RISK ASSESSMENT AND EMPOWERING COMMUNITY HEALTHCARE FACILITIES IN COASTAL CITIES OF BANGLADESH

S. BARUA[1] AND Y. NAGASAWA[2]
[1]Researcher; [2]Professor; Department of Architecture
The University of Tokyo, Japan

ABSTRACT

Floods, cyclones and storm surges are the key disasters that Bangladesh has to face recurrently. Also, epidemic diseases followed by periodic flood and cyclone, are the major risks for affected people and service providers. Review of past data shows that during recent decades, no severe earthquake has affected Bangladesh as compared to Japan and Turkey. In fact, people seem to be preoccupied with floods, cyclones and storm surges.

The massive devastations in healthcare and housing sub-sectors, accounted from cyclone 1991 to flood 2002; leads the country and the developing agencies for reconstruction efforts like Cyclone Shelters, School-Shelter-Clinics, Urban Primary Healthcare Projects, Housing, etc., in the affected coastal cities of Bangladesh. But problem follows its spatial design.

To understand its real emergency need for a better design approach, the captioned study had been addressed as a part of doctoral dissertation report focusing on the disaster risk caused by flood & cyclone, its post-disaster diseases and emergency medical support system, that needed within the existing shelter-cum-community healthcare facilities for sustainable development. The assessment result shows that the community healthcare facilities with Emergency Medical Support Space (EMSS) can play an effective role as a part of long-term disaster mitigations with the other recovery activities.

1. INTRODUCTION

The ill fate is that, Bangladesh is bestowed with numerous severe problems by the geography itself, which causes periodic flood and devastating cyclone every year. In addition, restlessness in the political, economic and social phenomena of the country is surplus issues. After great cyclone in 1991 and the flood in 1987-88, 1998 and 2000, both housing and healthcare facilities emerged to be the grimmest situations ever in Bangladesh, let alone the coastal areas housing and healthcare facilities. The

disaster caused by flood and cyclone in Bangladesh is like "To slay the slain" on housing and healthcare system. A preliminary assessment of damage indicated that after 1991 Cyclone, 1.63 million houses were either completely destroyed or partially damaged. Some 10.72 million people were left homeless, and above 92% population were, more or less affected by the post-disaster diseases in coastal belt and off shore islands (BCAS, Cyclone 91, 1991). The flood in 1987-88 had affected about two-third of the nation for more then six months, created a national hazard with regard to shelter and healthcare services. The government and the developing agencies were under pressure for providing 'emergency shelter and healthcare facilities', housing, etc., for homeless people of 1.5 million rural as well as urban dwellers, of which lion part of population were affected by water born diseases.

The Government, Developing agencies like UNDP/UNCHS, WHO, World Bank, JICA/ODA, European Agencies and NGOs have undertaken "Low cost housing", "Primary School-Shelter-Clinic (PSSC)", "Urban Primary Healthcare Projects (UPHCP)" projects, etc., for providing housing as well as emergency shelter cum healthcare services to the affected communities of Coastal Cities. But problem lies with its basic design approach: i.e., its spatial design.

The concept of using the Primary School as Shelter-Clinic is obviously unique, i.e., to turn School building, Classroom spaces, etc., to emergency Shelter-Clinic; but practically, there are no clinical facilities, even no pre-arrangement for its quick adoption during emergency situation, no proper water and sanitation system too. To ignore this real need means to put the sheltered people at *'second risk'* out of post-disaster health hazard, and allow an *'additional risk'* for the health service provider to get stationed themselves there during recovery period. On the other side, the Urban Primary Heath Care Project (HPHCP) faces lack of its strength regarding health workers and emergency clinical facilities for providing optimum health service to the community at risk. So, it is absolutely imperative to strengthen these Community Healthcare Facilities by the *'in-house emergency medical facilities'*.

Now, the climax rose centering its design: how it could be empowered, i.e., the emergency clinical activities could be adopted to the existing facilities, and how the community healthcare facilities could be boost up by additional mobile facilities in case of emergency situations.

With this goal, this research was addressed as a part of the doctoral dissertation report to understand disaster risk and to focus on effective design solution for the existing healthcare sub-sector, especially at primary level healthcare facilities (PSSC & UPHCP) for the Coastal Cities of Bangladesh.

2. DISASTER & RISK ASSESSMENT

'Any occurrence that causes damage, ecological disruption, loss of human life, or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the community, is disaster' (WHO, 1998). More elaborately, it is a mismatch between resources and tasks, whether caused by unavoidable natural events or by avoidable, man-made events (Drs Knut Ole Sundness & Marvin L Bimbaum, 2000).

And 'RISK is a concept used to describe the likelihood of negative consequences' (WHO, 1998).

2.1 Healthcare Sector and Disaster Mitigation; Present Research Process.

For the health sector, disaster mitigation means reducing the vulnerability of healthcare facilities and water supply systems by developing risk studies, applying corrective measures in existing facilities and taking into account the result of vulnerability studies when planning or designing new works. This task has several purposes:

- Political, for governments who must show the public works are efficient and effective.
- Social, demonstrating that every consideration has been given to ensuring healthcare facilities will continue to function and provide critical services when they are most needed, and
- Economic, the health infrastructure of the region must be cost effective. (PAOH Publication: Issue 77, 2002).

It is a precondition that, a chain of systematic working link between the healthcare setup, i.e., hospitals, clinics, primary healthcare centers, and other related facilities like food, water, sanitation, medicine supply, etc., is essential for its service delivery during disaster recovery period (Barua S, 2003). Now, the question is raised, how this healthcare setup could be interlinked, and which one in what way could be empowered for a real time service delivery in disaster areas at Chittagong Coastal City?

Procedure: 4 Clinics, 2 PSSC and 2 UPHCP centers were surveyed; the Emergency Medical Support Spaces (EMSS) were evaluated form the Clinics and justified with WHO/ Medical Space Standard, and then proposed for adoption in PSSC. Based on the past experience, a network of healthcare set up to Community Facilities is proposed considering disaster.

3. RISK ASSESSEMET AT CHITTAGONG COASTAL CITY

The Magnitude and Intensity of Disaster: The Velocity of cyclone 1991 was approximately 200km. as cloths were torn the cyclonic storm. Water height from ground was approximately 5.5 m according to the watermark, but for normal tidal surge usually happened is 2 meters. Water residence time was 8

hours. Air temperature was approximately 49 - 55 degree Celsius as the leaves of the trees were almost burnt (BCAS, Cyclone '91, 1991).

3.1 Disaster Data: Casualties during disaster and post-disaster diseases.

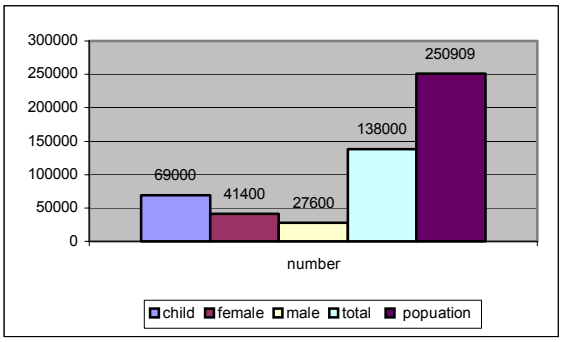

Figure1: Number of death of child, female & male by the disaster, 1991.

Table 1: Community casualties & % of death, Cyclone 1991

Persons	Disaster casualities	
	number	% of death
child	69000	50%
female	41400	30%
male	27600	20%
total	138000	100%
population	250909	

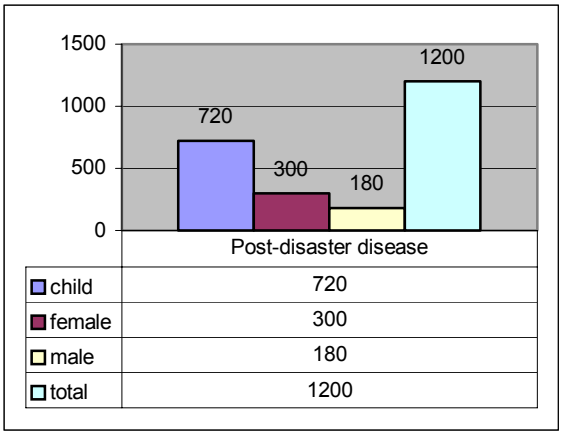

Figure2: Number of victims by Post-disaster disease.

Table 2: Post-disaster health hazard

Persons	Post-disaster disease	
	diseases	% of death
child	720	55%
female	300	40%
male	180	5%
total	1200	100%
injured	138866	

Table 2.1: Total casualties, 1991

casualities	
death	138000
injured	138866
affected	170000

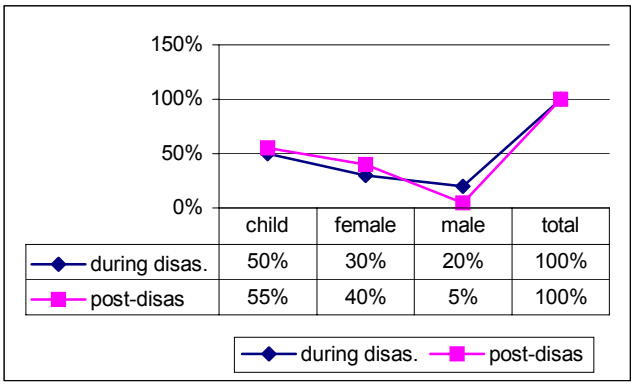

Figure 3: % of casualty during and after disaster.

The % of death of child & female during disaster is (50+30)% = 80%, and Post-disaster is (55+40)% = 95%; it shows the high risk of child and female than male.

3.2 Water born Disease & Sanitation:

Water born diseases	Number of people at risk
Pre-cyclone focal epidemic outbreaks of Diarrhoea. Dysenteric, Acute respiratory infections, Infectious hepatitis, Typhoid fever, Skin diseases and Eye diseases. Measles outbreaks among children risk for the spread of Malaria, etc.	2 – 3 million people were estimated to be at risk by water born diseases like:

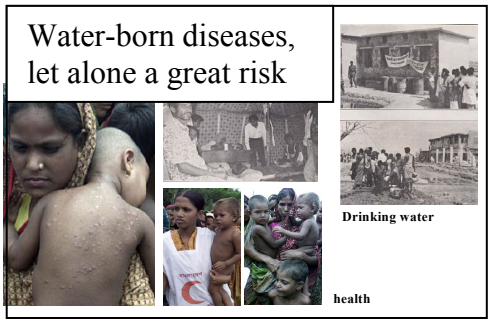

Figure 4.1: Post disaster diseases

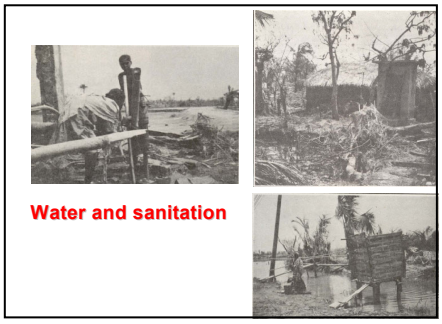

Figure 4.2 Water & Sanitation

3.3 Existing Community Healthcare Facilities: PSSC & UPHCP

Figure 4.3: Primary-School-Shelter-Clinic JICA project

Increasing number of Community Shelter/ Primary-School-Shelter-Clinic (PSSC) constructed form 1970 reduces the casualty risk at 2001.

Table 4: Nos. of Shelters.

Year	Commu./Pri. ShelterClinic	Casualty
1970	0	500,000
1991	150	138000
2001	1668	106

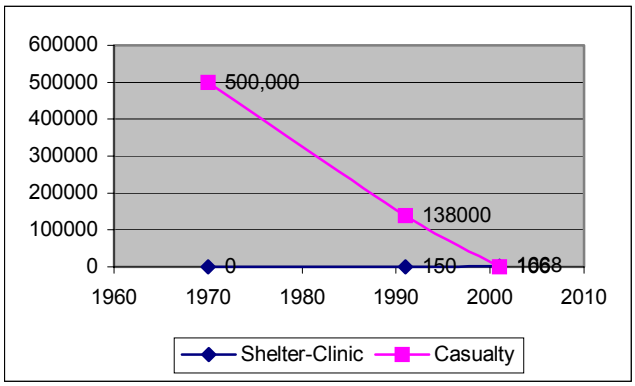

Figure 4.4: Decrease of Casualty from the year 1970 & 1991 to 2001.

Medical Team	
Presons	Number
doc.	2
paramedics	3
technician	1
total	6

national	875
army	108
intrenational	70

3.4 Affect on Healthcare infrastructures, Community facilities, and its Recovery cost.

The images of figure: 4.1 & 4.2 shows how massive the disaster was, and how complex to get recovery. A total 655 healthcare setups were affected as reported by UNDRO; and it needed total US$ 281.77 million dollars to overcome the situation with other recovery activities (table: 5.1).

Table 5: Nos. of Medical unit (left) Damaged Healthcare Set up

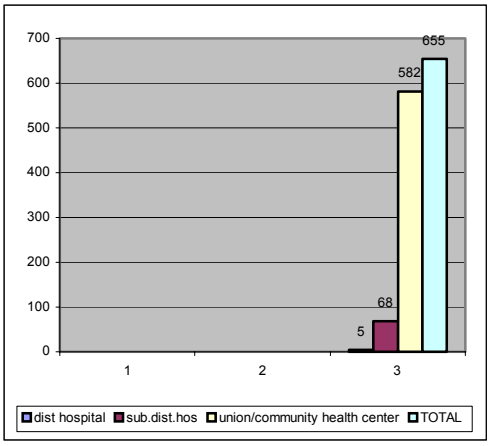

Figure 5: Nos. of damaged Health care set up.

Damage of Healthcare Set up	
Dist hospitals	5
Sub-dist. hospitals	68
Rural/ Urban Health centers	582
TOTAL	655

5 Organizations	Us $
UN System	3762000
Govt.	247980375
Int. Support	247980375
Red Cross/	13883355
NGOs	10218853
Total	281772605

4. EMERGENCY MEDICAL SUPPORTS SPACES (EMSS) FOR PSSC

From early findings of the original doctoral research (Barua S.2003), EMSS found in 4 clinics (C1, C2, C3 & C4) as at (table: 6), which are being served for 41 to 100 beds. The "standard space" specified by WHO for a rural community clinics is 108 sq. meters (1162 sft.); and (1237 to 2447) sft. by MEDICAL AND DENTAL SPACE PLANNING (Jain Malkin, 1990), for sub-urban or rural community clinics, with relative flexibility of working pressure. The evaluated result, thus satisfy the standard of space planning, and be considered to introduce in the existing facilities as well as for its new constructions.

Table6: EMSS in Clinics, justified with WHO/Medical & dental space standard

Space for community clinic (in sft.)						remarks
Standard	WHO	1162				Without surgery space
	Medical & Dental space planning.	1237	2447	4175		With minor surgery space
Evaluated	c1, c2, c3, c4	1700	2625	3162	2100, 3292	With surgery space (GF/1st)

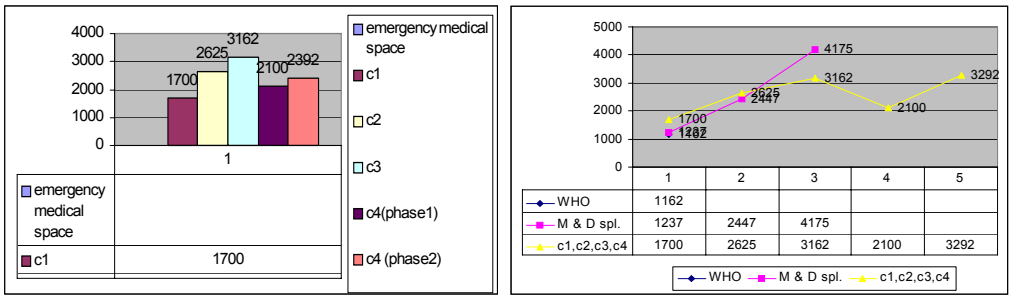

Figure 6: Evaluated Emergency Medical Support Spaces (EMSS)

4. 1 Adoption of Clinical functions (EMSS) within PSSCS and UPHCP:

Earlier, it was found that the *adaptability rate* of clinical function in remodeled clinic C1 is 87.23%; which supports the process of functional adoption (Barua S, 2003). For this the functioning Space and Space Grid also evaluated during the original study process Table: 7

Table 7: Major and Minor space grid in studied Clinics, PSSC & UPHCP justified with standard space of WHO and Medical & Dental Space Planning.

		Clinics		Facilities		Standard by
		C1, C2, C3	C4	PSSC	UPHCP	WHO/M & D Spl.
	Word					12x12
Major grid	OT	25xn	15x2xs	2x12x20	15x9	to
	Coordination Sp					20x24
	Exam/path					
Minor grid	Ambulatory	15xp	15x15	12x20	10x10	10x12
	Staff	10xp				to
	Cabin					12x12

n = n = (20, 17, 12.5) ft, s = 15, (15x2) ft; p = (12.5, 7.5) ft

4.2 Schematic Design Proposal:

On the basis of evaluated result, a probable schematic design for adoption of EMSS within PSSC is shown below:

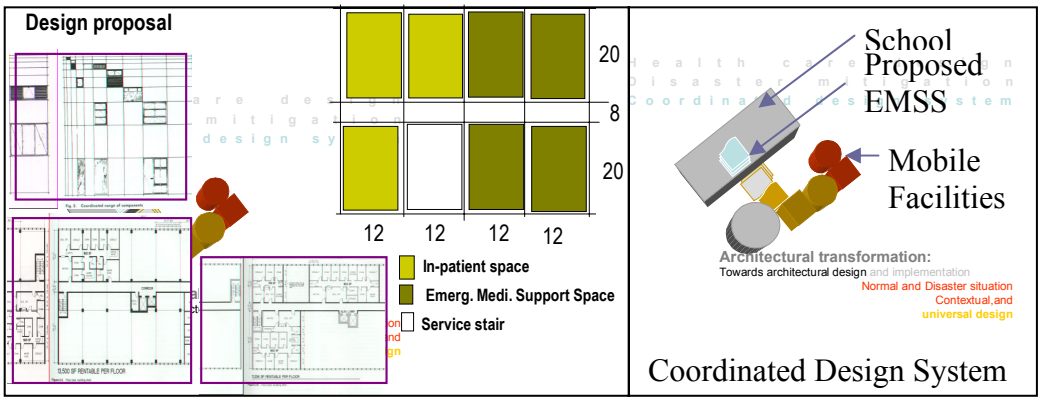

Figure 7.1: Schematic design of EMSS Figure 72: Healthcare set up etwork

5. EMPOWERING THE FACILITIES & FUTURE TASK

As the assessment result (figures & tables: 1 to 5) shows that the disaster risk is sever and the Community Facilities can play an important role for mitigating casualties (fig: 4.4), also can support for post-disaster diseases recovery (fig: 4.1); So, it is strongly recommended to adopt the evaluated Emergency Clinical Facilities (EMSS) to the existing facilities (PSSC/ UPHCP) as well as for its new constructions. It would be cost effective with compare to recovery cost (table: 5). By introducing EMSS:
a) The existing community healthcare facilities could be empowered; and
b) Network between the facilities could also be possible.
When there would be an existing space (emergency clinic, fig: 7.1) within it, the community healthcare facility center itself, would able to coordinate with other incoming medical units/ mobile facilities; i.e., link to it from out side facilities (hospital, International support), or link from it to the grass root level small unit, could be established as per situational demand. A conceptual design layout has shown (figure: 7.2). *To get the better 'coordinated design system' between the facilities, needs further research, hence let it for future task*.
Local mobile means (Boats): Considering geographical context and local practice, the convenient mobile transports would be the Local Boat during disaster. Even by using mechanized boat, the serious patients could be transported to the hospitals urgently.

Thus here, the above stated process satisfies the need for Healthcare Sector and Disaster Mitigation at the coastal cities of Bangladesh. Of course, the Healthcare Management and Disaster Mitigation comes with other important issues like Water, Sanitation, etc., but the proposed process, in some way, would help in the process of disaster mitigation and sustainable development. It will protect human life as well as deterioration of health and health services out of existing unwanted risk. Moreover it will stand for the political commitment of the Govt. and developing agencies, and uplift social status ensuring that the healthcare facilities will continue to function and provide 'critical service' when they are most needed for the people at risk.

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