DISASTER MANAGEMENT-ROLE OF FORENSIC EXPERT

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ABSTRACT

Disasters have existed ever since the existence of the mankind. The 'Hindu Philosophy' and 'Greek' philosopher Empedocles presumed that Universe consists of five elements: Earth, Fire, Air, Sun, and Water, from there comes the manifestation of violence like Earthquakes, Volcanoes, Cyclones, and Floods. The focus of nature has been relentlessly violent and Natural Disasters have been called the greatest destroyer of lives and property (Australian Counter Disaster College, 1984).

With the development of Chemical Processes and Manufacturing Industry, "Nuclear Bomb Explosion" in 1945, "Bhopal Gas Tragedy" in India on 3rd December 1984, and "Terrorist Attack on World Trade Center" in USA on 9/11th September 2001, and continuing technological advances, it is inevitable that Biological and Chemical Disasters are just round the corner and community must prepare themselves for these disasters. The growing "Terrorism" in the World over has added to ever increasing list and severity of Man Made Disasters.

This paper deals with meaning and definitions of disasters need for disaster management plan with special emphasis on role of Forensic Expert.

Key Words:

Calamities, Disaster, Management, Man Made, Natural.

INTRODUCTION

Disaster literally means 'Catastrophe', 'Calamity', or 'Aapada'. The Second Wednesday of every October during the Decade was observed as "World Disaster Reduction Day". National Day for Disaster Reduction was observed on 11th October. Theme for the year 2000 was "Community Participation and Public Awareness". The United Nations observed the Nineties as the "International Decade For Natural Disaster Reduction" (IDNDR), in order to focus on International Initiatives for minimizing the adverse impact of natural calamities particularly in the developed countries like India. The period of 1970 alone accounted for death of over 1 million persons and destruction of property over 46 billion dollars by Cyclones, Hurricanes, Tornados, Earthquakes, Floods and other disasters (UNDRO, 1979). In Past Century more than 10 million people have died due to Floods, Earthquakes and Tropical Storms (United Nation, 1983).

Man Made Disasters as a result of Toxic Chemicals; Explosions, Fire Incidents; High Rising Building's Collapse; And Hazardous Waste etc. have been the cause of many deaths and casualties. The increase in Chemical Processes and Manufacturing Industry inevitably carries the risk of accidents. Enrico Fermi and his associates in the year 1944 at the University of Chicago developed the First Atomic Reactor and when proved that chain reaction was in fact a reality the world was introduced to new and terrifying dimensions, in the cause and scope of disasters. The Nuclear Bomb was dropped in Hiroshima and Nagasaki in1945, since then the threat of Nuclear War is ever increasing (Mass Casualties Management, 1983). Increasing Nuclear Power Plants the world over inevitably carries the risk of accidents like manifested in the Three Mile Island and Chernobyl.

One of the worst Industrial Disaster in the World "Bhopal Gas Tragedy" in the Night of 3rd –4th December, 1984 which killed 2500 victims and 17500 victims were hospitalized, besides, incapacitating thousands. Many deaths, morbidity and suffering of thousands could have been saved in Bhopal with proper disaster management. The 'Chemical Disaster Prevention Day' being observed all over India on 4th December every year is a grim reminder of the worst recorded accident in the history of Chemical Industry.

A powerful Earthquake on 26th December 2003 strikes Bam (an Ancient Silk Road City) in South- Eastern Iran, killing some 40000 people and injuring some 30000 others. The Interior Ministry of Iran estimates 20000 deaths in Bam Earthquake (27-12-2003). [1]

Thus, disaster management plan is a must for every hospital as a disaster can happen anywhere anytime. No one can claim that, "It cannot happen here". The fact is that it can happen here, anywhere, not necessarily a nuclear bomb but it could be a riot, road traffic accident, fire incident, building collapse, or any of natural disasters or an act of man that can suddenly bring about a localized or

widespread state of disaster.

AIMS & OBJECTIVES:

To create a medical community, which is adequately knowledgeable about the disasters, natural or otherwise, it is likely to face and the safe ways of surviving community affected. The ultimate aim of disaster management plan is to save as many lives as possible by providing best possible medical care under those circumstances.

WHAT IS A 'DISASTER'?

Before going into discussion about actual topic, I would like to discuss what disaster means for medical fraternity?

The **Oxford Dictionary** describes disaster as "A sudden Calamitous Event bringing great damage, loss or destruction".

WHO Definition: "A situation, which implies unforeseen serious and immediate threat to public health".

Colin Grant's Definition: "Catastrophe causing injury or illness simultaneously to at least thirty people who will require hospital emergency treatment"-*(Colin Grant's-1973).*

Rutherford's Definition: "An emergency of such magnitude as to require extraordinary mobilization of emergency service"-(*Rutherford-1974).*

Jenkins A's Definition: "Disaster needs declaration when immediate patient load in the emergency medical services system is greater than normal, operator can care for" (*Jenkins An-1978).*

No definition seems to be complete which is suited to every **Hospital / Institution.**

What is my perception?

A disaster involves following Ingredients:

· Unforeseen, Serious and Immediate Threat to Public Health i.e. Suddenness in terms of time;

· An Emergency, Calamity, Catastrophe, Misadventure, Tragedy, Epidemic, Cataclysm etc.;

- Where number of casualties far exceeds medical facilities in normal situation that disrupts the normal routine of life i.e. Magnitude in terms of severity of damage or deaths.

In other words declaration of disaster depends on gravity or magnitude of situation, number of victims involved, time factor i.e. Suddenness of an event, availability of medical care in terms of space, equipments, medical and paramedical staff, medicines and other basic human needs i.e. food, shelter and clothing, weather conditions in the locality of incident etc. Thus, enhancing human sufferings and create human needs that the victims cannot alleviate without assistance.

DISASTER CLASSIFICATION

Disasters have been classified in various ways but the most convenient method used in classificationof disasters is in two distinct categories according to their causes.

1. Natural Disaster.

2. Man Made Disaster**.**

Western Countries classified disasters as follows:

1) NATURAL DISASTERS:

i) NATURAL PHENOMENON BENEATH EARTH'S SURFACE:

(a) Earthquakes.

(b) Volcanic eruptions.

ii) NATURAL PHENOMENA AT EARTH'S SURFACE:

(a) Land slides.

(b) Avalanches.

(c) Metrological / Hydrological Phenomenon.

(d) Wind Storms (Cyclones, Typhoon, Hurricane).

(e) Tornadoes.

(f) Hail Storms and Snow Storms.

(g) Sea Surges, Flash Floods or Cloud Burst.

(h) Floods.

(i) Droughts.

iii) BIOLOGICAL PHENOMENA:

(a) Locusts Worms.

(b) Epidemics of Diseases.

2) MAN MADE DISASTERS:

i) CAUSED BY WARFARE:

(a) Conventional Warfare.

(b) Nuclear, Biological & Chemical Warfare.

ii) CAUSED BY ACCIDENTS:

(a) Vehicular Accidents, (Plane, Train, Ship and Motor Car etc.).

(b) Drowning.

(c) Collapse of Building.

(d) Explosion.

(e) Fires.

(f) Biological.

(g) Chemical Including Poisoning.

SOME OF THE MAJOR DISASTER EVENTS

Year	Place Of Disasters World Wide	Casualties Reported
1348	Epidemic (Bubonic Plague) World Wide	25,000,000
1556	Earthquake China	8,30,000
1919	Epidemic (Influenza) World Wide	20,000,000

1949	Mini disaster Germany	3,000
1956	Hurricane China	2,000
1962	Avalanches Ranrahivca Peru	3,500
1963	Air Crashes Canada	118
1963	Dam Collapse Valout, Italy	3,000
1985	Volcanic Eruption Colombia, USA	23,000
1985	Air Crashes (Air India) Montreal, Canada	348
1987	Nuclear Plant Disaster Chernobyl, USA	29
1988	Earthquakes Armenia, USSR	55,000
1988	Train Accident South-West, London (Injured)	36(115)
1988	Earthquakes Unan, China	900
1988	Earthquakes Tazakistan, USSR	1,415
2001	Terrorist's Attack on WTC, USA	3,000
2003	Earthquake Bam, Iran	20,000
2004	MEENA, NEAR MACCA SAUDI ARABIA	244
2004	MADRID BLAST, SPAIN	198 (1400 Injured.)

Year	**Place Of Disasters in India**	**Casualties Reported**
1737	Earthquake Calcutta, India	3,00,000.
1961	Floods India	1,000.
1977	Cyclone Andhra Pradesh, India	10,000.
1979	Flash Flood Gujrat, India	2,500.
1984	Chemical Disaster Bhopal, India	2,500.
1988	Train Accident Quilon, India (Injured)	300(500).
1988	Air Crash Ahmedabad, India	135.
1993	13 Bomb Blasts In Mumbai, India.	250.
1998	Train Accident Khanna, Pusa, India.	211.
2001	Earthquake Bhuj Gujrat, India.	10,000.
2003	Frontier Mail Fire Ludhiyana, Punjab, India.	36 (14).
2003	2 Bomb Blasts In Mumbai, India.	45.
2003	Cloud Burst Himanchal Pradesh, India.	41.

2003	Stampede At Kumbh, Nasik, India.	35 (75).

Year	Place Of Disasters in J & K	Casualties Reported
2002	Terrorist's Attack Kaluchak, Jammu.	23.
2003	Terrorist's Attack on Railway Station, Jammu.	20.
2004	Terrorist's Attack on Railway Station, Jammu.	08.

DISASTER MANAGEMENT PLAN

AIM OF DISASTER MANAGEMENT:

The ultimate aim of disaster management is basically the prevention and minimization of death, disability, sufferings and losses.

There are certain fundamental principles, which should be thoroughly understood by everyone who may have responsibility for helping the victim of a disaster. Furthermore, it is important that these principles be applied in the proper sequence; otherwise they loose effectiveness or cause even more deaths and injuries- **(Grab & Eng. -1969).**

PRINCIPLES:

Disaster management means a planned and systemic approach towards understanding and solving problems in the wake of disasters. Some general principals of disaster planning are:

- It should be a continuous process.
- It should reduce the unknown in a problematic situation.
- Plan must evoke appropriate action.
- Plan must foresee what is likely to happen.
- Plan must be based on valid knowledge.
- Plan must focus on general principles.
- Plan should serve as an educational activity.
- Plan for overcoming resistance.
- Plan must be tested.

Adjust planning to people rather than expecting people to change their behavior in order to conform to the planning.

These principles include following steps:

- "Prevent" the occurrence of the disaster whenever possible.
- "Minimize The Number Of Casualties" if the disaster cannot be prevented.
- "Prevent Further Casualties".
- "Rescue The Victims".
- "Provide First Aid To The Injured".
- "Evacuate The Injured To Medical Installation".
- "Provide The Definite Medical Care".

· **"Promote The Reconstruction Of The Lives Of Victims".**

Thus, Disaster Management involves: (UNDRO, Vol.12, 1986)

Disaster Prevention:

Described as measures to prevent natural phenomena from causing or resulting in disaster or other related emergency situations.

Prevention concerns the following:

- To prevent or eliminate the occurrence of disaster, need for Formulation and Implementation of long-term policies and programs,

- On the basis of vulnerability analysis of all risks, prevention includes legislation and regulatory measures, principally in the field of physical and urban planning, public works and building.

Disaster Preparedness:

Described as action designed to minimize loss of life and damage and to organize and facilitate timely effective rescue relief and rehabilitation in case of disaster:

- Preparedness is supported by the necessary legislation and means a readiness to cope with disaster or similar emergencies, which could not be avoided.
- Preparedness is concerned with forecasting and working, the education and training of population, staff, organization for and management of disaster, including preparation of operational plan, training of relief group, the stock piling of supplies and the earmarking of the necessary funds.

Continuous preparedness to provide quick and effective relief, together with the adoption of such preventive measures as are possible to save life, lessens personal suffering and loss when a calamity strikes -(Skeet, 1979).

Disaster Mitigation:

Mitigation means reducing the actual or probable effects of an extreme hazard on man and his environment.

ROLE OF FORENSIC EXPERT

Role of Forensic Expert is of immense value due to medico-legal nature of all the cases especially in 'Man Made Disasters' like terrorist attack etc., and when MCI Recommendations are that emergency services to be brought under the supervision of Forensic Medicine Department and posting of Inters for two weeks in the casualty under the supervision of Forensic Experts.

TRIAGE:

Need for Emphasis on 'Triage' and plan for allocation or extension of emergency department space.The concept of 'Triage' or 'Sorting' was originally developed for Mass Casualty Disaster or Battle Field Situations in which decision had to be made about the allocation of resources and Medicare. This concept was being expanded to emergency department in which unscheduled patients arrive by ambulance or other means seeking urgent care. Triage is a core process in the emergency department.

The origin of Modern Triage is attributed to Baron Dominique Jean Larry in the Napoleonic Wars who created a system for sorting the thousands of French causalities into groups with different priorities for evacuation and treatment, not based on soldiers rank, but on the nature of their injuries.

The patient presenting to casualty in the late 1960's were not always triaged. Ambulance cases were generally afforded priority with the walking wounded being seen in order of arrival. In the mid 1970's staff at the Bore Hill Hospital in Melbourne developed a five tired time based scale and used different colored stickers on the medical record to indicate priority. This scale was slightly modified by Fitzgerald who demonstrated the validity of the scale in describing the urgency for need of medical care by testing its correlation with a range of actual and surrogate measures of injury and illness severity.

AIMS AND OBJECTIVES:

An effective 'triage' system will achieve the following:

- To ensure immediate medical intervention in life threatening situation.
- To expedite the care of patients through an accurate initial assessment of urgency.
- To ensure that patients are prioritized for treatment in accordance with the severity of their medical condition.
- To reduce the morbidity associated with medical conditions through early intervention.
- To assist patient requiring treatment in another hospital, department, or community health services.
- To improve public relations by communicating accurate information to friends and relatives who accompany patients.

· To improve patients flow within Emergency Department.

· To provide supervised learning for appropriate personnel's (like Interns, J.R.'s etc.).

· To assist with all aspects, in performance measurement in Emergency

- Sorting of dead from injured.
- Fixing of identity is a great challenge for Forensic Expert, and in almost all cases autopsy is to be performed as unknown, unclaimed dead bodies.
- Post mortem examination of all the casualties is must to confirm the cause of death.
- Fixing Identity and confirmation of event by Preservation and collection of evidences for Forensic Examination (DNA Evidence, Blood Grouping etc.).
- Almost all wounded patients need Casualty Services.
- For Post Mortem Examination, Demarcation of additional staff & space and rapid disposal of cases is the need of hour in cases of Mass Casualties.
- For creating Temporary Mortuary, use of tents, folding tables & adequate quantity of equipments may be needed.
- Mobile vans may be used for 'On the Site Post Mortem Examination'.
- Facility of 'Cold Storage Cabinets' or arrangement of Ice Cubes (blocks) for keeping the dead bodies till waiting for relatives or final disposition of dead bodies may be available.
- Provision for adequate water supply, arrangement of lights must be ensured before performing **'**On the Site Post Mortem Examination'.
- Another important point needs emphasis here is to ask for adequate security arrangements to avoid 'Secondary Disaster' due to Law and Order problems.

Role as a Leader:

Forensic Expert being an expert of medico legal nature of cases and also having administrative e knowledge and experience of working with law enforcement persons, must come forward and play a role as a Leaderin such disastrous situations.

Role as a doctor:

The primary role of doctors should be to function as a doctor and they should not be diverted, to other functions, and keeping in mind the directions of S.C. regarding treatment offered to a patient in emergency situation. No patient left unattended & treatment must not be delayed in the name of medico-legal nature of the cases.

ROLE AS A COORDINATOR:

Forensic Expert must act as a Coordinator of following's activities:

- Nursing staff,
- NGO**'s** (like Red Cross for ambulance services, setting up first aid team, help in providing food, drink, and temporary shelters for victims and rescuers, supply of drugs and equipments, help in rehabilitation, supply of cloths blankets etc.)
- Volunteers (like NCC, NSS etc.) for rescue, first aid, evacuation etc. the volunteer's should act in coordination with professionally trained persons. The volunteer's help should correspond as closely as possible to his training and experience-(Grab & Eng.-1969).

PUBLIC HEALTH WORK PERSONNEL:

- To perform any work that would lessen the chance of a 'Secondary Disaster' and then take other activity to support the rescue operation.

The usual task to be performed includes:

- Removing traffic jams or road blocks so that clear passage may be available for relief vehicles, ambulance, and fire brigade vehicles etc.
- Prevention of any untoward effects like break down of electric, water, and gas supply.
- To assist Fireman in obtaining adequate water for Fire Fighting.
- Rescue operations particularly of removing victims from under debris etc.

PREVENTION OF HEALTH PROBLEMS:

Prevention of 'Secondary Disaster': 'Secondary Disaster' means 'Disaster After Disaster' or 'Disaster Over Disaster' due to law and order problems during treatment or at nay stage of disaster management, like public outrage, conflicts between hospital staff and attendants of patient's or so called self made local leaders, creating strike like situation.

NEED FOR CHANGE OF ATTITUDE:

"Delusion Of Personal Invulnerability": Most people believe that a disaster is something that happens to someone else not to themselves or their families. This is called the "Delusion Of Personal Invulnerability". As a result they are likely to ignore or minimize warning and refrain from taking preventive measures- (Grab. & Eng.-1969).

Students can be trained in 'first aid' and remain in a constant state of preparedness. The idea that assumes the supreme importance is –the elimination of the critical difference between 'runaway' to 'run-in'**,** in case of any disaster.

FUTURE TRENDS IN DISASTER MANAGEMENT

The disaster management has come a long way from disgraceful history. The scientific development in many discipline have made significant breakthrough in better prediction, preparedness and mitigation **(**Stephan et al, 1985).

The use of satellite, computers, electronics, better communication facilities are going to make significant difference in disaster management. The data processing and computers are providing a useful tool in decision making in disaster.

SUMMARY AND CONCLUSIONS

When the disaster strikes, power goes out, all modes of communication (Telephone etc.) becomes inoperable, lifts stop functioning, when drinking water becomes contaminated, when normal modes of transportation suddenly becomes impossible, when casualties start coming in groups that is not the time for planning but that is the time of acting. This fact makes it imperative for community disaster preparedness and particularly health care system with its critical component **"**the hospital**"** which are to be prepared consistently to mobilize all their facilities for maximum use.

Creating public awareness about safety from disasters by organizing workshops, symposium, seminars etc. There is need for amending, enacting & effectively enforcing legislations for safety from disasters like Protection of habitations from adverse impacts of disasters, constructing new buildings safe from disasters and retrofitting existing buildings for improving disaster resistance.

Need for change of strategy from 'post-disaster reactive approach' to 'pre-disaster pro-active approach' to reduce the damage, losses to the property, and human sufferings along with prevention of human lives on one hand and reduce the cost of relief, rehabilitation and reconstruction on the other hand.

No master plan can be evolved to fit every emergency situation but a general schedule of emergency activity could prove extremely helpful in times of disaster, if executed in a coordinated and disciplined fashion.

The better awareness for disaster preparedness and mitigation is expected to result in coordinated extensive efforts to ensure better disaster management (Stephen et al, 1985).

Adequate procedures to deal with disaster should be formulating in every country of the world as no country is completely immune from both natural and man made catastrophe -(Skeet, 1979).

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