DISASTER PREPAREDNESS & RESPONSE: A CHALLENGE FOR HOSPITALS IN INDIA

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Key Words

Hospitals, Disaster Preparedness, India, Earthquakes, Emergency Response

Abstract

An effective and immediate response from hospital personnel in India is critical to meet the needs of people at the time of an earthquake disaster. Hospitals need to develop, practice and continuously update an effective disaster/emergency medical response plan. The lack of warning preceding an earthquake requires hospital personnel to practice and implement an effective disaster response plan to minimize disaster-related injuries and deaths. The response of hospital and medical personnel working near the site of the disaster is critical because most emergency medical care is needed within the first three to five days following an earthquake. Thus, communities and impacted regions cannot depend on immediate medical and humanitarian aid from other outside sources to meet medical care needs. This paper will describe the ability of hospitals in India to response to earthquake disasters. A description of the medical response of hospitals in India to past disasters will be provided. The paper will describe findings from the literature to enable Indian hospitals to implement or to improve a

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response to a disaster. To facilitate an effective disaster response, attention is given to hospital accreditation, training for hospital personnel, and the application of a checklist to assess current disaster response capabilities.

Introduction

The Asia-Pacific region where India is located geographically has experienced 60 percent of the world's natural disasters. India is located within the Himalayan belt which is one of the most active seismic regions of the world. The Sikkim earthquake of February 14, 2006 impacted the southern districts of Sikkim, India and represented the third significant earthquake this region had experienced in the past 50 years. A review of the record of disasters worldwide found India had the highest number of individuals affected by disasters in the world between the years 1966-1990 reporting 1,552 million individuals. India reported 216 separate disasters between the years of 1966-1990. When India was compared to other developing countries for this same period, India ranked second for experiencing the most disasters in the world. India ranked ninth out of the top twenty countries with 91,400 deaths during 1966-1990. More recently, India reported experiencing 18 disasters during 2007 (Noji, 1997) (International Disaster Database, n.d.).

Since a high rate of natural disasters is projected to continue and/or increase in India, all health care facilities need to create, practice and implement efficient and effective disaster response planning to provide an adequate medical disaster response (Noji, 1997), (Kaushik et al., 2006), (Dara et al., 2005). In India, health care is primarily a state function with the central government involved mainly in policy and specific disease control programs. While there are formal private sector medical care facilities and informal sector practitioners, the level of care varies. Regulatory problems for India include no database of private providers, no ability to enforce regulations and a lack of resources for regulatory bodies (Merson et al., 2006). Thus, attention to disaster preparedness in India needs to include both public and private sector hospitals.

Thesis

India has been cited in the world as "one of the worst affected countries in terms of disaster" (Metri, 2006, p.621). Continuous improvement of medical responses by healthcare facilities and government agencies is critical to reduce the impact of natural disasters on citizens. The purpose of this paper will focus on hospitals responding to disasters; however, "hospitals" are used throughout the paper in a general way to reflect any health care facility that would be in a position to provide medical care during and after a disaster. In describing disasters, the authors elected to focus on earthquakes given the frequency of occurrence, and the high mortality and morbidity rates reported following this natural disaster.

Applications

"Hospitals have always been an important link in the chain of disaster response and are assuming even more importance as advanced pre-hospital care capabilities lead to improved survival-to-hospital rate" (Dara et al., 2005, p.S3). Individuals in disaster medicine reported the need to improve the ability of health care facilities to rapidly respond to a disaster and for professionals to coordinate activities of multiple agencies. This report also urged hospitals in India to incorporate "surge" capacity in their planning. A relatively small number of injured persons can create a surge and overwhelm the normal capacity of a local health care facility

even if the facility is not damaged by the earthquake. When health care facilities plan for an effective medical response following a natural disaster such as an earthquake, it is important to be familiar with types of injuries and illnesses that have occurred during past disasters. A study by Jain et al. (2008) found casualties after the 2001 earthquake in Gujarat, India to be 250,000 injured people.

The preparedness and response capacity of the health care facilities were evaluated by Dr. Rannveig Bremer following the January 2001 earthquake in Gujarat, India. Bremer's (2003) findings indicated "substantial deficiencies in the existing health care system available in this region added to the severity of the disaster" (p.370). Bremer's analysis found efficient coordination was lacking, and policies on the delivery of disaster relief had not been developed.

The earthquake of 2001 in Gujarat, India demonstrated the ability of a natural disaster with rapid onset to shake the "lifeline and health system of about two-thirds of the population of India's Gujarat state" (Nanda, 2008, p.1). An assessment of the impact of this natural disaster found the "earthquake claimed more women and children as victims and resulted in 14,000 deaths and thousands injured, maimed, or rendered homeless and destitute" (Nanda, 2008, p.1). Most foreign field hospitals did not arrive in Gujarat until five to seven days after the earthquake occurred. This predicable lag in international support generated a huge surge locally in medical demand for the first week. Only one of the two major hospitals still functioned without critical structural damage after the earthquake. Also a temporary hospital was established by private and government doctors from nearby areas and tent field hospitals were provided by the Indian army. Completing an assessment of medical disaster response following the earthquake, Bremer (2003) and Nanda (2008) recommended that effective disaster planning and coordination between facilities and organizations would have improved the Guijarat earthquake post-disaster medical response.

A further assessment completed by Roy et al. (2002) of the Gujarat earthquake supported the importance of local doctors from secondary and primary health centers in the buffer region to provide ambulances and limited supplies. While emphasizing the importance of local medical staff in response since "outside medical assistance arrived too late for immediate care" (Roy et al., 2002, p.193). Investigators emphasized the lack of formal orthopedic care. Since crush injuries are reported as a major cause of death from those injured following an earthquake, providing adequate and prompt care for "crush" injuries is critical in the prevention of deaths (Roy et al., 2002). Roy and his colleagues found that the early discharge of those injured and the resistance of patients to be transferred to tertiary hospitals far away from the patient's relatives contributed to higher post-operative complications from earthquake injuries (Roy et al., 2002).

Speed in providing effective emergency medical services and health care within the first 24 hours following a disaster is critical to minimize deaths and permanent disability following a natural disaster such as an earthquake. The heavy demand placed on local hospital services for immediate disaster medical care demonstrates the need for every hospital to be prepared to handle an unpredicted surge in workload. Hospitals must be prepared prior to a natural disaster occurring to have an adequate medical response when the disaster strikes (Mehta, 2006).

The Indian government took action to enhance national and state level responses addressed by creating a National Response Plan. A national disaster planning effort created the National Disaster Management Authority that requires each state in India to establish a Disaster Management Authority and district disaster management committees. Also, the Ministry of Health in India has initiated a process to assess existing gaps in the management of disasters and issued policy guidelines to improve the disaster management system. To improve disaster response, the health sector of the national Indian government also has initiated support for mobile hospitals, specialized search and rescue medical teams, and building capacity for the management of mass casualties (Kaur, 2006). The primary responsibility for disaster response in India is similar to the United States and is at the state level. Additional responsibility for disaster coordination is at the national level. A National Crisis Management committee was created in 2005 composed of high ranking India government officials and coordinators to implement disaster response measures (Dara et al., 2005) (Kaur, 2006).

However, a report authored by USAID in 2006 reported individual states within India with limited resources still lacked state level plans. The shortcomings focused on delayed response, lack of resources to implement a mass evacuation, failure to keep an essential inventory of medicines and life saving equipment in "ready stock," and a lack of coordination among government departments. This same USAID publication (2005) documented recent case studies of disasters. This review found operating procedures to provide relief following a disaster were in some cases "non-existent." An additional study by Metri (2006) discussed methods to improve disaster mitigation and management and reported community awareness and disaster management effort to be "poorly coordinated."

Findings

In this section attention will be given to measures that would be beneficial to hospitals in responding to disasters. However, hospitals are valued resources in a community and medical care personnel need support from other service and public health workers to adequately address human needs during a disaster. Based upon a collective response to disasters, the authors have selected to focus on literature describing the Indian government's response, accreditation standards for hospitals, training needs, and the use of check lists to determine response capacity.

The impact of a lack of adequate disaster planning by health care facilities and government will impact disproportionately those individuals who are the most vulnerable following a disaster which include children and the elderly. Kaur's (2006) work based upon evaluating the responses of the local health care facilities, state, regional and national governments to past natural disasters in India found the following factors impacted the effectiveness of a disaster response:

- Poor coordination at the local level and the lack of an early warning system
- Very slow response times
- Limited number of trained and dedicated clinicians

- Lack of a systematic search and rescue system and equipment
- Poor community empowerment and participation

These factors have contributed to the poor response from disaster relief and health care facilities to past disasters in India according to professionals associated with the Ministry of Health and Family Welfare of India.

The national institutional framework for health policy and coordination was created by the Indian government to strengthen the ability of the state and national governments of India to support an effective relief and emergency medical response to disaster. This framework did not require each health care facility to create, practice and maintain an up-to-date disaster medical plan for each facility. Although the federal government established a national framework plan, specific actions must still be taken by each health care facility in India to adopt and implement disaster medical plans. Thus, improvement could be evident in the medical response capacity of each health care facility (Kaur, 2006).

Accreditation Standards

National accreditation systems have been used successfully to provide needed impetus for health care facilities to maintain and practice up-to-date disaster/emergency plans. To assist medical care personnel with critical disaster situations, it is helpful to know that accreditation standards provide guidance to those responsible for maintaining accreditation standards for hospitals.

Knowledge of the availability and quality of trauma-care systems in different regions of India is critical for those planning to respond to the increase in injuries following a natural disaster. Unintentional injuries remain a major public health problem in India. An assessment by Joshipura et al. (2003) reported, "The Government of India has failed to recognize it (injury) as a priority." (p.686). It was also reported in 2003 that trauma center access in India varies by state, region, wealth of a community and population even in non-disaster periods. Since "crush" injuries are one of the primary health problems following an earthquake, a medical disaster response plan must address the increased demand for trauma care and surgery during a disaster surge (Joshipura et al., 2003).

In addition to increasing access for potential victims to trauma medical services, it is important for health care facilities to address the need for maintaining quality at each trauma center. The effort to accomplish this consistency in quality should be addressed through the development of national accrediting system for health care facilities. A study found that "No mechanism for accreditation of trauma centres and professionals exists" in India (Joshipura et al., 2003, p.686).

In many developed countries, including the United States, hospitals are required to have an emergency/disaster response plan as a part of the requirements for accreditation. In the United States this accreditation process is operated by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). However, as late as 2006 India, like many other countries, had "no statutory body to regulate and accredit," hospitals (Mehta, 2006, pg. 89).

In May 2008 it was reported by Sharma et al. that only a few hospitals in India have sought and received accreditation for their services. This reported group included five hospitals and several medical institutes who had received accreditation from the Joint Commission International (JCI). The international organization JCI is affiliated with the leading accrediting agency JCAHO which is focused on health care quality in the United States. Sharma et al. (2008) reported that Delhi-based Escorts Hospital was accredited by the British Standards Institute.

An accredited program contributes to a viable disaster medical response. In 2008 one group of analysts provided the following assessment, "The attitude of Hospitals toward quality certification [accreditation] is very cold," (Cheerukara & Manlel, 2008, p.375). This statement was made at a May 2008 professional conference concerning medical care quality and the need for improvement. Thus, the Quality Council of India which "operates a national accreditation structure and obtains international recognition for its accreditation schemes," remains challenged to reach a goal of having a majority of health care facilities in India nationally accredited (Sharma et al., 2008 p.467).

Checklist to Record Response Capacity

While accreditation may be too involved for smaller hospitals to undertake, a disaster capacity assessment may be accomplished through the use of a check list. In countries without a strong hospital accrediting system, a check list or a disaster training program has been implemented. The check list allows for the uniform documentation of a health facility's disaster response capacity. While check list criteria have been generated by agencies, the following ten evaluation criteria developed and used for hospitals in Nepal provide an overview of the main areas that should be addressed by a check list. The criteria provided here were generated by the World Health Organization's Emergency and Humanitarian Action Team (Emergency and Humanitarian Action Newsletter, 2006).

The criteria categories used to evaluate a health care facility's capacity to provide medical care services following a disaster included:

- Current Disaster Planning Strategy
- Bed Capacity
- Surgical Capacity
- Blood Transfusion Resources
- Supplies of Medicines and Equipment
- Staff Availability
- Staff Training
- Communication Facilities
- Transport Availability
- Disease Surveillance and Control

When a survey tool was designed using the criteria, the tool was reviewed and field tested by an epidemiologist from the London School of Hygiene and Tropical Medicine. The Emergency and Humanitarian Action group chose to implement the data collection project in Nepal. The project was designed to provide a national perspective on the health care system's disaster medical response plan in Nepal. A similar project could be used to gather information on the medical response capacity of hospitals in India (Emergency and Humanitarian Action Newsletter, 2006).

Disaster Response Training for Health care Workers

Check lists can focus on many aspects essential to medical care response; however, the persons delivering care are critical responders to ensure injuries are reduced and lives are saved.

Following the 2004 disaster response to the tsunami in Sri Lanka, an assessment of post-disaster health care services by Wickramasinghe, et al. (2007) identified the need to provide targeted training to prepare health care workers for future medical disaster responses. This group identified "the development and implementation of a disaster management course for healthcare workers" (p. 765) as a priority to improve medical disaster response. Disaster medicine physicians promote disaster education and training as one of their primary professional roles and can be effective advocates to ensure disaster preparedness training is implemented (Dara et al., 2005).

The International Strategy for Disaster Reduction, The World Health Organization and the World Bank partnered with governments, organizations and individuals worldwide to raise awareness through the "2008-2009 World Disaster Reduction Campaign." A critical component of the campaign is supporting the need for "preparing and training the health workforce to act in emergency situations" (United Nations, 2009), (p.na).

Experience from the October 8, 2005 earthquake that struck Pakistan illustrated the lack of preparation by final-year medical students to provide the medical response to a disaster. "…we were entirely unprepared for the task of treating casualties of the Kashmir earthquake—we had not had any disaster management training or exposure to real-time emergency situations" (Sabri and Qayyum, 2006, p. 1452). These medical students were quickly confronted with challenges associated with search and rescue, unsupervised emergency care for patients, personal emotions from viewing the rubble and human suffering, prioritizing medical attention, managing children's injuries and the obstacles associated with gender issues (Sabi and Qayyum, 2006). Ofrin and Salunke (2006) have cited the importance of using training and regular drills to build capacity for medical disaster response. These challenges and others need to be included in the curricula that is used to train medical personnel and hospital staff to respond in a disaster. Additionally, any training effort for medical and hospital personnel needs to incorporate effective communication skills.

Discussion

There is a need for hospital and other health care facilities to create an effective response capacity for earthquake disasters. This can be accomplished through preparing and practicing

disaster plans, participation in accreditation processes and by conducting training for hospital personnel.

Local medical personnel who typically practice outside the hospital need to practice disaster response in collaboration with their hospital counterparts. These drills should be conducted using available health care facilities and by using alternate locations as practice sites. This second action is necessary because medical building structures can be rendered unsafe or destroyed by an earthquake.

The earthquake challenges facing India are not unique. Rather, the global community is positioned to share best practices with nations affected by earthquakes. India is making progress in disaster response; however, issues pertaining to hospital accreditation, training curricula on disaster preparedness, qualified personnel, adequate resources including health expenditures for disasters and assessment of response capabilities are universal needs. Governments are in a positioned to provide leadership but it takes collaboration among public and private health care sectors to protect and care for populations affected by natural disasters. Emergency preparedness is a universal global need.

References

Bremer, R. (2003). Policy Development in Disaster Preparedness and Management: Lessons Learned from the January 2001 Earthquake in Gujarat, India. Prehospital and Disaster Medicine, Vol. *18*, No. 4, pp. 370-382.

Cherukara J. M. and Manalel J. (May 2008). Medical Tourism in Kerala--Challenges and Scope. Proceedings of the Conference on Tourism in India Challenges Ahead, May 15-17, 2008, IIML pp. 369-379.

Dara, S. I., Ashton., R. W., Farmer, J. C., and Carlton P. K. (2005). Worldwide Disaster Medical Response: An Historical Perspective. Critical Care Medicine, Vol. 33, No. 1, (suppl.) pp. 2-6. Society of Critical Care Medicine and Lippincott Williams and Wilkins.

Emergency and Humanitarian Action Newsletter, September 2006. Issue VIII. Retrieved February 19, 2009 website: http://www.nset.org.np/peer/background.htm

International Disaster Data-base(ND). 2007 Disasters in numbers. Retrieved November 17, 2008, from www.undisr.org Web site: http://www.unisdr.org/eng/media-room/facts-sheets/2007-disasters-in-numbers-ISDR-CRED.pdf

Jain, V., Noponen, R and Smith, B.M. (May 2003). Pediatric Surgical Emergencies in the Setting of a Natural Disaster: Experiences from the 2001 Earthquake in Gujarat, India. Journal of Pediatric Surgery, Vol. 38, No. 5, pp. 663-667. Elsevier Inc.

Joshipura, M.K., Shah, H.S., Patel, P.R., Divatia,P.A and Desai, P.M. (2003).Trauma Care Systems in India. Injury, International Journal of the Care of the Injured, Vol. 34, No. 9, pp. 686-692. Elsevier Ltd.

Kaur, J. (2006). Administrative Issues Involved in Disaster Management in India. International Review of Psychiatry, Vol. 18, No. 6, pp. 553-557. Routledge.

Kaushik, H.B., Dasgupta, K., Sahoo, D. R. and Kharel, G. (August 2006). Performance of Structures during the Sikkim Earthquake of 14 February 2006. Current Science, Vol. 91, No. 4, pp. 449-455.

Merson, M. H., Black, R. E. and Mills, A. J. (Eds.). (2006) International Public Health: Disease, Programs, Systems, and Policies, Jones and Bartlett Publishers, Boston, United States.

Metri, B. (2006). Disaster Mitigation Framework for India Using Quality Circle Approach. Disaster Prevention and Management, Vol. 15, No. 4, pp. 621-635. Emerald Group Publishing Limited.

Mehta, S. (2006). Disaster and Mass Casualty Management in a Hospital: How Well Are We Prepared. Journal of Postgraduate Medicine, Vol. 52, No. 2, pp. 89-90. Medknow Publications, India.

Noji, E. (Ed.). (1997). The Public Health Consequences of Disasters. Oxford University Press, New York, United States.

Nanda, S.K. (2008). Safe Hospital Initiative in the Aftermath of the 2001 Earthquake in Gujarat (India). A Report of the Regional Consultation of SEAR Member Countries on Keeping Health Facilities Safe from Disasters 15-17 April 2008, New Delhi, India. Regional Office for South-East Asia, World Health Organization.

Ofrin, R. and Salunke, S. R. (December 2006). Disaster Preparedness in the South East Asia Region. International Review of Psychiatry, Vol. 18, No. 6, pp. 495-500.

Roy, N., Shah H., Patel V., Coughlin R.R., (2002) The Gujarat Earthquake (2001)A Seismically Unprepared Area: Community Hospital Medical Response. Prehosptial and Disaster Medicine, Vol. 17, No. 4, pp: 186-195.

Sabri, A. A. and Qayyum, M.A. (September 2006). Why Medical Students Should Be Trained in Disastser Management: Our Experience of the Kashmir Earthquake. Plos Medicine, Vol. 3, No. 9, pp. 1452-1453.

Sharma, V., Tomar, R. S., and Ahola, N. (May 2008). Branding India for Health and Spiritual Tourism. In Health, Spiritual and Heritage Tourism, Conference on Tourism in India-Challenges Ahead, IIMK.

United Nations. 2008-2009 World Disaster Reduction Campaign. Hospitals Safe From Disasters. www.unisdr.org/wdrc-2008-2009; www.who.int/hac/techguidance/safehospitals

USAID (2005) USAID India: Our Work-Strategic Objective 3-Disaster Management. Retrieved August 5, 2008, from http://www.usaid.gov Web site: http://www.usaid.gov/in/our_work/strategy/strategy6.htm

Wickramasinghe, K. K., Ishara M. H., Liyanage M. H., Karunathilake, I. M. and Samarasekera, D. (September 2007). Outcome-based Approach in Development of a Disaster Management Course for Health Care Workers. Annals Academy of Medicine,Vol. 36, No. 9, pp. 765-769.

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