



Research Paper

## Strategies to Manage Disaster in the Emergency Department of A Multispeciality Hospital-A Study

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### ABSTRACT:

*Background of the study:*

A disaster may be a serious disruption, occurring over a comparatively short time, of the functioning of a community or a society involving widespread human, material, economic or environmental loss and impacts, which exceeds the power of the affected community or society to cope using its own resources. In a hospital there are two types of disaster that can occur, external disaster and internal disaster, it can be natural as well as manmade disaster. When a disaster occurs in a community, the emergency department of each hospital plays a significant role in command and control, safety and security, surge capacity, continuity of essential services, human resources, logistics and supply management, post-disaster recovery. Emergency preparedness programs are the first step in preparing the hospital to respond effectively and quickly to emergencies that occur within the community or within the hospital.

### *Objective of the study:*

- To assess the disaster management plan in the emergency department of selected hospitals in relation to the National Disaster Management Authority
- To analyze the preparedness about handling disasters among the staff in the emergency department.
- To report the gaps and suggest corrective and preventive actions for the analysis.

**Methodology:** Cross-sectional study was conducted in the emergency department of a multi-speciality hospital in Mangalore, where a universal sampling technique was used to select the respondents. A pre-determined questionnaire, which was prepared with the guideline of NDMA, for managing disasters was administered to draw information from all the staff working in the emergency department. The data analysis was descriptive, where demographic details of the respondents were collected in order to understand the profile of the respondents who presented the data.

**Result:** Firstly, the awareness about disaster management among the respondents was analyzed. All of them also responded that there were standards, protocols, guidelines for disaster preparedness and response.

**Conclusion:** The present study was conducted in only one hospital, which showed moderate preparedness to handle mass disasters.

**Keywords:** Disaster, preparedness, emergency department, NDMA guidelines

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## **I. INTRODUCTION**

Health care organisation anywhere in Universe would face multiple challenges during disaster. We have witnessed the emergency of Pandemic in the year 2020, which have forced the health care organisations to revisit their emergency preparedness plans. Emergency department in any health care sector is prominently the first entrance during any disaster. Disaster may be external or internal, natural, or manmade. Emergency preparedness is the first stage in preparing the hospital and its manpower to respond effectively and quickly. The preparedness plans will help the management to embed them to day-to-day operations which will lead resilience efforts through meaningful strategies and not merely assumptions. The management also will have to take the disaster management as the business leaders because with disaster, there will be other risk to threaten the business continuity. Hence managing disaster especially in the emergency department becomes the top priority. All the hospitals should be able to develop a robust strategy that can help to recover and manage the emergency as and when it occurs. Managing emergency in the hospital includes planning for the emergency operation planning, which explains the organisations capabilities and response procedures to recover and maintain the medical equipment and the human resources for the critical patient care. Hence training of the staff by conducting drills, infrastructure set up, critical IT set up etc should be planned, so that the hospital will run smoothly even during emergency.

Several studies were undertaken to find the level of disaster management in the health care units. One of the study conducted in Nepal, by Filmer LB et.al (2013)<sup>1</sup> aimed to find the role of leaders regarding the health response to disasters. They observed the performance of leaders during a mock disaster scenario. They observed how the triage, treatment was performed and it was found that the respondents struggled to apply the disaster plans. The authors concluded that there is a need to be confident in implementing the disaster contingency plans and the role of the leaders have to be distinguished.

To specifically understand the role of each personnel in the emergency department, another study was interpreted. Spranger et.al. 2(2006) in their study assessed the physical preparedness and response capacity to bioterrorism or other public health emergency in a metropolitan area. They studied the physician role in detection, reporting and responding to the disease outbreak, anomalous biologic events, or other public health emergencies in community's safety. The result showed that 91% of the local physician reported their knowledge as "fair poor", 80% desired for more information, 83% favouring for more training opportunities. Similar many more studies shows, the need for developing strategies for emergency preparedness in the hospital.

Another study conducted in teaching and private hospital in Shiraz, by Mahdaviazad H3, had an objective to understand and compare all the component of disaster plan using 10 key component of world health organisation checklist. The author compared the disaster plan between teaching and private hospital. The end result showed that the disaster preparedness was at intermediate level and some of the key component like operating room management, surge capacity and human resource was at very limited and at an early stage of development. This study also showed that there is urgent requirement of attention and improvement.

Rosemary Maud Moabi<sup>4</sup> conducted a study to ascertain the knowledge, attitudes and practices of hospital management at the Johannesburg Hospital regarding disaster preparedness. The study population included the hospital administrators, head of clinical units, head of casualties, the chief porter, the chief clerk, the theatre matron, senior sisters and doctors within the casualty department, head of security, head of transport and the chief pharmacist. It was a cross sectional study, which collected data through a self-administered questionnaire with structured and open ended question having a response rate of 71,4%. The management at the Johannesburg Hospital was conscious of the disaster preparedness of the hospital and its plans, and disaster management preparedness. Their attitudes to the plans and drill were largely positive. However, the practices were deficient and work still needs to be done regarding ongoing training, performance of drills and the frequency of regular updating of the plans. With an aim of implementing appropriate disaster management in the emergency department of a multi-speciality hospital, the present study tried to analyse the preparedness in managing the disaster in the emergency department and to compare the disaster management plan in relation to the National Disaster management authority.

## **II. METHODOLOGY**

Cross sectional study was conducted in the Emergency department of a multi-speciality hospital in Mangalore, where a universal sampling technique was used to select the respondents. Pre-determined questionnaire which was prepared with the guideline of NDMA, for managing disaster was administered to draw the information from all the staff working in the emergency department. The sample size in the

present study included 55 respondents, which included 5 administrative staff, 29 Clinical staff including doctors and nurses and 26 supportive staff including reception coordinators and security. The data analysis was descriptive, where demographic details of the respondents was collected in order to understand the profile of the respondents who presented the data.

### III. RESULTS

#### Demographic data

In the present study, universal sampling was conducted, and among them 9.0% were administrators, 10.9% were doctors, 43.6% were registered nurses and 36.3% were supportive staff. The recruitment of the personnel was done in accordance with the NABH standards. 56.4% were found to be male respondents with 43.6% were found to be females. Most of the respondents belong to the age group of 21-30 years (60%). 30.9% were in the age group of 31-40 years. Hence most of the respondents in the Emergency department were found to be adults, for whom handling emergency cases would be efficiently done. In emergency department when the patient visits in any hour of the day, decision making for the specific treatment would be the important factor, hence the age of the person working in Emergency department would play a major role. In the present study it was found that 9.1% were in the age-group of 41-50 years. The research felt that selection of personnel to the emergency department, age should be one of the strategies which was seen in the present research site.

The most likely cases received by the Emergency department according to the respondents were, majority was road traffic accident (81.8%), Natural disaster and fire accidents which accounted to be 14.5% each, and chemical spills cases was 10.9%. during the study period there were no cases of disease epidemic. 5.4% of the cases were general like Obstetrics, cardiac related etc.

#### **Strategies undertaken regarding the disaster management in the hospital:**

Firstly, the awareness about the disaster management among the respondents was analysed. 47 respondents among the total 55 (85.4%), agreed that they had an awareness on hospital disaster management. All the respondents (100%) agreed that they knew that there is a disaster management committee in the hospital. The total 100% of them, felt that the Hazard risk assessment was periodically conducted in the hospital. All of them also responded that there were standards, protocols, guidelines for the disaster preparedness and response. They also reported that there were workshop, training, drills, mass casualty incidence response drills, simulations on disaster according to the scheduled time. Another important strategy followed in the hospital was protection against contagious disease by providing vaccination in the hospital which was agreed by the 85.4% of the respondents. Remaining respondents were nonclinical for whom the protection vaccine was not given. 100% of them agreed that there was the necessity of using personal protective equipment while caring the patients.

#### **Disaster Preparedness in the hospital among different level of Managers:**

The administrators (N=5) were the first set of respondents from whom Disaster preparedness in the emergency department in a hospital was analysed. NDMA guidelines was referred while preparing the questionnaire for Disaster preparedness. The factors for which the information derived was, updation of Inventory of all equipment supplies and pharmaceuticals and establishment of storage alert mechanism, contingency agreement with vendors to ensure the procurement and prompt delivery of equipment and supplies in mass casualty, information about the hospital storage and stockpiling of additional supplies to ensure uninterrupted cold chain, mechanism for quick assessment of functional status, maintenance and repair of equipment for essential service, awareness regarding the hospital treatment capacity and hospital surge capacity, demarcate beds allocation, was derived in the present study. It was seen that all the total respondents (100%) who were the administrators, were aware about this disaster preparedness which was being followed in the hospital. The following table depicts the responses of the administrator in disaster management.

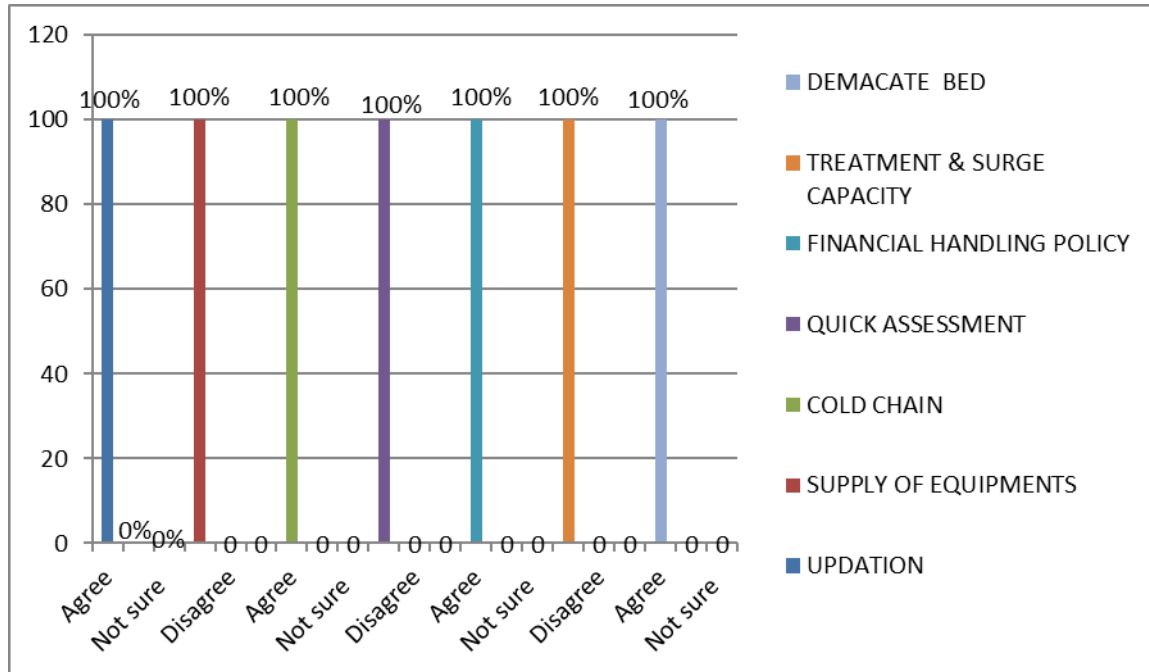
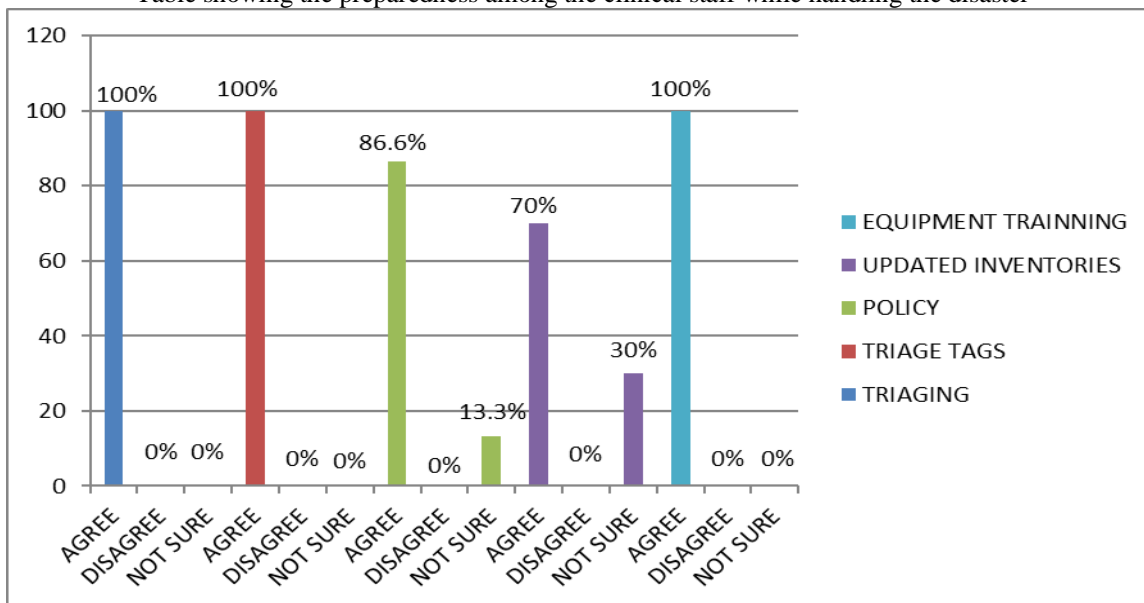
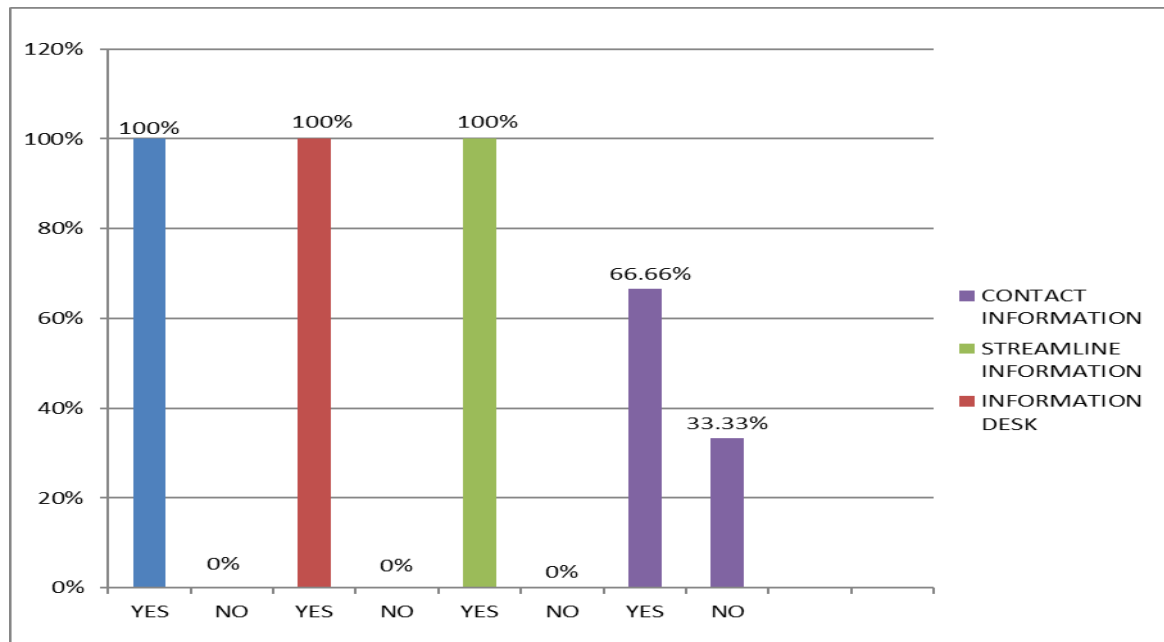


Table showing the preparedness among the clinical staff while handling the disaster



The information about the same factors were asked with the clinical staff (N=30). Clinical staff included doctors (N=6) at the emergency department and the registered nurses (N=24), working in the emergency department. All the clinical staff (100%) followed the triaging and ensuring triage tags to the patient. All of them had equipment training as per the policy of the hospital. When the information was elicited regarding the policy, especially about the brought dead cases, only 86.6% of them were aware and others were not. When they were asked about the updated inventories of equipment, supplies, pharmaceutical and shortage alert mechanism to ensure uninterrupted cold chain, only 70% were aware about this factor and others were not. When the information regarding the preparedness was elicited by the reception staff (n= 6) and the following data was seen.



Here the questions slightly differed with an view to satisfy the customers receiving emergency service during disaster. Total respondents (100%) in the reception staff category, felt that hospital have public information spokesperson to communicate with public, media and health authority, and also there is an information desk which is having a list of casualty scope of services. Along with their status in both English and local-language. All the respondents (100%) also viewed that during emergency, there is a streamlined mechanism for information exchange between hospital administration, department heads and facility staff.

In the hospital where research is being undertaken, there is a internal communication facility during mass casualty. According to all the respondents (100%), landline phones are being used for internal communication with the code given by the hospital policy. 66.6% of them felt that internal telephone exchange is utilised, and 33.3% of them felt it was the public address system and another 33.3% also felt that wireless sets are used during mass casualty. 66.6% of the respondents reported that updation of the contact information of hospital staff, police, district functionaries of administration and other nearby hospital is made available in the communication room.

**Disaster Preparedness in the hospital among the supportive staff (N=16):** security staff of play a vital role in managing the disaster. Hence the disaster preparedness of the security staff (N=10) is also studied to understand the level of preparedness and to provide the strategy. The reception staff (N=6) were also included in the study, because they are also trained for preparedness during disaster to arrange the necessary staff for the service of the patients. All the respondents (100%) said that the security team in the hospital is responsible for hospital safety and security activities and it is necessary to prioritize the vulnerability according to the condition of the patient. They also felt that there is a need to maintain registers in the receiving area to note down the place of incidence, vehicle number, driver details and patient identification and they also felt that permanent and updated posters, wall hangings and hoardings should be always displayed in the hospital premises. All of them also felt that there should be alarms, emergency communication system during mass casualty. However, the result showed that only 60% of them agreed that the department is having transfer policy and facility during mass casualty and only 80% of them felt it is the security personnel responsibility to escort the clinical department to carry out the treatment.

**Disaster Preparedness in the hospital among nursing staff (N=4):** the disaster preparedness was studied among the nursing staff in handling the biomedical waste during disaster. And it was seen that all the respondents (100%) felt that the colour codes and biohazard symbol for collection of biomedical waste before disposal was followed, also the storage, transportation and disposal of waste are done within 48 hours of the emergency. All of them felt that multiple collection of the waste during mass casualty is necessary to manage disaster properly. All of them (100%) were aware that the biomedical waste bags and sharps containers filled more than three quarters full and that the replacement bags or containers should be available at each waste collection location. It was also seen that all the respondents agreed that all glassware should be pre-treated with 1% hypochlorite sodium and the hospital premises have storage facility for biomedical waste till the waste transported for the treatment. They (100%) were also aware that the using personal protective equipment is



important while handling biomedical waste. However, when the question was asked regarding the using of chlorinated plastic bags for collection of the biomedical waste, only 25% of them agreed and others disagreed.

#### **IV. DISCUSSION:**

Health emergencies are unforeseen events, which creates confusion, risk, or injury or even loss of life. Often in any health care centres, we witness the mismatch of resources and the needs. This amplifies the situation, when disaster or emergency occurs. To identify the loophole of the preparedness of the disaster management in a super speciality hospital, the present study was undertaken.

Different parameters related to the study was considered. According to the analysis, all the responses were received. The study explored various factors which was associated with the hospital preparedness and resilience during emergency. Most of the emergency cases which were brought in to the casualty during the study period was road accidents (81.8%), Natural disaster and fire accidents accounted for 14.5% each, 10.9% with chemical spills and 5.4% were general cases like obstetrics, cardiac related etc. During this period, no cases of disease epidemic was admitted.

Self-reported awareness about the disaster management among the respondents was analysed which reported that 85.4% agreed to have awareness about the hospital disaster management. 100% of them knew about the committee working in the hospital for disaster management because they were aware about the hazard risk assessment which was periodically conducted in the hospital with scheduled workshop, training drills mass casualty and simulations on disaster. They were also aware about the protocols, standards, guidelines for the disaster preparedness and response.

The respondents (85.4%) reported that the hospital, as a preventive action also provided vaccination for protection against contagious disease. As per the study objectives of the present research, disaster preparedness was analysed with various levels of managers in the hospital. This was done in order to find the extent of preparedness in various level and to find the process of communication during the occurrence of disaster.

As per the first level of analysis, awareness on disaster preparedness among the administrator level was seen. The questionnaire was prepared on the basis of NDMA guidelines and the factors for which the information derived was, updation of Inventory of all equipment supplies and pharmaceuticals and establishment of storage alert mechanism, contingency agreement with vendors to ensure the procurement and prompt delivery of equipment and supplies in mass casualty, information about the hospital storage and stockpiling of additional supplies to ensure uninterrupted cold chain, mechanism for quick assessment of functional status, maintenance and repair of equipment for essential service, awareness regarding the hospital treatment capacity and hospital surge capacity, demarcate beds allocation, was derived in the present study. It was seen that all the total respondents (100%) who were the administrators, were aware about this disaster preparedness which was being followed in the hospital. Next with the analysis of awareness of the clinical staff including doctors and nurses, 100% of them followed triaging and ensuring triage tags to the patients immediately. However, only 86.6% were aware about the policies regarding the brought dead cases and only 70% of them were aware of the updated inventories of equipment, supplies and pharmaceutical and shortage alert mechanism. Awareness in this area is equally important to ensure the uninterrupted cold chain system, which is needed to be prepared for the disaster occurrence. Hence training is needed periodically to the clinical staff to monitor these needs. The present study was support by the study conducted by Baack S, Alfred D (2013)<sup>5</sup>, which high lights the need for the training of nursing staff to create confidence among them during disaster management.

During emergency, there will be sometimes a huge crowd in the hospital which is difficult to manage. The systematic process of the admission in the hospital may go mismanaged with confusion and uncontrolled emotions. During this time, there is a need for a streamlined mechanism for exchange of information between the hospital administration, department heads and facility staff. The supportive staff should be well-equipped with effective communication and proper awareness. The research site had a facility of internal communication like landline phones which the supportive staff (100%) like reception coordinators and the security personnel were aware off. All the supportive staff were well aware of the vulnerable policy of the hospital and prioritized the vulnerable patients to the casualty during emergency. Documents are the need of the day in the emergency department, which was well maintained by the supportive staff. Records like domicile of the incidents, vehicle number, driver details and more importantly the patient identification was clearly noted in the registers. During mass emergency, when communicating minute information to the attendants of the patients becomes difficult, the need for permanent and updated displays like wall handing and hoardings is well understood by the supportive staff in the hospital. However, 60% of the supportive staff knew about the transfer policy and facility during mass casualty and also 80% of them felt that there is a need for security staff to take the responsibility to escort the clinical department to proceed with the treatment.

Biomedical waste management during disaster is very important and all the respondents (100%) responsible for the management of biomedical waste knew about the colour codes and biohazard symbol for

collection of biomedical waste before disposal was followed, also the storage, transportation and disposal of waste are done within 48 hours of the emergency. All of them felt that multiple collection of the waste during mass casualty is necessary to manage disaster properly. All of them (100%) were aware that the biomedical waste bags and sharps containers filled more than three quarters full and that the replacement bags or containers should be available at each waste collection location. It was also seen that all the respondents agreed that all glassware should be pre-treated with 1% hypochlorite sodium and the hospital premises have storage facility for biomedical waste till the waste transported for the treatment. They (100%) were also aware that the using personal protective equipment is important while handling biomedical waste. The study result showed that there is need for creating an awareness about the using of chlorinated plastic bags for collection of the biomedical waste as only 25% were aware of this factor.

#### **V. CONCLUSION:**

The present study was conducted in only one hospital, which showed the moderate preparedness to handle the mass disaster. This study helped in identification of gaps between disaster preparedness of employee at emergency department in according to NDMA guidelines. Revealed the need of updated information and policies to the employee in the super speciality hospital.

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