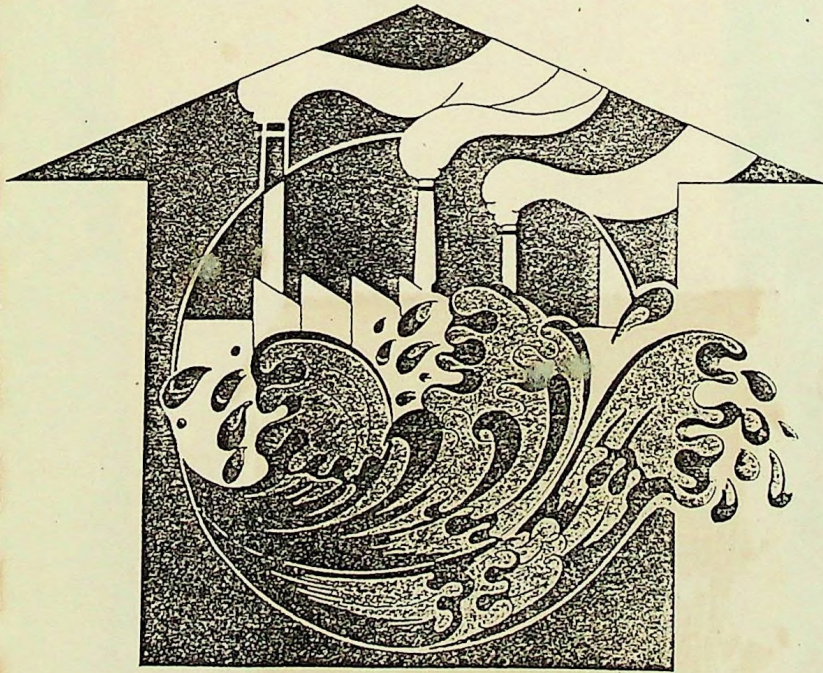


DISASTER MANAGEMENT



आरोग्यं मातृमयम्

राष्ट्रीय स्वास्थ्य एवं परिवार कल्याण संस्थान
NATIONAL INSTITUTE OF HEALTH AND FAMILY WELFARE
NEW MEHRAULI ROAD, MUNIRKA, NEW DELHI-110 067



Module 9 Disaster Management

Introduction

Natural calamities and industrialisation have increased the incidence of disaster. It is obvious that disaster can occur at anytime, anywhere and in any weather. These situations contribute to the sufferings of mankind and present a formidable challenge to health managers to cope with the health problems of the victims and the community. Therefore in fitness WHO in 1990 gave the call to member nations "Should Disaster Strike - Be Prepared."

Avalanches, droughts, floods, cyclones and earthquakes are well known phenomena causing havoc in various parts of the country. Gas leaks, air crashes, boat capsizes, train accidents are also adding to the miseries. These events happen and we are caught unaware. It is, therefore, essential to know about the nature of the disaster and to be prepared for it in order to lessen the human miseries and losses. It involves evolving a suitable medical and public health relief plan for each district which would prove useful to deal with any disaster that may arise.

Objectives

After going through the module the students are able to:

1. Describe the types of disaster and its managerial dimensions in health.
2. Develop a disaster plan for the district to cope with the health problems during disaster.
3. Organise public health and medical relief measures for disaster.

Units

In order to achieve the above objectives, the following units are presented as part of the module. These are:

Unit 9.1 Disasters and Dimensions for Management in Health

Unit 9.2 Health Management in Disaster

Unit 9.1 Disasters and Dimensions for Management in Health

9.1.1 Objectives

At the end of the unit, the student is able to:

- i. Define disaster, its various types and subsequent injuries,
- ii. Prepare the community about disasters before they strike them, and
- iii. Define the role of district health administration in disaster preparedness and managing its aftermath.

9.1.2 Key Terms and Concepts

Disasters - natural and manmade, slow and sudden, secondary disasters, disaster preparedness, sequelae to disasters, district health administration and disaster management.

9.1.3 Introduction

WHO in 1990 has given the call to member nations to meet disasters. It focussed on "Should disaster strike - Be prepared" which is very relevant in the present context. The MIC leak in Bhopal had hit the headline of the newspapers all over the world in 1984, ... perhaps the greatest manmade disaster in history. The cyclones in Andhra Pradesh had created havoc in coastal regions in 1977. The Bangalore air crash in 1990 has happened just yesterday. How tragic and devastating to human life?

All these situations, have caused large scale disruptions of human ecology. They are to be regarded as disasters. All these situations present major health problem in the deaths, injuries and human sufferings which they cause. Disasters of magnitude involve emergency relief from international and national sources consuming approximately \$1 billion each year. Therefore, understanding about disaster and being prepared before it strikes requires to be looked into from its managerial dimensions.

9.1.4 Definition of Disaster

The term disaster is generally used to cover such desperate events as wars, industrial accidents, blizzards, avalanches, volcanic eruptions, earthquakes, fires, floods, famines, windstorms and train or air accidents - events which have little in common except for their destructiveness. Defining a disaster is a difficult proposition. The definitions known are either too broad or too narrow.

A few attempts, made to define a disaster, are as follows:

- i. The relatively sudden and widespread disturbance of a social system and life of a community or a large part of a community by some agent or event over which those involved have little or no control.
- ii. An event or series of events which seriously disrupt normal activities.
- iii. More sociologically, a disaster is an event, located in time and space which produces the conditions whereby the continuity of the structure and processes of social units become problematic.

The Pan American Health Organisation has summed the definition of disaster in perhaps the simplest and the most precise manner. According to them disaster is an overwhelming ecological disruption occurring on a scale sufficient to require outside assistance.

Type of Disasters

Disaster may be classified into two groups, 'natural' and 'manmade' and may sometime be subdivided again into those of 'slow' and 'sudden' onset. To illustrate certain disasters caused by "fires" may be both 'natural' or 'manmade' according to the circumstances. Natural disaster may also be because of the direct result of human action, for example, establishing settlements in areas prone to the risk of frequent floods, or the use of construction material and methods known to be of high risk in earthquake prone areas. Under certain conditions such sudden-onset disasters like floods, and earthquakes may also occur slowly, otherwise those are instantaneous.

Disasters have different type of effects and therefore involve multiple dimensions of management. First of all we should know the types of calamities or injuries following the disasters. Measures to contain disaster and provision of first aid and medical and public health relief management are discussed in unit 9.2. Their interrelation with epidemic management has been described in unit 10.1

Classification of Disasters

Disaster affects health services due to events affecting community, causing calamities, injuries and casualties. The classification of disaster as given by Western is as follows:

1. Natural Disasters

a. Natural Phenomena Beneath Earth's Surface

- i. Earthquake
- ii. Tsunamis
- iii. Volcanic Eruptions

b. Natural Phenomena at Earth's Surface

- i. Landslides
- ii. Avalanches

c. Meteorological/Hydrological Phenomena

- i. Windstorms (Cyclone, Typhoon, Hurricane)
- ii. Tornadoes
- iii. Hailstorms and Snowstorms
- iv. Seasurges
- v. Floods
- vi. Droughts

d. Biological Phenomena

- i. Locust Swarms
- ii. Epidemics of diseases

2. Manmade Disasters

a. Caused by Warfare

- i. Conventional warfare
- ii. Nuclear, Biological and Chemical Warfare

b. Caused by Accident

- i. Vehicular (Plane, Train, Ship and Car etc.)
- ii. Drowning
- iii. Collapse of building
- iv. Explosions
- v. Fires
- vi. Biological
- vii. Chemicals including poisoning.

The general belief that, disasters cause only surgical problems is not true. The example of chemical poisoning due to leakage of MIC in Bhopal and subsequent epidemics of diseases are both medical and public health problems.

In India different States are prone to the following types of disasters:

A. Natural : Earthquake, Floods, Avalanches, Drought, Cyclone etc.

B. Manmade : Gas leakage, Accident, Mass Casualties due to fire etc.

A. Natural Disaster

i. Earthquakes

Those generally occur in well defined belts and are due to interactions at the edge of great plates which make up the surface of the world. However, no country is immune to the risk of earthquakes (1960 Agadin earthquake in Morocco and 1967 Koyana in India, have occurred well away from zones of high seismic activity. The overwhelming majority of people who die in earthquakes are killed by the collapse of manmade structures, particularly domestic dwellings.

ii Tornadoes

A tornado is like a cyclone, a vortex of air, but on a much smaller scale. The velocity of air rising in the centre of a tornado vortex may be very high and is responsible for much of the damage. Objects like cars, even railway stock - are vacuumed from the ground. The sharp pressure differences across a tornado may cause houses to 'explode'. A tornado may cause destruction 500 - 1000 mts wide and while crossing an urban area it may totally destroy houses and buildings.

In the tornado in Lebanon in 1965, many people got injured, about 17 people were killed of these ten had been at home and seven were riding on motorbikes. Of the 24 patients admitted to the hospital, 20 had been at home.

iii. Floods

Floods are the commonest of all natural disasters and cause greater deaths than any other type of disaster. Most of the States in the country are prone to floods and they may occur for a variety of reasons like (i) over-topping of rivers, (ii) rainfall and melting of snow, (iii) the rupture of dams and glacial lakes, and (iv) cyclonic storm surge and tsunami. In the first two categories escape is generally possible and mortality generally low. In the last two categories, in densely populated areas many thousands die. Floods generally account for approximately 50 per cent of the disasters and a similar proportion of deaths.

iv. Cyclones

Cyclones begin as low pressure areas in equatorial latitude. Severe winds occur in a circular band. Wind speeds diminish from the centre to the periphery, surface winds upto 64 kms/hr. may occur upto 60 kms from the centre. The threat of cyclone is only in coastal regions like Andhra Pradesh where it causes heavy damage. The deaths are generally due to crush asphyxia. The injuries are generally lacerations caused by missiles or falls.

v. The Cyclonic Storm Surge

The countries bordering the Indian Ocean and particularly those bordering the Bay of Bengal have suffered most from cyclones and sea surges in the world. 13 out of 19 'noteworthy' tropical cyclone disasters over a period of 250 years occurred in India and Bangladesh. In the same period the Western hemisphere has suffered only three comparable events.

The cyclonic storm surge is caused partly by the pressure differential within cyclonic storm and partly by high winds acting directly on the water. This results in a mass of water above the general sea level moving at the same speed as the cyclone. After striking the coast a storm surge will move in land and will only be stopped by high inland. The water then begins to retreat.

On the night of November 19/20, 1977 a cyclone, heavy rainfall and a storm surge struck part of coastal Andhra Pradesh. The delta of Krishna river caught the worst of the wave. Along the front of the river delta, the wave was 15 ft. high, reducing to 3 ft. further inland. The wave moved at about 10 mph and penetrated inland for 10 miles. Together the cyclone and storm surge affected an area of approximately 7,500 sq. miles. There occurred approximately 400 mm of rainfall in a 6-7 hour period. Total of 8,504 people were killed. 6,892 were killed by the storm surge in Krishna district while most of the 1,519 people reported killed in Guntur were reported to have died as a result of building collapse due to high winds and torrential rain.

vi. Tsunami

Tsunami results from sudden movements of sea bed caused by under sea earthquakes. These movements displace large volumes of water, causing a wave of low amplitude but long wave length. Damage and loss of life may occur at great distances from the point of origin of the

wave. The tsunami set up by Lisbon earthquake of 1755 caused great tides as far as in Barbados and floods in Norway and Germany.

vii. Avalanches

An avalanche is a mass of snow which is set in motion by its own weight through a violent disturbance of its equilibrium. Avalanches occur in all mountainous areas where slopes are sufficiently steep and where a large proportion of the precipitation is in the form of snow. There are two kinds of avalanches, the surface avalanche in which only the top covering of the snow slips, and the ground avalanche, in which the whole mass is carried away.

Principal Types of Avalanches

a. Powder-snow Avalanche

It is generally a winter phenomena occurring on steep slopes after a fresh fall of snow. There has to be some violent shock for it to become detached, such as a very strong wind or the blast of another avalanche. An avalanche of powder snow is capable of flattening quite a large tract of forest because of its blast.

b. Avalanche of Fresh Wet Snow

This is after a surface avalanche, but its weight may make it a ground avalanche. It moves a little slower than a powder snow avalanche. Its consequences are the same as those of the powder snow variety but has, in addition a crushing effect because of its weight. On coming to a halt it hardens immediately like plaster.

c. Wet Snow Avalanches

This is predominantly a spring time avalanche and nearly always is a ground avalanche. It may also occur in winter when there is rain. It flows slowly but its force is considerable, it flattens and destroys everything. One cubic metre of powder snow weighs about a kilogram while the same volume of wet snow might weigh several hundred times more.

d. Snow Slab Avalanche

This is a dangerous avalanche because it is often unforeseeable. A snow slab is made of snow which is superficially compressed but has not adhered to the underlying layer from which it remains separated by a layer of air, snow slabs are particularly to be feared after a fresh fall of snow, for then they are not longer visible. They are in any case difficult to recognise.

e. Sea/River Avalanches

They are caused by the movement of the glacier and may occur at any time. Avalanches are of increasing importance because of the population growth in the mountain ranges of Himalayas and growing popularity of winter sports, mountaineering and tourists coming to hill resorts.

f. Volcanoes

The mortality from volcanic activity is low. During the last 500 years only 200,000 people (400/yr) have died from this cause. However because of the fertility of volcanic soils, the areas

around many volcanoes are densely populated, and within these areas the risks are substantial. For example, more than a million people live in the area around Merapi volcano in central Java, and every few decades eruptions take a few hundred to a few thousand lives.

Secondary Disasters

It is said certain natural phenomena causing disaster like earthquakes and Tsunami are followed in quick succession by secondary disasters like fire storm, breach of dams or tidal waves etc. but the popular notion that it often occurs in quick succession is not very tenable and seems to be rarely happening in reality. After a natural disaster has struck, there are two main risks to survivors. First from the secondary disaster e.g. breach of a dam which is triggered off by the primary event like earthquake. Second, it is much more regular, but generally causes minor risks alone leading to loss of property and physical injuries to survivors in the post disaster environment.

b. Manmade Disasters

Manmade disasters generally occur in the following forms which cause damage to mankind and bring calamity. These are:

1. War and civil strifes
2. Accidents - Air and Rail
3. Fires
4. Gas leak

The magnitude of different types of disaster events that occurred in India from 1960-1989 (compiled by WHO) are presented below:

Table 1
Disaster Events in India from 1960-1989

Type	Frequency	Killed	Injured	Total Affected
Accident	40	5512	101359	351010
Avalanche	1	250	0	0
Civil strife	2	5660	0	10400000
Cold wave	7	1555	0	0
Cyclone	26	31730	1700	33474172
Drought	9	0	0	70666000
Epidemic	19	16150	0	35723
Earthquake	8	595	2424	50000
Fires (major)	7	60857	103059	754926905
Floods	38	24988	1000	223296610
Heatwave	7	1235	0	0
Storm	27	2647	1993	9672267
Total	191	151179	211535	1742872687

The above table clearly brings out that cyclones, floods, fires, storm and accidents have caused maximum loss of human life.

Check Points

1. Enumerate the disasters that occurred in your district in the last ten years.
2. How many of those disasters were predicted in advance?
3. Which type of disasters cause:
 - i. High mortality and high morbidity?
 - ii. High mortality and low morbidity?
 - iii. Low mortality and high morbidity?
 - iv. Low mortality and low morbidity?

9.1.5 Health Problems Common to All the Disasters

After a major disaster initially the only behaviour exhibited is either generalised panic or stunned waiting. Spontaneous yet highly organised individual actions occur as survivors rapidly recover from their initial shock which may be just minutes after an earthquake. Often rumours particularly about epidemics abound. The following table presents the short-term effects of major natural disasters:

Table 2
Short-term Effects of Disasters

Effect	Earthquakes	High winds (without floodings)	Tidal waves flash floods	Floods
1. Deaths	Many	Few	Many	Few
2. Severe injuries requiring extensive care	Overwhelming	Moderate	Few	Few
3. Increased communicable diseases	Potential risk following all major disasters (Probability rising with over crowding and deteriorating sanitation)			
4. Food scarcity	Rare	Rare	Common	Common
5. Population displacement movements	Rare	Rare	Common	Common

i. Climatic Exposures

The health hazards of exposure to the climatic hazards reported are small, even after disasters in cold countries. As long as the population is reasonably well clothed death from exposure does not appear to be a major risk. The need to provide emergency shelter therefore varies greatly with local conditions.

ii. Food and Nutrition

Flooding and sea surges often damage household food stocks and crops, disrupt distribution and cause major local shortages. Food distribution, even for the short-term, is often a major and urgent need, but large scale distribution is not always necessary.

iii. Mental Health

Anxiety, neuroses, and depressions are not major acute public health problems following disasters, and family and neighbours can deal with them temporarily. Wherever possible, efforts should be made to preserve family and community social structures. The indiscriminate use of sedatives and tranquilizers during the emergency relief phase is strongly discouraged.

iv. Communicable Diseases

Disaster does not usually result in outbreaks of infectious diseases, although in certain circumstances it does increase the potential for disease transmission. The most frequently observed increases in disease are caused by fecal contamination of water and food. The risk of communicable diseases is proportional to population density and displacement, which increases the load on water and food and its risk of contamination as seen in refugee camps.

In the longer run an increase in vector borne diseases may occur in some areas as insecticides may be washed away and the breeding sites of mosquitoes may increase.

The epidemics of communicable diseases following disasters have been discussed in the Module 10 on Epidemics Management.

Injuries Following Disasters

The injury pattern following a particular disaster is quite constant and it varies from one to another type of disaster. Its knowledge, therefore, could be of utmost help in the planning and monitoring processes of health aspects of disaster management.

i. Earthquake

The mortality in an earthquake is primarily due to the collapse of the manmade structures. The risk of dying is high inside or near dwellings but is very small in the open. The earthquakes at night, are more deadly as most of the people are indoors. Fractures of pelvis, thorax and spine are common as the people are lying in bed. Crush injuries constitute a vast majority of cases. The common internal injuries are rupture of bladder and the urinary tract as the bladders are full.

The earthquakes occurring during the day time cause injuries to arms, legs, collarbone and skull. Cases of burns may occur in areas close to where electricity and gas are installed.

The mortality rates are found to be high for the very young and the very old, but relatively low for those aged 15-44 years. The risk of death of the infants is low as he/she is normally with the mother.

ii. Cyclones and Storm Surges

The mortality is generally not high unless tidal waves and storm surges occur. The combined effects of wind and torrential rain may cause the houses to collapse. Crush asphyxia takes a heavy toll. Objects are lifted in the air and carried along by the wind. The common injuries are lacerations, fractures, cuts and bruises caused by missiles, flying objects, crushings or falls.

iii. Tornado

Severe crushing injuries of the skull are the commonest cause of death in a tornado. Cases of empty cranium with cranial contents perhaps being sucked out and crushing injuries of the chest and trunk are seen. The common injuries are of skull and fractures, of other parts, lacerations, abrasions and severe and extensive soft tissue injuries. Foreign materials such as splinters, tar, dirt, and manure are deeply embedded into soft tissue injuries.

iv. Floods

In floods the mortality is high only in the case of sudden floods i.e. flash floods or the collapse of breaches in dams. In normal cases there is sufficient time to warn the public. Fracture, injuries and bruises may also occur. Floods in winters may also cause hypothermia.

v. Volcanic Eruptions

In volcanic eruptions, the mortality is high in case of mudslides and glowing clouds. There may be injuries, burns and suffocations. The WHO has identified the following diseases which are consequent to disasters and need to be monitored so that they may not take the epidemic form:

Diseases to be Monitored when People are Housed in Temporary Shelters after Onslaught of a Disaster Event

Disease ¹	Main Causes
Diarrhoeal diseases	Overcrowding, contaminated water and food.
Measles	Overcrowding
Respiratory complaints	Poor housing conditions, shortage of blankets and clothing.
Malaria	A new environment with a type of malaria against which the refugees have no protection. Stagnant water becoming a mosquito breeding ground.

1. People suffering from malnutrition are particularly at risk of serious attacks of all these diseases. Good nutrition therefore constitutes an effective preventive measure.

Meningococcal meningitis	Overcrowding in a region where the disease is endemic (it is often seasonal in certain places).
Tuberculosis	Overcrowding.
Helminths, particularly hookworm	Overcrowding, poor sanitation.
Scabies (a skin disease caused by mites)	Overcrowding, poor body hygiene.
Xerophthalmia (night blindness)	Vitamin A deficiency (Xerophthalmia is often provoked by measles or some other acute infections).
Anaemia	Malaria, hookworm, shortage or poor assimilation of iron and folate.
Tetanus	Injuries in an unvaccinated population. Poor obstetrical practice may cause tetanus of the newborn.

Check Points

1. Why do various disasters have different types of injuries pattern and health problems?
2. Is it possible to make a common plan to deal with all the disasters? If yes why? If no why not?

9.1.6 Multiple Dimensions of Health Care Managements During Disaster

No major disaster can be managed without assistance from the State, the Centre and may be even International agencies. The strange thing however is that even with the best possible help provided the relief operations shall be far from satisfactory if the district administration is inefficient and poorly co-ordinated.

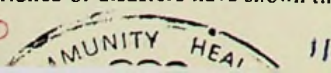
First of all a good state of preparedness before the striking of a disaster may reduce its impact and the greatest number of lives may also be saved during the first few hours after the disaster has occurred. However developed a country may be no outside help beyond district can arrive during this initial brief period. Thus, if the lives have to be saved the District Health Officer has to be prepared for a disaster. If the community is properly educated, well organised and actively involved the numerous problems of survival and health are dealt with more efficiently.

The people who are to take early action in the event of a disaster are:

- a. the local health personnel,
- b. the community, and
- c. the local authorities and individuals or groups who concern themselves in the localities with rescue work, communications, transport, shelter and food supply.

The local population stricken by a disaster should be enabled to be taking action for itself, no action being taken for it. This presupposes a fundamental shift compared with the usual notion that the responsibility of caring for disaster stricken community should be entirely taken over by outside agency or official authorities. Experience of disasters have shown that cases c

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panic are generally localised and shortlived. The majority of people continue to stay in the threatened area and generally take steps to protect their families and together with their friends and groups participate in rescue operations. Conflicts and class differences often die down and a sense of community solidarity not ordinarily present develops. Local communities react quickly and effectively, particularly if they are supported by assistance from outside.

The action of the local community is of utmost importance but by no means can it be self sufficient in case of a disaster. Most of the problems can be solved only through outside assistance at various levels:

- a. The intermediate level : The nearest and best equipped urban hospital other than the district/local hospitals.
- b. The national level : The government and national bodies, including non-governmental organisations.
- c. The international level : The international organisations and may be even other countries.

A District Health Officer has to co-ordinate with all the above mentioned levels. However, an efficient disaster preparedness plan laying special emphasis on the commonly occurring disasters in the district should be prepared in advance.

Check Points

1. What is the importance of co-ordination in the management of disasters?
2. What role can the local agencies play in the management of disasters?
3. Make a list of people and institutions in your district you would co-ordinate within the event of a disaster?

9.1.7 Dimensions of Health Management

Prior to managing the health aspects of disaster the following stages need to be considered:

i. Warning Stage

This is the period of time when meteorological, seismological and other forecast related departments can predict the occurrence of a disaster before it really strikes a few hours to forty eight hours before in case of a cyclone and a week before in case of floods.

ii. Stage of Impact

This is the time period during which the disaster actually strikes. It may be just a few minutes in case of earthquakes, hours in cyclones and days in floods.

iii. Stage of Rescue Operations

It is the time when the actual rescue of the victims and their evacuation is being done. This requires active work and should be completed at the earliest in the most efficient possible manner. It should not take more than two to three days even for worst of the disasters provided there is good disaster preparedness.

iv. Stage of Health and Medical Relief

This is the most crucial phase of the disaster management. The mortality, morbidity and the loss of property is inevitable when the disaster strikes. It shall however be a further disaster if survivors of the disaster succumb and suffer due to relief work being not upto the mark. It requires a lot of foresight, planning, co-ordination and management. An efficient relief phase is in fact the hallmark of a competent District Health Officer.

v. Rehabilitation Stage

The displaced persons are then to be rehabilitated in their original settings. This depends on the resources of the state and its commitment. Healthy rehabilitation is possible only if there is good political support. A poor rehabilitation phase results in an exodus as large number of refugees and the people migrating to nearby urban areas resulting in slums, unemployment and deprivation like what happened in the East Pakistan cyclone (now Bangladesh) in 1970.

Check Points

1. What can you as a District Health Officer do before the disaster has occurred?
2. What shall be your role in the various stages of the disaster?

9.1.8 Planning to Manage a Disaster

In order to manage disaster the following preparation and advance actions need to be undertaken by a DHO in consultation and close collaboration with district administration in various phases:

Planning Phase

A thorough and feasible planning in advance is mandatory for a smooth and efficient management of a disaster. It is something like the mock exercises so frequently done by the commandoes and soldiers.

I. Review

Pre-planning requires detailed review of all the disasters that have struck the district in past years and the neighbouring districts. The information may be collected on an open ended proforma based on a checklist something like described below for action diagnosis:

- i. Would it have been possible to foresee the disaster?
- ii. What preparedness would have limited the number of victims and the damage?
- iii. What caused the victims and the damage?
- iv. What were the problems in the subsequent hours and days?
- v. What errors were made which must not be repeated?
- vi. What actions did the most good?
- vii. What were the main difficulties in the relief work?

The checklist for the local health personnel may be as follows:

- a. What types of emergency cases occurred and what was possible to do for them?
- b. What problems were encountered in the reception of the injured?

- c. What supplies were lacking?
- d. What difficulties arose in sending the injured to properly equipped hospitals?
- e. Would it have been possible to obtain better co-operation from the volunteers?
- f. What were the difficulties of co-ordination with the authorities and the other community groups?
- g. How would it have been possible to obtain more effective outside assistance?
- h. What health problems arose after the disaster and what were the difficulties in coping with them?

Based on the analysis of the previous disasters and their management in the past we shall learn from our mistakes and try not to repeat them in the future.

II. Pre-determining the Community Needs

Pre-determining the needs in the event of a disaster not only avoids bewilderment and confusion but also serves to:

- i. define priorities for direct action by local staff in the emergency relief work and later in the management of health problems.
- ii. determine the real and accessible resources available in the way of personnel, premises, medicaments, equipments and materials.
- iii. ascertain what is missing and what must be obtained as a priority from outside assistance.

The need pre-determination must seek to establish in every instance what must be done, who should do it, in what way and by what means.

The community is expected to co-operate and show solidarity. In order to get the best out of them, the knowledge of several aspects of life and moving forces in the community should be assessed like: (i) the composition of the population by age, sex and household; (ii) social structure; (iii) its economic and productive activities; (iv) the community institutions, services and administration; (v) the forms of local political management, influential groups and persons, current conflicts; and (vi) traditions, eating habits, the various aspects of local culture.

III. Co-ordination with Other Departments

The health department can never manage a disaster by itself. The District Health Officer should thus in his plan for preparedness scheme develop proper co-ordination with the following departments:

- i. District Administration
- ii. Public Utilities Departments (water, electricity etc.)
- iii. Post and Telegraphs Department
- iv. Transport Services
- v. The Department of Social Welfare
- vi. Voluntary Organisations
- vii. Redcross and the other International Organisations
- viii. Outside Assistance Agents/Agencies.

IV. Training Health Personnel

The training of the health personnel is an important component of the disaster preparedness. The training component can be divided into two components:

- a. First aid in the various types of emergencies.
- b. The development of working methods to deal with various aspect of public health.

(a) Various types of emergencies for first aid:

- i. haemorrhages
- ii. cardiovascular failure
- iii. respiratory distress
- iv. states of shock
- v. skull injuries
- vi. burns
- vii. fractures, dislocations,
- viii. wounds
- ix. exposure to cold
- x. drownings
- xi. electrocutions
- xii. poisoning

Development of working methods to deal with various aspects of public health:

- i. health information network, use of record cards, notebooks and registers, drafting reports,
- ii. disease monitoring system,
- iii. action to promote mental health and how to deal with psychological difficulties,
- iv. psychological and physical rehabilitation,
- v. education for health, hygiene and a clean environment,
- vi. control of endemic diseases (diarrhoea, tuberculosis, malaria, parasite diseases, vaccinable diseases), and
- vii. monitoring of nutritional status, remedial diet, education on nutrition in famine areas.

V. Preparation of the Health Centre or Hospital

The preparation of the hospitals and health centres to deal with the emergency must be made. The following provision must be made in the hospitals or health centres:

- i. premises for receiving and sorting the injured,
- ii. a reserve stock of emergency medicaments,
- iii. a stock of medical supplies for use in emergencies,
- iv. essential medical equipment, bearing in mind the level of professional skill of the local health personnel (sterilisation, minor surgery, resuscitation etc.),
- v. ensuring the availability of water, electricity, fuel and supplies needed for the health facility to function,
- vi. means of transport (ambulances, other vehicles), and
- vii. means of communication (telephone radio etc.)

When the local health personnel include several professionals, a plan for emergencies must be prepared which assign to each of them precise tasks such as:

- i. co-ordination of reception of cases,
- ii. screening and emergency care,
- iii. organisation of the voluntary health workers in the health facility,
- iv. organisation of the voluntary health workers in the community,
- v. supplies, and
- vi. communications.

Even the local hospital may get damaged in a disaster. To deal with that possibility, a plan must be drafted to make provisions for:

- i. the tasks and responsibilities of staff,
- ii. instructions for using the disaster warning systems,
- iii. explanation of fire fighting equipment and the points at which extinguishing equipment is kept,
- iv. ways and means of evacuating hospitalised patients, and
- v. periodic exercise.

VI. The Training of Voluntary Health Workers

The voluntary health workers should be trained in specific areas so that their services are properly utilised for example:

- i. collaboration in first aid,
- ii. reception of cases at the health facility,
- iii. liaison with the family groupings,
- iv. operation of the health information system, and
- v. collaboration in carrying out programmes of vaccination, health education, environmental sanitation, nutrition, mental health.

VII. Preparedness Activities for Population

Disaster preparedness activities should be included in programmes focussed on certain population groups:

- i. schools, occupational training centres,
- ii. work places,
- iii. neighbourhood groups, and
- iv. associations, groups of volunteers etc.

They should be trained in:

- i. First aid,
- ii. Activities to ascertain health risks,

- iii. Exercises in sanitation and hygiene, and
- iv. Activities concerned with the health education of groups at risk.

Check Points

1. What is the significance of investigating the details of the disasters that have occurred in your district?
2. You are informed that the level of water in the river in your district is above the danger mark. After 48 hours the water would flood 200 sq. km² of the area. Outline the steps you will plan to take to face the calamity.

9.1.9 Implementation Phase

The immediate reaction of the people after a disaster is that of FEAR. Surprisingly people rise to the occasion and give support to each other and take the injured to the health centre or the hospital. Yet fear must be countered immediately by issuing certain items of information or instructions (by using loudspeakers and mobilizing volunteers).

- i. What to do to be safe?
- ii. Information on the evolution and consequences of the disaster.
- iii. Where to obtain information about the scattered members of the family?
- iv. Information on essential matters like water, shelter and food.

Panic is not a common reaction and occurs when the disaster finds people crowded in sky high buildings, towers, or theatres. Readers would recall that about a decade back quite a few children died in the stampede in the Qutub Minar because of the panic caused by power failure. Instructions over the loudspeakers to be calm and indicating where the exits are is to be broadcasted.

I. Rescue Operations

A disaster may result in people being:

- trapped under the ruins of buildings that have collapsed,
- buried under mud or landslides, and
- cut off by floods or the blockage of communication routes.

The rescue work will mostly be carried out spontaneously by relatives, friends and local volunteers. When it is difficult to reach a victim or when there is a risk of further caving in, it is advisable to leave the work of extrication to experts (fire fighters, army, trained volunteers, building workers etc.). As soon as the rescuers reach an injured person they should help to:

- maintain and ease respiration,
- clear the victims airways by using fingers to clean the mouth and throat, taking out dentures and loosening collars, belts and clothing, and
- use blankets to prevent the victim catching cold.

The stretcher must be put down near the injured person. If no stretcher is available, one can be made with blankets, pieces of cloth, ladder, door planks etc.

When lifting the injured person certain rules must be followed:

- movements must be calm and coordinated and carried out in accordance with the instructions of a rescue worker,
- the injured person must be moved as little as possible, and
- the victims head, neck and trunk must be kept in the same axis.

Conveyance by stretcher to the local health establishment must follow simple, common sense rules of patient transport.

I. Reception at the Health Centre or Hospital

The volunteers assisting the local health personnel should ensure the queries of the people and guide them and help scattered families to re-unite or communicate and identify the injured.

II. Triage

When a large number of injured people are brought at the same time to the health establishment, the more expert among the local health workers, taking into account the equipment and professional skills available, must sort the cases into the following categories:

A. Those who must be sent urgently to the nearest properly equipped hospital. Among those two orders of priority may be distinguished.

A.1. Emergency cases that must be operated on within the hour:

- i. acute cardio-respiratory insufficiency
- ii. severe haemorrhages
- iii. internal bleeding
- iv. rupture of the spleen
- v. injuries of the liver
- vi. severe chest injury
- vii. severe cervico-maxillary lesions
- viii. states of shock
- ix. severe burns (over 20%)
- x. skull injuries with coma

A.2. Emergency cases in which it is possible to wait a few hours before operating:

- i. ligatured vascular injury
- ii. intestinal lesions, severe haemorrhage or shock
- iii. open joint and bone injuries
- iv. multiple injuries with shock
- v. injuries to the eyes
- vi. extensive closed fractures and dislocations
- vii. less severe burns
- viii. skull injuries without coma

B. Those given attention on the spot. Priority is given to the most serious cases among those

with a chance of surviving. There are those who are attended to while waiting to be sent to a specialised centre and those who do not need major medical care and can be treated on the spot. The early group also includes very serious cases with no chance of survival who would be pointless to be moved.

This shall be discussed in detail in the units 9.2 of this module.

Check Points

1. When does panic occur in a disaster? What can be done to prevent it?
2. What role can the people struck by the disaster perform in the rescue work?
3. How important is the role of the local people in reducing the mortality in the event of a disaster?

9.1.10 Planning for Post Disaster Action

The District Health Officer now bears the responsibility of co-ordination with all the departments and organisations already described and gear up action. The action will include the assessment of the magnitude of the disaster and concomitant needs and extent of delegation of responsibilities. The help sought will cover general problems and activities for health.

I. Assessing the Quantum of Services and Resources

A. General Information

- i. estimate the number of victims
- ii. assessment of the number of homeless
- iii. evaluation of the type, extent and seriousness of the material damage
- iv. information on isolated villages
- v. information on people cut off from their families
- vi. forecasts as to how the natural phenomena responsible for the disaster will develop.

B. Inventory of Support Material Required for Assistance

- i. machines for clearing trouble
- ii. means of transport, fuel
- iii. shelters (tents, materials for constructing shelters, caravans, others)
- iv. blankets, clothings
- v. food
- vi. tools, batteries, containers, materials
- vii. persons specialising in rescue work
- viii. health equipment and material
- ix. medicaments
- x. any health personnel required
- xi. suitably equipped hospitals to which patients may be sent who cannot be looked after on the spot.
- xii. means and organisation for evacuating the injured and the risk.

II. Other Relevant Aspects

A. Family Groupings

The community should be sub-divided into groups consisting of neighbouring families and someone should put in charge of each group. This person delegates special tasks to the members of the group and keeps in daily touch with the person delegated by the District Health Officer. This helps:

- i. to collect information or requirements,
- ii. to pass on instructions and information,
- iii. to distribute where necessary the means of survival (clothing, blankets, food etc.), and
- iv. the health personnel using the system for health activities.

B. Temporary Shelter and Sanitation

Temporary shelter is a very important component of management. If the temporary shelter and sanitation are well taken care for the ensuring epidemics that follow disaster (discussed in detail in the units on management of epidemics) are greatly reduced. The site chosen for erecting shelters should be:

- i. flood proof, above high water level,
- ii. preferably on a gentle slope to facilitate rainwater and waste water drainage,
- iii. not too close to the water table otherwise the ground could become marshy in the rainy season,
- iv. protected against landslides,
- v. easily accessible, not far from the centre of population,
- vi. at a higher level than waste tips, and
- vii. down stream from sources of drinking water.

The group looking after the organisation of relief camps should give priority to the following:

- i. site location
- ii. camp layout
- iii. food requirements
- iv. water needs
- v. sanitation
- vi. security
- vii. information
- viii. children's problems
- ix. lost and found service
- x. equipment store
- xi. volunteer's residence
- xii. camp director and administration

The camp director should ensure that:

- i. volunteers are not rushed from one task to another without proper rest,
- ii. there is no confusion in assigning responsibilities to individuals or groups,

- iii. a pressing problem is not shelved but is tackled with faith and determination,
- iv. no one is reprimanded in presence of others. Call the defaulter separately and explain the way it should be handled,
- v. all victims and volunteers are treated alike and no favouritism is shown to anyone,
- vi. officials on duty are not absent from camps for long hours,
- vii. all preparations are there to face adverse weather, rain or storm,
- viii. campers (victims) are treated with sympathy and courteously,
- ix. a sense of humour can save many a critical situations, and
- x. gradually involve the victims in relief administration.

C. Disposal of the Dead

An early disposal while giving the dead due respect should be done. It is necessary to:

- i. remove the bodies from the disaster area as rapidly and discreetly as possible. As soon as this has been done, attempts should be made to gather and note down information necessary for identifying them like (place where one is found, information from relatives and neighbours).
- ii. identify the bodies and attach tags to them giving the identification particulars.
- iii. draw up an official register of the deaths, containing identification particulars.
- iv. transport the bodies, which should be covered, to the place where they are to await cremation/burial and where personal belongings are also deposited.
- v. cremate/bury the dead as late as is compatible with the laws, customs and weather of the country so as to enable identification.
- vi. handover personal effects to the nearest relatives.

D. Dealing with Animals

In a disaster animals may be killed (in large numbers in floods for instance) or dispersed. They may lose their shelter. Endemic zoonosis may spread. Dogs may revert to the wild and go about in packs. The community, possibly using groups of volunteers (who will be more effective if they have been trained in advance), should take steps to carry out the essential tasks:

- i. Destruction of animal carcasses: this is not easy because they are difficult to burn and burying them involves a great deal of labour.
- ii. Housing of shelterless animals; treatment of stray animals. The animals must be brought together in specially prepared premises, fed, milked and looked after.

The veterinary services in the area should:

- i. organise the monitoring of communicable animal diseases and of slaughter houses.
- ii. carry out mass vaccination, depending on the local hazards such as rabies, foot and mouth disease, swine fever, anthrax etc.
- iii. eliminate any sick animal and isolate the farms affected.

Measures to save stock may be very important in the rural areas and have a great impact on the morale, health and economic recovery of the community.

III. Health Problems in the Post-disaster Phase

After the emergency treatment phase, in addition to the need to resume routine health activities, problems arise that are specific to the post-disaster period:

- i. possible complications and sequelae of injuries, fractures, cuts and burns,
- ii. the possibility that poor sanitary and living conditions may favour the recrudescence and spread of diseases already present in the area, and
- iii. the psychological suffering and disquiet that affect individuals and diminishes the community's power to recuperate.

The District Health Officer must organise his staff to take on these new problems as part of their activities which include:

- i. the twenty four hour running of the health centre or local hospital and provision of routine care,
- ii. the disease-monitoring system,
- iii. the resumption of the health programmes in progress before the disaster (vaccinations, maternal and child health, control of tuberculosis, malaria, diarrhoeal diseases, malnutrition and other health problems depending on the circumstances), and
- iv. activities to alleviate psychological sufferings.

IV. Monitoring the Community's Health

Monitoring of the community's health is based on a few essential elements:

- i. the basic network made up of voluntary workers with the charge of the family groupings,
- ii. the instructions issued at national or international level on the diseases that must be kept under special scrutiny,
- iii. the possibility for the local health personnel to send specimens to an intermediate level laboratory for examination to confirm diagnoses, and
- iv. the drafting of regular reports.

Disease monitoring must be particularly meticulous when one or more of the following conditions exist:

- i. presence of endemic foci,
- ii. people living in shelters,
- iii. concentrations of displaced persons in camps or on sites without services,
- iv. precarious or unsatisfactory nutritional status,
- v. difficulties in supply of safe drinking water,
- vi. difficulties in disposal of refuse and waste water, and
- vii. unfavourable climatic conditions.

V. Health Education

When a concentration of displaced persons are living in temporary shelter, health education is very important. It should include informational and educational activities on:

- i. utilisation of water, cleanliness and protection of drinking water containers, making water fit to drink (boiling, filtration), disposal of waste water.
- ii. the utilisation and cleaning of latrines.
- iii. waste disposal, education on keeping public areas clean.
- iv. cleanliness of the temporary dwellings.
- v. control of lice and other parasites.
- vi. control of flies, insect disease vectors and rodents.
- vii. keeping everywhere clean, protection of food, minor cleaning work.

VI. Reporting by the Local Health Personnel

The health personnel should submit periodic reports(weekly at the outset, then monthly) to the intermediate levels and then to the District Health Officer. He should periodically study them and advise accordingly.

Check Points

1. List the broad managerial actions that you would take in case disaster occurred in your district.
2. Where do you think the management could be improved and how?
3. How can the mortality and morbidity be reduced during disaster?

9.1.11 Unit Review Questions

1. Which of the two disasters - natural or manmade are worse and why?
2. Are the injuries similar in all types of disaster? If not why?
3. Name the disasters which are preventable.
4. What are the problems faced in the relief operations in disasters?
5. Your district is a flood prone one. You have been informed that the river has crossed the danger mark and may flood the district within 24-36 hours. How will you proceed?
6. Make a mock plan of the rescue and search operations in a district after a major earthquake.
7. What is the significance of the restoration of the public utility services?
8. Why should assessment of needs be done before finishing the relief operations?

9.1.12 Test Items

Select the most suitable or correct answer from the following and tick against that:

1. After a major disaster the mature behaviour exhibited is of:
 - a. being in panic.
 - b. stunned waiting for outside help.
 - ☒ c. spontaneous yet organised action by sufferers after recovery from shock.
 - d. inaction due to shock for few days to a few weeks.

2. The injury among this group is highest after an earthquake:
 - a. persons who are indoors,
 - b. infants,
 - c. old aged persons, and
 - d. young children.
3. The aftermath of winter floods is:
 - a. high mortality,
 - b. high mortality in flash floods,
 - c. high mortality in collapse of dams, and
 - d. floods in winters may cause deaths due to hypothermia.
4. Following a disaster all the following actions take place except:
 - a. local people busy themselves in rescue operations,
 - b. caste and class differences die out and people work together,
 - c. the majority of the people prefer to stay in the threatened area, and
 - d. the responsibility of caring for a disaster stricken community should be entirely is taken over by outside assistance and State authorities.
5. In the preplanning for disaster management it is important to:
 - a. collect information about the diseases that occurred in the past in the district,
 - b. know the type of disasters and flaws in the management in the past,
 - c. determine the problems being faced in co-ordinating within health sector and other organisations, and
 - d. all of the above.

9.1.13 Further Readings

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