MODULE

Health Consequences of Disaster

For the Ethiopian Health Center Team

Yared Kifle, Lellise Taye, Yimaj Abdulwahab,

Mulusew Gettie, Selamawit Debebe

Harayama University

In collaboration with the Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education

2003

Funded under USAID Cooperative Agreement No. 663-A-00-00-0358-00.

Produced in collaboration with the Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education.

TABLE OF CONTENTS

Contributors

1. Sr. Meselech Asegid, Faculty of Health Sciences, Department of Nursing, Alemaya University.

2. Dr. Eyob Aklilu, Faculty of Health Sciences Department of Public Health, Alemaya University

3. Ato Tadesse Alemayehu, Faculty of Health Sciences Department of Environmental Health, Alemaya University

ACKNOWLEDGMENTS

We would like to acknowledge Alemaya University for giving us the opportunity of preparing this module. We are also indebted to the Carter Center (EPHTI) for sponsoring this work.

We are indebted to those who gave their support for the accomplishment of this module. Special thanks go to the Harari Region Health Bureau and the Disaster Prevention and Preparedness Commission Office.

Our thanks also go to Negash Beyan and Negga Baraki for their valuable references and support. Last but not least, we thank Tinebeb Reta and Sinedu Tesfaye for typing the manuscript.

UNIT ONE

INTRODUCTION

1.1. Purpose and Use of the Module

This module is intended to serve as a general learning material about the health consequences of disaster by the health center team: health officers, public health nurses, environmental health technicians (sanitarians), and medical laboratory technicians. The basic and general concepts about disasters and their health consequences, their causation, epidemiology,

Select and do the questions of the portion appropriate to your professional category.

- When you are sure that you are through with the Core Module proceed to read the satellite module corresponding to your profession or interest.
- Go through the task analysis for the health center team members and compare with that of your own.

Note: You may refer to the list of abbreviations and glossary at the end of the module for terms that are not clear.

UNIT TWO

CORE MODULE

2.1. Pre-test:

2.1.1. Pre-test for all categories of health workers

1. Which is the most common immediate health consequences of flood?
    A. Water washed disease
    B. Malaria outbreak
    C. Malnutrition
    D. Death and injury
2. The adverse effects of pest infestation include
    A. Famine
    B. Food shortage
    C. Economic stress
    D. All
3. Which one of the following is not a preventive measure for landslide?
    A. Hazard mapping
    B. Community education
    C. Legislation and land use regulations
    D. None of the above
4. List some measures that can be taken by the health center team to prevent health consequences of flood.
5. List some of the impacts of drought on health.
6. Describe the role of the health center team to reduce health consequences aDrght espa -ock.k3ne eaks cts of.80.0001 UWlowing is

12. What are the prevention and control measures for malaria epidemics?
13. What causes deforestation?
14. Describe the adverse effects of deforestation

2.1.2. Pre-test for health officers

1. How can a disaster be anticipated?
2. Which anthropometric measurements are used for nutritional assessment?
3. How is malnutrition diagnosed?
4. What are the specific duties of the health officer when disaster happens?
5. What is the role of the health officer in managing a disaster causingt duties of

3. During emergency situations after a disaster, over-chlorination of drinking water is recommended.

    A. True

    B. False

4. Burial of the dead corpses from the disaster scenes is not the concern of health workers.

    A. True

    B. False

5. The dosage of chlorine disinfectants is not affected by the quality of water to be treated.

    A. True

    B. False

6. What are the strengths of commonly available halazone tablets and what amount of clear water is disinfected by these?
7. What are the common chlorine compounds that we use for disinfecting small amounts of water in emergency conditions?
8. What are the possible sources of drinking water for disaster-stricken population?
9. What is the chemical that we use to eliminate high chlorine concentration in disinfected water and what is the application rate of this chemical?
10. What are the commonly used excreta disposal methods in a disaster stricken area?
11. Which of the following is

2.1.5. Pre-test for medical laboratory technicians

1. A commonly used disinfectant in laboratory is
    A. Formaldehyde
    B. 70% alcohol
    C. Ether
    D. Physiological saline
    E. None
2. The preferable sites for capillary puncture adults include
    A. Ear-lobe
    B. Finger tip
    C. Heel
    D. A and B
3. Which of the following is a medium used for stool samples?
    A. Cary – Blair medium
    B. Buffered saline
    C. Eosin
    D. All

2.3. Learning objectives

Up on completion of this module, the learner will be able to:

1. Define disaster
2. Describe the epidemiology and significance of disaster
3. Classify the types and causes of disaster
4. Identify the most common types of disaster in Ethiopia
5. Describe the health consequences of disaster
6. Plan for the necessary intervention in cases of disaster
7. Design appropriate preventive and control measures in disaster situations
8. Identify the roles of CHW and care giver in management, control and prevention of disaster

2.4. Case study

Read the following story and answer the questions following it

Learning activity 1

Village Dunfo was a very natural green and healthy place to live just 10-15 years ago. People from the neighboring region were attracted to this village to have a better life, so rapid population growth occurred.

As the need to build houses and farming increased, deforestation was inevitable. Gradually the area started to lose its green nature. The climate was getting drier and hotter. The rain expected during wet season started to skip seasons. The harvest could not meet the need of the community as production decreased and population increased. Drought was becoming a common event.

Consequently, people became refuges as they left their homes when they could no longer support themselves. Those who have no place to go were

most vulnerable. They were made to stay in the nearby camp to get food and water by the regional authorities. After 3 days of being in the camp many children under 5 years of age started to have fever, vomiting and diarrhea after an unexpected 24 hours of intense rain. Many of the affected children died and later, even adults started to be affected by a similar illness.

Questions related to case study

1. What are the possible reasons for displacement of the people from the village Dunfo?
2. Who are the most vulnerable groups in such a disaster?
3. Why do you think large numbers of people are affected at the same time?
4. What can the health center team contribute in preventing the drought?
5. Which sectors in the community do you think are responsible for alleviating the drought?
6. What do you think is the most likely disease occurring in the camp?
7. What is the role of the health center team in tackling the epidemic?
8. What can the health center team do to prevent the occurrence of such disease in a mass displaced community?

2.5. Definition

Disaster is any human made or natural event that causes destruction and devastation that cannot be alleviated without assistance (1).

2.6. Epidemiology

The effects of a disaster vary depending on the characteristics of the exposed elements and on the nature of the event itself. The elements at risk are the environment, people, and socio economic structures: e.g. industries, housings, etc.

Among the various members of the community, it is possible to single out groups which had specific risks before disaster, may find themselves in increased difficulties after the disaster. This risk is determined by the

potentially harmful effects in these groups that the environment may exert after the disaster. The two aspects of the risk include: biological and social.

more often than they used to and are deadlier and more destructive. Disasters in Africa have caused disability, displacement, epidemics, health hazards, psychological problems, famine, malnutrition, and the deterioration of the environment. (7)

Ethiopia is a country endowed with a wealth of human and natural resources. Yet its history is plagued by disasters. The most common ones include food shortages, famine, epidemics, and conflicts. For example the number of people affected by the humanitarian crises in Ethiopia has reached 10.5 million. This total includes 300,000 internally displaced persons in the Tigray region as a result of border conflict with Eritrea (4). Currently number of people suffering from famine has reached nearly 15,000,000 according to media reports.

2.7. Causes of disasters

Etiologically disasters can have two major causes.

1. Natural causes
2. Human causes (Human-made)

I. Natural causes: Natural disasters include storms, earth quakes, land slides, draughts, floods, epidemics and pests. Some natural disasters are difficult to predict although in some cases they can be controlled to a degree. Earth quakes, volcanic eruptions, tidal waves, and hurricanes are examples of hazards that cannot yet be prevented in practice, while floods, droughts, and landslides can be controlled or mitigated through public works involving drainage and soil stabilization.

II. Human causes: Human-made disaster can be caused deliberately or can be due to a technical defect that triggers a string of failures causing major disasters. There is a wide range of possible disasters of technological origin. At present, urban centers and ports are highly susceptible to this type of event due to high density of industry,

buildings and mass transportation of cargo and people (2). The following are examples of human made disasters: fire, environmental pollutions, conflicts and deforestation.

2.8. Health consequence of disaster

2.8.1 Health problems common to all disasters

Sudden natural disasters are often believed to cause not only widespread death but also massive social disruption and outbreaks of epidemic disease and famine which can leave survivors entirely dependent on outside relief. Systematic observation of the effects of disaster on human health has led to rather different conclusions, both about the effects of disaster on health and about the most effective ways of providing relief. Though all disasters are unique in that they affect areas with differing social, medical, and economic backgrounds, there are similarities between disasters which, if recognized, can optimize the management of health relief and use of resources. The

4. Climatic exposure

Health hazards of exposure to the different types of climatic conditions are not serious even after disasters in cold countries. As long the climate is dry, people reasonably well clothed, and able to find windbreaks, death from exposure does not appear to be a major risk. The need to provide emergency shelter therefore varies greatly with local conditions. However, problems related to exposure to hot climate like dehydration and heat stroke should not be overlooked.

5. Food shortage and malnutrition

Food shortages in the immediate aftermath arise in three ways: First, chronic limited food supplies may cause food insecurity even in a non disaster situation. Second, food stock destruction with in the disaster area for example by armed conflict, flooding, and spoilage may worsen the already limited food supply. Third, disruption to distribution and access to available food supplies by the food distribution infrastructure may also worsen food shortages. This occurs during natural disasters such as earthquakes or floods as well as human-made disasters. As a result of the above factors food shortage may cause acute malnutrition in the affected individuals. The most vulnerable groups to malnutrition are children, pregnant and lactating women and the elderly.

6. Mental health

Anxiety, depression and other neurotic psychiatric problems following disasters are not major, acute public health problems, and family and neighbors can generally deal with them temporarily. Wherever possible, efforts should be made to preserve family and community social structures. Mental health problems in disaster are classified as those occurring during the acute phase and chronic phase. The acute phase includes anxiety neurosis, depression immediately after the event. Chronic phase includes depression, post traumatic stress disorder and somatization after months or years of event. The indiscriminate use of sedatives and tranquilizers during the emergency relief phase is strongly discouraged. In developed countries,

mental health problems are reported to be significant during long-term rehabilitation and reconstruction and may need to be dealt with during that phase.

2.8.2. Causes and health consequences of specific disasters

1. Deforestation

The major causes for deforestation are the spread of farming and grazing, fire wood collection and timber harvesting. The above causes contribute to other hazards by removing root systems which stabilize the soil, allow percolation of water in to the soil and retain moisture in soil. Deforestation results in loss of forest resources such as fruits and medicines. It also contributes to other hazards, like flooding, drought, famine, desertification, environmental pollution and global warming. Prevention of desertification includes protection of forests through legislation and management, reforestation, community education, promoting fuel alternatives to wood and initiating soil conservation measures (12).

2. Drought

Climate variability and more specifically drought are one contributing factor of African famine. Drought implies significant decrease in rainfall relative to the amount of water the society needs. Meteorological drought is reduction in water resources.

Drought occurrence may be due to human activity, natural climatic trends and random phenomena. Random phenomena like increased population are thought to play major role in droughts. Secondary effects of increase population include environmental degradation, caused by over-cultivation, overgrazing and deforestation. These expose bare soil and rock that reflect more solar radiation back in to the atmosphere than do grass, shrubs and trees. This keeps the atmosphere warmer, disperses clouds and reduces rainfall.

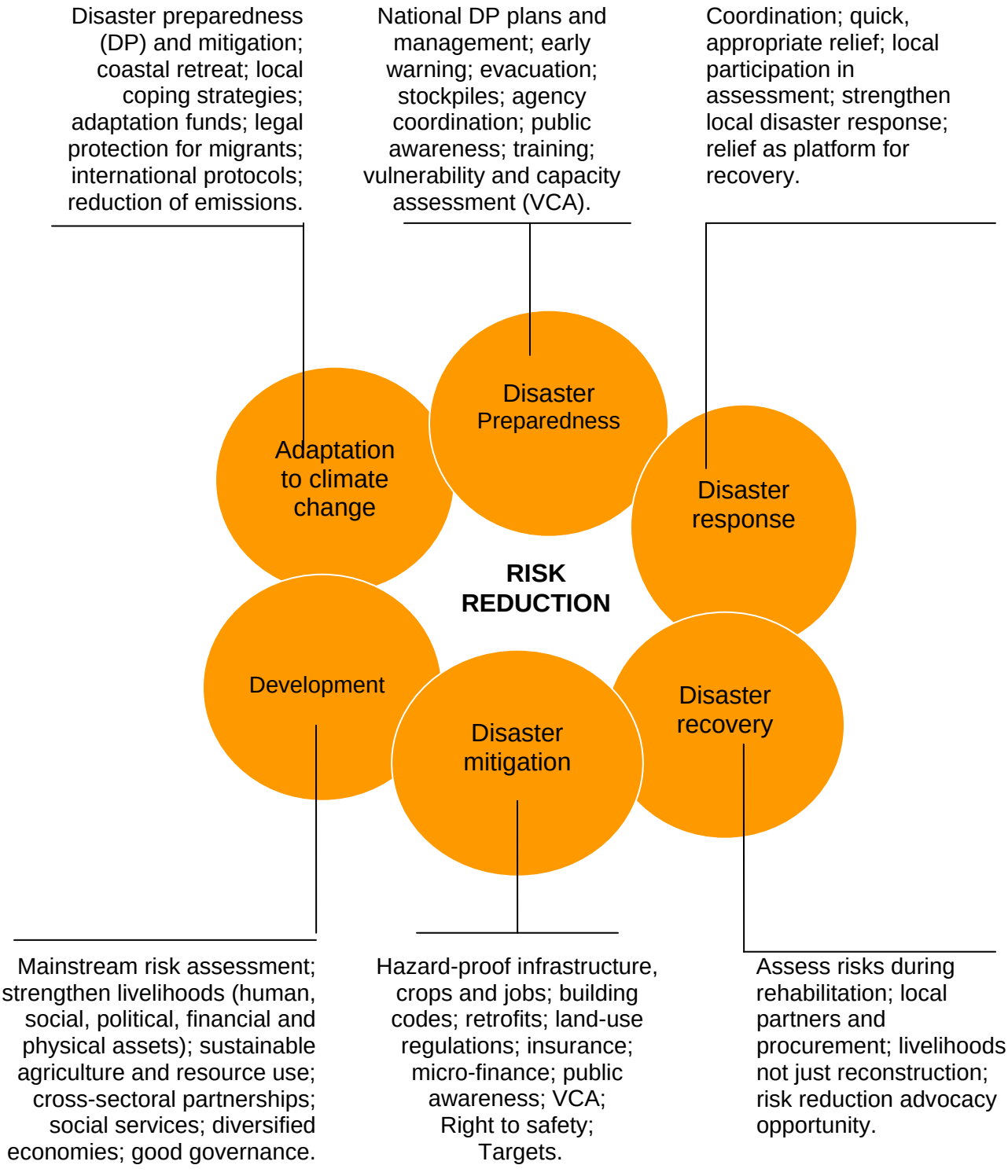
The most obvious health effects of drought are malnutrition, disease and death. However, mass population displacement and subsequent

overcrowding in camps and food distribution sites and generally unsanitary conditions lead to increased disease transmission and communicable disease outbreaks. There are also psychological problems of apathy, despair and depression that affect famine victims.

3. Epidemic

Epidemics are increases in the frequency of illness or other health related conditions, e.g. more accidents than the normal rate of occurrence. Typically, in disaster these epidemics are enteric diseases (cholera or typhoid), vector borne diseases (malaria or louse borne typhus) or diseases due to close human contact (measles, meningitis…). Bacterial viral or parasitic infections are capable of causing epidemics of disastrous proportion. However, control of cholera, malaria, meningitis, and yellow fever is far below satisfactory in Africa (13). Epidemics are caused by

Figure 2.1: Elaboration of risk reduction measures source (14)



4. Pests

Pests are creatures which are undesirable in a particular situation, for reasons of health, hygiene, comfort and acceptability e.g. Locusts (14). Pest infestation could be caused by increased in pest numbers due to ecological factors. These include; temperature, monoculture of crops, introduction of plants to new locations, migration and conducive weather patterns. There are other factors that contribute to the vulnerability of a community to pest infestation like large numbers and varieties of pests, lack of control on improved plant products, constraints on resources to predict and treat pest infestation, and under development of agricultural technologies. Pest infestations may result in adverse effects, which include food shortages, famine and stress on economic systems. Before pest infestations occur it is possible to minimize the risk by physical controls, cultural controls, crop plant resistance, biological controls, chemical controls.

5. Floods

Floods are climatological phenomena which are influenced by the geology, (geo-morphology) soil and vegetation conditions. Flooding occurs because of a variation in hydrological cycle. Metrological and hydrological processes can be fast or slow. These processes can produce flash floods or more predictable, slow developing, river floods. Human action intensifies floods by removing forest cover, by denuding the land of other vegetation, and by exacerbating erosion of soils.

The health effects of flood and tropical storms may be divided in to those resulting from primary exposures (acute and long-term effects) and those arising from secondary exposures.

I. Primary exposure

Acute effects: Floods may cause large numbers of deaths. Mortality is mainly due to drowning and individuals are either killed or survive without serious injury. Deaths and injuries are sometimes

caused by floating debris and other accidents but the number of orthopedic causalities is likely to be relatively small. Numbers of deaths in flooding are related to factors like: absence of flood warning, high flood water velocity and level, and rapid onset of flood. Deaths tend to selectively affect young and elderly who are least able to act on receipt of warning.

Long-term effects: These can be sub-divided in to those affecting the health of flood victims as a direct or indirect result of being flooded, and those disruptive effects on society and economy which lead to dislocation of food production and transportation. Food shortage may lead to malnutrition and subsequent predisposition to other illness. For example, investigators have reported rises in morbidity and ill health in flooded areas after the flood occurs. There are also increased psychological problems among the people living in flooded areas for five years following a disaster (14).

II. Secondary exposures and effects

Flood affects water supply system including water purification plants, and sewage disposal systems. Toxic waste sites, storage tanks, and chemical stores may be flooded, so that water may be contaminated. The increased exposure to biological and chemical agents can lead to outbreak of diseases. An increased risk of communicable diseases following flooding is inevitable because migrant flood victims and clustering in temporary camps increase exposure of susceptible people. Common serious diseases following flood are water-borne-diseases like typhoid, cholera and bacillary and amoebic dysenteries. There is an inherent risk of increased incidence of malaria following flood because mosquitoes are likely to multiply. Secondary effects of flood include disruption of “normal” health and social service programs.

Preventive measures: Measures employed to prevent floods include both structural measures (e.g. large and small scale engineering

Air pollution: Pollutants such as sulphur dioxide, nitrogen oxides, particulates, carbon monoxide and lead from industry and transport are the commonest causes of pollution.

Marine pollution: Sewage, industrial effluents, marine litter, petroleum spills and dumped radio active substances.

Fresh water pollution: Discharge of human and domestic waste in to lakes and rivers, industrial effluents, use of irrigation and pesticides, run off nitrogen from fertilizers.

Global warming: Accumulation of carbon dioxide from combustion of fossil fuels, deforestation, and methane from livestock'.

Ozone depletion: Chlorofluorocarbons (CFC) released into the atmosphere deplete the ozone shield against ultraviolet light and increase global warming.

Health consequences of pollutions include: Damage to agricultural crops, forest, aquatic systems, structural materials and human health, spread of pathogens, injury to marine life, and spread of chemicals to the environment affecting the health of humans, animals and sea life, sea level rise, climate change, temperature rise inducing skin cancer, cataract and reduction in immune system function.

8. Fires and explosions

Fire is the most common of all hazards created by humans. Every year fires cause thousands of injuries, billions of dollars in property damage and deaths. The underlying contributing factors for fire are: negligence in using different machines in the work place and utensils in the house, lack of skill of using different machines, conflicts at individual or national level and burning left over crops for human production to increase the fertility of the soil. Children, aged people and women are at special risk of suffering the health consequences of fire. The common effects of fire on humans are:

A. Burns

Burns can occur on any part of the body to different extents from mild to severe forms. Some people can die from extensive burns due to fluid losses, secondary infections; organ failure, or from inhalation of smoke. Even those who survive may be left with some consequences like paralysis and loss of some part of the body. After burns especially children are at high risk because they have a high body surface area to volume ratio, greater fluid losses and less strong immunity.

B. Structural loss

Fire in its broader sense can cause destruction of communal properties or households. People may suddenly lose whatever they had saved including food stores, money etc. A particular household may totally lose its self sufficiency. People may develop adjustment disorder, become careless of the family and might not be able to recover from the situation quickly. Hence members of the family may be affected by problems like malnutrition. In addition to these post traumatic stress is a common adjustment problem which occurs after many disasters.

We should always have plans to prevent the occurrence of fires in the workplace, or household. These include:

1. Increasing awareness about the utensils we are manipulating
2. Increasing the awareness on how to reach a fire brigade
3. Taking care of children and debilitated individual in a household
4. Having a facility inspected for fire hazard
5. Distributing fire safety information to employees

    how to prevent fires in the work place

    how to contain a fire

    how to evacuate the facility

    where to report a fire

6. Instructing personnel to use stairs and to crawl on hands and knees

Children live closer to the ground than adults and thus are more likely to inhale any materials stirred up from dust. They breathe more air per kg of body weight per day. They also have potentially more life time in which to develop mesothelioma or other delayed diseases that may result from exposure to asbestos or other toxic materials.

The problem of post traumatic stress disorder although common to many disasters, is grave and severe with respect to explosions. People suffer from a range of symptoms including flash backs, blackouts and feelings of grief and devastation. Alcoholism, depression and even suicide are quite possible. Careful assessments of psychological status and the provision of extensive counseling to survivors are vital.

In order to prevent such consequences, certain precautions should always be kept in mind as part of the community and as a health promoter of a society. These include:

Awareness of the proper procedures when using potentially explosive equipment

Children should not be left alone to play in areas that were once used in war or that have potentially flammable chemicals.

Appropriate measures to clear land mines meticulously

Psychiatric stability of individuals whenever conflict arises

Government policies should be developed in such a way that they don't harm individuals and nationality rights. **iann wadaC/Tn war5 T usiarisess**

likely magnitude, including identifying causes and consequences of the disasters, areas and population groups at risks and numbers of people likely to need support.

2.9.1. Declaration of disaster

A disaster is declared to save the lives and livelihoods of people threatened by the occurrence of such event. It can be declared at different levels like Woreda, zone, region and so on. To declare a disaster, the disaster prevention committee of the concerned administrative level should have convincing evidence that such a measure is warranted. The relief requirement can be met through regional budgetary and non budgetary resources (17).

2.9.2. Relief plan

This is a comprehensive plan which includes measures to be taken to prevent the occurrence of a disaster, and alleviate the suffering of victims at different stages of a disaster when it occurs. The plan is formulated to set in motion measures which can be taken to relieve current distresses and future occurrences.

In the relief plan scheme, the health service has important role. Periodic visits to the affected areas by the health team allow required treatments to be given for communicable and other diseases and ensure that all the necessary medicine is adequately supplied.

2.9.3. Health intervention

Health activities during disaster include developing health action plans and taking appropriate interventions during the three important phases of disaster: Pre-disaster, inter-disaster and post-disaster phases. Health intervention activities in each phase are discussed below.

Health action plan

Disasters are often associated with health problems as the susceptibility of people to diseases increases with deprivation of basic necessities such as food and shelter. Every time a disaster is anticipated, a health plan should, be drawn up by the Woreda Health Office in consultation with and with the assistance of the zonal and regional health bureaus. It should include the following tasks:

Health and nutritional surveillance of the affected areas.

Mass immunization of vulnerable population in the event of likely outbreak of epidemics, particularly immunization against measles and meningitis

Regular and periodic disinfestations of sources of drinking water

Medical examinations of children in schools and supplementary nutritional support and supplementary vitamins e.g. vitamin A

To provide appropriate and timely care for casualties due to the disasters like injuries, trauma and burns, malnutrition, treatment for acute cases in epidemics and chemical disasters.

To prevent exposure to adverse climatic and environmental conditions (lack of food, water, sanitation, shelter, clothing, poisoning)

To prevent short term and long term disaster related morbidity: Outbreaks of communicable diseases, increases in morbidly due to destruction of health infrastructure and inability to provide basic health services, introduction of new diseases due to resettlement or imported by external relief workers, occurrence of widespread malnutrition.

To reestablish health services to or above pre disaster levels, with special attention to reconstruction and repair of damaged health facilities, renovation of health facilities on adequate and appropriate basis, reorganization of health services based on primary health care.

Phases of disaster

There are three distinct phases of disaster.

Non disaster and inter disaster phase

Long before disaster strikes is the time for prevention and preparedness measures. This includes training and educating the community. The awareness and interest in disaster planning of the community and policy makers will greatly depend on the occurrence of recent disasters within the country. Therefore, in areas less prone to

Determine the services and health resources needed immediately to treat serious injuries and prevent further morbidity and mortality

Determine the quantity and quality of locally available resources

Initiate procurement of essential external resources

Determine what additional information might be needed.

Provide an assessment and recommendations to appropriate relief authorities

Identify locations that could be used to establish temporary health facility

The rapid assessment should provide information about the affected population which is factual and not based on rumor. Sources of information include the affected community, local administration, relief workers, regular reporting systems and surveys.

Management of mass causalities and acute illnesses

Principles of mass causality management include:

Search, rescue and first aid

Transport to health facilities with treatment as necessary

Redistribution of patients between health facilities when necessary

Feeding and provision of safe and adequate water, in case of severe shortage of food or famine

In epidemics, local health services will have the responsibility for diagnosis and treatment of the increasing number of cases during the initial phases. The local availability of trained health personnel, basic diagnostic facilities and essential drugs and vaccines are essential for fighting outbreaks and reducing the mortality rate. Furthermore it is important to have pre-established and readily available standardized treatment protocols and procedures which are already well known to the health personnel.

Post-disaster epidemiological surveillance

Natural disasters are often accompanied by outbreaks of communicable diseases such as measles, malaria, and diarrhea. The probability of increased transmission of communicable diseases in a disaster situation is related to:

Sudden increases in population density

Displacement of large population

Disruption of pre-existing sanitary services

Disruption of the normal public health program

Inadequate food supply

Ecological changes

If a standard reporting system does not exist, a special surveillance system can be established in response to the disaster, utilizing other sources of data including community sources, newspaper accounts, information from political sources and reports from relief workers. The system should collect information only on diseases which cause epidemics (e.g. cholera meningitis, measles).

Disease control activities

Disease control programs should be implemented immediately after the disaster, based on previous observations following similar emergencies.

In situations where the population is confined to camps where there is overcrowding, poor sanitation and inadequate water supply, children should be immunized against measles and diarrheal diseases.

Environmental health management

Environmental health is of primary importance in emergency health management after a disaster. Physical disruption of infrastructure and services may be aggravated by the displacement of large sectors of the population. The consequent alteration in their daily environment has potentially hazardous health consequences.

Post-disaster environmental health measures can be divided in to two priorities

Provision of adequate and safe water, basic sanitation facilities, disposal of excreta and liquid and solid wastes and shelter.

Food protection, vector control measures and the promotion of personal hygiene. Locally available human resources should be actively involved in providing the services needed in emergency situations.

Food and nutrition

Not all disasters result in food shortages and cause harmful change to the nutritional status of the population. Certain disasters like drought and refugee movements are almost always characterized by severe food shortages. Others like floods, tidal waves affect food availability directly and may completely destroy standing crops and family food stocks. The priorities in alleviating food problems are:

Making an initial estimate of likely food needs in the affected area

Locating or procuring stocks of food and assessing their quality and fitness for consumption

Supplying food immediately where there appears to be an urgent need (isolated populations, institutions, displaced population)

Monitoring information on nutritional status and food needs so that procurement, distribution and other programs may be modified as the situation changes

Management of health relief supplies

In natural disasters, health relief supplies should consist mainly of essential drugs and medical equipment for treating casualties and acute illness as well as preventing communicable disease (vehicle, cold chain equipment etc.)

The rehabilitation phase

Rehabilitation can lead to improvement of health structures and the health condition of the affected population, linking disaster to overall developmental

activities. Following a disaster, the pattern of health needs will change from causality and acute patient management towards the provision of primary health care. Priorities will shift from health care to environmental health measures and epidemiological surveillance. There are three main areas of assistance which should not be overlooked following health emergency operation. These are:

Long term problems caused by the disaster, including the extended need for medical care for some victims, surveillance of communicable diseases and care for orphans

Reestablishment of normal health services, taking into consideration the opportunity provided for making major changes in health care methods

Assessment, repair and reconstruction of damaged facilities and buildings as well as the local economy

Finally, the reconstruction phase following a disaster should lead to restoration of at least the pre disaster conditions. The reconstruction period is also the time for thinking about the lessons learnt. This is the time to develop preparedness plans on the basis of newly acquired experience. It’s the beginning of a new inter-disaster phase. (See figure 2.1 for summary of phases of disaster).

UNIT THREE

SATELLITE MODULES

3.1. Satellite module for health officers

3.1.1. Direction for using this module

Before reading this satellite module, be sure that you have completed the pretest and studied the core module

Continue reading this satellite module

3.1.2. Learning objectives

After completing this module, the reader will be able to:

identify the specific role of the health officer in the event of disasters

identify the specific role of the health officer in the prevention and control of disasters

3.1.3. Role of the health officer in the event of disaster

Each category of the health center team has its own role during the different phases of disaster. (See task analysis section).

As part of the health center team, the health officer plays an important role in the event of disaster. These are:

1. Nutritional assessment

Nutritional insufficiencies in a community can follow any type of disaster. The health center team is primarily responsible for assessing mutational status of a community and the health officer is in charge of coordinating the activity, compiling data, and planning for intervention in coordination with local Disaster Prevention and Preparedness Commission (DPPC) office.

Anthropometric measurements (measurements of body weight and height) are used to give an approximation of the nutritional status of a population.

The data can be used to decide whether the individual should be included in supplementary feeding program or treated for severe malnutrition.

In emergency nutritional assessment, one should focus on children aged 6-59 months because this is the most vulnerable group. By comparing body measurements of a child with those of healthy children of the same weight or age, one can classify his/her nutritional status.

Three commonly used nutritional indices are weight for height, weight for age and height for age.

Weight for height – reflects recent malnutrition with loss or gain. It is best indicator of wasting.

Height for age – reflects skeletal growth. It is best indicator of stunting.

Weight for age – composite index, which reflects either wasting or stunting. Refer to “Growth Monitoring Chart “which is based on this principle

The presence of edema should also be noted during emergency assessment as bilateral pedal edema is a key indicator of kwashiorkor. Weight for age is the most commonly used nutritional index in emergencies is the nutritional survey because it tells about the current situation (acute weight loss). Refer to table 3.1 for classification of acute malnutrition based on weight for age and edema. The other commonly used index in emergency situation is Mid Upper Arm Circumference (MUAC). It is a rapid and effective predictor of death when below 11 cm in children from 12-59 months.

The nutritional indices (combination of measurements) will be compared to a reference.

Table 3.1: Classification of acute malnutrition based on weight for age and edema

	< 60% standard	60-80% of standard	>80%
Edema absent	Marasmus	under weight	

An irregular pulse may signify heart or pericardial problems.

Following the above measures

should be procurement of important drugs and other equipment with respect to the anticipated diseases before disaster occurs.

Now you are through with satellite module for the health officer; there are still some activities remaining as stated below.

1. **Read the task analysis for different categories of the health center team on Unit 4.**
2. **Do the questions of the pre-test as a post-test**
3. **Compare your answers of the pre-test and post-test with the answer key given on Annex 1 and evaluate your progress.**

3.2. Satellite module for public health nurses

3.2.1. Learning objectives

By the end of this module you will be able to:

1. Describe the role of a nurse in disaster preparedness.
2. Describe the role of a nurse in disaster response.
3. Describe the role of a nurse in disaster recovery.

3.2.2. Direction for using this module

Before reading this satellite module, be sure that you have completed the pretest and studied the core module

Continue reading this satellite module

3.2.3. Role of the nurse in disaster preparedness

Nurses in disaster preparedness facilitate preparation within the community and place of work. The nurse is in a unique position to provide an updated record of the vulnerable population within the community. In addition to knowing where these populations exist, the nurse should be involved in educating the vulnerable population about what impact the disaster might have on them.

As community advocates, nurses help maintain a safe environment. Recalling that disasters are not only natural, but human-made as well, nurses in the community need to assess and report environmental hazards. For example, the nurse should be aware of and report unsafe equipment, faulty structures and the beginning of epidemics such as measles or diarrhea.

The nurse should also understand what community resources are available and how the community members will work together.

For nurses to work actively in disaster situations, they need to take following steps

1. Join the local disaster action team
2. Liaise with local health facilities
3. Determine the health related appropriateness of shelter sites.

high probability of survival once stabilized. Second priority is given to victims with injuries with systemic complications that are not yet life threatening and who would be able to wait up to 45 to 60 minutes for treatment. Lowest priority is given to those victims with local injuries without immediate complications and who can wait several hours for medical attention. These assessments help to match available resources to populations' emergency needs. Lack of or inaccurate information regarding the scope of the disaster and its initial effects may contribute to the misuse of resources.

Ongoing surveillance reports are just as important as initial assessments. They indicate the continuing status of the affected population and the effectiveness of ongoing relief efforts.

3.2.4.2. Shelter management: Nurses, because of their role in delivering aggregate health promotion, disease prevention and emotional support, make ideal shelter managers especially, for the elderly, women, children and the chronically ill. Many of the problems in shelters involve stress. The shock of the disaster itself, loss of personal possessions, fear of the unknown, living in close proximity to total strangers, and even boredom can cause stress.

Basic measures that can be taken by the nurse in managing a shelter include the following:

Listen to victims, let them tell and retell their feelings related to the disaster and their current situation

Encourage victims to share their feelings with each other if it seems appropriate to do so

Help victims make decisions about personal matters.

Delegate tasks (reading, crafts, and playing games with children) to teenagers and others to help combat boredom.

Provide the basic necessities (food, clothing, rest, etc)

Satellite module for environmental health technicians

3.3.1. Purpose and use of the satellite module

This satellite module is prepared for environmental health technicians to be used as a guide when disaster occurs. The module emphasizes only areas that were not covered by the core module.

3.3.2. Directions for using the module

Before reading this satellite module, be sure that you have completed the pretest and studied the core module

Continue reading this satellite module

3.3.3. Learning objective

After studying this satellite module the learner will be able to:

Describe the effects of disaster on environmental health

Describe the management of disaster created environmental health conditions

Explain the sanitation requirements during disaster.

3.3.4 Learning activity

A case study continued from the core module

The displaced people from village Dunfo were made to stay in a camp. The numbers of displaced people were estimated to be 3500.

Questions for discussion

1. What are the points that should be considered in choosing an appropriate site for the camp?
2. Estimate the area of land required for the camp, if tents are chosen for Sheltering

3.

3.3.6. Management of disaster created environmental health conditions

There are different major environmental health concerns to address as soon as the full impact of the disaster begins. Some of the specific concerns that must be addressed in the immediate post disaster emergency period are described in detail below.

3.3.6.1. Shelter

Immediately following a disaster, displaced persons usually seek accommodation with families or friends. In some cases, public shelter has to be provided temporarily until more permanent locations can be planned. Existing public buildings such as schools, meeting halls, churches, and mosques are chosen as temporary shelters because they can be converted easily into dormitories. They are also likely to have sources of water supply and waste disposal and bathing and washing facilities. Some even have cooking and mass feeding facilities.

Relief operations for the displaced people can be undertaken in tent camps or in buildings. The site selection and the facilities required in these places are described below: (15,16,17).

1. Tent camps

During relief operations, sites for tent camps should be chosen where the slope of the land and the nature of the soil favor easy drainage and where there is protection from adverse weather. Sites must be away from mosquito breeding places, refuse dumps, and commercial and industrial zones. The layout of the site should meet the following specifications:

1. 3-4 hectares of land for each 1000 persons
2. Roads of at least 10 meters width
3. Minimum distance between edge of roads and tents should be 2 meters
4. Minimum distance between tents of 8 meters
5. Minimum floor area of each tent of 3 square meters

Water distribution in camp sites should meet the following specifications

1. Minimum capacity of tanks of 200 liters
2. Minimum capacity of tanks per capita of 15 liters per day
3. Maximum distance of tanks from farthest tent of 100 meters

Solid waste disposal containers in tent camps should be waterproof, insect-proof, and rodent-proof; the waste should be covered tightly with a plastic or metallic lid. The final disposal should be by incineration or by burial. The capacities of solid waste units should be 50-100 liters for each 25-50 persons.

Excreta and liquid waste should be disposed in bore-holed or deep trench latrines in tent camps. These should be 30-50 meters away from tents and one seat should be provided for10 persons.

Modified soakage pits should be used for waste water by replacing layers of earth and small pebbles with layers of straw, grass, or small twigs. The straw needs to be removed on a daily basis and burned. Washing should take place on an ablution bench, which is 3 meters in length and double-sided. 2 should be provided for each 100 persons.

2. Buildings

Buildings used to accommodate victims during relief should provide the following:

The floor area should have a minimum floor area of 3.5 square meters per person, and minimum air space of 10 square meters person and there should be separate washing blocks for men and women.

Washing facilities should be provided as follows. One hand basin per 10 persons; or one wash bench of 4-5 meters for each 100 persons and one shower head per 50 persons in temperate climates and one shower head per 30 persons in hot climates.

Toilet accommodations in buildings housing displaced persons should meet requirements of one seat for 25 women and one seat plus one urinal for 35 men with a maximum distance from building of 50 meters.

Refuse containers should be plastic or metallic and have closed lids. One container of 50-100 liters capacity should be provided for 25-50 persons.

3.3.6.2. Water supply

Adequate drinking water should immediately be made accessible to victims and relief workers in essential locations, such as hospitals and treatment centers. Water can then be made available in peripheral areas of urban centers, in densely settled rural areas and scattered rural sites. After drinking water is secured within stricken areas, making water available for domestic uses (such as cleaning and washing) should be considered.

Drinking water should be obtained from operational water distribution systems. However, it also should be sought from undamaged, private sources (such as power plants, breweries, and other similar establishments); from undamaged springs, wells, or rain water cisterns; and from newly constructed water structures such as bore-holed wells. All water supplies must be carefully evaluated in order to eliminate the risk of water-borne infection and poisoning. The advice of an environmental health specialist (e.g. a sanitary engineer or sanitarian) should be sought when auxiliary water supplies are chosen.

Water suspected of contamination by human or chemical waste should not be used until it has undergone laboratory analysis. Sources located in the vicinity of sewage out-falls, chemical plants, solid waste disposal fields, abandoned mines, and other hazardous places should be considered suspect until such time that an environmental health specialist familiar with local conditions recommends otherwise.

Water distributed to disaster stricken populations must be kept safe until consumed. This is ensured by disinfecting all supplies, particularly the ones from surface sources and flood structures (such as wells, reservoirs, and rain water cisterns).

The residual concentration of chlorine in the distribution system should be increased after disaster. This reduces contaminants that can enter the system because of inadequate water treatment and allows detection of any water already contaminated that penetrates the distribution system. However, care must be taken to avoid over chlorination of drinking water; therefore, the chlorination program should be supervised by an environmental health specialist.

If water supplies in the disaster area are not being chlorinated because chlorination systems within the distribution network are not functioning, water must be disinfected in small quantitie

Personnel involved in distribution should be aware of this precaution and should educate users.

B. Granular calcium hypochlorite

This dry powder, called HTH (High Test Hypochlorite), contains 60 to 70 percent available chlorine. It remains quite stable when stored in tightly sealed containers in dark, dry and cool places. Once the container has been opened, it loses 5 percent of its initial available chlorine in forty days.

Care must be taken not to contaminate the powder with oil or combustible organic materials when it is mixed, because to do so may cause fire. To use HTH, add and dissolve one heaping teaspoon (approximately 7 grams) per 8 liters of water, thus producing a stock solution of 500 milligrams/liter. Add the stock solution to the water to be disinfected in the proportion of 1 part solution to 100 parts water. Let this stand for thirty minutes. If the taste of chlorine is too strong, allow it to aerate by standing another few hours or by pouring it several times from one clean container to another. The stock solution should be used within two weeks after it is prepared.

C. Sodium hypochlorite bleach

Common household bleach contains a compound that can, in emergencies, be used to disinfect water. The content of available chlorine (usually 3 to 10 percent) should be determined. It should be added to the water as shown in table 3.2.

Table 3.2: Percent of available chlorine in sodium hypochlorite bleach and their application to clear and turbid water

Available chlorine	Drops/liter of clear water	Drops/liter of turbid or colored water
1%	10	20
4-6%	2	4
7-10%	1	2

If the strength of available chlorine in the bleach is unknown, ten drops of bleach should be added. After mixing the treated water, allow it to stand for thirty minutes. There should be a slight odor of chlorine. If not, repeat the dosage and allow the water to stand for fifteen minutes.

2. Iodine

Iodine is available in different forms. The following are some forms of iodine compounds used for water disinfection.

A. Tablets

The most convenient and reliable iodine tablet forms are those that contain approximately 20 milligrams of tetraglycine hydroperiodine, 90 milligrams of disodium dihydrogen pyrophosphate, and 5 milligrams of talc. These tablets will dissolve in less than one minute at about 20°C, liberating 8 milligrams of elemental iodine per tablet. This amount will be adequate to treat 1 liter of most natural waters within ten minutes.

B. Iodine tincture

Common household tincture of iodine from a first aid kit (2 percent tincture of iodine) can be used to disinfect water. Five drops of tincture of iodine will be sufficient to disinfect 1 liter of clear water. For turbid water, however, add ten drops. Let the water stand for at least thirty minutes.

3. Potassium permanganate ($KMnO_4$)

Potassium permanganate is seldom used because of its long contact time. It is usually considered as a disinfectant for large quantities of water in wells, springs, or storage tanks. Potassium permanganate is of doubtful efficacy against pathogenic organisms, with the possible exception of *Vibrio cholerae.*

To use the chemical, prepare a solution by dissolving 40 milligrams of $KMnO_4$ in 1 liter of warm water. The solution will disinfect approximately 1 cubic meter of water after twenty-four hours of contact time.

Water consumption

During evacuation of people from disaster stricken area, water from suspicious sources must be boiled for one minute or it must be disinfected. The minimum amounts of water to be provided during evacuation are: 3 liters/person/day in cold and temperate climates and 6 liter/person/day in hot climates.

During relief operations while the disaster affected population are in hospitals, mass feeding centers or temporary shelters, the daily water consumption and the provision of safe water supply is recommended as follows.

40-60 liters/person in field hospitals

20-30 liters/person in mass feeding centers

15-20 liters/person in temporary shelters and camps

35 liters/person in washing installations

Water disinfection as protection

For disinfecting water used by disaster affected population, the following dosage can be used:

for routine chlorine residual, 0.7-1.0 milligrams/liter is used

for disinfection of pipes, 50 milligrams/liter available chlorine for 24 hours contact; or 100 milligrams/liter for 1 hour contact is used

for disinfection of wells and springs, 50-100 milligrams/liter for 12 hours contact is applied.

for elimination of high chlorine concentration in disinfected water, use 0.88 grams of sodium thiosulfate/1000 milligrams chlorine

To protect water from pollution, the distance between the water source and sources of pollution must be at least 30 meters. Keeping the bottoms of cesspools and latrines 1.5-3 meters above the water table and with impervious casing 30 centimeters above and 3 meters below ground surface can protect wells. A concrete platform around a well of 1 meter radius and fenced area of 50 meters radius are also essential protective measures.

3.3.6.3. Food sanitation and inspection

Locally available food products can become degraded or contaminated as a result of a natural disaster. Food usually becomes contaminated by polluted flood waters and, in some cases, by disease vectors and by unsanitary handling, especially in mass feeding facilities. Degradation results from long periods of power cuts that disrupt refrigeration and from contact with water, fradulent adulteration, and the use of old stocks of food products.

Since consumption of contaminated and degraded food leads to poisoning or infection, it has serious health implications. These consequences are best dealt with by appropriate location of available food supplies and investigating their fitness. Priority should be given to the consumption of uncontaminated, perishable food, particularly if the food supply originates in areas where there has been a power cut. All food, however, needs to be inspected. The analysis of food products should be of low priority, because it often is too complex an undertaking to initiate in areas affected by the disaster. Adequate inspection, nevertheless, can be made with simple kits for testing food, such as phosphate determination kits.

A qualified environmental health technician should inspect all damaged places of food production and distribution before operations are carried out. The activities at mass feeding facilities also should be supervised by a technician.

To avert health problems related to food degradation and contamination, the public should be informed about measures that can be taken to guarantee the safety of domestic supplies. The public should know which foods are safe to

and any other construction companies. Solid waste should be deposited, compacted and properly covered with earth during the landfill operation.

B. Burial:

This method is suitable for small camps where earth moving equipments are not available. A trench 1.5 m wide and 2 m deep is excavated and at the end of each day the refuse is covered with 20-30 cm of earth. When the level in the trench is 40 cm below the ground level, the trench is filled with earth and compacted, and a new trench is dugout. If the trench is 1m in length, it should be filled in about one week for every 200 persons.

C. Incineration:

Where burial is not practicable, solid waste should be incinerated. If the waste is very wet, fuel is needed to facilitate burning. Waste from first aid stations

and fuel is procurable. In the event of epidemics, personal belongings should be disinfected before they are returned.

Materials required for burial work are; stretchers, leather gloves, rubber gloves, overalls, caps, soap and disinfectants, cotton clothes, picks and shovels, heavy earth moving materials and trucks.

Now you are through with satellite module for the environmental health technician; there are still some activities remaining as stated below.

1. **Read the task analysis for different categories of the health center team on Unit 4.**
2. **Do the questions of the pre-test as a post-test**
3. **Compare your answers of the pre-test and post-test with the answer key given on Annex 1 and evaluate your progress.**

3.4. Satellite module for medical laboratory technicians

3.4.1. Purpose and use of the satellite module

This satellite module is prepared for environmental health technicians to be used as a guide when disaster occurs. The module emphasizes only areas that were not covered by the core module.

3.4.2. Directions for using the module

Before reading this satellite module, be sure that you have completed the pre-test and studied the core module

Continue reading this satellite module

3.4.3. Learning objectives

At the conclusion of this chapter, the learner will be able to:

Prepare the necessary materials, and chemical reagents before going to a disaster area.

Collect samples that are commonly requested in a disaster area

Transport samples for test that could not be performed in that area

3.4.4. Preparation of equipment, chemicals and reagents

A. Microscope

Electricity supplies may not be available in the disaster area. It is better to have a microscope that can work both by electric or solar power

B. Slides and cover slides

The slide and cover slides should be clean and free from any scratches

C. Disinfectants

Chemical disinfectants, usually 70% alcohol, should be available to clean the site for blood sample collection as well as to disinfect the area after the collection procedure has been accomplished.

D. Staining reagents

Preparation and formula of Cary-Blair medium

To make about 70 bottles you will need:

Sodium thioglycollate	0.75 gm

1. Weigh the sodium chloride, and transfer to a clean bottle made to hold a

5. Wipe off the first drop of blood, never press out blood
6. After having the required amount of blood, apply a slight pressure over the area with sterile swab.

b. Stool

Materials required:

Clean, wide mouthed container

Physiological saline

Transport media

Slide, cover slide

Applicator stick

Cotton wool swab

Procedure

Give the patient a labeled, clean, wide mouthed container and tell him or her to bring very small amount of feces, avoiding contamination with urine and other contaminants

i. If the specimen is to be transported,

Transfer a portion of the specimen to a cotton wool swab

Insert the swab in a container of sterile transport medium (Cary-Blair transport medium)

Break off the swab stick to allow the bottle cap to be replaced tightly.

Label the specimen and send it with a request form to reach the

iii. There may be a need to examine bodily secretions and discharges. Use the appropriate procedure for each.

Now you are through with satellite module for the medical laboratory technician; there are still some activities remaining as stated below.

1. **Read the task analysis for different categories of the health center team on Unit 4.**
2. **Do the questions of the pre-test as a post-test**
3. **Compare your answers of the pre-test and post-test with the answer key given on Annex 1 and evaluate your progress.**

3.5. Satellite module for community health workers

3. 5.1. Purpose and use of the module

This module is intended to be used by the community health workers to provide them with basic information to serve the community in the prevention and control of disasters. It will help them recognize their role when case disaster occurs.

3.5.2. Direction for using this module

Start with the pretest questions for community health workers

Study the text including the task analysis

3.5.3. Pre-test questions

1. List the most common types of disaster in Ethiopia?
2. List the common health problems arising after disasters?
3. What major roles can community health workers play in disaster Prevention and control?

3.5.4. Learning objectives

After completion of this module, the community health worker should be able to:

Define disaster

Identify types and cause of disasters

Describe health consequences of major disasters

Explain the role of community health workers in preventive and control measures of disaster.

3.5.5. Definition

A disaster is an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community.

3.5.6. Causes of disaster

Disasters have two major causes

1. Natural causes like earthquakes, landsides, floods, droughts and epidemics
2. Human-made causes like fires, explosions, accidents, environmental pollutions, and deforestations

The most common types of disaster in Ethiopia are drought and armed conflict.

3.5.7. Health consequences of disaster

There is a relationship between the types of disaster and its effect on health. Some of them cause the effects like population movements and environmental changes causing increased risk of disease transmission. The following are some of the common health problems arising after disasters.

1. Social reaction

People may have different responses to disasters. They may invent exaggerated rumors especially in epidemics which force authorities to take seemingly inappropriate relief work. At times they may not cooperate with measures planned by authorities, for example rejecting mass vaccination.

2. Population displacement

Destruction of housing by floods is known to cause large population movements and so does armed conflict.

3. Communicable diseases

Outbreaks of infections, especially those caused by fecal contamination of water and food, are likely to occur. The risk of epidemic communicable disease is proportional to population density and displacement

4. Food shortages

Food stock destruction within the disaster will reduce the reserve food available. The other cause for food shortage is disruption of the distribution system due to disasters.

5. Mental health problems

Anxiety and depression are some of the problems that follow disaster. Efforts should be made to preserve family and community social structures.

6. Trauma of different body parts

This may result from all types of disaster although some disasters bring about more serious consequences as in the case of earthquakes, explosions and armed conflicts.

3.5.8. Prevention and control of disasters

Community Health Workers can very well participate well in disaster prevention and its control. They play a major role in the early warning system by making the community aware of and prepared for the impending disaster.

The initial rapid assessment after disaster should focus on determining existing and potential health problems including morbidity and mortality, severe injuries and malnutrition. Providing assessment and recommendations to appropriate relief authorities is also expected from the Community Health Worker. In the management of mass casualties, giving first aid, and transporting patients to health facilities are also the task of the Community Health Worker. Finally, the community health worker should be involved in the rehabilitation phase by giving care to the victims and orphans and contributing to the repair and reconstruction of damaged facilities and buildings, either by direct participation or by mobilizing the community for such activities. The Community Health Workers should communicate well the lessons learnt from the disaster to the community. Please refer to table 3.3. for task analysis of community health workers.

Table 3.3:

3.5.9. Answer key for pre-and post-test for community health workers

1. Drought and armed conflict
2. The common health problems are:
    - Social reaction
    - Communicable disease
    - Population displacement
    - Food shortage
    - Mental health problem
    - Trauma of body parts
3. The major roles include participating in early warning system and making the community aware and prepared of the impending disaster.

3.6. Take home messages for care givers

1. **Definition:** Disaster is an occurrence of an event that can endanger the normal existence of the community beyond the capacity of the community to adjust. It can result in loss of life bodily injury and loss of property.
2. **Types of disaster:** Disaster can be caused by

   Natural causes: for example earthquakes, floods, droughts, etc

   Human-made causes: resulting from activities human beings that favor disasters. For example, cutting of trees, overgrazing, motor vehicle accidents, armed conflicts etc.

There are different health consequences following disasters. Some of these are mass displacement of people which predispose people to diseases that affect many people at the same time or others like injuries and traumas following flooding or earth quake.

Disasters can be prevents or controlled by the active participation of the community, the community leaders and the health workers. The role of the health worker includes giving information about the early warning system and identifying any possible disasters that can affect that community and making efforts to decrease the vulnerability of the community. In the case of disaster the role includes helping the injured and cooperating with the community leaders and other health workers in disaster control activities.

Table 2 Bem(TMC / Tf20.0011 Tc 0213.9- Tc 29 Twem901.18Tj[Attitude objectives and Bi)5(vities

Table 4.3: Practice objectives and activities

Learning objectives	Learning activities			
	HO	**PHN**	**EHT**	**MLT**
- To plan for appropriate intervention in cases of disaster	- Design appropriate intervention plan in cases of disaster	- Design appropriate intervention plan for specific activities	Design appropriate intervention plan for specific activities	Design appropriate intervention plan for specific activities
- To carry out appropriate actions in cases of disaster	- Organize and co-ordinate intervention activities, give health education monitor and evaluate the program	- Give vaccination and health education, evaluate the nursing activities	Give health education and perform other environmental activities	Give health education prepare the necessary lab equipment and materials
- To design appropriate preventive and control measures	- Perform preventive and control measures	- Perform preventive and control measures	Perform preventive and control measures	Perform preventive and control measures

UNIT FIVE

GLOSSARY

Adjustment disorder: Development of emotional or behavioral symptoms in the context of one or more identified psychosocial stressors.

Amputation: Removal of limbs surgically

Anxiety: A pathological state characterized by a feeling of dread accompanied by somatic signs that indicate a hyperactive autonomic nervous system.

Apathy: Lack of feeling, emotion, interest or concern: common in depression

Blackouts: Loss of memory/consciousness for a short time

Cataract: Opacity of the lens of the eye that impairs vision.

Cyclone: A very violent wind moving very rapidly in a circle with a calm central area.

Depression: Feeling low, characterized by sadness, apathy, pessimism and a sense of loneliness

Edema: Accumulation of fluid in the interstitial space (out of the blood verses)

Enteric: Something related with gastro intestinal system

Aacksigak tuemot of thepleura,f the mebraoneelionte the

Micronutrient: Essential nutrients needed by the body in very small amount (vitamin and minerals)

Morbidity: The number of cases of disease occurring within a particular number of the population

Mortality: The number of deaths in a given period in a particular population

Neurosis: A chronic or recurrent non-psychotic disorder, characterized by anxiety that is experienced or expressed directly or is altered through defense mechanisms.

Orthopedics: A branch of medicine dealing with the correction of diseased, deformed or injured bones, muscles and joints

Per capita consumption: The amount consumed per each person.

Post traumatic stress: Anxiety produced by extraordinary major life stress.

Procurement: Obtaining goods by careful attention or effort

Sedative: Drugs and other measures which soothe the excitement of nervous system.

Sporadic: Occurring here and there, as opposed to epidemic outbreaks or endemic situation

Stunting: Lower value of height for the expected age

Supplementary nutrition: Additional nutrition provided in the form of tablets or direction especially of micronutrients.

Surveillance: Systematic collection, analysis and dissemination of data on ongoing basis

Survey: One time assessment

Tranquillizer: Drug which induces a mental state free from agitation and anxiety and renders the patient calm and peaceful.

Wasting: Low value of weight for the expected age

Water-borne disease: Diseases caused by agents which depend on water for their living

UNIT SIX

ABBREVIATIONS

ABC – Airway, breathing, circulation

CFC – Chlorofluorocarbon

CHW – Community health worker

EHT – Environmental health technician

EPI – Expanded program of immunization

HC – Health center

HO – Health officer

Ht – Height

MLT – Medical laboratory technology

MUAC – Mid-upper arm circumference

NGO – Non governmental organization

PHN – Public health nurse

USD – U.S dollar

Wt – Weight

UNIT SEVEN

REFERENCES

1.

12.

Annex 1. Answer keys

1.1. Answer keys for pre- and post-test for all categories of the health center team

1. D

11. Population movement, over crowding, contamination of water or food supply, decline in nutritional status
12. Structuring an emergency plan, establishing an early warning system, training of national staff in emergency operations.
13. Spread of farming and grazing
    Fire wood collection
    Timber harvesting
14. Loss of free products from forest such as fruits and medicine
    Decline in tradition culture
    Contributes to other hazards like:
    Flooding drought, famine, desertification, pollution

1.2. Answer keys for health officer satellite module

1. - by taking, into consideration past experience
   - by noting increasing number of cases of sporadic diseases
   - by noting preceding disasters
2. - Measurements of body weight and height
   - Measurement of the Mid Upper Arm Circumference (MUAC)
3. - by taking proper history
   - picking specific physical signs
   - taking anthropometric methods
4. - Nutritional assessment
   - Diagnosis and treatment of specific diseases
   - Organization and proper management of the health service
5. - Securing ABC rule of life
   - Disinfecting and clearing wound area
   - Doing minor surgeries like debridement of dead tissue
   - Giving appropriate antibiotics.

1.3. Answer keys for of public health nurse satellite module

1. Role of the nurse in disaster preparedness includes:
    - Helping in keeping safe environment
    - Assessing and reporting environmental hazards
    - Reporting the beginning of epidemics
    - Identifying available community resources
    - Teaching the community about disaster
2. Role of the nurse in disaster response includes:
    - Community assessment
    - Health education
    - Surveillance
    - Mass vaccination
    - Shelter management for displaced people
    - Triage during accidents
3. Role of the nurse in disaster response includes:
    - Home visiting
    - Environmental assessment
    - Follow-up and referral of patients

1.4. Answer keys for environmental health technician satellite module

1. E
2. a. 40-60 liters/person in field hospitals
    b. 20-30 liters/person in mass feeding centers
    c. 15-20 liters/person in temporary shelters and camps.
    d. 35 liters/person in washing facilities.
3. False
4. False
5. False
6. - One tablet of 4 mg is used to treat one liter of clear water
    - One tablet of 160 mg is used to treat 40 liters of clear water.

7. a) Halazone tablets
   b) Granular calcium hypochlorite or HTH (High Test Hypochlorite) powder
   c) Sodium hypochlorite bleach
8. - From operational water distribution systems
   - From undamaged private sources such as power plants, breweries, and other similar establishments
   - From undamaged springs, wells, or water cisterns, and
   - From newly constructed water structures such as bore-hole wells
9. 0.88 grams of sodiumthiosulfate/100 milligrams of chlorine
10. - Shallow trench latrines
    - Deep trench latrines
    - Bore-hole latrines
    - Pit privies
11. D

1.5. Answer keys for medical laboratory technician satellite module

1. B
2. D
3. A

Annex 2. Additional information for health officers and public health nurses

Anthropometric measurements

How to take weight of a child using a hanging spring balance.

1. Install a 25 kg hanging spring scale (graduated by 100 g). If mobile weighing is needed, the scale can be hooked on of tree or a stick held by two people.
2. Suspend weighing pans from the lower hook of the scale and recalibrate to zero.
3. Remove child's clothes, and any jewelry and place him/her in weighing pans, older children may hold on to the bar and lift themselves off the ground.
4. Ensure nothing is touching the child.
5. Reed the scale at eye level (if the child is moving about and the needle does not stabilize, estimate the weight by using the value situated at the mid-point of the range of escalation).
6. Announce value to assistant who repeats, verifies and records.

Height and length

Procedure for measuring the length of a child less than 85 cm

1. Shoes should be removed.
2. The child is placed gently against the measuring board, the soles of the feet against the fixed vertical part, the head near the cursor on the moving part, the child should lie straight on the middle of the board, looking directly up.
3. The assistant holds the feet firmly against the foot board, and places one hand on the knees of the child, while the measurer gently holds the child's head, places the cursor against the crown of the head.
4. The measurer reads and announces the length to the nearest 0.1 cm.

Procedure for measuring height for a child taller than 85 cm

1. Place the measuring board upright in a location where there is room for movement around the board.
2. Remove the child’s shoes and stand her/him against the middle of the measuring board.
3.