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A Magnetic-board System for Education and Training in Disaster and Emergency Medicine: A Practical Demonstration

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Education and training is an absolute prerequisite for a well-functioning organization in major accidents and disasters. Education in this field can not be based only on lectures. Practical training is essential for the understanding of the organization and the need for a different mode of action in these very difficult situations.

Practical training can be achieved in exercises, which are very important. To get an optimal amount of knowledge and skill from an exercise, however, the participants must be well-prepared. Thus, there is a need for a training system that: 1) prepares the participants to act as properly as possible in the (often expensive) exercises in the field; 2) provides an opportunity for all participants in a course to act, communicate, and make decisions; and 3) can replace (at least in part) exercises in situations where full, practical training in the field for all participants is not possible.

With this background, a system has been developed based on magnetic-board symbols and pictures illustrating all functions/positions in the whole chain of rescue action and medical care. The patients (also illustrated by symbols) are connected to pictures describing different injuries. Setting of priority and all measures in emergency medical care are indicated with a transferable labeling system. The symbols are monitored on white-boards illustrating rescue, medical care, and hospital facilities in the area, alarm systems, organization on the scene, transport, and organization and management in the hospital (emergency room, OR, ICU, and wards).

This system provides the participants with the opportunity to work with realistic times in the field during transportation and in the hospital, and permits all participants (single or in groups) to train: 1) communication between units; and 2) decision-making on all levels, where all effects of a decision clearly can be illustrated (learning by doing).

The described system has been used successfully and developed during 10 years in training on all levels: 1) basic and post-graduate education and training for nurses; 2) courses for teachers and instructors in Disaster Medicine; and 3) education and training of coordinators at a very high level. The experiences have been evaluated prospectively and illustrate clearly the information that previously was given in lectures can be illustrated much better using a system of this kind. The use of such a system will be demonstrated during a simulated major accident.

EXAMPLES OF ACCIDENTS

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KAMEDO: A Swedish Disaster Study Organization

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In 1964, a committee was established in Sweden to pursue studies and collect experiences in the field of Disaster Medicine, and to transfer the experiences to facts and information available for doctors and organizations concerned with disaster medical care. The main task was to send observers to disaster areas all over the world to study recent disasters, collect useful experience, and to become familiar with the problems. A report of the study then is distributed to relevant public authorities, hospitals, and to some major fire brigades. The name of the organization is KAMEDO, which stands for *Katastrofmedicinska Organisationskommitten,* the Organizing Committee for Disaster Medicine.

More than 60 studies have been performed. The aim and direction of the studies have, within certain limits, been dependent upon the type of disaster, but four main groups may be distinguished: 1) medical; 2) psychological; 3) organizing; and 4) social studies.

In this paper, some of these studies, including comments of the findings, are presented. The benefit from studies of this type also is discussed.

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Data Collection from Earthquakes for Risk Management and Disaster Medicine

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Objective: To introduce and identify relevant sources of data concerning earthquake injury problems. To review the efforts and to define the scope of the applications for research of the information sources in Bulgaria.
Methods: The theme is difficult to approach from any narrow method because it requires a collaboration of trans-disciplinary methods. Analysis of the necessary quantitative information and possible selections among different sources of data is conducted.
Results: Material losses from earthquakes are subject to compensation, but the principal threat is future earthquake casualties. However, information required to reduce human losses during the response phase has not been gathered in the past. According to sources, a few sets of data exist: seismological; population; medical characteristics; rescue and search operations; and buildings and equipment data. When evaluating statistical data about injuries, it is necessary to consider the limitations of the data and the lack of reliability.

Conclusion: Suggestions about mechanisms for data collection during earthquakes are presented. It is necessary to develop standardized data collection forms and data processing methods corresponding with risk management needs. Portions of the earthquake injury information may be applied to other disasters.

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The Earthquake in Turkey in 1992: A Mortality Study

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Objective: To investigate the causes and circumstances of deaths in earthquakes (EQ).
Methods: A retrospective (case-control), randomized, structured interview study and medical record review methodology was employed to collect information from lay survivors, rescuers, health care providers, disaster managers, and medical records concerning care provided to and outcome of critically injured EQ casualties. An interdisciplinary team of researchers travelled to the site of the 13 March 1992 EQ (Richter Scale Magnitude [R] = 6.8) in Erzincan, Turkey (population 92,000).
Results: An analysis of mortality data revealed a crude death rate of 7.4/1,000 pop. (683 total deaths), an injury rate of 38/1,000 pop., and 3,500 total injuries. Of the total number of deaths, 99% occurred in the prehospital setting. Locations of the protracted deaths were at the scene of injury without any treatment (33%); during transport (44%); and after arrival at a hospital (23%). Of the protracted death cases, 93% had been trapped or pinned under rubble, 45% were observed to have breathing problems, and 36% had bleeding problems. After extrication, 71% experienced a deterioration in their general condition.
Conclusions: A significant number of deaths from earthquakes occur slowly, prior to resuscitative attempts. The possibility of preventing many protracted deaths justifies disaster preparedness with basic and advanced trauma life support components.

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Disaster Reanimatology Potentials Revealed by Interviews of Survivors of Five Major Earthquakes

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Objective: To present a synthesis of results of resuscitation studies on five major earthquakes.
Methods: Retrospective interviews of survivors and providers, lay persons, rescuers, physicians, and administrators were conducted informally after the major earthquakes in Peru (1970) and Italy (1980), with structured interview methodology after the earthquakes in Armenia (1987), Costa Rica (1991), and Turkey (1992). Questions were designed to achieve cross-validation and information on slow dying processes, life-supporting first-aid (LSFA), advanced trauma life support (ATLS), and resuscitative surgery.
Results: No victims with severe trauma were extricated alive after 24 hours (h). The use of LSFA was not practiced except for control of external hemorrhage, because of lack of public education. The capability for initiation of ATLS existed as physicians reached some sites within 2 h, but was not practiced in the field because of lack of preparedness, an inadequate number of mobile ICU ambulances, and scarce equipment and supplies. An estimated 20%–50% of those ultimately "dead" appeared to have died slowly. The majority would have been candidates for resuscitation attempts, and 10-20% of these might have been saved with immediate LSFA plus ATLS <24 h.
Recommendations: All lay populations should receive LSFA training. Expansion of ATLS and hospital capabilities, in preparation for mass disasters, requires cost-effectiveness data.

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