

The effect of risk factors of Occupational stress on general health of the firefighters of Ahvaz city

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Abstract

Introduction: Firefighting profession is one of the most stressful occupations; in each mission, firefighters are exposed to harmful factors, including the stress due to the driving, traffic, to see heartbreaking scenes, and so on. Occupational stress is one of the factors affecting at increased risk of mental and physical problems in the job. The main objective of this study was to determine the effects of risk factors of occupational stress on general health.

Methods and Materials: Information required for this cross-sectional descriptive study was completed by 270 staff in the fire stations through two standard job-specific and general health questionnaires. Data was analyzed using SPSS software and the corresponding tests.

Results: The results showed that work environment, and social-cultural-economic factors were the greatest factors affecting on the job stress. It also revealed that occupational stress has a straight and significant relationship with general health ($p < 0.05$).

Conclusions: It is suggested that changes in work environment, and social-cultural-economic factors of stress can balance job stress; and accordingly, the level of general health of personnel will be increased.

Keywords: Occupational stress, General health, Fire-fighting.

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Introduction

One of the fundamental problems of the human societies in the past few decades due to gradual turning into a modern life is the phenomenon of stress. This phenomenon is especially important in the industrialized world, and will affect the health of workers widely and increasingly. The psychosocial factors beside the physical, chemical, biological and ergonomic risks in the work environment is considered as one of the main risk factors in the workplaces, and occupational stress is of particular importance among the psychological factors. According to the National Institute for Occupational Safety & Health (NIOSH), an occupational stress occurs when no coordination exists between the demands of the job abilities, capabilities and aspirations of the individual. Occupational stress as a biological, psychological and cognitive process makes the human body enforced to effort; the body naturally tries to match with it, and this is accompanied by energy-consuming and fighting with disease and vital response (1). Undoubtedly the profession of firefighting is one of the toughest jobs which people choose. The most important tasks of firefighters include in alert round the clock attending events, rescue operations, active participation in disaster management, and control of fires in various industries and locations. Thus, in each mission firefighters are exposed to many harmful factors, including the stress of driving, traffic and visibility. Tragic and grievous scenes, permanent confrontation with individuals at death risk, a solemn responsibility to rescue accident victims on time, dealing with unpredictable situations, the effects of shift work, the effects of smoke and toxic gases in operation, sirens, fire and heat on contact or absorption of chemicals through the skin. Tensions resulting from stress can cause losses such as a lot of absenteeism, abuse of drugs, and

apathy at work, reducing the incentive to work and disability as well as leading to the occurrence of errors during the task, which may cause irreparable damage. Therefore, due to the nature of the job of firefighters, and effects of occupational stress on employees in this job, to determine the stress levels and general health, and to specify relationship between these variables it can help managers to identify specific cases that require support, counseling and therapy. Due to the lack of similar research on firefighters in the Ahvaz County, we decided to do this study.

Methods and Materials

This cross-sectional-descriptive study was performed to determine the general and the specific stress level and the relationship between these variables. The study population was all the personnel in the operating fire station in Ahvaz. Tools for collecting data consisted of two specific questionnaires integrated in the form of a 96-question questionnaire as follows:

This questionnaire included all factors that may cause stress. These factors are divided into four categories: 1) - socio-cultural, economic, 2) - factors related to the working environment, 3) - familial factors, and 4) - personal factors. The amount and intensity of stressful factors were identified by numbers from 1 to 7, which No.1 showed the low importance of each factor in terms of stressful and No. 7 showed the high importance of each factor. If an individual's score on each section is higher than 14, that factor has had an important role in the level of stress. The reliability of the questionnaire based on internal consistency coefficient was a Cronbach's alpha of 0.79 (2).

2. General Health Questionnaire-28 (28-GHQ ")

This questionnaire is a valid and standard method for assessment of the general health

of the people, and was composed of the four parts (sub-scale), each of which have seven questions. The 28-GHQ assesses the mental state of the person in question during a last month and includes subscales for physical symptoms, anxiety and insomnia, social dysfunction and depression, separately.

In this questionnaire, the cutoff score of 23 is used to separate the people. The score of questionnaire equal to or greater than 23 indicates a dysfunction in the general health. Many studies have been conducted about the reliability and validity of 28-GHQ. The results suggest that the 28-GHQ has good validity and reliability.

The General Health Questionnaire was developed by Goldberg for the first time (1972). The main form contains 60 questions; its short form was prepared from 12 to 28 items and was translated into 38 languages and psychometric studies have been performed on it in 70 countries (3).

Goldberg and Williams (1989) investigated the psychometric properties of the different versions in the 43 studies in the different countries that participated in the study, and showed that a 28-item version has more validity and has more suitable sensitivity and specificity (4).

Gibbons investigated factor structure, reliability and validity of GHQ-28 in El Salvador. The sample consisted of 732 students; the Likert scoring, and principal components analysis was used and four factors, including somatic symptoms, anxiety and insomnia, social dysfunction and depression were identified.

The reliability, sensitivity, and specificity were obtained by the test - retest method as 0.74 and 0.88 and 0.84, respectively (5). Grifffthus investigated the validity of questionnaire among the outpatients with spinal cord injury along with a clinical interview schedule, which the sensitivity and specificity were obtained as 0.81 and 0.82, respectively (6).

Hobbs studied Psychometric Properties of GHQ-28 in a sample of 382 subjects in New Zealand; the test sensitivity, specificity and diagnosis error were obtained as 0.95, 0.69, and 0.13, respectively (7).

A few psychometric studies have been carried out regarding the quality and factor structure of the GHQ in Iran.

In a study conducted by Ebrahimi *et al.*, to examine the psychometric properties of the questionnaire among the patients with psychiatric disorders in Isfahan, using a cutoff of 24, sensitivity, specificity, and the total classification error was obtained as 0.80, 0.99 and 0.10, respectively (8).

To gather the data after necessary coordination with authorities of *fire-fighting stations* in Ahvaz, questionnaires were completed by operating personnel. The data collected were analyzed using Pearson's correlation coefficient and *Analysis of Variance* (ANOVA) and SPSS version 17.

Results

This study was conducted on 270 operational personnel (all male) of *fire-fighting stations* in Ahvaz. Table 1 shows the distribution of frequencies of staff according to the demographic characteristics, education level, and *work experience*.

In this study, the highest frequencies of firefighters (50%) were in the age group of 40-49 years; the lowest frequencies (5%) were in the age group below 30 years; the mean age of firefighters was 42 years as well as the greatest frequency of work experience (about 55%) was 20-10 years.

In the field of stress factors, workplace factors and social - cultural - economic factors with the 75.5% and 72.1% were the most affecting factors on staff's stress, and personal and family factors were in the next ranks (Table 2).

In the field of general health of workers using GHQ-28 and a cutoff of 23, about

20%, 22%, and 14.7% of people had scores equal to or more than 23 in terms of physical symptoms, anxiety and insomnia symptoms, social dysfunction and depression signs, respectively; from this respect, they had disordered health. Regarding the overall level of general health, 59.5% of people were below the cut- off score (healthy) and 40.5% were above the cut-off score (the disturbed general health). In this study, 75.4% of people said that the stress has had an effect on their job performance.

The sixty-four percent of the firefighters stated that they had taken leave due to

sickness caused by the occupational stress during the past year, as well as 52.3% of respondents were low or very low satisfied with Fire-fighting jobs. In this study, no significant relationship was found between stress scores with their age, educational level, and work experience (P -value > 0.05).

In this study, chi-square test was used to investigate the relationship between general health and occupational stress in the research community. The results showed a significant relationship exists between occupational stress and general health in the research community (P - value <0.05).

Table 1: Frequency distribution of the fire station of Ahvaz personnel according to demographic characteristics, work experience, education level

Profile		Frequency	Percentage
Age	30>	13	5
	30-39	60	22.9
	40-49	131	50
	50<	58	22.1
Marital status	Married	5	2
	Single	263	98
Work experience	1-10	32	12.1
	10-20	146	54.9
	20-30	88	33.1
Education level	Below diploma	16	6.3
	Diploma	152	59.8
	A graduate of the University of	86	33.9

Table 2: The distribution of the frequency of fire station personnel branch based on the severity of the stress and the factors affecting stress

Intensity Variables		Down (rating < 14)		High (14 $>$ points)	
		Frequency	Percentage	Frequency	Percentage
Effective factors on stress	Personal factors	77	39.3	119	60.7
	Family factors	101	52.6	91	47.4
	Work environment factors	47	24.4	145	75.5
	Social-cultural-economic factors	55	27.9	142	72.1

Discussion

The results of this study showed that workplace factors and social - cultural - economic factors were the most determinants of occupational stress. In the section of workplace factors, there are stressful factors such as the difficulty of assigned responsibilities, the physical condition of the workplace and fatigue caused by it, high workload, and inadequate information to carry out the tasks and responsibilities and expectations of higher authorities. And in the social -cultural and economic factors section, stressful factors such as lack of social support or job security, not belonging to any community groups and the lack of safe recreational facilities can be cited. Therefore, efforts to reduce the stress in the organization should be focused in order to eliminate the stressors mentioned. To do this, the following measures are recommended:

- 1) Job scheduling to improve working conditions
- 2) care for psychiatric disorders and risk factors
- 3) Dissemination of information and training
- 4) expansion of mental health services for staff
- 5) the goal at work
- 6) social systems.

The above-mentioned findings are in agreement with other studies as well. The impact of economic -cultural factors and social support in preventing general health risks and creating stress on the employee in some jobs have been studied by some researchers. The effect of social support on stress and health risks was studied by Dudek (9), Oginska (11, 10) and Karaseka (12) in a group of police officers; also, Swietochowski (13) studied it in a group of teachers.

The results of these studies indicated that economic - cultural factors and social supports play an important role in creating stress on their employees. Furthermore, Oginska's study (2005) was conducted to

investigate the effects of stress and experiences of social and personal resources such as self-confidence, optimism, sense of coherence and social support, on the health consequences of firefighters, prison officers, police and security forces. The results of this study confirmed a significant role of social and individual support in reducing the stress and preventing negative health outcomes in the study group (14). In another study which aimed at investigating the effect of stress on the performance of nurses as well as the impact of social support on the relationship between stress and their performance, it was found that the relationship between occupational stress and social support of partners is negative; namely more social support of the partners could reduce nurses' occupational stress (15). The results of the mentioned research showed the need for greater emphasis on social support to improve performance and reduce the stress.

As it was mentioned, the results of this study showed that, regarding the factors affecting occupational stress, factors in the working environment were among the most significant factors affecting a person's stress component. This finding is consistent with Abtahi and Alwani's study results regarding research on stress of manager in the industrial sector (16).

The results of the mentioned study showed that 93% of the research community was faced with the intolerable stresses, which of this group, 57% of people described the work environment as stressful, and 23% described the community environment as stressful (16). Previous studies have shown that stress may lead to work absenteeism, reduced job satisfaction, and job performance (17).

Another goal of this study was to investigate the general health using general GHQ-28. The results of the questionnaire showed that 40.5% of the subjects were in the higher

range of the cut-off score and they had some degrees of impairment of general health. The most important disorder regarding the symptoms of general health was related to the anxiety and insomnia symptoms, and physical signs that 22% and 20.4% of the subjects, were in the upper limit of these symptoms. The findings of the mentioned is consistent with another study conducted using the same questionnaire, where the symptoms prevalence of Post Traumatic Stress Disorder (PTSD) study among fire department employees was estimated to be 18.2% as well More over 27% of subjects in accordance with the questionnaire, had some degrees of impairment of the general health, which lead to the absence of work, anxiety and depression among the group studied (18, 19).

Furthermore, in other studies conducted by Yong-Shing Chen (19), Fullerton (20), and Shirley (21) on the firefighters, it was found that PTSD and depression have a significant effect on a person's general health and the quality of life, as well as due to the nature of the job of firefighters in the groups studied, a greater tendency existed to consuming alcohol. In another study by Ahyaknndh *et al.* on the relationship between health and burnout in 2009 it became clear that there is a significant negative relationship between public health and job burnout, which is somewhat consistent with the results obtained in this study (22).

The statistical tests in this study also showed that a significant relationship exists between occupational stress and general health. In a similar study conducted on traffic officer, it was found that occupational stress and stressful life events have a significant relationship with public health, and occupational stress and stressful life events can be considered as the predictor variables for public health (23).

Not-responding to all questions by all participants can be pointed out as one of the limitations of this research; moreover, due to the low number of Ahvaz firefighting headquarters personnel (about 30 people) and lack of their appropriate collaboration, designing control group for the study was not possible.

Therefore, in accordance with the results of this study and similar studies it can be concluded that promoting general health and reducing occupational stress should be a work preference for headquarter managers of the firefighting job.

The officials and leaders of firefighting must pay more attention to the factors that cause occupational health disorders, and decrease their personnel's occupational stress by establishing a proper communication with them, financial and spiritual supports, and developing a proper workplace for performing their responsibilities.

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References

- 1-Rahmani F, Behshid M, Zamanzadeh V, Rahmani F. [General health communication, stress and burnout in nurses working in special teaching hospitals affiliated to Tabriz University of Medical

- Sciences]. Iran J Nursing 2010 ;(66):55-63. [In Persian]
- 2-hajibabaei,M. Identify and prioritize the most important factors for Job Stress of managers in high school in Qom.Iran.2004
- 3-Goldberg DP, Gater R, Sartorius N, Ustun TB, Piccinelli M, Gureje O.The validity of two versions of the GHQ in the WHO study of mental illness in general health care. Psychol Med 1997; 27:191-7.
- 4-Goldberg DP.Screening psychiatric disorders. In: Williams P, Willkinson G, eds.The scope of epidemiological psychiatry. London: Routledge; 1989.
- 5-Gibbons P, Arevalo HF, Monico M. Assessing of the factor Structure and reliability of the 28 item version of the General Health Questionnaire (GHQ-28) in: Salvador EL. Int J Clin Health Psychol 2004;4:389-98
- 6-Griffiths TC, Myers DH, Talbot AW. A study of validity of the scaled version of the general health questionnaire in paralyzed spinally injured out-patients. Psychol Med 1993; 23(2):497-504.
- 7-Hobbs P, Ballinger CB, Smith AH. Factor analysis and validation of the general health questionnaire in women: a general practice survey. Br J Psychiatry.1983; 142:257-64.
- 8-Ebrahimi A, Molavi H, Moosavi G, Bornamanesh A, Yaghobi M. [Psychometric Properties and Factor Structure of General Health Questionnaire 28 (GHQ-28) in Iranian Psychiatric Patients]. Res Behav Sci 2007;5(1):5-12. [In Persian]
- 9-Dudek B, Koniarek J. Sense of coherence and perceived relations between working conditions, stress and perceived health status. Alkohol Narkom 1996; 22(1):65-74.
- 10-Ogińska-Bulik N. Occupational stress in policemen. Łdź: Academy of Humanities and Economics; 2003.[In Polish].
- 11-Ogińska-Bulik N. Personal resources protecting police officers against negative outcomes of occupational stress. In: Juczyński Z, Ogińska-Bulik N, eds. Personal Resources Favorable to Individual's Health. Łdź :University Press; 2003. P 91-106.[in Polish].
- 12-Karasek RA, Theorell T. Healthy work.Stress, Productivity and the Reconstruction of Working Life. New York: Basic Books; 1990.
- 13-Świętochowski W. Sense of coherence and teachers' professional burnout. Acta Univ Lodziensis Folia Psychol .2004; 8: 55-65 .
- 14-Oginska-Bulik N. The role of personal and social resources in preventing adverse health outcomes in employees of uniformed professions. Int J Occup Med Environ Health 2005; 18(3):233-40.
- 15-Sawatzky JA. Stress in critical care nurses: Actual and perceived. Heart lung 1996; 25(5):409-17.
- 16-Abtahi H, Alwan M.[Research on Stress of Manager in the industrial sector]. J Manage Stud 1992; 45-52. [In Persian]
- 17-Wanger D, Heinrichs M, Ehler U. Prevalence of symptoms of posttraumatic stress disorder in German a professional firefighters. Am J Psychiatry 1998; 155(12):1727-32.
- 18-Guidotti T. Firefighting Hazards: The ILO Encyclopaedia of Occupational Health and Safety. 4th ed. Geneva: ILO; 1998. p. 954-9.
- 19-Yong S, Ming C, Frank H , Feng C, Feng Ch.The relationship between quality of life and posttraumatic stress disorder or major depression for firefighters in Kaohsiung, Taiwan. Qual Life Res2007;(16):1289-97
- 20- Fullerton CS, Ursano RJ, Wang L. Acute stress disorder, posttraumatic stress disorder, and depression in disaster on rescue workers. Am J Psychiatry 2004;161(8):1370-6.
- 21-Murphy SA, Beaton RD, Pike KC, Johnson LC. Occupational stressors, stress responses and alcohol consumption among professional firefighters: a prospective, longitudinal analysis. Int J Stress Manage 1999;6(3):179-196.
- 22-Ahyakonandeh M. Shafi Abadi A. Sudan M. [The relationship between burnout and health workers Behbahan University]. J thought behav 2009 ;(10):99-107. [In Persian]
- 23-Aghilinejad M,Mohamadi S,Afkari M,Abaszadeh R.The relationship between job stress and mental health, personality type, and stressful life events in the Tehran traffic police. J Res. 2007 ;(4):355-60. [In Persian]