

## DISASTER-RESILIENT HOSPITALS: THE NOAH'S ARK

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### ABSTRACT

Health services are important lifelines of a community any time and this role is more pronounced during times of disasters. Evidence from various parts of the world presents examples of disaster-induced damage to hospitals and failure of health services at times of need. The impact of disasters-induced damage to health care is three-dimensional: health, social and economic. Damage to health care facilities apart from delaying and complicating relief measures also compromise the achievement of planned national and global health and related goals. The indirect and long-term costs of damage to health sector are greater than direct and immediate costs, compounding the disastrous consequences on the economy. The increasing invasion of nature spaces, climate change and urbanisation are bound to aggravate more natural hazards in future. So a resilient health care system is an immediate necessity for all global states. This paper discusses the international and national endeavours towards a resilient health-care system and analyses the strategies to promote safe hospitals in future.

**Key words:** Disaster, Safe hospitals, disaster-resilient hospitals, Kathmandu declaration

### DISASTER: DEFINITION

A disaster is a serious disruption of the functioning of a community or society causing widespread human, material, economic or environmental losses exceeding the ability of the affected community or society to cope using its own resources.<sup>1</sup> Though broadly classified as natural and man-made, the Hyogo Framework for Action adopted at the World Conference on Disaster Reduction

(2005-2015), recommends using term, “disasters associated with natural hazards” instead of “natural disasters” to emphasize that such disasters are not wholly natural, but are the result of the way individuals and societies respond to natural hazards.<sup>1</sup>

### DETRIMENTAL EFFECTS OF DISASTER ON HEALTH CARE

The May 2009 earthquake in China's Sichuan province which left 90000

people dead or missing and an approximate 5 million homeless also destroyed 11000 health facilities across the region compounding the disastrous consequences.<sup>2</sup> Similar instances have occurred in Pakistan following 2005 earthquake which damaged half of the hospitals in affected areas and in Aceh Province, Indonesia following the great tsunami of 2004 which destroyed about 61% of the area's health facilities<sup>2,3</sup>. Myanmar's cyclone Nargis and Pakistan's 8.0 earthquake in 2008 has also caused similar mass casualties and health sector damage.<sup>4</sup>

In India, Gujarat earthquake of 2001, Indian Ocean tsunami of 2004, Kashmir earthquake of 2005 and more recently, the Kashmir floods of 2014, flash floods of Uttarakhand in 2014 and Chennai floods of 2015 and many more such disasters brings to concern the high vulnerability of the country and failure of health system at dire times of need.<sup>5</sup> Apart from these natural events, the fire in AMRI Hospital, Kolkata and more recently the fire in SUM hospital, Bhubaneswar highlight the need for safe hospitals and preparedness.<sup>5,6</sup>

## **DISASTER-RESILIENT HEALTHCARE: NEED OF THE HOUR**

The World Health Organization (WHO) global assessment of national health sector preparedness and response (2007), found most countries had experienced a major disaster within the previous five years.<sup>7</sup> The impact of disasters-induced damage to health care is three-dimensional: health, social and economic.<sup>5</sup> Damage to health care facilities during disasters complicates relief measures due to delay in treatment of trauma and other diseases.<sup>3</sup> The failure of functional elements such as laboratory, medical records and operating theatres

compounds the effects of disaster.<sup>5</sup> Besides such immediate impacts, damage to public health care has the potential to cause devastating secondary disasters by compromising the achievement of planned national and global health and related goals. The functionality or failure of health services in a disaster is also an issue of great political gain or risk for governments.<sup>8</sup>

Hospitals are important lifelines of a community during normal times and especially during disasters. They are important symbols of social progress and economic stability which aid in redevelopment of a community recovering from disaster.<sup>8</sup> The United Nations/International Strategy for Disaster Reduction (UN/ISDR) report on global assessment on disaster risk reduction 2009, estimates about 8800 disasters between 1975 and 2008 resulted in death of approximate 2.28 billion and economic loss about US\$ 1527.6 billion.<sup>7</sup> Estimates from studies carried out in Mozambique, Costa Rica, Sri Lanka and Pakistan post major disasters compare health sector damage costs to a range of 61 days to 214 days of government health spending on the entire population of the respective countries. Indirect health sector related costs have been greater than costs of direct disaster-induced damage.<sup>8</sup> The increasing invasion of nature spaces, climate change and urbanisation are bound to aggravate more natural hazards in future. So a resilient health care system is an immediate necessity for all global states.

## **SAFE HOSPITAL- INTERNATIONAL AND NATIONAL ACTION**

A safe hospital by definition is a system which will not collapse in disasters, killing patients and staff, can continue to function and provide its services as a critical community facility when most needed and is organized, with well-planned

contingency plans and trained health workforce to keep the network operational.<sup>3,8</sup>

The WHO called for disaster-safe hospitals following the 2009 earthquake in China.<sup>2</sup> The Hyogo Framework for Action (2005- 2015) adopted by 168 countries stresses the importance of disaster-resilient hospitals.<sup>8</sup> The 2008-2009 World Disaster Reduction Campaign by WHO and UN/ISDR focussed on the theme “Hospitals safe from Disasters: Reduce Risk, Protect Health facilities, Save Lives”.<sup>8</sup> The UNISDR launched “One million safe schools and hospitals campaign” as part of 2010-2011 World Disaster Risk Reduction Campaign on “Building resilient cities- My city is getting ready” campaign.<sup>5</sup> The WHO’s eleven member states in South East Asia have adopted the Kathmandu declaration on protecting health facilities from disasters in September 2009.<sup>7</sup> In India the National Accreditation Board for Hospitals (NABH) considers disaster mitigation and management under two categories- standards specific to disaster management and associated standards for effective implementation of disaster management plans and strategy.<sup>5</sup>

Countries are adopting new fool-proof measures. Hospitals and shelters are being built on stilts or higher grounds to withstand sea surges, flooding and high

wind in cyclone-prone Bangladesh.<sup>4</sup> Japan and Chile are using “base isolation” techniques for hospitals to absorb shocks caused by temblors.<sup>4</sup> Similar post-disaster response, mitigation measures and building standards have also been undertaken in countries such as Nepal, Pakistan, Mexico and St. Kitts & Nevis.<sup>3,8</sup>

## SOLUTIONS FOR DISASTER-RESILIENT HEALTHCARE

Awareness among individuals, communities and policy-makers is the key to developing disaster-resilient hospitals.<sup>4</sup> Advocacy should be employed to target new hospitals to install necessary disaster-proof safety measures. For new hospitals low-cost safety plans incorporated in the initial designs are estimated to add only an additional 4% to the budget compared to enormous loss suffered post-disaster.<sup>8</sup> For existing hospitals, low-cost retrofitting with prioritization of critical care and hospital functionality is estimated to cost an approximate 1% but protects 90% of the hospital value during disaster.<sup>8</sup> A tiny difference in investment between constructing a resilient or unsafe hospital could mean the difference between life and death for millions or difference between destituteness and sustainable development for a nation.<sup>8</sup> Table 1 shows the broadly classified solutions for a disaster-resilient health care.

**Table 1: Disaster-resilient health care: three-fold solution**

| Solution                                      | Strategies  |
|---|---|
| Safe building                                 | <p>Detailed design process including independent assessments of architectural and construction plans and adhering to building and seismic codes should be prepared.<sup>4</sup></p> <p>Complete compliance in construction to building codes and safety norms<sup>5</sup></p> <p>A documented Hospital Disaster Management plan in all hospitals.<sup>5</sup></p> <p>A Quality control department enabled by the state should ensure that the risk reduction measures detailed in the designs are followed into construction and adequate building standards are maintained.<sup>8</sup></p> <p>Periodic risk assessment and mock drills to assess the resilience of the structure and the preparedness of the staff and community.<sup>8</sup></p> |
| Making existing structures disaster resilient | <p>Periodic Hazard-vulnerability assessment and revision of Hospital disaster management plan<sup>5</sup></p> <p>Assessment of safety of hospital using Hospital Safety Index and other such</p>  |

|   |   |
|---|---|
|   | <p>indicators<sup>5</sup></p> <p>Periodic check to assess compliance with revised design standards.<sup>5</sup></p> <p>Retrofitting with prioritization of critical care and hospital functionality<sup>8</sup></p>   |
| Develop fool-proof emergency response plans | <p>An exclusive Hospital Disaster Management Committee (HDMC) in each hospital with members trained to implement Hospital Incident Response system (HIRS) during internal and external disasters<sup>5</sup></p> <p>Strengthening internal and external communication systems.<sup>5</sup></p> <p>Efficient triage system<sup>5</sup></p> <p>Area-level networking among hospitals<sup>5</sup></p> <p>Coordination and collaboration with district and state disaster management authorities.<sup>5</sup></p> <p>Sensitization of medical professional and supportive staff, orientation and training of all personnel involved in hospital functioning to handle disasters<sup>5</sup></p> <p>Awareness generation among key stakeholders or target groups who can be divided as primary (hospital staff and administrators, doctors, nurses and paramedical staff, policy makers, politicians) secondary (students, architects, engineers, masons, media professionals, financial institutions and donors) and tertiary (community members).<sup>5</sup></p> <p>Local capacity building involving community representatives and volunteers in risk reduction and preparedness measures through Red Cross, Red Crescent and non-governmental organizations<sup>7</sup></p> <p>Prominent display of hazards and risks in and around hospitals and exit, evacuation routes.<sup>5</sup></p> <p>A functional fool-proof disaster management plan should be made a mandatory requirement for licensing and accreditation of hospitals.<sup>5</sup></p> |

Disaster-resilient hospitals are a social, moral and ethical necessity for a secure community.<sup>5</sup> They are similar to the proverbial Noah's Ark. It wasn't raining when Noah built the ark. Similarly right endeavours at the right time towards disaster-resilient health care help avert needless loss of lives and economy and helps easier rebuilding of the society.

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