

Disaster and mass casualty management in a hospital: How well are we prepared?

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Disaster scenarios once seemed merely theoretical have become a disturbing reality. Disasters in the communities come in all the shapes and sizes. Some impact a small number of people and put intense demands on the health system for a short period. Others may involve a large number of casualties but reach a plateau only after a latent period, placing heavy continuing demands on the health system. For some natural disasters like hurricanes, floods and volcanoes—hospitals are likely to receive advance warning and be able to activate their disaster plan before the event. For other natural disasters, such as earthquakes and tsunami, there is no advance warning, as of now. Many man-made disasters also provide no advance warning; these include chemical plant explosions, industrial accidents, building collapses and acts of terrorism.^[1] The emergence of state-sponsored terrorism, proliferation of chemical and biological agents, availability of materials and scientific weapons expertise all point toward a growing threat of a mass casualty incident (MCI). Preparing for MCIs is a daunting task, as unique issues must be considered with each type of event.^[2] For example, the systemic stress of a bio-threat is entirely different from that of a chemical disaster. These differences hold challenging implications for the hospital preparedness and training.

The hospital disaster preparedness has therefore taken on an increased importance at local, state and national levels.

Hospitals would be among the first institutions to be affected after a disaster, natural or man-made. Because of the heavy demand placed on their services at the time of a disaster, hospitals need to be prepared to handle such an unusual workload. This necessitates a well documented and tested disaster management plan (DMP) to be in place in every hospital. To increase their preparedness for mass casualties, hospitals have to expand their focus to include both internal and community-level planning. The disaster management plan of a hospital should incorporate various issues that address natural disasters; biological, chemical, nuclear-radiological and explosive-incendiary terrorism incidents; collaboration with outside organizations for planning; establishment of alternate care sites; clinician training in the management of exposures to weaponizable infectious diseases, chemicals and nuclear materials; drills on aspects of the response plans; and equipment and bed capacity available at the hospital.^[3] The most important external agencies for collaboration would be state and local public health departments, emergency medical services, fire departments and law enforcing agencies. The key hospital personnel should be trained to implement a formal incident command system, which is an organized procedure for managing resources and personnel during an emergency. The hospitals should also have adequate availability of personal protective hazardous materials suits, negative pressure isolation rooms and decontamination showers. A hospital's emergency response plan has to be evaluated whether that plan addresses these issues. The hospitals in USA are required to have disaster response plans to be accredited by the Joint Commission on

Accreditation of Healthcare Organizations (JCAHO).^[4] In India and probably in many other countries, there is no statutory body to regulate and accredit this requirement.

While responding to a mass casualty event, the goal of the health and medical response is to save as many lives as possible. Rather than doing everything possible to save every life, it will be necessary to allocate limited resources in a modified manner to save as many lives as possible. When a hospital responds to a large number of victims presenting over a short time, often without a prior warning, delivering care to the level of usual hospital standards or benchmarks may not be possible and "altered standards" may have to be acceptable. The term "altered standards" has not been defined, but generally is assumed to mean a shift to providing care and allocating scarce equipment, supplies and personnel in a way that saves the largest number of lives in contrast to the traditional focus on saving individuals. For example, it could mean applying principles of field triage^[5] to determine who gets what kind of care. It could mean changing infection control standards to permit group isolation rather than single person isolation units. It could mean limiting the use of ventilators to surgical situations. It could mean creating alternate care sites in the waiting area, lobby or corridors which are not designed to provide medical care; minor surgical procedures in victims in these areas could mean altered level of asepsis. It could also mean changing who provides various kinds of care like enhancing the scope of nurses, physician assistants and hospital paramedics. Secondary triage also may be necessary within hospital, as demands on the system grow. Hospital DMP should consider the possibility that a hospital might need to evacuate partially or wholly, quarantine, or divert incoming patients. For

example in the event of flooding, the ground floor services may need shifting to higher floors or a make shift operation theatre may be needed. Spare capacities for such contingencies should be included in the DMP.

One of the key components of an effective health and medical care response is ensuring adequate supplies of a broad array of qualified health care providers who are available and willing to serve in a MCI.^[6] This could mean re-allocating non emergency and non-clinical doctors to emergency area of the hospital and recruiting retired or unemployed providers for temporary service. The traditional separation between the medical care community (e.g. hospitals, physicians and nursing homes) and the public health community needs to be bridged in preparation for mass casualty incidents. Mass casualties will provide more work than any organization itself can address. Coordination is the key and the historic separation is a genuine disadvantage. Several strategies help ensure protection of staff handling disasters e.g. safety measures including personal protective equipment, prophylaxis, training specific for different events, adequate back-up staff for rotation to prevent burnout and fatigue related errors and care of families of staff.

A wide range of training of hospital staff is needed to ensure an effective health and medical response to a mass casualty event.^[6] Training should include, but not limited to, general disaster response, including an introduction to altered standards of care; legal and ethical basis for allocating scarce resources in a MCI; orientation to how an incident command system would work in a mass casualty event; how to recognize the signs and symptoms of specific hazards and treat specific conditions; basic and advanced life support; hazardous materials (HAZMAT) life support; decontamination and isolation protocols, triage protocols; personal protection gears; and use and maintenance of emergency equipment.

Preparedness for disasters is a dynamic process. In addition to having a well documented DMP in place, it is prudent to have regular drills to test the hospital's DMP. The drills may be hospital disaster drills, computer simulations and tabletop or other exercises.^[2] In India, hospitals rarely have a documented DMP and even rarely conduct disaster drills or publish the reports of such drills. The JCAHO actually requires hospitals to test their emergency plan twice a year, including at least one community-wide drill.^[7] The purpose of the hospital disaster drills is to train hospital staff to respond to an MCI, to validate the readiness and effectiveness of the hospital's DMP, to make new hospital staff to become aware of procedures in disaster response, to incorporate advancements in knowledge and technology into the DMP and to use the reports from the drill to reinforce the DMP. Hospital disaster drills should test various components viz incident command, communications, triage, patient flow, drugs and consumables stock, reporting, security and other issues. Survey of some published articles on disaster drills^[8-10] have highlighted that internal and external communications were the key to effective disaster response; a well-defined incident

command center reduced confusion; conference calls were an inefficient way to manage disaster response; accurate phone numbers for key players were vital and regular updating was necessary; disaster drills appeared to be an effective way to improve clinicians' knowledge of hospital disaster procedures; computer simulation may be an economical method to educate key hospital decision makers and improve hospital disaster preparedness before implementation of a full-scale drill; a tabletop exercise can help to motivate hospital staff to learn more about disaster preparedness and can help to teach staff about aspects of disaster-related patient care in a way that simulates the practice setting; a regional exercise involving top government officials can help to increase awareness of the need for better disaster response planning; and video demonstrations may be an inexpensive, convenient way to educate a large number of staff about disaster procedures and equipment use in a short time.

The hospital's patient care role begins with and follows the disaster. The hospital's community service role begins long before the disaster as the hospital develops, tests and implements its disaster plan.^[1] The objective is to prepare the hospital through the development of emergency response systems, staff training and purchase of equipment and materials so that it can continue caring for its present patients, protect its own staff and respond to the needs presented by the disaster. Finally, hospital preparedness can be enhanced more rapidly if standardized state and national guidelines for model hospital DMP, staff training, disaster drills and accreditation of hospitals based on DMP are developed and widely disseminated.

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