

Original Article

## Prevalence of occupational stress and its correlates among firefighters, Tehran, Iran, 2013

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### Abstract

**Introduction:** Among the various occupations, firefighters are exposed to stress due to the nature of their occupational. Hence, our aim in this study was to assess occupational stress and its correlates among Tehran's firefighters, Iran.

**Methods:** A cross-sectional study was carried out among firefighters of Tehran in 2013. A total of 312 staff of firefighting organization selected from five operating region through a multistage sampling. Demographic and occupational stress questionnaires were filled by subjects. Finally, data were analyzed with the help of SPSS for Windows.

**Results:** Prevalence of overall stress was 2.2%. Stress levels were 5.8% in demand area, 41.0% in control area, 12.5% in communication area, 1.5% in role area, 17.0% in change area, 14.1% in manager support area, and 5.4% in peer support. The significant association was found between married status ( $P = 0.006$ ), lower education ( $P = 0.011$ ), number of medical visit ( $P = 0.044$ ), career history ( $P = 0.047$ ) with occupational stress.

**Conclusion:** Prevalence of occupational stress in firefighters of Tehran is relatively low. It is suggested that stress-prone individuals should be identified and advised.

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### Introduction

Around the world, many people spend long hours at work. Regardless of economic issues, psychological disorders considered as one of the most important occupational risks.<sup>1</sup> Stress is one aspect of psychological disorders that is defined as response to physical and psychological, the lack of coordination exists between business needs and abilities, capabilities and desires of the individual.<sup>2</sup> Some conditions including overwork and demanding, insufficient time for rest, long shifts can lead to stress and defensive reactions such as increased heart rate, muscle tension and deep breathing.<sup>1</sup> If this situation persists,

other organs may also be affected. In the recent 20 years, many studies have shown an association between, mood disorders, stomach upset, cardiovascular diseases, skeletal disorders with occupational stress.<sup>3,4</sup>

Among the three European workers, one person is suffering from stress, which is equivalent to 40 million workers in Europe. Fourth European working conditions survey found that, 20.0% of workers in 15 countries of Europe and 30.0% of workers in 10 countries that are member of EU recently have suffered from occupational stress. The expenses of stress and other psychological problems in EU countries in 2004 is over 265 billion euro,

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meaning 3-4.0% of total gross domestic product of these countries.<sup>1,4</sup> Among the occupations, firefighting is one of the stressful and dangerous profession and in terms of mortality, it is rated fourth among America occupations.<sup>5-7</sup> So our aim in this study was to determine the prevalence and correlates of occupational stress among Tehran's firefighters, Iran, as one of the susceptible population.

### Methods

A cross-sectional study was conducted in 2013 on 321 firefighting staff. Firefighting organization consists of five operating area in Tehran, and the total number of staffs was 3200. Considering stress distribution in the five operational areas, multistage sampling was used. Regarding each area of operation as a stratum, the number of subjects corresponds to the number of personnel in the area. Five stations were randomly selected in each region as a cluster. In each station, samples were selected proportionally to the number of staff. Sample size was calculated using the study has been done by Yazdi and Sharifian among Tehran firefighters in 2000 to ensure 80.0% statistical power and Type 1 error < 0.05.<sup>8</sup>

Occupational stress questionnaire is used to determine the level of stress. This questionnaire has 7 domains and 35 questions that were built in the late 1990s to measure stress and employee health and safety by the Institute of occupational safety and health.<sup>9</sup> Seven domains are: 1- demand (8 items): issues like workload, work environment characteristics, 2- control (6 items): to what extent does a person do their jobs, 3- protection authorities (5 items), 4- peer support (4 items), 5- communication (5 items): increase training and positive characteristics to enhance communication and reduce conflict in the workplace, 6- the role of personals (9 items), 7- changing organization forces (3 items).

The reliability and validity of the questionnaire were assessed good in various studies, and this questionnaire has various domains and fewer questions versus other

same questionnaires.<sup>9,10</sup> External reliability co-efficient is 0.7, and the range of Cronbach's alpha co-efficient is 0.63-0.83.<sup>10,11</sup> It is also to be noted that, the questionnaire has been standardized in Iran.<sup>12</sup>

Furthermore, purposes of the study were explained for participants, and informed consent was taken. Each question has five options, and scoring is rated from 1 to 5 (Likert scale). High scores indicate greater safety in terms of stress. Scores < 1.5, 1.5-2.5, 2.5-3.5, and more than 3.5 classified as severe, moderate, mild, and non-stressful, respectively. According to the normality, collected data were analyzed using an independent t-test, analysis of variance, and Pearson correlation coefficient with SPSS for Windows (version 16, SPSS Inc., Chicago, IL, USA).

### Results

In this study, 312 fire personnel were studied, including: 210 (67.5%) firefighters, 69 (22.2%) technician, and 32 (10.3%) director. The mean of age was  $31.32 \pm 7.6$  years. 228 of participants were married (73.0%). The majority of subjects were diploma. The remarkable proportion of subjects had occupational experience < 5 years and 5 to 10 years. Cigarette smoking was low, and only 6.4% of them were smoker (Table 1).

Finally, it could be said that, the prevalence of stress was negligible (2.2%). Stress levels were 5.8% in demand area, 41.0% in control area, 12.5% in communication area, 1.5% in role area, 17.0% in change area, 14.1% in manager support area, and 5.4% in peer support (Table 2).

The present study found that, significant association exist between occupational stress and marital status ( $P = 0.020$ ), and the stress level was higher among bachelor subjects. Also, a significant association was found between educational level and occupational stress level ( $P = 0.046$ ), and among theses, under diploma and diploma subjects had lowest and highest stress level, respectively. There was not significant association between occupational history and stress level ( $P = 0.086$ ), but it could be said that subjects

with more occupational history had more level of stress. An interesting finding is that, subjects who smoked had a low level of stress, but this association was not significant ( $P = 0.569$ ). It is important to be noted that,

stress level was decreased with increment in the medical visits, but this association was not statistically significant ( $P = 0.156$ ). Finally, significant associations were found between all domains (Table 3).

**Table 1. Description of measured variables among Tehran's firefighters in 2013**

Variable	n (%)	Stress score	P
Organizational role			
Firefighters	210 (67.50)	3.49 ± 0.42	0.376
Technician	69 (22.25)	3.46 ± 0.39	
Director	32 (10.30)	3.59 ± 0.36	
Marital status			
Single	229 (73.40)	3.59 ± 0.45	0.020
Married	83 (26.60)	3.46 ± 0.39	
Educational level			
Under diploma	2 (0.60)	3.12 ± 0.88	0.046
Diploma	197 (63.40)	3.54 ± 0.42	
BSc	110 (35.40)	3.43 ± 0.38	
MSc	2 (0.60)	3.25 ± 0.33	
Occupational experience (year)			
< 5	100 (32.10)	3.55 ± 0.43	0.086
5-10	114 (46.20)	3.42 ± 0.40	
11-15	39 (12.5)	3.60 ± 0.38	
16-20	15 (4.80)	3.53 ± 0.27	
21-25	10 (3.20)	3.51 ± 0.59	
> 25	4 (1.30)	3.65 ± 0.33	
Smoking			
Yes	20 (6.40)	3.44 ± 0.44	0.569
No	292 (93.60)	3.50 ± 0.41	
Medical visit			
No visit	174 (55.60)	3.54 ± 0.40	0.156
1 time	24 (7.70)	3.50 ± 0.38	
2 times	34 (10.90)	3.44 ± 0.36	
> 3 times	81 (25.90)	3.42 ± 0.46	

**Table 2. Prevalence of stress among Tehran's firefighters by domains in 2013**

Stress level	No stress		Low stress		Average stress		High stress		Stress ratio	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Demand	30.4	95	63.8	199	5.8	18	0.0	0	5.8	18
Control	13.1	41	45.8	143	40.4	126	0.6	2	41.0	128
Protection Authorities	49.0	153	36.9	115	13.1	41	1.0	3	14.1	44
Peer support	12.1	225	22.4	70	4.5	14	1.0	3	5.4	1
Communication	34.3	107	53.2	166	12.5	39	0.0	0	12.5	39
Role	91.0	284	7.4	23	1.6	5	0.0	0	1.6	5
Change	39.7	124	43.3	135	15.4	48	1.6	5	17.0	53
Occupational Stress	52.2	163	45.5	147	2.2	7	0.0	0	2.2	7

**Table 3. Correlation between domains of stress among Tehran's firefighters, 2013**

	Control	Peer support	Protection authorities	Demand	Communication	Role	Change
<b>Control</b>							
Correlation coefficient	1.000	0.151	0.204	0.198	0.029	0.212	0.331
Significance level		0.008	< 0.001	< 0.001	0.606	< 0.001	< 0.001
<b>Peer support</b>							
Correlation coefficient	0.151	1.000	0.730	0.151	-0.055	0.373	0.598
Significance level	0.008		< 0.001	0.008	0.332	< 0.001	< 0.001
<b>Protection authorities</b>							
Correlation coefficient	0.204	0.730	1.000	0.123	-0.084	0.351	0.598
Significance level	< 0.001	< 0.001		0.030	0.138	< 0.001	< 0.001
<b>Demand</b>							
Correlation coefficient	0.198	0.151	0.123	1.000	0.160	0.263	0.225
Significance level	< 0.001	< 0.001	0.030		0.005	< 0.001	< 0.001
<b>Communication</b>							
Correlation coefficient	0.029	-0.055	-0.084	0.160	1	0.236	-0.020
Significance level	0.606	0.332	0.138	0.005		< 0.001	0.736
<b>Role</b>							
Correlation coefficient	0.212	0.373	0.351	0.236	0.105	1	0.411
Significance level	< 0.001	< 0.001	< 0.001	< 0.001	0.064		< 0.001
<b>Change</b>							
Correlation coefficient	0.331	0.528	0.598	0.225	-0.020	0.411	1.000
Significance level	< 0.001	< 0.001	< 0.001	< 0.001	0.726	< 0.001	

## Discussion

Stress is a natural and biological response to a range of stimuli or psychological discomfort. Stress plays an important role to create problems, ailments, physical or mental disability and costs. Research on occupational stress has been conducted in nursing, teaching and so on, but firefighting is less attended in Iran. The prevalence of stress in this study was 2.2%, which is less than the stress levels reported in other studies. A study has been done by Bahrami et al. found the prevalence of stress as 4.7%.<sup>13</sup>

Another study has been done by Khaghanizadeh et al., found that occupational stress among nurses is 10.0%.<sup>14</sup> Azad-Marzabadi et al. have shown that, 13.5% of subjects have a high level of stress.<sup>15</sup> The level of stress among firefighters is higher than other occupations and hence that in a study conducted on 1672 firefighters in Japan, 22.3% of subjects had some degrees of stress.<sup>16</sup>

The least amount of stress was in role domain that was consistent with the study has been done by Azad-Marzabadi and Salimi.<sup>17</sup>

The highest rate of prevalence was observed in the control domain that represent obstacles in the way of their work. In this study, single subjects significantly had a high level of stress, but in other studies controversial findings were reported. In a study on nurses by Bahrami et al. in Kashan, Iran, no significant association was found between married status and stress.<sup>13</sup> However, study has been done by Aghilinejad et al., found a significant association between married status and stress.<sup>18</sup>

Dividing the workload with wife and emotional support by them could be considered as protective factors for stress. A study has been done by Bahrami et al. was not found a significant association between education and stress, which is discordant with the present study.<sup>13</sup> It seems, educated subjects have more motivation for studying

the coping methods of stress. In the present study, a significant association was not found between occupational history and stress, which is confirmed by study has been done by Behrami et al.<sup>13</sup>

Regardless of the effects of stress on occupational satisfaction and quality of work among employees and achieving to the organizational mission, psychosomatic disorders should not be forgotten. Based on the studies has been done by Vena and Fiedler<sup>19</sup> and Winkleby et al.,<sup>20</sup> association of stress with depression, anxiety, somatization disorder, mental fatigue, drugs, mental health, heart disease, death risk, digestive problems, breathing problems, and musculoskeletal disorder is approved. Although stress level is low in Tehran firefighter, but this not impose less importance of it. Periodical assessment seems to be useful in early detection of high levels stress to prevent low performance and psychosomatic disorders. An educational program for coping with stress is a

supplementary option too.

### Conclusion

Although in the present study prevalence of stress is low in comparison to other studies, but it is important due to its role in quantity and quality of delivered services, financial losses, and psychosomatic disorders. Periodical assessment seems to be useful in early detection of high levels stress to prevent low performance and psychosomatic disorders. Educational programs for coping with stress, ensuring occupational security, insurance, and financial aids is suggested for management of the organization to improve the effectiveness of personnel.

### Conflict of Interests

Authors have no conflict of interest.

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### References

- Houtman I, Jettinghof K, Cedillo L. Raising awareness of stress at work in developing countries: a modern hazard in a traditional working environment: advice to employers and worker representatives. Geneva, Switzerland: World Health Organization; 2007.
- Sauter SL, Murphy LR, Hurrell JJ. Prevention of work-related psychological disorders: A national strategy proposed by the National Institute for Occupational Safety and Health (NIOSH). *American Psychologist*, 1990; 45(10): 1146-58.
- Benner PE, Wrubel J. The primacy of caring: stress and coping in health and illness. Menlo Park, CA: Addison-Wesley; 1989.
- Leka S, Jain A, World Health Organization. Health impact of psychosocial hazards at work: an overview. Geneva, Switzerland: World Health Organization; 2010.
- Carlisle CF, Brook M. The role of occupational stress in the contemporary fire service: psychological stress, its causation, identification, treatment, reduction, and resolution. Emmitsburg, MD: National Fire Academy; 1999.
- Heslop P, Smith GD, Metcalfe C, Macleod J, Hart C. Change in job satisfaction, and its association with self-reported stress, cardiovascular risk factors and mortality. *Soc Sci Med* 2002; 54(10): 1589-99.
- Rosenstock L, Olsen J. Firefighting and death from cardiovascular causes. *N Engl J Med* 2007; 356(12): 1261-3.
- Yazdi SM, Sharifian SA. Job stress and its related factors in Tehran firefighters in year 2000. *Tehran Univ Med J* 2001; 59(6): 72-8. [In Persian].
- Cousins R, MacKay CJ, Clarke SD, Kelly Ch, Kelly PJ, McCaig RH. 'Management Standards' work-related stress in the UK: practical development. *Work & Stress: An International Journal of Work, Health & Organisations* 2004; 18(2): 113-36.
- MacKay CJ, Cousins R, Kelly PJ, Lee S, McCaig RH. 'Management Standards' and work-related stress in the UK: policy background and science. *Work & Stress: An International Journal of Work, Health & Organisations* 2004; 18(2): 91-112.
- Kerr R, McHugh M, McCrory M. HSE Management Standards and stress-related work outcomes. *Occupational Medicine* 2009; 59: 574-9.
- Azad Marzabadi E, Gholami Fesharaki M. Reliability and validity assessment for the hse job stress questionnaire. *J Behav Sci* 2011; 4(4): 291-7.
- Bahrami A, Akbari H, Mousavi S, Hannani M, Ramezani Y. Job stress among the nursing staff of Kashan hospitals. *FEYZ* 2011; 15(4): 366-73. [In Persian].
- Khaghanizadeh M, Ebadi A, Cirati nair M, Rahmani M. The study of relationship between Job stress and quality of work life of nurses in military hospitals. *J Mil Med* 2008; 10(3): 175-84. [In Persian].
- Azadmarzabadi E, Tarkhorani H, Emami khansari

- N. Job Stress in a Group of Military Personnel. *J Mil Med* 2007; 9(1): 15-22. [In Persian].
16. Saijo Y, Ueno T, Hashimoto Y. Job stress and depressive symptoms among Japanese fire fighters. *Am J Ind Med* 2007; 50(6): 470-80.
17. Azad-Marzabadi E, Salimi SH. Study on Job Stress in a Military Unit. *J Mil Med* 2005; 6(4): 279-84. [In Persian].
18. Aghilinejad M, Attarchi MS, Golabadi M, Chehregosha H. Comparing stress level of woman nurses of different units of Iran university hospitals in autumn 2009. *Annals of Military and Health Sciences Research* 2010; 8(1): 44-8.
19. Vena JE, Fiedler RC. Mortality of a municipal-worker cohort: IV. Fire fighters. *Am J Ind Med* 1987; 11(6): 671-84.
20. Winkleby MA, Ragland DR, Syme SL. Self-reported stressors and hypertension: evidence of an inverse association. *Am J Epidemiol* 1988; 127(1): 124-34.