



Research Paper

Firefighter's Job-related Stress Assessment in Operation Department of Fire Stations



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ABSTRACT

Background: Increasing job-related stresses among firefighters not only affect the incentive of work but also cause a reduction in productivity.

Objectives: This study was conducted to investigate job-related stress situations among firefighters and its related factors.

Materials & Methods: This cross-sectional study was performed on 184 employees of operation department of fire stations of Rasht in April and May 2015. Health and Safety Executive tool was used to assess stress score among participants.

Results: Of total, 141 subjects were participated in the study (response rate=77%). The prevalence of moderate and high job-related stress among firefighters was 2.1%, which have been experienced severe stress and need rapid intervention. the prevalence of low stress that need to improve their stress situation was 88.7% (125 firefighters). 13 firefighters (9.2%) had no stress and were on ideal conditions and this situation should be maintained.

Conclusion: Firefighters have great responsibility in saving people lives, thus periodic reviews on firefighters is essential to determine the level of stress and its early identification and prevention. Training of firefighters on ways of coping and empowerment can be effective in promoting their health and improving rescue services.

Keywords: Job-related Stress, Firefighters, HSE Questionnaire

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1. Introduction

Today, managers of organizations are facing with a range of financial and psychological problems. Stress or psychological pressure is one of the most important problems that can impact on workers' performance [1]. Factors related to job and work conditions affect the mental status of work force and put their mental and physical health in danger [2]. According to the report of European organization for safety and health at work, job-related stress affects 28% of European workers. The second common work-related problem is back-ache due to work [3]. The complex process of job-related stress has several irreparable consequences and can cause psychological, physical and organizational problems [4]. Besides individual problems, job-related stress whose cost is 20 billion Euros per year for European Union causes high expense for society [4].

Stress is the product of our perception or assessment of environmental expectations, abilities and available resources. Therefore, a similar situation or event may be stressful for some people but not for others [5]. Job-related stress is a process in which employees perceive and assess opposing and challenging job demand and respond to them. Pressures resulted extensively from harmful and negative responses demonstrated by employees while facing stress [6].

Firefighting is a difficult job due to high risk of direct exposure to harmful agents, stressful environment, constant tension and anxiety. Development of job stress among firefighters leads to lack of job motivation and eventually low productivity, so that it can have direct effect on the responding time to accidents and life-threatening events [7]. Several studies have shown that firefighters suffer from heart ischemia disease compared to other people. Firefighting activities put firefighter at high risk compared to non-emergency jobs [8]. Also, due to heavy firefighting equipment exerting large amount of energy and inappropriate situation, musculoskeletal disorders are prevalent among firefighters, which are related to job stress [9]. In the 1970 quality of employment survey, firefighting was categorized in occupations with work demand above international average level and job control below the international average level because of high mental and physical demand, unpredictable fights with fire, shift work and periods of calmness between alarms accompanied by a state of vigilance and alertness [10].

Although stress is a major problem in fire-fighting job, this issue has not been well studied in firefighters. In order to maximize the efficiency and effectiveness of the organization, understanding and identifying the effective factors on job-related stress is necessary, so that stress can be reduced and job satisfaction increased by identifying related factors and implementing required intervention to high-risk groups. Therefore, this study was performed to assess the job-related stress and associated factors among firefighters in Rasht, North of Iran.

2. Materials and Methods

This cross-sectional study with census sampling method was performed on 184 employees of the operation department of fire stations of Rasht in April and May 2015. The statistical population included the firefighters with at least six months job experience and working in Rasht active fire stations. Data were collected following coordination with authorities of firefighting organization and safety services of Rasht.

In this study, required data were collected by self-reported questionnaire. Job-related stress questionnaire was distributed among all employees of operation department and an informed consent form was completed by participants. The questionnaire consisted of two main parts which included 46 questions. Demographic data contained eleven questions about age, marital status, educations, the second job, income, employment status, job experiences, number of children, housing conditions and smoking habits. Health and Safety Executive (HSE) with 35 items in seven domains was used for measuring job-related stress. In the late 1990's, English HSE organization designed this questionnaire in order to measure the job-related stress among workers and employees. HSE domains are: 1. job demands which includes subjects such as workloads and features of work environment; 2. job control which indicates to what extent an individual does his/her job in a proper way; 3. peer support that shows a worker receives support from his/her colleagues; 4. manager support that demonstrates a worker receives support from his/her manager and service institution; 5. relationships which indicates social communication and prevention of conflicts and disputes in workplace; 6. role, which expresses the proper role of staff in the organization; 7. changes, which is ways of organizing and staffing [11, 12].

The HSE items are scored based on 5-point Likert scale from never to always. High scores represent a sign of health and safety in terms of stress, and low scores indicate more stress in respondents. The reliability and va-

lidity of HSE has been confirmed by Azad Marzabadi and Gholami using confirmatory and exploratory factor analysis. Also, the reliability of the questionnaire was obtained 0.78 and 0.65 through Cronbach's alpha and split half methods, respectively [13].

The classification of scores is on the basis of percentage and each ranking requires special measure. Scores less than 20% requires urgent measure (High stress), scores between 20 and 50% needs to improve conditions (Moderate stress), scores between 50 and 80% represents desirable performance but needs potential improvement (Low stress), scores equal and above 80% shows a very good situation and requires maintaining performance (No stress) [14].

Data was described using frequency, percent, mean and standard deviation according to the type of variables. The association between variables was assessed using independent T test and ANOVA and analysis of variance. All analysis was performed in SPSS software, version 19.

3. Results

Of 184 distributed questionnaires in nine fire stations, 141 questionnaires were completed and collected for analysis (response rate=77%). The sample included 88 firefighters and 53 drivers. The majority of participants were married (88%), between 26 and 40 years old (80.1%), had job experience of ten years (60.3%), and had one child (42.6%). About half of them (51.8%) had personal house and 48.2% had an outcome between ten and twenty million Rials. Table 1 shows baseline characteristics of study participants and mean stress score according to each variable. There was a significant association between age and stress score. The mean stress score in under 25-year-old age group was lower than that the two other age groups ($P=0.01$). there was no significant association between stress score and other individual characteristics.

Table 2 shows the frequency of stress categories among the study participants. The highest frequency of job-related stress was seen in control area (21.3%) and the lowest frequency of job-related stress was observed in role area (0.7%). Only 1 subject in the relationship domain had high stress.

The relationship of each domain of job-related stress with demographic variables also shows a significant inverse association between domain of control and age. The mean stress score in participants below 25-years of age was lower than the other two age

groups indicating higher stress in this age-group compared to the other two groups.

4. Discussion

The results showed that the prevalence of moderate job-related stress was 2.1% among firefighters. This finding is consistent with the results of Sepidarkish et al. that found 2.2% of stress level among firefighters in Tehran, the capital city of Iran [15]. Bahrami et al. showed the prevalence of stress in nurses was 4.7% [16]. However, in the Darvishi et al. and Yazdi et al. studies, it was reported that there was high prevalence of stress in firefighters [17, 18]. Furthermore, Ziaei et al. firefighters' stress was estimated as 98.9% that was not consistent with the results of this study [19]. The difference in stress levels among different studies may be caused by different workload at different times and workplaces' conditions.

In this study the highest stress level was in the control area that was in agree with previous study by Sepidarkish et al. and high stress in this area shows that there are many obstacles in the way of doing their work [15], and the lowest stress level was observed in the role and supervisor support areas. People's perception of the role and receiving support of supervisor can reduce job stress, thereby high levels of job-related stress is associated with low social support [20]. Positive leadership in organization creates positive organizational atmosphere and affects relationships and reduces stress [21].

The study results indicated that there was the highest level of stress in under 25 year of age group. In the study by Yazdi et al. it was shown that there was a significant relationship between age and firefighters' job-related stress [18]. Darvishi et al. found in their study that there was the highest stress level in under 30 year old age group [17]. Akbari et al. as well as Hosseinzadeh et al. found no significant relationship between age and job-related stress [12]. In Azad Marzabadi et al. study, a significant inverse relationship was observed between age and stress, thereby, stress reduces with increasing age [22]. Ziaei et al. demonstrated in their study that lower stress was felt with increasing age and job experience in emergency staff because of higher adaptation with the environment changes [19]. The power and ability to coping with psychological and environmental stressful factors in individual increase with age [23]. Also, person's experience promotes in the workplace, thus the stressful events range reduces [24].

Table 1. Characteristics of study participants

Variables	Characteristics	No. (%)	Mean±SD Stress Score	P
Organizational role	Firefighters	88(62.4)	3.5±0.41	0.57
	Drivers	53(37.6)	3.4±0.55	
Marital status	Single	17(12.1)	3.56±0.6	0.53
	Married	124(87.9)	3.47±0.45	
Second job	Yes	35(24.8)	3.48±0.4	0.98
	No	106(75.2)	3.48±0.49	
Smoking status	Yes	20(14.2)	3.45±0.33	0.74
	No	121(85.8)	3.48±0.49	
Age group	≤25	8(5.9)	3.03±0.6	0.01
	26-40	113(83.1)	3.52±0.45	
	>40	15(11)	3.54±0.53	
Experience (year)	<10	85(60.3)	3.51±0.5	0.25
	10-20	53(37.6)	3.6±0.45	
	>20	3(2.1)	3.45±0.33	
Income(Rials)	<10000000	50(42.4)	3.5±0.51	0.69
	10000000-20000000	68(57.6)	3.46±0.41	
Educational level	Under diploma	7(5)	3.2±0.68	0.06
	Diplom	71(50.4)	3.55±0.47	
	Upper diploma	63(44.7)	3.43±0.43	



In this study, there was a significant relationship between age and area of control, that is, the control score goes up with age. Individual experience also rises with increasing age, hence, he/she exerts more control over work.

In this study, no significant relationship was found between marital life and job-related stress. Various studies' results showed that marital life is effective in the prevention of stress if there is positive relationship with other members of family due to get emotional support [23-25], and single people are more susceptible to stress compared to married ones because of being younger. In the study of Sepidarkish et al., as well as Darvishi et al., it was shown that [15, 17] single people had higher stress, however, Aghilinezhad study result was consistent with that in current study, and there was no significant relationship between marital life and stress [26].

In this study, smokers showed more stress than nonsmokers, but this difference was not statistically significant. In Ziaei et al. study, it was shown that the smokers had more stress [19]. Also, Clare et al. found that smokers had higher heart rate at the time of the rescue operation compared with non-smokers [27], however, in the Sepidarkish et al. study, it was shown that smokers had less job-related stress and this difference was not statistically significant [15].

In this study, no significant relationship was observed between job-related stress and the second job. This is consistent with the results of Ziaei et al. study [19], however, Yazdi et al. have shown that people with a second job suffer higher stress [18]. It seemed that having second jobs can increase stress because of spoiling leisure time. On the other hand, the people with a second job have lower finan-

Table 2. Prevalence of stress by domains of HSE among firefighters in Rasht in 2015

Domains	No Stress		Low Stress		Moderate and High Stress	
	Percent	Number	Percent	Number	Percent	Number
Demand	5.7	8	78.7	111	15.6	22
Control	11.3	16	67.4	95	21.3	30
Peer support	34.8	49	53.2	75	12.1	17
Managerial support	50.4	71	46.8	66	2.8	4
Relationship	36.9	52	55.3	78	7.8	11
Role	85.8	121	13.5	19	0.7	1
Changes	33.3	47	53.2	75	13.5	19
Total Job-related stress	9.2	13	88.7	125	2.1	3



cial problems because of earning higher income and greater prosperity, and therefore have less stress.

The results on the relationship of type of occupation as one of the main causes of job-related stress among fire service employees showed that there was no statistically significant difference in the mean stress score between firefighters and drivers, and these two groups felt equal job stress, however, in the study conducted by Sepidarkish et al., there was a statistically significant difference [15]. It seemed that this different result is due to that both firefighter and driver in Rasht fire station participate in extinguishing and approaching accident scene, while in Sanandaj firefighting service, only firefighters involved in the accident scene, and thus endured more stress, as was studied by Darvishi et al. [17].

The limitations of this study are neglecting the effects of the individual personal characteristics and personality type on the job-related stress level, and the use of cross-sectional data. More accurate assessment of stress in individuals needs to be considered through a more extensive way at different times of year, because there is various workload and also different situations in people at different times, and this could have an impact on their stress.

5. Conclusion

This study found a low prevalence of moderate stress among firefighters. Despite the low prevalence of occupational stress, stress has been shown to play an important role in career of firefighters because of their critical role in the rescue operation. Firefighters have great responsibility in saving people lives, thus periodic reviews on firefighters is essential to determine the level of stress

and its early identification and prevention. Training of firefighters on ways of coping and empowerment can be effective in promoting their health and improving rescue services. More accurate assessment on this occupational group requires broader consideration at different times of year, because the workload can vary in different seasons, and it affects their stress level.

Ethical Considerations

Compliance with ethical guidelines

This article is a research project approved by Ethical committee of Guilan University of Medical Sciences, which was conducted as a research project (Code: 93122619).

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

Related to this research, the authors confirm that they have no conflict of interest.

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