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# Some Health Risks to Firefighters

*Firefighters face unique occupational health risks caused by the specific nature of their work. They consistently operate in rough work environment with excessive heat, dense smoke, emotionally demanding situations, extreme physical challenges and toxic chemicals. This paper aimed to investigate the working conditions and mental health of firefighters. The paper has four main parts. The first part reports about the main risks to firefighters' health. The next part is dealing with the posttraumatic stress disorder. The study is mentioning predictors of psychological distress and aspects of the health prevention of firefighters. The final part of the paper is dedicated to the outcomes of the mental health research of firefighters. The main objective of the firefighters' work is to save lives, extinguish fire and property protection. It really does not matter whether this is a fire burst out in a residential area, industrial plant or their duty is performed at an airplane accident. Their fundamental mission is always the same. Therefore, the paper should be understood in a wider context and applicable on firefighters involved in fire extinguishing of airplanes, cars or boats as well.*

***Keywords:*** *firefighter, risk, health, posttraumatic stress disorder*

## Introduction

Being a firefighter is not an easy job at all. While on duty, firefighters are confronted with different sorts of risks, work unsocial hours and must respond to calls regardless of occurrences or weather. There is some diversity in the duties of the firefighters. Municipal firefighters face different situations than wildland ones. However, disregarding size of a department or nature of fire, all firefighters are involved in some common working conditions.

Firefighters must be in outstanding physical condition whether they work in cities or remote surroundings. Also, their protective gear is very heavy. They must be able to operate different size hoses and other gear. These firefighters are called upon to rescue unconscious or injured victims from burning flats. An excellent physical condition is necessary for them to climb stairs, run, stoop, kneel, jump and bend. To be a firefighter means to be aware of how dangerous this specific occupation is. Firefighting is a very demanding occupation either physiologically or psychologically. This requires an enormous number of opportunities for firefighter trainings as well as inducing special workplace safety.

Approximately 33% of the firefighter injuries result from exposure to fire leading to the possibility of reducing these injuries through training firefighters to make better decisions, particularly when under stress [9].

A safe and cost-effective alternative to practice with real fire are simulations. Simulations are effective for firefighter entry level education but they are also useful in advanced trainings to reach a specific competency level. The best way to reduce the effects of any disease, illness or injury is to identify it as early as possible. This is especially true for firefighters who, in many cases, are at a higher risk for certain diseases, illnesses and injuries than the rest of the population. The best manner to find these diseases, illnesses and injuries is for healthcare providers to have extended awareness and for firefighters to have frequent physicals that can show abnormalities early. The industry has been searching for different health prevention programmes for firefighters. From a physical demands standpoint, physical training needs to be specific to what firefighters do. A new term, "tactical athletes" was adapted for firefighter training, as it is very similar to professional athletes' one. There is one difference between firefighters and professional athletes. Athletes know when their game is scheduled and when they must perform at the highest level but firefighters must be prepared to intervene any hour and any minute.

## Risks to Firefighters' Health

Incidents with multiple fatalities, natural disasters, the death or injury of a team member and stress of dealing with potential life-and-death situations can take a toll on the emotional well- being of firefighters.

According to the Illinois Work Net Centre, in a typical work setting, firefighters:

- Are extremely responsible for the health and safety of others.
- Have a high level of social contact. City firefighters are in constant contact with each other when on the job.
- Give speeches and talks to the public or government officials on a weekly basis. This mostly applies to forest firefighters.
- Communicate daily with co-workers and others by telephone and in person. They communicate less often by letters and memos.
- Usually work as part of a team on a daily basis.
- Are regularly placed in conflict situations where others might be rude or angry, usually when inspecting buildings.
- Have limited responsibility for the work done by other firefighters.
- Work outdoors and indoors. Forest firefighters may be outside on a daily basis during fire season. However, they often are able to work under cover. City firefighters are indoors when working at the fire station.
- Work in an enclosed vehicle, such as a fire truck, on a daily basis.
- Always wear specialised safety gear and a special uniform. They regularly wear specialised equipment, such as oxygen tanks.
- Are regularly exposed to hazardous equipment.
- Are often exposed to contaminants.
- Are often exposed to very hot or very cold temperatures.
- Are regularly exposed to hazardous situations and conditions. Because of this, firefighters may suffer cuts, bites, stings and minor burns.

- Are exposed to sounds and noise levels that are distracting and uncomfortable on a weekly basis.
- Are often exposed to cramped work places that require getting into awkward positions.
- Are often exposed to extremely bright or dim lighting conditions.
- Sometimes are exposed to high places.
- Work very near each other and other people, sometimes within inches. Firefighters often have to physically assist victims when escaping a dangerous situation.
- Must be very exact in their work. Errors could result in serious or fatal injuries.
- Must be constantly aware of frequently changing events while fighting fires.
- Make decisions that strongly impact co-workers. If time permits, they may consult a supervisor about some decisions, but usually make them most independently.
- Make decisions that impact others on a daily basis. Decisions about how to put out a fire best strongly impact those who live or work in a particular house, office, or area.
- Are able to set most tasks and goals for the day without consulting a supervisor.
- Repeat the same physical activities.
- Often must abide by strict deadlines. This applies mostly to forest firefighters.
- Have to be moderately aware of job pressures.

63.5% of the firefighters suffered some kind of job related accident with blood or body fluids. Statistically significant association was found between having suffered accidents at work and incomplete use of personal protective equipment. Regarding the biological risks, 57.1% of all patients had blood or secretions, which corresponds in average to 16.0% of the total work time, based on a working day of 24 h. Besides biological risks, other stressing factors were identified: emergency and complexity of decision, high responsibility regarding patients and environment, and conflicts. Health promotion and accident prevention actions must be emphasised as measures to minimise these risks [1].

According to Lima (2003), there is an evidence to indicate that the practice of certain professions exposes individuals to elements harmful to their mental health. The author gives the example of a study which found a high frequency of cases of alcoholism and posttraumatic stress disorders, with or without depression. It also mentions that the action of the psychologist should be aimed at identifying these harmful elements and at the adoption of preventive measures in the workplace [2].

## Posttraumatic Stress Disorder

A wide range of psychological effects of firefighter work originate from working conditions where psychological safety is threatened and attending traumatic incidents. Firefighters work shifts with long periods of inactivity meeting periods of high activity. Firefighter health depends on an organisational structure and the degree of a management support. Higher level of stress in firefighter work include major disasters and terrorist events, witnessing death or injury, exposed to hazardous substances, attending multiple fatalities or incidents involving infants and young children. Much of the research on the psychological impact of firefighting estimates the prevalence rates for posttraumatic stress disorder (PTSD), depression and other psychological illness. Prevalence rates depend on the specific group of firefighter studies.

According to the study of the Centre of Full Employment and Equity (CofFEE), it is common to find people having one or more psychological illnesses, such as, PTSD, depression, anxiety or substance abuse. A study of US firefighters over a two-year period found elevated levels of PTSD and alcohol abuse. PTSD was 26.5% and alcohol abuse was 36.2% at the base period. The rates decreased over the two-year period to 22.2% for PTSD and 29.7% for alcohol abuse.

Also suicide is a possible outcome of occupational stress. Alcohol, drugs, PTSD, depression, anxiety are a probability that firefighters may be more likely to commit suicide. On the other hand, it is not easy to determine whether there is some occupational link between firefighting and suicide due to the lack of data on the unreliability of data.

Empirical research reported the predictors of psychological distress like previous psychological problems, younger age, single, being injured, feeling unsafe, lower feeling of self-worth, lower level of social support, longer job experience and lack of control.

According to the International Association of Fire Fighters, the Posttraumatic Stress Disorder (PTSD) is an anxiety disorder that can occur after someone experiences a traumatic event that caused intense fear, helplessness, or horror. PTSD can result from personally experienced traumas (e.g. rape, war, natural disasters, abuse, serious accidents and captivity) or from the witnessing or learning of a violent or tragic event.

- While it is common to experience a brief state of anxiety or depression after such occurrences, people with PTSD continually re-experience the traumatic event; avoid individuals, thoughts, or situations associated with the event; and have symptoms of excessive emotions.
- People with this disorder have these symptoms for longer than one month and cannot function as well as they did before the traumatic event.
- PTSD symptoms usually appear within three months of the traumatic experience; however, they sometimes occur months or even years later.

Symptoms for individuals with PTSD can vary and may fall into different categories. There is a category called Re-experience. Individuals very often experience recurrent and intrusive recollections of and nightmares about the stressful events. The literature lists the experiences flashbacks, hallucinations and vivid feelings of a person. Some other individuals experience psychological or physiological distress when some objects, situations, etc. remind them of the event. Many people suffering from PTSD persistently avoid things that remind them the traumatic event. This avoidance can lead to avoiding everything from thoughts, feelings, or conversation associated with the incident to activities, places, or people that cause them to recall the event. A lack of responsiveness might be signalled by an inability to recall aspects of the trauma, a decreased interest in formerly important activities, a feeling of detachment from others, a limited range of emotion, and feelings of hopelessness about the future. Also symptoms in this area may include difficulty falling or staying asleep, irritability or outbursts of anger, difficulty concentrating, becoming very alert or watchful, and jumpiness or being easily startled.

Although the chances of developing PTSD after a traumatic event are low, there are many factors associated with an increased risk of developing PTSD. When considering the transactional stress theory (TST) and general adaptation syndrome (GAS), there are noticeable differences in theoretical risk factors that would predispose a person to increased stress [4]. The TST tends to attribute specific personality factors and strong coping skills to an increased

resilience to stress [3] while the GAS places more emphasis on the duration and intensity of exposure to the stressor when determining the stress response [5]. In case of PTSD, it seems that both personality and coping factors, and intensity and duration of exposure to the stressor, are factors in the likelihood of developing PTSD.

Based on the literature available, increasing social support within departments and proactive teaching of coping skills to manage traumatic stress when it occurs should be areas of focus when developing PTSD preventative interventions in the firefighting population [6], [7]. Similarly, internal educational efforts may be useful in providing information and tools to members. Sommerfeld et al. (2017) found that captains lead the crew in terms of approach to mental health; consequently, to improve acceptance and openness regarding mental health issues, education for captains will potentially improve organisational acceptance for revealing mental health symptoms and also improve organisational knowledge about referrals and other sources of support for members in need [8].

## Firefighters' Health Risks Prevention

It is necessary to identify protective factors that reduce the likelyhood of psychological distress. In general, it is the development of copying strategies and social support. Talking to workmates, friends and some black humour could belong to a group of the coping strategies. Social support operates through feelings of safety and security, social integration, recognition by others, availability of assistance if needed, access to advice and a sense of being needed by others.

Models of Occupational Health and Safety utilised knowledge of predictive and protective factors. Then the models are able to identify and address risks. There are risks that cannot be eliminated in the career of a firefighter. It is important to train staff to recognise the signs of psychological problems and have effective strategies in place to provide support for the affected staff.

Following the CofFEE recommendation, the preventive model should consist of these elements:

1. pre-crisis preparation;
2. demobilisation;
3. defusing;
4. critical incident stress debriefing (CISD);
5. individual crisis intervention;
6. pastoral involvement;
7. family or organisational crisis intervention/consultation;
8. follow-up referral and evaluation of possible psychological assessment and treatment.

Obstacles were identified to the success of support and welfare programs. The reluctance of firefighters was described as a dominant one.

Reasons are few, like:

1. the macho nature of the job and the "rescue mindset" of concentrating on helping others;
2. a preference for informal mechanisms such as talking to shift-mates;

3. reluctance to expose any weaknesses to fellow workers or management;
4. lack of confidence in the educational program.

Management plays an important role in programs to prevent adverse psychological effects. Inadequate support from the management might not lead to the planned health improvement triumph. Lack of support from the management presents serious problems for rewarding implementation of the welfare programs built to deal with psychological stress.

Safety planning, technology development, advances in personal protective equipment have not yet prevented firefighters from getting injured on the job. No doubt, firefighting is a very dangerous work. There are a lot of different choices how to achieve injury prevention as much as possible.

## Research of Firefighters' Mental Health

This research focused on factors affecting firefighters' mental health. Also, this paper is searching for answers how firefighters used to apply different preventive measures to build up their physical and mental health.

### Hypotheses

1. The time pressure a firefighter is exposed to, can significantly affect his health.
2. 24 hour shifts can affect firefighters' biorhythm and result in fatigue and fast temper changes.
3. Violation of healthy food consumption and adequate sleep regime result in health complications.
4. Firefighters are aware of adherence of mental health principles.
5. Firefighters do not exploit all the resources and methods to preserve their mental health.

### Research methodology

For hypothesis verification, the research utilised questionnaires. The research was performed at an anonymous fire and rescue services department in the Slovak Republic. The questionnaires listed 33 questions, including open questions to survey how firefighters care about their mental welfare.

### Questionnaire questions

- Personal data of the respondent (questions 1–4);
- an impact of time pressure on firefighters (questions 5–12);
- firefighters' sleep habits (questions 13–19);
- firefighters' healthy food habits (question 20–24);

- ✈ firefighters' knowledge about mental hygiene (questions 25–26);
- ✈ how firefighters apply mental hygiene in their everyday life (questions 27–33).

Answered questionnaires return graded 100%. The total number of respondents was 30, including 26 males and 4 females.

Age of respondents ranked from 18 to over 46.

- ✈ 23% of respondents aged from 18 to 25 years;
- ✈ 40% of respondents aged from 26 to 35 years;
- ✈ 27% of respondents aged from 36 to 45 years;
- ✈ 10% of respondents aged from 46 and over.

*Hypothesis 1.* Time pressure, a firefighter is exposed to, can significantly affect his health.

The research confirmed that firefighters are conscious about stress resulting from time pressure. They understand how much stress is put on them from time pressure and they have to deal with it. Also, the research results proved that senior firefighters can respond to stress less sensitively than their younger colleagues. Obviously, more time pressure stress was reported during night shifts.

*Hypothesis 2.* 24 hour shifts can affect the firefighters' biorhythm and result in fatigue and fast temper changes.

Firefighters knew how many hours of sleep they need to stay alert and active. But many times they do not afford themselves enough sleep. 50% of the respondents confirmed they are able to sleep daytime after a night shit.

*Hypothesis 3.* Violation of healthy food consumption and adequate sleep regime result in health complications.

Firefighters do not have regular meal times and their eating habits are usually formed by different break times during and after shits. Almost 40% of the firefighters do not visit canteens but prefer eating directly at their work places.

*Hypothesis 4.* Firefighters are aware of adherence of mental health principles.

The research proved that almost 50% of the firefighters care about their health hygiene. The rest of the respondents do not see mental hygiene as an important factor for their life.

*Hypothesis 5.* Firefighters do not exploit all resources and methods to preserve their mental health.

According to the research results almost 50% of the respondents used to relax after a shift. Preferably, they do some outdoor sport activities. An average time spent for outdoor sports was 12 hours a week. Others used to go socialising to unwind themselves. The rest of the respondents do not practise any active relaxing activities.

The research confirmed that firefighters should care about their mental health and use mental hygiene as a tool to relax and rejuvenate after shifts. Vital physical and mental health conditions play an important role for prompt and efficient interventions. Shifts work can have serious negative impact on one's health. Working nights and in a stressful environment, usually do

not burst into illness immediately. Many times, it takes years till the first signs of irregular working hours and terrible mental hygiene demonstrate symptoms of any health impairment.

## Conclusion

Firefighting is very much a physically demanding occupation. Firefighters must be prepared to deal with all sorts of situations involving heavy lifting, bending, twisting. Devastating situations many times leave traces in their minds and memories are often regressed. There is a growing concern about behavioural health issues and the significant impact on wellness. The stress faced by firefighters and paramedics throughout the course of their careers – incidents involving children, violence, inherent dangers of firefighting, and other potentially traumatic events – can have a cumulative impact on their mental health and well-being. If a firefighter feels the stress from a job-related incident, that must be communicated with a trusted source, friend, co-worker, clergy, spouse, or family member and an employee assistance program. One must know that he/she is not left alone. Establishing lines of communication will help to process one's response to stress. Co-workers must also be very sensitive to the surrounding of their workplace. If someone is showing signs of job-related stress, we must observe and listen. We must be empathetic, not judgmental. The proper precautions like fire safety training, flame retardant materials, fire detection devices, standards and regulations, plus taking care of one's physical and emotional health, might help mitigate the damage and destruction from fire and the inherent stress firefighters encounter in their jobs [10].

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## TŰZOLTÓK EGÉSZSÉGÜGYI KOCKÁZATAI

A tűzoltók munkájuk sajátos jellegéből adódóan egyedülálló munkahelyi kockázatokkal szembesülnek. Folyamatosan durva munkakörnyezetben, túlzott hővel, sűrű füsttel, érzelmileg igényes helyzetekkel, extrém fizikai kihívásokkal és mérgező vegyszerekkel dolgoznak. Ez a tanulmány a tűzoltók munkakörülményeinek és mentális egészségének vizsgálatára irányult. A cikknek négy fő része van. Az első rész a tűzoltók egészségével kapcsolatos fő kockázatokról számol be. A következő rész a poszttraumatikus stressz-rendellenességgel foglalkozik. A tanulmány a pszichológiai zavarok előrejelzőit és a tűzoltók egészségmegőrzésének szempontjait említi. A cikk utolsó része a tűzoltók mentális egészségéhez kapcsolódó kutatások eredményeit taglalja és tágabb értelemben kell értelmezni – a repülőgépek, autók vagy hajók tűzoltásában részt vevő tűzoltókra is alkalmazható.

***Kulcsszavak:*** *tűzoltó, kockázat, egészség, poszttraumásstressz-zavar*

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