

# JOB STRESS AMONG IRANIAN FIREFIGHTERS: A SYSTEMATIC REVIEW

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## ABSTRACT

**INTRODUCTION:** Firefighters, as the first responders to disasters, are exposed to dangerous and stressful situations and experience high job stress due to the nature of their work, affecting various physical and mental health dimensions. The aim of this study was to assess job stress in Iranian firefighters by systematic review.

**MATERIAL AND METHODS:** PRISMA guideline was used to conduct the present study. Data resources of SID, Magiran, Scopus, PubMed, ISC, Web of Science, and Google Scholar were searched. Conference papers and the reference list of retrieved articles were screened to identify additional studies. Literature searches were conducted in both Persian and English without any time limit until the end of 2020.

**RESULTS:** Initially, 147 studies were identified, and finally 13 eligible studies were systematically reviewed. In this study, 2378 Iranian firefighters were studied. Most of the studies had cross-sectional designs.

**CONCLUSIONS:** The results of the present study showed that most Iranian firefighters are exposed to job stress, influencing other life aspects such as quality of life, job satisfaction, etc. As appropriate interventions can reduce job stress, providing firefighters with adequate training at the beginning of employment and also with in-service training, it is possible to reduce their job stress.

**KEY WORDS:** occupational stress; job stress; firefighters; Iran

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## INTRODUCTION

Job stress affects persons working in a certain job, depending on his/her experience and strength or weakness in facing existing conditions. Feedback on job stress may affect the person's physical, psychological, and behavioral dimensions [1]. Also, job stress has adverse consequences on organizations [2]. Firefighting, not only because of the dangerous effects of smoke and fire but also the duty of firefighters

to protect victims, is one of the most stressful professions [3]. Firefighters, as first responders to disasters and because of their roles and responsibilities, face many risks and therefore are exposed to physical and mental exhaustion [4]. Therefore, they are exposed to adverse mental health consequences such as depression, posttraumatic stress disorders (PTSD), acute stress, and anxiety [5]. Numerous factors including work and living conditions, protective clothing, col-

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leagues and superiors, and fear of leaving their families during missions expose firefighters to stress [6]. Due to the nature of their jobs, firefighters are often exposed to dangerous and stressful situations, and frequent contact with traumatic events can notably impact their physical and mental health [7]. Firefighters due to high job stress and frequently facing traumatic events are particularly susceptible to behavioral disorders, reduced life quality, and long-term mental and physical problems [8, 9]. Firefighters due to occupational mental and physical stress are easily exhausted, and this stress can be expressed as excitement and anger. On the other hand, occupational exposition to stressful events further exposes them to alcoholism and post-traumatic stress disorder [10, 11]. The results of a study in Iran showed that 98.9% of firefighters and 97.3% of pre-hospital emergency personnel had low-moderate stress, and the severity of stress was higher among firefighters than pre-hospital emergency personnel [12]. Numerous studies have been conducted to determine job stress among Iranian firefighters; however, a comprehensive study has not yet been conducted to investigate this issue. So, the aim of the present study was to assess job stress among Iranian firefighters. This can provide a basis for planners, managers, and policy makers to implement measures to reduce job stress in this population.

## MATERIAL AND METHODS

We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline for conducting this study [13].

### Search strategy

In this study, we searched the data resources of Scopus, PubMed, Web of Science, Google Scholar, SID, ISC, and Magiran. Conference proceedings and the reference lists of retrieved articles were also checked to find additional related articles. Initially, based on experts' views, related studies were extracted using MeSH keywords and their Persian equivalents: 'firefighter', 'fire and rescue personnel', 'fire fighter', 'first responder', 'job stress', 'job-related stress', 'work-related stress', 'workplace stress', 'work place stress', 'professional stress', 'occupational stress', and 'Iran'.

In the next step, search strategies were designed using appropriate Boolean operators and search

fields for each database. Searches were performed in both Persian and English without any time limit until the end of September 2020.

Here, an example search syntax has been shown for PubMed: [(firefighter\* or 'fire and rescue personnel' or 'fire fighter\*' or 'first responder\*') and ('job stress\*' or 'job-related stress\*' OR 'work-related stress\*' or 'workplace stress\*' or 'work place stress\*' or 'professional stress\*' or 'occupational stress\*') and (Iran)].

### Eligibility criteria

All the studies such as review, quantitative and qualitative articles assessing job stress among Iranian firefighters were included. Investigating psychological consequences other than job stress in Iranian firefighters was considered as an exclusion criterion.

### Selection of studies

Initially, 147 studies we extracted and entered into EndNote X7 software. In the next step, after removing duplicates, 92 studies were further screened. Two researchers (AS and MG) independently read the full texts of related studies and finally selected 25 articles.

### Quality assessment

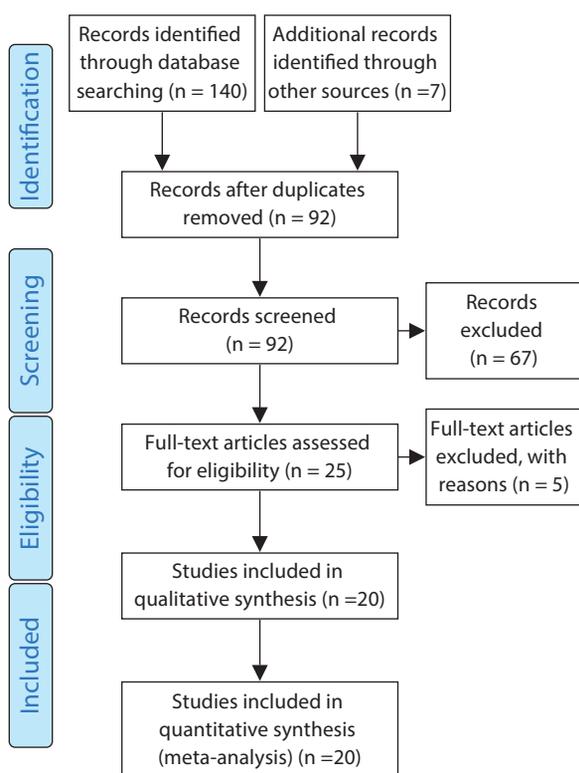
Two researchers (AS and MG) independently evaluated the quality of the selected studies. the appraisal tool for cross-sectional studies (AXIS) [14], Joanna Briggs Institute (JBI) [15], Consolidated Standards of Reporting Trials (CONSORT) [16], and the Mixed Methods Appraisal Tool (MMAT) [17] were used to quality assessment of cross-sectional, quasi-experimental, randomized clinical trial (RCT) and mixed-method studies respectively.

### Data extraction and synthesis

For data extraction, the research team initially designed a checklist *via* Microsoft Word software, and then two researchers (AS and MG) independently entered required data including the first author's name, year of publication, sample size, location of study, and studies' findings into the checklist. In the phases of Selection of studies, quality assessment and data extraction of any disagreement between the two researchers was resolved through group discussion. The results of the included studies were qualitatively analyzed (Tab. 1) [1, 12, 18–35].

**Table 1. The specifications of the extracted articles for systematic review**

First Author	Year of study	Study design	Location	Sample size	Findings
Sajjadipoor [18]	2018	Cross-sectional	Yazd	80	Job stress reduces firefighters' life satisfaction
Baghianimoghadam [19]	2015	Cross-sectional	Ahvaz Yazd	244	Firefighters need to be supported by the organization and other colleagues and training programs focusing on communication skills
Karimian Zo [20]	2018	Cross-sectional	Mashhad	258	Job stress and tolerance of shift work are prerequisites for marital satisfaction, and a reduction in job stress and increased tolerance can promote marital satisfaction
Nodoushan [21]	2019	Cross-sectional	Yazd	160	Participants had relatively low levels of job stress, and there was a relationship between job stress and work-related incidents
Darvishi [22]	2015	Cross-sectional	Sanandaj	50	Job stress was high among firefighters; it is particularly affected by work conditions and environment and reduces job satisfaction
Hoseinabadi [23]	2019	Cross-sectional	Mashhad	28	There is a relationship between job stress and burnout, and job stress has a significant impact on a person's lack of success
Rahimi [24]	2019	Cross-sectional	Tehran	149	Approximately one-third of participants had moderate to severe stress, and there was a relationship between job stress and burnout
Kazeronian [25]	2019	Cross-sectional	Tehran	228	24-hour work shifts are linked with job stress. Focusing on the work-shift-related causes of job stress can increase job satisfaction and reduce job stress
Hoseinzadeh [1]	2013	Cross-sectional	Tehran	55	More than half of studied firefighters suffered from job stress and needed to be educated regarding coping skills
Ziaei [12]	2014	Cross-sectional	Kermanshah	89	The severity of job stress was higher in firefighters than medical emergency workers
Sepidarkish [26]	2014	Cross-sectional	Tehran	312	The level of stress was relatively low among studied subjects. Periodic evaluations can be helpful in identifying vulnerable people and consulting them
Bolghanabadi [27]	2019	Cross-sectional	Nishapur	65	Firefighters had high levels of job stress and workload and low levels of quality of life and job satisfaction
Yazdi [28]	2001	Cross-sectional	Tehran	155	Firefighters' greatest job stress was related to physical effort and exposition to hazardous substances
Dortaj [29]	2012	Quasi experimental	Tehran	80	Cognitive therapy regarding dealing with occupational problems reduces job stress and increases job satisfaction in firefighters
Hatami [30]	2019	Cross-sectional	Mashhad	130	Job stress affects firefighters' ability to work
Mehrabian [31]	2017	RCT	Rasht	128	Stress management training improves firefighters' communication skills and prevents from the exacerbation of stress
Talebi [32]	2020	Quasi experimental	Tehran	60	Aerobic exercise and stress coping skills reduce job stress and improve the performance in firefighters
Rajabi [33]	2020	Mixed method	Shiraz	65	Organizational parameters are among the most common factors contributing to job stress in firefighters, and improving job stress requires management strategies
Mohamadi [34]	2013	Cross-sectional	Ahvaz	270	Work environment along with economic, social, and cultural factors have the greatest impact on firefighters' job stress, on the other hand, firefighters' job stress is influenced by their general health
Khodabakhshi-Koolaei [35]	2018	Quasi experimental	Tehran	30	Stress management training reduces burnout and increases life quality in firefighters



**FIGURE 1.** The flow diagram of the study based on the PRISMA guideline

## RESULTS

Based on a comprehensive search, 147 studies were initially extracted, and after removing duplicates, 92 studies were screened, of which 25 studies were selected for full-text review. At last, 20 studies were selected for quality assessment (Fig. 1). The selected studies had been conducted between 2001 and 2020. Overall, 2378 Iranian firefighters had been studied. In terms of study design, 14 studies were cross-sectional, one was an RCT, one had a mixed design, and finally, three were quasi-experimental studies. Regarding location, most of the studies ( $n = 8$ ) had been conducted in Tehran.

## DISCUSSION

In the present study, it was shown that in most of the reviewed studies, job stress was high among Iranian firefighters. The results of a study by Kim in South Korea also showed that firefighters had high levels of job stress and the fact that job stress was associated with the incidence of occupational damages and problems [36]. The results of a review study by Sahebi et al. [37] in 2020 showed that the prevalence of PTSD was 23.17% among Iranian

firefighter. Another study by Golitaleb et al. [38] revealed that the prevalence of PTSD was 50.20% among pre-hospital emergency personnel. Klimley et al. [40] also stated that more than 80% of first responders (police, firefighters, and EMS personnel) had experienced occupational traumatic incidents, and the prevalence of PTSD was estimated as 10–15% among them [39–41]. The results of these studies are in line with those of the present study and emphasize the high level of job stress among first responders, especially firefighters. As first responders, because of the nature of their jobs, are among the first individuals who arrive at the scene immediately after the accident, they may face many traumatic and stressful events, so the risk of job stress is high among these people. Therefore, these people should be periodically and regularly screened for any evidence of job stress.

Another issue addressed by the reviewed studies was the association of job stress with burnout and job satisfaction, as well as firefighters' quality of life. The results of a study by Jung et al. [39] in South Korea in 2020 showed that there was a positive correlation between job stress and burnout in firefighters. Also, Yun et al. [41] showed a significant relationship between job stress and burnout among EMS personnel. Namdari et al. [42] in 2014 showed that there was a negative relationship between EMS staff's quality of life and their job stress, meaning that a higher level of job stress predicted a lower quality of life. According to studies, social support via positive adaptation can reduce burnout among firefighters [43]. Other studies have shown that religiosity and spirituality have positive effects on mental and physical health and reduce stress and increase the quality of life [44]. The results of these studies, in parallel with our observations, emphasize the role of job stress as a contributing factor to burnout and reduced quality of life in first responders, especially firefighters. As job stress can ensue negative consequences such as burnout and reduced quality of life, people who are vulnerable to job stress must be supported and followed up continuously to reduce the incidence of these adverse complications.

Another issue highlighted in this study was the effect of interventional measures in reducing job stress in firefighters. The results of studies have shown that active encountering and social support may have key roles in reducing PTSD among firefighters [45]. Baek et al. showed that listening to music reduced job stress in firefighters [46].

On the other hand, adaptation to job stress promotes firefighters' resilience and also improves their performance [47]. The results of the mentioned studies are consistent with ours and highlight the role of interventional programs in reducing job stress in firefighters. Considering that firefighters are exposed to chronic workplace-related stress which in turn affects other aspects of their lives, including quality of life and job satisfaction, implementing appropriate educational interventions such as stress adaptation and coping methods can reduce their job stress to some extent.

### Strengths and limitations

The present study was the first comprehensive report on the job stress of Iranian firefighters. One of the limitations of this study is about bounding job stress papers in Iranian firefighters.

### CONCLUSIONS

The results of the present study showed that most Iranian firefighters are exposed to job stress which can further affect their other life dimensions such as quality of life, job satisfaction, etc. Because implementing interventional programs can reduce job stress in these people, it is advisable to consider appropriate interventions, strengthen religion and spirituality and training at the beginning of employment, as well as in-service training, to reduce job stress in these individuals.

### Conflict of interest

The authors declare that they have no competing interests.

### REFERENCES

- Hoseinzadeh E, Faghih MA, Kalte Ho, et al. Evaluation of occupational stress factors in firefighters of tehran in 2011. *Jentashapir J Cellular Molecul Biol.* ; 2013: 129–136.
- Chirico F, Afolabi AA, Ilesanmi OS, et al. Prevalence, risk factors and prevention of burnout syndrome among healthcare workers: An umbrella review of systematic reviews and meta-analyses. *J Health Soc Scie.* 2021; 6(4): 465–491, doi: [10.19204/2021/prvl3](https://doi.org/10.19204/2021/prvl3).
- Laureys V, Easton M. Resilience of firefighters exposed to potentially traumatic events: a literature review. *Intern J Emergency Serv.* 2020; 9(2): 217–232, doi: [10.1108/ijes-05-2019-0021](https://doi.org/10.1108/ijes-05-2019-0021).
- Smith T, Hughes K, DeJoy D, et al. Assessment of relationships between work stress, work-family conflict, burnout and firefighter safety behavior outcomes. *Safety Science.* 2018; 103: 287–292, doi: [10.1016/j.ssci.2017.12.005](https://doi.org/10.1016/j.ssci.2017.12.005).
- Chirico F, Crescenzo P, Sacco A, et al. Prevalence of burnout syndrome among Italian volunteers of the Red Cross: a cross-sectional study. *Ind Health.* 2021; 59(2): 117–127, doi: [10.2486/indhealth.2020-0246](https://doi.org/10.2486/indhealth.2020-0246), indexed in Pubmed: [33473066](https://pubmed.ncbi.nlm.nih.gov/33473066/).
- Kazronian S, Zakerian S, Saraji J, et al. Reliability and Validity study of the NIOSH Generic Job Stress Questionnaire (GJSQ) among Firefighters in Tehran city. *Health Safety Work.* 2013; 3(3): 25–34.
- Straud C, Henderson S, Vega L, et al. Resiliency and posttraumatic stress symptoms in firefighter paramedics: The mediating role of depression, anxiety, and sleep. *Traumatology.* 2018; 24(2): 140–147, doi: [10.1037/trm0000142](https://doi.org/10.1037/trm0000142).
- Carpenter GS, Carpenter TP, Kimbrel NA, et al. Social support, stress, and suicidal ideation in professional firefighters. *Am J Health Behav.* 2015; 39(2): 191–196, doi: [10.5993/AJHB.39.2.5](https://doi.org/10.5993/AJHB.39.2.5), indexed in Pubmed: [25564831](https://pubmed.ncbi.nlm.nih.gov/25564831/).
- Kim W, Bae M, Chang SJ, et al. Effect of burnout on post-traumatic stress disorder symptoms among firefighters in korea: data from the firefighter research on enhancement of safety & health (FRESH). *J Prev Med Public Health.* 2019; 52(6): 345–354, doi: [10.3961/jpmph.19.116](https://doi.org/10.3961/jpmph.19.116), indexed in Pubmed: [31795611](https://pubmed.ncbi.nlm.nih.gov/31795611/).
- Lee S-S, Jeong S, Choi Y-S. The effect of stress coping on resilience of firefighters. *Biomed Research.* 2019; 30(2).
- Zegel M, Tran JK, Vujanovic AA. Posttraumatic stress, alcohol use, and alcohol use motives among firefighters: The role of distress tolerance. *Psychiatry Res.* 2019; 282: 112633, doi: [10.1016/j.psychres.2019.112633](https://doi.org/10.1016/j.psychres.2019.112633), indexed in Pubmed: [31708250](https://pubmed.ncbi.nlm.nih.gov/31708250/).
- Ziaei M, Yarmohammadi H, Laybidi MI, et al. Comparison of occupational stress among personnel of firefighting and emergency medical stations of kermanshah (Iran) in 2013. *World J Med Sci.* 2014; 10(3): 362–367, doi: [10.5829/idosi.wjms.2014.10.3.8316](https://doi.org/10.5829/idosi.wjms.2014.10.3.8316).
- Moher D, Liberati A, Tetzlaff J. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA Statement. *Open Med.* 2009; 3(3): e123–e130, indexed in Pubmed: [21603045](https://pubmed.ncbi.nlm.nih.gov/21603045/).
- Downes MJ, Brennan ML, Williams HC, et al. Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open.* 2016; 6(12): e011458, doi: [10.1136/bmjopen-2016-011458](https://doi.org/10.1136/bmjopen-2016-011458), indexed in Pubmed: [27932337](https://pubmed.ncbi.nlm.nih.gov/27932337/).
- Tufanaru C, Munn Z, Aromataris E, Campbell J, Hopp L. Checklist for Quasi-Experimental Studies (non-randomized experimental studies) Joanna Briggs Institute, 2017.
- Schulz KF, Altman DG, Moher D. CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. *Trials.* 2010; 11: 32, doi: [10.1186/1745-6215-11-32](https://doi.org/10.1186/1745-6215-11-32), indexed in Pubmed: [20334632](https://pubmed.ncbi.nlm.nih.gov/20334632/).
- Hong Q, Fàbregues S, Bartlett G, et al. The mixed methods appraisal tool (MMAT) version 2018 for information professionals and researchers. *Edu Inform.* 2018; 34(4): 285–291, doi: [10.3233/efi-180221](https://doi.org/10.3233/efi-180221).
- Sajjadipour FS. Investigating the relationship between job stress and life satisfaction of firefighters. *First International Conference on Culture. Psychopathol Edu.* 2018.
- Baghianimoghadam M, Hatamzadeh N, Sharifi M, et al. Investigation of job stress and related factors in firefighters in the cities of Ahvaz and

- Yazd, Iran. *Caspian J Health Res.* 2015; 1(1): 27–34, doi: [10.18869/acadpub.cjhr.1.1.27](https://doi.org/10.18869/acadpub.cjhr.1.1.27).
20. Karimian Zo M, Soliemanian A, Rahimi Pordanjani T. The role of shift work tolerance and job stress as predictions of marital satisfaction among mashhad city firefighters. *Occup Med Quarterly J.* 2018; 10(2): 1–9.
  21. Nodoushan RJ, Halvani G, Sadri A, et al. A study of the relationship between occupational stress and work accidents in employees of fire department and safety services of Yazd city. *J Toloobehdasht.* 2019; 18(3): 69–80, doi: [10.18502/tbj.v18i3.1445](https://doi.org/10.18502/tbj.v18i3.1445).
  22. Darvishi E, Sadeghi F, Saed PK. Evaluation of effective factors on occupational stress in firefighting personnel. 2015; 11(1): 184–192.
  23. Hosseinabadi F, Solati F, Ghanbari HR. Investigating the relationship between job stress and dimensions of burnout in firefighters in Mashhad. *International Conference on Interdisciplinary Studies in Management and Engineering Teheran*, 2019.
  24. Rahimi MA. Investigating the relationship between job stress and burnout and mental health of firefighters in Tehran. *4th International Conference on New Research in the Field of Educational Sciences and Psychology and Social Studies in Iran Teheran*, 2019.
  25. Kazronian S, Zakerian SA, Morteza-pour A, et al. Influence of 24-hours shift work system on occupational stress among iranian firefighters. *Arch Adv Biosci.* 2019; 10(4): 31–40.
  26. Sepidarkish M, Safiri S, Hosseini SH, et al. Prevalence of occupational stress and its correlates among firefighters, Tehran, Iran, 2013. *J Resi Clin Med.* 2014; 2(4): 177–182.
  27. Bolghanabadi S, Mousavi Ko, Mahmodi A, et al. The effect of mental workload on stress and Quality of Work Life firefighters. *J Sabzevar Univ Med Sci.* 2019; 26(5): 547–553.
  28. Yazdi S, Sharifian S. Job stress and its related factors in tehran firefighters in year 2000. *Tehran Univ Med J TUMS Publ.* 2001; 59(6): 72–78.
  29. Fariborz D. effectiveness of coping therapy on job stress and satisfaction of firefighters satisfaction. *J Soc Order.* 2012; 4(3): 183–194.
  30. Hatami A, Afshari D. Effect of occupational stress on the work ability of Iranian firefighters. *Jundishapur J Health Sci.* 2019; 11(1), doi: [10.5812/jjhs.83410](https://doi.org/10.5812/jjhs.83410).
  31. Mehrabian F, Kasmaei P, Roushan ZA. The effect of stress management education on firefighters' stress in Rasht. *Iran Occup Health J.* 2017; 13(6): 78–86.
  32. Talebi N. The effectiveness of aerobic exercise interventions and stress coping skills training on the reduction of job stress among employees of the organization. *Clin Psychol Personal.* 2020; 17(2): 11–18, doi: [10.22070/cpap.2020.2904](https://doi.org/10.22070/cpap.2020.2904).
  33. Rajabi F, Molaeifar H, Jahangiri M, et al. Occupational stressors among firefighters: application of multi-criteria decision making (MCDM) Techniques. *Heliyon.* 2020; 6(4): e03820, doi: [10.1016/j.heliyon.2020.e03820](https://doi.org/10.1016/j.heliyon.2020.e03820), indexed in Pubmed: [32368655](https://pubmed.ncbi.nlm.nih.gov/32368655/).
  34. Mohamadi A, Nourollahi M, Latifi SM. The effect of risk factors of occupational stress on general health of the firefighters of Ahvaz city. *Jundishapur J Health Sci.* 2013; 5(3): 167–173.
  35. Khodabakhshi KA, Falsafinejad MR, Moghadam M. Effectiveness of stress management training on life quality and occupational burnout among firefighters of Tehran. *J Health Chime.* 2018; 6(1): #a0042.
  36. Kim YK, Ahn YS, Kim K, et al. Association between job stress and occupational injuries among Korean firefighters: a nationwide cross-sectional study. *BMJ Open.* 2016; 6(11): e012002, doi: [10.1136/bmjopen-2016-012002](https://doi.org/10.1136/bmjopen-2016-012002), indexed in Pubmed: [27888173](https://pubmed.ncbi.nlm.nih.gov/27888173/).
  37. Sahebi A, Yousefi K, Moayedi S, et al. Prevalence of posttraumatic stress disorder among firefighters in iran: a systematic review and meta-analysis. *Iran J Psychiatry.* 2020; 15(4): 358–365, doi: [10.18502/ijps.v15i4.4301](https://doi.org/10.18502/ijps.v15i4.4301), indexed in Pubmed: [33240386](https://pubmed.ncbi.nlm.nih.gov/33240386/).
  38. Golitaleb M, Mozafari A, Yousefi K, et al. Post-traumatic stress disorder in emergency medical services personnel in iran: a letter to the editor. *Iranian J Psychiatry Behavioral Sci.* 2020; 14(1), doi: [10.5812/ijpbs.100281](https://doi.org/10.5812/ijpbs.100281).
  39. Jung Y, Oh M, Kim H. The relationship between occupational stress and burnout among firefighters: mediating of grit. *J Korean Academy Psychiatric Mental Health Nurs.* 2020; 29(2): 96–105, doi: [10.12934/jkpmhn.2020.29.2.96](https://doi.org/10.12934/jkpmhn.2020.29.2.96).
  40. Klimley K, Hasselt VV, Stripling A. Posttraumatic stress disorder in police, firefighters, and emergency dispatchers. *Aggression Violent Behavior.* 2018; 43: 33–44, doi: [10.1016/j.avb.2018.08.005](https://doi.org/10.1016/j.avb.2018.08.005).
  41. Yun YJ, Hong SW. Effects of job stress and burnout on the quality of life among 119 EMTs. *The Korean Journal of Emergency Medical Services.* 2018; 22(3): 131–148.
  42. Namdari M, Sharifi T, Tabatabaee SS. The effect of job stress on the quality of life of emergency personnel. *J Management Medical Inform School.* 2014; 2(1): 37–127.
  43. Huang Qi, An Y, Li X. Coping strategies as mediators in the relation between perceived social support and job burnout among Chinese firefighters. *J Health Psychol.* 2022; 27(2): 363–373, doi: [10.1177/1359105320953475](https://doi.org/10.1177/1359105320953475), indexed in Pubmed: [32883114](https://pubmed.ncbi.nlm.nih.gov/32883114/).
  44. Chirico F. Spirituality to cope with COVID-19 pandemic, climate change and future global challenges. *J Health Social Sci.* 2021; 6(2): 151–158.
  45. Lee JH, Park S, Sim M. Relationship between ways of coping and posttraumatic stress symptoms in firefighters compared to the general population in South Korea. *Psychiatry Res.* 2018; 270: 649–655, doi: [10.1016/j.psychres.2018.10.032](https://doi.org/10.1016/j.psychres.2018.10.032), indexed in Pubmed: [30384285](https://pubmed.ncbi.nlm.nih.gov/30384285/).
  46. Baek ML, Kim YR. Effect of music listening on convergent job stress of fire-fighter. *J Korea Convergence Soc.* 2016; 7(6): 99–104, doi: [10.15207/jkcs.2016.7.6.099](https://doi.org/10.15207/jkcs.2016.7.6.099).
  47. Lan YL, Huang WT, Kao CL, et al. The relationship between organizational climate, job stress, workplace burnout, and retention of pharmacists. *J Occup Health.* 2020; 62(1): e12079, doi: [10.1002/1348-9585.12079](https://doi.org/10.1002/1348-9585.12079), indexed in Pubmed: [31407446](https://pubmed.ncbi.nlm.nih.gov/31407446/).