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## Psychophysical burden of connections with work in the State Emergency Medical Services System in the light of the Public Health strategy

### Obciążenia psychofizyczne związane z pracą w Systemie Państwowego Ratownictwa Medycznego w świetle strategii Zdrowia Publicznego

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#### Keywords

psychophysical load, work in PRM system

#### Słowa kluczowe

obciążenia psychofizyczne, praca w systemie Państwowego Ratownictwa Medycznego

#### Conflict of interest

#### Konflikt interesów

None  
Brak konfliktu interesów

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#### Summary

**Introduction.** The work of the State Medical Rescue (PRM) team carries with it numerous risk factors, which in consequence may lead to accidents at work, post-traumatic stress disorder and burnout. A number of loads ranging from changes in the bone and joint system, through exposure to stress, aggression, chemical, physical and biological factors, violation of the principles of ergonomics adversely affect the health of paramedics and absenteeism at work.

The National Health Program takes care of preventive actions and implements appropriate tasks to prevent occupational irregularities.

**Aim.** Assessment of the psychological and physical burden of ZRM on the risk factors and their impact on health and work.

**Material and methods.** In the presented thesis the method of the diagnostic survey was used the questionnaire. The study included 34 paramedics and one nurse working in the State Medical Rescue System in Suwałki, Olecko and Augustów from September to December of 2016.

**Results.** Employees of the State Medical Rescue System are exposed to a number of burdens, injuries and dysfunctions related to the work performed. The National Health Program is in favor of eliminating this type of inconvenience through various preventive tasks. It turns out that with such specificity of work it is not realistic to fully observe the good practices used at the workplace.

**Conclusions.** The system of State Emergency Medical Services, and in particular, the members of ZRM fit perfectly into the tasks of the NPZ, but only as a negative example of the failure to implement the Public Health strategy.

#### Streszczenie

**Wstęp.** Praca zespołów Państwowego Ratownictwa Medycznego (PRM) niesie ze sobą liczne obciążenia czynnikami ryzyka, które w konsekwencji mogą prowadzić do wypadków w pracy, zespołu stresu pourazowego i wypalenia zawodowego. Szereg obciążeń począwszy od zmian w układzie kostno-stawowym, poprzez narażenie na stres, agresję, czynniki chemiczne, fizyczne, biologiczne, łamanie zasad ergonomii wpływa negatywnie na zdrowie ratowników medycznych i absencję w pracy.

Narodowy Program Zdrowia dba o działania profilaktyczne i wdraża odpowiednie zadania, aby zapobiec nieprawidłowościom zawodowym.

**Cel pracy.** Ocena obciążenia stanu psychicznego i fizycznego ZRM na działanie czynników ryzyka zawodowego oraz ich wpływ na zdrowie i pracę.

**Materiał i metody.** W prezentowanej pracy magisterskiej zastosowano metodę sondażu diagnostycznego i wykorzystano opracowany kwestionariusz ankiety. Badaniem objęto 34 ratowników medycznych i jedną pielęgniarkę pracujących w Systemie Państwowego Ratownictwa Medycznego w Suwałkach, Olecku i w Augustowie od września do grudnia do 2016 roku.

**Wynik.** Pracownicy Systemu Państwowego Ratownictwa Medycznego są narażeni na szereg obciążeń, urazów i dysfunkcji związanych z wykonywaną pracą. Narodowy Program Zdrowia ma za zadanie niwelować tego typu niedogodności poprzez różne zadania profilaktyczne i prewencyjne. Okazuje się, że przy takiej specyfice pracy nierealne jest w pełni przestrzeganie dobrych praktyk stosowanych na stanowisku pracy.

**Wnioski.** System Państwowego Ratownictwa medycznego, a w szczególności członkowie ZRM, idealnie wpisują się w zadania NPZ, jednak jedynie jako negatywny przykład braku realizacji strategii Zdrowia Publicznego.

## INTRODUCTION

„Public Health as a science and art of disease prevention, prolonging life and promoting physical health through organized effort of the society, supervision of environmental hygiene, prevention of infections” (1). The definition of Public Health defines the scope of activities carried out under the health strategy in the area of social activities. The basic document of public health policy in Poland is the National Health Program (NPZ) is a document compliant with the Public Health Act and established by the regulation of the Council of Ministers. This document is issued for at least 5 years and contains the basic strategic, operational and key objectives that should be implemented to improve the health and quality of life of the society. The NPZ’s strategic goal is to reduce inequities in the health of people with different social statuses, extend the lives of Poles and improve the quality of life associated with health. The National Health Program combines many preventive programs and is an integral part of social and health policy. In the currently binding National Health Program for 2016-2020, we distinguish six main goals. One of them, which fits into the subject matter, talks about the need to reduce the health risk associated with biological, physical and chemical hazards in the external environment, as well as the workplace, study and residence. As part of this objective, initiatives are taken to prevent occupational and work-related diseases. The most important aspects of this goal are the introduction of procedures for early identification of hazards related to the work environment, raising awareness of the need to maintain a hygienic lifestyle, including the introduction of preventive measures. So how does work in the State Medical Rescue System (PRM) work in the strategy of public health and preventive activities?

PRM system employees, like victims of accidents, traumatic events or catastrophes, are exposed to strong stress. A factor contributing in a special way to the increase of tensions related to work in PRM is the very nature of events described as traumatic. In order to be able to work in the State Emergency Medical Services, a number of formal requirements defined by the legislator should be met, as well as qualifications, physical and psychological abilities. Due to the specificity of working in the PRM System, it is difficult to clearly determine the place of work of Medical Emer-

gency Teams (EMT). It depends on the type, place and nature of the event called by the legislator as the area of activity. The locations of ZRM and their number are determined by the Provincial Member of the State Emergency Medical Services System for individual provinces.

The risks associated with working in the PRM system relate to psychosocial, physical, biological, psychological, chemical and ergonomic factors. This wide range of risk factors results from the specifics of work.

### Psychosocial factors

Psychosocial factors play an increasingly important role in the work of travel teams. These include high demands at work, traumatic experiences, or aggression and violence applied to employees of the PRM system. A victim who is in a state of threat to life and health experiences stress and fear related to his or her loved ones’ situation. Some of them are respond in such circumstances passively, showing depressive tendencies or withdrawal. Others react with aggression. It turned out that among those victims showing negative behavior at the time of injury, up to 40% is under the influence of alcohol and/or psychoactive substances (2, 3). The paramedic/nurse and the physician of the system during the performance of medical rescue operations use the rights of a public officer, and therefore they can exercise their rights to protection in court. An important aspect in this situation are actions taken by the justice system, which can be a kind of “bogey” for potential aggressors who could commit aggression against PRM system employees. Another factor that can negatively affect the mental and physical condition of employees of the PRM system is the shift work system. Disorders in the functioning of the “biological clock” can adversely affect memory processes and concentration. This situation may contribute to unintentional accidents at work (4). The negative effects of this type of work can be divided into three basic types: 1) sociological factors that depend on gender, age, marital status or personality traits; 2) health factors that in an abnormal way may affect the course of human work; 3) biological factors. Night work negatively affects interpersonal relationships: family, social and intimate.

The changeable mode of work predisposes to improper functioning of the circulatory, digestive,

hormonal, sleep and procreation systems. Such functioning at work increases the risk of addiction.

### Accidents and random events

PRM employees, bypassing their own safety rules, risk their health to save others. They forget about the fundamental principle: "personal safety".

Central Institute for Labor Protection by analyzing accidents at work, which are subject to medics. Replacing situations (impacts on stationary objects, mainly in ambulance equipment, objects in the area of operation), which can cause injuries, such as: fractures, bruises, cuts, trapping, wounds in contact with sharp objects. In addition, inadequate lighting can reduce the visibility of various obstacles and lead to personal injury. Slippery surfaces in turn cause the lifeguard's slips and falls in the area of operation. However, traffic accidents on the way to the place of the accident or during the return of the ambulance can lead to numerous injuries or even death. Falls from heights occurring during the flight of rescuers from the stairs (during transport of the patient), may result in injuries, mainly head and spine. On the basis of accidents registered by the Ambulance Service in Wrocław in 2005-2010 a list of accidents at work was created, which is shown in figure 1. Exposure to infectious material, as well as accidents related to it are included in the occupational risk of paramedics. In unfavorable working conditions of ZRM, it is not difficult to puncture contaminated needle, which is also considered as an accident at work. Working environment, rush, restless patients, often aroused, can cause the needle to slip and stab (5).

### Biological factors

In the first place among the professional population threatened with the negative effects of harmful biological factors are health care workers (6). Work in health care, including the State Medical Rescue System consists in providing medical assistance to patients, re-

gardless of their state of health or hygiene, which is why the patient's infected, infected the environment, infected medical equipment, infected medical supplies should be considered including dressing as a source of risk for biological agents.

Harmful biological agents can have an allergic, toxic effect, lead to an infectious disease. Microbes occurring in health care facilities are characterized by higher than normal virulence and pathogenicity. The blood-borne pathway of transmission of microorganisms is associated with the possibility of infecting with dangerous pathogens.

One of the most dangerous pathogens with which medical rescuers can meet in their professional practice are viruses that cause hepatitis (HBV, HCV), HIV, staphylococcus aureus, tuberculosis mycobacteria, tetanus bacillus, influenza viruses, herpes virus, HPV, ebola virus (7). Diseases caused by the most dangerous of pathogens are rare, but the risk of getting sick is higher than in the average healthy person. The most frequent infections occur as a result of an accidental needle-pricked needle, contact with damaged skin, mucous membrane and body fluids. Therefore, personal protective equipment is an important element of prevention against infection.

### Chemical factors

Chemical factors that PRM employees have contact with during their professional work include latex, disinfectants and sterilants, medicines and other chemicals. These and other substances, depending on the type and concentration may cause allergic reactions, lead to irritation of the mucous membranes of the airways, to skin changes or severe anaphylactic reactions. Contact with chemical agents that may have irritating or sensitizing properties, entails a risk of getting ill.

Sensitization to latex is quite common, which is why nitrile gloves have been introduced to prevent the occurrence of allergic reactions. In terms of safety, nitrile gloves show better protection (8).

Type of event	Years						Total events
	2005	2006	2007	2008	2009	2010	
Aggression	1	0	1	2	3	0	7
Animal attacks	0	0	1	1	0	0	2
Cutting with a sharp object	1	1	1	1	0	0	4
Hitting a stationary element	2	2	4	3	3	0	14
Blow on a movable element	7	0	4	3	4	6	24
Fall at the same level	1	0	4	4	4	9	22
Fall from the stairs	0	5	1	5	4	6	21
A blow when getting out of the ambulance	1	5	3	1	7	4	21
Trauma during manual transport	3	10	8	13	21	17	72
Transport accident	9	3	7	12	10	8	49
Stabbing with a dirty needle	4	4	6	15	14	6	49
Other	3	1	2	8	5	6	25
In total	32	31	40	68	75	62	308

Fig. 1. The accidents at work of employees of the Ambulance Service in Wrocław in 2005-2010

Some sources indicate exposures to chemical agents and related complications, as highly harmful and even carcinogenic. Changes in the genetic material caused by long-term exposure to a chemical agent can cause damage and lead to mutations.

### Physical factors

Analyzing the work process of medical rescuers or nurses, it can be unequivocally stated that there are many factors that increase physical loads, one of them is the way of performing work and organizational working conditions. Forced body position, lifting and transfer of oversized weights, the size of the unit load of employees has a negative impact on their physical condition.

A diverse work environment of paramedics, exposes them to physical factors from excessive exposure to heat and cold, mechanical vibrations, and electric shock or fire. In addition to the negative impact on health, exposure to certain factors can lead to serious injuries and significant damage to health, can be a cause of considerable discomfort or the cause of the disease.

Noise is one of the physical factor considered to be onerous, occurring in the work of physicians. Harmfulness of noise depends on the frequency of vibrations, intensity and time of exposure. Mechanical vibrations that accompany your work every day while transporting a patient may have a negative effect on the bone-joint and muscle system. Lighting using natural and artificial light enables safe work, however, due to the specificity and diversity of circumstances prevailing during medical rescue operations, this condition is often not met. The negative effects of the lack of proper lighting at work include sudden injuries, accidents, errors in the performance of activities, or diseases of the eye.

### Ergonomic factors

Work ergonomics is one of the most important elements affecting health in the work environment. The specificity of the work of a paramedic is far from the correct patterns of ergonomics in the workplace. The most "strained" is the osteoarticular system, especially the spine. To a large extent people who are in a state of immediate threat to life or health are not able to move independently, so they must be transported manually to the ambulance. Carrying patients and their transmission negatively affects the state of health, leads to numerous micro-injuries in the muscles, muscle fascias and joints. Forced, unnatural body position can increase the risk of musculoskeletal system loads. The numerical value of the weight that can be lifted by a woman according to ergonomic standards should not exceed 25 kg, and for men – 30 kg. However, in the current legal situation, which allows the functioning of two-person ZRM, this condition is not met and therefore there is widespread violation of work safety rules. In addition, the

number of trips is constantly increasing, which also increases the number of patients in need of manual transport. This obligation rests on the members of EMT who need to stabilize and then transport the patient in a life-threatening condition.

The Central Institute for Labor Protection in 2013 conducted research on threats to the work of paramedics. Based on the research, he concluded that the biggest health problem in the work of paramedics is back pain, mainly the lumbar section, followed by the cervical and thoracic segments. In contrast, lower extremity pains are a much less common phenomenon, as are upper limbs (9).

An important problem in the work of paramedics is the ergonomics of work. The standards regarding the technical requirements of emergency vehicles, as well as the scope of necessary equipment are regulated by the legal letter in the form of the Ordinance of the Minister of Infrastructure of December 31, 2002. Dz. U. of 2003 No. 32, item 262.

In addition, the provisions in force in the Polish Standard PN-EN 1789 for a means of transport cat. B oblige to maintain standards for ambulances.

### Stress and burnout syndrome

Employees of the PRM system are exposed to stressful situations alternating with periods of peace and routine. This determines additional work-related tensions. Excessive duties, traumatic nature of events, incorrect interpersonal relationships, increase the negative work experience. Feeling helpless when dealing with inevitable death affects destructively the psyche, causing it to "exhaust". Long-lasting stressful action reduces the body's resistance and consequently leads to disease (10, 11).

Work in emergency services requires special personality predispositions and mental resilience. Usually contact with the victim is short-lived, but the feelings accompanying the meeting, especially in traumatic situations, are permanent. Trust is essential to establishing a good relationship with the patient. The problem arises at the moment when the employees of the system are left with the decision not to take or stop medical rescue operations (MDGs). This applies to patients with massive injuries or in cases that do not survive. Being with a dying person and contact with his family is highly stressful.

The burnout syndrome that occurs among employees of the PRM system is an example of the fact that their work is responsible and trembling. The reasons for professional burnout include: the nature of the work, its nuisance, the degree of commitment to responsibility incurred during its performance, high requirements, working conditions, the number of stressful or considered to be cumbersome situations, interpersonal contacts, high work pace.

Medics are also exposed to post-traumatic stress disorder and are characterized by intrusive, recurring memories. The reason for his appearance may

be contact with upcoming death, traumatic situations. It also happens that people affected by PTSD identify with the victim, which intensifies the sense of anger.

PTSD (post traumatic stress disorder) is characterized by a symptom of conversion (intrusion) – experiencing a negative event anew, in the form of bad memories and dreams, moreover symptoms of avoidance, ie, escape from stimuli, conversations related to a traumatic event. PTSD may also be manifested by psychophysical stimulation, which is manifested by violent outbursts of anger, difficulties with concentration of backfilling, shallow sleep and awakenings (4). However, positive changes after bad experiences, being a kind of motivator, are often observed. This phenomenon is called posttraumatic growth, or posttraumatic self-development, which means positive changes in self-perception and attempts to cope with experienced stress (4).

### AIM

The aim of the work is to assess the psychological and physical burden of EMT on the risk factors and their impact on health and work.

### MATERIAL AND METHODS

Own research: The study included 34 paramedics and one nurse working in the State Medical Rescue System in Suwałki, Olecko and Augustów from September to December 2016.

The majority of respondents are men (28 men, 80.0%), and the remaining (7 women, 20.0%) are women. In the presented thesis the method of the diagnostic survey was used and the questionnaire was developed for this purpose. The questionnaire contains 31 questions about psychophysical loads, work accidents, stressful situations, burnout syndrome, traumatic events and their impact on the mental and physical state of the respondents.

### RESULTS

When asked about the number of years worked in the PRM system – the largest group (14 people, 40%) is made up of respondents who work between 5 and 10 years in the profession, followed immediately by people whose work experience is above 20 years (10 people, 29%). Then 5 people (14%) work in the 11-15 age group, and only 4 (11%) – under 5 years. The smallest group are medics who have worked for 16 to 20 years (2 people, 6%). More information on this topic is shown in figure 2.

Often, the work of Medical Emergency teams requires a lot of physical effort from them. This happens during the transport of the victim or in many medical activities affecting the osteoarticular system. Among the respondents who answered yes to the question whether they have ever struggled with the loads associated with the osteoarticular system, large (18 people, 45%) are people who experience dysfunctions related to back pain, sciatica and discopathy. Some (18 peo-

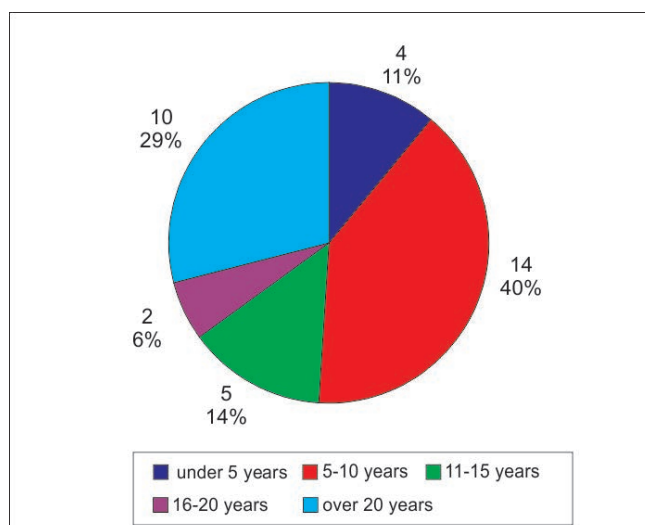


Fig. 2. The years spent in the State Medical Rescue System

ple, 45%) mention pains of various origins, while others (10 people, 25%) indicate fractures, sprains and dislocations as a result of the musculoskeletal system load. The least (2 people, 5%) of the large group are those who indicate degenerative changes as a cause of their ailments. It turns out that the work of members of ZRM often in a forced position gives results in the form of various problems. Data regarding bone and joint load is illustrated in figure 3.

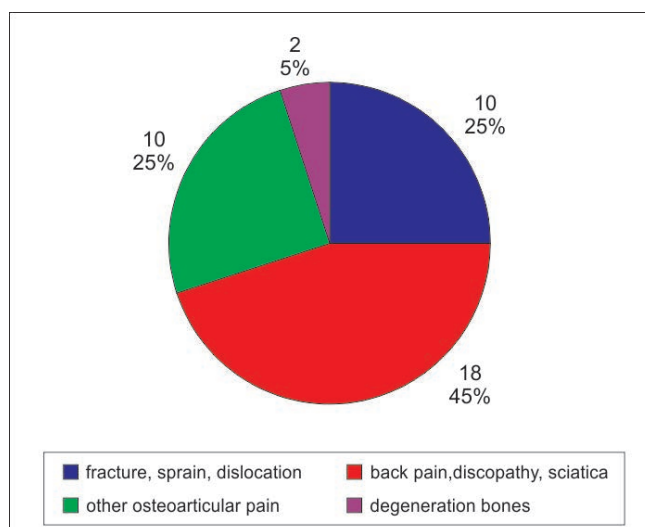


Fig. 3. The bone-joint system solstice

Any worse resulting from performing work requires diagnosis, treatment and rehabilitation. On the question of whether the rehabilitation and treatment process related to the disability has been completed, nearly half (17 people, 49%) of people responds in the affirmative, the others (18 people, 51.4%), however, recognize that they do not. More than half of the respondents (20 people, 57%) say that they still feel discomfort associated with the disfigurement. The other 5 (14%) people do not feel such discomfort and 5 (14%) can not clearly say that it is. A significant

part, as many as 27 (77%) of respondents confirm that dysfunction in their assessment is associated with the profession, and only three (9%) responds that they do not know.

Another important issue is the aggression on the part of the patient or his family or witnesses of the incident towards the employees of the State Medical Rescue system. All (35 people, 100%) participants in the study agree that they are victims of such aggression. More than a half (19 people, 54.3%) people experience verbal aggression with the use of physical strength, while the remaining 16 (45.7%) only indicate verbal aggression, this is illustrated in figure 4.

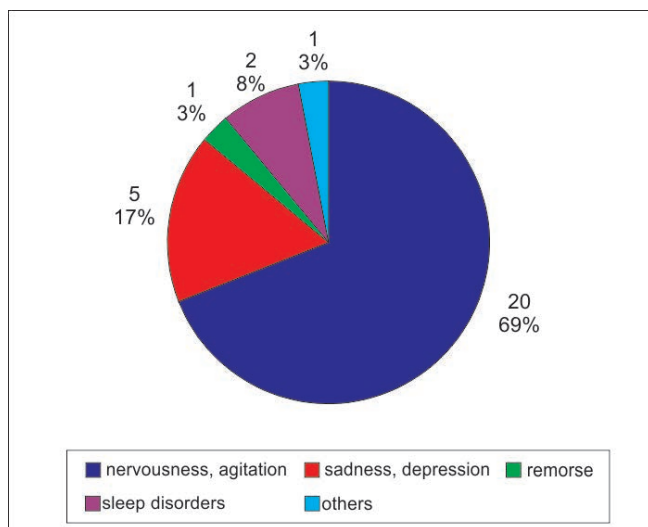


Fig. 4. The influence of aggression on members of Medical Emergency Teams on their mental state

A significant majority (20 people, 69%) of medical personnel indicate that the aggression applied to them has a negative impact on their mental state and is manifested by nervousness and agitation. Grief and depression are felt by 5 respondents (17%), and the others indicate sleep disorders (2 people, 8%) and remorse (1 person, 3%). One of the people (1 person, 3%), emphasizes the fear and fear of similar events. This is illustrated in figure 5. The analysis of the research shows that the majority (32 people, 91%) of opinion-makers are witnesses of traumatic events experienced by members of ZRM in their professional work, and only a few (3 people, 9%) do not experience similar situations. Among people who are experiencing dramatic situations, the biggest trauma for them is the accident involving children (17 people, 21%), hanging (15 people, 19%), Sudden Circulation and Breathing (NZK) (11 people, 14%), death of a child and mass accident (9 people, 11%), drowning (8 people, 10%), massive injuries and fatal accidents (5 people, 6%), traffic accidents (3 persons, 4%). Others include: self-injury, charred corpses, abused children, women's NZK after childbirth, CPR with family (1 person, 1%). The graphic form of traumatic situations is illustrated in figure 5.

The impact of traumatic events on the psychological status of EMT members is of great importance in

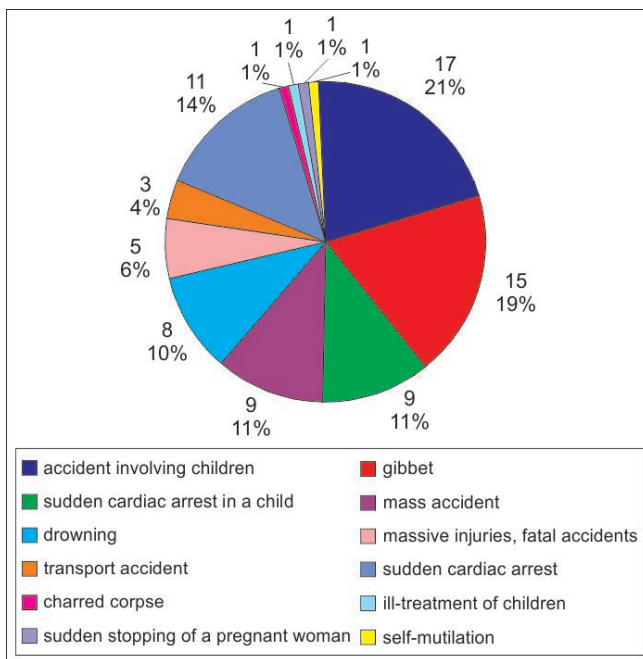


Fig. 5. Traumatic situations

further work. The largest percentage (20 people, 54%) is a sense of sadness and depression after experiencing a difficult situation. Seven people (19%) feel nervousness and agitation, 6 (16%) remorse, and 4 (11%) sleep disorders. These situations are illustrated in figure 6. An important aspect is the fact that none of the people who experience such situations use the help of a psychologist (74%), although the vast majority of members of Medical Emergency Teams (96%) believe that access to free psychological help should be provided by the employer.

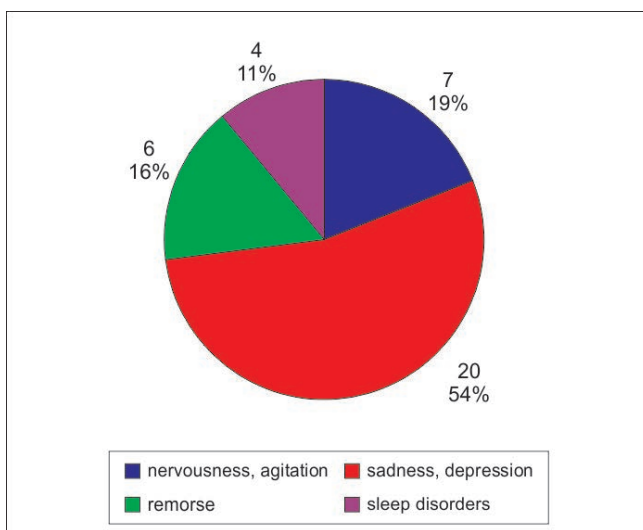


Fig. 6. The influence of traumatic events on the mental state of members of Medical Emergency Teams

Analyzing the data, it can be noticed that stress is an inseparable element in working with patients experienced by the majority of middle-level personnel (32 people, 91.4%). Almost half (16 people, 41.8%) of respondents indicate that this situation has

a negative impact on their mental and physical condition, 13 people (37.1%) say that no, and 6 (17.1%) can not unambiguously state that it is. Depending on individual predispositions, the consultants provide various types of ways to deal with stress. Most willingly, medical rescuers rest and spend time with their family (13 people, 19%). Others consider practicing physical activity as the best form of stress relief (12 people, 18%). A significant part of the respondents are isolated to cool down from emotions (11 people, 17%) after experiencing a stressful situation, by drinking alcohol in the form of relaxation (8 people, 12%). Others (1 person, 1.5%), indicate reading books, playing instruments, household chores, taking pharmacological agents, as good ways to deal with stress. Although some respondents indicated that stressful situations had a negative impact on their mental and physical condition, almost everyone indicated the forms of coping with the stress they prefer. This is shown in figure 7.

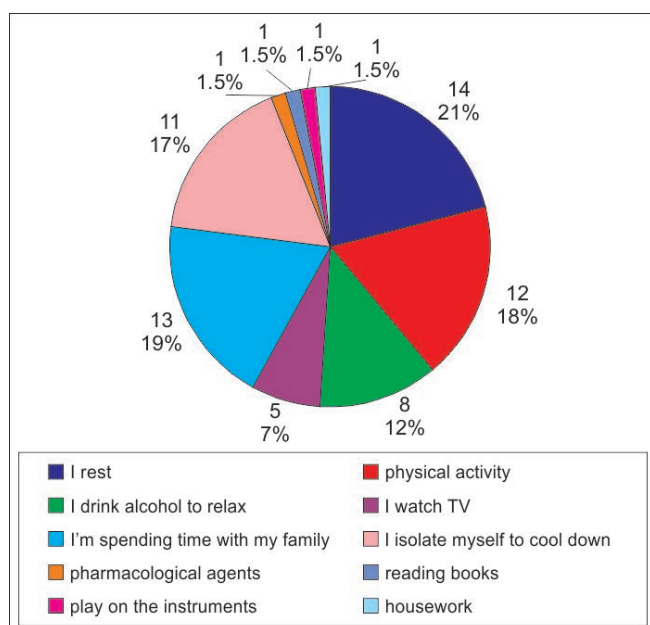


Fig. 7. Some ways of coping with the stress of members of the Emergency Medical Team after experiencing a stressful situation

In addition, our behavior in different situations is influenced by the attitude of others. It can be destructive (transmission of anxiety, aggressiveness) or construction (help in the risk of life, “keeping cold blood”). In situations of danger, some behave heroically, while others behave in an unusual way – not ethically (12).

The burnout syndrome is one of the most negative effects of a long-term stressful job. According to Christina Maslach, this is “emotional exhaustion syndrome, depersonalization and a reduced sense of personal achievement that can occur in people working with other people in a certain way” (13-15). Working in away teams forces you to make quick decisions, working in difficult conditions with the risk of life and health, which in the future results in burnout in the profession. Data

analysis shows that almost half of respondents perceive the symptoms of professional burnout as: irritability (12 people, 31%), indifference (9.2%), physical fatigue and frustration (7 people, 18%). The others signal as a symptom of burn-out – an adverse effect on family life, as well as problems with concentration. This is just a few of the most frequently mentioned symptoms of occupational burnout among employees of the PRM system, visible in figure 8.

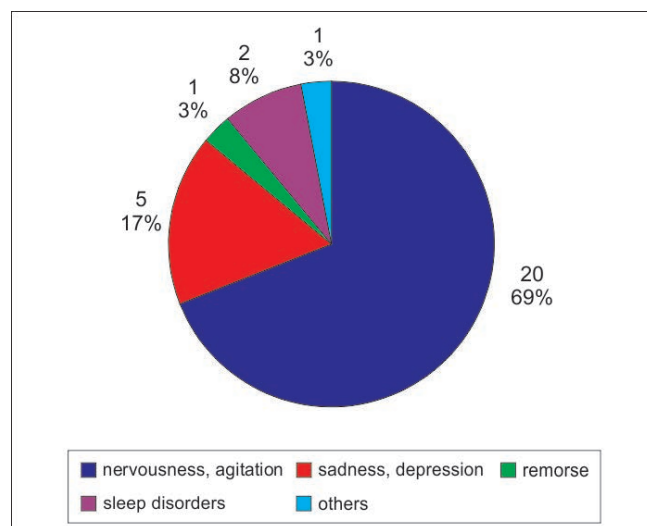


Fig. 8. Symptoms of burnout occurring among employees of the State Medical Rescue system

Post-traumatic stress and burnout syndrome may in the future result in addictions, absenteeism at work and aggression towards the closest family or colleagues (16, 17).

Due to the specificity of work in the system of State Medical Rescue, accidents at work are quite often encountered. Data analysis shows that a part (12 people, 11.6%) of respondents experience an accident at work during their work. Among those surveyed who are injured at work, 7 (33%) of people suffer injuries involving the motor organ, 5 (24%) of people undergo sprains, cuts and falls on slippery surfaces, while four (19%) are exposed to blood and other body fluids. Injuries in the musculoskeletal system were noted in the course of manual transport of the injured or on slippery surfaces, as illustrated in figure 9. High accidents are caused by work in unfavorable and often difficult conditions on the body. The important role here is awareness of hazards, the need to report accidents and treatment and prevention of such situations. The research shows that a small proportion (7 people, 20%) of the medics use sick leave after such events, and the rest (5 people, 14.3%) do not have dismissal or individually organize convalescence. Unfortunately, the effects of accidents at work can be felt for a long period of time, even up to several years. At the time of completing the survey, as many as 12 (34.2%) of respondents still feel discomfort associated with an accident at work.

Analyzing the research, it can be concluded that the majority of respondents confirm their exposure to

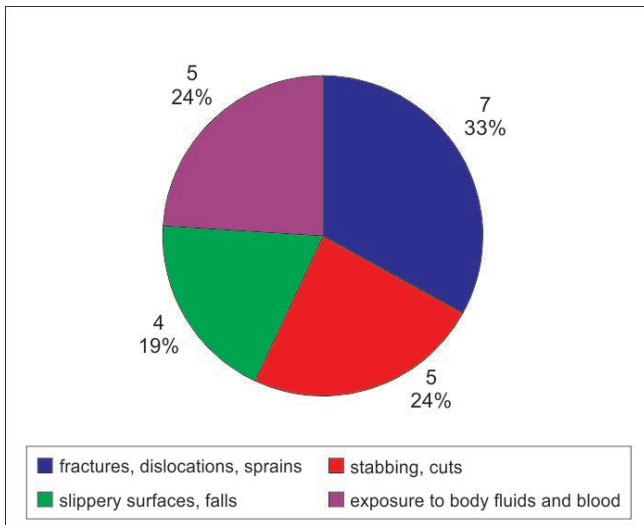


Fig. 9. The accidents at work

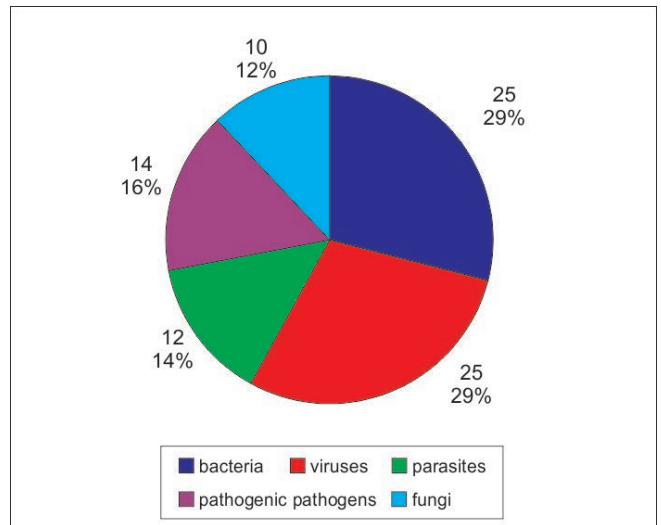


Fig. 11. The types of biological factor

chemical agents while working. Some people observe negative effects of these factors in the form of skin lesions, allergic reaction, respiratory problems. This is shown in figure 10.

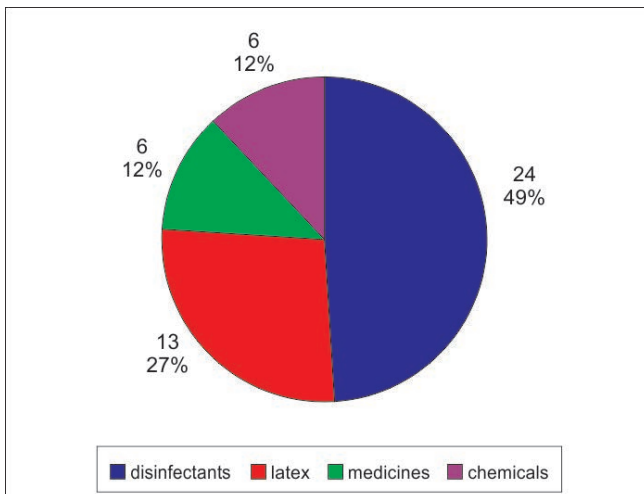


Fig. 10. The types of chemical factor

Most people (24%, 49%) were exposed to disinfectants, 13 people (27%) to latex, and 6 people (12%) reported exposure to chemicals and medicines.

Biological factors are another adverse effect on the health of the members of the outgoing teams. We find out from the research that 25 (71.4%) of respondents are admitted to exposure to these factors during work. Employees indicate that they are in contact with: bacteria and viruses (25 people each, 29%), pathogenic pathogens (14 people, ie 16%), parasites (12 people, 14%) and fungi (10 people, 12%). The types of biological factors are illustrated in figure 11. Contact with pathogens is included in the occupational risk of paramedics. On a daily basis, away teams have contact with patients who, due to diverse disease entities, as well as medical interventions, may be carriers of various diseases and constitute a reservoir of infections.

Physical factors, i.e. those that depend on the environment in which we are also negatively emanate the health of medical workers. A significant part, because 29 (82.8%) of respondents were exposed to such factors, and 14 (40%) felt their negative effects. Analyzing figure 12, it can be unequivocally stated that in comparison to other factors that medical rescuers are exposed to, physical determinants and their repeatability in subsequent respondents is the highest. The largest group (27, 25%) are respondents who indicate forced body position and discomfort of movements, 24 people (22%) – contact with excessive heat and cold, 20 (18%) of respondents emphasize noise and insufficient lighting as a factor negative. The mechanical vibrations show 19 (17%) of respondents. At this point, a very important conclusion is drawn that respondents in the case of physical factors were exposed to more than one factor. Gros (31, 88.5%) employees consider work in the State Medical Rescue System to be inconsistent with the principles of ergonomics. Similarly, most people (32, 91.4%) admit that working in teams negatively affects their mental and physical condition.

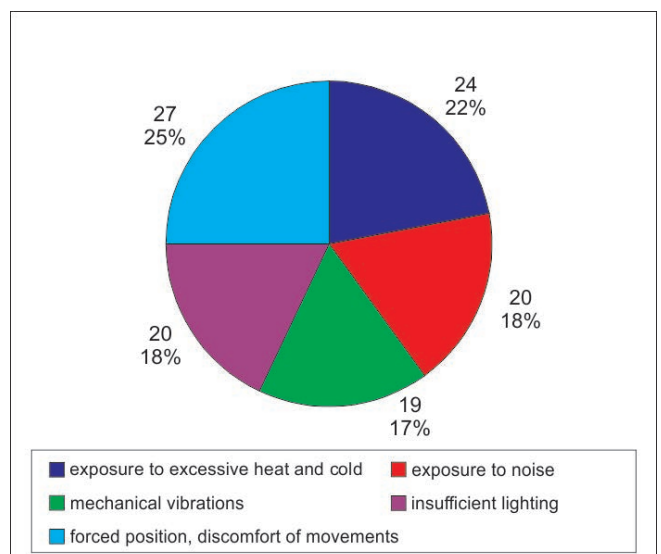


Fig. 12. The types of physical factors



Analyzing the above questionnaire, you can put forward many interesting, but at the same time disturbing conclusions. The first of these is the fact that most of the respondents struggled with the loads associated with the traffic system. Inconvenient position of the body, carrying excessive weights, work in difficult and limited conditions, handles the transport of patients, has a negative impact and overloads the osteoarticular system. Back pain, discopathy, fractures, dislocations, sprains and pains of various aetiologies account for a significant percentage (18 people, or 45%) of the total number of locomotive discomforts among PRM employees. What is also disturbing is the fact that a large part of people who struggled with dysfunctions still feel its consequences, and yet on the day of completing the survey was active professionally. This proves that despite the pains of various origins, paramedics work and are aware that their dysfunctions are caused by work.

Another disturbing conclusion is that among respondents, everyone has experienced active verbal aggression or physical force. The patient, the patient's family, or people around the scene of the incident may be potential aggressors. What is more often reported are cases in which paramedics, using the rights of a public official, after the act of aggression decide to submit an application to the court, not only in the event of a physical carnage violation, but also in cases of insults. The rescuer, when going to action, thinks about how he can help the patient, in what dimension, will he try to ease his pain, heal the wound, accept the child or simply support him in a difficult situation. He does not expect a threat where he will save human life. The worst, however, is that the emotions associated with aggression towards medical rescuers do not "stay" at the scene of the incident, but "return" to their homes with them. A significant part of the respondents (20 people, 51%) admit that such events negatively affect mental states causing sadness, depression or lead to agitation and nervousness, but also cause fear of further similar situations. Traumatic events by some considered as the worst point of a paramedic's work are an indispensable element of their work. ZRM members face such situations on a daily basis. As evidenced by the results of the survey, the vast majority, as many as 32 (91.4%) opinion makers experienced such a situation during their professional work. Almost half (17 people, 48%) of the respondents recognized that these situations had a bad impact and affected their mental health. Many people felt sadness and despondency, some remorse and nervousness after experiencing a traumatic event, and some had sleep disorders. As traumatic situations, accidents involving children, hangings, sudden cardiac arrests, mass events, flooding, massive injuries, abused children, death of the whole family in a car accident, NZK of a child, CPR of a woman after childbirth were mentioned. It should be re-

membered that each of these events was extremely stressful and the scale of the drama was very high. Although most of the respondents did not have to use the psychologist's services after being exposed to a traumatic event, almost everyone agreed that such assistance should be provided by the employer (33.6, 96%). What is also disturbing is the fact that the workplace does not organize the possibility of obtaining psychological counseling. Thus, the members of ZRM "experience" traumatic events most often in the comfort of their homes.

Stress can be motivating or destructive. The majority (32 people, 91.4%) of respondents felt that stress accompanies them in their daily work, and they themselves have to try to deal with it. Time pressure, severe medical cases, unfavorable environment, all have a stressful effect on rescuers. Almost half (16 people, 45.8%) of respondents thought that stress had a negative impact on their mental and physical condition, which is why individual ways of dealing with stress were used. A significant part of the respondents relax and spend time with family, others engage in physical activity. Worrying is the fact that some people consume alcohol to de-stress, and yet such behaviors can not only lead to addictions, but even deepen the psychological problem. The others are isolated to cool down from emotions, some take pharmacological agents, others read books and play instruments. Techniques and ways of coping with stress is an individual matter and depends on the degree of influence of stress on our mental state.

Many years of work, high stressfulness, and on the other hand, routine can lead to burnout. Some people noticed symptoms of professional burnout in the form of increased irritability, frustration, physical fatigue, indifference, and in some cases professional burnout translated into a family situation. Often the frustration associated with the work is transferred to family members, which can lead to quarrels and serious family problems. Medical rescuers, as a high-risk group, should have the privilege to obtain earlier pension rights, as is the case with uniformed professions. Analyzing the survey, one more conclusion emerged: the longer the seniority, the higher the percentage of people affected by the burnout syndrome.

## CONCLUSIONS

EMU members usually work in conditions unknown to them, the specificity of their work increases the risk of injury. Part (12 people, 11.6%) of respondents claims that during the course of their work, she was an accident. The injuries mainly concerned fractures, sprains, dislocations, falls on slippery surfaces. There were also strokes about the immobile parts of the ambulance, as well as the elements of medical equipment. Some of the respondents carried out a simplified process of convalescence and treatment themselves, and some needed a sick leave for the time of recovery.

Analyzing the results of the survey, it can be clearly stated that accidents at work constitute a high percentage, and work in the PRM system increases the probability of injury.

Exposure to chemical agents, and above all to latex and disinfectants constituted a high percentage of all exposure cases. In some of the respondents there have been negative effects of contact with chemical substances, manifesting themselves with skin lesions, allergies and breathing disorders.

Exposure to biological agents is part of the risk of working with patients. The risk of contact with a potentially infectious patient is extremely high. The vast majority (25 people, 71.4%) of respondents were exposed to biological agents in the form of bacteria, fungi, viruses, pathogenic pathogens, or parasites.

Variable work environment, unfavorable weather conditions, a post that is not adapted to the needs and many other elements make the paramedics in their work exposed to various physical factors. Some of the respondents were exposed to excessive heat or cold, noise, mechanical vibrations, which are related to the fact that most of the time the rescuer is in the ambulance, which in many cases is also moving. Insufficient lighting, discomfort of movements or forced body position adversely affect your health. Prolonged exposure to physical factors may impair the functioning of the organ of sight, hearing and movement. What is also worrying is the fact that the majority of people marked more than one answer, which indicates a large scale of exposure to physical factors, in addition, some of the respondents noted their negative health effects.

The basic principles of ergonomics at the workplace should be kept, and when it comes to working in EMT it is far from them. Excessive local load, workplace unsuited individually to the employee, the hands of transporting patients often with considerable burden leads to break-

ing the basic principles of occupational health and safety. Polish law regulates the provisions regarding health and safety and ergonomics, however, in the case of medical rescuers, unfortunately only in theory. A large majority (31 people, 88.5%) of respondents recognized that work in PRM is not in accordance with the principles of ergonomics and negatively affects their psychophysical condition. The question summarizing the questionnaire concerned the negative impact of work in the State Medical Emergency System on the mental and physical condition of paramedics. Worrying is the fact that 32 employees (91.4%) admitted that their work has a negative impact on their mental and physical health.

A number of loads ranging from changes in the bone and joint system, through exposure to stress, aggression, chemical, physical and biological factors, violation of the principles of ergonomics adversely affect the health of paramedics. Every day in their work they experience aggression, they are exposed to pathogenic pathogens, they work 24 hours a day, 7 days a week, often in over standard working hours. They work under time pressure, they must demonstrate professionalism and extensive knowledge in many fields. The analysis of the survey confirms that the employees of the State Medical Rescue System are exposed to a number of burdens, injuries and possible dysfunctions related to the work performed. As already mentioned at the beginning, the National Health Program has to compensate for this type of inconvenience by carrying out a number of preventive and preventive tasks. It turns out that with such specificity of work it is not realistic to fully observe the good practices used at the workplace. The system of State Emergency Medical Services, and in particular, the members of ZRM fit perfectly into the tasks of the NPZ, but only as a negative example of the failure to implement the Public Health strategy.

## BIBLIOGRAPHY

1. Kulik TB (red.): *Zdrowie publiczne*. Wydawnictwo Lekarskie PZWL, Warszawa 2014: 32.
2. Dudek B: *Ochrona zdrowia pracowników przed skutkami stresu zawodowego*. Oficyna Wydawnicza Instytutu Medycyny Pracy im. prof. J. Nofera, Łódź 2004: 9-13.
3. Kiwerski J: *Epidemiologia urazów kręgosłupa*. Prewencja Rehabilitacji 2005; 3(9): 1-4.
4. Ogińska-Bulik N: *Dwa oblicza traumy: negatywne i pozytywne skutki zdarzeń współczesnego świata*. Wydawnictwo Difin, Warszawa 2015: 9-177.
5. *Dziennik Bałtycki, Gdańsk: Ratownik, który zakłuł się brudną igłą, sam zapłaci za leki?*; <http://www.rynekzdrowia.pl/Uslugi-medyczne/Gdansk-ratownik-ktory-zaklul-sie-brudna-igla-sam-zaplaci-zaleki,14068,8.html> (dostęp z dnia: 11.08.2015).
6. Bober-Gheek B: *Prewencja i kontrola zakażeń*. Wydawnictwo Elsevier Urban & Partner, Wrocław 2012: 29-36.
7. Romanowska-Słomka I, Słomka A: *Zagrożenie biologiczne w służbie zdrowia*. Wykazy, charakterystyka. Biblioteczka Ośrodka Szkolenia Państwowej Inspekcji Pracy, Wrocław 2006.
8. Merez D, Mościska A, Waszkowska M: *Poczucie kontroli w miejscu pracy a poziom stresu zawodowego i związane z nim skutki*. *Medycyna Praktyczna* 2001; 5: 12-16.
9. *Materiały informacyjne dotyczące prewencji wypadkowej i profilaktyki nadmiernego obciążenia układu ruchu ratowników medycznych*. Centralny Instytut Ochrony Pracy, Warszawa 2013.
10. Korzeniowski K: *Wpływ stresu na zdrowie*; <http://www.salusnatura.pl/stres/wplyw-stresu-na-zdrowie/> (dostęp z dnia: 11.08.2015).

11. Kacperska MJ: Wpływ stresu na organizm człowieka; <http://www.psychiatria.pl/artikul/wplyw-stresu-na-organizm-czlowieka/17705> (dostęp z dnia 12.11.2018).
12. Kliszcz J: Psychologia w ratownictwie. Difin SA, Warszawa 2012: 31.
13. Wnukowski K, Kopański Z, Brukwicka I, Sianos G: Zagrożenia towarzyszące pracy ratownika medycznego – wybrane zagadnienia. *Journal of Clinical Healthcare* 2015; 3: 10-16.
14. Pasikowski T: Polska adaptacja kwestionariusza Maslach Burnout Inventory. [W:] Sęk H (red.): Wypalenie zawodowe. Przyczyny – mechanizmy – zapobiegania. Wydawnictwo PZWL, Warszawa 2000: 135-148.
15. Juszczyk S: Metodologia badań empirycznych w naukach społecznych. Akademia Wychowania Fizycznego, Katowice 2001.
16. Jurczyński Z, Ogińska-Bulik N: Ruminacje jako wyznaczniki negatywnych i pozytywnych konsekwencji doświadczonych zdarzeń traumatycznych u ratowników medycznych. *Medycyna Pracy* 2016; 67(2): 201-211.
17. Lepiesza P: Stres na stanowisku pracy ratownika medycznego. Zakład Higieny, Katedra Medycyny Społecznej, Uniwersytet Medyczny im. Karola Marcinkowskiego w Poznaniu. *Hygeia Public Health* 2011; 46(4): 455-461.

received/otrzymano: 08.11.2018  
accepted/zaakceptowano: 29.11.2018