

Nature and scope of activities of a disaster medicine

Radosław Ziemba

Military Centre of Pharmacy and Medical Technique in Celestynów, Poland

Author's address:

Radosław Ziemba, Military Centre of Pharmacy and Medical Technique, ul. Wojska Polskiego 57
05-430 Celestynów, Poland; e-mail: zx11@op.pl

Received: 2012.12.12 • **Accepted:** 2013.03.13 • **Published:** 2013.03.30

Summary:

A disaster medicine has become an important field of the scientific system, supported by a number of modern specific sciences such as: strategic management, probability theory, any forms of environmental engineering, etc. It was established in 1973 in Mainz under the auspices of the United Nations. This paper attempts to systematize the degrees and types of disasters and their effects as an important part of a disaster medicine.

Key words: disaster, disaster medicine, rescue, rescuer, prophylaxis, disaster classification.

The civilization of the 21st century placed the nature of a disaster in the centre of perception of the phenomena accompanying a human being and his/her development. Thus it cast a shadow on the issues of the security of people in a general sense, the condition of a human being entangled in a variety of issues that are not always in his/her favour. Medical assistance, which for centuries has adopted the model of a rational process, not to use the term discourse, led to the emergence of the sphere of intervention, dynamic, immediate actions. It is accompanied by complex measures, in many cases forces, which constitute a broad setting for its core structures, without which it would be useless, would not bring desired effects. To this day, there have been disputes about whether we are dealing here with an emergency medicine, accident medicine or a “disaster medicine”.

Etymologically, rescue, rescuer have existed longer than the term disaster. The former is associated with any form of delivering assistance in various situations, “emergencies, especially those that are life and health threatening”. “The emer-

gency” has been heightened by various causes, not always treated on a par with disasters. As a phenomenon, an accident has always surprised with the so to speak drama of events, and often affected one person or a few people. Its results have been connected with disastrous effects of destruction of property, numerous body injuries, often fatalities. The outcome of an accident has always been rather measurable, could be clearly captured, a certain prophylactic measures could be used against it, it could be counteracted in various ways, prevented directly or indirectly.

The scientific and technical civilization has increased the share of the latest means, fundamentally changed the view of the world, the environment of a human being and his/her contribution to the creation of culture in a broad sense. The view of the surrounding nature has changed, so has the way it is perceived by the entity that exploited it, i.e. human being. As a result of permitting its shameful devastation, the term “disaster” emerged as a hardly predictable, sudden state, the size of which is difficult to determine.

The state of a disaster often equals the state of calamity, as events of this kind usually entail tragedy intensified effects. Increased threats to human life and health usually take the “hyper” dimension. The unprecedented frequency and scale of natural as well as increasingly man-made disasters determined an increase in the number of the injured, rarely encountered in the history before. The increasingly global effects caused by a human being are wars understood as a consciously conducted destructive activity on a multifaceted and mass scale. The shape of current civilization led to a significant broadening of the term war in which a relatively small group of people can be responsible for effectiveness of destroying any living force. This, of course, refers to terrorism, which today is global and became the most important problem to the modern world and people in general. Its effects created the necessity for a broadly understood medical assistance to extend beyond a broadly specialized group, as we previously thought of a medical personnel, that is doctors, nurses, and related technical personnel.

The present situation places the duty of delivering medical assistance on those professional groups that previously dealt with the elimination of the material effects of various kinds of accidents and calamities. The operation of the medical personnel themselves becomes, at a wider level, specialized and necessitates an integrated work with other services (fire brigades, law enforcement authorities). Such an integration was known in military medicine before, but it is hard to say whether there was similar multifaceted structural connection. The whole medical personnel were obliged to focus attention on medical issues connected with distribution of assistance in mass and concentrated injuries, whose variety often is impossible to predict. Thus, the knowledge in this area must be broadened permanently. Currently, it is necessary that these services act effectively in states of disasters bordering on wars whose range of accompanying circumstances has not been predicted by anybody yet.

To ensure the protection of mankind as a whole against losses and a planned elimination of related adverse phenomena, a decision was made at the forum of the 51st Session of the United Nations Economic and Social Council (ECOSOC) about global assistance in disasters, emergencies,

larger collisions and natural disasters. As a result, during an International Symposium of Disaster Medicine in 1973 in Mainz a new, independent field in medicine was created—a disaster medicine. Its main objectives focus on research problems connected with its functioning in calamity states, as well as on organization and training aimed at effective work for the benefit of a large number of people in such specific conditions as unpredicted calamities are.

Following the views formulated in Mainz and at subsequent scientific conventions in the following years, various states and Poland elaborated the issues connected with a disaster medicine in a broad sense. Apart from a broad range of studies, the issues started to be implemented.

Medical assistance to those affected in the conditions of a huge number of the injured, with which “a disaster and emergency medicine” deals, is understood as ensuring the survival of the largest possible number of the injured and preventing other threats to their health and life, mass assistance delivered using limited means, obligation of segregation, evaluation and selection of the injured according to how urgent it is to deliver assistance and transport them.

An important task of a disaster medicine is to facilitate the teaching of the abilities to deliver medical assistance to the injured (the wounded, sick, disabled) in various conditions, using limited forces and means of health care. The term “various conditions” should be understood as non-normal circumstances, even primitive, dictated by the pressure of time. As a rule, these are irreversible situations, requiring taking immediate and firm decisions.

Thus, a disaster medicine suggests knowledge and prophylaxis that should be used when the number of casualties or injured exceeds the amount of the health care resources that are allocated for their treatment in normal conditions covered by a classical medicine.

An accident not always can be equated with a disaster. It, however, reaches the scale of a disaster when the needs of the rescuers significantly and rapidly exceed the forces and means that are at the disposal of the health care in given circumstances.

The observation of civilisational conditions and states in the 1970s suggested the emergence of a disaster and emergency medicine. This independent discipline closely cooperates with other medical disciplines, and draws on various fields of crisis management, using their achievements, research methods and ways of operation.

In terms of objectives and functions, it is close to a much longer existing military medicine. Thus, it maintains cooperation with, and takes advantage of organizations for health protection of armies. The ways and methods of medical protection of military operations of armies, as well as the tasks, forms and work methods of military health care organizations are quite closely connected with a disaster and emergency medicine.

The medical character of disasters and military health care organizations is more distinct from other medical disciplines. The latter more consistently follow the principles of medical deontology and promote the classically established doctor's approach towards the affected individual (patient). A disaster medicine and related disciplines (such as variations of a military medicine) are accompanied by a psychological shock. For a doctor, it is caused by the situation in which he/she must treat the injured, significantly different from normal hospital conditions, which makes it more difficult to establish a contact, make diagnosis, etc.

This area of medicine often involves the necessity of rescuing in the first place the injured who show the chance of survival. And those who don't have much of a chance of being rescued must be given a proper humanitarian care.

So, it can be stated that the general objective of a disaster and emergency medicine is to decrease the number of deaths, disabilities, consequences of injuries in all disaster states in which there is a huge number of the injured.

Outline description and taxonomy of disasters

When defining the nature of a disaster we must assume that disasters are not on the "macro scale", similarly as a personal car is not a variant of a truck.

Etymologically, the term "disaster" is derived from the Latin "astrum", which means star. This suggests that a given extraordinary event was caused by an uneven or unusual position of stars.

The literature of the subject provides a number of definitions of a disaster. In a general sense, this term is used to refer to any event of local or regional extent which disturbs the proper functioning of a local community and is threatening to the life, health and property of the inhabitants. [1].

From a linguistic perspective, a "disaster" is defined as a "sudden and usually unexpected event of mechanical, chemical, geophysical or meteorological character with tragic and extensive consequences, causing huge losses, usually including fatalities" [2].

The penal code states that a disaster occurs when there are serious effects in the form of damage of significant extent to property or persons. Such event must cause at least body injuries to a few persons or a significant damage to a property. The degree of body injuries is not important here. They can be even minor injuries, as specified in article 157 §2 of the Penalty Code. A significant damage is one whose value at the moment of the act is over two-hundredfold the amount of the lowest monthly salary [3].

In rescue services "a disaster" is defined as an extraordinary event with a significant number of the injured and extensive ecological impact, whose consequences cannot be handled using available means and outside help is needed [4].

A disaster differs fundamentally from an accident or mass accident. An accident is a limited event whose consequences can be handled using available means, whereas a mass accident is any event resulting in enough victims to disturb the normal work of rescue services and hospitals. Such an event affects small areas and doesn't pose risk to a large number of inhabitants. However, when developing the organization and management principles in events of this type we can adopt ones that can be used both when a mass accident and a disaster occurs.

Classification and character of disasters

There are a lot of ways of classifying disasters. The most popular one is distinguishing between natural disasters – such as floods and hurricanes - and man-made disasters, i.e. those caused by a human being—collapses of buildings, airplane crashes, train derailments, etc. A more detailed division is as follows:

1) Natural disasters (water, land, fire, air)

1a) Earthquakes and floods, accounting for 80% of all natural disasters:

- Flood (high wave), breaking of flood banks, violent high tides;
- Avalanches, mountain landslides, volcanoes;
- Fires;
- Hurricanes, typhoons;
- Draughts;

2) Man-made disasters:

2a) Wars:

- using classical weapons,
- using mass destruction weapons (nuclear, chemical, biological wars).

2b) Civilisational disasters:

- Communicational—mass collisions on motorways,
- rail smashes,
- plane crashes,
- ship sinkings.

2c) industrial and construction disasters:

- explosions,
- poisonous substance leaks,
- irradiation,
- collapses.

2d) Huge fires of:

- department stores
- schools,
- hospitals,
- skyscrapers.

3) Secondary consequences of disasters—famine, infectious diseases, epidemics, epizootics, environmental devastation.

For some time, there has existed another kind of classification of disasters, more useful in planning the activities necessary to be taken at the very beginning of their occurrence. It refers relatively to the type of injuries suffered by those affected. Thus, we can distinguish:

- a “surgical” disaster, understood as a disaster whose victims sustain injuries caused mainly by a mechanical factor, burns or gunshots;
- “general-medicine” disaster where the affected people sustain general injuries not requiring a surgical intervention.

Apart from that, we have a toxicological disaster, epidemiologic disaster, etc.

The information identifying the kind of a disaster determines a better preparation of hospitals for delivering assistance to the injured.

In the construction of a management system, it is particularly useful to classify disasters according to the degree of engagement of medical and logistic services. Here, we distinguish three degrees:

- **I degree**—a disaster during which local medical and logistic resources are sufficient once a response plan has been implemented.
- **II degree**—a disaster during which local medical and logistic resources will be inefficient and assistance from neighbouring areas will be needed.
- **III degree**—a disaster during which local and neighbouring rescue systems will be overstrained and it will be necessary to use the regional and national resources.

Planning as well as trainings always require that attention is paid to a quick classification of events to one of these three degrees. If a disaster is bigger than I degree we should take into account additional time and effort needed to obtain necessary outside assistance.

The character of disasters allows us to realize the following three possibilities:

- a disaster occurs in a neighbouring region and local units may be asked for help,
- a disaster occurs in the area serviced by a local rescue system – this is a typical scenario for which action plans are developed,
- a disaster concerns a rescue system entities.

A local disaster affects equipment, premises, its effects are damages (for instance to a hospital by a flood, watchtower, school, etc.)

The disaster site is an Emergency Call Centre. Scenarios of this type are usually not taken into consideration, nevertheless we cannot forget about them or exclude the possibility of their occurrence. This issue is emphasized by various cases faced by rescue systems.

At this point, we should mention the stages of the procedure during disasters. These are:

- activation stage,
- implementation stage,
- return to previous state.

The activation stage comprises:

- mobilisation and initial response,
- command organization and evaluation of the place where the event occurred.

The implementation stage comprises:

- searching and rescuing,
- collection of the injured, segregation, stabilization and transport,
- managing the place where the event happened.

The return to the previous state comprises:

- retreat from the scene,
- return to minimal operations,
- reporting.

For the purpose of organizing the planning, the reaction (response) to a disaster can be chronologically divided into sequences of successive events. As they occur, specific actions are taken as a response to the disaster.

Doctors usually focus in their activities on direct actions of saving the health and life of those affected. However, disaster planning and training require knowledge of the issues of organization and management. Engaged in managing the consequences of these events are the following services: rescue and firefighting units of the State Fire Service, the police, ambulance service, hospitals, non-governmental rescue service organizations, energy teams, telecommunication companies, municipal services, self-government or government administration representatives, etc.

In II and III degree disasters, similar groups to those mentioned above are engaged – from other regions. This makes it necessary to ensure that the plans and schedules take into account the principles of management and cooperation of units and entities operating in individual potential threat events on the local, regional and national scale.

Sadly, a common shortcoming of trainings and exercises is the fact that they are held only within the framework of the existing rescue system without participation of public services. This leads to a huge chaos and confusion if a real disaster occurs.

Trainings and exercises must be held jointly with these services so that the personnel can get to know both each other and each others' abilities. For instance, exercises may be held with the scenario of a plane or helicopter crash in a distant region requiring bulldozers to make it possible to get to the site of the crash. This would make it possible to find out whether and how fast the public works office can provide the necessary heavy specialist equipment.

Rescue medicine specialists must view the issues of public safety in immediate and extraordinary risks in a comprehensive, even systemic manner. It cannot be treated on a par with a conduct in emergencies in hospitals, but as a rescue service in a broad sense, with numerous structures taken into account. It is also necessary to conduct a continuous risk assessment and prophylaxis.

Assistance in the event of a disaster is not an individual service, but results from a cooperation between non-governmental, technical, medical and administrative bodies.

The medical aspect is only a small, although an important part of the whole issue. Doctors and medical personnel are helpless unless they are provided with the access to the victims and treatment facilities and this access is maintained.

During mass accidents and disasters there is, as the definition states, a disproportion between the need for assistance and optimal possibilities of providing it, between the necessity and possibility.

The assistance in these conditions is a mixture of improvisation and organization. The better

the assistance is prepared, the less room remains for improvisation and confusion during the first hours during which it is provided. All these are the issues that are the subject of interest of a disaster medicine. What is necessary is the synchronization of the actions of various services and social factors. This advantage of cooperation can be ensured by intensively conducted trainings and knowledge of appropriate field and local structures by the communities inhabiting given areas.

A disaster medicine comprises:

- medical assistance,
- management of forces and means,
- sanitary-epidemiological provision,
- logistics,
- psychological issues of rescue operations,
- secondary effects,
- life-long training of medical personnel.

Medical assistance in a disaster medicine includes:

- anaesthesiology,
- surgery,
- internal medicine and toxicology,
- gynaecology, ' - paediatrics
- psychiatry,
- radiology.

Management in optimal functioning of a disaster medicine constitutes the most important motive for crisis action. It comprises such elements as: planning, organizing, managing.

Logistics constitutes a material and locomotive basis of a disaster medicine and includes: medical

supply of medical and technical resources, provisions, evacuation, communication.

Secondary effects move the planning of medical actions to further effects of every disaster that can include: infectious diseases, epizootics. Concentrated technological facilities, unprecedented means of transportation and communication existing in the proximity of huge agglomerations carry the risk of various failures, difficult to predict, whose effects have the scale of disasters. Tackling such tragedies requires multidimensional, rationally conducted operations. Any chaos, getting into a panic, lack of methodical distance may only bring disastrous effects.

The intervention in the event of various tragedies by means of methods used in a disaster medicine became expediency today—rise of global terrorism, any disastrous effects for a random human being that this movement causes by its methods makes it necessary that the populations of cities, villages and regions be prepared for action. A specific readiness, constant awareness of delivering assistance, permanent capability of various social cooperation became essential. These elements can be strengthened through a planned system of programme trainings and organization of exercises using forces and resources. This is an effective way of ensuring that the character and scope of activities of a comprehensive disaster medicine is consolidated in the awareness. In the event of various potential events it becomes a necessary condition for functioning of a society that knows the canons of values of the surrounding environment.

References:

1. J. Konieczny, Zarządzanie w sytuacjach kryzysowych, wypadkach i katastrofach, Poznań -Warszawa, 2001.
2. Encyklopedia Powszechna Wyd. Guttenberga-Kurpisz, Poznań, 1998 r.
3. Art. 115 §4 and 5 of Penalty Code, Stefański, 1999.
4. Konieczny, Zarządzanie w sytuacjach kryzysowych, wypadkach i katastrofach, Poznań –Warszawa, 2001.