PREPAREDNESS OF HEALTHCARE FACILITIES FOR DISASTERS IN THREE DISTRICTS OF DELHI

A dissertation submitted in partial fulfillment of the requirements for the award of

Post-Graduate Diploma in Health and Hospital Management

by:

Dr. Shilpa Jain,

PG/10/041

International Institute of Health Management Research,

New Delhi-110075,

May, 2012

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Certificate of Internship Completion

Date……..

TO WHOM IT MAY CONCERN

This is to certify that **Dr. Shilpa Jain** has successfully completed her three months internship in our organization from February 3, 2012 to April 30, 2012. During this intern she has worked on **Preparedness of Healthcare Facilities for disasters in three districts of Delhi** under the guidance of me and my team at **UNDP, India**. She has been regular in her activities and has worked with full dedication. We wish her good luck for her future assignments

G. Padmanabhan

Emergency Analyst and Officer in Charge, Disaster Management Unit, UNDP India

Certificate of Approval

The following dissertation titled "**Preparedness of Healthcare Facilities for disasters in three districts of Delhi**" is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post- Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

Name	Signature
_____	_____
_____	_____
_____	_____

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Shilpa Jain,** a graduate student of the **Post-Graduate Diploma in Health and Hospital Management**, has worked under our guidance and supervision. She is submitting this dissertation titled "**Preparedness of Healthcare Facilities for disasters in three districts of Delhi** " in partial fulfillment of the requirements for the award of the **Post-Graduate Diploma in Health and Hospital Management**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Faculty Mentor

Dr. Preetha GS,

Assistant Professor, IIHMR, New Delhi

Date: _____

Organizational Advisor

G. Padmanabhan,

Emergency Analyst & Officer Incharge
Disaster Management Unit
UNDP, India

Date:_____

Abstract

Introduction/Hazard Profile of India

India has always been vulnerable to natural disasters because of its unique geo-climatic conditions. During the last thirty years the country has been hit by 431 major disasters resulting into enormous loss to life and property. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena in India. As India is a disaster prone country, healthcare facilities should be upto the mark and should be prepared aptly to provide a swift response when the emergency strikes. Also, apart from being providing services, the healthcare facilities should be strong enough to sustain the damages and shouldn't collapse themselves on account of the disasters. Looking on the statistics, the government has become active about the situation, adopting a holistic approach for disaster management.

Methodology

The purpose of the study is to assess how well the health facilities in Delhi are prepared for managing the disaster. Therefore, the study has been planned on the basis of Survey research design where in the research shall lead to the conclusion whether the health facilities are adequately prepared to face any kind of eventuality involving a large number of casualties and injuries requiring immediate care. The study was approved by the Disaster Management Unit, UNDP, India, prior to being conducted. Sampling method was non-random convenience sampling. For the convenience of study a total of 14 healthcare facilities were taken. Out of which 9 PHC/PUHC/Dispensary (3 are from each district), 2 CHC and 3 Private Hospital were taken from three (South, South-West, West) districts of Delhi. For the purpose of evaluation, the information was collected through the self-administered questionnaires named "Preparedness of Health Facilities for Disasters" developed primarily on the basis of guidelines named "Guidelines For Hospital Emergency Preparedness Planning" developed under GOI-UNDP Disaster Risk Management Programme (2002-2009). The investigation focused mainly on measuring facilities preparedness, standard operating procedure (SOP). The data is analysed using tools like, MS Excel and SPSS.

Results

After analyzing the data it was found that only 11% of the primary healthcare facilities had a written Disaster Management Plan whereas all the private hospitals (tertiary care facilities) had a written Disaster Management Plan.

Also, after comparing the parameters like presence of an Incident Command System, Hospital Administration, Nursing Administration, Security Representatives, Pharmaceutical Representatives, it was found that 100% of the private hospitals have representatives from all the above said, but in primary and secondary (government) health facilities only 11-30% have these representatives.

Conclusion

The inference drawn from the study is that Disaster Management is still an understudied topic in Delhi till date. Since Delhi is a disaster prone state, stronger initiatives should be taken to prepare healthcare facilities for disasters. Disaster Management has to be a multi-disciplinary and pro-active approach. Besides various measures for putting in place institutional and policy framework, disaster prevention, mitigation and preparedness should be emphasized more. Also, besides tertiary care hospitals, primary health centres should also be strengthened for facing disasters.

Acknowledgement

I owe my deep sense of gratitude to **Mr. G. Padmanabhan**, Emergency Analyst and Officer Incharge, Disaster Management Unit, UNDP and for giving me an opportunity to learn various aspects of Healthcare Practices with special emphasis on Disaster Management.

My special thanks to **Ms. Ranjini Mukherjee and Ms. Abha Mishra**, Project officers, UNDP, for their guidance, support, interest, involvement and encouragement. They left no stone unturned in updating me about the subject.

I also thank **Dr. Preetha GS** for her guidance throughout the training period.

My sincere gratitude to **Dr. L.P. Singh, Director, and Dr. Rajesh Bhalla, Dean** International Institute of Health Management Research, New Delhi, who always have been a source of motivation and inspiration.

Dr. Shilpa Jain
(Post Graduate Diploma in Health and Hospital Management)

International Institute of Health Management Research, New Delhi

TABLE OF CONTENTS

ABBREVIATIONS

- ACLS — Advanced Cardiac Life Support
- BISS — Bureau of Indian Standards
- BLS — Basic Life Support
- CBSE — Central Board of Secondary Education
- CGHS — Central Government Health Scheme
- CHC — Community Health Centre
- CPR — Cardio Pulmonary Resuscitation
- CRM — Crises Resources Management Training
- DGD — Delhi Government Dispensary
- DH — District Hospital
- GHI — Geo Hazard International
- GTB — Guru Teg Bahadur Hospital
- HVA — Hazard Vulnerability Analysis
- ICS — Incident Command System
- IEC — Information, Education, Communication
- ITLS — International Trauma Life Support
- MCD — Municipality Corporation of Delhi

- MCI Mass Casualty Incident
- NCT National Capital Territory
- PALS Pediatric Advanced Life Support
- PHC Primary Health Centre
- PUHC Primary Urban Health Centre
- RWA Residents Welfare Association
- UNDP United Nations Development Programme

PART-I

INTERNSHIP REPORT

UNITED NATIONS DEVELOPMENT PROGRAMME

UNDP is the United Nations' global development network, an organization advocating for change and connecting countries to knowledge, experience and resources to **help people build a better life**. They are on the ground in 177 countries, working with them on their own solutions to global and national development challenges. As they develop local capacity, they draw on the people of UNDP and the wide range of partners. World leaders have pledged to achieve the Millennium Development Goals, including the overarching goal of cutting poverty in half by 2015. UNDP's network links and coordinates global and national efforts to reach these goals.

UNDP in India

UNDP is committed to help India achieve the global Millennium Development Goals (MDGs) as well as the national objectives articulated in consecutive Five-Year Plans. The goal of the organization is to help improve the lives of the poorest women and men, the marginalized and the disadvantaged in India.

The Resident Coordinator heads the UN System in India and is the Resident Representative for UNDP in India. UNDP has appointed a Country Director who is responsible for the day-to-day work of UNDP India. The Country Director is assisted by two Deputies, one for Programme and the other one for Operations.

UNDP in India works closely with the Government of India through its designated nodal department, the Department of Economic Affairs (DEA) in the Ministry of Finance. All activities falling within the Country Programme Action Plan are nationally owned. Implementation of the programme activities are being carried out by Implementing Partners, i.e. Government Ministries, State Governments, District Authorities, Civil Society Organizations, NGOs, and UN agencies including UNDP as appropriate, under the overall oversight by DEA.

UNDP Staff in India

UNDP India currently employs 72 staff members. Our staff, which represents all segments of the Indian society, come from a diverse range of professional backgrounds. Four staff members are international staff.

UNDP MANDATE

1. UNDP aims to make a difference in the lives of the most disadvantaged. UNDP in India has been dedicated to improve the lives of the poorest since 1951. UNDP works in the states that have the lowest Human Development Indicators and focuses on inclusion of the most disadvantaged groups, including the poorest such as Scheduled Castes and Scheduled Tribes.
2. UNDP supports capacity development of people and institutions. UNDP helps strengthen capacity of people and institutions in order to improve the implementation of national schemes, missions and programmes.
3. UNDP adopts a Human Rights Approach to development. UNDP applies core principles of Human Rights, i.e. non-discrimination, participation, and accountability, to all aspects of its work.
4. UNDP is working towards joint United Nations efforts. The Resident Representative of UNDP also serves as the coordinator of all development activities for the United Nations system in India as a whole. Through such coordination, UNDP seeks to ensure the most effective use of the UN's and international aid resources.
5. UNDP supports the achievement of the Millennium Development Goals. UNDP works towards accelerating progress of human development within the framework of the Government of India's (GoI) 11th Five Year Plan, and supports the Government to meet the Millennium Development Goals (MDGs) in India.

PRIORITIES OF UNDP IN INDIA

UNDP – like other UN agencies in India - works in the seven states that score the lowest on the Human Development Indicators in India, namely Bihar, Chhattisgarh, Jharkhand,

Madhya Pradesh, Orissa, Rajasthan, and Uttar Pradesh. In these geographic areas, UNDP has different levels and targets of intervention.

- **National Level**
  Knowledge sharing and advocacy leading to development of policies
- **State Level**
  Strengthen implementation as well as monitoring and evaluation of the key Human Development Programmes, schemes and missions
- **District Level**
  Integrated district planning, accountability, participation and capacity development
- **Panchayat or Community Level**
  Capacity development and participation of elected officials and communities

THE AREAS UNDP WORKS IN

In India, the focus is on:

- Poverty Reduction
- Democratic Governance
- Crisis Prevention and Recovery
- Environment and Energy
- HIV and Development

Democratic Governance

UNDP strengthens the capacity of the Government, local elected representatives and communities to undertake more participatory and equitable development planning. The organization promotes equal access to justice for all.

Poverty Reduction

UNDP helps national and state governments to implement inclusive poverty reduction programmes, with a focus on human development. UNDP supports programmes, policies

and partnerships that promote income opportunities for poor people, and help them access financial products to protect these gains.

Energy and Environment

UNDP supports Government and community efforts that protect biodiversity, reduce pollution, and reverse land degradation and also works on meeting the emerging challenges posed by climate change.

Crisis Prevention and Recovery

In areas prone to disasters, UNDP furthers efforts that build the resilience of communities at risk. The organization also supports state and district institutions to prepare for and better manage disasters.

HIV and Development

UNDP supports the Government at all levels and vulnerable groups to respond to HIV by expanding awareness, action and alliances beyond the health sector. UNDP also supports efforts by civil society and the private sector to reduce stigma and discrimination associated with HIV.

CRISIS PREVENTION AND RECOVERY

UNDP is working with the Government of India, Ministry of Home Affairs, in setting up an institutional framework for disaster preparedness, response, prevention and mitigation. It is working with the Central Government in 176 districts in 17 states that are prone to multiple hazards. The project, a multi-stakeholder, multi-donor partnership, is supporting preparedness, response and mitigation plans at all levels of administration.

Goal

UNDP supports efforts to strengthen disaster management capabilities across rural and urban India. By institutionalizing disaster risk reduction, the goal is to help minimize losses and reduce vulnerabilities to natural disasters that affect millions in India each year.

Integrate community oriented disaster preparedness activities and main concerns of development

Encourage equal participation of women and men in decision-making

Strengthen institutional capacities to improve people's ability to manage disaster events

Streamline mitigation measures to reduce vulnerabilities from environmental changes and risks from natural disasters

As an intern I was involved in Disaster Risk Reduction (DRR) Programme. The DRR Pogramme aims to proactively reduce disaster risk and implement timely, sustainable and locally relevant recovery activities in post disaster scenario. Implemented by NDMA and UNDP, the approach focuses on strengthening of SDMAs/DDMAs to effectively undertake activities that can reduce risk and integrate issues of inclusion, gender equity and empowerment in community led interventions to disaster risk.

Objectives

1. Strengthen capacities of SDMA/DDMAs to undertake activities outlined in DM Act, 2005
2. Build resilience of the poor, marginalized communities such as Scheduled Castes and Scheduled Tribes.
3. Integrate disaster risk reduction into national development programme.
4. Address specific vulnerabilities of women t hazards.
5. Enhance capacities for recovery planning.
6. Establish platforms for knowledge sharing.

As a part of my internship I was involved in making Guidelines for NDMA for capacity building of hospital staff including Doctors/Hospital Administrators/Nurses/Paramedics/Patients for pre disaster, disaster and post disaster phase. I was involved in building a strategy framework for the following. The capacity building matrix developed is as shown below:

CAPACITY BUILDING FRAMEWORK

Type of Facility	Primary Healthcare Facilities PHC, PUHC, Govt Dispensaries						Hospitals CHC, DH, Pvt & Govt Tertiary Care Hospitals			
Target Group	Doctors	CMO I/C	Paramedical Staff	will be trained at PHC, PUHC, Govt Dispensaries ⬅	Local Community Volunteer	trained volunteers can be sent to hospital, for coordination with their activities ➡	Doctors	Hospital Managers	Paramedical Staff	Patients/ Attendants
Topics of training	Emergency Obstetric care	HRV Analysis	Basic life Support		Counselling		Emergency Obstetric care	HRV Analysis	Basic life Support	Patient Safety/ Evacuation
	Basic life Support	Preparation Of Hospital Disaster Plan and Mapping of Resources	Training to Local Community Volunteers		First aid		Emergency surgical care	Preparation Of Hospital Disaster Plan and Mapping of Resources	Search and rescue	
	ACLS	Safety Audits	Search and rescue		Crowd Management		Basic life Support	Safety Audits	Crowd Management	
	Post Disaster Public Health Problems	Planning of Health Facilities- Water, Sanitation, Power Utilities, Logistics	Crowd Management		Search and rescue		ACLS	Financial Management		
	Mass Casualty Management	Media Management			Basics of Disaster response		Post Disaster Public Health Problems	Planning of Health Facilities- Water, Sanitation, Power Utilities, Logistics		
	Triage	Crowd Management					Mass Casualty Management	Media Management		
							Triage	Crowd Management		
Mode of Training	Self assessment Questionnaires	Self assessment Questionnaires	Group Exercices		Group Exercices		Self assessment Questionnaires	Self assessment Questionnaires	Group Exercices	First aid Guidebook
	online training	online training			online training		online training	online training		Awareness raising hoardings/ TV films
	Mock drill/ Scenario Building/ Simulation exercises	Mock drill/ Scenario Building/ Simulation exercises	Mock drill/ Scenario Building/ Simulation exercises		Mock drill		Mock drill/ Scenario Building/ Simulation exercises	Mock drill/ Scenario Building/ Simulation exercises	Mock drill/ Scenario Building/ Simulation exercises	
	Awareness raising Workshops	Awareness raising Workshops	Awareness raising Workshops		Focus Group Discussions		Awareness raising Workshops	Awareness raising Workshops	Awareness raising Workshops	
	Brainstorming Sessions	Brainstorming Sessions			First aid Guidebook		Brainstorming Sessions	Brainstorming Sessions		
	First aid Guidebook	First aid Guidebook	First aid Guidebook				First aid Guidebook	First aid Guidebook	First aid Guidebook	
	Focus Group Discussions	Focus Group Discussions	Focus Group Discussions				Focus Group Discussions	Focus Group Discussions	Focus Group Discussions	
Centres for Training	Emmanuel Hospital Association, AIIMS Trauma Centre, Teaching Hospitals, Life supporters Institute of Health Sciences, Indian Institute of Emergency Medical Services						Can be trained within the hospital			

Also as a part of capacity building strategy I developed a database of the American Heart Association accreditated centres required for the training of doctors, nurses and other paramedical staff on various topics as stated above in the matrix. The database developed is as shown below:

S.NO.	AHA ACCREDATED TRAINING CENTRES	CONTACT ADDRESS	WEBSITE	TRAINING PROGRAMMES
1	GVK EMRI	Devar Yamzal, Medchal Road Secunderabad - 500 014. Andhra Pradesh, India Email: info@emri.in Tel: 91-40-23462600 , 23462602, 23462222 Fax: 91-40-23462178	www.emri.in	Paramedic Training
				First Aid
				BLS
				ACLS
2	Indian Institute of Emergency Medical Services	Noya Plaza, Above Catholic Syrian Bank Kalathipady, Vadavathoor.P.O. Kottayam - 686 010 Kerala, India Email : iiems@iiems.org Tel: 91-481-3260911 Mob1: 91-9446000487 Mob2: 91-9946010911	www.iiems.org	American Heart Association (AHA) and International Trauma Life Support (ITLS) certified training programs for healthcare providers.
				Advanced Trauma Care for Doctors and Nurses.
3	Lifesupporters Institute of Health Sciences	1 / 105, Moti Manzil, Parmar Guruji Marg, Parel (E), Mumbai -400 012. Maharastra, India Email: drparesh.navalkar@lifesupporters.org Tel: 91-22-24181299 Fax: 91-22-24188187	www.lifesupporters.org	BLS
				ACLS

				PALS
				ITLS
				CPR/AED
				Hospital Emergency Disaster Management
4	**Emmanuel Hospital Association**	**New Delhi**		**BLS**
				ACLS
5	**Apollo Health City**	**Jubilee Hills Hyderabad - 500033 Andhra Pradesh, India Tel: 914023607777 (extn 5517) Fax: 91-40-23608050**	**www.apollohealthcity.com**	**BLS**
				ACLS
				PALS
6	**Symbiosis Institute of Health Sciences**	**Senapati Bapat Road, Pune 411004 Maharashtra, INDIA Email: info@sihspune.org Tel. 91-20-25678680/ 25655362**	**www.sihspune.org**	**BLS**
				ACLS
				ITLS
7	**St Johns Medical College Hospital**	**Department Of Emergency Medicine Sarjapur Road Bangalore- 560034 Tel1: 91-80-22065000 Tel2: 91-80-22065206**	**www.stjohns.in**	
8	**Fortis Hospital**	**B-22, Sector-62 Noida-201301 Uttar Pradesh, India Fax: 91-120-2403222 Tel: C11 91-120-2400444**	**http://www.fortishealthcare.com/Noida/**	

9	**TACT Academy for Clinical Training**	**V-70 (old 89), Fifth Avenue, Anna Nagar Chennai 600040 Tamil Nadu, India Tel: 91-44-42026644 Fax: 91-44-42026655 Email: info@tact-india.com**	**www.tact-india.com**	**BLS**
				ACLS
				BLS-ONLINE
				CRM
10	**MAX Healthcare Institute LTD**	**1, Press Enclave Raod, Saket New Delhi, India - 110017 Tel1: 011-66115050 Tel2: 011-66114545 Tel3: 011-40554055 (Emergency) Fax: 011-66115050**	**www.maxhealthcare.in**	**BLS**
				ACLS
11	**Rabindranath Tagore International Institute of Cardiac Sciences**	**124, Mukundapur, E.M.Bypass, Near Santoshpur Connector, Kolkata - 700 099, India Phone: 91-33-2436-4000 Fax: 91-33-2426-4204**	**www.rtiics.org**	
12	**Sri Ramachandra Medical College & Research Institute**	**1, Ramachandra Nagar, Porur Chennai Tamil Nadu INDIA - 600116 Tel: 044-24768403 Fax:044-24767008**	**www.srmc.edu**	
13	**Himalayan Institute Hospital Trust**	**Swami Rama Nagar, P.O. Doiwala Dehradun - 248140 Uttarakhand, India Tel: 91-0135-2471133 Fax:91-135-2471122**	**www.hihtindia.org**	**BLS**
				ACLS
				PALS
				CPR

14	**Maulana Azad Medical College**	**Bahadur Shah Zafar Marg New Delhi INDIA - 110002 Tel:011-23239271 to 23239280**	**www.mamc.ac.in**	
15	**Medical Simulation Centre, Manipal University**	**Manipal University Manipal Karnataka INDIA - 576104 Tel: 0820-2922323**	**www.manipal.edu**	
16	**Phoenix Medical Education and Research**	**184, SFS MIG Flats, Pocket B New Delhi INDIA - 110025 Tel: 011-46591709**	**www.indiacpr.com**	**BLS**
				CPR
17	**Medical Colleagues CPR**	**Near Police Quarters, 5-3 Berlie 1st Cross Street Langford Town, Shantinagar Bangalore INDIA - 560025 Tel: 080-22745142**	**www.mccpr.in**	**BLS**
				CPR

PART _ - II

DISSERTATION REPORT

Preparedness of Healthcare Facilities for Disasters in three districts of Delhi

INTRODUCTION

India has always been vulnerable to natural disasters because of its unique geo-climatic conditions. During the last thirty years the country has been hit by 431 major disasters resulting into enormous loss to life and property[1]. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena in India.

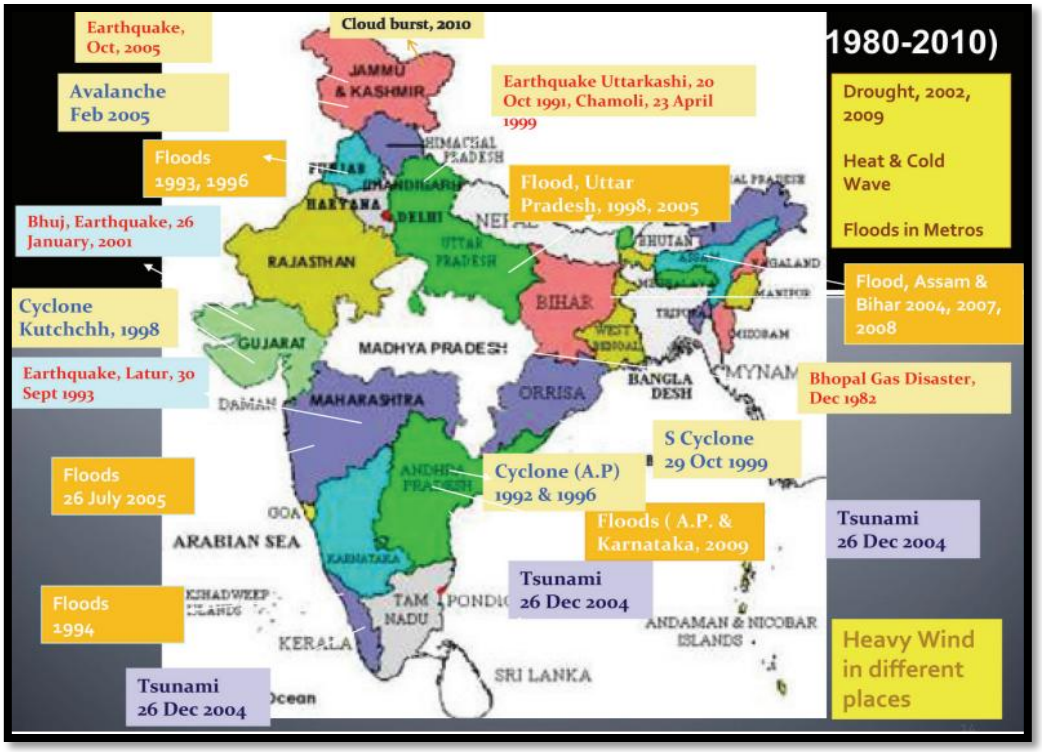


**fig1: Major Disasters in India from 1980-2010*[1]

As India is a disaster prone country, healthcare facilities should be upto the mark and should be prepared aptly to provide a swift response when the emergency strikes. Also, apart from being providing services, the healthcare facilities should be strong enough to sustain the damages and shouldn't collapse themselves on account of the disasters. Looking on the statistics, the government has become active about the situation, adopting a holistic approach for disaster management. Hospitals play a critical role in health care infrastructure.

Hospitals are primarily responsible for saving lives, by provide 24x7 emergency care service and hence public perceive it as a vital resource for diagnosis, treatment and follow-up for both physical and psychological care. It has been observed that in most mass casualty incidents majority of the victims are not seriously injured and come in the walking wounded category. Therefore, in these cases small centers such as PHCs, Dispensaries, PUHCs, CHCs can provide immense help by providing definitive care but unfortunately these facilities are most neglected ones.

Each hospital should have an emergency preparedness plan to deal with mass casualties and should have trained health managers. But, still this level of preparedness is lacking in our present structure. Three factors play an important role while preparing the healthcare facilities for disasters, i.e. Structural & Non-Structural factors related to the hospital building, Hospital Disaster Management Plan and capacity building of healthcare providers. But there are many obstacles in the path to prepare these facilities for Disasters, such as there are planning issues, legal issues, and perception of people regarding the benefit of preparing the facilities against the cost involved in preparing for it. There are also issues relating to staff training and availability of manpower and other resources at the time of disaster.

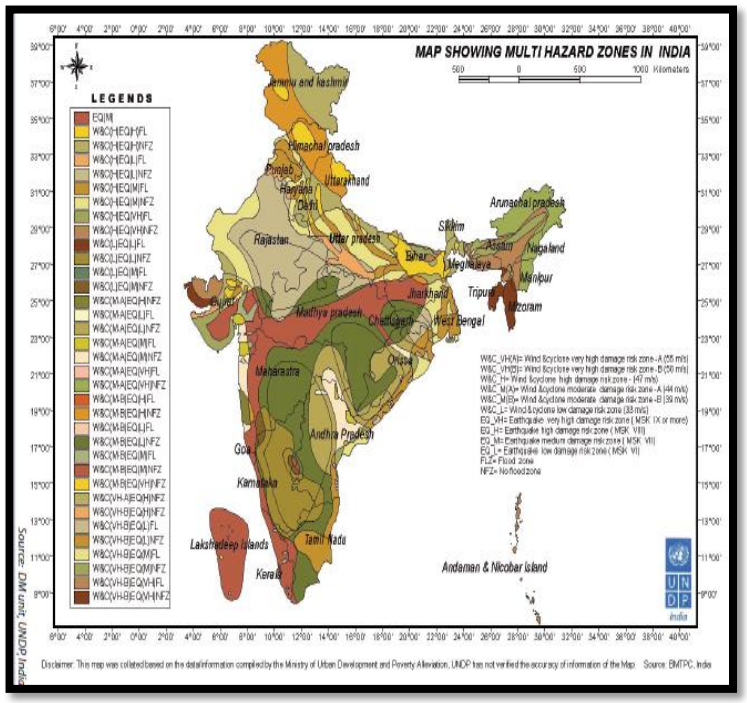
RATIONALE OF THE STUDY

The study aims at giving an insight to the preparedness of healthcare facilities in Delhi. Delhi is one of the disaster prone state in India. The three districts chosen for the purpose of the study are taken on account of their vulnerability to hazards like earthquake, fire, road accidents etc. Through this study I will be able to determine the various steps taken in few of the health facilities for preparing for disasters. Also it will be determined that what the gray areas are and where we need to focus more.

LITERATURE REVIEW

Hazard Profile of India

India face many types of both natural as well as man-made disasters, such as earthquakes, floods, fire, tsunami, landslides, terrorist attacks etc. India is experiencing an increasing population and extensive unscientific constructions mushrooming all over, including multistoried luxury apartments, huge factory buildings, gigantic malls, supermarkets and warehouses and masonry buildings, which makes the country susceptible to different types of disasters[3]. The country has experienced 10 major earthquakes that have resulted in over 20,000 deaths since last 15 years. Here is a map showing multi hazard profile of India (*fig2*)[1]. As per the current statistics, over 59% of India's landmass is under a threat of moderate to severe seismic hazard. Apart from earthquakes, floods are the most frequent natural calamity that India experience almost every year in varying magnitudes in some or other parts of the country. Flooding is mainly caused by the inadequate capacity within the river banks to contain the high flows brought down from the upper catchment due to heavy rainfall. Poor drainage areas get flooded by accumulation of water from heavy rainfall.



According to the estimate of the National Commission on Flood, 40 million hectares of the area is prone to floods in the country, out of which it is considered that 80%, i.e., 32 million hectares could be provided with reasonable degree of protection. In the span of 124 years, the probability of occurrence of drought was found maximum in Rajasthan (25 %), Saurastra & Kutch (23%), followed by Jammu & Kashmir (21%) and Gujarat (21%) region. The

drought of 1987 in various parts of the country was of "unprecedented intensity" resulting in serious crop damages and an alarming scarcity of drinking water[1].

According to Disaster Management Act, 2005[4]

- "**Disaster[4]**" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.
- "**Disaster Management[4]**" means a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient for-

  (i) prevention of danger or threat of any disaster;
  (ii) mitigation or reduction of risk of any disaster or its severity or consequences;
  (iii) capacity-building;
  (iv) preparedness to deal with any disaster;
  (v) prompt response to any threatening disaster situation or disaster;
  (vi) assessing the severity or magnitude of effects of any disaster;
  (vii) evacuation, rescue and relief;
  (viii) rehabilitation and reconstruction;

Disasters are broadly **classified** as:

- **Natural** such as earthquakes, floods, landslides, cyclones, tsunami, draught, epidemics etc
- **Human-Made** such as terrorist attacks, fires, riots, accidents, explosions etc

The approach to Disaster Management has always been reactive and relief centric but a paradigm shift has now taken place at the national level from the relief centric approach to a proactive and integrated approach with more emphasis on prevention, mitigation and preparedness. These efforts are aimed at minimizing losses to lives, livelihood and property.
A typical Disaster Management cycle comprises of six elements i.e., Prevention, Mitigation

and Preparedness in pre-disaster phase, and Response, Rehabilitation and Reconstruction in post-disaster phase defines the complete approach to Disaster Management.

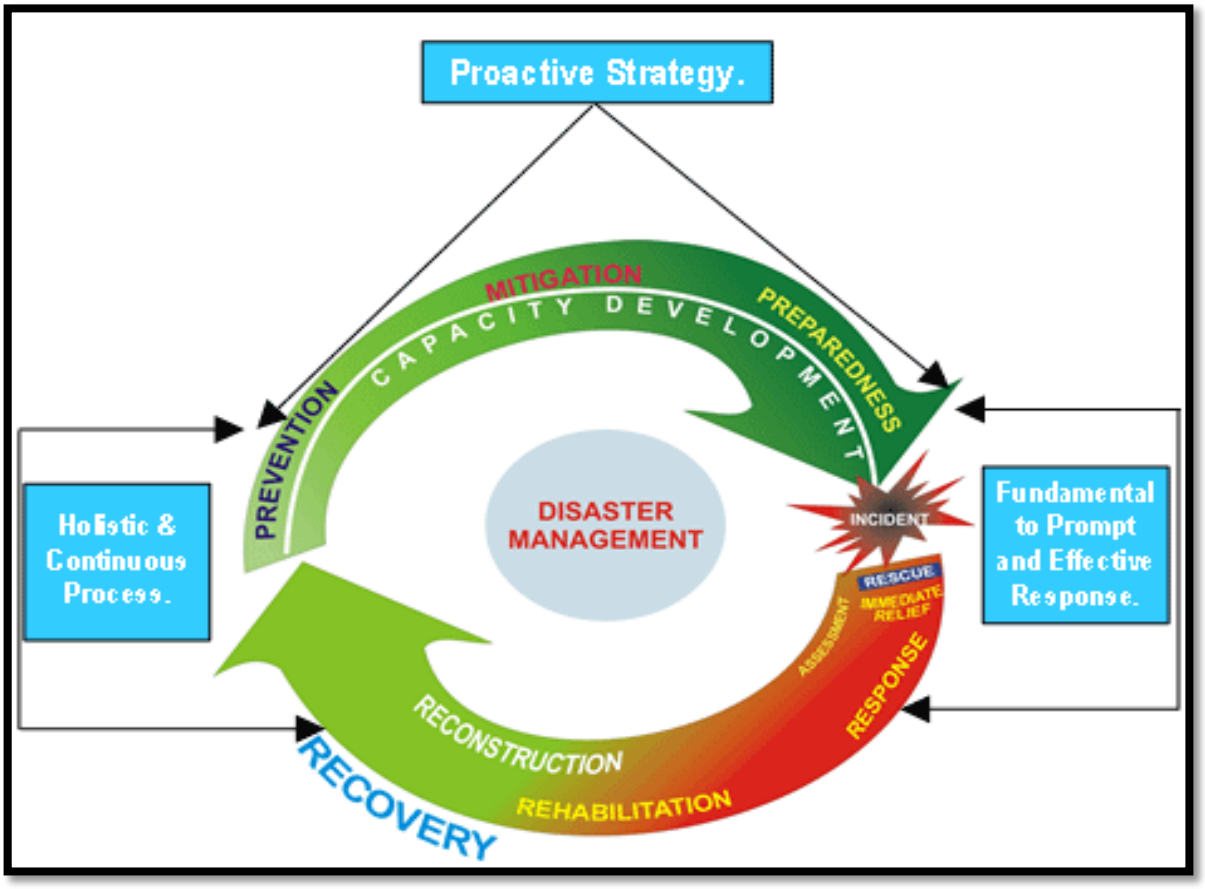


**fig3: Showing Disaster Management Cycle*[3]

Institutional Framework for Disaster Management in India

The super cyclone in Orissa in October, 1999 and the Bhuj earthquake in Gujarat in January, 2001 changed the approach to Disaster Management in India, which then started to address the issues of early warning systems, forecasting and monitoring setup for various weather related hazards. A framework has been set up for structured flow of information, in the form of warnings, alerts and updates about the oncoming hazard[1].

A multi-stakeholder high powered group has been setup by involving representatives from different ministries and departments. Ministry of Home Affairs has been designated as the nodal ministry. The institutional structure for disaster management has been set up following the Disaster Management Act in 2005. It is in a state of transition where the two structures co-exist. The National Disaster Management Authority has been established at the centre,

and the State Disaster Management Authority at state and district authorities at district level are gradually being formalized[1]. In addition to this, the National Crisis Management Committee, part of the earlier setup, also functions at the Centre. There are two distinct features of the institutional structure for disaster management i.e. the structure is hierarchical and functions at four levels – centre, state, district and local, and it is a multi-stakeholder setup, where, the structure draws involvement of various relevant ministries, government departments and administrative bodies.

The Government of India has now realized the importance of mitigation and prevention as essential components of their development strategy. Each State is supposed to prepare a plan scheme for disaster mitigation in accordance with the approach outlined in the plan[2].

A **Disaster Risk Management Programme** was taken up with the assistance from UNDP, USAID, European Union, AUSAID, DFID, From The People of Japan, UNISDR (a multi-donor framework) in 176 most hazard prone districts in 17 States including all the 8 North Eastern State. The programme components include awareness generation and public education, preparedness, planning and capacity building, developing appropriate policies, institutional, administrative, legal and techno-legal regime at State, District, Block, village, urban local body and ward levels for vulnerability reduction[2].

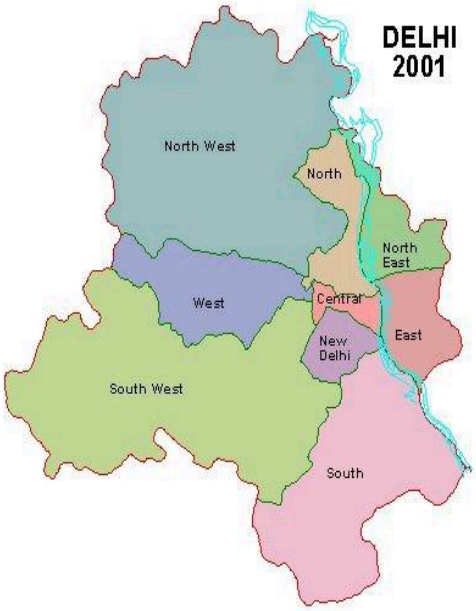
Also, NDMA has taken initiatives for mass media campaign through **audio, video and print media as well as publicity through pamphlets, posters, bus back panels at all levels**. The **posters are supposed to be prominently displayed at buildings like Primary Health Centres, Community Centres, schools**. The Central Government has also taken initiatives in **training and equipping 96 specialist search and rescue teams, with each team consisting of 45 personnel including doctors, paramedics, structural engineers etc. A 200 bedded mobile hospital**, fully trained and equipped is being set up by the Ministry of Health and attached to a leading Government hospital in Delhi. Three additional mobile hospitals with all medical and emergency equipments are proposed to be located in different parts of the country which will also be attached to the leading Government hospitals in the country. This will enable the mobile hospitals to extend assistance to the hospitals with which they are attached in normal time. They will be airlifted during emergencies with

additional doctors/paramedics taken from the hospitals with which the mobile hospitals are attached to the site of disaster.

Incident Command system has been professionalized, which would comprise of an Incident Commander and officers trained in different aspects of incident management – logistics, operations, planning, safety, media management etc[1].

DELHI: State Profile[5]

Delhi is located in Northern India between the latitudes of 28°-24'-17" and 28°-53'-00" North and longitudes of 76°-50'-24" and 77°-20'-37" East. Delhi shares borders with the States of Uttar Pradesh and Haryana. Delhi has an area of 1,483 sq. kms. Its maximum length is 51.90 kms and greatest width is 48.48 kms. Delhi is divided into nine districts as: North, South, East, West, North West, South West, North East, Central and New Delhi as shown in the figure (*fig4*). Delhi is one of the state in India which is prone to various disasters both natural as well as manmade. With increasing industrialization and modernization, Delhi is exposed to numerous hazards, such as earthquake, flood, bomb-blasts, other acts of terrorism, fires, industrial and nuclear, biological & chemical hazards, flash floods, building collapses, road accidents, water logging, etc. Looking at the situation Government of NCT of Delhi has adopted a proactive, comprehensive and sustained approach to disaster management to reduce the detrimental effects of disasters on overall socio-economic development of the State.



Hazard Profile/ Risk and Vulnerability Analysis of Delhi[6]

S.No	Hazard	Districts of maximum risk (in terms of damage and losses-)	Vulnerability
1	Earthquakes	North East, East, Central , North, North West and West Southwest and New Delhi	More than High Moderate to High
2	Floods	North-east, east, North, North west	Moderate to High
3	Wind storms	All districts	Low
4	Epidemics (water borne diseases)	All districts	Medium
5	Road Accidents	All districts	High
6	Fires	All districts	Medium
7	Industrial and Chemical Accidents	All districts	High

fig 5: Chart showing Risk and Vulnerability Analysis of Delhi[6]

The above shown chart states that Delhi is susceptible to all sorts of disasters. But the main focus in this study is on the South, South-West and West districts of Delhi.

As stated above in discussion, India is divided into different seismic zones. The region with intensity less than V is designated as Zone 0. Thus, the designation of area as seismic Zone V indicates activity. Delhi is located in zone IV which has fairly high seismicity where the general occurrence of earthquakes is of 5-6 magnitude, a few of magnitude 6-7 and occasionally of 7-8 magnitude. **Delhi thus lies among the high-risk areas**. Delhi is prone to severe earthquake damage both by nearby earthquakes and by large earthquakes occurring in the Himalayas[7].

The distribution of the epi-centres of earthquakes follows a Northeast-Southwest trend correlated with the direction of major tectonic features of the region. It coincides with the extension of the Aravali Mountain belt beneath the alluvial plains of the Ganga basin to the northeast of Delhi towards the Himalayan Mountain. Along with this there is severe threat of liquefaction along the Yamuna river areas covering northeast, east and some part of North West district. A moderate to high threats across the belt running from central district, West district and South-West district is also expected. These districts are also prone fire incidents

because of congestion in these areas. In past, maximum numbers of calls of fire incidents have been received in Shahdra (east division), Janakpuri (west division), Moti Nagar (northwest), Connaught Circus (central), Roopnagar and Nehru Place in South Delhi[5.]

Disaster Mitigation & Preparedness[8]

According to Disaster Management Act, 2005, **"Disaster Mitigation[4]"** can be defined as measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation and **"Disaster Preparedness[4]"** can be defined as the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof.

Disaster mitigation primarily focuses on the hazard that causes the disaster and aims to eliminate or drastically reduce its effects. For example construction of dams to prevent floods or coordination of release of water from various irrigation dams to avoid flooding. Strengthening of buildings to make them earthquake proof, planting of crops that are less affected by disasters, controlling land-use patterns to restrict development in high-risk areas/town planning could be other examples for Disaster Mitigation activities. A mitigation strategy however, cannot be successful unless it is backed by all concerned authorities– the administration, the research institutions, the non-officials and the community. So, it also becomes imperative to have built-in institutional arrangements and/or legislative backing to oversee the mitigation strategy over a period of time.

In Delhi, several measures have been taken for disaster mitigation, but few of importance are discussed here, such as

1. **Public Awareness and Training:** Measures like distribution of IEC material has been taken for public awareness and training. They have been distributed to all districts, schools, communities, markets, RWAs etc. Disaster preparedness months have been celebrated in North, South, North East, North West districts of Delhi. Disaster management has been included in CBSE syllabus for class VIII and IX.

2. **Land Use Planning and Regulations-** Measures taken under this are:
    - ✓ Retrofitting of Buildings- **The Delhi Earthquake Safety Initiative[7] has been taken up** as a pilot project to precede the National Earthquake Mitigation Project of the Ministry of Home Affairs. Under this project five lifeline buildings of the Govt. Of Delhi are to be retrofitted with technical assistance from Geo Hazards International (GHI) &USAID, out of which one is GTB Hospital. Technical assistance for Structural and Non-structural mitigation activities are provided by SEEDS and GHI.
    - ✓ Prioritization of buildings according to their importance during emergency.
        - o All major hospitals are categorized as First Priority Building
        - o Other Hospitals and clinics are categorized as Second Priority Building
    - ✓ Enforcement of Building codes
        - o Review and Updation of building codes according to the BISS
        - o Implementation of codes in new engineered and non-engineered constructions
    - ✓ Capacity Building
        - o Priority-wise training to the engineers, architects, and masons for disaster-resistant buildings should be arranged. These people may further utilized for assisting in retrofitting and reconstruction exercises.

But unfortunately nothing much has been done till yet for health settings preparedness in Delhi. Inspite of Delhi being such a disaster prone area, no strict rule and regulation has been devised for healthcare facilities in Delhi.

Role of Healthcare Facilities in Disaster Management

Hospitals play a critical role in health care infrastructure. Hospitals are primarily responsible for saving lives, by provide 24x7 emergency care service and hence public perceive it as a vital resource for diagnosis, treatment and follow-up for both physical and psychological care. They are the central agency which provides emergency care and hence when a disaster strike the society falls back for immediate medical care[9].

In India, public healthcare infrastructure has been planned as a pyramid with primary and community health facilities at the base and tertiary health care facilities like medical

college/University hospitals at the apex. In between there are many other hospitals like the district hospitals, municipal hospitals etc. having a moderate bed strength of 100 - 200.

The emergency plan varies for all types of healthcare settings. For facilities like PHCs, Dispensaries, PUHCs the disaster plan may be only to provide first aid care to walking wounded patients, and referral to nearest hospital. For small hospitals like CHCs it may be actually to provide either mobile emergency care on the site of disaster or providing immediate stabilization and forward referral of serious patients to the nearest networked hospital. It has been observed that in most mass casualty incidents majority of the victims are not seriously injured and come in the walking wounded category. Therefore, in these cases small centers such as PHCs, Dispensaries, PUHCs, CHCs can provide immense help by providing definitive care but unfortunately these facilities are most neglected ones.

IMPORTANCE OF PREPAREDNESS OF HEALTH FACILITIES

Preparedness of Healthcare Facilities for Disasters in India

Each hospital should have an emergency preparedness plan to deal with mass casualties and should have trained health managers. But, still this level of preparedness is lacking in our present structure. Three factors play an important role while preparing the healthcare facilities for disasters, i.e. Structural & Non-Structural factors related to the hospital building, Hospital Disaster Management Plan and capacity building of healthcare providers. Efforts have been taken up by Delhi government as mentioned before for retrofitting of buildings, but still there are many gaps in the present planning structure. The existing syllabus for medical doctors does not include emergency health management. Therefore capacity building through on-job training of the current heath managers and medical personnel in handling health emergencies is extremely essential. To overcome this issue, two committees have been constituted for preparation of curriculum for introduction of emergency health management in MBBS curriculum, and preparation of in-service training of Hospital Managers and Professionals in consultation with Medical Council of India(MCI). Rajiv Gandhi University of Health Sciences Karnataka has been identified as the lead national resource institution for the purpose. Ministry of Health and Family Welfare has issued instructions to the states to evaluate the structural integrity of existing health

institutions in high seismic zones and carry out the necessary retrofitting activities, it is also important to address the integrity of non-structural elements like essential medical equipment as part of hospital preparedness for emergencies[10].

Disasters seldom occur, but when they strike a very fast and effective response is needed from healthcare services. According to the literature, there are many reports on incidents when hospitals are not able to work to their full capacity during disasters, which is a matter of concern related to patient safety and hospitals' preparedness for disasters.

During the evolution of hospitals in the 20th century, there is change in services provided by the hospitals. Earlier, the hospitals were designed mainly to provide shelter for sick and indigent people with many functions supported by charitable and religious organizations from the community[11]. During the early part of the 20th century, hospitals' central role in the field of clinical medicine led to arousal of new concepts medical treatment, community health, and wellness in these institutions. The donations provided by local governments, their support and assistance helped in the expansion of these institutions. Because of the generous community support and the ability to pass on preparedness costs, hospitals expected to play an important role in community emergencies and disasters, and these expectations became a public expectation as well. Hospitals have also lost their special status and values and are now looked upto as business commodities that derive their value solely from their importance in the free marketplace. Despite this change from a social service model to a business model, the public and policymakers still expect that the healthcare facilities are aptly equipped to provide services at the times of emergency to the communities in need. Although most hospitals belong to private sector, they are expected during emergencies and disasters to serve an essentially public sector function in treating mass casualties[11].

It is very well known that among the various components of management, i.e. crisis management, hospitals play a very important and crucial role in providing relief and rescue services and thus there is an urgent need to prepare these facilities for the next coming disasters. According to a thorough literature search and experience it can be clearly stated that confusion and chaos at the time of disasters, are the two most common issues confronted by the hospitals[12]. Therefore it can be clearly stated that if an effective

management system with accurate organization and preplanned activities comes into play, then the negative effects of the disasters can be minimized through an efficient medical system and optimum utilization of resources. Successful responses of hospitals to the disaster situation requires coordination among all hospital units, planning and coordination of police, firefighting services and pre-hospital emergency forces in order to make sure that communication lines are established and there is flexibility for responding to every extent and severity of incident[12].

In India there is an excellent layout of infrastructure for the delivery of services through a four tier system of sub-centers, primary health centers, community health centers and hospitals in both the public and private sector. However, the health pyramid does not function effectively because of limited resources, communication delays, lack of managerial skills, and political will. During the Gujarat earthquake, many health workers died because of the collapse of health facilities. There were very few health personnel available, who were not sufficient to meet the demand. Even one year after the earthquake, doctors and nurses were working out in the tents and temporary shelters[13]. This indicates the need for disaster poof health facilities and a strong management plan which is capable of withstanding the situation effectively and efficiently.

According to literature, it has been stated that 72.9% health services in United States reported that their organization has a written plan for response to a disaster[14]. Also, nearly all (99%) had emergency response plans that are specifically addressed to chemical accidents or attacks, which were not significantly different from the plans for natural disasters (97.8%), epidemics or pandemics (94.1%), and biological accidents or attacks (93.2 %)[15]. About 93.7 percent of hospitals were engaged in cooperative planning in developing or updating an emergency response plan for public health emergencies with the state or local office of emergency management[15]. About 85.3% of hospitals had regional communication systems to track emergency closures or diversions. About 29.2% implemented these systems during an actual incident in 2007. About 73.7% of hospitals had plans for setting up temporary facilities when the hospital is unusable (e.g., without power or flooded). Many hospitals had plans for establishment for alternate areas of care with beds,

staffing, and equipment in nonclinical space (68.7%), inpatient unit hallways (52.3%), or decommissioned ward space. About 94.6% of hospitals had hospital evacuations plans. Most hospitals had plans for transporting large numbers of patients within the hospital (83.9%) or between hospitals (77.0%)[15].

But are we in Delhi still prepared this much. In the next course, we'll learn more about **step in preparedness of health facilities**: There are different school of thoughts and different approaches for management of emergency situations in a hospital. Few of them are listed below:

Following a MCI/disaster, there is surge of casualties and hospitals are needed to swiftly reorganize and systematically manage its resources to deliver the services. Barbisch *et al* has described the concept of surge capacity which is known as the "3 S System" — the "3 S" stands for "**staff, stuff and structure**." By keeping in mind these 3 key components, healthcare facilities can respond better during a crisis. Hospitals should be prepared with adequate and appropriately skilled personnel (staff), event specific supplies (stuff), and patient care space with incident management systems (structure— physical and management infrastructure) during disasters[16].

Moore et al gave concept of "All Hazard approach" for emergency preparedness of public health settings which state that there should be functional integration between all the government activities with plan designed for emergency situations[17]. The US Centers for Disease Control and Prevention has identified nine core competencies in emergency preparedness that all public health workers should meet[17]:

(1) Describe the role of public health in a range of emergency responses;

(2) Describe the chain of command in emergency response;

(3) Identify and locate their own agency's response plan;

(4) Describe their own individual role in an emergency;

(5) Demonstrate correct use of all types of communication equipment;

(6) Describe the various communication roles in an emergency;

(7) Identify the limits of their own knowledge, expertise or authority;

(8) Recognize unusual patterns or events that may indicate an emergency; and

(9) Apply creative problem-solving to unusual challenges within one's own role.

According to Richard et al[15], there are few broad categories of hospital preparedness which includes memoranda of understanding (MOUs) with other hospitals, regional communication systems, mutual aid agreements, expansion of on-site surge capacity, priority setting for limited resources, expansion of on-site health care work force, mass casualty management, management of pediatric and other special populations, and communication strategies.

Chan et al[18] stated that personals in accident and emergency department should always be alert to the possibility that they may be dealing with a hazmat-contaminated individual. Recognition of disaster, assessment of the conditions, protection of staff and facilities, identification of the disaster, and subsequent decontamination are important constituents in the formulation of a contingency plan. Although industrial disasters are uncommon, they pose a major threat to the health of patients and hospital staff. Therefore hospital preparedness is an important element for effective treatment of casualties and protection of staff against contamination.

According to HEICS[12], Incident command system (ICS) is the most common system of incident management in the world at presents because of its successful outcomes. ICS is based on some basic principles, which ensures effective utilization of resources on one hand, and reducing disorders in policy making and operations of responsible groups or organizations, on the other hand. In this system, one person is appointed as an Incident Commander, who is responsible for directing emergency team or taskforce group.

According to Ronal and Lindell[19], the most critical step in preparedness for disasters lies in establishing a hospital disaster planning committee or group. This group drives the planning process and maintains it. It should be a permanent committee holding meetings regularly and headed by a chairperson (usually the institution's risk manager). It should include

different representatives from the institution, including the medical staff, administration, nursing staff, infection control, emergency department, security, communications, public relations, laboratory/radiology, engineering and maintenance, and medical records and admissions. Liaison representatives to prehospital care organizations, ambulance services, regional hospital associations, local public health agencies, local police departments, and local political and disaster management authorities should also be included. The objective is to create a committee that fully understands all dimensions of hospital function and capabilities, and to make specialists possessing expertise regarding threats and knowledge of community plans and resources accessible. The cooperation between hospitals as well as between hospitals and organizations that deliver local emergency management, prehospital care, law enforcement, public health services, and handling of the deceased is necessary to handle the mass casualties.

This system will enable the medical staff to integrate their activities completely with the supporting agencies so as to efficiently manage the onslaught of self-referred patients, family members, and other visitors who tend to converge on medical facilities. The hospital emergency incident command system has been cited as a "best practice" by the US Occupational Safety and Health Administration.

Another critical component of the hospital disaster plan is Hospital security[19]. Commonly hospital security is provided by private security guards but they tend to be overburdened at the time of disaster, therefore to supplementation by local police force is needed to manage the increased demand. Apart from patient security, hospital staff security is also important during disasters.

According to Chung and Shannon[20], as part of staff protection, hospitals must create sheltering-in facilities/protocols during the time of mass casualties. Such protocols are needed to prevent unauthorised entry and exit. To accomplish this, an inventory of all exits and entrances must be made and a mechanism for mobilising additional security forces to protect all entrances and exits must be in place.

The hospital's capacity to manage patient surge is a critical element disaster plans[19]. Therefore, to expand capacity, the hospital should seek measures such as expansion of staff

work shift hours, call-back of off duty employees, and adapting nonclinical staff to clinical roles, as appropriate, and the development of rosters through medical societies for incorporating private physicians into staff rotation. At the time of disasters the principles of triage and transportation seems to be ineffective because of the large demand making hospitals to be the victims of disasters[20]. According to the author, it is estimated that for every critical care patient, there will be five unaffected patients seeking treatment. Those who are ambulatory will try to come to the hospitals by any means possible, some by walking, or by private transportation. Hospitals need to evaluate their resources and determine how to respond to a disaster that could involve management of large number of casualties. In preparation, hospitals should identify temporary areas which can be converted into triage areas (for example, a lobby) and alternative care sites for the ‘‘walking wounded’’ (ambulatory clinics) and ‘‘worried well’’ (auditorium, conference rooms) in order to allow the emergency department to focus on critically ill patients only[20].

External communication plays an important role in hospital disaster plans and the major attention should be given to establishing communication links with local emergency operations centers, other hospitals, and medical institutions, ambulance services, and government authorities. Internal communications, however, are often not given attention during the planning phase. Because mobility and low cost are key features of hospital disaster planning, radios are most often adopted as means of communicating within the facility. These radios also have an added advantage that they require little training for operation and can be shared with staff of other agencies visiting the hospital for performing support operations[19].

To function successfully, hospital disaster plans should have training and an exercise component. Training is an integral part of the disaster planning process and successful training yields high results in effectiveness of emergency response[19]. Mock drill is an important component of training. It constitutes a simultaneous and comprehensive test of emergency plans, staffing levels, personnel training, procedures, facilities, equipment, and materials. Finally, conducting drills helps in larger community disaster planning and management process. Publicizing drills reports informs both the public and community

officials that planning for disasters is underway and that preparedness is being enhanced and reviewed.

Steve et al[14] stated that in US in 2006, most of the services (1242 [69.3%]) reported that they had participated in a local or regional disaster drill in the past year. They also emphasized the importance of pediatric specific drills so that they are also equipped adequately for emergency situations.

Richard et al[15] stated that in US, 50.6% of hospitals conducted more than one internal drill; 31.9% conducted only one internal drill; 11.1% conducted no internal drills; and 6.4% were unaware about the drill. Also 28.4% of the hospitals conducted more than one external drill (i.e., in collaboration with other organizations); 53.6% conducted only one external drill; 11.5% conducted no external drills; and 6.5% of hospitals were unaware about the drill.

Chung and Shannon[20] stated that an outbreak can occur at any time, so a sufficient core of trained staff (physicians, nurses, administration, security, and engineers) should be present 24 hour a day so that hospitals can respond to any emergency situations. Initial training should be followed by regular drills and refresher courses. Multidisciplinary hospital drills that involve physicians, nurses, security, engineering, and occupational health specialist should be conducted to test the strengths and weaknesses of existing protocols. Hospital drills can range from treating mock patients to table top discussion and should also include children as victims or simulate an event where all victims are children. Adult health care providers should receive additional education in the event that they may have to care for children.

Ahmad et al[21] has also raised the importance of trained manpower in PHC also apart from hospitals. According to him there should be appropriate distribution of physicians in urban and rural areas. The health workers in the PHCs should also be provided with sufficient competency to face disasters. There are some competencies that health workers require in order to be ready to cope with disasters, such as disaster preparedness training, basic and advanced life support, as well as separate public health emergency training. But surprisingly only two of the nine PHCs had sent their staff for disaster preparedness training. Only one PHC had trained its health staff in basic life support and none of the PHCs' health staff had

received any advanced life support training, whereas only one PHC had attended a public health emergency training in districts of Indonesia.

From the above discussion it can be clearly stated that effective planning requires explaining the provisions of the plan to all the personnel of those departments that will be involved in any phase of the disaster response[19]. Furthermore, hospital disaster plan information needs to be shared with other organizations such as emergency management authorities, local government, police, nongovernmental agencies, and other hospitals that will correspond to disasters. This serves to clarify expectations for institutional performance and to identify the types of support that might be shared among responder organizations.

OBSTACLES TO ADEQUATE PREPAREDNESS

There are many obstacles to preparedness of healthcare settings; an effort has been done to enlist few. According to the author, lack of administrative culture for crisis management, lack of need for establishment of such system on behalf of managers, absence of statutory requirements and instructions related to crisis management, too many decision maker authorities, high cost implementation, lack of authorities support and non-commitment of managers, lack of qualified managers in different levels, poor communication and coordination in crisis team, lack of competitive atmosphere for progress and excellence and planning among hospitals, attention to daily activities by managers, absence of a common management language, constant change in regulations, absence of ICS in the country and lack of unity of command in hospitals are few of the obstacle responsible for inappropriate preparedness of healthcare settings[12].

Planning Assumptions

Joseph et al[22] stated that the traditional planning assumptions that are based on conventional wisdom rather than evidence- and experience-based approach is a hurdle in preparedness for disasters.

1. *Expecting orderly distribution of casualties:* Many hospital administrators perceive that it is the responsibility of the community's public authorities to primarily prepare for managing a large-scale disaster. Some therefore expect that emergency medical

services, fire department, and law enforcement agencies responding to the scene will conduct thorough triage operations in the field and accomplish orderly distribution of casualties to hospitals equipped to deal with them. This erroneous understanding can lead to an assumption that the hospital will receive only processed casualties and can close to additional patients when full, or defer receiving casualty types that they do not treat typically.

2. *Expecting only ambulances transport casualties:* Emergency medical services is the typical transport for severely ill or injured patients. This expectation states that only significantly injured or ill patients will arrive at the hospital for treatment, leading to inadequate preparation to accommodate "the walking wounded" or concerned, potentially ill, or injured patients who arrive by other means. As a result, hospital capacity may be committed to the earliest arrivals, compromising treatment of severely injured or sick patients who are transported later.

Cost Versus Benefit

It is seen that the government and public rely on completely on both public and private healthcare facilities, which requires a lot of funding[23]. So if this funding is reduced or eliminated, then it will be a major challenge for hospitals and other health care organizations to procure all of the necessary financial resources. Also, many hospitals are confronted with financial viability issues on a daily basis, because of the inadequate payment by patients[22]. So for these hospitals emergency preparedness concerns may seem irrelevant when they are handling financial crisis. As noted, the financial and personnel time cost associated with emergency preparedness can be a major disincentive[22]. Hospital executives may be even more reluctant to support preparedness activities that are financially burdensome while producing little objective and immediately tangible benefits. Expending funds without an immediate return on investment or other inherent economic benefit may appear to useless for modern business practice, in which excess and unproductive capacity is lessened, and just-in time inventory with just enough staffing is considered the standard for effective business management. Building a surge capacity may require investing in equipment and supplies that may never be used or used rarely. Resources must be stored, maintained, and frequently replenished. Similarly, health care executives may be reluctant to free their

employees from their daily schedules to participate in training activities, when these activities do not appear directly relevant to everyday hospital operations. Another cost-versus-benefit analysis may lead hospital leadership to consider the use of insurance as protection instead of emergency preparedness, particularly for low-likelihood hazards that have not historically affected the hospital[22].

Data Systems and Measurement Tools

It has been very well pointed out by Richard et al[23] that we should collect data, every time a disaster occurs. Also there should be a system that enables us to thoroughly study the response efforts and the impact of disasters on the health and well-being of community. If there is a system with standardized tools and a team ready to respond, it would allow for more comprehensive and valid data to be collected. Along with the collection of good data, there is a need of more reliable and valid methods for measuring health care emergency management capabilities.

Legal Issues

There are numerous legal obstacles that hinder hospitals' disaster preparedness and response capabilities[23].

1. The health care organizations are not guaranteed reimbursement for the medical care they provide during a disaster if their documentation and accounting is incomplete.
2. To maintain continuity of services or to create surge capacity, hospitals and other health care organizations need effective memorandums of understanding to provide assistance in the event of an emergency.
3. There is a need to address disaster or situational standards of care. Decisions regarding the allocation of scarce resources and the appropriateness of conserving resources need to be addressed by the health care community and policymakers.
4. Health care worker liability during disasters has not been resolved. Steps have been taken to identify, credential, and protect volunteers; however, this needs further strengthening
5. Developing a common HVA requires divulging information about operational strengths and vulnerabilities. The sharing of information is important when planning

mutual aid, establishing guidelines for casualty distribution, and addressing other key issues. This may be viewed as releasing sensitive or proprietary information to business rivals[22]

Staff Training

Based on observation data, Ahmad et al[21] concluded that some of the heads of the PHCs were unaware of disaster preparedness training, basic and advanced life support training, as well as public health emergency training. This was the basic problem, because every physician who was responsible for managing the healthcare in a sub-district had to possess these capabilities, not only for the health staff themselves, but also for teaching the community to give first aid after a disaster.

Human/Resources

When it comes to resources then there are many things which can be included such as Transportation, Hospital Beds, Emergency response facilities and Human Resources. According to Ahmad et al[21] only four of the nine PHCs had any emergency facilities in two districts of Indonesia. Only one PHC had considered the need for triage and fire management, and four of them did not have any prepared secure area or a generator in place in case of power failure. The PHCs in Padang Pariaman lacked transportation facilities in the form of ambulances, mobile PHCs, which is vital to transporting health workers and disaster victims following a disaster.

Same as transportation, hospital bed shortage enforces a rapid turnover of patients, increasing the early discharge of patients and endangering their safety[23]. Apart from this, there are nonurgent patients which cause overcrowding of emergency departments. An overloaded emergency department has a great impact on other adjacent activities e.g. prehospital organization, ambulance transports, surgery, and individual patient's safety. Although these measures seem to be logical to improve healthcare effectiveness and reducing the costs, but they also, in a negative way, affect the surge capacity of a hospital. Such capacity is necessary for proper management of emergency incidents and is influenced by 3 essential elements; staff, supplies/equipment, and structure. Along with this Ahmad et

al[21] has also pointed out that shortage of manpower is equally responsible in ineffective handling of disasters. It can be said that a key to successful response to a disaster by a hospital lies in its emergency department and its personnel, who will triage the casualties and will rapidly transfer them for definitive treatment. If this key function is overcrowded already at the onset of a disaster response, the outcome for the patients will be suboptimal.

Lack of Command

There is a lack of clear cut command i.e. the ICS which creates confusion and chaos at the time of disasters. This was also shown by the Ahmad et al, that in districts of Indonesia the standard operating procedures and policy were not available in any of the PHCs that should be there for preparing for disasters. Also, the PHCs implemented the disaster response themselves after the disaster and there was no coordination between the PHCs, NGOs, and the local government. The PHCs had not even thought about how the system will be built if disaster struck[21].

Communication

Another common issue is of overloaded or collapsed communication system during disasters. Also the fixed telephone system lacks mobility and the frequencies for radios are weak and they are available in insufficient numbers[19]

OBJECTIVES OF THE STUDY

General Objective- To determine the level of preparedness of Public & Private Health Facilities for disasters in Delhi

Specific Objectives:

1. To determine the level of preparedness of Public Health Facilities (PUHC, CHC, DH, Government Dispensaries) for Disasters in three districts of Delhi.
2. To determine the level of preparedness of Private Hospitals for disasters in three districts of Delhi.
3. To suggest for bridging out various gaps found while conducting this study

METHODOLOGY

RESEARCH DESIGN:

The purpose of the study is to assess how well the health facilities in Delhi are prepared for managing the disaster. Therefore, the study has been planned on the basis of Survey research design where in the research shall lead to the conclusion whether the health facilities are adequately prepared to face any kind of eventuality involving a large number of casualties and injuries requiring immediate care. The study was approved by the Disaster Management Unit, UNDP, India, prior to being conducted.

SAMPLE DESIGN & SAMPLE SIZE:

Sampling method was non-random/convenience. For the convenience of study a total of 14 healthcare facilities were taken. Out of which 9 PHC/PUHC/Dispensary (3are from each district), 2 CHC and 3 Private Hospital were taken from three (South, South-West, West) districts of Delhi. The chosen PHCs/Dispensaries were:

1. DGD Chaukhandi, New Delhi
2. DGD Khyala, New Delhi
3. CGHS Dispensary Tilak Nagar, New Delhi
4. CGHS Dispensary Kidwai Nagar, New Delhi
5. CGHS Dispensary Nanakpura, New Delhi
6. CGHS Dispensary Motibagh, New Delhi
7. DGD Dwarka Sector-12, New Delhi
8. DGD Dwarka Sector-19, New Delhi
9. CG-PHC Palam Dabri Road, New Delhi

The two CHC taken were:

1. Charak Palika Hospital, Motibagh, New Delhi
2. MCD colony Hospital, Ashok Nagar, New Delhi

The three private hospitals chosen were:

1. Rockland Hospital, New Delhi
2. Maharaja Agrasen Hospital, New Delhi
3. Bensups Hospital, New Delhi

TARGET POPULATION

The study population included senior hospital managers, chief medical officers, staff nurses, medical officer incharge of disaster management.

TOOLS:

For the purpose of evaluation, the information was collected through the self-administered questionnaires[1] named "Preparedness of Health Facilities for Disasters" developed primarily on the basis of guidelines named "Guidelines For Hospital Emergency Preparedness Planning" developed under GOI-UNDP Disaster Risk Management Programme (2002-2009). The questionnaire developed for the study contained mainly dichotomous items. Few open -ended questions were also added to help respondents to give their preparedness in terms of the information, which could not be elicited through dichotomous questions. Information was also collected by direct observation and email because of the limited cooperation of the heads of the health facilities and time constraint. Interviews were also conducted with several key informants in the health facilities to support the questionnaire data. The investigation focused mainly on measuring facilities preparedness, standard operating procedure (SOP). The data is analysed using tools like, MS Excel and SPSS.

[1] *Annexure1- Questionnaire*

RESULTS AND DISCUSSION

As per the requirements of the study, the number of health settings taken was 14, out of which 9 were primary healthcare facilities(3 from each district), 2 were secondary care facilities(1 from south and 1 from west district), and 3 were tertiary care hospitals(1 from each district)[2].

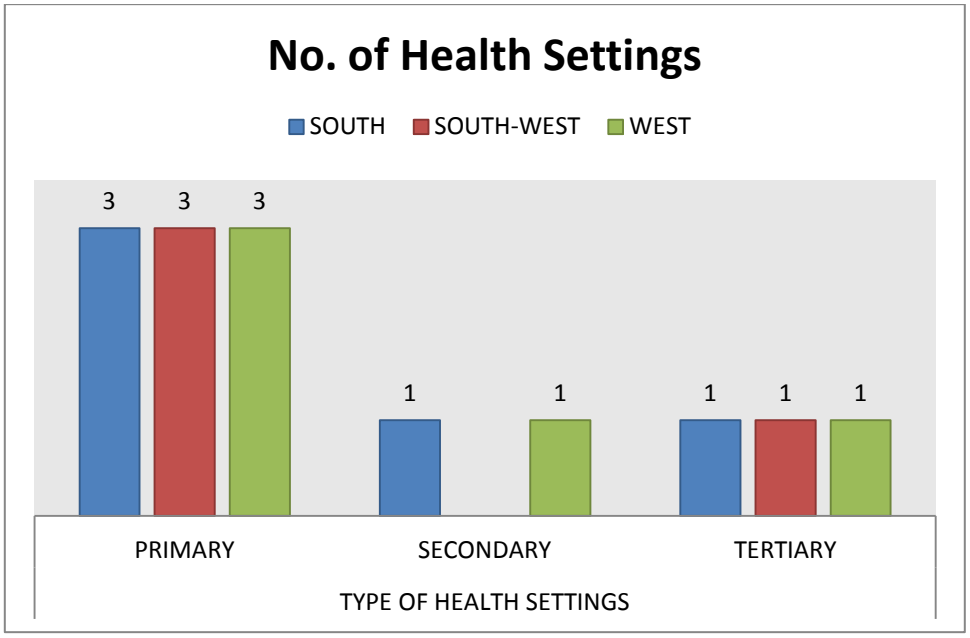


**fig 6: Chart showing number of health settings in three districts*

After analyzing the data it was found that only 11% of the primary healthcare facilities had a written Disaster Management Plan whereas all the private hospitals (tertiary care facilities) had a written Disaster Management Plan[3].

Also, after comparing the parameters like presence of an Incident Command System, Hospital Administration, Nursing Administration, Security Representatives, Pharmaceutical Representatives, it was found that 100% of the private hospitals have representatives from all the above said, but in primary and secondary (government) health facilities only 11-30% have these representatives. Communication is an important parameter which cannot be overlooked.

[2] *Annexure2- Table1*
[3] *Annexure2- Table2*

It was seen that landline connections are more prevalent (100%) among the government health facilities (both primary and secondary) but at the time of disaster landlines collapse easily, so there is an urgent need of wireless facilities which are lacking in government health facilities but can be seen in private health care facilities(nearly 67%). Also, clearly written Action/Job cards were completely absent in Government health facilities (0% in primary and nearly 50% in secondary health facilities)[4].

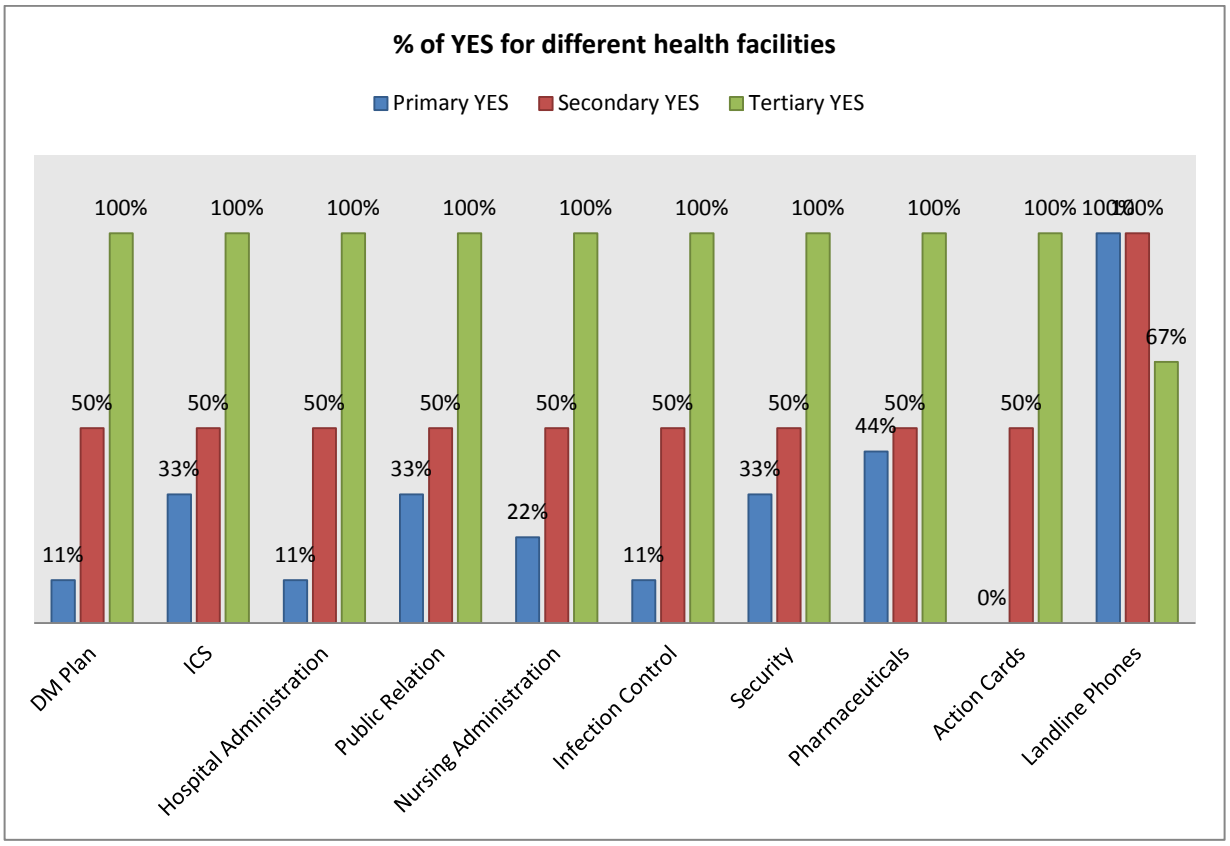


**fig 7: Chart showing percentage of YES among the three type of facilities*

Next looking at other important parameters, it was seen that only 10-20% of primary health facilities were maintaining Special Disaster Stores and Records, whereas 100% of tertiary care hospitals have Special Disaster Stores and Records. When considering access to ambulance it is seen that, nearly 90% of primary health facilities get the ambulance outsourced from CATS, but nearly 100% of private hospitals have their own ambulances,

[4] *Annexure2- Table2*

which is of critical importance for disaster situations, as the absence of ambulance can lead to increase in response time and delay in referral.

Awareness materials such as Signage / Hoardings/ Boards/ Posters play an important role in Disaster Management. According to literature, many initiatives have been taken to display print media options in primary health centres, but these seems to be the most lacking in both the government and private healthcare facilities. Also, such low figures reveal negligence, lack of awareness on the part of healthcare facilities for disaster management.

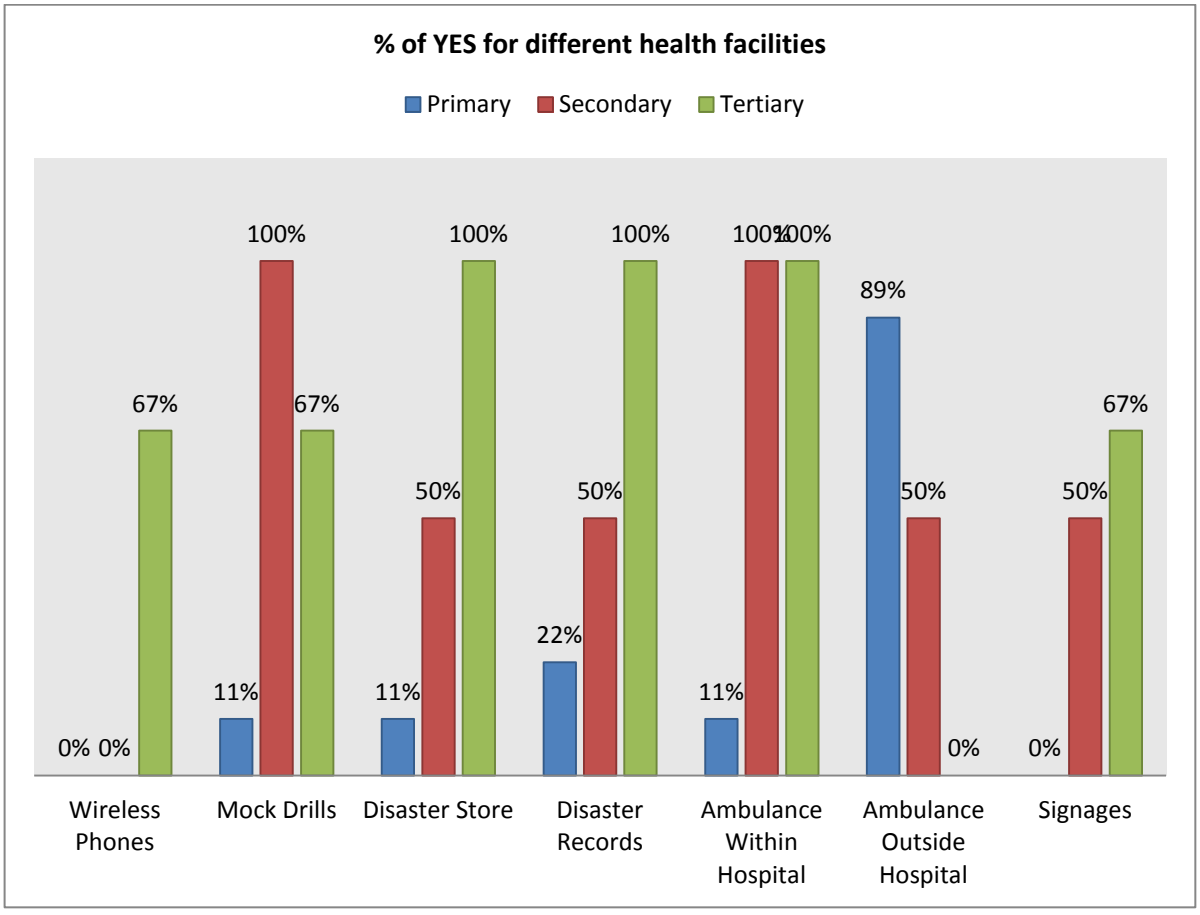


**fig 8: Chart showing percentage of YES among the three type of facilities*

When the respondents were asked about various aspects of Disaster Management, many issues gained focus. The respondents were asked about their perception of preparing the health facility for Disasters. The Staff Nurse at dispensary said *that "our job is to provide first aid and to refer the patient further to AIIMS."* Whereas the Medical Officer at PHC refers to it as *"sensitization of staff towards disaster and following up of proper protocols*

during disasters." But the Medical Officer In charge of Disaster Management, CHC refers to it as "*To bring down the casualty, giving first aid at the quickest, to segregate different kind of injuries and treating them according to specialty required. Hence bringing down the total number of casualties in terms of death."* He also said that he has taken following measures for preparing the hospital for emergencies*:"general awareness regarding different kind of disasters (nuclear, earthquake, epidemics), assigning nurses, ward boys, doctors and all paramedical staff their responsibilities towards their families."* The Assistant Floor Manager of a tertiary care hospital said that *"We have organized our healthcare setting in a way that it is ready to act in mass emergency situations. Measures have been taken to coordinate activities in case of emergencies so that there is no confusion. We have a separate approach for internal and external disasters."*

Mock Drills has been the most unutilized resource in hospitals when asked in any type of healthcare facility. Around 90% of them refuse to organize any kind of mock drill within their facility. The staff nurse at dispensary said that *"they have faced many challenges while organizing for mock drills such as incomplete instruments, shortage of manpowerand no clear roles and responsibilities."* On the other hand Medical Officer In charge of Disaster Management, CHC said that the strengths of organizing mock drills are *"upgrading system of treatment, managerial skills for segregation of patients, realization of duties by all paramedical staff, streamlining, and standardization of treatment of all kinds of injuries."* Whereas he mentioned that *"these are not actually working according to the disaster management plan as a major weakness."* The Assistant Floor Manager of a tertiary care hospital said that *"There was proper coordination of activities and the situation was controlled effectively without any confusion but the housekeeping staff requires more training."*

All of the respondents were asked about the various challenges they face while preparing their healthcare settings for disasters. There were varied responses, such as Medical Officer In charge of Disaster Management, CHC quoted that *"there are no standard operating procedures by the authorities, also the means of communications collapses during disasters."* Whereas the Medical officer, PHC, said that "*there is a big shortage of manpower and funds. Also mock drills are not conducted for staff training*." Apart from this

the Chief Medical Officer, Dispensary mentioned that "*we are not clear about their roles and responsibilities during disasters and we are not equipped to handle any large scale emergencies."* But the Medical Director of a tertiary care hospital said that "*unawareness and ignorance are two big challenges I have faced*." But there were few other gaps as mentioned by a Staff Nurse of a Dispensary, "*lack of proper water, laboratories, medicines, power supply and infection control."*

RECOMMENDATIONS

Findings of the study revealed many gaps such as lack of a clear cut command system, lack in awareness, lack of facilities, shortage of resources and manpower etc. These are the implications of the hurdles which are present in the path of effective Disaster Management. The obstacles as discussed earlier in literature are lack of financial assistance, legal issues, lack of governance, untrained staff and personnel, under estimated planning. To overcome these few solutions are recommended below:

1. **Internal Solutions**: solutions that can be implemented within the health settings.

Internal short term solutions	Internal long term solutions
Capacity Building of Doctors/ Paramedics/Patients	Management of Human/Resources
Financial planning for resources	Management/Back-up of Database
	Strong Incident Command System

2. **External Solutions**: solutions which will be implemented outside the health settings.

External short term solutions	External long term solutions
Public Private Partnerships	Proper Allocation of Budget
	Designing of standard guidelines/rules/policies and their strict implementation.
Unbiased and Efficient selection of administrators	Strong Incident Command System
	Twinning/City Pairing

1. Capacity Building[11, 16]: The hospital staff comprising of Doctors, Nurses, Paramedics and Administrators should be trained accordingly on topics like Basic Life Support, Advanced Cardiac Life Support, Media Management, Crowd Management, Search and Rescue Techniques, Triage Techniques through focus group discussions, workshops, and mock drills/simulation exercises to deal with the disasters in an effective manner.
2. Standard Operating Procedures[11, 12]: similar guidelines/SOPs should be designed for each type of healthcare facility so that they can be planned in a simultaneous manner and functions in an integrated manner.
3. Budget Allocation[11, 12]: budget should be managed both within and outside the hospital to plan for the resources.
4. Strong Incident Command System[12]: is needed both at the policy level and within the hospital who can function without mistake at the time of disasters
5. Management of Database[16]: a strong and efficient Management Information System is the need of the to maintain databases for medicines, doctors and their contact details, vendors and their contact details, patient data and post disaster data and disease surveillance.
6. Twinning/City Pairing[24]: is the concept of pairing two cities to fight against the disaster situation where resources from one city can be mobilized to another city which is affected by the disaster.
7. Media Forms: such as print/audio/video should be enforced in the system to generate awareness.
8. Management of Human/Resources: The resources including human resources and resources such as water, power and communication facilities should be mapped prior to the disasters so that it can be resumed back to the normal as soon as possible during the disasters. Also, human resources should be managed as such that more staff can be directed towards the hospital in action during the disaster and can be transferred on-site for immediate patient care.

LIMITATIONS OF STUDY

1. Limited time period was a major constraint while collecting data.
2. Sample size is small as only few health facilities have been taken into consideration.
3. The physical verification of the response given by the respondents could not be done as the secondary data was not shared by any of the healthcare facility.
4. Because of the limited data available, an in-depth analysis could not be conducted.

CONCLUSION

The inference drawn from the study is that Disaster Management is still an understudied topic in Delhi till date. Since Delhi is a disaster prone state, stronger initiatives should be taken to prepare healthcare facilities for disasters. Disaster Management has to be a multi-disciplinary and pro-active approach. Besides various measures for putting in place institutional and policy framework, disaster prevention, mitigation and preparedness should be emphasized more. Also, besides tertiary care hospitals, primary health centres should also be strengthened for facing disasters. A comprehensive approach should be developed for preparing them for disasters, as well there should be proper coordination among public sector, private sector as well as NGOs. But the main emphasis should be given on issues related to governance, designing of guidelines is not important, but more important is their strict implementation and effective utilization of existing resources.

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ANNEXURE I

Preparedness of Health Facilities for Disasters in New Delhi

This is a part of a research study being conducted by me, student of IIHMR, New Delhi as a part of course curriculum /Internship/**Dissertation**. No personal information of the respondent would be released to anyone without the respondent's consent. Kindly give your genuine response to the statements for the relevant parameters. There are no right/wrong answers. Besides, your response will be kept confidential and will be used strictly for my academic work.

QUESTIONNAIRE

Name of the Health Setting: _____

Type of Health Setting: _____

Address of the Health Setting: _____

Name of the Respondent: _____

Designation of the Respondent: _____

Questions	Yes	No
• **Do you have a WRITTEN Disaster Management Plan for your health setting?**	◯	◯
• **Do you have an Incident Command System?**	◯	◯
• **Do you have a Disaster Management Committee?**	◯	◯
• **Do you have representatives in Disaster Management Committee from services dealing with:**		
▪ **Hospital Administration**	◯	◯
▪ **Communication/Public Relation**	◯	◯
▪ **Medical Personnel (eg. Emergency Medicine, Intensive Care, Internal Medicine)**	◯	◯
▪ **Nursing Administration**	◯	◯
▪ **Infection Control**	◯	◯
▪ **Respiratory Therapy**	◯	◯
▪ **Human Resources**	◯	◯
▪ **Security**	◯	◯
▪ **Pharmaceuticals**	◯	◯
▪ **Engineering & Maintenance**	◯	◯
▪ **Laboratory Services**	◯	◯
▪ **Dietary Services**	◯	◯
▪ **Laundry, Cleaning & Waste Management**	◯	◯
▪ **Hospital Unions**	◯	◯
• **Do you have clearly written JOB Cards/ Action Cards for dealing with emergencies for your employees?**	◯	◯

• **What type of communication networks do you have?**		
▪ **Internal Telephone Exchange**	◯	◯
▪ **Landline Phones**	◯	◯
▪ **Mobiles/Cellular Phones in Closed User Group**	◯	◯
▪ **Private Mobile/Cellular Phones**	◯	◯
▪ **Loudspeakers/Public address systems**	◯	◯
▪ **Wireless Sets for Security and Ambulance Personnel**	◯	◯
▪ **The Communication Room**	◯	◯
• **Do you have a provision for special service areas during disasters such as:**		
▪ **Reception & Triage Areas**	◯	◯
▪ **Emergency Department**	◯	◯
▪ **Operation Theatre**	◯	◯
▪ **Wards**	◯	◯
▪ **Intensive Treatment Area**	◯	◯
▪ **Minor Treatment Area**	◯	◯
▪ **Holding Area**	◯	◯
• **Do you have a provision for essential ancillary service during disasters such as:**		
▪ **Laboratory Services**	◯	◯
▪ **Radiological Services**	◯	◯
▪ **Blood Banks**	◯	◯
▪ **Mortuary Services**	◯	◯
▪ **Hospital Dietary Services**	◯	◯
▪ **Sanitation Services**	◯	◯

▪ **Hospital Laundry & Sterile Supply**		
▪ **Additional water storage tanks**		
▪ **Standby Generators**		
• **Is your staff trained to handle disaster?**		
• **Do you conduct Mock dills for your staff education and training?**		
• **Do you have provision for increasing the bed capacity during disasters?**		
• **Have you maintained a special "Disaster Store"?**		
• **Do you refer patients for further treatment to :**		
▪ **Other PHC/PUHC/Dispensary**		
▪ **Secondary Care Hospital**		
▪ **Tertiary Care Hospital**		
▪ **Private Hospital**		
• **Do you maintain Special Disaster Records?**		
• **Do you have linkages with Ambulance Services:**		
▪ **Within the Hospital**		
▪ **Outside the Hospital**		
• **Do you have resources to set up temporary facilities during times of disasters:**		
▪ **First-Aid Health Facility**		
▪ **Media Management**		
• **Are the Signages for Disaster Management present?**		
• **Did you participated in the mock drill held on 15th Feb,2012?**		

Preparedness of Health Facilities for Disasters in New Delhi

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QUESTIONNAIRE

Name of the Health Setting: _____

Type of Health Setting: _____

Address of the Health Setting: _____

Name of the Respondent: _____

Designation of the Respondent: _____

Q1. What do you understand by preparing the hospital/health facility for disaster/emergencies?

Q2. What measures have you taken for preparing your health setting for disasters/emergencies?

Q3. Have you organized any type of mock drill Disaster Management? What were the strengths and weaknesses?

Q4. Has your staff been trained on Disaster Management? If yes, then how and on what topics?

Q5. Have you encountered any kind of disaster/emergency situation in past 10 years? If Yes, What?

Q5a. Have you made any changes in your management since then?

Q6. What challenges you are facing while preparing for disaster management?

Q7. Are you aware of the GOI-UNDP "Guidelines for Hospital Emergency Preparedness Planning"? If Yes, then are implementing it?

ANNEXURES II

TABLE 1: Table showing number of Health facilities in the three districts

DISTRICTS	TYPE OF HEALTH SETTINGS		
	PRIMARY	SECONDARY	TERTIARY
SOUTH	3	1	1
SOUTH-WEST	3		1
WEST	3	1	1

TABLE 2: Table showing relation between different parameters and type of health facilities

Parameters	Type of Health Setting		
	Primary	Secondary	Tertiary
	YES	YES	YES
DM Plan	11%	50%	100%
ICS	33%	50%	100%
Hospital Administration	11%	50%	100%
Public Relation	33%	50%	100%
Nursing Administration	22%	50%	100%
Infection Control	11%	50%	100%
Security	33%	50%	100%
Pharmaceuticals	44%	50%	100%
Action Cards	0%	50%	100%
Landline Phones	100%	100%	67%
Wireless Phones	0%	0%	67%
Mock Drills	11%	100%	67%
Disaster Store	11%	50%	100%
Disaster Records	22%	50%	100%
Ambulance Within Hospital	11%	100%	100%
Ambulance Outside Hospital	89%	50%	0%
Signage	0%	50%	67%

ANNEXURE III

LIST OF FIGURES: