement measures to reduce the experience of employees' stress.

Keywords:

Demographic variables, emergency department, emergency medicine, health workers, occupational stress

Introduction

Stress is an inevitable and essential part of life and follows a pervasive phenomenon, and it spreads widely throughout the life of employees. Occupational stress determines the condition of psychological stress associated with employees' work. It

usually originates from pressures, which do not align with employees' skills, knowledge, or expectations.^[1] Job stress might increase when workloads are often excessive or too low. Workers often experience stress at the workplace, which keeps them motivated for their survival and growth. It affects employees' health regardless of their age,

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gender, race, economic status, or education level.^[2] Stress refers to a negative phenomenon or catastrophe, which may cause physical and mental disorders.^[3] In recent years, the World Health Organization (WHO) has declared stress a widespread problem worldwide.^[4,5] The Health and Safety Executive has predicted over 13.5 million working days and more than 5.56 billion US dollars losses annually due to the damages from occupational stresses during 2007–2009.^[6,7] Health centers provide satisfactory services in the shortest possible time to patients worldwide.^[8,9] The emergency medical services system is a part of the chain system responsible for patients' care from the severe critical time to their rehabilitation and discharge.^[10-12] This section provides the conditions in creating stress for the personnel employed in this sector due to time constraints in performing affairs. The critical status of the patient, expectations of companions, the openness of the environment, fear of inadequacy in rescuing a dying patient, decision-making power in urgent situations and factors related to workforce.^[13,14]

Scholars debated that prolonged exposure of emergency medical personnel to unpredictable stress settings poses health-workers at high risk exposure of post-traumatic stress disorder (PTSD).^[15,16] Besides, if stress is not adequately addressed, it can lead to many physical and psychological symptoms among EMS personnel.^[17] Some symptoms refer to anxiety,^[18,19] depression,^[20] sleep disorders, fatigue and unsafe behavior,^[21,22] gastrointestinal symptoms, backache,^[23] diminished occupational satisfaction,^[24] occupational burnout,^[25] emotional disturbance, and depersonalization.^[26,27] The effects of day and night shifts might cause fatigue, sleep disorder, gastrointestinal disorders, and poor performance.^[28] A study conducted in urban and road bases and pre-hospital emergency medical services in East Azerbaijan province revealed that the most critical stress load factors are occupational factors, environmental factors, and patient-related factors.^[29] A study based on Ardabil's provincial employees indicated a significant correlation between age and occupational stress. A UK-based study revealed that emergency medical technicians had the highest level of physical stress, second-highest rank of dissatisfaction, and the fourth rank in mental health compared to the other 25 jobs.^[30] Besides, the issues as mentioned above involve emergency medical personnel employed by the Iranian Government's health-care system in addressing other challenges, such as staff shortages, inadequate equipment, inadequate training of the necessary standards, interaction with people, skills training problems, anxiety, and various forms of emotional distress.^[31,32]

This study investigated the occupational stress of the personnel employed in the Medical Management Center

of the Kermanshah provinces. The stature of job and occupational stress are prominent in emergency medical workers, which is the critical element of health systems. It provides the optimal provision of healthcare and clinical services for the affected at a crucial moment. This study focused on investigating the personnel's occupational stress status of the disaster and emergency medical management center, and the role of demographic variables. This issue enables planning and comparison with other areas of the country while identifying specific cases supporting counseling and treatment.

Materials and Methods

Study setting and participants

This descriptive-analytical research was performed cross-sectionally from May to September 2021. All staff of emergency bases in Kermanshah province (417 people) were selected, and 200 male technicians working in emergency medical centers affiliated with Kermanshah University of Medical Sciences were chosen using the Cochran formula for calculating sample size (with 95% confidence level and 5% error) and the method of stratified random sampling, which was appropriate to the size of the population. As a result, the survey comprised 85 individuals from urban bases and 115 individuals from emergency road bases.

Criteria for entering the study included working in a pre-hospital emergency ambulance as one of the technical categories (paramedic, basic technician, middle technician, and senior technician) (technicians working in administrative departments and communication centers were not included); working primarily in the ambulance (except those who are working in the form of overtime from other units or employment in a small volume); and having work experience in the emergency 115 for more than six months and a diploma or higher. Exclusion criteria included reluctance to engage in the study and incomplete completion of questionnaires. All research samples were informed that participation in this study was voluntary. They were also assured that all information would be kept anonymous and confidential.

Tools

The following tools were used in the study:

- 1) Demographic and organizational information:** Researcher-made form was used to collect the participants' demographic and organizational information, including the respondents' age, marital status, education and education of the respondents, work experience, employment status, workplace (urban and roadside), and monthly working hours.
- 2) Occupational stress questionnaire-HSE:** The standard occupational stress questionnaire is related

to the UK Health and Safety Executive (HSE).^[33] The British Institute for Health and Safety (HSE) developed this questionnaire in the late 1990s.^[34] The questionnaire focused on measuring the job stress of British workers and employees.^[34,35] This questionnaire consists of 35 questions and seven subscales, including “demand (containing the topics, such as workload, features, and work environment)” (eight items), “control (i.e., how much the person is on the path to do his duties)” (six items), “support from authorities (the amount of support a person receives from the management)” (five items), “support from colleagues (the amount of support someone receives from his/her colleagues)” (four items), “communications (enhancing positive traits to increase social connections and reduce workplace conflicts)” (four items), role (proper understanding of the role of personnel in their organization)” (five items), and changes (organization and its labor force) (three items). It also includes the 5-option Likert scale (never, rarely, sometimes, often, and always). The validity of the questionnaire has been examined by numerous international and domestic studies, and their results suggest good validity of the questionnaire.^[36,37]

Statistical analysis

The study applied SPSS version 24 to perform analysis in the next stage and performed analysis to draw the results. The study used descriptive analysis (frequency, percentage, average, and standard deviation) and inference analysis (ANOVA and independent *t*-test) by using the level of significance at *P* < 0.05.

Ethics approval and consent to participate

The principal investigators conducted this study in accordance with the Helsinki Declaration and followed the ethical standards for the scientific research procedures. The Ethics Committee of the Kermanshah University Medical Sciences under number IR.KUMS.REC.1402.233 approved this study. All participants were informed about the study, and only those providing written informed consent were enrolled in the study.

Results

Sociodemographic profiles

This study has analyzed the results, as indicated in Table 1. The study results specified that the participants’ mean age was 30.14, with a standard deviation of 5.96. The study results showed the mean score of total occupational stress 3.41 ± 0.26 . The results showed the highest (4.34 ± 0.35) and the lowest stress levels (2.72 ± 0.86) related to role dimensions. The study findings revealed a significant relationship between stress level and participants’ age, marital status, educational level, type of base, workplace,

Table 1: Individual characteristics of study samples and comparison of the mean and standard deviation of occupational stress score according to demographic variables

Characteristics of the research sample	n (%)	Mean±SD	P
Married status			
Single	86 (43%)	3.48±0.29	0.001 ^a
Married	114 (57%)	3.35±0.23	
Age (year) 30.14±5.96			
20–30	116 (58%)	3.47±0.29	0.000 ^b
31–40	74 (37%)	3.34±0.18	
41–50	10 (5%)	3.11±0.03	
Education level			
Associate degree	97 (48.5%)	3.51±0.28	0.000 ^b
Bachelor’s degree	99 (49.5%)	3.30±0.20	
Master’s degree	4 (2%)	3.60±0.07	
Education degree			
Emergency medical services	160 (80%)	3.37±0.26	0.000 ^b
Nurse	18 (9%)	3.46±0.27	
Anesthesia	10 (5%)	3.57±0.10	
Practical nurse	12 (6%)	3.66±0.11	
Work experience			
<5 years	95 (47.5%)	3.44±0.32	0.092 ^b
10–6	70 (35%)	3.36±0.20	
20–11	27 (13.5%)	3.36±0.17	
30–21	8 (4%)	3.55±0.04	
Type of employment			
Formal	39 (19.5%)	3.44±0.26	0.241 ^b
contractual	50 (25%)	3.39±0.17	
Informal	40 (20%)	3.34±0.22	
Plan	71 (35.5%)	3.43±0.33	
Base of workplace			
Urban	85 (42.5%)	3.49±0.24	0.000 ^a
Road	115 (57.5%)	3.34±0.26	
Work hour per month			
<150	26 (13%)	3.60±0.07	0.000 ^b
200–150	58 (29%)	3.25±0.23	
250–200	116 (58%)	3.44±0.27	

SD=Standard deviation; ^aIndependent *t*-test; ^bOne-way ANOVA

and the number of work hours per month. There was no relationship between the type of employment and work experience with stress levels. More than half of the participants (58%) were in the age range of 20–30 years, and 57% of them were married, and the rest were single. Most individuals (80%) had an emergency medical degree. Nearly half of the individuals (47.5%) had less than five years of work experience, and 35.5% worked on most projects. Besides the type of bases of the employees’ workplace, 42.5% of individuals were in the urban ground, and 57.5% in the road base. More than half of them (58%) worked between 200 and 250 hours per month [Table 1]. The mean total occupational stress score in single individuals (3.48 ± 0.29) was higher as compared to married individuals (3.35 ± 0.23). The independent *t*-test showed a significant difference (*P* = 0.001). The results of this test showed that the mean total score of

occupational stress in individuals employed in urban base (3.49 ± 0.24) was significantly higher than road base (3.34 ± 0.26) ($P = 0.000$) [Table 1].

The ANOVA test result showed that the total mean scores of occupational stress had decreased significantly with increasing age ($P = 0.000$). ANOVA test showed a significant differences between job stress with educational level and field of education ($P = 0.000$), individuals with master's degrees had higher occupational stress score (3.60 ± 0.07), and individuals with an emergency medical degree had a lower score (3.37 ± 0.26) compared to other grades and fields. On the other hand, the results of this test showed that there is a significant difference between occupational stress score and working hours per month ($P = 0.000$); therefore, individuals with the lowest working hours (less than 150 hours per month) had higher occupational stress score (3.60 ± 0.23). However, there was no significant difference between work experience ($P = 0.092$) and type of employment ($P = 0.241$) with occupational stress score [Table 1]. The mean and standard deviation of the total score of occupational stress was 3.41 ± 0.26 . The highest and the lowest level of occupational stress showed a relation to role dimensions (4.34 ± 0.35) and changes (2.72 ± 0.86) [Table 2]. The mean score of stress in terms of demand, control, and change showed a significant difference with the type of base of the workplace ($P < 0.05$). Hence, the mean score in all these dimensions in urban bases employees was more than road bases [Table 3].

Discussion

This study primarily focused on examining job stress levels among the employees of disaster and emergency medical management center and aimed to investigate the role of demographic variables under investigation. The results showed the highest and the lowest stress levels were related to role dimensions. The study findings revealed a significant relationship between stress level and participants' age, marital status, educational level, type of base, workplace, and the number of work hours per month. There was no relationship between the type of employment and work experience with stress levels.^[38] The assigned role domain to the employees measures personnel's correct understanding of working in the healthcare units. The present study's findings revealed that the employees lacked sufficient knowledge about their assigned duties, goals, responsibilities, organization views, and expectations.^[39] Conversely, the change domain describes how to organize and change the forces within an organization. This study showed that the health officials professionally focused on change in duties, developed a healthy working environment, and maintained a good relationship with the employees to make intra-organizational changes. These findings are consistent with the literature.^[40] Past literature documented that healthcare workers' highest and lowest job stress levels revealed a link to role and demand domains.^[41] Sharifi *et al.* identified that the demand dimension showed the highest, and the role dimension specified the lowest job stress levels among emergency

Table 2: Mean and standard deviation of occupational stress dimensions in the study population Variable

Scale	Indicators Subscales	Mean±SD	Number (question)	Min.	Max.
Occupational stress	Demand	3.71±0.43	8	2.50	4.75
	Control	3.12±0.60	6	2	4.33
	Support of authorities	2.87±0.68	5	1.80	4.40
	Support of colleague	3.46±0.65	4	2	4.75
	Relation	3.61±0.69	4	2	5
	Role	4.34±0.35	5	3.80	5
	Changes	2.72±0.86	3	1.33	4.67
	Total occupational stress	0.26±3.41	35	2.77	3.86

Max=Maximum; Min=Minimum

Table 3: Relationship between occupational stress dimensions with the workplace of personnel of emergency medical center in Kermanshah Province

Employees Occupational stress dimensions	Urban-based n=85	Roadside n=115	Total individuals n=200	P
Demand	3.80±0.40	3.65±0.45	3.71±0.43	0.018
Control	3.35±0.52	2.95±0.59	3.012±0.60	0.000
Support of authorities	2.99±0.76	2.79±0.60	2.87±0.68	0.43
Support of colleagues	3.53±0.40	3.40±0.78	3.46±0.65	0.123
Relation	3.56±0.72	3.65±0.66	3.61±0.69	0.366
Role	4.34±0.29	4.35±0.39	4.34±0.35	0.847
Changes	2.87±0.89	2.61±0.83	2.72±0.86	0.038
Total occupational stress	3.49±0.24	3.34±0.26	3.41±0.26	0.000

Note. Sample size is based on urban-based and roadside personnel affiliated with emergency medical

medical personnel.^[42] Mei Lu *et al.* showed that the subscale of problems related to time and workload based on the job stress questionnaire (which is in line with the HSE questionnaire's demand dimension) was one of the subscales with the highest score among emergency nurses.^[43] However, Mahdizadeh *et al.* concluded that the workload issues do not cause much stress to EMS personnel.^[44]

The results indicated that young employees experienced more job stress, which is in line with the findings of Motie *et al.*^[13] They reported that the stress levels decreased with technicians' age to about 40–45 years.^[13] The level of job stress is normal to decrease with age and work experience; increasing age to a particular stage can play a protective role against stressors. d'Ettorre *et al.* stated that respondents' age had a significant relationship with job stress in emergency nurses.^[45-47] However, Seyyed Javadi *et al.* achieved contradictory results, so that the job stress in EMS personnel increases with age^[48] and Bardhan *et al.* also considered age to be strongly associated with job stress levels, stating that age over 40 years is a higher risk factor for emergency nurses' stress.^[49] This study aimed to observe an increase in stress levels among employees more than 50 years of age in the present survey. According to the present study, unmarried workers had more job stress than married people did. Similarly, Shareinia *et al.* stated that the stress levels were higher among single nurses.^[50] However, Seyyed Javadi *et al.* showed no relationship between EMS technicians' job stress and marital status.^[47]

Only 2% of the participants were postgraduate students who identified more job stress. They stated that the intention to stay also decreases with increasing educational levels.^[8] While improving education level improves knowledge and skills, the quality of service provision helps improve employees' abilities to deliver services according to required expectations.^[51-52] The medical staff face typically challenging situations and their job responsibility increases occupational stress. The findings indicated that healthcare employees perform duties in stressful environments that require quick and timely decision-making, regardless of their education. They might not be able to function effectively and experience high levels of stress.^[13] Job stress had a significant relationship with individuals' academic level because the EMS degree workforce had less job stress than other fields (nursing, anesthesiology, and paramedic). Namdari *et al.*^[8] described a significant relationship between job stress and the field of study of EMS staff.

This study's findings showed that EMS graduates' workers had undergone specialized academic training to provide pre-hospital services. They experience less job

stress than other disciplines who had typical training for hospital conditions, which indicates to employ suitable and relevant personnel in EMS centers. It suggests recruiting people with a job-related degree to reduce workplace stress. This study's findings showed that health workers in urban centers generally encountered higher job stress than road station health units' employees. The results are consistent with the investigations of Motie *et al.*^[13] and Namdari *et al.*^[8] Leszczyński *et al.* reported that the EMS employees experience varying degrees of occupational stress depending on the workplace.^[53] Yuwanich *et al.* stated that the emergency nurses were more exposed to job stress than nurses in other departments.^[54] In conclusion, the personnel in different places and departments experience different levels of job stress. Policymakers and senior managers should consider this issue.

The study's investigation revealed that the level of work-related stress in the three dimensions of demand, control, and change was significantly higher in urban station staff. Thus, results evidenced that the leading cause of more occupational stress is workload and pressure (demand dimension), lack of self-control (control dimension), and non-compliance with intra-organizational changes (change dimension) in the urban stations. Shareinia *et al.* identified a considerable difference of workload subscale between Emergency and non-emergency nurses (due to the high number of patients referred), causing higher job stress.^[49] Sharifi *et al.* identified that the dimensions of change, role, peer support, and chairman support showed a significant relation to various workplace station types.^[42] The results showed that although the mean total score of job stress was higher in people with less than five years of experience and 21 to 30 years of age (both sides of the spectrum).

Motie *et al.*^[13] identified the same results. However, stressors' total score increases among employees with over 20 years of experience. Yuwanich *et al.* stated that low expertise and work experience are associated with the job stress of emergency nurses,^[53] and Bardhan *et al.* showed that less than ten years of work experience is a decisive risk factor for higher job stress in nurses, which are somewhat consistent with the present study.^[48] Likewise, d'Ettorre *et al.* considered work experience to be related entirely to emergency nurses' job stress.^[45] There is a strong relationship between working hours and employees' job stress. The findings showed that the lowest hours (less than 150 hours/month) caused more stress. This finding is justifiable because prolonged work absence increases job stress during duty time. The result is in line with Shareinia *et al.* study, which identified a slight positive relationship between overtime and job stress.^[49]

Limitations

There are always some limitations to survey-based studies. In the same manner, the current research study has some limitations. First, the above study results report a cross-sectional research method, and it is challenging to draw causal inferences through this research design. In the same way, another study limitation is its small sample size, which reduces the study results' generalization to other health departments and regions. This study used a self-reported questionnaire to collect the data for this empirical study. It is not applied a qualitative or a mixed-method approach. Therefore, the study findings recommend conducting future research studies with a larger sample size with broader geographical areas. The present study reports on the data received from Kermanshah province, and the generalizability of the findings do not apply to other technicians and emergency departments. The current study's findings suggest conducting future studies to determine the relationships between working environment conditions, stress, and emergency medical workers' burnout.

Conclusion

The Emergency Medical Services (EMS) Center is a community-centric health unit that coordinates with the entire healthcare system. The healthcare workers are the most vital asset of this medical center. The study examined the role of demographic variables and occupational stress faced by the staff working at EMS health units in urban areas and roadside emergency medical management units. The emergency medical personnel are at risk of high occupational stress due to the nature of their job. Reducing the stress experienced by them in the workplace is critical and improves the quality of service provided to patients. Since the highest level of stress indicated a link to the role and demand, authorities should, in many ways, understand the correct people from the organization and reduce their workload. Based on the literature evidence on this research topic, the present study's findings provide essential information and contribute to the scientific literature. Senior managers need to pay special attention to this issue and use similar studies to develop strategies to reduce their employees' stress, resulting in better performance. It is recommended that managers of emergency medical centers investigate the causes and consequences of occupational stress symptoms, as well as the effectiveness of various components in this group of employees across the country in larger samples.

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Conflicts of interest

There are no conflicts of interest.

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