Hospital Preparedness and Response: 2008 Mumbai Terror Attacks

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Cehat

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Preface

Rapid urbanization, will result in about 590 million people in India residing in cities by the year 2020. Unplanned spatial growth and development can potentially create high levels of vulnerability to disasters such as earthquakes, cloud bursts, floods, diseases compounded bypoor access to services such as water and sanitation. With a global rise in the intensity and frequency of disasters there is greater recognition that public health systems play a crucial role in saving lives. Disasters have serious health consequences and often bring the spotlight on the levels of preparedness of a nation's public health system. India is a disaster prone country and with the government spending a mere 1.3 % of GDP on public health, it is well known that during disasters and other emergencies, public health systems are severely strained. However there are virtually no systematic studies documenting what transpires within these systems during a disaster. As a result, the degree of preparedness of public hospitals and health care systems for emergencies created by disasters remains undocumented and under-studied.

The terror attack of 2008 on Mumbai city, the commercial capital of India, remains unprecedented in several respects. Besides indiscriminate firing at public places such as railway stations, hostage situationsin prominent hotels, government hospitals were also attacked. It is in the aftermath of this event that CEHAT approached the Jamsetji Tata Centre for Disaster Management at TISS to collaborate in a research study that systematically examines what transpired and also the degree of disaster preparedness of city hospitals.

In our view, this study assumes significance from both a disaster and a development perspective. It seeks to identify strengths and gaps in the response capacities of select government hospitals in Mumbai city and the procedures that were followed in the wake of the terror attack. The insights it provides would be of value to the government, health care providers as well as the disaster research community. It would also be of interest to those concerned with hospital preparedness for mass casualty events. The study points to the need for systematic review of public health services, administrative procedures and systems in order to keep pace with the rising health-care needs of an expanding urban population.

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We would further like to thank the team at CEHAT and TISS who helped in data collection and coding. This includes Ms. Nidhi Sharma, Ms. Rashmi Divekar, Dr. Vikas Kurne, Mr. Kanchan Kumar, Ms. Ketki Hate and Ms. Karishma Makeshwar. We are thankful to Dr. Nobhojit Roy and Prof. Janki Andharia for providing expert inputs right from the stage of proposal development, till finalization of the report. Thanks are also due to CEHAT's scientific review committee consisting of Dr. Padmini Swaminathan, Dr. Padma Prakash, Dr. Lakshmi Lingam, Dr. Vibhuti Patel, Ms. Padma Deosthali, Ms. Sangeeta Rege and Mr. Oommen Kurian, who provided critical comments that have helped us sharpen our analysis. Finally, we are immensely grateful to Padma Deosthali, Coordinator of CEHAT, who conceived the idea of doing this study and provided leadership and guidance throughout its conduct. A special thanks to Jasmin Chembiparambil and Pramila Naik for their support in referencing and printing.

Research Team

Executive Summary

Mass casualty incidents often put health systems under tremendous stress in terms of equipment, adequate staffing and resources. The health system in India is structured such that the primary health responder during mass emergencies is the public health system and it often remains the only responder. This makes it critical to develop comprehensive systems to respond from the pre-hospitalization phase right up to discharge and compensation disbursement. The aim of this study is to enable the development of well prepared, robust health care response systems for disaster related emergencies.

Research and sharing of the experiences, lessons and challenges related to such events is critical in policy-making and planning of hospital preparedness. However, documentation and dissemination of such information from a public health perspective today exists mainly in the international sphere with little or no research in India, despite the fact that India has had a history of responding to mass-casualty events like terrorism and riots.

During the 2008 Mumbai Terror Attacks, which left 172 dead and 304 Injured, the hospitals that responded were the state-run JJ Hospital and its peripheral hospitals: G.T Hospital and St. George's Hospital. In addition the Cama and Albless Hospital itself was under attack, which created a challenging situation for the staff where they had to also ensure safety of patients and themselves. The unprecedented nature and the duration of the attacks further complicated the chaotic atmosphere in which the hospitals had to operate.

It is in this context that this study aimed at understanding what transpired in these public hospitals during the attacks and assessed the preparedness of the hospitals to deal with such a crisis from the healthcare providers' perspective. Moreover, it attempts to document lessons learnt and identify ways of improving the response based on experiences of the providers. The study has used in-depth interviews of staff present during attacks in the four hospitals. It captures detailed accounts of staff interaction within and outside the hospitals, constraints faced and recommendations for measures to be taken ensuring efficiency.

The findings point to the need for greater planning towards better preparedness of both heath facilities and personnel during mass casualty incidents. Besides planning, conducting trainings, analysing existing resources, judiciously deploying them, co-ordinating both within and outside the hospital and creating a knowledge base - are all measures that would enable the health system to strive towards better response in emergencies. It also highlights that mass casualties are unpredictable but pre- planning that defines responsibilities, allows scaling up and incorporates multi-sectoral involvement can dramatically improve response.

The study strongly recommends that policy makers and hospital administrators make preparation and training of health care providers to respond to such events a priority. It clearly highlights the need to systematically look at medical interventions during emergencies in the Indian context so that best practices can be recognized and formed into new plans or codified for better performance into the existing plans. The study argues for the public health system to move from impulsive reaction to proactive response.

Abbreviations

AHRQ	Agency for Healthcare Research and Quality
BMC	BrihanMumbai Municipal Corporation
CEHAT	Centre for Enquiry into Health and Allied Themes
CME	Continuing Medical Education
CMO	Chief Medical Officer
CST	Chhatrapati Shivaji Terminus
DHS	Directorate of Health Services
DM	Disaster Management
DMER	Directorate of Medical Education and Research
ECG	Electrocardiography
ENT	Ear Nose Throat (Specialist)
HoD	Head of Department
ICRC	International Committee of Red Cross
ICU	Intensive Care Unit
IED	Improvised Explosive Devices
IV	Intravenous
JJGH	JJ Group of Hospitals
MCE/I	Mass Casualty Event/Incident
MCGM	Municipal Corporation of Greater Mumbai
MLC	Medico Legal Case
MO	Medical Officer
MRI	Magnetic Resonance Imaging
MS	Medical Superintendent
NDMA	National Disaster Management Authority
NGO	Non-government Organizations
OPD	Out-patient Department
OT	Operation Theatre
PAHO	Pan American Health Organization
PIC	Public Information Centres
RMO	Resident Medical Officer
SIC	Sister-in-charge
TTSRL	Transnational Terrorism, Security and Rule of Law
VIP	Very Important Person

INTRODUCTION

Attention to terrorism has increased sharply in recent years given the severe loss of life, injury and destruction accompanied by psychological effects on the population. Terror attacks as a tactic are increasingly being used by different groups around the world to assert their objectives or state their demands and are replacing conventional armed conflict as a major form of violence (Transnational Terrorism, Security and Rule of Law [TTSRL], 2008). With such attacks targeting public infrastructure mainly in urban areas, potential destruction and loss has become more acute (Savitch, 2005). Cities are increasingly becoming targets of terror attacks - whether it is through chemical attacks like the Tokyo Subway Attacks (1995), using explosives like the Madrid Train Attacks (2004), the London Bombings (2005) and the recent Volgograd Bombings (2013), sustained gun and grenade battles like the Mumbai Attacks (2008) and the Kenya Mall Attacks (2013) or large scale events like the 9/11 Twin Tower Attacks (2001).

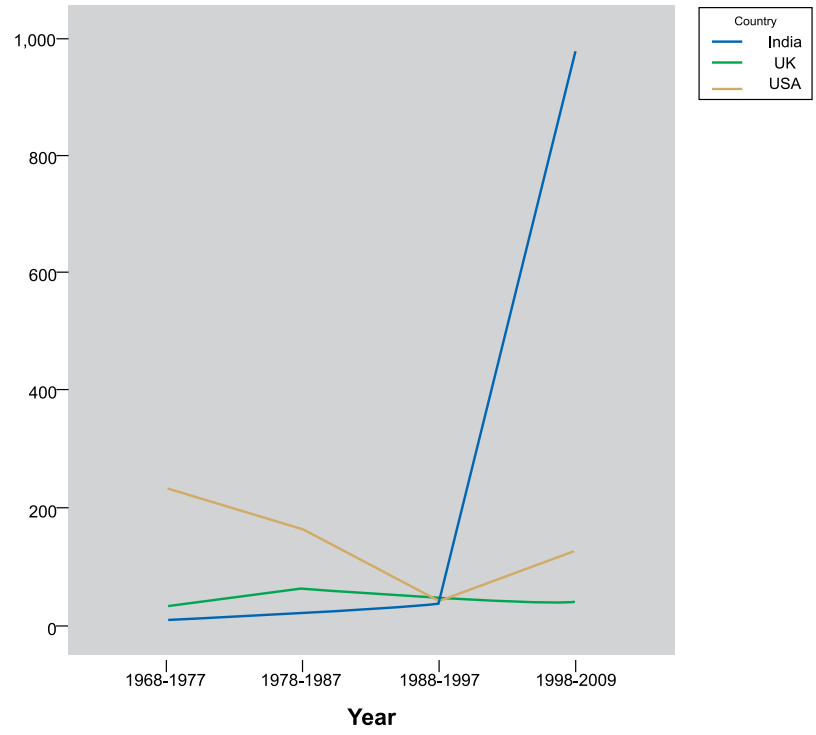

Fig 1 **Frequency of Terror Attacks in India, UK and US** (Source: RAND Database)[1]

India has been affected by terror attacks since independence. Data since the 1970s show that India ranks third in the world in terms of terror attacks and third in terms of fatalities due to such attacks (Lafree, 2010). India has seen a spurt in terror attacks particularly in urban areas in the last three decades.

Role of the Health System during Terror Attacks

Given the scale and scope of modern weapons to inflict injury, terror attacks manifest as mass casualty events, becoming a formidable challenge to the health system (Shapira and Shemer, 2002). Mass casualty incidents result in physical as well as psychological trauma, which makes health facilities and the role of health care professionals important. It is the frontline of saving lives, emergency care and focal point of interaction between different agencies like the government and the security forces; hence the community falls back on the health system for providing care and hope, making their responsibilities more challenging and visible during such events. As mass casualty events, terror attack incidents often put health systems under a tremendous resource crunch in terms of equipment, adequate staffing, drugs and blood requirements. To make matters worse, health care often gets suspended or rendered impossible during such attacks because of the damage inflicted on the facilities or personnel and the atmosphere of insecurity that prevails (International Committee of Red Cross [ICRC], 2011).

[1] Created using the RAND Corporation's data Base, retrieved from http://www.rand.org/nsrd/projects/terrorism-incidents.html

Health Sector Response in India

The nature of the health system in India is such that the primary and often the only health responder during mass emergencies is the public health sector. Private health care facilities have lent a helping hand at times, but by and large, response to mass casualty events is by the public health facilities. This makes it critical to develop systems to respond from the pre-hospitalization phase right up to discharge and compensation. It is only recently that there has been recognition of the importance of planning and preparedness of hospitals to emergencies. The National Disaster Management Authority, which since its inception in 2005 has been constantly endeavouring to lay down policies on disaster and emergency management, has only recently recognized the importance of planning and preparedness of hospitals during emergencies (National Disaster Management Authority, 2007). But resource crunches and bureaucratic hurdles have affected the implementation of such measures uniformly across the public hospitals in the country. Without adequate systems of planning, capacity-building and co-ordination in place, the health response continues to be fragmented. In India, hospitals rarely have a documented plan and even more rarely conduct disaster drills or publish reports on such drills (Mehta, 2006).

Need for studying Health Sector Response

The peculiarity of mass casualty events makes it imperative that lessons from the past are incorporated into future planning (Frykberg, 2005). Documentation, research and sharing of experiences, lessons and challenges related to such events can form the source for further preparation and training of health care providers to respond to such events. With increasing incidents of terror attacks globally, there have been substantial studies on hospital management and the response of health care providers to such emergency situations (Shapira and Shemer, 2002; Fetter, 2005; AHRQ, 2005; Shirley, 2006; Liebrgall et al., 2007, Shirley and Manderloot, 2008; Bisson et al., 2010). These studies have tried to analyze the nature of the response, the lapses, the roles that different grades of health care providers like doctors and nurses play and more importantly, key lessons learnt from each response.

However, documentation and dissemination of such information from a public health perspective exists mainly in nations with strong existing health systems, resources and capacities, which is not always the case in middle and low-income settings like India. There have been limited attempts in academia and research to study in depth the impact of these attacks on public health services in India (Sundaresan et al., 2012). There is still very little documentation in India of how the health facilities and providers should respond in cases of mass casualty incidents and the efficacy of existing plans in the face of terrorist threats. This is despite the fact that India has had a history of responding to mass casualty events like terrorism and riots.

This void needs to be addressed with more research by the health sector from within and by public health analysts from without. Such documentation would help to understand whether current practices are adequate and in what way they can be improved. It would also bring to the fore the gaps and identify areas where specific guidelines and training are required. This can create a body of literature that looks at medical interventions holistically so that best practices can be recognized and formed into new plans or codified into the existing plans.

Rationale of the Study

It is in this context that there is need to document how the public hospitals responded at the time of the 2008 Mumbai terror attacks that left nearly 172 dead and 304 injured (Roy at al, 2011). These hospitals had to bear the burden of care towards survivors and victims of the attacks as is the case with each event of mass casualty in India. Owing to the attention that the public health system receives during such crises, the inadequacies of the already strained system are magnified. Such times offer an opportunity to assess the existing malaise and direct the policy-makers' attention to the need to equip hospitals and providers to respond to such emergencies.

In a scenario like this, it is vital to get the providers' perspectives on whether they were equipped to handle the difficult situation, both in terms of clinical expertise and infrastructure, whether there was a cohesive response and whether they think there could have been a more efficient method of handling the event. Such an enquiry would help identify gaps in response, which could then be rectified so that providers feel more in control of the situation, should such an event occur again.

As with other disasters and incidents of mass violence, one expects that this episode has taken its toll on the emotional well-being of all providers, particularly those who were involved in caring for the survivors of the attacks. Insights gained from the providers' narratives can be incorporated into disaster management training, so as to equip them emotionally and physically to respond to such events.

OBJECTIVES

This study aims to

- Understand how public hospitals in Mumbai responded to the terror attacks
- Assess the preparedness of the hospitals to deal with such a crisis from the providers' perspective
- Evaluate the preparedness of providers after the attack to deal with similar emergencies
- Document lessons learnt and identify ways of improving the response based on the experiences of the providers.

METHODOLOGY

2.1 The Context

The financial capital and the most densely populated city of India, Mumbai was attacked by terrorists on November 26, 2008. After entering the city by sea, the group of ten terrorists split up and attacked various prominent places in downtown Mumbai using hand grenades and modified assault rifles. The first target was the central railway station Chatrapati Shivaji Terminus (CST), which was packed with passengers. Next, a Jewish Community Centre, the Chabad House and a public hospital, the Cama and Albless Hospital in the vicinity were attacked. A local pub frequented by foreigners, the Café Leopold was fired upon after which two of the biggest luxury hotels in the city, the Taj Palace and the Oberoi Towers were attacked and people were taken hostage. There were also two blasts in taxi-cabs at two different locations in the north-west and central areas of the city because of explosives planted by attackers. The law enforcement agencies lost some senior officials during the attacks and finally, the armed forces had to be called in. The entire episode lasted for more than 60 hours, leaving more than 172 people dead including 28 foreign nationals and more than 300 injured (Roy et al, 2011). The duration of the event together with the uncertainty caused by the nature of this atypical terror attack created panic and a sense of insecurity throughout the city, which has seen terror attacks before but mainly involving improvised explosive devices (IEDs). This was an unprecedented event and the city's security system was clearly unprepared for the nature of the attacks.

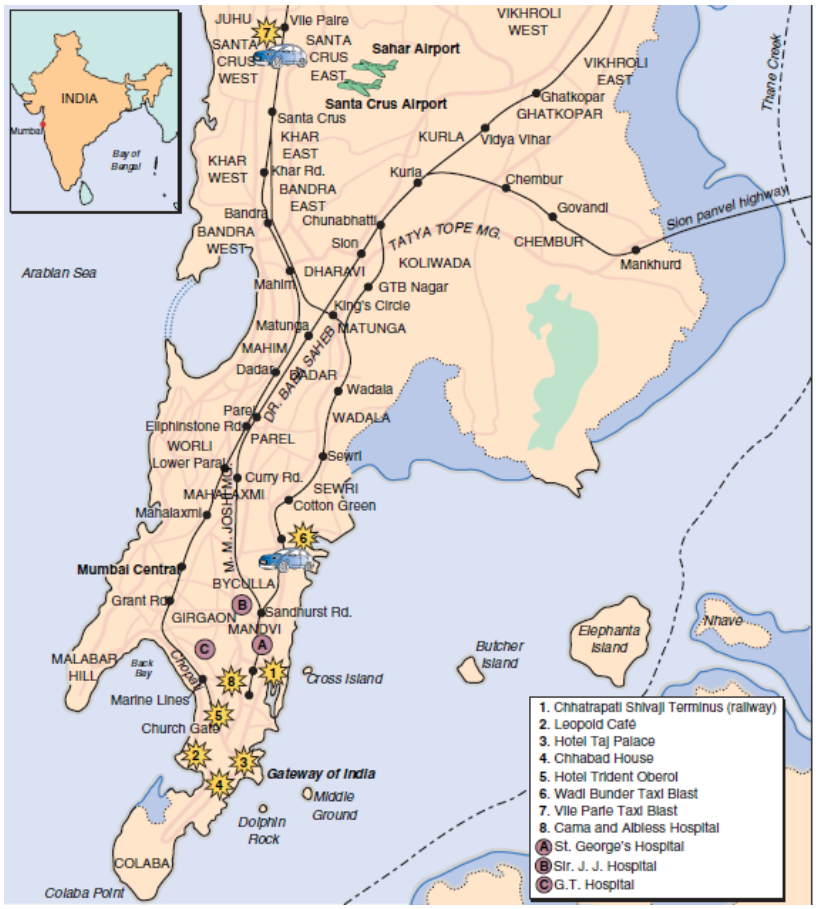

Fig 2. **Mumbai Terror Attacks 2008 - Sites**
(Source: Bandharwar et al., 2008)

The hospitals that responded were the state-run JJ Hospital and its peripheral hospitals, GT Hospital, St. George's Hospital and Cama and Albless Hospital. In addition, there were certain peculiarities about the Mumbai attacks that complicated the situation. The Cama and Albless Hospital itself was under attack, which created a challenging situation for the staff who had to ensure the safety of patients and themselves.

During the attacks, all the victims were brought to the peripheral hospitals, St. George's and GT hospitals, given their proximity to the site of the attacks. Later, all the patients who were being treated in these hospitals were transferred to JJ Hospital. These hospitals treated physical injuries and were also responsible for medico-legal documentation. The sheer number of patients and the unprecedented

nature of the event resulting from the attacks required the hospitals to prepare and respond to the crisis within an extremely short period. Post mortems needed to be done for the deceased. Those with injuries needed to be treated immediately. The wounds that patients presented with were also not ones that doctors were accustomed to dealing with routinely (Bandharwar et al., 2008). Apart from a few patients who requested for a transfer to other hospitals, mainly private specialty hospitals, most completed their treatment at JJ, which in some cases went up to a year (Bandharwar et al., 2008).

2.2 Study Method

The objective of this study was to understand, from the perspective of providers, how they responded to the attacks. The method used was qualitative in-depth interviews with health care providers involved in responding to the attacks. This study explores the manner in which providers made decisions about their role, the nature of problems they encountered and their recommendations for improving the response. In-depth interviews provided us with the opportunity to understand these aspects. This study was conducted after a gap of almost fifteen months, which were spent in getting necessary permissions from the government. That there would be some loss of information due to the time lapse was recognized. Nevertheless, this was an unprecedented incident and therefore, documenting the responses from the providers' perspective would be a valuable contribution.

Sampling

In-depth interviews of key informants (Dean, Medical Superintendent, Senior Medical Officer, Matron, and Medical Records Officer) and other staff from various departments of the four hospitals, who were present on the day of the attack, were conducted. The study participants were purposively selected such that the sample would be representative of various departments and all the levels of the staff who were present during this crisis. The staff (Heads of Departments, Lecturers, Residents, Resident Medical Officer (RMO), Chief Medical Officer (CMO), Technicians, Sanitary Inspector, Ambulance in-charge and Nurses) were selected from the different departments: Casualty, Medicine, Surgery, Orthopaedics, Intensive Care Unit (ICU), Radiology, Blood Bank and Forensic Medicine. The interviews were conducted by two staff members of the Centre for Enquiry into Health and Allied Themes (CEHAT).

A total of 44 interviews were conducted with health care providers across three hospitals – JJ, GT and St. George's directly involved in responding to the attacks. The respondents across different categories are tabulated below.

Table 1: Distribution of Respondents categorized by Hospitals

Category	JJ Hospital	St. George's Hospital	GT Hospital	Cama Hospital	Total
Key Informants	MS, Matron, Social Worker	MS, Matron	MS, MRO, Matron	MS	**9**
Doctors	3 Senior doctors , 2 RMO, 1 CMO	1 RMO, 1 CMO, 1 HoD of Surgery, 1 Doctor	1 RMO, 1 CMO	1 RMO , 1CMO	**14**
Nurses	2 SIC, 3 Staff Nurses	1 SIC, 3 Staff Nurses	2 SIC, 2 Staff Nurses	4 Nurses	**17**
Technicians	2	1	1		**4**
Others	3 (Ambulance driver, mortuary)	2 (Ambulance driver, watchman)	2 (Ambulance driver, watchman)	3 (office superintendent, watchman, telephone operator)	**10**
Total	**19**	**13**	**12**	**10**	**54**

Conducting Interviews

Before each interview, the researcher met with the prospective respondents and briefed them about the study. An introductory note about the study was shared with the respondent and an appointment for an interview was scheduled. Interviews were conducted in complete privacy.

In-depth interviews covered the following areas:

The ***interview with key informants*** enquired about

1) A detailed account of the actual response
2) Factual information about staffing, resource availability, criteria for triage, incident command system, risk communication strategies and organizing information.
3) Gaps if any and reasons thereof
4) Training of staff
5) Past experience that helped them deal with the emergency
6) Lessons learnt and Recommendations

The *interview with the staff* enquired about

1) The role that each respondent played
2) Perceived constraints in terms of infrastructure and expertise
3) Perceived sense of self-efficacy (including previous training)
4) Perceived effectiveness of response and reasons for malfunction if any
5) Consequences on the providers if any
6) Lessons learnt and Recommendations for better response

2.3 Analyzing Data

Eight representative interviews from different cadres of staff and hospitals were coded initially to identify first order concepts and second order concepts. This identification of themes was done collectively by all the researchers who had been involved in data collection. Different sets of concepts were identified for the hospitals that were involved in responding to victims of the attacks and the one hospital which had been attacked, as the nature of data collected in both cases was different. Once the first and second order concepts were finalized, all 44 interview transcripts were entered into ATLAS ti v.6.2 and coded, based on the themes identified.

2.4 Ensuring Scientific Rigor

Before embarking on data collection, the entire team of researchers went through training and conducted mock interviews. Each interview was conducted by two persons – one who conducted the interview, and another who documented it verbatim. After each interview, both persons debriefed and went over all aspects of the interview so as to ensure that no information had been lost. All the interviews were transcribed on the same day or the following day at the latest. The entire team of researchers reviewed all the transcripts periodically in order to monitor the quality of data being collected.

2.5 Ethical Considerations

Given the nature of the incident, a number of measures were taken to ensure that ethical standards were met. Efforts were made to ensure voluntary participation by providing information about the study through an introduction letter and allowing participants to decide if they wanted to participate. At the beginning of each interview, interviewers explained the rationale for the study, the fact that participants could refuse to participate if they did not want to, the right of the participants to stop the interview

at any time, or not answer specific questions. We also requested participants for permission to record the interviews, but none agreed to this. Written consent was sought from each participant before the conduct of the interview. No incentives were offered to the respondents for participating and there was no disincentive for not participating.

Efforts were also made to ensure absolute privacy, confidentiality and anonymity. In order to ensure privacy, all interviews were conducted in a side room usually after the participant's duty was over. There were times when a matron or other senior wanted to be present during the interview, but this was disallowed. In instances when private space was not available, the interview was re-scheduled to another time. Steps were taken to ensure that the identity of the participants was not divulged. During the interviews there were times when participants or matrons would ask who had been interviewed and what information they gave, but this was not revealed. The transcripts of the interviews were only shared within the research team. All soft copies of the transcripts were password protected to prevent information from being read by others. In order to protect anonymity, the report takes care not to mention any identifiable information.

As the objective of the study was to capture the experiences of the health care providers, the questions revolved around what happened that fateful night and the collective responses of the hospitals rather than individual action. This removed any scope of counterattacks on the respondents. The researchers also prepared themselves for emotional outbursts during the interviews as these events were traumatic for the respondents.

2.6 Challenges Faced

One of the greatest challenges faced while conducting this study was that of gaining access to the study population. While the study was conceptualized in January 2009, soon after the attacks, fieldwork began only by May 2010. We were referred from the administrative heads of the hospitals to the Directorate of Medical Education and Research, from where the proposal was forwarded to the Secretary, Medical Education. There was reluctance to provide permissions for this study as it was considered 'sensitive' and a matter related to national security. Moreover, most government officials are generally careful and cautious about speaking freely to researchers and journalists on matters that are being probed by security agencies. This made it even more important to get proper permissions and convince gatekeepers, so as to mitigate any risks to participants because of backlashes. Their concern of being pulled up for speaking to non-government agencies had to be assuaged. Since it was a public hospital, it would be easier for them to participate knowing that the study had received official sanction from the Government.

Once permission from the Secretariat was obtained in March 2010, the research team went back to the respective administrative in-charge of the hospitals, who issued a circular requesting the hospital staff to cooperate with the researchers in collecting data. In one hospital, the leadership changed during fieldwork and the respondents requested that we seek permission from the new person in-charge all over again. This led to a significant delay as the new administrator was averse to allowing researchers into the institution.

The consequence of this delay was that several people who were part of the response team on the day of the attacks were transferred to other hospitals and could not be tracked. The RMOs had been transferred and in all hospitals except St. George's, even the superintendents had changed. This reduced the pool of staff that one could pick from. Besides, certain groups like those of resident doctors (post-graduate students) could not be interviewed. Information about the clinical aspects of the response was sought from honoraries, who were clinical experts associated with the hospital. A second consequence of the delay was that no investigation could be conducted into the prevalence of post-traumatic-stress disorder among the staff.

Another challenge was the emotional reactions of the respondents in recollecting the incident. Two of the participants broke down while talking about the incident. The researchers reassured them that they had done their job to the best of their ability and that it was an unprecedented situation where they had gone beyond their call of duty.

2.7 Limitations

The study has tried to cover all the health care providers who were on duty during the attacks. However, delay in securing permissions and consequently conducting the interviews led to a situation where not everyone who responded could be interviewed and therefore, a few experiences may have been left out. The time lag also impeded assessing the immediate physical and psychological impacts on the providers after the attacks using specific research instruments.

EMERGENCY HEALTH SYSTEM IN MUMBAI

The city of Mumbai has faced a series of mass casualties earlier, especially terror attacks. There were large scale communal riots in the city in 1992 and 1993 killing nearly 1000 people; this was followed by the first major terror bombings in the city in 1993 which resulted in over 300 fatalities. In 2002 and 2003, the city saw a spate of bus bombings which killed around 50 people. In 2006, there were a series of co-ordinated bomb attacks in the railway network of the city, which killed more than 200 people. This was followed by the 2008 attacks.

The Existing Healthcare System

Mumbai and its surrounding urban area comprises around 18 million people[2] who depend on the city's health system. The health system in the city is mainly divided into three main providers - the public sector, the private and the charitable trusts hospitals[3]. The public healthcare system is further categorised as state-run facilities (run by the Government of Maharashtra) and the municipal facilities (run by the Municipal Corporation of Greater Mumbai (MCGM)). The municipal-run facilities comprise three major tertiary-level multi-specialty hospitals each with attached teaching institutions;,16 peripheral hospitals in the suburbs, five specialized hospitals for tuberculosis, leprosy, eye care, ENT (ears nose throat) and infectious diseases, 27 maternity homes and a network of dispensaries and health posts[4]. The only state-run hospital is the JJ Group of Hospitals (JJGH) consisting of the nodal JJ hospital, which is a tertiary-level, multi-speciality hospital with around 1200 beds and three peripheral hospitals with 400-500 beds each. Of these, GT and St. George's Hospitals have multi-speciality services and Cama and Albless is reserved for the treatment of women and children.

The private healthcare system and the charitable hospitals constitute the major chunk of the health service in the city with more than 1000 facilities, both big and small (Arya, 2012). There are nearly 80 odd charitable trust hospitals across the city and its suburbs with around 8000 beds. This includes 42 tertiary care hospitals with more than 100 beds with multi-speciality services. However, these hospitals have been known to restrict their services to those who can afford to pay and routinely flout the mandated earmarking of services to the economically backward (Kurian, 2012). There are also a number of private hospitals that provide tertiary care and hundreds of clinics, nursing homes and private practitioners in the city that provide mostly secondary and primary services (Arya, 2012).

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[2] Press Information Bureau. Government of India. (2011). INDIA STATS : Million plus cities in India as per Census 2011 . Retrieved from http://pibmumbai.gov.in/scripts/detail.asp?releaseId=E2011IS3.

[3] Charitable Trust Hospitals are one of the oldest forms of Public Private Partnerships. Charitable hospitals in Mumbai are given various concessions and in return they are supposed to provide free treatment amounting to 10% of their operational and occupational capacity for indigent patients and earmark an additional 10% of their operational beds to provide concessional treatment to weaker sections of society.

[4] Municipal Corporation of Greater Mumbai. (2005). Mumbai City Development Plan 2005-2025. Retrieved from http://www.mcgm.gov.in/irj/go/km/docs/documents/MCGM%20Department%20List/City%20Engineer/Deputy%20City%20Engineer%20(Planning%20and%20Design)/City%20Development%20Plan/Health.pdf

Given that more than half the population of the city lives below the poverty line, majority of the people in the city depend upon the public health system stretching the public hospitals well beyond their limits. Overcrowding, inadequate equipment and shortage of staff have further impaired the quality of services in the public hospitals (Qureshi, 2005). These overburdened public facilities have to bear the additional responsibility of providing medical services to the affected population during emergencies and mass casualties.

Existing Response Plans

There are city-level disaster plans for Mumbai during emergencies prepared by the MCGM along with ward-level plans for the 24 wards of Mumbai. The Disaster Management Action Plan which is the nodal plan for emergencies (Municipal Corporation of Greater Mumbai [MCGM], 2007) deals primarily with natural and industrial disasters. Being a bureaucratic tool, the plan places the responsibility of the health response on the municipal Health Department. According to the plan, the ward-level health officials will have to assess and monitor the health risks in the ward and alert the hospitals, including private hospitals in the ward, to render services. Special channels of communications will have to be established along with other agencies such as the police and transport services with public hospitals. The ward-level health officials will have to liaise between the different blood banks, take stock of medical supplies, co-ordinate with the police on disposal of dead bodies and be constantly in touch with the MCGM Control Room. The Health Department is also supposed to collect information from its ward-level offices and different hospitals on the number of fatalities and measures taken to prevent deaths during the disasters. The plan states that for preparedness, the public hospitals and their deans "would be contacted".

As the plan focuses only on disasters, the thrust is on disease surveillance and prevention of epidemics. Mass casualties like terror attacks or riots are therefore not considered in the plan, which would require the active role of the emergency departments of the hospitals. While there is mention that hospitals would be intimated, the specific roles of the hospitals and guidelines on how they should respond are not covered. Preparedness is the duty of the public hospitals, but what are the guidelines and measures that constitute preparedness is not addressed by the plan. Again, the role of the private sector, which provides most of the health services in the city, is excluded in these plans.

JJGH was the frontline of the medical response during this episode, handling all the patients of the entire complex emergency. As the nodal hospital, JJGH had prepared its own disaster management plan in 2007, which was meant to address mass casualties. The plan describes various risks, both man-made and natural, that the JJ hospital would have to deal with including riots and accidents, but terror attacks have not been included. It has descriptions on how the emergency plan would be activated, the flow of patients and an exhaustive inventory of equipment, resources, vendors and staff. The plan also details the roles for the different departments and senior level staff within the hospital. This laid the framework for action during the response to the attacks and provides a reference point for addressing its strengths and shortcomings. The inadequacies of the plan with respect to this event will be discussed later with a view to help enhance preparedness of hospitals in the city and draw lessons for the future.

Findings

After analyzing the interview responses, the findings have been categorized to study the entire health response during the attacks. It begins with a study of the Cama and Albless Hospital, which unlike other hospitals, was itself under attack, and this provides a unique situation in understanding the perception of threat and the responses initiated. In the section that follows, the general medical response of the hospitals, the management of staff and resources highlighting the key challenges faced by health care providers and the hospital administration, psychosocial support provided to victims and family are dealt with. Following which, the crucial factor of co-ordination between the hospitals and the various stakeholders involved like the government, security agencies, volunteers and the media is looked at. Next, we look at issues that came up during the post-disaster phase, changes made as observed by the health care responders followed by introspection of gaps in the pre-event hospital-level planning in responding to this emergency.

4.1 "Hospital under Attack"- The Case of Cama and Albless Hospital

After attacking the Chhatrapati Shivaji Terminus (CST), two of the gunmen entered Cama and Albless Hospital, which was near the railway station. They went through the floors of the hospital while being chased by the police and opened fire at the gates of the hospital compound. One night watchman was killed and a staff member was injured during the attacks by the gunmen. Being under attack, Cama Hospital as a health provider was in a very difficult position; it had to ensure the protection of the existing patients, who were mainly pregnant women and children, and its own staff. Being caught unawares in a hospital, which was seen as a safe place and therefore less likely to be under attack, the patients as well as the staff panicked.

Absence of any Centralized System of Intimation

The initial reaction of the staff was that the gun shots were probably fire-crackers and they remained undeterred. It was only when they saw the security guards running into the hospital and the gunmen enter the building that they realized it was an attack. There was no way by which all the staff in the hospital campus could be informed that there was an attack by men with guns and that they should go into hiding. The security guards were attacked first and one watchman was killed. On seeing this, the other staff quickly hid or ran to their wards on different floors. The telephone operator was forced to take shelter in one of the rooms and was unable to inform anyone. This shut down the main source of communication both within and outside the hospital. The staff, who had locked themselves, made most of the calls on their mobile phones. While many of the respondents stayed put till the attackers left, some nurses did try to go to other wards to warn the staff and check on the patients. Some of the staff were confused and ran out to see what was happening, rather than run into the building to hide. One staff member was killed because of this.

The absence of a mechanism to issue a distress signal within the hospital also meant that there was no way to intimate those in hiding once the crisis situation was within control of the security personnel. Those in hiding were not sure of what was happening, and were not intimated when to come out of their hiding.

Ensuring Safety

The safety of patients, their visitors, and hospital personnel themselves, depended to a great extent on their fortune of being or not being in the line of vision of the terrorists and the ability of the hospital personnel to see that everyone was safe. The staff in each ward shut off the lights to give the impression that the wards were empty. However, this was not always possible because serious patients needed to be

monitored. The staff also tried to close the main entrance to each of the wards. In some cases, however, the grills and locks were broken and the gates could not be closed. The staff also tried to contact the Azad Maidan police station which was the nearest police station, but were unable to get through. Most of the staff acted swiftly by taking care of pressing health needs, and other needs that would not give away their place of hiding. One member of the staff "pretended he was dead" and was saved. These were however at an individual level rather than a collective response, depending on how threatened they felt.

Providing Treatment to Injured Staff and Existing Patients

Despite the stressful circumstances, the health care providers in hiding treated injured police and hospital staff, as well as existing patients. There were patients in labour who needed immediate attention and the labour room functioned all night. Even in the absence of instruments and materials, the doctors reportedly did a commendable job. In one case, instructions were provided over the phone by a senior doctor.

Absence of a Plan or Training for responding to Disasters

Most of the respondents said that they *"had no prior planning or training"* and the general pattern of response seemed to be varied without any uniformity. One nurse said, *"there were no instructions...we did what we felt was right."* Therefore, it can be deduced that there was no protocol or plan for emergencies that the staff recalled and followed. Despite the absence of any specific training or planning, the hospital personnel seemed successful in their efforts to protect themselves and their patients.

A few respondents who felt that their response was inadequate shared how differently they *"would've handled it"* had they been trained on *"what to do"*. This again touches on the necessity for clear guidelines to be put in place for emergencies and mass casualty incidents (MCIs) during terror attacks or any other disaster. On the other hand, the respondents who felt that they had done their best thought that no training would ever help. The responses of the staff during the interview also indicated that they would have probably responded the same way to other events such as floods or a building collapse, each working according to his or her intuition. It needs to be noted that while in this particular incident most of the staff were able to respond by exercising personal choices, an emergency management plan cannot be based upon implicit expectations of personnel to arrive and perform their duties (Danon and Shemer, 1994). Therefore, clear sets of protocol should be followed during emergencies and the hospital staff at all levels should be trained in following them.

Even after such an experience, most of the staff maintain that their skills and knowledge were enough to respond to such emergencies and they see little scope for training. They felt that they *"can handle anything."* They believed that the absence of a primary line of defence in the form of armed guards and strong gates was the main reason for their vulnerability. According to the respondents, improving the physical integrity of the hospital and vigilance would suffice rather than training. This could be symptomatic of overlooking hospital-level disaster management as an important part of hospital preparedness and safety at the individual level and policy level.

Perception of Self-efficacy

Perception of self-efficacy by the health care providers shapes their behaviour and decision-making skills affecting their performance (Amentrop et al, 2013). This is especially significant given that the attack on Cama was unprecedented and the staff were not trained to respond in such circumstances. Studying the responses of the staff at Cama and Albless Hospital shows that the levels of perception of self-efficacy varied among the hospital personnel. This perception seemed to be proportional with the age, years of experience and exposure to previous emergencies and disparate with grade of employment. Those who exhibited a high sense of self-efficacy felt that *"their skills and*

Perception of self-efficacy depended on number of years of work experience and exposure to emergencies.

knowledge are sufficient to see them through any hazard or disaster". These respondents had worked in Cama during the 1993 Mumbai bombings and riots. During the attacks, while there was *"an atmosphere of fear and insecurity"* they responded that they *"continued to do their duties."* The same respondents in retrospect also felt that *"they required no orientation or training"* and could manage such challenges under any conditions. On the other hand, the new staff who said that they were *"afraid",* expressed the desire to be trained and be *"taught the basics of disaster management".* Those who felt that they were unaffected by the attacks asked those who were afraid, *"if we could stand bold why couldn't the others".*

Psychological Reactions and Lack of Response

Post exposure to the event, almost all hospital personnel did suffer some psychological distress. In the short term, respondents reported *"being afraid to work or travel at night", "crying", "not being able to sleep at night and being startled by loud sounds".* One staff nurse reported that she *"still gets scared when she hears loud sounds such as that of fire crackers".* But what seemed to be pivotal was the need to report to duty. This is proven by the fact that despite this enhanced perceived risk, every single hospital personnel reported to duty within 48 hours of the initiation of the attack. This included both personnel present at the hospital at the time of attack (victims) and others. Respondents stated that none of the hospital personnel were given any kind of psychosocial first aid except for a few *"words of comfort by the in-house Matron."* A nurse recounted that no one *"was allowed to speak about it to anyone for nearly.....Only later we have started sharing it with others".* One respondent said that she *"self-counselled"* her fear by repeatedly telling herself that the incident was over and she had come out alive.

Despite the psychological stress post-event, there were no services provided to the staff and most respondents kept to themselves and seldom spoke about it.

Increased Security and Profiling following the Attacks

The key changes that the respondents wanted and which were implemented by the hospital after the event were structural. These included more security personnel, firearms for the watchmen, stronger gates, metal detectors, higher walls, locks for doors and no parking in the premises. These also extend to measures like screening all the patients, especially Muslims. A senior hospital administrator superintendent in one of the hospitals echoed the sentiments of many respondents when she said, *"women who wear burkhas .....could be carrying arms and ammunition"* and therefore *"should be seen more closely".* The responses seemed to favour *"fortifying the hospitals"* and surprisingly, *"communal-profiling"* of visitors. It seems that the respondents and the hospital administration felt that this would prevent an attack in the future and they did not focus as much on putting in place better systems of preparedness and response through protocol and training, which could have alerted them, equipped them better and improved their response. However, a discriminating attitude towards members of a particular community is highly unethical. It affects health access and outcomes of the community negatively as the health care system alienates the community with prejudice (Planning Commission of India, 2013).

Recommendations of the Respondents

While there have been no precedents of attack on hospitals in India, this attack shows how health care workers who play an important role in responding to emergencies are relatively unprotected, making them soft targets for terror attacks. A senior doctor recommended the establishment of systems of communication like alarms which are discreet, both within the hospital and to administrative and security agencies. This was suggested to enable signalling of threat during emergencies. The use of mobile phones, which was the main source of communication during the attacks, could be formalized into a grapevine network system of communications to inform all the staff, wards and hospital authorities to trigger a response mechanism.

Respondents felt that since their skills helped them handle the situation, they required no training. They believed that security needed to be improved rather than their own response.

The analysis suggests that no specific system was followed during the attacks with respondents devising their own ways to safeguard themselves and the patients purely out of instinct. The lack of guidelines and training impeded their ability to respond collectively despite individual 'acts of bravery' when under attack. Experiences from mass casualty incidents (MCIs) have shown the need for a common set of protocol and procedures that are collaborative and flexible, which will establish a system of command and co-ordination so that despite the 'chaos' post-emergency, hospitals and health care systems are able to recover quickly and start functioning cohesively (Donhue and Touhy, 2006). There seems to be little consideration of the emotional impact of such crises on the staff with not enough psychosocial support mechanisms being provided to the affected by the hospital administration.

4.2 Response of the Health care Sector

In this section, we shall focus on the three hospitals, namely, St. George's, GT and JJ who handled the entire response. From the treatment of the victims to the final autopsies, all were conducted by these three hospitals. Therefore looking at their actions, challenges and experiences is vital to understand the how the health care system responded during the attacks.

a. Communication of the Attacks

Intimation backed with a robust communication system of the MCI is very important as it sets the stage for responding to the health crisis the hospital faces. It activates the response plan enabling the organization of resources and preparing the health care providers for the response.

At St. George's Hospital, which was the closest to the CST railway station attacks, most of the staff who lived on the campus or were on duty heard the gun shots and assumed they were fire crackers. One felt that it could be a gang war and remained quiet. It was only when victims were brought into the hospital that they came to know about the attack. The information was then sent to the seniors who were on campus or away. In GT Hospital, farther away from the attacks, the staff who came in from the vicinity of CST were the main sources of information. Some of the respondents were called up by their relatives who saw the news on TV. At JJ Hospital, all the information was from television reports, which was conveyed to the different department heads, who in turn informed their subordinates.

Absence of a Uniform Communication System

There was no specific system or person appointed for notifying or communicating the attacks especially in the peripheral hospitals. This left limited scope of activating any plan or even deciding on a plan of action. This is substantiated by the fact that most of the providers acted on their own individual judgment rather than as per a pre-decided plan in the peripheral hospitals. It appears that the lead time that JJ Hospital got in getting ready was because it was much further away from the attack.

A robust system of communication should be used to alert hospitals before a response and to coordinate during a response.

b. Managing Human Resources

Any mass casualty incident results in physical as well as psychological trauma, which makes the role of health care professionals important. It is necessary to have clear cut roles, a system of division of duties and an incident command system to utilize the staff effectively without overburdening them physically or mentally (Shirley and Manderloot, 2008).

All the respondents shared that these attacks were *"unlike any they had never seen before"* and therefore, it was a challenge to organize both themselves and their staff to respond. Most of the senior staff had witnessed MCIs like communal riots and the 2005 train bombings but the nature of the violence, its duration, the type of medical injuries and the sheer number of victims were different in this case. The peripheral hospitals, St. George's and GT were overwhelmed with the initial influx of patients and it took sometime for the staff to prepare themselves. The staff in St. George's could still hear firing going on at

CST and had to pull together the staff in a tense situation, some of whom were hiding in order to protect themselves. But they did eventually take control and responded to the victims to the best of their abilities and competencies.

The staff in JJ Hospital, despite the lead time before the arrival of the first patient, reportedly took time to adapt to the arrangements and responsibilities. The first phase was erratic but the staff later streamlined the process; as a doctor put it, *"Initially there was chaos for about half a day……..Once things were set in motion there was no problem."*

With most of the staff in all the three hospitals living on campus, mobilization was not a challenge. All the attendants, nurses and doctors were immediately available to provide treatment. Students of the medical school and the nursing school on campus also made themselves available for emergency services. St. George's Hospital additionally had dental students who rushed to the hospital wards to help. Moreover, relatives of the staff living in the campus pitched in helping the movement of bodies and patients in the hospitals. The staff living off campus, especially the heads of department had to face considerable difficulty in getting to the hospital as the roads were cordoned off and the railway system connecting CST had shut down.

In JJ Hospital, the respondents had time to assign roles to the staff – for instance, the 50 member Special Duty Cell of nurses and assembling of technicians in the forensics unit they created to focus on attending to the victims. The interviews indicate that at St. George's and GT, which had less staff and time, the staff had to plan action and formulate roles as they went along.

Overlapping Roles of Staff

In the absence of a clear assignment of roles in the peripheral hospitals, the senior staff had to take up different roles at different points of time. The Resident Medical Officers (RMOs) and the Chief Medical Officers (CMOs) in the peripheral hospitals were required to multitask. This created a lot of stress on the person, considering the chaotic conditions in the hospital. Had the responsibilities been better divided, it would have eased the burden on some of the staff, thereby enabling a smoother process.

Detailed roles and responsibilities were not specified in the planning and this created bottlenecks, many tasks overlapped and constant instructions had to be given

In the case of nurses and other junior staff, there was a great variation in roles. For instance, they were involved in treatment, procuring supplies, transporting supplies, cleaning the wards and the operation theatre (OT). There seemed to be no clear plan for division of tasks and assignment of responsibilities, as some departments were understaffed, while in others there was overcrowding of personnel. Therefore, if there had been clearly defined roles and responsibilities in the planning, the overlap and confusion regarding who does what could have been minimised and the whole response would have required little supervision and control from above.

Poor Utilization of Human Resources

The senior staff in JJ seemed to have had well-defined roles when compared to the staff in the peripheral hospitals. Did they know what to do from the plan, or were they more responsible, is a question that is difficult to answer. On the other hand, even the higher staff in the peripheral hospitals performed simple tasks, thereby underutilizing the other staff available. Only one hospital administrator sat doing the entire documentation in St. George's, when clearly there were other people who could have supported him. If the documentation work could have been done by the dental or nursing students, who otherwise seemed to have no specific role, it would have eased the burden on the administrator in St. George's.

Need for detailed roles and guidelines for each person to prevent unequal distribution of duties and to help better utilization of resources.

Another administrator expressed that his main responsibility was to ensure that there were enough supplies, blood and manpower for the patients. But he just opened up the cabinets and left it in charge of the pharmacist as he was pulled into identification. The opinion here was that they *"would have liked more staff."* Thus, the administrators in the peripheral hospitals of GT and St. George's also seem to have had no clearly chalked out roles or responsibilities and were doing work which could easily have been delegated to junior staff. Despite the presence of a number of nurses and students in St. George's Hospital, one nurse had to manage the entire operation theatre all by herself, which could have left scope for fatal errors. Even the respondents from JJ felt that they were using *"multiple staff for the same task"* like suturing or preparing the OT and needed to *"organize themselves more efficiently"* and distribute the tasks among the staff. This also indicates the absence of an incident command system. Such a system assigns roles and creates a clear chain of command which can make sure that staff and resources are utilized to the best without overburdening some and leaving others underused (National Disaster Management Authority, 2007 and Federal Emergency Management Agency, 2008). This is especially relevant in a tight hierarchical system as that in the public hospitals in India.

Unclear Working Relationships

The roles and responsibilities of the lower and middle staff in all the hospitals seem to have been unclear and they simply *"followed decisions by the seniors."* The respondents also state that *"no one knew what to do.....there was no one person in-charge."* One nurse states how she felt humiliated by a doctor who told her that she *"had no right to tell her what to do"* when she suggested that they document simultaneously while giving treatment. Another respondent from JJ mentions how he felt *"I had no right (while performing tasks) ...there was lack of co-operation, pressure from top...We wasted a lot of time and could've done better."* The entire response thus seems to have been a top-down approach.

Lack of Participatory Decision-making

In emergencies, it is crucial to have standardised structures and protocol that can be implemented in different facility settings (Shirley and Manderloot, 2008). A one sided approach can be highly problematic as it leaves little scope for observation-based decision-making and flexibility in responding to emergencies. The peripheral hospitals and the middle and lower level staff followed their superior's orders without having their say even when they felt that it was counter-productive or affecting their work, as in the case of transferring of patients. The challenges mentioned above like poor utilization and unclear roles would remain unresolved as long as there are no mechanisms to communicate both from the top and bottom.

Similarly, respondents shared that officials from the Directorate of Health Services (DHS) and senior hospital administrators of JJ Hospital were closely involved in planning the response and giving instructions. They also played a role in ensuring that adequate supplies were available for patient management. These senior officials were a visible presence and were posted around the clock. Respondents state that the officials made all the decisions without communicating to the peripheral hospitals. A senior doctor from St. George's stated, *"We were asked to just follow instructions."* Many of the key orders like the transfer of patients took the peripheral hospitals by surprise and the senior staff failed to understand the logic behind the order and felt it was *"to take all the credit"*, as a doctor from GT Hospital put it.

In the absence of clear plans or guidelines, the authorities made all the decisions without any feedback or opinions from the staff.

c. Work Environment

The work environment plays a crucial role in the ability of health care providers to act. Given the complex and dynamic work pressures during MCIs in hospitals, it is essential to ensure that there are minimum interruptions, with sufficient security and equitable distribution of responsibilities so that the entire response process can be more efficient without affecting standards of care.

Sense of Insecurity

A deep sense of insecurity prevailed during the attacks and partial protection provided to the senior staff irked many of the other staff.

Owing to the proximity of the peripheral hospitals to the site of the attacks, a deep sense of insecurity prevailed among the staff. They had to ensure the security of the hospital premises, reassure the other staff and adopt measures to barricade themselves from the attacks. In St. George's, the security personnel actually had to hide as they possessed no weapons other than a baton. There were also rumours about further attacks, which added to their fear and uncertainty. In GT hospital, the staff were compelled by the tense atmosphere to shut the OT doors and barricade them. The ambulance drivers in both the hospitals felt vulnerable as they had to transport patients and bodies during the crisis without any police protection. The ambulance driver at St. George's also went to CST to pick up victims and later to Cama and Albless Hospital and the Taj Hotel as well. This feeling of vulnerability was further intensified when the ambulance drivers saw that the doctors were given special protection, while they themselves had to ply unguarded on the roads. One ambulance driver complained, *"Protection is there only for big officers like doctors and bureaucrats. People like us are expected to go just like that, no matter what the situation."* This is a reflection of the sense of vulnerability on the one hand, and a sense of resentment on the other about the perceived lack of plans and concern for the lives of those performing essential and life-saving duties such as ferrying the injured.

Chaotic Interruptions

The respondents in all the hospitals maintained that patients came in with distraught relatives who wanted priority treatment for their patient and the staff were constantly interrupted while performing their duties. The staff had to calm the relatives, console dead patients' relatives and provide information on the status of patients. This added to the chaos and the burden on the staff who were taken unawares and were already pressurised. One doctor stated, *"There was such a lot pressure resulting in hot exchanges with the relatives."* As all the patients were finally transferred to JJ Hospital, it was the site of numerous visits by politicians. The general protocol was that to brief any dignitary, a team of doctors and anaesthetists would accompany him or her around the hospital. This affected the work of the doctors and other staff who were *"forced to interact with the guests."*

d. Medico-legal Documentation

Medico-legal documentation in times of mass emergencies is of critical importance. It provides important documentation and evidence, which would aid not just the process of identifying and prosecuting the accused, but also help victims claim compensation for the damage caused. Medico-legal procedures in such situations involve several things such as documentation in the Medico-legal Case (MLC) Register, declaration of death, identification of bodies, post mortems and injury certificates. This is one of the important roles of the health systems in times of mass casualties, along with provision of treatment and care.

Incomplete Medico-legal Registration

Back log of documentation as there was no division of this task leaving a lot of data work to be done retrospectively

In routine times, the MLC register documentation is conducted by the Casualty Medical Officer on duty. The CMO carries out this responsibility along with those of diagnosis and treatment. However, in this event at both the peripheral hospitals, the CMOs were overwhelmed with the quantum of cases to be managed and could barely make time for even recording the names of all the patients. Without prior delegation of responsibilities, the primary focus of all the hospital staff was providing treatment. It was assumed that they would be able to do it later *"when the duty gets light"* as the overstretched system was primarily focused on saving lives and treating patients.

When the unexpected orders came to transfer all the patients to JJ, the MLC recordings remained unfilled. As a result, the peripheral hospitals were left with *"no records"* or just basic information on the patients. All the administrators had to *"retrospectively collect the data"* and as a senior administrator from GT said,

"it had to be manipulated later" implying intelligent guesswork to fill the gaps. No support was provided to the administrator to carry out this duty. On the other hand, the patients arrived from the peripheral hospitals to JJ Hospital with *"no case papers"*.

This was especially significant considering the fact that the MLC documentation would form the basis of the injury certificates for compensation to the victims. After the case-load decreased, the administrator along with two colleagues went to each ward where patients were admitted, and filled in the MLC register retrospectively. Some of the patients had been transferred to other hospitals, private hospitals other than JJ and the doctors had to go to these hospitals, identify the patients and complete the documentation.

The entire process was labour intensive and would have also impacted the accuracy of documentation, as treatment had already been provided. The administrator from one peripheral hospital pointed out that in this time, some patients may have left the hospital on an OPD basis with no documentation of their having come to the hospital.

Lack of Guidelines for MCIs

Using normal procedures (which by themselves are in adequate) during MCIs was cumbersome, and this led to speculation of what was the best and quickest way to do what was right.

By and large, the protocol to be followed in cases of medico-legal emergencies is not defined clearly in public hospitals, even in normal times. The findings illustrate that in times of emergency such as the terror attacks, there is even more chaos caused because of these ambiguities. For instance, there was no clarity on the procedure to be followed for declaration of death in such cases and this was a big dilemma faced by doctors in JJ Hospital who were doing most of the MLCs. In normal circumstances, the doctors usually conduct an ECG to establish certainty of death and a death certificate is issued accordingly. However, under these circumstances, there was no time to conduct an ECG for each patient. Initially, the doctor did send the first few patients for ECG but later when the volume increased, she was confused about what to do. Based on her own judgment, she used clinical signs such as dilated pupils, no breathing and heart sounds and non-responsiveness to painful stimuli to declare death. She later said that she had taken the decision at the time, but did not know whether it was right or wrong as there were no guidelines. The introduction of definite protocol would definitely reduce the uncertainty that doctors face in dealing with MCIs and empower them to make on the spot decisions.

Overload of Medico-legal Work in one Centre

South Mumbai has three large tertiary care public hospitals, with qualified forensic experts. Yet, almost all the autopsies were carried out only in one centre – JJ Hospital. The respondents from JJ maintained that the police wanted this as it would be easier to manage the entire process of autopsy. Since JJ Hospital is in the area that falls under the jurisdiction of the police headquarters in South Mumbai, the government's Health Department insisted that all the autopsies take place in the JJ Forensics Department. This decision was made by the Department unilaterally and handed down to the doctors.

Without protocol for MCIs and emergencies set in place, administrative (police) concerns dictated hospital procedures. This led to a huge overload at one place, much to the ire of many relatives.

The insistence that the Forensics Department in JJ Hospital should alone perform the procedures without distribution to other facilities severely restricted space and time and efficient functioning. This led to respondents' being pressurised by distraught relatives to complete the post-mortem of their kin's body on a priority basis. Relatives wanted to *"get it over with"* and take the body quickly to perform the last rites. The delay led to heated arguments with the hospital staff. The respondent doctors at JJ themselves felt that it would have been better to distribute the bodies to different public hospitals in the vicinity like KEM, Sion or Nair, particularly since there was no estimation as to how many bodies would have to be autopsied. But most of them were

carried out in JJ with a few being sent to St. George's, Nair and Sion hospitals. With the delay in getting requisition from the required police officer and lengthy process of completing the autopsy, it took as many as five days to complete all the autopsies.

Considering that the event was a rare emergency, the existing norms could have been replaced with more practical and time-saving protocol. Such emergency guidelines would have to be made in joint collaboration with the police. If there had been a uniform distribution of the bodies for autopsies, irrespective of the police jurisdiction, it would have reduced the burden on one mortuary, the fatigue felt by the doctors and the waiting time and angst of the relatives.

e. Service Provision

It is interesting to note that many of the doctors who responded felt that these attacks would be treated as crimes by the highest national and international courts, and therefore extra precaution and care was required in managing them. A senior department doctor in one hospital described, *"Superior quality work had to be done as this was not a local crime but an international matter between countries."*

Triage at Hospitals, but None at the Site of Disaster

Triage is the key tool in responding to MCIs because there are limited resources and greater demand of services. A unique feature during terror attacks is the extensive variety of injuries both life-threatening as well as non-critical making it all the more important to use a system of triage to identify the more critical (Frykberg, 2005). In order to ensure that greater numbers of people are saved, it is necessary to prioritize people with critical injuries and provide them with medical intervention as quickly as possible. Ideally, a systematic on-site as well hospital-level triage can improve the outcomes of seriously injured victims drastically. On-site primary triaging enables decisions regarding which medical facility the victim should be taken to depending on the severity of the injuries, whereas secondary triaging at the hospital aids in deciding which patient requires immediate care (Nocera and Garner, 2000). On-site triage may not always be practical with limited resources and untrained staff, but it can play a key role in sending the victims to the appropriate hospital rather than transfer them after they arrive at a facility.

During the attacks, victims and patients were brought in ambulances without attendants and in some cases they were rushed in by bystanders in trolleys and hand-carts. This included all kinds of injured and also dead bodies with little scope for on-site triage. Retrospectively, it has been found that the dead to injured ratio was approximately 1:1.5 (Bhandarwar et al. 2008) This means that onsite triage systems could have been in place to prioritize treatment so that the resources were not consumed in transferring the dead, especially when the same resources (personnel, infrastructure) could have been optimized for survivor care. The ambulance driver at one of the peripheral hospitals reported, *"I didn't know what was happening inside the hospital"* and kept on bringing all the victims dead and alive to the hospital. Consequently, he had to transfer the serious patients to JJ Hospital. If he had been trained in some basic triage or had been accompanied by a doctor or a trained attendant to the site, the patients could have been segregated and the seriously injured could have been taken directly to JJ. This would have saved multiple trips in transferring patients from one hospital to another.

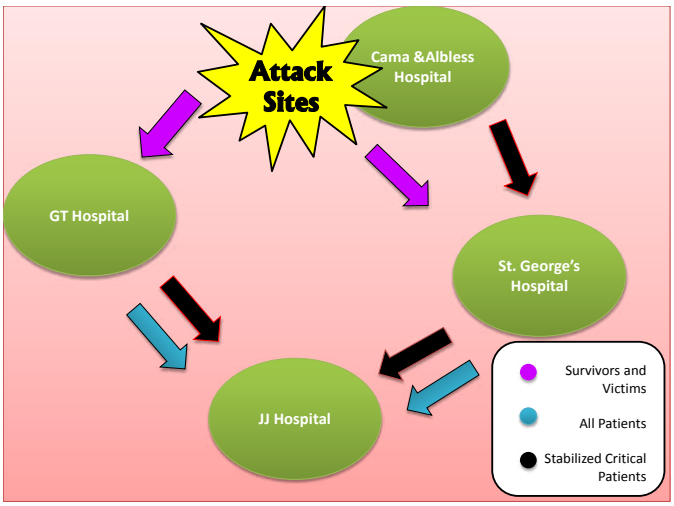

Fig 3. **Flow of Patients to the Hospitals during the Attacks**

The respondents recognized that ideally, classification of patients based on the severity of injury and directing them to various hospitals should have been done at the site of disaster itself. This would have

helped in getting those whose lives could be salvaged on a priority basis to the hospital. Across hospitals, respondents shared that patients were prioritized for management only after they were brought in. Doctors classified patients into those whose lives could be salvaged by immediate resuscitation efforts or surgical intervention, those with non-threatening injuries who could wait, those with grievous injuries who were beyond help, and the dead. Patients with head or cardiac injuries were transferred immediately to JJ Hospital from the peripheral hospitals which did not have a trauma ward and necessary equipment to cater to these patients. Patients were being received in the casualty where they were provided first aid and emergency treatment to stabilize their conditions. Then based on their needs, the doctors transferred them to the operating room, wards and ICU to create space in the casualty to receive more patients.

While it was not possible to conduct on site triages, drivers should have been accompanied by one doctor/nurse or a trained attendant to be able to judge to which hospital the patient needed to be taken.

On the whole, there was a lot of pressure on the doctors at the hospitals. While some maintained that sending a team of doctors would have helped in taking patients directly to the hospital which could cater to their needs, it would have been risky and more, it would have reduced the capacity of the responding teams at the hospital. It is therefore necessary to train the ambulance drivers and attendants on basic triage so that the more seriously injured can be provided with faster medical intervention. A system of requisitioning other doctors and medical services needs to be put in place in hospital protocol.

Treatment Area Severely Constrained

At the peripheral hospitals, respondents shared constraints encountered in treatment due to the physical arrangement of the Casualty Department, which could receive only 3-4 patients at a time making it impossible to accommodate all the patients on beds. Patients were given primary treatment on the beds and after being stabilized were shifted to the floors in other vacant rooms available. Respondents shared that the entire Casualty Department and veranda in both St. George's and GT Hospitals were packed with dead bodies and injured patients. In these hospitals bandaging, suturing, dressings were also being done wherever there was place - on the wheelchairs with a nurse standing with the materials as the doctors did the suturing.

JJ Hospital had a specifically designated emergency ward that had been created previously. It was opened as soon the patients started coming in, but it had only 20 beds and later the wards on the whole floor were cleared to accommodate the patients as they came. Respondents shared that there was an emergency ward where patients were received and stabilized, and then sent to the special disaster management ward or to another ward, intensive care unit (ICU) or operation theatre (OT) depending on their need. The Disaster Management Ward was used to house the dead bodies till they were sent for autopsy. Reportedly, the wards were inadequate to accommodate all the patients from the attacks. On the whole, it appeared that the emergency wards in JJ till then functioned simply as an area where additional supplies and beds were available, and the staff had not been trained in how to activate and organize the wards during emergencies. During the attacks, the staff were mobilized for the first time. This led to an atmosphere of disorganization and a *"sense of chaos"* due to the large influx of patients. In GT and St. George's, the patients were initially asked to sit wherever there was space available, be it tables, chairs or the floor.

This underscores the need of having a plan that assigns specific places in case of overcrowding and shortage of beds in the peripheral hospitals. Merely increasing the number of beds is not enough as it cannot be raised beyond a point in the peripheral hospitals which have space constraints. Rather, there should be division of floor space in the hospital so that areas can be pre-defined for non-critical procedures, thus making optimum use of space without investing heavily in building more wards. Planning and dividing geographically as well as assigning different areas to specific tasks are important (Shapira and Shemer, 2002). In the course of planning, areas for receiving patients, transferring them after stabilizing and conducting medical procedures should be ear-marked ahead of the response. The process of attending to

patients and moving them for procedures should also be unidirectional considering how a streamlined process would save time and space and better utilize human resources rather than have patients being taken back and forth in a disorganized fashion (Pan American Health Organization [PAHO], 1995).

f. Resource Management

Strain on Ambulance Services

Ambulance services are the first responders from the hospital in any MCI; accordingly their role becomes important in determining the outcomes of the response. All the three hospitals had ambulances with staff ready prior to the attacks, however, it was only GT and St. George's that had ambulances sent to the site of the attacks. The ambulances from JJ were put on *"stand-by"*. The drivers of the ambulances in both the peripheral hospitals went alone to the site ferrying back patients, without any attendants. The ambulances made multiple trips to ferry victims as there *"were no other ambulances to help."* These ambulances were stopped by the police at various check points delaying their work. Later in the night, the ambulances were also ferrying patients to JJ Hospital. Ambulances were also used to transport doctors from JJ hospital to the peripheral hospitals to assist in the management of patients. In the days following the attacks, they were used to bring blood from blood banks, take patients for investigations to other hospitals, get reports of investigations, bring dead bodies to the mortuary and so on. The ambulances from JJ were used only for such purposes. A few ambulances from private hospitals like Sabu Siddqui were used to take patients for investigations to other hospitals. These services were reportedly provided free of cost. From the responses of ambulance drivers, it was noted that though each hospital had many ambulances, only a few were utilized. Often only one ambulance driver was doing trips all night and bringing or transferring patients.

A structure within the hospitals for activating and providing instructions to ambulance drivers to mobilize victims from the site of attacks was missing. The ambulance driver from one of the peripheral hospitals shared, *"I started collecting everyone, calling through phone to join duty. Nobody instructed me to do so and there was also no need to tell me since things were happening in front of us I knew what was to be done."* This proved difficult as he had not taken along any attendant, and therefore, he had to lift the patients and bodies, put them into the ambulance and leave them at the hospital before driving back. An ambulance driver also reported that though he had asked the hospital administrators for an accompanying attendant to help in mobilizing patients in and out of the ambulance, it was not available. The reasons for this are still unclear, but as a result, most of them reported extreme exhaustion. They expressed uneasiness in transferring patients in case a patient's condition became serious during the transfer. Ambulance drivers reported feeling insecure while taking the ambulance on the roads that night as the attacks were still going on. Most of the drivers complained bitterly that they were forced to fend for themselves and put their lives at risk without any protection.

Despite the large number of ambulances, only a few from the peripheral hospitals were used without any protection. This was physically excruciating for the few drivers who were involved.

Pre-hospital process such as ambulance care to survivors who have to be transported to the hospital, assessing the functioning of the ambulances and the human power required to manage them need to be planned. A roster of ambulance staff who can arrive at a short notice and be inducted into action in rotation should be created and practiced with regular drills and updating. Since it is difficult to predict the burden on ambulance services, contingency planning with other hospitals should be made for requisitioning staff and resources at short notice. While it would be ideal to have medical or paramedical teams for the primary response of on-site triage, when there are limited resources, providing training to the drivers and attendants on these topics would be useful so that they can direct the patients to the appropriate hospital that would be able to attend to their specific needs. Even just one doctor or nurse in the ambulance would enable simple triaging of victims to the specific hospitals. This would reduce the burden of transporting them later. The security of the ambulance staff should be paramount, as ignoring it not only jeopardizes the safety of the primary responders but also their morale.

Adequate Resources with Scope for better Utilization

Respondents at the peripheral hospitals shared that instruments and materials in the operating rooms were sufficient for the surgeries performed. Long procedures like autoclaving (sterilization of equipments) was not an issue as high-speed sterilizers were present, which would sterilize instruments as a surgery was going on. However, a doctor at a peripheral hospital did share that autoclaving took 20-25 minutes and as new instruments were required every 15 minutes there may have been shortage of instruments if more surgeries had to be done.

Respondents from peripheral hospitals shared that portable X-ray machines may have been useful in locating bullets for surgical removal as there were a number of firearm injuries in these attacks. The surgeons were still able to perform the surgeries albeit that the process would have been faster with an X-ray machine. Some surgeons did confess that one X-ray machine and one technician may have been inadequate to deal with the volume of patients. MRI and CT scan machines were not available at the peripheral hospitals. So all patients with head injuries were immediately transferred to JJ Hospital, which was the protocol even routinely. At JJ Hospital, equipment such as ventilators and CT scan were reported to be sufficient. A RMO at JJ Hospital suggested that it would have been easier to perform critical medical care if there had been a dedicated trauma ward which was equipped to handle patients in emergencies.

> *The resources were adequate. However, certain departments like the Forensics were over burdened due to administrative decisions.*

As the operating rooms in the peripheral hospitals could not conduct more than a few surgeries at a time, most of the patients were shifted to JJ hospital where operating rooms like those of Ophthalmology and ENT, which were not typically operational during the night, were opened to accommodate patients requiring surgery. The staff also came up with coping strategies using existing plans and intuition to provide surgical and post-operative care to the surge of patients arriving using the available resources.

Surgical and medical supplies, drugs and materials were reported to be adequate at all hospitals both in stock, as well mobilizing them from other departments and private stores as required. Apart from small hitches and delays due to shortages, by and large the medical procedures were unaffected. Ironically the supplies were easier to come by during the crisis as opposed to daily routine times. A matter of concern in JJ was that the Resident Medical Officer who is generally in-charge of the supplies during emergencies has to attend to patients often leaving the supplies unmonitored. This was feared to lead to unaccounted usage and theft. It was therefore suggested that one person should be made responsible for the supplies during MCIs to account for the usage of materials.

It is a good practice to maintain and regularly update existing equipment as part of a contingency plan during emergencies. It is essential to create a network among different hospitals where such equipment can be shared or patients can be transferred for using such equipment during MCIs. This would also require a standardised protocol based on good practices for using medical equipment and other resources learnt from this response and others before. This will help create a more streamlined system of conducting procedures thereby avoiding the backlog shared by respondents. Mock drills and familiarising the service-providers with protocol and taking in their inputs rather than a single top-down approach would make the employment of resources more user-oriented and implementable.

Overwhelming Availability of Blood

At all hospitals there was no overt shortage of blood reported as blood stocks are typically kept available for routine surgeries. The requirement for blood was not felt to be much as there were not many injuries that required more blood, besides blood substitutes were being used as well. As needed, it was also possible to mobilize blood from blood banks of other hospitals and from agencies such as the Red Cross.

At JJ Hospital, the CMO and superintendent alerted the blood bank about the emergency to ensure that adequate stocks were available. The hospital social worker was called to mobilize blood stocks as required. There was an overwhelming donor response with nearly 285 donations adding to the crowds

at the hospital. Reportedly, contact numbers of all the blood banks including the peripheral hospitals were being aired on TV channels asking people to donate blood. However, there was no immediate need for blood at the peripheral hospitals. All night the technicians at the peripheral hospitals had to answer calls from potential donors, which created a lot of hindrance in their work of responding to emergency patients' requirements. This again underscores the absence of co-ordination and planning.

Blood was available, but when it was felt required, a camp was held, which led to considerable confusion. Instead Blood Banks in the vicinity could have been used.

Box 1. ***Blood Bank Policy***

If blood is required for a patient then the doctor sends the patient's blood sample and requisition form to the blood bank. Grouping and cross matching are done in the blood bank, and availability and reservation of blood communicated to the doctor. "Unknown" was written if the patient had not been identified and the blood bank technicians would determine the blood type. The blood bank technicians were very particular in identifying the right blood type and providing it to the patient due to the high-risk involved and obtained doctors' consent that if there was any casualty due to transfusion, the blood bank would not be responsible.

Around 200-250 potential donors turned up at St. George's hospital adding to the chaotic situation in the hospital. The blood bank in-charge had to put up a notice outside the main gate that no blood was required and that donors would be informed if the need arose. It was not possible to take blood immediately as a lot of staff was required for collecting and maintaining blood. Moreover, it is not possible to use freshly collected blood as it requires to be tested, processed and only then transfused. A hospital that is already stretched to capacity in responding to victims must not be burdened with considerations of mobilizing blood or returning the blood obtained from other agencies. Incidentally, at St. George's a blood collection drive had been held a few days before the attacks, so they were well stocked. At GT, volunteers turned up and were asked to leave their numbers with the social worker to contact in case of emergency.

The only hospital that had an emergency plan was JJ, but there is no mention whatsoever in the plan of conducting a blood donation camp in the middle of an emergency. This highlights the vagueness of the plan in allowing random decisions by superiors with little consideration for the stakes involved in an emergency situation of this magnitude.

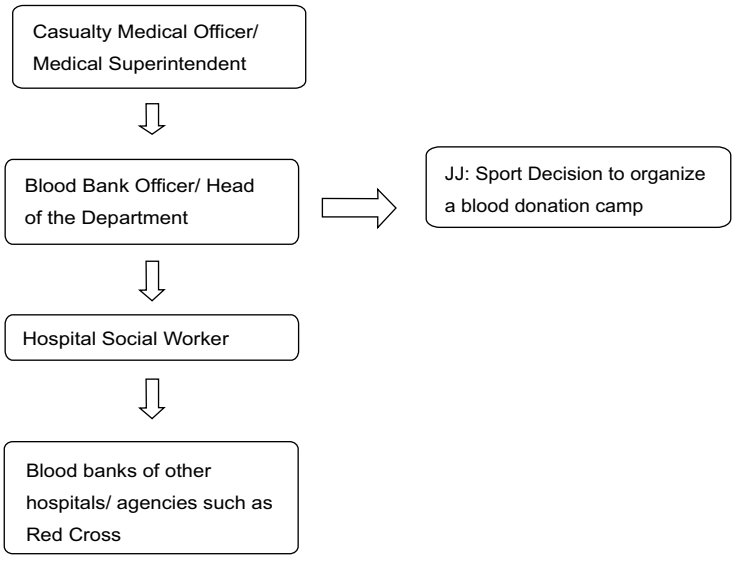

Fig 4. **Process of Procuring Blood following the Attacks**

The blood donation camp may have been necessary since it was not clear how many days the attacks would continue and ambiguity about the number of casualties expected. If so, hospital disaster plans need to explore a unified system to make a precious resource such as blood easily available during an emergency. Other blood banks could have been contacted and blood taken on credit basis (as is the norm) rather than organizing a camp in the middle of an emergency. Administrative level streamlining needs to be done along with blood banks, which can then be codified and incorporated into the disaster plan for each hospital.

g. Psychosocial Support Services for Victims and Relatives

Lack of Information

A crucial aspect of restoring a sense of control to those affected by such incidents of trauma is to ensure that sufficient information on the treatment and the health status is made available to both patients and relatives. While the JJ hospital had apparently developed a 'control room' staffed by a social worker and RMO, where information was supposed to be available, in practice the function of the control room was merely to answer phone call inquiries and receive donations.

Lack of adequate information to relatives on treatment and procedures resulted in anxiety that could have been prevented.

The lack of information also resulted in altercations in some instances. For instance, the doctor in the mortuary at JJ mentioned that dead bodies would often be brought to the department without a police requisition and so the relatives would be asked to wait until the police was able to provide a requisition. But to the unaware relatives it felt as though the hospital was unnecessarily delaying the autopsy. Such incidents could have easily been reduced if proper information on patient names, status, location, procedures for transferring or discharging a patient and claiming a dead body was made available through an information desk to relatives. Instead the approach seems to have been to tell the relatives bluntly, *"it is the law, you have to do it."*

Lack of Substantive and Systematic Services

A psychiatrist was asked to speak to all the victims who were admitted in JJ. The psychiatrist, along with a resident doctor visited the patients and assessed them for symptoms suggestive of depression or mental trauma. If patients reported being upset, lack of sleep, lack of interest in life, nightmares, flashbacks, fear, mood swings, etc., symptomatic treatment in the form of medications would be started and follow-up advised. However, *"no specific counselling support"* was offered to the patients. Most of the patients had questions about hospital procedures for discharge and compensation, resources to travel back home, in addition to discussing the sense of loss or pain. However, it was not the mandate of the psychiatrist to provide such information or link up survivors of the attacks to relevant agencies who could offer such help. In fact, it was conveyed to the patients that the psychiatrist would categorically not be able to provide such support. The progress of the services on the mental health of the survivors could not be ascertained because *"no records were maintained as there were no follow ups."* This leads us to assume that the purpose of the psychological support seems to be merely a cosmetic feature which came as an afterthought. It was without any real purpose or long-term utility.

Only superficial services were available, which do not adequately address the psychological issues faced by victims and survivors.

No Bereavement Support to Relatives

The attacks had an impact not just on those who were injured, but also those related to the injured and dead. Respondents working in the mortuary at JJ and the casualty in all the hospitals reported that there were incidents of people and even children, having lost their entire families. However, at the hospitals there was no one who felt equipped to convey this information to the affected persons and offer substantive bereavement support. In some cases, information of death was provided quite irresponsibly. A senior nursing staff who was in plain clothes reported that one doctor in the casualty came up to her assuming that she was a relative and told her that her patient was dead. However, several health care providers – doctors, nurses, ambulance drivers, servants working in the wards, casualty and mortuary in all the hospitals went out of their way to help relatives search for patients despite their heavy work loads. This should have been coordinated more systematically so that providers could direct relatives to person/persons who dedicatedly provided such support.

In addition to the trauma of having lost loved ones, the relatives of patients had to also endure a long wait for post mortems to be performed, given the patient load. No systems were put in place to provide support during this time, respond to their needs, guide them about procedures, or to channelize appropriate social support services. It was left to community members to support these relatives or for the persons to fend for themselves.

The only point of contact between the relatives of victims and the providers was providing information on the demise and health status of patients, which was limited.

Provision of psychosocial support is increasingly being recognized as one of the critical components of disaster response. It is the responsibility of the health system to ensure that not just the immediate health care needs, but also psychological and social support needs for the re-instatement of people back to their normal lives are provided to them by health facilities. This was an area sorely lacking in response. Given the poor recognition and services available for mental health in the country, the hospital could have been used as an ideal setting to provide services. As discussed earlier, there was no serious effort to screen and provide psychological support to staff, victims or relatives. This lacunae needs to be addressed in future plans for health responses in emergencies both at the hospital and government levels.

h. Well-managed Injury Compensation System

The respondents said that the compensation system was well managed with little bureaucratic hurdles and went on smoothly. Compensation was provided to all patients, even those who had sustained minor injuries. Reportedly, Rs. 50000 was given to those with minor injuries, and Rs 1 lakh to those who had grievous injuries.

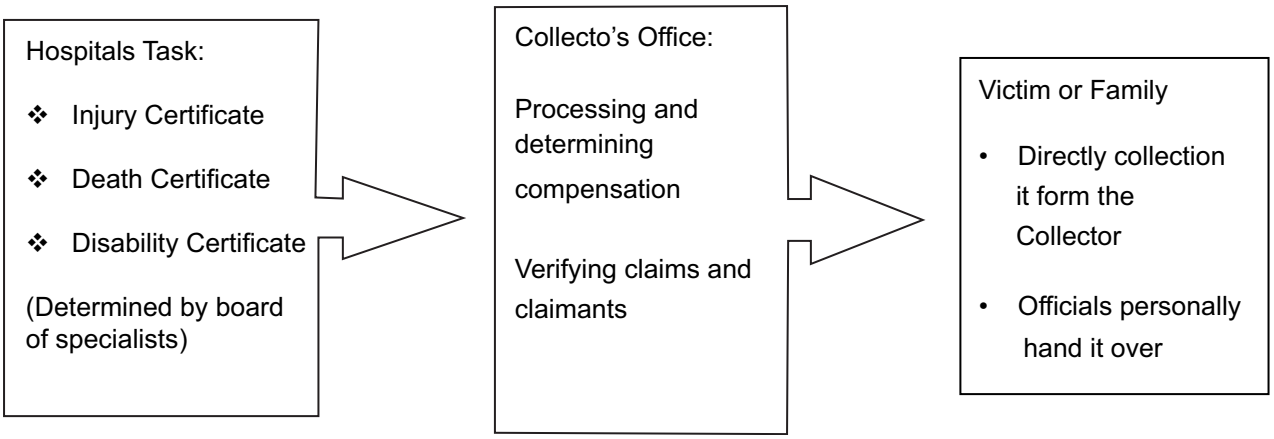

Fig 5. **The Process of providing Compensation to Survivors and their Families**

Victims were compensated for their physical injuries. Assessment of psychological health consequences for the purpose of injury compensation was missing. Few patients were compensated based on a psychiatrist's assessment of the magnitude of psychological disability as a consequence of these attacks.

Additionally, it was reported that wives of hospital servants who died in the attacks were given jobs, house and money from the government. The Railways also provided compensation of Rs. 50,000- Rs.1 lakh (100,000) for patients who were injured or who had died on the railway premises.

Some patients had gone to private hospitals or returned to their villages for further treatment. On hearing about the government's compensation scheme, they came forth. In these attacks, an exception was made and all those with valid injury certificates were given compensation, regardless of whether they were admitted in the government hospital. Typically in disasters of such magnitude, there are often complaints from relatives of not having received compensation enough to treat the injury. In fact,

As compared to previous MCIs that involved compensation, these attacks had quicker and smoother procedures

the Medical Records officer in one of the hospitals reported *"I even have the 92-93 records lying here for so many years. Sometimes the court asks for it, because victims have appealed. In this incident they have not asked. It was a clear-cut instruction that everyone should get compensation at the earliest. The collector himself had come to the wards to see the patients."*

4.3 Impact on Healthcare Providers

a. Physical Impact

Given that they were the closest to the attack, the peripheral hospital staff had to work through the night treating patients as they did not know how many more victims to expect. It is highly commendable that most of the staff reported to work the next day after going home for a short rest and they went about performing their duties regardless of their physical and mental strain. The process of doing all the autopsies in JJ Hospital added pressure on the Forensic Department, which worked continuously for five days to complete the case-load. After the second day, most of the bodies were coming from the attack sites were bloated, making them quite heavy to transfer and handle manually. The technicians at JJ also reported that the mortuary X-ray unit did not have good penetration for full-body scans, hence X-rays had to be administered 2-3 times resulting in greater exposure of technicians to radiation with their limited protective gear.

In spite of reporting psychological stress, respondents had either ignored it or internalized it coupled with the lack of any psychological support to staff and crude services to victims.

In all the hospitals, some of the staff especially the technicians and junior staff were unable to cope physically with the sudden onslaught of victims, mutilated bodies, families trying to identify bodies and grieving relatives. The technician at JJ recounted how he travelled each day with his clothes smelling of putrid flesh. Some were physically averse to the stench and vomited, while many others experienced psychological stress.

b. Psychological Impact

Though almost all the respondents described that they were tense and felt insecure at the time, only a few of the respondents reported having psychological issues. They reported how they found it difficult in the days that followed to report to work especially in night-shifts, fearful memories of that night, insomnia, getting startled by loud noises, afraid of crowded places and inability to concentrate. Families of the staff were also desperately calling them to ensure their safety adding to their anxiety. Some of the respondents stated that they were still affected by the event. One respondent from JJ reported breaking down and crying at the thought of the event. One staff member who was emotionally affected stated, *"I "I cried so much. I still feel like crying at times,"* with tears in her eyes. Two of the respondents broke down during the interview.

Most of the respondents stated that they counselled themselves that they had to get out of the psychological stress and had to carry on working rationalizing, *"What can we do? It's our job."* Some stated that they spoke to their families and the matrons about the issues that they faced and felt better. Social and family networks in India play a significant role and talking and sharing provides a cathartic force. There were, however, no formal arrangements for the respondents to seek counselling by the hospital though there were psychiatric services provided by the Department of Psychiatry at JJ for victims. Most of the staff held the opinion that as health care providers they *"can't remain sad and have to get up and get back to work"* and therefore, psychological problems had to be dealt with either internally or overcome at a personal level.

Even if there are mental health support services available to victims, health care providers are often left outside the ambit of such services despite the short-term and long-term stress that they face (Agency for Healthcare Research and Quality [AHRQ] 2005). But the health officials and the heads of departments seem to consider it irrelevant; as one RMO put it, *"Why is counselling required for those in this profession?"* This assumes that health care providers are *"immune from psychological problems"* and that they are

"trained to be strong" not recognizing that they are also *"human beings who are sensitive"*. Perhaps, this is a cultural element where reporting psychological stress is viewed as weakness and only a few were actually comfortable or had the courage to report. This leaves the mental health needs unmet and may prevent those who require counselling from seeking it. Whether seeking social support to deal with stress or dwelling on the emotional states and seeking therapy is the better option, it has been seen that seeking such support is usually associated with poor outcomes as it depends on the reactions (positive or negative) of others (Aldwin and Yankura, 2004). Therefore, there is a need to provide access to formal psychological support for health care providers and create an environment where seeking such help is encouraged.

4.4 Coordination with Different Agencies

During mass casualty incidents, hospitals are at the frontline of the response. Different agencies like the police, government and media, all jostle for space, information and resources. In such a situation, ensuring co-ordination within the hospital and different agencies is crucial. Such co-ordination is vital to ensure an efficient response.

a. Between Peripheral and Central Hospitals

At the time of the attacks, reportedly all government hospitals were put on high alert, and there were ongoing telephonic conversations between administrators of these hospitals to monitor and respond to the situation.

Two issues highlighted the one-way decision making and lack of co-ordination between JJ and the peripheral hospitals: the transfer of patients and the performing autopsies.

A team of surgeons and anaesthetists was sent from JJ Hospital to St. George's hospital to manage patients at the site itself. This was deemed necessary as the number of surgeons at St. George's would not be adequate to respond to the volume of patients. Besides this, there seems to have been no response from the central hospital to the peripheral hospitals.

Concentration of Work at JJ

GT and St. George's, by virtue of being close to the site of attacks, were the receiving hospitals for all patients coming from the site of attacks. During the emergency response, a decision was taken to transfer all patients from these two peripheral hospitals to JJ Hospital for further management, due to which all the work was concentrated in JJ. Respondents shared that this decision was taken by senior health officials from the Directorate Health Services, Directorate of Medical Education and Research, Health Secretariat and senior hospital administrators without consulting them. Till then all the patients came to the peripheral hospitals. They were stabilized and then moved for further treatment. As capacity permitted, surgeries were being performed at the peripheral hospitals. But if patients had head injuries or cardiovascular problems, they were sent immediately to JJ. Most respondents from the peripheral hospitals were *"clueless"* about the reason for the decision to transfer all patients to JJ. Additionally, it was not clear which patients are to be sent to JJ as blanket orders for the transfer were received and *"they had to just follow instructions."* Some of the respondents from JJ perceived reasons such as:

1. JJ is more equipped to manage patients in terms of high-end equipment, labs and specialists.
2. Infrastructure and skilled human resources inadequate at peripheral hospitals to deal with large volumes of patients.
3. Easier for authorities to make arrangements for visits by VVIPs and ensure their security if all patients were at one place.
4. Logistically easier to keep track of management of all patients, maintain records, coordinate with the police, relatives and other agencies if all patients were under one roof.

5. Free up peripheral hospitals to receive more patients who were coming directly from the site of attacks. As the attacks were continuing there was no idea how long the attacks would go on and the number of casualties.

6. It is codified in the JJ Disaster Management plan that once stabilized; patients are to be transferred to JJ.

The staff in the peripheral hospitals were upset about not being involved in the decision making process of this unexpected transfer and felt that it was *"not required"* and that they *"could manage it."* A few staff members at St. George's simply thought of it as a *"move to get all the recognition"*. It was also felt that the relatives would perceive it badly that their patients were being shifted from one place to another in an injured state. As the caregivers themselves were not sure of the reason for the transfer, they would not have been able to explain the same to the relatives satisfactorily.

There is no mention of such a protocol of transferring all patients in the JJ Hospital Disaster Management Plan. Clearly it appears that this decision to transfer all patients to JJ was made single-handedly by health officials, without involving the doctors or providing them with justification for such a move.

b. Between Municipal and State Hospitals

It is evident that public hospitals in Mumbai seem to be operating without co-ordination. The JJ Group of Hospitals operates under the State Government, while other large hospitals like Nair and KEM come under the Municipal Corporation of Mumbai. These hospitals do have the necessary resources to put together at the time of an emergency. There seems to be lack of interaction between the municipal and state-run hospitals. Despite the proximity, no patients were transferred from JJ Hospital to Nair Hospital, which was a tertiary hospital with adequate facilities to conduct surgery and treat patients with critical injuries. The doctors from JJ also reported having some doctors come in from Nashik and Pune to assist them. Reportedly, a team of doctors from KEM Hospital also came by ambulance to St. George's hospital. But no role could be identified for them and they were sent back. It is not clear to which specialties the doctors from KEM belonged, and why their services were not utilized. It was only after the services in JJ were exhausted that few of the autopsies were sent to Nair Hospital and some to St. George's.

The seemingly limited interaction between the State-run Hospitals and the municipal hospitals underscore the need for better co-ordination and sharing of resources between them.

c. Between Private and Public Hospitals

Apart from public hospitals, private providers too have a responsibility to pitch in and share the burden of responding to such emergencies. A few CT scans and MRI imaging that were done at private hospitals like Sabu Siddqui Hospital for free and the ambulance that came from Jaslok Hospital to St. George's which remained unused, were the only interactions between private hospitals mentioned by the respondents. There is little clarity on this matter. There were several private hospitals close to the area of attack, but patients were all brought to the public hospitals. Some patients were transferred to

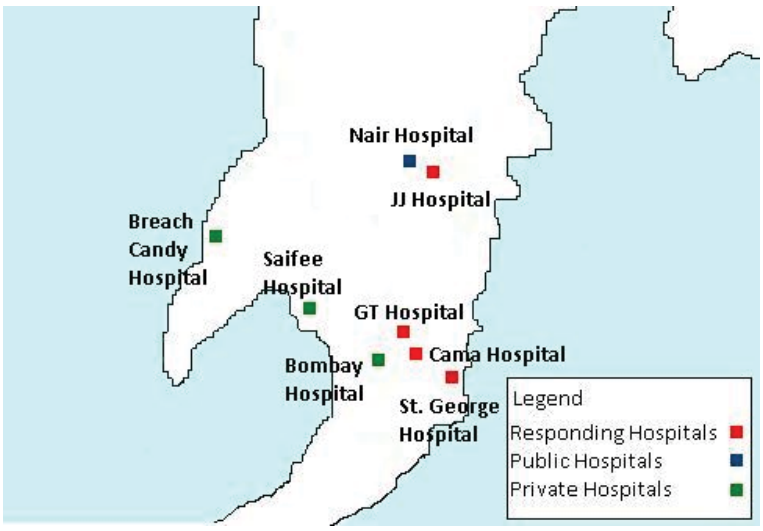

Fig 6. **Location of Major Hospitals in the Vicinity of the Attacks**

private hospitals on request and these were economically better off patients and foreigners. A doctor at JJ mentioned that they took the decision to transfer some of the patients who were foreigners to private hospitals because they felt that foreigners should "return with a good impression of healthcare services in India".

In the case of this attack, it seems that no private hospitals were involved initially. However, the role of private hospitals cannot be fully established from the data available. It is also unclear if some patients went directly to private hospitals for treatment or were taken by their relatives and more, whether private hospitals took only paying patients.

The role that private hospitals can play in providing specialized care and reducing the burden on government hospitals during a disaster should be systematized in pre-disaster planning and policy. In times of emergency, the private sector must be obliged to contribute and provide services, rather than burden the public sector with it completely.

d. External Agencies

i. Police

Overall, it was reported that the police were cooperative and helpful in assisting with hospital activities. Several police officers themselves had been injured in the attacks. Some tasks that the police were reported to be involved in included custody of valuables from the victims' bodies, crowd management, bringing patients to the hospital, pulling trolleys, transferring dead bodies, managing ambulances/vehicles coming to the hospital, guiding ambulances to the site of attacks, controlling media personnel and inquiry from victims. A large police presence also accompanied politicians/VIPs to the hospital. The police were also seen to assist victims in calling their families; filing cases and helping relatives identify victims/dead bodies.

Cumbersome police procedures affected the hospital service provision. Therefore, evolving protocol to reduce delays without compromising on legal requirements should be looked into.

Delay in Autopsies

One of the important roles of the police was related to the post-mortem process. The police were responsible for providing the authorization/requisition for an autopsy, making an accidental death report and conducting the inquest (Panchnama) in the presence of witnesses before the body could be taken for post-mortem. This has been discussed in the earlier sections as an important cause of delay.

ii. VIP Visits

At all affected hospitals, politicians or VIPs visited on the day after the attacks. They were reported to be interacting with the staff to assess the magnitude of casualties, ensure that resources were adequate and address any concerns of the patients and their relatives. Representatives from foreign embassies also visited the hospitals to enquire about patients from their countries.

Disruptions were felt by the staff because of the patient's families and VIP visits.

Hindering Duty in Hospitals

Orders were given to the staff to prepare the hospitals for visits by VIPs. The staff had to put aside their work and get involved in cleaning up the whole hospital. Despite this preparation, the VIPs did not turn up at the appointed time. Hence the staff were required to wait beyond their duty hours even after a hectic day. As per state protocol for any VIP visit, a team of doctors and an anaesthetist have to be with them all the time. Hence, after their duty some doctors had to go immediately to receive the Prime Minister and his entourage and give them an overall idea of the situation. The presence of politicians also resulted in a lot of media coming to the hospital. All this hindered work and most of the hospital personnel felt that politicians should not visit hospitals during an emergency as it disturbs the work flow and is a waste of time.

Restricted Movement of Health care Providers

Security was also beefed-up with a lot of police cover, dog squads and security guards. A staff member from JJ Hospital shared that at the time of a VIP visit they were stopped by security at the gate and not allowed to enter. Their ID card was also not validated by the security personnel at the gate. This prevented them from joining their duties on time and relieving other staff from their duties. The staff was disappointed at being meted out such treatment after having worked all night managing patients. The Disaster Management Act of 2005 has provisions for restricting visits by VIPs which should be enforced and followed during MCIs. Co-ordination on these issues is important.

Considering the inconvenience caused by VIP visits, the current system of protocol should reformed such that the hospital services are not affected during such visits.

iii. Media

It was widely understood by most respondents in all hospitals that only higher authorities such as the Health Secretary, Dean, MS, honorary doctors or CMOs were to interact with the media. Some mentioned having received clear instructions regarding the same, and thus would direct journalists to the seniors. Respondents also believed that their role was to enable them to respond to inquiries by the media. Questions typically revolved around the number of patients/ dead bodies, types of injuries, management of patients at the hospital, emotional status of patients and what the doctors felt about the incident.

Interference in Functioning

Many respondents felt that the presence of media was a *"nuisance"* and *"interfered"* in their work flow. In some cases, the media also came up to the wards and started interviewing patients directly. This required the staff in the wards to intervene and ensure that the journalists had the requisite permissions. At JJ and St. George's, respondents shared that the media were restricted to the gate and not allowed to enter the hospital. This is also the protocol followed internationally during terror attacks to ensure that while important information is disseminated through the media, it should pose no interference in the work (Shirely, 2006). As part of hospital protocol, the media should be given periodic updates by the hospital administration, but outside the hospital.

Media can be either a tool to disseminate information or a hurdle in performing duties. So creating guidelines to ensure the former is important. The handling of the media during the attacks was quite good; this could be formalized as best practices.

Information Dissemination

The respondents also listed the beneficial effects of informing and updating the media. They felt that since the media had broadcast lists of patients in the hospitals, it enabled relatives to track down their kin. It was also a platform to garner funds and resources such as food and medicines for the affected. However, the information updates should be carefully cross-checked with the hospital administration before being given out to avoid confusion as in the case of misinformation dealing with blood donation.

There should be engagement with the media in the pre-disaster phase itself to outline a plan for their involvement in an emergency and their responsibility.

Voluntary Agencies

During an emergency, particularly one that is widely reported in the media, there is a heightened sense of 'wanting to do something' among the general public. Respondents reported that such an overwhelming sense of enthusiasm to help out the victims was also seen during the attacks.

Table 2: Types of Voluntary Groups and the Nature of their Support

Groups	Support
Political Parties	Private Ambulances
Volunteers from the Hospital (students from nursing and dental colleges and relatives of hospital staff)	Assisting patients, helping relatives, consoling relatives, distribution of food
Local Volunteers (Students, Ganesh Mandals, social workers)	Transport, food, blood donations, assisting patients, helping relatives, consoling relatives
Trusts, Public Agencies (Railways, Police) and Corporate Groups (Taj, Citigroup, Johnson & Johnson, etc.)	Monetary donations, medical equipment, stretchers, surgical supplies
NGOs	Food, finding sponsors, blood drives

A team of administrators and social workers were appointed to sit in the control room at JJ Hospital for eight-hourly shifts for a week. They were responsible for receiving and directing the donations appropriately to the respective departments; for instance, wheelchairs were sent to Orthopaedics and clothes, cots and mattresses to the wards.

Too many unnecessary Donations

A problem of plenty arose as truckloads of fruits and food items were being sent. Announcements had to be made on the media asking people to stop sending food. Leftover fruits were distributed to patients' relatives and others as they would get rotten. A respondent also shared that the presence of a large number of voluntary agencies made the wards very crowded. It was not clear who was who, and in that chaos many supplies may have been stolen.

No Clear Role for Volunteers

Given the influx of private volunteers and organizations, there is a need to create clear protocol to incorporate them in hospital responses.

The enthusiasm of the general public can be channelized to aid the smoother functioning of systems. However, this is possible only if there is a pre-disaster effort to allocate roles to volunteers. In the case of the attacks, several individuals came forth to offer help and some were turned away because they were considered a nuisance. For instance, a respondent from St. George's mentioned that the dental college students from the hostel on campus came to the casualty to help out. But because no role could be chalked out for them, they were sent back as they seemed to be only *"adding to the crowd"*. This cohort could have been used in performing tasks such as documentation and dressing minor wounds relieving doctors and nurses to carry out more critical tasks.

Similarly in JJ, it was reported that several volunteers came forth to donate blood but since no blood was required, they were turned away. By imparting some skills, such volunteers can easily be trained to provide assistance to relatives, assist with documentation or provide information at a desk. While voluntary agencies came forward to offer their assistance, they were not clear how they may contribute; the hospital authorities were unable to guide them or decide on their roles. A respondent mentioned that an emergency meeting was also called with the Health Secretary and Directorate of Health Services, where NGOs were invited to participate. This may have been useful to assess the needs and plan accordingly. However, what stands out starkly is that there was no prior plan for the best utilization of the strengths of different voluntary agencies. There exists potential to utilize the assets that voluntary agencies may have to offer both in ensuring disaster preparedness as well as during the disaster response phase. Engagement with these voluntary agencies in the pre-disaster phase is essential to tap this potential.

4.5 Post-disaster Phase

Appreciation and Forms of Recognition

Respondents shared that monetary compensation was not expected, yet a small gesture in the form of a certificate, or even a meeting calling all the staff together for tea would have been appreciated. It would have made the staff and their families feel proud of their efforts. The respondents felt that everyone had put in their best with a sense of duty, and did not expect gratitude in return, but recognition does boost morale and work efficiency. A couple of respondents shared that no compensatory leave was given to the staff who worked tirelessly through the four days of attacks, which in itself would have been a form of recognition and should have been mandated.

At GT hospital, the matron did not wait for the government, but organized a felicitation ceremony and gave certificates to the staff who worked during the attacks. Nurses shared that they felt appreciated when doctors and seniors lauded their efforts in ensuring everything functioned smoothly during the attacks.

A couple of doctors said that they were felicitated by the government at a function organized by a minister and featured on TV. Ambulance drivers at JJ reported being given a letter of appreciation and a monetary reward for their efforts, while the situation was in stark contrast at the peripheral hospitals.

Dissatisfaction: Between Hospitals, across Cadres, Within a Cadre and Partiality in Recognition was worse than No Recognition

Unequal felicitation of staff post-emergency can lead to bitterness and feeling of neglect, therefore hospital authorities must ensure that such appreciations are given fairly.

Respondents largely shared that they *"were only doing our job, so it is okay"* and they did not want to be felicitated. Nonetheless only a few were felicitated. Ironically, those who were honoured from each hospital were often not really involved in the response, while those who did the work were overlooked. It was felt that during earlier events, *"no, one got any felicitation so it did not hurt"* however this time largely doctors were honoured by the government with monetary awards and certificates. This made the staff in the lower cadres feel that *"their efforts are not acknowledged or appreciated"*. Even among doctors some were felicitated, and some were not. This lead to bitterness, with some doctors saying, *"The next time we won't work as our work is not valued"*. This discrepancy resulted in awkwardness in interpersonal relations within the same cadre and also across cadres. Some members of the staff returned their certificates when they realized that only some of the persons who worked on that day had been recognized. Ambulance drivers of the peripheral hospitals expressed a sense of hurt at the attitude of the government, which did not give them any kind of felicitation or certificate, considering the dangers involved in their job.

A large number of respondents from the peripheral hospitals shared that with the transfer of all patients to JJ Hospital, their hospital and staff did not get the recognition deserved for being the initial responders to this emergency. Neither did the VIPs visit their hospital to recognize the efforts of the staff there and boost their morale, nor did the media feature them. Respondents at JJ Hospital felt that the staff from Police Surgeon's hospital got monetary rewards and certificates, but that hospital staff did not, and they were angry about this partiality.

Thus, unequal recognition and felicitation led to disaffection among the staff who felt that it was unfair treatment. Those complimented by their hospitals felt less hurt by the lack of appreciation. There was also a perception among the staff of the peripheral hospitals that the nodal hospital JJ stole all the limelight despite the hard work put in by the peripheral hospitals.

Expressing appreciation post-response indeed plays a critical role in motivating the performance of the staff and respecting their sentiments. This responsibility falls squarely on the hospital administration and the senior staff. They should have ensured that all the staff involved in both the central and peripheral hospitals were recognized. They should have jointly prepared the lists of the staff to be felicitated and

checked for any discrepancies. The perception of discrimination, if any, should have been brought to the notice of the administration by the senior staff and remedied. *"Hurting the feelings"* of any cadre of hospital staff amounts a big *"disservice"*.

Changes Observed

a. Increase in Security

Most respondents reported that security had been tightened within a few weeks after the attacks by way of more security guards, increased vigilance on vehicles entering or parking in the campus, CCTVs, metal detectors, restricted entry for relatives accompanying patients, and a 24 hour police chowki inside the campus for patrolling. It was also reported that the hospitals had begun keeping an eye on Muslim patients under the pretext of security. As one nurse in a peripheral hospital reported, *"The guards control how many people are allowed to come in. When Mohammaden patients are admitted, lots of relatives come to meet them; we don't know who is coming to see relatives and who is not. So not many people are allowed inside."* There was a definite sense of insecurity about Muslims, reported the hospital staff. A social worker at one of the hospitals remarked that the security in the hospital was insufficient considering that *"the hospital is surrounded by a mini-Pakistan."* Such a sentiment is rather troubling and indicates the perception of the health care providers of terror attacks and terrorists. This prejudice against a particular community was seen despite the fact that the respondents stated how local Muslim community members had come forward to make donations in cash and kind, and local Muslim charitable hospitals like Sabu Siddqui had provided investigations that were unavailable at the hospital for free.

The general sense that one gets from the staff is that structural changes (more security, better equipment) lead to improved responses. Soft components like training, planning, creating protocol are not focus areas for the staff. Besides, over reliance on hard components can only reduce the effects of emergencies and attacks; it will not improve the response by hospitals.

b. New Equipment

Respondents at JJ shared that they got new equipment worth Rs. 100 crores including a new MRI machine in the months following the attack because so many head injuries were managed; a Cath lab had been set up. These were in the pipeline before, but were expedited after the attacks.

Respondents from St. George's hospital shared that a special ward had been designated to accommodate patients for emergencies. When its capacity was exceeded, patients were shifted to other wards. Earlier there was no ICU, but now there is an ICU with cots and one ventilator. Despite the increased space requirements for intensive care, it should be kept in mind that merely increasing the number of beds is not enough, the staff have to be trained to provide critical care, which seems to missing from the reviews of the interviews of the staff. High performance during a response depends on both human as well as material resources and cannot be independent of each other (Shirley and Maderloot 2008). Therefore, it is important for peripheral hospitals to invest in good equipment to be able to provide stabilization and emergency treatment to patients before transferring them to specialized tertiary care in JJ or other hospitals.

c. Capacity Building

A senior doctor at JJ reported that the staff are now being trained to respond to emergencies; the frequency of mock drills has been increased and a Continuing Medical Education (CME) program for disaster management has also been initiated at their hospital after the attacks. However, this was not corroborated by any other respondent at JJ Hospital. Most of the respondents maintained, *"no such special training is given to us"*. Therefore, it remains to be seen if training sessions are indeed taking place, what is the nature of such training and is it across the cadres or only for the higher positions. Respondents shared that health personnel were more equipped to deal with emergencies after this attack, were aware of the protocol and everyone now knew what was to be done.

An analysis of the responses of hospital personnel on the kind of disaster training they have received reveals that often training is equated with having actually participated in a disaster response - *"work from experience"* as it were. A respondent said, *"There is no need for special training. Doctors and nurses are already trained. They know their job."* Thus, little importance was given to the need to train or orient staff.

4.6 Pre-disaster Preparedness

Mass Casualty Incidents are unique and cannot be uniformly addressed, therefore each plan is as good as it is tested in reality (Shirley, 2006). Planning is pivotal otherwise even good medical practice is superseded by chaos and confusion. Planning should include protocol from the intimation of a crisis to the admission of victims and discharge of patients both internally among the different departments as well as externally with other agencies. Since burn-out during medical responses is high, planning should be standardized across hospitals and departments so that resources can be transferred and shifted during MCIs. When such plans are made familiar to the staff, practiced through drills and updated through reviews, they become the source of preparedness of the hospitals.

Limited Understanding of 'Preparedness'

Most providers believed that preparedness depends on each individual's capacity and conviction, and that planning or training would make no significant difference in responding to MCIs. They recounted their experiences during earlier calamities like the previous blasts and the 2005 Mumbai Floods, which according to some, were far more challenging and they maintained that this experience enabled them to respond during the terror attacks.

The DM Plan does not cover the Peripheral Hospitals

Of the hospitals, only the nodal hospital JJ had a disaster management plan, while the peripheral hospitals did not have any specific planning. The plan at JJ Hospital has outlined a system of response and incident command. However, these were limited to duties to be performed rather than an action plan to be followed. Interviews with respondents indicate that preparedness in the peripheral hospitals was mainly to ensure that there were adequate supplies available usually through circulars that said how much supply is to be stocked in order to be prepared for a disaster. One of the staff stated, *"All the hospitals have a disaster management plan and they have to keep stock of medicines for at least 200-300 people"*.

Preparedness was limited to a few instructions on emergency provisions. There have been no focussed attempts to include training for preparedness to all the staff in all the hospitals. There were neither guidelines nor drills in place on what is to be done during emergencies. The only hospital that had a plan was JJ, which had many drawbacks.

No Training to Healthcare Providers either on Disaster Management (DM) or on their specific role vis-à-vis the DM Plan

Doctors and nurses appear to have been aware that a disaster management plan did exist but had no idea what their part in that plan was as no training was provided for them. Since the plan itself was based on defining roles without adequate training, the staff were unaware of what had to be done. Moreover, the plan focused on the responsibilities of the higher staff like the RMO, CMO and matron leaving the lower staff out of the process, which might explain why they could only passively follow orders rather than participate pro-actively. This is also the perception among the lower staff who believe that disaster management planning and training is *"the work of officers at the high level. They take the decision as to how to manage the situation in such crisis."*

While it is true that it would not be possible to be prepared for every kind of event especially in cases of urban MCIs related terrorism, studies in Israel (Shapira and Shemer, 2002; Shirley, 2006 and Fykberg, 2005) have clearly shown better response abilities with adequate planning and preparedness among health care providers. However, most health care providers remain tight-lipped about the challenges and constraints faced during responding to emergencies and are unwilling to share these for reviewing.

For instance, during the course of an interview, a dean said, *"I will reserve my answer,"* Therefore, it is necessary to break the mindset that personal convictions and experience will enable one to function adequately during disasters and recognize the need for documenting, reflecting, planning and preparing to respond effectively.

Box 2. Highlights of JJ Hospital's DM Plan: Scope for Improvement

- The responsibilities of the senior staff such as the CMO and RMO have been described without sufficient clarity on the roles of the lower staff like nurses, ambulance drivers, etc. leaving the entire decision-making apparatus with the top few. In cases of mass casualty, this could become a serious hurdle especially if the senior staff are absent or burdened by other duties.
- All communication between departments is channelized through a nodal person, which could delay the response.
- Though a coloured triage and designing special documentation for emergencies by the Medical Records Department has been suggested, the implementation is ambiguous as is reflected in the statement, "it will be standardised whenever possible".
- The telephone operator has been designated to manage the communications of the hospital during emergencies; however, how the operator would access the information has not been laid out. In case the system fails or is over-burdened, an alternate system has not been identified.
- The medical social worker is assigned the task of managing the relatives, contacting them, providing food and support, which is enormous considering the chaos in dealing with kith and kin. Therefore human resources for this task could be expanded in order to deal effectively with relatives ensuring order.
- Overall, the plan describes a single line of very general duties that one has to perform, which is only slightly different from regular times but it does not define specific roles for each member of the staff. It also does not describe in detail protocol that has to be followed during emergencies, thereby looking at "what to do" without mentioning "how to do".
- It does not specify what is to be done in scenarios where even one person is absent or unable to perform.
- The plan looks at immediate response (first 24 hours), not beyond that, which is especially critical considering the nature of medical emergencies and the high burn-out rates of health care workers.
- The role of external agencies has not been covered considering how important co-ordination is between agencies like the police and media.
- The over-flow of volunteers and voluntary organizations with resources has been documented in all emergencies, management of these resources and human power should be considered and codified into the plan.
- The plan states "regular training would be given to the staff" but when, who and what type of training is not specified. Consequently training appears to have taken place on the lines of this plan in the hospital.
- The plan also says that "mock drills will be carried out to check the preparedness" but the time and frequency of these drills have not been mentioned. Therefore, in the year between the time the plan was made and the attack, no drills had taken place. Even after the attack there have been no drills.

RECOMMENDATIONS

Considering the significant role that the public health system plays especially in India in responding to mass casualty events, it is imperative that it be strengthened both in capacity and preparedness. The findings suggest that there is work to be done in this regard. Though there is a plan, it falls short of laying a clear-cut incident plan and defining roles, leaving many areas uncovered. The fact that it has not outlined the nature and frequency of training and mock-drills severely incapacitates the scope of the plan and applicability during a crisis. Without a plan, the peripheral hospitals can do only what they deem fit during emergencies or wait for orders from the nodal hospital which are at times antagonistic. Hospital incident command plans should incorporate robust yet simple communication systems like high frequency radio communication between key personnel of the hospital, between different hospitals and between various agencies like hospitals, ambulatory services, police and civil defence. These can act across the hospital even when other communication systems have failed in order to mobilize their response plan. A group can be trained in this specific task with a nodal officer who verifies and collects the information, which can be transmitted through the group to different departments so that they can arrange for required stocks of medical supplies, prepare the equipment and rooms and be ready to treat victims.

Technological means such as mobiles do play a very important role in the notification of the attack but these modes of communication could be affected or fail due to high network usage as demonstrated during the 2005 "7/7 London Bombings" where traditional methods like telephone and runners were the most adept and reliable sources of information to the hospitals (Shirley, 2006). However, what is to be taken into consideration is that there should be a uniform system of communication so that there can be a collective response rather than fragmented responses in different departments, especially when the hospital is itself under attack.

Organizing an information desk can be a key solution to reduce the confusion and obstruction created by relatives seeking information. They can be directed to a phone or a desk which can provide them with details and whereabouts of victims and survivors and direct them to appropriate areas of the hospital (United Nations Development Programme-Government of India, 2008). Even if there is not enough information that is collated, the presence of such a system can inspire confidence in the affected people and their relatives. Such a system can streamline the information that goes out to the public and keep a check on rumours and speculations.

This incident highlights the need to create an alternative system of medical and MLC documentation during emergencies. Apart from senior staff, junior doctors or nurses can be been trained and authorized to collect and maintain the data, while the role of the administrators would be to certify it. This would reduce the burden on them as well ensure that complete and accurate data is collected.

The possible interactions, communications and support both within the hospitals, between public hospitals and external actors like the government, police, media and volunteers need to be looked into and laid out more effectively in the plans and protocol. Hence, there is necessity to revisit the entire approach of the public health systems to address the specific requirements during mass emergencies from the planning phase to the per-hospitalization processes right to the post-crisis phase. Here are some of the areas that need to be particularly addressed for improving the response to mass casualty events:

5.1 Pre-Incident

- Creating a comprehensive disaster management plan that not only outlines roles but also firmly establishes a chain of command and standard operating procedures that should be activated during mass casualty incidents. It should articulate individual responsibilities right from the top to the very last person in the hierarchy.
- Ensuring communication and co-ordination between different departments and across hospitals is requisite for a successful response.
- Building the capacity quantitatively and qualitatively of the hospital staff, especially the nurses and the Grade IV staff so that they can contribute more effectively.
- Conducting regular training sessions and periodic drills within the hospital, and incorporating the feedback and lessons learnt into the plan as the efficacy of Disaster Management plans will be known only when they are put to test.
- Defining roles clearly in the plans that encompass the nodal and the peripheral hospitals and other public hospitals so that the load can be divided among the hospitals. There should also be scope for transferring staff between the hospitals rather than patients.
- Standardization of procedures and processes during mass emergencies from pre-hospital stage through admission and finally until discharge across hospitals so that documentation, medico-legal work, transfer of patients and bodies is simpler, smoother and more streamlined.
- Exploring the scope and partnerships between different types of public and private healthcare facilities and codifying them in order to ensure that there are no bureaucratic hurdles in the transfer and exchange of patients and staff in order to improve the intervention and save as many lives as possible.
- Defining roles and responsibilities clearly between the hospitals and the security forces in terms of inquests, post-mortems, and medico-legal procedures to prevent hindrances in their functioning and to boost co-ordination.
- Establishing contracts with ancillary agencies blood banks, pharmacists, medical suppliers and voluntary agencies before hand on the procurement of resources and services with clear terms and guidelines to be followed during emergencies.
- Instituting forms of simple reporting and documenting so as to collect evidence for judicial processes and compensation claims, not just during emergencies for fear of scrutiny, but regularly during routines times.
- Providing adequate security equitably to hospitals and staff with proper surveillance and checking systems and equipping security suitably.

5.2 During Incident

- Creating a system of intimation at the hospital level, which can quickly pass out information to all the departments and between hospitals so that adequate preparation and mobilization of resources can be achieved in the shortest possible time.
- Introduce a system of rostering, whereby trained extra staff can be intimated at the earliest in order to remediate for the high turnover of emergency staff and full utilization of staff for both clinical and non-clinical tasks (documentation, inventory, medico-legal case-work). This should be effective as most of the staff stay on the campus. Systems are only as good as the people who run it, therefore it must be ensured that the staff get adequate reprieve and rest in order to perform better.

- Considering the importance of on-site triage in the pre-hospital phase, its scope should be increased through prior training of ambulance drivers and attendants so that they can save precious time and salvage lives.
- Identification of spaces and sections in the hospital so that it is easy to treat, transfer and monitor patients between departments.
- Rotation of senior staff between departments to make immediate decisions and unblock bottlenecks and solve issues that come with considering the dynamic and unpredictable nature of mass casualty events. Decentralize certain decision-making with the staff in-charge with accountability to reduce obstacles and increase performance during such events.
- Establishing a "Public Information Centre" (PIC) in each hospital that is updated with information on the entire patient, procedures going on in the hospital, formalities for staff who can then share this information with other PICs, the public, media and relatives and prevent them from overcrowding the wards and theatres.
- Creating a more simplified process in the management of the dead (issuing of death certificates, post-mortems, claiming of bodies) during mass casualty events and universalizing them across hospitals to ensure that while relevant precautions are being taken and information is being sought, the bodies are handed over to the kith and kin at the earliest.
- Ensuring that the medical procedures do not get held up due to political and bureaucratic pressures by enacting and enforcing guidelines, which ensure that the health of victim is of priority overriding all other factors.
- Easing the process of compensation and providing it in a dignified manner as was done during this response should be formulated into policy for all forms of casualties.

5.3 Post-Incident

- Acknowledging everyone's efforts by ensuring that appreciation and felicitation is uniform across cadres so as to avoid feelings of hurt and resentment is necessary to boost the morale of the staff as well maintain amicable professional relationships.
- Creating awareness among health care providers, victims and relatives on psychological stress and symptoms they may experience and to provide necessary resources to cater to the mental health needs of the population within the hospital through staff and volunteers with proper follow-up and referrals.
- Lastly, but importantly, there should be open post-emergency reflections across the different cadres within and outside the public health system debriefing and auditing the entire response identifying issues, recognizing challenges, determining good practices and appraising the efforts. These should be documented and analyzed and then incorporated into the planning with corrective measures and most significantly shared with the public in order to improve the responses each time.

CONCLUSION

The common gaps in health system preparedness are generally well understood, but they are often not addressed in a comprehensive and systematic manner. The findings reiterate the need for greater planning and better preparedness of both health facilities and personnel during mass casualty incidents. This calls for making a paradigm shift in approaching emergencies with adequate capacity building. Adequate planning, conducting training sessions, analyzing existing resources, utilizing resources, co-ordinating both within and outside the hospital and creating a knowledge base are all measures to enable the health system to strive towards better response in emergencies. Mass casualties are unpredictable but good planning that defines responsibilities, allows scaling up and incorporates multi-sectoral involvement, improves the response. Such a holistic and comprehensive approach in policy and plan for mass casualty incidents will alone enable the public health system to move from impulsive reaction to proactive response.

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