State of the art paper

Post-traumatic stress disorder in disaster workers and emergency personnel

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Submitted: 27 July 2018
Accepted: 4 October 2018

Arch Med Sci Civil Dis 2018; 3: e195–e201
DOI: https://doi.org/10.5114/amscd.2018.81187

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Abstract

The problem of stress and disorders occurring in a team (traumatic stress) is the subject of numerous scientific studies in relation to victims of traffic accidents, rape, acts of terrorism and war. The research on this overlooked subject concerns specific professions such as the military, police, fire brigades and rescue medical teams. The aim of this research is to analyze the mechanisms leading to increased susceptibility to stress and predisposing factors for the occurrence of post-traumatic stress disorder and its specific features among people working in emergency medical teams.

Key words: post-traumatic stress disorder, emergency medical teams, treatment outcome.

Introduction

The issue of stress and disturbances occurring in post-traumatic stress disorder (PTSD) is a topic frequently examined in relation to the victims of traffic accidents, rapes, terrorist attacks, and wars. Research on PTSD is being constantly carried out, but such professional groups as the army, police, fire brigade and, finally, emergency medical teams (EMS), have been omitted. It is often forgotten that those who rescue and provide help also suffer from PTSD.

It is worth stressing that the medical emergency service is a specific field of science and work. This non-standard character is emphasised in particular by the media by presenting the work of medical emergency teams on public television. The receivers of those images – their potential customers – usually watch fast action while being kept in suspense and they also treat this profession as an adventure, or a challenge, without realising how much energy it consumes and how it exposes the employees of the medical emergency system to stress. It cannot be said that someone gets accustomed to the sight of blood, wounds, and dying people – every time an employee of a medical emergency team responds in the same way to a stressful situation, such as emergency calls. It is widely known that medical emergency teams work in a hostile environment, and they are expected to provide immediate help and to produce

immediate results, which is often unlikely to be accomplished.

The demanding requirements of the service, as well as the obligation to remain on standby, the need for constant improvement in their professional competence, accompanied by the low social status and prestige of this profession and inadequate earnings for the services performed, make this important, absorbing and unique profession a source of severe stress for the members of medical emergency teams.

During every intervention employees are exposed to various bio-psycho-social factors, which generate stressful situations. If such events as sudden cardiac arrests, construction accidents, and plane crashes are taken into consideration, we also need to take into account that members of medical emergency teams may suffer from post-traumatic stress disorder.

Unfortunately, although they are expected to actively participate in emergency operations and to cope with stress and provide psychological help to the victims, no-one realises that a similar problem will also affect them. There is no psychologist at emergency service stations and emergency-care departments available, who follows every serious emergency operation, who would discuss the situation with the team that participated in the incident, and who would professionally support the members of the medical emergency teams. Such a situation entails a serious risk of PTSD [1].

The objective of the following paper is to describe the mechanisms leading to increased sensitivity to stress, among others the factors predisposing the person to PTSD and its specific aspects among persons employed in medical emergency teams.

Stress

Stress, particularly chronic stress, is responsible for many illnesses, both mental and somatic, and in terms of the scale of the phenomenon, it poses not only a health problem, but also a social-economic one. Attempts to define stress are still accompanied by many controversies. Such a situation results from the application of this term to different fields of science, and also in the vernacular. It is used with different meanings, sometimes even with extremely remote ones. Stress is commonly considered as "an organic, metabolic, physiologic and neuropsychological disorder triggered by aggressive factors." Stressors, stimuli evoking a stressful reaction, are generally divided into the physical and mental, depending on the way the information reaches the organism [2]. The identification of information serving as a stressor depends not only on its objective meaning, but also on the assessment carried out by the organism itself. In the case of physical stressors, a subjective assessment does not differ much from the objective one; however, it appears to be different in the case of mental stressors, when previous experience, cognitive patterns, and emotional attitude play a crucial role in the process of comprehension and categorisation. A stressful situation activates a specific response aimed at its solution, as well as a general, non-specific stress reaction, which sets the organism at an optimal level of psychophysical functioning, which facilitates the finding and carrying out of the aforementioned specific response [3]. There are three types of definitions of stress: 1) Stress as a stimulus. Situations which occur in our environment have a natural capacity to arouse strong emotions and tensions. 2) Stress as a reaction. A physiological and psychological reaction, which constitutes a response to stressors – situations causing stress. 3) Stress as a process or transaction. A definition emphasising the relationship between an individual and the environment [4].

The pathophysiology of stress reaction

Many organism functions, which are regulated by the endocrine and autonomic systems, are subject to changes in a stressful situation. The reactivity of the organism to stressful situations is an individual characteristic. A stressor in the organism triggers a general response activating the mechanism of hormonal or neuronal inhibition. Numerous systems and structures, such as the limbic system – hypothalamus – hypophysis – adrenal glands, the sympathetic – adrenal system, the locus coeruleus, the raphe nuclei, and other structures of the brain regulating the course of stress reaction, are responsible for stress reactions [5, 6].

Exposure to occupational stress

Occupational stress occurs if requirements concerning work exceed the abilities of an individual. Both physical and psychosocial factors may constitute sources of stress at work. There are numerous classifications of stressors related to the work environment. A list considering most aspects related to this topic was developed by Levi and Frankenhausen. The list includes the following division: stress factors concerning the work itself, social relations in the workplace, an organisational, and emotional structure, position in the organisation and extra-organisational sources, elements concerning the professional career. All the above-mentioned factors influence the process of tension and stress creation both at work and in private life, which may affect the quality of performed work considerably [7].

Stress-inducing factors related to the paramedic profession

A constant tension related to the work of paramedics may be associated with the following factors:

- The responsibility for human life and health – the patient's future life depends on the knowledge and skills, but also on the effectiveness, of the paramedic's actions.
- The necessity to make difficult decisions individually – entails a heavy responsibility, a necessity to act fast and a distinctiveness of every case.
- Simulated work discipline – a paramedic has to be able to modify patterns of conduct adequately to the situation as it is.
- Barely visible work results – interaction with the patient only at the stage of pre-hospital assistance.
- Work overload – a broad scope of duties related to highly specialised skills.
- Work at night – related to the shift system.
- Salary system – earnings inadequate for the educational level and responsibility associated with the profession of paramedic.
- Limited promotion prospects – the system of medical emergency services in our country is new and it is just emerging, exactly as is the profession of paramedic itself.
- Exposure to contagious diseases – a constant exposure to contagious material (inter alia, patients' bodily fluids).
- Failure to meet patients' expectations – the profession of paramedic is based on public trust, which entails very high expectations of society.
- Constant contact with suffering and death – one of the aspects inherent to the nature of the profession [8].

Methods of stress management

The term "stress management" may be understood as a response to psychological and environmental requirements of a specific situation inducing stress. Management also comprises the following components: cognitive processes; behavioural processes; the mechanism of stress management, which comprises three levels: 1) the biological level, i.e. the immune system and regeneration mechanisms; 2) the psychical and interpersonal level, i.e. defence mechanisms, acquired patterns of stress management and support of friends and family; 3) the social-cultural level, i.e. group resources such as labour unions, religious organisations or other formal institutions.

Post-traumatic stress disorder (PTSD)

A definition of Post-traumatic Stress Disorder was introduced in 1980 along with DSM III (*Diagnostic and Statistical Manual of Mental Disorders*), which is a classification system of mental disorders binding in the United States. The concept has evolved. The definition of a stressor, which may trigger PTSD, has undergone changes. The classification of DSM IV is currently binding. According to DSM IV, post-traumatic stress disorder can be recognised when an individual is exposed to a traumatic incident or three criteria are fulfilled: An individual experiences, witnesses or is confronted with an incident or incidents, as a result of which someone is killed, sustains serious injuries or there is a threat of death, serious injuries or a loss of physical integrality of their own or of others. An individual's reaction to such an incident is characterised by deep fear, helplessness and horror. Those symptoms may be replaced by the disorganisation of behaviour, or manifesting anxiety, especially in the case of children. A traumatic incident is constantly recalled and might be experienced in one of the ways listed below: Constantly recurring memories of the incident, which comprise images, thoughts and perceptual impressions. In the case of children, "plays" might occur, during which aspects of the trauma will be acted out [9].

Depressing dreams about the incident might present themselves. In the case of children, it might concern terrifying dreams without a specific context. Behaviour and feelings as if the traumatic incident was still occurring. Persons experience hallucinations, rumination, reminiscence. Strong negative emotions during an encounter with an external or internal factor, which symbolises or reminds the person of an aspect of the traumatic incident. A physiological reaction triggered in connection with an external or internal stimulus, which symbolises or reminds the person of an aspect of the traumatic incident. An individual avoids stimuli related to the traumatic incident, and he/she is characterised by a general mental indifference that had not occurred before the incident, manifesting itself by the occurrence of three or more of the following symptoms: efforts directed towards preventing thoughts, feelings and conversations related to the trauma. Efforts directed towards avoiding actions, places or people evoking memories about the traumatic incident. An inability to remember an important element of the trauma [10].

A considerably reduced interest in important operations, and limited participation. A feeling of alienation. Limitation of feelings, an inability to experience positive emotions, such as love. A negative assessment of the future and a lack of expectations. Symptoms of excitation previously absent are maintained and manifested by at least two of the following symptoms: sleep difficulties,

light sleep and waking up; dysphoria; concentration difficulties; increased alertness; exaggeration of terror reaction; duration of the disorder exceeds 1 month. The disorder causes a clinically relevant disturbance or breakdown of functioning of an individual in social, professional and other relevant environments.

Post-traumatic stress disorder symptoms

Emotional and physiological reactions, such as: a feeling of indifference and/or numbness, limited experience of emotions and not reacting to other people's presence; a feeling of constant fatigue; lowered interest in personal tasks and work; avoidance of situations related to the traumatic experience and memories of it; excessive excitement and proneness to irritability and anxiety; excessive alertness towards the environment; and others.

Reactions connected with the cognitive area: problems with concentration, constant thoughts of the traumatic experience, worsened memory, the sense of alienation and being misunderstood, lowered self-esteem, negative self-image, imagining revenge and the possibility of changing attitude, and others. Reactions in the interpersonal area: difficulties with establishing and maintaining intimate relationships, distancing from close persons and others. Types of PTSD. There are three kinds of post-traumatic stress disorder: acute – when symptoms last less than 3 months; chronic – when symptoms last longer than 3 months; delayed – when symptoms occur at least 6 months after the trauma [11–13].

Post-traumatic stress disorder versus the work of a paramedic

Paramedics are persons who, due to the character of their work, while performing their duties are exposed to interaction with a critical or even hostile environment, with persons showing verbal aggression. A factor which massively increases stress is the situation when dangerous health problems threatening one's life are dealt with in the presence of hostile witnesses of the incident who assume a critical approach, which makes the work of a paramedic especially difficult. The work of a paramedic is ultimately connected with situations dangerous to human life, involving high pressure, intermingled with periods of peace or even boredom. The threat of physical harm, as well as constant contact with situations where human life is in danger, makes this work extremely stress-inducing. Most workers of medical emergency teams who deal with deadly cases at some point experience reactions which are typical for post-traumatic stress disorder. Usually they are capable of developing successful strategies for coping, which help them to perform their job, on their own. However, in the case of some people, typical symptoms will remain for a longer period of time, disrupting normal functioning both at work and outside [14].

Growing knowledge about post-traumatic stress disorder enables the distinguishing of typical symptoms of PTSD, concerning persons working in medical emergency teams, resulting directly from the character of the work performed. The symptoms mentioned below influence paramedics and the duties performed by them in a particular way [15]. Recurring obsessive memories causing anxiety – in the case of a paramedic they can cause embarrassment due to the fact that they will result in avoiding everything which can recall a traumatic situation, which in the work of medical emergency teams is impossible to carry out, so they will cause considerable problems in performing duties. Avoiding – a paramedic tries to avoid the place associated with a traumatic situation, which is unavoidable when it took place at work. Avoiding can take the form of actions aimed at hiding, such as pretending to be ill or going on leave. Avoiding can become a very strong habit, and extremely difficult to cope with. Constant contact with injuries and death – the work of a paramedic is inseparably connected with being a witness to people being injured or dying. A paramedic is often the person who informs the family of the victim of the tragic news, joining with them in pain and despair. The elements symbolising the experienced events are retained in the memory and if they occur in the future, they cause processing of the memories of the incident again. Weakening of the sense of invincibility – paramedics are constantly subjected to the sight of death and injuries, so they cannot maintain the belief that they and their families are safe from harm. The level of fear, which occupies an important place in their minds, is not shared by the environment in which they live. Identification with witnesses and their families – a phenomenon occurring especially in a situation when there are similarities between the paramedic and the injured person, as well as their life situations. An accident is often associated with fear about the nearest persons; it activates inner fear of loss which cannot be controlled. Sense of helplessness – a highly negative factor which considerably reduces the sense of control over the situation and increases the impact on the emotions of the events to which the paramedic was witness. It intensifies the sense of guilt and failure to complete the task and the feeling that the paramedic did not do everything that he/she could. The sense of helplessness intensifies as a result of contact with the victim's family.

The paramedic can associate it with factors which do not have any influence on the result of the emergency operation such as the place of the accident or the choice of the road used. The continuing sense of guilt influences the results of work, making it difficult to regain balance after the trauma. This kind of feeling is a natural consequence of being exposed to traumatic experiences which end in death or injury – in most cases it is not grounded in reality. Anger – a typical reaction to traumatic situations. Verbalised anger facilitates the processing of the negative feelings accumulated. Due to the nature of their work, paramedics have to hide their anger. In paramedics' environment controlling one's feelings is an accepted norm [16]. Major personal characteristics of an ideal paramedic include a personal feeling of engagement, control over the situation and a sense of responsibility, yet they often lead to a detailed evaluation of one's own contribution to the situation development, which may lead to an unjustified feeling of guilt [17].

Factors increasing exposure to post-traumatic stress disorder among the workers of medical emergency teams

There are some typical factors resulting from the specific features of the work and individual factors, which increase exposure to PTSD among the workers of medical emergency teams. Requirements from the environment – the work of a paramedic is characterised by a high level of pressure from the environment, including time, effort and expectations of society. Reactions of workers of medical emergency teams should be analysed taking into account the proximity of stressors, since a stress reaction is not always pathological. Occupational duties can become a factor leading to prolonged activation of cognitive schemes associated with a traumatic event stopping the habituation process.

A tendency to identify with victims – many workers of medical emergency teams present an attitude of high expectations as to the duties performed by them, which results in the sense of failure and blaming oneself in the case when an emergency operation does not end in success. This happens due to the *attribution* of one's actions and failures. Identifying oneself with the injured being helped is a natural reaction. As Wilson's study indicates [18], the workers of medical emergency teams often show strong anti-transfer reactions towards victims of a traumatic event, which results in a sense of obligation towards the person being assisted. The organisational structure of the system – this factor plays the key role in post-traumatic adjustment. If a team of workers interprets the expression of distress with an unprofessional approach to work, other members of such a team will be reluctant to express their emotions, which in turn hinders the process of recovery back to the condition before the traumatic event. Previous injuries – workers in medical emergency teams are constantly and frequently exposed to traumatic events, which increases the risk of psychological problems occuring. Social expectation concerning resistance to injury – the identity in a group of medical workers is based on the image of an individual person as strong and resistant to stress. There is a wrongful conviction that symptoms of acute stress are a sign of weakness and lack of competence. It is not infrequent that the person's own occupational abilities are associated with the level of stress resistance. One may be right to assume that the decision to give up the occupation lies at the bottom of this phenomenon [19].

The phenomenon of extreme traumatisation and the "trauma membrane"

The phenomenon of extreme traumatisation is one of the key factors behind the development of the post-traumatic-stress-related reaction among emergency workers. This involves continual and repeated contact with traumatic events of low intensity, the results of which are accumulated with time. The frequency of the occurrence of these rather minor traumatic events may considerably hinder the proper processing of previous injuries, which may in turn contribute to a significant deepening of stress reactions. A paramedic who was able to successfully deal with many difficult stressful situations in the past can react to yet another situation typical for his/her work in an impetuous way, to the shock of his/her colleagues [20].

This phenomenon usually refers to people providing assistance to others, hence also to paramedics. People suffering from injury or bearing witness to injury do not react to it in an open way, since all the means they have at hand are directed to dealing with the situation and to providing assistance to those who suffered the most.

Jakubaszko conducted an analysis of the psycho-hormonal stress-induced reactions among "R" team workers. The researched group included both men and women. The concentration of the hormone known as cortisol, whose growth is the major factor reflecting stimulation of the limbic system – hypothalamus – pituitary gland – adrenal gland (LHPA) axis in the venous blood during service and after an emergency operation, was the parameter analysed. The research results indicate that paramedics are continually exposed to the effects of LHPA activation, which is indicated by the considerable increase in the cortisol level in the blood occurring after an emergency operation. The research in question also reveals that the

physiological response occurs to a higher degree in men, though this may result from a higher average number of duty hours per month, compared to women, which was also subject to analysis as part of the research. Strelau suggests that leaving this job is viewed as a means of avoiding excessive traumatic stimulation by people less resistant to stress, and the sixth year of performing this job constitutes the critical point [21, 22].

A model of post-traumatic stress disorder prevention in medical emergency teams

Post-traumatic debriefing is an activity aimed at preventing the post-traumatic stress syndrome. It alleviates the long-term effects of posttraumatic stress and is based on a casual discussion concerning the traumatic event. The aim of the discussion is to reduce the influence of the traumatic event on the psyche of a paramedic, and to accelerate the process of recovery back to a normal condition by those who suffer as a result of the critical event. Debriefing is aimed at showing that the belief about the abnormality of our own reactions is wrong. It also strengthens the degree of cooperation and uniformity in a team. A period of 1–4 h following the emergency operation is the most effective period in terms of recovery from stress. Debriefing should be conducted within 24 to 72 h following the traumatic event by a psychiatrist or psychologist, and a few paramedics who are not members of the group receiving help. The meeting should last about 3 h, and should be held in any of the following situations: several paramedics showing stress symptoms; stress symptoms are strong; paramedics manifest changes in their usual behaviour, such as making unexpected mistakes not previously observed; the whole team asks for help; the event was extraordinary; the signs of distress continue for a period exceeding three weeks [23].

Debriefing is divided into phases. The preliminary phase is aimed at briefing the participants on the purpose of the meeting, and on its confidential and voluntary character. During the facts-based phase, participants demonstrate the emergency operations performed, after which they are asked to share their thoughts which accompanied their actions. The aim of this phase is to reveal personal attitudes to various aspects of the emergency operation analysed. As part of the reaction phase, the participants process information on the event at both the cognitive and emotional level, answering the following question: "What was the worst thing that happened to you during the emergency operation?"

The aim of the next phase is to reveal the symptoms of distress experienced by the paramedics during the debriefing and during the emergency operations, as well as those which may occur within 24 h and after a few days following the event. Learning is another phase, aimed at making the participants realise that the symptoms they observe in themselves are not extraordinary and will diminish with time. They are also informed on how to manage stress and alleviate certain symptoms in the most efficient way. Finally, the participant will be asked to comment on the events occurring during the emergency operation. This will be followed by a summary of the meeting by the debriefing team members, who will also inform the participants on the possibilities offered by individual consultancy services, since some people may still feel certain adjustment difficulties when the meeting is over [24].

A debriefing team should consist of medical professionals, such as physicians and psychologists, as well as people employed in medical emergency institutions, both in management and lower-rank positions. In the event of a large catastrophe involving nearly 50% of the regional medical emergency teams, or if the whole action exceeds 8 h, a special, separate place should be prepared to provide the opportunity for the emergency teams to take a rest. The demobilisation process should last around 30 min – 10 min devoted to information being provided by a member of the debriefing team concerning stress, its causes and effects, and the remaining 20 min devoted to rest. Prior to recommencing emergency service duties, a stress-recovering meeting should be held, lasting 35–45 min.

Several authors claim that there are fears that debriefing may have detrimental effects, since the process of verbalisation and the work on the traumatic event can intensify the symptoms of distress. Dissociation and escape mechanisms, which are specific ways of coping with stress, performing a protective function after the trauma, are very frequent reactions to the acute distress phase. Debriefing eliminates these reactions, which may in turn trigger an overwhelming fear which hinders habituation [7–11, 18–21].

Based on the above facts, it clearly transpires that it is necessary to conduct research aimed at explaining the effectiveness of debriefing, as well as at establishing a better model of preventing post-traumatic stress syndrome in medical emergency teams.

Conclusions

The risk of post-traumatic stress syndrome occurring in the environment of people working in medical emergency teams is treated as a relatively abstract phenomenon. However, the work of a paramedic, connected with a high level of stress, is extremely inductive to the occurrence of the disease entity in question.

Although there are only a few studies on PTSD among paramedics in ambulance teams, they

serve as unambiguous evidence that the risk of PTSD occurring is real, and even high.

A sense of obsessive fear of approaching death and a diminished sense of security, arising from the continual endangering of the paramedic's life, is a regular phenomenon in medical emergency teams, whose members are in a constant contact with life-threatening or disability-causing situations. Usually this condition continues for around 4 weeks, after which it retreats. However, very often the medical emergency workers again witness dangerous accidents within 4 weeks, which disturbs the processing of injury, leading to an accumulative effect. It is believed that a considerable number of people constantly exposed to stress shows symptoms typical of the post-traumatic syndrome. One may also assume that the work environment can be inductive to the acute form of the post-traumatic stress syndrome.

Helping people who work in medical emergency teams appears to be a real challenge, given the insufficient support they receive from the system. Moreover, further studies on the effects of the applied model of preventing the post-traumatic stress seem absolutely necessary; so does the attempt to develop an efficient model adjusted to the specific requirements imposed by the occupation of paramedic.

Conflict of interest

The authors declare no conflict of interest.

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