

Post-Traumatic Growth in Response to Occupational Stress among Firefighters in Iran: A Qualitative Research

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ABSTRACT

Firefighters are more facing to stressful situation than many other occupations. The purpose of this study was to investigate the way of firefighters' respond to occupational stress, and to create a theoretical model for this response regarding the Iranian culture. In this qualitative study, grounded theory with a Glaser approach was applied. A purposeful sampling method was carried out on 28 firefighters at one of the major firehouses in Tehran. After collecting the data and identifying the pattern, the final result was re-backed to participants to redesign a pattern with minor refinements. The results showed that firefighters experience both stress and post-traumatic growth. These two phenomena compete with each other and the outcomes that the individual experiences are the result of this competition. When an individual selects a passive reaction, post-traumatic stress will be overcome, and post-traumatic growth will be prevailing when he tries to change the situations and negative emotions effortful. Interpersonal, cultural and organizational factors play an important role in overcoming stress or post-traumatic growth in firefighters. By designing interventions, this group can be guided to personal growth

Keywords: *Firefighter, Post-Traumatic Stress, Post-Traumatic Growth, Coping Style, Occupation Stress.*

INTRODUCTION

Job stress is widely assumed to be highlighted in firefighting occupation. On the one hand, firefighters frequently put at risk and on the other hand, they are dealing with victims who are severely injured and people who are dying [1]. Stress can lead to severe physical problems such as chronic pain, who are dying [1]. Stress can lead to severe physical problems such as chronic pain, breathing problems, digestive, and neurological disorders [2].

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According to the U.S. Crisis Management Agency in 2015, 67% of firefighter fatalities are related to job stress. Some studies have focused on the firefighters' psychological disorder. Studies showed that, in addition to occupational stress, firefighters' mental health may be affected by organizational factors [3]. Although previous studies emphasized stress as a negative factor in firefighters' physical and psychological health, little attention has been paid to its positive effects.

An overview of the research literature showed that repeated exposure to traumatic experiences, organizational stress, and ineffective cognitive strategies predicted subsequent Post-Traumatic-Stress-Disorder (PTSD) with symptoms such as emotional numbness and avoidance, persistent fear, irritability, and sleep disturbances [4].

Individual factors, including motivation to self-care behaviors [5], effective coping strategies [6], and flexibility [7] are also correlated with post-traumatic growth (positive changes after struggling with traumatic events).

In an integrated qualitative and quantitative research, different patterns of firefighters' emotional behaviors were demonstrated. Factors such as emotional suppression, work-family conflict, risk-taking behaviors, and health problems were extracted from the interviews which were all associated with symptoms of PTSD in research collaborators [8]. The recent studies revealed that risk probability out of work environment may be decreased when firefighters increase their courage and feel passionate about their career. Those who suppressed their emotions and experienced more work-family conflict was more in risk and had less physical health [9].

Research demonstrated that people tend to use restorative coping strategies when exposed to occupational stress. Firefighters usually use a defense mechanism such as separation when they are in the gap between two high-pressure missions. They also feel proud about job achievements which cause decreased fatigue and more job engagement [10]. Different researches showed that Firefighters who use defense mechanisms such as talking about stressful experiences and occupational stress have more psychological health and somehow it can be said they have reached PTG in this way [11].

Previous investigations focused on the negative symptoms of firefighters' stresses, such as physical and psychological consequences. Research that looked at the positive effects of stress in firefighters were limited; most of them used questionnaires for assessment positive and negative of stress consequence, and less studied psychological enrichment factors. There is no study that accurately determines what is growth from the firefighters' perspective and which factor(s) determines trauma and growth in firefighters. Focusing on both aspects will help designing well not only negative stress symptoms

but also simultaneously reinforcing positive symptoms in designing psychological interventions to reduce stress. This study was aimed to investigate the positive stressful experiences because this experience is a main resource of growth. Since growth has a different meaning for each individual, qualitative study was applied to extract of real meaning of personality development in firefighters. The purpose of this study was not only to study participants' living experiences, but also to identify their patterns of stress and growth. The grounded theory is a suitable method to get a paradigm not just for emotional experiences, but also allows people to express their attitudes and beliefs about situations. Furthermore, the Glaser's approach unlike the traditional grounded theory provides which focuses both on personal experience and individual perspective.

METHODS AND MATERIALS

In the present study the Glaser's grounded theory (or emergent approach) was used as a qualitative research [12]. Glaser applied a qualitative method to enhance an in-depth and extensive research and discover the hidden facets of human behavior that are often far from quantitative methods. This approach was suitable for the present study because the theory is extracted from the real data which shows a better explanation of reality. In this study, the grounded theory was applied to evaluate simultaneously the post-traumatic stress and growth. Several sub-approaches have been proposed in grounded theory but the emergent approach was more consistent with the goals of this study because this method deals with both description and conceptualization of phenomena. In the present research, two main questions were studied. First, what kinds of stress can firefighters experience on the job and second, how do these stresses lead to trauma and growth? The purpose of this study was to identify the job stress pattern among firefighters and their psychological responses toward stressful events. So this method was seemed to be suitable for discovering and identifying the mechanisms of firefighters' exposure. Firefighters who participated in this research showed high participation and they tended to provide their rich experiences around research questions. Participants were selected among different age's group, work experience, marital status, and education.

The interviewer was a graduate student (in psychology) that his main job was the firefighter. Before conducting interviews, he was trained in this field. According to Glaser The method of content analysis and emergent approach different in the role of interviewer. In content analysis, the psychological distance between the researcher and participants is a needed condition but in the emergent approach, there is no necessary for the researcher remained separate from the research environment. This view also applies to data analysis. Not only are participant quotes accurately coded, the researcher's perception is also effected on the analysis.

The purposeful sampling method was used and tried to interview with staff that had more than one year of experiences in the fire department. Because it was assumed that, they had a considerable number of firefighting missions and subsequently exposed to the associated crisis and have probably learned how to cope with the stressful job.

Semi-structured interviews were considered as the main method. Interviews were conducted in a station of Tehran fire department and each interview lasted about 1 to 1:15 hours. Interviews began with the general questions and then go on more specific to follow up. General questions as examples: "What stress do you usually experience in your work environment?", "How do you deal with stress?", "What troubles do you have because of stress?" and "What have been the positive outcomes of your job stress?" were asked. In the final, open-ended questions about the firefighters' experiences were asked.

At the first, the content of interviews was recorded; then were written word by word and finally analyzed. The data were analyzed in two stages: vivo coding and theoretical coding. Before data analysis, each text was read several times to get a general understanding. After sample selection, extraction of primary concepts and analysis of the first interview, next sample was selected by the theoretical sampling method and this process continued to achieve saturation which occurs when there are no new data and categories, a clear relation between concepts and subcategories and the formation of a theory. Over and over, the reviews were revised and attempted to identify the concepts within it. Next step, classification, and comparison of extracted concepts were done. Gradually, the links between the signs became apparent. In the theoretical coding step,

selection of concepts was carried out and finally, a new pattern was designed. This process continued until theoretical saturation reached. In this study, 28 respondents were interviewed to attain saturation.

Schwandt et al. [13] used criteria in order to ensure trustworthiness. Researcher needed to earn employees' trust in order to increase acceptability. The deep review was done voluntarily by the interviewer who was a research assistant. The interviewer was one of the staff members of the fire organization who was trained in this regard.

Based on past coordination, he asked not only the research questions but also observed and registered the interviewee behavior (because of non-contradiction between behaviors and verbal reports). The results were approved by the participants and they confirmed extracted pattern in accordance with reality. In the final step of research process, the extracted pattern was shown to participants. Finally, their comments were considered to improve the model. Of course, the sample variety was also confirmed the data validity.

Credibility

Credibility means conscious effort to ensure the interpretation of the meaning of the data in terms of accuracy. Validity is related to the internal validity of the research, the degree to which the findings of the study are genuine and that the findings reflect the purpose of the research and the social reality of the research participants. To obtain credibility, participants were selected with the highest diversity of experience (participants with low or high work experience); the most appropriate semantic unit was selected. The internal validity of content analysis was assessed through face validity. For this purpose, the interview transcript and extracted codes were provided to the participants, commenting on its accuracy, and if any discrepancies were noted, they were considered. In addition, the researcher explained to participants what was ambiguous or not understood clearly by the participant.

Confirmability

This criterion demonstrates the ability to replicate data at similar times and conditions which can be considered as a reliability criterion in quantitative research. In this study, careful review of

the data by an external observer was used to increase the consistency of the research. Time is a factor in data stability problems.

To prevent negative effect of this factor, the data collection time (interviews) was shortened to the extent possible and all participants were asked about a topic.

Dependability

This criterion indicates that the research results are not based on the researcher's hypotheses and predictions. To this end, several colleagues expressed their views on the extracted pattern.

Transferability

Subsequently, some examples and conversations of participants in the text are included in the text. In addition, the relationships between variables were expressed by shape and table so that the reader can more easily understand the relationship between themes.

Ethic

Ethical issues such as the entrance permission (by obtaining permission from Tehran Fire Department), awareness of research goals, right to withdraw of study, non-disclosure of participant identity, and participant permission for recording interview were also considered. For example, before the interview begins, the research goals were explained to the participants and it was emphasized that whenever wanted could leave the research. Interviews were recorded after their satisfaction.

RESULTS

In this study, 28 Tehran Fire Department firefighters were participated. The lowest age was 26 and the highest was 39 years. About 83% of them were married and 78% had one or two children. About 85% of them were at bachelor's and master's level. The length of employment as a firefighter varied from 3 to 12 years.

This research is raised two main questions: First, firefighters how do experience occupational stress? Second, how do they experience job stress' trauma and growth? When coding was done, it became

obvious that both questions were related to each other. In the first question, six main themes were extracted: fear of injury, firefighters' function may cause fatalities or injuries rumors, psychological fears (i.e. fear of death and constant vigilance), stress relate to firefighting equipment (worry about equipment malfunction), organizational stress (emotional, cognitive, and behaviors response to harmful job), and family stress (conflict between work and family). When participants were asked to describe their coping mechanisms with these stressors, two categories of countermeasures were identified: passive and active reactions to stress and responsive reactions. In the analysis of the themes, it was found that PTSD and PTG experience is related to the type of response to occupational stress.

1. Post-Traumatic Stress Disorder (PTSD): syndromes were characterized by sleep disorders and emotional response damage.
2. Post-Traumatic Growth (PTG): This concept is characterized by being empowered in the face of difficult events and increasing interpersonal sensitivities.

Key themes and sub themes, along with examples of each participant, were summarized as shown in Table 1. The relationships among these themes were also determined as presented In Figure 1. The participants were not only anxious about being injured during missions, but also worried about secondary damages and illness after missions. This concern caused dichotomy and inconsistencies in outlook toward their job. The firefighters should be reckless and brave during operations due to the nature of their job but at the same time, they have to be cautious regardless of their bad experiences. This dichotomy between roles can exacerbate stress. Rumors and operation fatalities or injuries self-blaming are those common cognitive impairments among firefighters. The scope of these concerns transferable to their families. These concerns are the main source of conflict between work and family among firefighters. Anxieties may affect their performance or affect their ability over a long time. In addition, over-attention to danger stimuli and ruminant thinking about harm would be a background for the development of psychiatric disorders. These stresses also affect expectations from the organization and they become more sensitive to organizational support because of feeling insecure. This is a great point for organizations with high risk jobs. If they would be

supportive, they will decrease the psychological problems among their employees.

The participants pointed out methods to deal with career stresses. Totally, they used various solutions for overcoming difficult situations from reinforcement physical and mental skills to smoking and self-blaming.

Whatever they were close to the unpleasant events, it seemed that they reacted negatively and passively, whatever times past, they showed more effortful reactions to control the difficult circumstances. Their reactions were noticeably affected by their emotional experiences.

Table 1. Classification of concepts extracted from interviews with examples of items

Main categories	Sub-Categories	Concepts	Examples
		Physical injury	Concerns about fractures, burns and physical traumas in a high-risk environment: If we are not careful enough, several events will threaten us.
	Fear of being hurt	Vulnerability to Disease	Vulnerability to some health problems (pulmonary disorders, dermatological illnesses and myocardial infarction): One of our colleagues was burned during an operation in the city center and unfortunately his kidneys were severely damaged. We are all exposed constantly to such problems.
Occupational stress		Concerned that colleagues and friends might be harmed.	After the horrible accident (fire on a major commercial building in Tehran), I think my colleagues will never return when they go on a mission.
	Concerned that others might be harmed	Worries about victims	An image of a woman who threw herself out of a window while burning goes in my mind constantly and sometimes I have nightmares.
		Fear of death	I was not confessing to anyone before that I am always scared that something bad will happen (I will die) and my wife and my only son will stay alone.
	Psychological fears	Fear of not going back home and never again see our loved ones	Whenever a difficult mission comes, I talk by myself; this is the last time I get home. This imagination is repeated in

		my mind constantly that I may not see my loved ones.
	State of hyper vigilance to the alarm during the work	We are always waiting for the alarm to be on standby. So I suddenly jump with a slight noise at work. I also react to any sound even at home.
Equipment malfunction fear	Stress to maintain equipment	If equipment such as (breathing hose, flashlight, projector, insoles, gloves, boots, and masks) available to each firefighter is not regularly inspected, it can be a hazardous mission. Therefore, the concern you keep from them is part of our everyday worries.
	Alternative tools	If the device is not properly repaired, the firefighter will have to use the alternate tool. For example, if the projector is broken, we have to use a flashlight.
	Not suitable insurance	Health insurance will not cover all of the treatment cost if we are injured.
	Lack of welfare and recreation facilities	Our job is too stressful and we have to wait for an event for a long time, but there is no entertainment.
Organizational stress	Tax despite the hazardous work law	Although our job is classified as a "hazardous" work, we have to pay taxes despite the law.
	Fear of expressing problems to senior managers	We usually talk about common problems when we get together with our colleagues, but we do not dare to complain.
Family stress	Accountability in family	Night shift and sometimes continuous mission do not let us spend enough time with our family. Sometimes I cannot see my daughters because either I am at work or they are at school.
	Self-blaming	On a mission, a building fired and collapsed. We could not save an old woman who was in a fire. I can't forgot this scene so far. I hate myself because I could do nothing
Coping with stress	Smoking	When I throw myself, I turn on a corner and smoke.
	Learning new skills	I try to learn something new every time after any hardship situation. We have a lot of training courses that make us more capable.
Problem solving-focused coping style (Effortful reactions)	Predict risks and planning	There are always unpredictable crises, but after years, the attained experience helps to overcome the crisis more

PTSD	Sleep disorders		Emotional expression	calmly. Whenever in a mission, there is more to come to dominate in the future. When things go wrong, I writing in my notebook. Sometimes so annoyed me, unburden to my wife.
			Nightmare	I'm disoriented, I get nightmares. I dream I got into a fire. The same calamities are bothering me; I feel desperate. I sleep a while. First I thank God that I could asleep. Then it's not like that to stop me. One week may not be, again, the nightmare, you're tortured and harassed.
			Lack of sleep	My sleep pattern is irregular. It is possible to sleep for 1 or 2 hours then I had to wake up, then I could not sleep again.
	Emotional disruption		Vigilance	When I went out to have fun with my family or even at home, every little sound distress me.
			Anxiety	I do not know for what I have all the time to worry about, I think every moment something bad may happen. When humming sound in my head, I want to crash everything; especially home appliances. I cannot control it. Many times I scared my wife and son.
			Explosion of anger	"I did not think about these things before getting hired, but now I feel like I love my wife and children so much" I think most of the day.
PTG	Positive sensitivity towards interpersonal relationship	Being caregiver for	Family	The pain of the people seems to be my own pain, as soon as my friends or people find themselves in trouble; I am quickly ready to help.
			Friends & people	After work time, I go to the club with my friends.
	Empowering in the face of disasters	Turning to a happy lifestyle	Exercise	We have a good relationship with my colleagues. They are very funny. We often tell joke and laugh. Being with them is like I am with my family.
			Sense of humor	Between two missions, I often read my favorite books.
			Reading book	Music is like a miracle. When I hear a music, I find a spiritual sense.
		Listen to music		

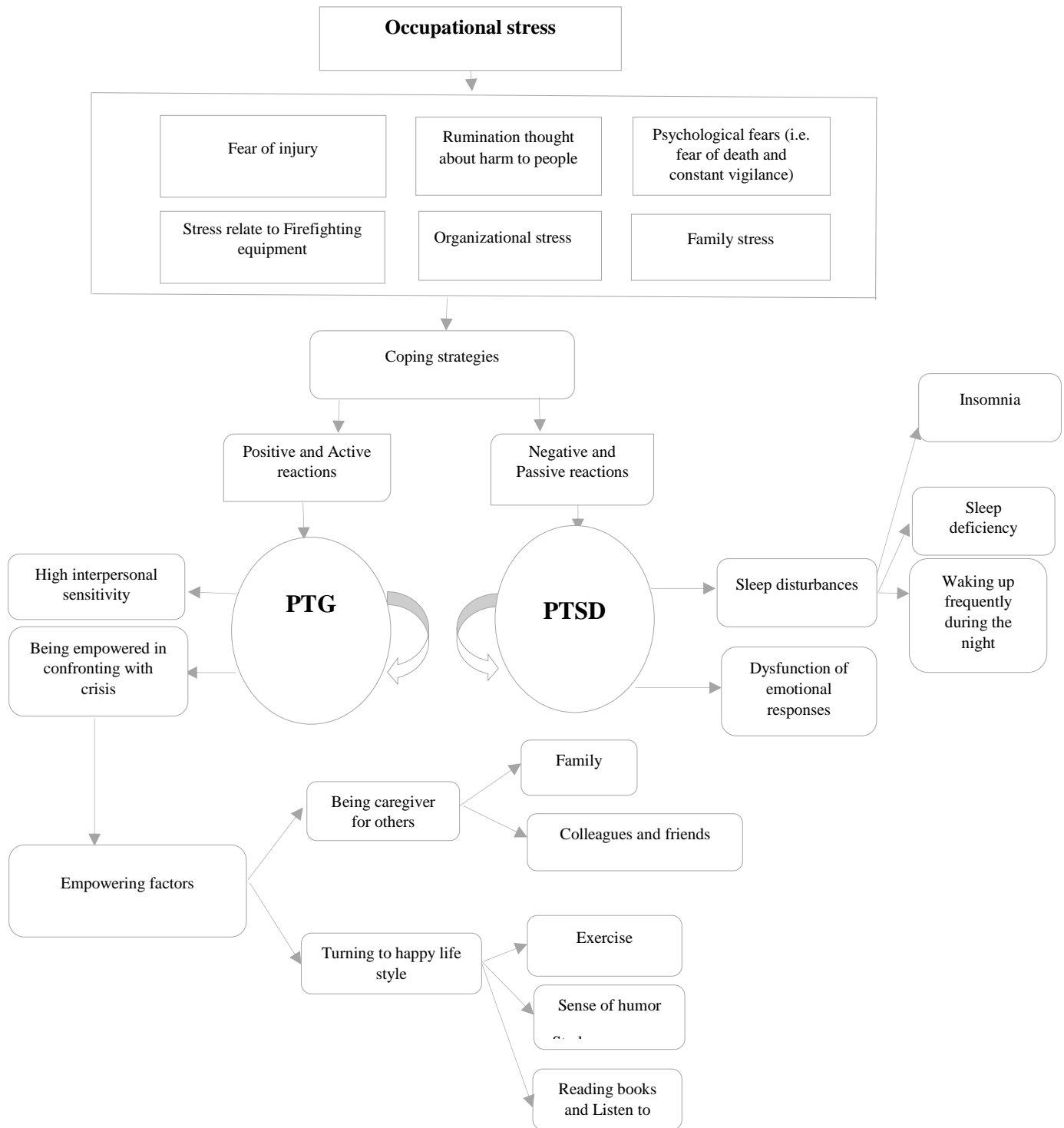


Fig. 1. Competition between stress and post-traumatic growth (PTG) in firefighters

DISCUSSION

Firefighters have to respond to a wide range of emergencies each day. In many of these emergencies, firefighters are witnessing events (such as injuries, children fatalities, and people who have been deeply damaged), which may lead to emotional disruption. Earlier researches have revealed that repeated exposure to this kind of horrible events has a negative impact on the emotional and psychological health of firefighters [14]. This study revealed that firefighters experience six types of stress such as fear of injury, firefighters' function may cause fatalities or injuries rumors, psychological fears (i.e. fear of death and constant vigilance), stress relate to firefighting equipment (worry about equipment malfunction), organizational stress (emotional, cognitive, and behavioral response to harmful job), and family stress (conflict between work and family). The finding of this study approved previous findings.

The post-traumatic stress was distinguished from post-traumatic growth among firefighters. Accordingly, this is one more achievement of this study. Qualitative research that simultaneously studied post-traumatic stress and growth among firefighters has not been found, but some quantitative studies have examined this subject. For example, Armstrong et al. [17] using multiple regressions among 218 firefighters, showed that the organizational factors predicted PTSD, social support, and coping style predicted PTG. Firefighters who were using more self-care strategies had experienced more growth. In the present study, coping style determined the tendency toward growth or stress. Since self-care strategies are one of the coping skills, therefore, the findings of Armstrong confirmed this research.

In an extensive research in South Korea, Ha et al. [15] confirmed that firefighters state very serious organizational stresses such as challenge with the high-demand job, interpersonal difficulties, and organizational injustice. This finding was similar to these research's findings. When stress is severe and uncontrollable, they prefer to find a clear answer to their problems. Perhaps the overemphasis on organizational stresses is an indication of the effort of individuals to explain uncontrollable job stress.

O'Neill et al. [16] in a qualitative study about psychological problems among firefighters in the United States showed that emotional suppression,

work-family conflict, self-harm, and firefighters' health problems were identified as the most important psychological factors. They also evaluated the role of cultural factors and attitudes toward firefighting jobs. In cultures were related to joviality and companionate love, firefighters experienced least health problems, work-family conflict, and emotional suppression but suppressors reveal more psychological problems and take the risk out of works. The themes embedded in O'Neill research were similar to those of the present work. Although the role of culture has not been explored directly in this research, Iranian culture attitude toward firefighters is positive. Emotional suppression was a common ground between two studies; it was lead to psychological problems and PTSD.

Ogińska-Bulik et al. [18] examined relationships between spirituality, social support, post-traumatic growth and the negative effects of negative traumatic experiences and job stress among 116 firefighters. They found that organizational support may reduce PTSD, spirituality and social support of colleagues accelerated PTG. According to their finding, spirituality plays a greater role in overcoming to job challenges and finding the convincing meaning. In this study, organizational problems were mentioned. Participants briefly recognized the lack of organizational support as a stressful factor. Moreover, according to research findings, caring for and protecting others is

an aspect of firefighter's growth. Having a spiritual perspective in the present study was expressed by turning to happy and positive aspects of life. In Iran, some people deny their spiritual needs for many reasons and express a positive view of life as a spiritual approach. It is possible don't overlap between religious issues and spirituality in the respondents in present study.

The present study showed that firefighters experienced symptoms of post-traumatic stress disorder (PTSD) such as hypervigilance, sleep disorder, and emotional disruption. This finding was in line with previous studies. For example, Corrigan et al. [20] in a comprehensive study, 8487 firefighters in North America investigated after difficult missions and loss of colleagues, 12 percent were suffering from PTSD, and 28 percent referred to counseling centers for treatment.

Jahnke et al. [21] in a qualitative research based on the experience of the firefighters showed that repeated exposure to traumatic events caused psychological problems such as sensitivity loss, depression, and irritability. In this study, PTSD were identified by negative emotional responses such as emotional numbness or strong emotional reactions. These findings confirmed results of this study regarding PTSD symptoms such as sleep disorders and negative emotional responses in the participants.

In a large study, 1916 firefighters from eight European countries, there was a significant difference between countries in emotional responses to PTSD and PTG [19]. Cultural differences focused on safety in work and organizational factors. How firefighters express their emotional experiences? Demographic factors such as firefighters' age, the events that have experienced in their career within the last 10 years, and childhood injuries and abuse history (which determine their emotional resiliency) can also affect the perceive of PTSD and PTG. In the case of PTSD symptoms, all individuals show similar symptoms, but cross-cultural differences in growth are more noticeable. Although, investigation of Markham et al., conducted in a large sample but the details of cultural differences between PTG symptoms were neglected. In the present study explored the nature of growth in firefighters more deeply. In Iran, the signs of growth were manifested by increased interpersonal sensitivity and self-care behaviors.

The number of qualitative articles about post-traumatic growth among firefighters is very rare, but researches in personality growth when individuals exposed to a stressful situation is not uncommon. A research in China was showed that factors such as the new philosophy of life, life appreciation, communication with others, personal ability and spiritual beliefs, were the five areas of post-traumatic growth [22]. In this study, personal skills and communication empower in center of PTG and philosophy of life and spirituality less were reported. In a qualitative research about post-traumatic growth, Hundt et al. [25] identified three positive, negative, and neutral reactions among individuals. Positive reactions include self-validation, hope and proactivity; neutral responses including confusion, uncertainty, and acceptance, and negative reactions including shock, denial, and fear of stigma. The present study, such as previous studies, confirmed post-traumatic

growth. In this research, post-traumatic growth was identified in a range of negative to positive reactions. The firefighters who participated in this study were more likely to express emotional reactions and, in the face to difficult occupied conditions, were less focused on changing their negative beliefs and cognitive variables. They were more likely to experience more positive emotional experiences.

Although firefighters expose to various stresses, each time they improve their ability to cope with difficult situations and they become more skillful in hazardous challenges. An important finding of this study was that firefighters tried to minimize uncontrollable stresses and not to give up. This action showed sympathy and self-sacrifice; they tried to be an awesome father, husband, and son; showing a good performance in job and a dutiful citizen.

The current study was focused qualitative method which may limit related findings. In the present study, no references were assessed regarding team leadership's stresses and teamwork during high-risk missions. Cultural and subcultural factors were not studied in the stress and growth of firefighters, which is another limitation of this research that is suggested to be studied in future. The results showed that coping mechanisms in the orientation of the positive and negative reaction to occupational stress is determinant and this factor can be considered in the design of self-care education and psychological interventions of firefighters when are engaged in risky situation.

CONFLICT OF INTEREST

There is no conflict of interest for any of the authors.

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