Vulnerable Hospital function after a potential earthquake of Dhaka

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Background:

On 24 April 2013 Rana Plaza, a nine storied commercial building located in Savar, adjacent to capital of Bangladesh collapsed. In that disaster 1127 dead bodies recovered, 2224 were injured and many were reportedly still missing (ASK, 2013). This kind of massive disaster is rare in the world and brought us lots of experiences and many scopes of studies and research. As Dhaka is very vulnerable to the earthquake and the earthquakes can also create this kind of collapse of building. So researcher can make some findings with relating to the earthquake and building collapse. After the disaster like earthquake and building collapse hospital function become a vital issue of disaster management because it creates lots of injuries.

Introduction:

Earthquake is a disaster which forecasting is yet to be discovered. Dhaka, the capital of Bangladesh is very prone to earth quake compared to other areas nearby. Vulnerability of earthquake in Dhaka is very high because of excess density of building, unplanned development and socioeconomic condition of the residents. Recently there is some improvement of research in earthquake. Though earthquake is a sudden event, emergency responses pay a significant role here.

When earthquakes occur, disaster management institutions and health care institutions have to provide major services. Quality and efficiency of these emergency services depend on the degree of the comprehensiveness of the disaster management plan available resources. So hospital function is very extensively related to the management of earthquake management and its recovery. Unlike to other disasters, earthquakes can damage the hospital severely. Hospital can be damaged structurally and non-structurally.

Irony is that hospital and its functions can be damaged and it should be bring to recovery Besides the effective hospital functions can pay important role in earthquake damage recovery.

Necessity of hospital After Earthquake Destruction:

Dhaka city has around 600 hospitals. But 600 numbers is not lucrative regarding the size and facility. Because among the 600 hospitals 466 hospitals are small medical clinic which lacks suitable facilities. A survey, done by CDMP shows the numbers of different hospitals in Dhaka.

Type	Number
Large Hospitals	75
Medium Hospitals	59
Small Hospitals	98
Medical Clinics	368

(CDMP, 2009)

Study shows the potential destruction of earthquake in Dhaka city. A 7.5Mw earthquake originated from Madhupur fault will moderately destroy 166570 buildings which is 51% of building. An earthquake originated from under the city at 6.O Mw will damage about 53,989 buildings which is beyond repair. So Dhaka is very prone to destruction for its density of buildings and its structural condition. This kind of scenario will create a lot of injury and life loss. Probable human injury in Dhaka after an earthquake of 7.5 Mw from Madhupur fault (AFD, 2009)

Description of injury	**Number of people at day time occurrence**	**Number of people at night time occurrence**
Category 1: Killed immediately	16 thousand	18 thousand
Category 2: Require hospitalization and can become life threatening if not promptly treated	8 thousand	9 thousand
Category 3: Require hospitalization but are not considered life-threatening	46 thousand	50 thousand
Category 4: Require medical attention like first aid or some kind of treatment	137 thousand	150 thousand

Fires always breaks out from earthquakes. A massive earthquake will create a number of fires at the same time. Lack of resources and experiences and inaccessibility of road can make the fire out of control.

This case is also a cause of making lots of injury and life loss. So in this crucial period after the earthquake the hospital function become the prime factor to save lives.

Resources Limitation of Hospitals:

There are limited studies concerning the hospital resources to manage a disaster. A study shows that there are about 59,849 hospital beds available for use in Dhaka. It calculated that after occurrence of destructive earthquake only 44% of these beds will be available for the use of people injured by the earthquake and other patients. (AFD, 2009) Category 2 and 3 types of injury require urgent hospitalization. It needs about 60 thousands beds which is greater than the number of the total number of bed existing. The available on first day of earthquake will be around 26,171. So the demand is around 3 times larger than the available bed. So this management will be very crucial for the hospitals.

Objective of Hospital Management after the Earthquake:

Hospitals are always the first institutions to be affected after an earthquake. Beyond the usual services hospital should be prepared for the unusual workload after a disaster. So the hospital should have a disaster management plan to handle the earthquake. This plan should focus all the disasters. Plan should be evaluated regularly. The key hospital personnel should be trained to implement a formal command system of the emergency time. Some hospitals provide some special and unique types of facilities. These hospitals should build a network with the other one for the efficient support.

The main objective of the hospital during an earthquake should be to save as many lives as possible. Besides, best possible medical services are expected under that disastrous condition. To ensure this wide range of training of hospital stuff is needed. The hospital has to focus some issues like disaster response, allocation of limited resources.

Hospital After an earthquake:

After an earthquake a hospital faces damage in 4 sectors. These are structural, nonstructural, lifelines, and personnel. There may be thousands of cracks appear in the plaster, and the falling plaster may create much like the Public Health Service Alaska Native Hospital after the Alaska earthquake of 1964 (Wilson, 1964). During the earthquake patients become in a fix that “should he run out of hospitals?”.

Electricity may be off and other utility connection also. Oxygen tanks may have leakage which may create massive fire. If the hospitals become affected structurally, it may loss some of its important information and patient's information also.

Structural Damage: Hospitals which is built following the codes faces less structural damage. Structural damage appears minimal in hospital. (Mitrani-Reiser et al, June 2012) Geotechnical failures can cause widespread damage to the hospital campus. There may be catastrophic structural failures. Some severe structural damage can cause other forced closures like lifeline services. Only structural strength cannot guarantee continuous operations of hospitals. Other factors like lifeline and support organizations are related to the smooth functionality of the hospitals.

Non-Structural Damage: Recent studies have shown that as much as 80% percent of the earthquake damage to hospitals is due to nonstructural components (Goulet et al. 2007,Trifunac et al. 1999) The non-structural damage included the failures of many components: windows, non-load, bearing ceilings, partition walls, floor coverings, medical equipment, building content, architectural finishes, utilities etc. Secondary effects come from the loss of utility services such as power, telephones, water, and sewers (Dueñas-Osorio and Kwasinski, 2011).

Loss of Internal and External Services: City utility services surely be damaged in Dhaka after an massive earthquake. The main water supply, power distribution, waste management network can be damaged fully. Moreover backup power of power of the hospital may also be damaged.

Impact on Functionality: This kind of disaster can frighten all the staff of the hospital which will hamper the functionality. Besides there will be very pressure on the emergency department of the hospital. Supplies and non-clinical services may be undamaged. This also affects the functionality of the hospital. The pharmacy may be run out of pharmaceuticals, blood products and supplies. There may also loss or shortage of lab supplies, radiological supplies or other diagnostic supplies.

The damage of utility supplies will disrupt the functionality of the hospital. It may take time to recover this damage. So every hospital management should focus on the inventory of nonstructural, structural and functional vulnerabilities. Effective plan to reduce these indentified vulnerabilities will help the hospital to withstand after earthquake and provide proper service.

Plans of Bangladesh regarding hospital function:

Bangladesh is prominent country in disaster management. It has developed some policy documents for disaster management. Among them there are Disaster

management plan, Standing order for Disaster Management and Contingency plan for earthquake.

Disaster management plan: Recently government of Bangladesh developed a disaster management plan. This detailed plan focuses many aspects of disaster and its management. But the health and clinical management of disaster is always ignored. This plan identified its many stake holders but failed to identify the hospital and directorate of health which may be one of the significant stakeholders. At national level and sub national level there are many committees but none of these include the health and hospital sectors. A guidelines for Government at all levels are developed as best practice models, and are used to assist Ministries, NGOs, disaster management committees and civil society in implementing disaster risk management. There the guideline for hospital function was also ignored. Unlike all other disaster earthquake can be very destructive. Without this the plan of disaster management will be some theoretical description only. When we have to face an earthquake of major destruction we the disaster management committee have to have a strong collaboration with the hospitals. Disaster management action matrix and overall command and coordination section of the plan also avoided the relation and collaboration with hospital function. If earthquake we need comprehensive disaster management and emergency response. There are many approaches of emergency response of earthquake. Among them we are preparing through cluster approach of emergency response for earthquake. Health cluster is significant among the nine clusters of the disaster management plan.

Contingency Plan: Armed Forces Division has developed a Contingency Plan for Earthquake Hazard. Contingency plan was developed to have a rapid emergency response for the earthquake. This plan incorporated hospital slightly. It tried to propose a integrate management concept into the operational plans of heath service provider at all level. It proposed different processes to enhance capacity of health sectors. Development of in integrated framework covering the risk assessment, health intelligence, capacity building, public awareness and effective emergency response is needed. A need for technical guidelines and surveillance standard is proposed for best health practice during the crisis situation. These processes need urgent involvement of expert physician.

Responsibilities regarding Hospital Functions:

Government of Bangladesh has had the Standing Orders on Disaster (SOD) in effect since 1997. SOD mainly states the responsibilities of different sectors during the disaster. All responsibilities related to hospital functions are discussed below:

In this SOD, responsibility of the Corporation Disaster Management Committee stated to identify open space at city corporations to establish field hospitals & medical operations for mass causalities management. But detailing of this process is needed. Keeping the stock of emergency drug and other support facilities is stated but no practice at all.

Bangladesh army has given the responsibility of giving medical service and field hospital service. They can also establish field hospital. Bangladesh air forces responsible for evacuate seriously injured person to nearest hospital. Border Guards of Bangladesh (Bangladesh Rifles) are responsible for listing the safe hospital, places and shelters.

The SOD states some important issues relating to the hospitals. Ministry of Health and Family planning is responsible for the developing plan for establishing temporary hospitals if health centre are damaged. This ministry has to ensure the infrastructure and lifeline safety of hospitals with backup facilities for earthquake and other disaster. Retrofitting of the infrastructure also stated as the responsibility of that ministry. They also have to manage in-hospital patients in hazard affected areas, including their evacuation to shelters if necessary, or to alternate hospitals.

Directorate General of Health Services has to undertake a program to provide health services to the people of the affected area. They have to provide mobile hospitals and medical team in the affected area. They also have to evacuate the patients and injured to the hospitals. Directorate has to provide additional beds and medical treatment in the hospitals too. The field office of DG health services has to plan the operation of field hospitals.

SoD also make the local administrator like UNO (Upazilla Nirbahi Officer) and other Local Government authorities for the overall management of the hospital during the disaster situation of an area. These are the policy framework of Bangladesh to manage the hospital factions after an earthquake disaster.

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