MODULE

Diarrheal Diseases

For the Ethiopian Health Center Team

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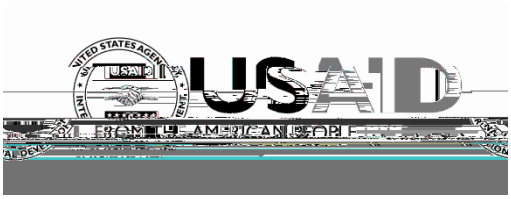

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UNIT ONE

INTRODUCTION

1.1 Purpose and The Use of Module

The scarcity of relevant teaching or learning materials in t

1.2 Direction For Using The Module

In order to make maximum use of the module the health center team should follow the following directions:

Do the pretest for all categories of the health center team in section 2.1.1, unit 2 of the core module and the pre-test for your professional category under section 2.1.2 unit 2 of the core module and evaluate yourself referring to the keys given in section 7.1 and 7.2, unit 7 of the core module

Read the core module thoroughly.

Read the case study and try to answer questions in the posttest pertinent to it.

Use the listed references and suggested reading materials to supplement your understanding of the problem

UNIT TWO

CORE MODULE

2.1 Pre and Post Test

2.1.1 Pre and Post Test For All Categories of the Health Center Team

1. Dagmawi is a 9 months old infant and was healthy until he developed diarrhoea 3 weeks ago. The episode began with stools that were loose and sometimes watery. Dagmawi had vomited several times in the past week. His mother said that he does not eat as much as usual and seems to have lost weight. He was weaned from breast milk to cow's milk 3 months ago. What type of diarrhoea does he have?
   A. Acute diarrhoea
   B. Chronic diarrhea
   C. Dysentery
   D. Persistent diarrhoea

2. Which of the following agents are important causes of acute diarrhea or dysentery in young children in most developing countries? (there may be more than one correct answers)
   A. Entamoeba Histolytica
   B. Yersinia enterocolitica
   C. Shigella species
   D. Giardia lamblia
   E. Enterotoxogenic E. coli

3. Which of the following factors can reduce the incidence and severity of diarrhea in young children? (There may be more than one correct answer)
   A. Washing hands after defecation and before preparing food.
   B. Bathing the child frequently
   C. Exclusive breast - feeding for the first 4 -6 months of life.
   D. DPT immunization
   E. Immunization against measles

4. Which of the following can enhance the absorption of sodium in the intestine (there may be more than one correct answer)

8. Bacillary dysentery is caused by

A. Viruses
B. Bacteria
C. Parasites
D. Fungus
E. All of the above

9. The specimen used for microscopic investigation of the causes of diarrhoeal diseases is

A. Blood
B. Stool
C. Urine
D. Sputum

10. Extra intestinal amebiasis is caused by

A. E.histolytica
B. G.lamblia
C. Shigella
D. Viruses
E. All of the above

11. Which one of the following statements is not true?

A. Microorganisms can cause acute or chronic diarrhea
B. Acute diarrhea is caused by microorganisms only
C. Microorganisms are not the only causes of acute or chronic diarrhea
D. A and B
F. A and C

12. What is the common way of diarrhoeal disease transmission

A. Through contaminated water
B. Through contaminated food
C. Through contaminated spoil
D. Through contaminated hand

E. All of the above

13. In the Ethiopian context what are the hazards in the living environment that promote the transmission of diarrhea.

A. when toxic material is deposited in the open field

B. when people defecate in the open field

C. When lead and mercury are ingested

D. When people use biomass fuel

E. None of the above

14. What are the important practices one should follow after constructing a latrine?

A. Cleanliness of the latrine

B. Covering the hole

C. Ventilation to avoid bad odor

D. Hand washing practice after defecation

E. All of the above

15. If one does not have soap what other material can he use to wash his hands after defecation?

A. Oil

B. Ash

C. Dirt

D. Dung

E. All of the above

16. What social problem can you identify for the cause of Kadija's death?

A. lack of road

B. lack of health facility

C. Poverty

D. All of the above

E. None of the above

17. When you are teaching and demonstrating how to prepare ORS at home, Which one of the following is wrong?

A. Washing of hands before and after preparation of ORS solution.

B. The ORS Should be mixed with 500 ml of clean water.

C. Instructing the mother to give frequent small sips using a cup or spoon.

D. Instructing the mother to continue giving extra fluid until diarrhea stoops.

18. Which one of the following is wrong procedure about rehydration using nasogastric tube?

A. Using clean NG tube

B. Moistening the tube with water-soluble lubricant or oil.

C. Passing the tube through the nostril and gently advancing it until the tip is at the back of the throat.

D. Placing the patient on his back with the head slightly tilted backward.

2.1.2 Pre and Post Test for Specific Categories of The Health Center Team

2.1.2.1. For Health Officers

1. In which of the following situation is it correct to give an antibiotic to a child with diarrhoea (there may be more than one correct answer)
   A. The child has had bloody diarrhoea with fever for 2 days.
   B. The child has had watery diarrhoea with fever for 2 days.
   C. The child has fever, dehydration from acute watery diarrhoea and cases of cholera
   D. The child has had diarrhoea for 12 days and shows signs of dehydration and weight loss.
   E. A child who has rota virus diarrhea

2. Which one of the following complications of severe diarrhoea is most dangerous?
   A. Potassium depletion
   B. Anorexia
   C. Base-deficit acidosis
   D. Fever
   E. Hypovolaemia

3. which of the following are features of hypertonic dehydration?
   (There may be more than one correct answer.)
   A. Extreme thirst
   B. Serum sodium concentration of 140mmol/liter
   C. Very irritable child
   D. Serum potassium concentration of 3.8 mmol/ liter
   F. Lethargic child

4. Kadija, who is a 2 years old child is brought to you because she has had a diarrhea for three days. When you examine her you note that she is irritable and fussy and that her skin pinch goes back rather slowly. Other findings most consistent with her degree of dehydration would be:

A. Normal eyes, tears are present when she cries, the mouth and tongue are moist

B. The eyes are very sunken, tears are absent when she cries, and she is unable to drink

C. The eyes are some what sunken, she drinks water eagerly from a cup, the mouth and the tongue are (rather dry)

D. She has fever of $38.5c^0$, her stool contains some blood, she is not interested in drinking water.

5 . A mother brings her 2 year old daughter Kadja to you because she has had diarrhoea for two days. When you examine her you note that she is irritable and fussy, her eyes are not sunken, she has tears when she cries, her mouth is somewhat dry, and she takes water eagerly from a cup, her skin pinch goes back rather slowly. She does not appear to be under nourished. Based on these findings, what conclusions would you draw about Kedija's condition and how she should be treated. (There may be more than one correct answer)

A. Kadija has severe dehydration

B. Kadija has no signs of dehydration

C. Kadija has some dehydration

D. Kadija should be treated according to treatment plan A

E. All, are correct

6. Which of the following is not the sign of severe dehydration?

A. Low urine out put

B. Lethargy

C. Irritability

D. Drinking eagerly

E. Hypotension

7. List the different types of diarrhea by pathogenesis

A .....

B. .....

C. .....

D. .....

8. What is the possible diagnosis in child with bloody diarrhea, tenesmus, fever, abdominal cramp and there were members of his family with this manifestation in the last 4 days?

A. Giardiasis

B. Amebiasis

C. Bacillary Dysentery

D. Food poisoning

E. A &C

9. Could there be any possibility of occurrence of an outbreak in this family's village?

A .....

B. .....

10. What could be the complication of such kinds of diarrhea?

A. Dehydration and shock

B. Reactive arthritis

C. Toxic mega colon

D. Hemolytic uraemic syndrome

E. All can be the possible complications

2.1.2.2 For Public Health Nurse

Multiple choice: Circle the correct Answers.

1. In acute diarrhea the primary concern is to rapidly replace losses of body fluid and:

A. Sodium, chloride, potassium and bicarbonate
B. Sodium, Potassium, zinc and Iron
C. Sodium, phosphate, calcium and magnesium
D. Iron, Sodium, Zinc and calcium.

2. Reasons why diarrhea may lead to malnutrition are:
   A. Loss of appetite
   B. Damage to small bowel mucous, resulting in malabsorption
   C. Food withdrawal
   D. All of the above

3. The oral rehydration salts (ORS) solution recommended by WHO and UNICEF contains:
   A. Sucrose, water, sodiumchloride, organic flavour and potassium chloride
   B. Glucose, water, sodium chloride and sodium bicarbonate.
   C. Glucose, water, sodium chloride, potassium chloride and trisodium citrate dehydrate
   D. Glucose, water and sodium chloride.

4. One packet of ORS packaged by UNICEF should be mixed in:
   A. An amount of water depending on the degree of dehydration
   B. 500 ml of water.
   C. 1000 ml of water
   D. 1500 ml of water

5. Indications for intravenous therapy in the treatment of acute diarrhea are:
   A. Some dehydration, fever, nausea, and vomiting.
   B. Severe dehydration with shock, stupor or coma, persistent vomiting or paralytic illius.
   C. Any dehydration with fever and pneumonia
   D. None of the above

6. ORS (oral Rehydration salt) is:

   A. A physiological fluid for rehydration and maintenance body fluid and electrolyte in diarrhea
   B. A food during diarrhoea
   C. Indicated only in diarrhea with fever and tenesmus
   D. Useful only in very mild cases
   E. A replacement for IV fluid whenever there is severe dehydration.

7. Oral fluid can be administered by:

   A. Cup and spoon
   B. Catheter
   C. Nasogastric tube(NGT)
   D. A and C

8. The correct home treatment of diarrhea is:

   As soon as diarrhea starts,

   A. Give more fluid than usual, discontinue feeding and look for signs of dehydration.
   B. Give more fluid than usual especially Food based ORT , continue feeding, and give anti-diarrhoeal agents.
   C. Look for more signs that indica

10. Three key signs of dehydration in children are:
(there are more than one answer)

A. Increased crying spells.
B. Increased thirst, eagerness to drink
C. Restless, irritable condition
D. Sunken eyes.
E. Reduced ability of skin to retract.

2.1.2.3 For Laboratory Technicians

Directions: *Choose the letter of the answer that best suits*

1. One of the following is not included under macroscopic examination of stool specimen?

4. Stool specimen for the investigation of diarrhoeal disease can be collected in

   A. Cary-Blair transport medium
   B. A waxed car board box
   C. Plastic box
   D. A glass Jar designed for stool collection
   E. All of the above

5. Diarrhoeal stool specimen should be

   A. Examined immediately
   B. Examined macroscopically only
   C. Referred to specialized laboratories for culture and biochemical tests
   D. Preserved in suitable medium
   E. All of the above

6. Usually methylene blue feacal smear preparation helps to investigate

   A. Fecal leukocytes
   B. Stages of parasites
   C. Bacteria
   D. Viruses
   E. All of the above

7. Modified Ziehl-Nelsen staining of fecal smear helps to detect and identify stages of

   A. T.trichiura
   B. E.vermicularis
   C. Cryptosporidium
   D. histolytica
   E. None of the above

8. Basic fuchsin fecal smear preparation mainly helps to investigate

   A. Campylobacters
   B. Hookworms
   C. Rotaviruses

D. G.lamblia

E. None of the above

2.1.2.4 For Sanitarians

Directions: *Give short answers for the questions stated below.*

1. What are the causative agents of diarrhoea that are related to viral agents?
2. If feces is deposited in the open area how would it reach our food source?
3. What are the common ways of diarrhoeal transmission?
4. Even if individuals are supplied with clean water it may be contaminated in the home. How would that happen?
5. Mention three transmission routes of diarrhea and describe how the disease is transmitted through that route?
6. How is food contaminated by diarrhoea causing germs :
   - At the source
   - During preparation
   - During storage
7. In the Ethiopian context what are the hazards in the living environment that promote the transmission of diarrhea?
8. What personal hygiene practice plays a major role in preventing the transmission of diarrhoeal disease?
9. What two methods do you know in giving health education ?
10. What are the important practices one should follow after constructing a latrine?
11. Where do you site a pit latrine? Why?
12. What hygienic behavior contribute to diarrhoeal disease transmission when drawing water from water storage

2.1.2.5 Pre and Post Test for PHWs/CHWs

Directions: *Choose the letter of the answer that best suits (there could be more than one answer)*

1. The cause of diarrhoeal diseases is
   - A. Germs
   - B. Evil eye
   - C. Taking more third diet
   - D. Tooth extraction
   - E. None

2. One method of preventing diarrhoeal disease is:

E. A & b only

5. Suppose there are over 10 children who developed bloody diarrhea with fever and tenesmus in your surrounding over a period of 5 days, what will you do first?

A. Give contro azol(deta3a011ill chm.0021 Tw -18.01 -1.725 TdT* coBtro)T939 100.OR

Diarrhoeal diseases have persistently been the first or the second causes of visits to health units in the country. In general, diarrhoea alone contributes to 19% of the under five deaths globally, while 22.5% of hospitalization and up to 20% of all outpatient visits in children. Diarrhoeal death ratio, i.e number of deaths of children due to diarrhea over the total number of deaths of children due to any cause is 46%.

The dangers of diarrhoea are related to dehydration and mainutrition while, dysentery is another important causes of death due to the fatal complications associated with it. The main objectives of control of diarrhoeal diseases (CDD) in Ethiopia are reduction of morbidity and mortality due to diarrhoeal disease in children under 5 years of age. The control and prevention can be achieved through effective curative, preventive, promotive and rehabilitative services. These services can be rendered effectively by a properly trained health center team-which is the whole theme of this module.

2.3 Learning Objectives

2.3.1 General Objectives:-

The purpose of this module is to equip the students (trainees) with the appropriate knowledge, attitude and skills required to correctly identify and effectively manage diarrhoeal cases as well as prevent and control diarrheal diseases.

2.3.2 Specific Instructional Objectives:-

For correct identification and effective management of diarrhoeal cases, as well as prevention and control of diarrhoeal diseases, students are expected to achieve the following specific objectives:-

1. Identify and define the types of diarrhoea
2. Enumerate the causes and risk factors of diarrhoea
3. Describe the magnitude and contribution of diarrhoea to the overall child health problems both locally and throughout the country


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The village where Kadija was born and live is isolated. Moreover, it has no safe water supply, health facility, school nor convenient communication. The family lives in a one roomed traditional house together with other animal such as chicken, goats and cows. The dirty floor, the animal waste, and poor ventilation makes the living environment unsanitary.

Since Kedija's mother and father are farmers, they spend most of their time in the field, hence, Kadija and the other kids have never been taken care of by the mother. The elder daughter who is a small girl herself is responsible to look after the little ones.

The family has a small plot of land to farm. If they have a good harvest they may be able to eat one meal a day for some months but not for the whole year. It is during the rainy season, and when food is scarce among other things that Kadija developed bloody diarrhea with fever, tenesmus, abdominal cramp and vomiting .

The family had experienced many unhappy days in the past. Children were getting sick very frequently, Fatuma herself has never been a healthy mother. She has no rest even when she is pregnant as she has to help her husband in the farm. In this time of the year (rainy season), many farm activities take place. Kadija's diarrhoea, although not a new phenomenon in the family is another family burden.

Kedija's diarrhoea worried the mother, nevertheless they did not do any thing to alleviate her problem the first day. The following morning, Fatuma and her husband drank their coffee and left to their farm living Kadija behind with her elder sister. Fatuma returned in the afternoon to take some f

cause she had become very weak and sick. When Fatuma

her husband that

work.

Late in the afternoon the second day, both went to Kadija's fa

sick daughter after which th

elp. She told him that she can

him to visit a traditional healer some distance from their village. He went there in the dark and found the traditional healer who has given him a small quantity of plant juice, Kedija was forced to drink it, but she threw most of it away.

The third day, a woman in the neighborhood who had the same bad experience in the past advised the family to take Kadija to the health center which was found at a distance from their village. Since Ato Ahmed had no money to pay for transport he had to walk to the health center. He started walking very early carrying Kadija in both his arms, his wife following him. The whole trip, Kadija never moved or made any sound. She was very weak. They arrived at the health center around 10:00 a.m. but the guard told them that they are too late. He informed them that they have to return very early the following day. Although they begged and pleaded it was to no avail. They told the guard "she won't survive the night, please let us in ". He ignored them. So, Fatuma and Ato Ahmed with Kadija in his arms had to sit outside the health center under the fence for several hours thinking, whether they should go back or not and discussing " Where would we spend the night if we stayed here?". Tears dribbled from their eyes, lumps swelled in their throat, but no solution. It is then that Ato Ahmed felt a jerky movement in his arms. He looked down at Kadija, terrified. He saw her dying. Kadija died.

In the small funeral service, everyone was talking about children that died in the past. They think God is angry at them. One elder said, "God gives and takes, we should just ask for his mercy". Another added to the conversation "all are dying within two to three days sickness." they all know what is happening, but they do not know why.

2.5 Definition

Diarrhea is defined as a passage of three or more loose or watery stools in a 24 hours period. However, mothers may use a variety of terms to describe diarrhoea depending upon whether the stool is loose, watery, bloody or mucoid or there is vomiting (Readings on diarrhoea, 1992). Diarrhea that begins acutely and lasts less than 14 days is called ***acute diarrhea*** . If diarrhoea begins acutely and lasts longer duration, usually over 14 days, it is called ***persistent diarrhoe****a.*

2.6 Epidemiology of Diarrhoeal Disease

2.6.1. Magnitude and Severity of The Problem

Diarrhoeal diseases are a leading cause of childhood morbidity and mortality in developing countries where an estimated five million deaths occur each year in children under 5 years of age. Children under 5 years of age may experience as many as 5 episode of diarrhoea per year, although a rate of 3-4 episode is more common.

- Failing to dispose feces off (especially infant feces) hygienically. It is often believed that infant feces is harmless, whereas it may actually contain large numbers of infectious viruses or bacteria. Animal feces also can transmit enteric infections to humans.

2.6.2.2.1.2 Host Factors That Increase Susceptibility To Diarrhea (biological factors)

Several host factors are associated with increased incidence, severity, or duration of diarrhea. They include:

- Malnutrition : the severity and duration is increased in under nourished children, especially those with severe malnutrition.
- Failure to get children immunized for measles:- diarrhea and dysentery are most frequent or severe in children with measles or who have had measles in the previous four weeks. This presumably results from immunological impairment caused by measles. Its association with diarrhea accounted for one-third or more of diarrhea related deaths in young children. Measles predisposes to diarrhea by:
  a. Direct effect of the virus on the intestinal epithelium
  b. Inducing immune suppression
- Immunodeficiency or immunosupression:- This may be temporary, due to certain viral infections (e.g. measles) or it may be prolonged, as in persons with the acquired Immunodeficiency syndrome (AIDS). When immunosuppression is severe, diarrhea can be caused by unusual pathogens and may also be prolonged.
- **AGE -** Most diarrheal episodes occur during the first two years of life. Incidence is highest in the age group 6-11 months, when weaning often occurs. This pattern reflects the combined effects of

2.7.1 Pathogenesis

2.8 Clinical Features(Signs and Symptoms)

2.8.1. Symptoms :

Symptoms

- Passage of loose stool
- Increased frequency of passage of stool
- Loose, watery consistency of stool
- Low urine out put
- Increased volume of stool
- Vomiting

Signs

- Sunken eye ball
- Dry tongue and ducal mucosae
- Poor skin turgor
- Low blood pressure
- Lethargy
- Weight loss

2.8.2. Using Clinical Signs to Determine the Degree of Dehydration

As indicated in table 1 below, the degree of dehydration dictates as to which treatment plan one should follow based on the signs of dehydration.


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Complications :-

Dehydration

This is the most common acute complication which accounts for 70% of deaths due to diarrhea

Malnutrition

Electrolyte imbalance

Key sign *

For two or more of the above signs plus one key sign (*) indicates severe dehydration and requires urgent treatment ,according to treatment plan C.

(* key sign for some dehydration and ** key sign for severe dehydration)

Poor skin Turgor Indicates Severe Dehydration

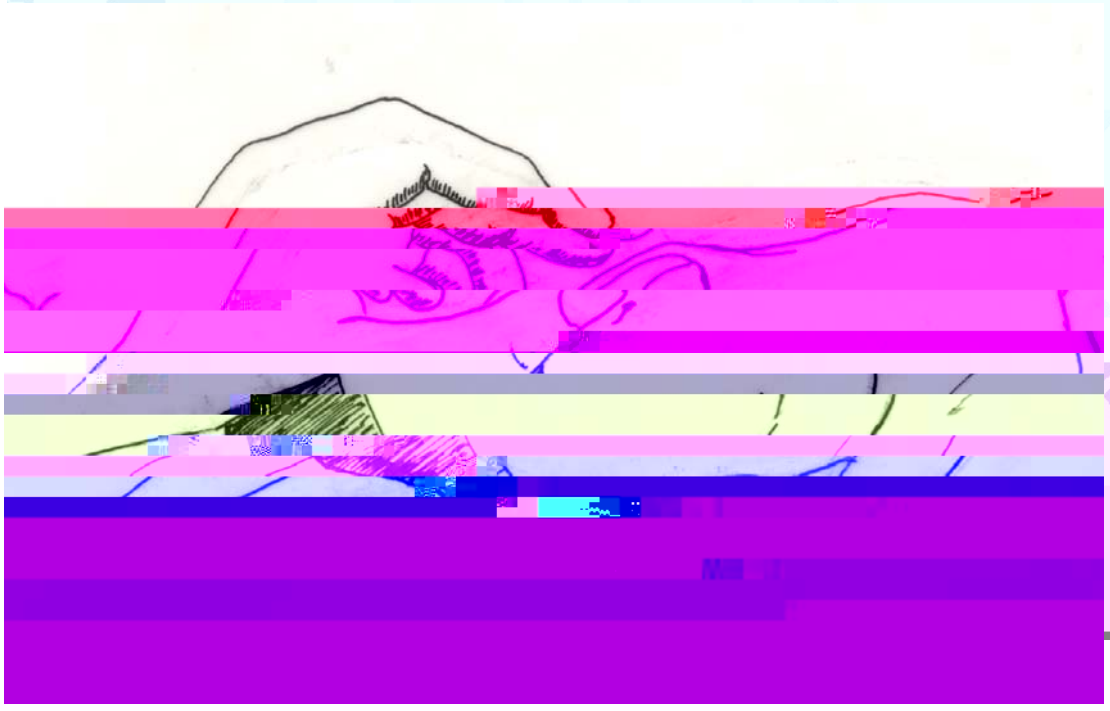


Figure 1. Skin Pinch assessment to detect dehydration

2.9 Diagnosis

2.9.1 Clinical Diagnosis

Mainly from medical history and physical examination (see page 28)

2.9.2 Laboratory Diagnosis

Macroscopic and microscopic examination of stool is sufficient for starting treatment of diarrhoeal disease. A well equipped laboratory is required for culture sensitivity tests and electrolyte determination, but at a primary health care unit(PHCU) level basic laboratory service like stool examination is adequate

2.10 Case Management (see table one page 30)

1. Replace fluid & electrolytes - irrespective of the etiology (give ORS or food based ORT)
2. Continue feeding give increased fluid during diarrhea
3. Anti-microbial and anti-parasites are not required except for Diarrhea due to cholera, severe bacillary dysentery and parasites(for the fluid regimen and the dose and choice of antibiotics, refer to the satellite module for health officers in unit 2, section 2.10).

Giving ORS is Life Saver to a Child With Diarrhea

Figure: 2 Mother giving ORS with spoon

Figure: 3 Mother giving ORS with cup

2.11 Control and Prevention

Diarrhoeal disease occurrence is closely connected with individual and community hygienic practice and thus hygiene education coupled with environmental and water sanitation is the major preventive strategy. The objectives of health education should be to enhance proper case finding and treatment both and in the home as well as at health institution level, and to promote and strengthen the preventive practices related to diarrhoeal diseases.

The effectiveness, feasibility and cost of each of the many possible interventions for the reduction of diarrhea morbidity and mortality in children under 5 years of age was assessed by WHO/CDD supported researchers. Among the interventions, the following seven could markedly reduce the rates of both morbidity and mortality due to diarrhoeal diseases in young children.

1. ***Breast Feeding:*** during the first 4-6 months infants should exclusively breast fed. This means the baby should receive breast-milk and no other fluids such as water, juice or. formula. During the first six months of life, the risk of having severe of fatal diarrhea is 30 times greater for infants who are not breasted than for infants who are exclusively breasted. During the second six months of life infants should be partially breastfed. Partial breast feeding reduces the risk of severe diarrhea and diarrhoeal death.

2. ***Improved Weaning Practices:*** when the child is about 4-6 months old breast feeding should continue but the child should be introduced to a few soft, mashed foods twice per day. From one year of age continue breast feeding as desired and give all foods, suitably prepared, 4 to 6 times per day. Suitable nutritious weaning food recipes should be developed and promoted. Extreme care and safe hygienic practice should be exercised in the preparation and storage of weaning foods.

Breast Feeding is essential for Prevention of Diarrhoea

Figure:4 Mother Breast Feeding

3. ***Use of Plenty of Clean Water:*** Using plenty of clean water helps protect families from diarrhea. Families can reduce their risk of diarrhea by using the cleanest available water and protecting it from contamination, at the source and in the home.

4. ***Hand Washing:*** Good hand washing means use of soap (or local substitute), use of plenty of water and careful cleaning of all parts of the hands. (all family members should wash their hands well).

   After cleaning child who has defecated

   After defecation

   After performing and cleaning work

   Before preparing food

   Before eating

   Before feeding a child

Proper Hand Washing Essential for Prevention of Diarrhoea

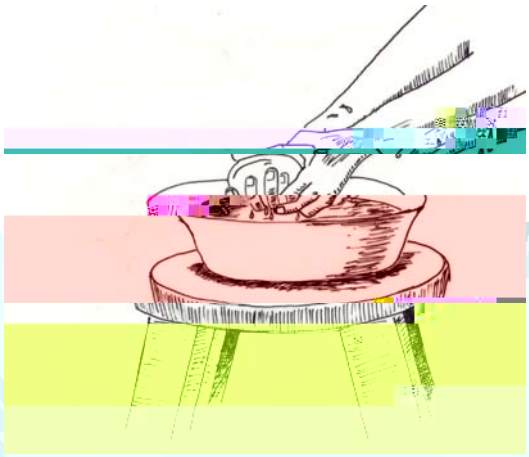


Figure:5 Proper Hand Washing

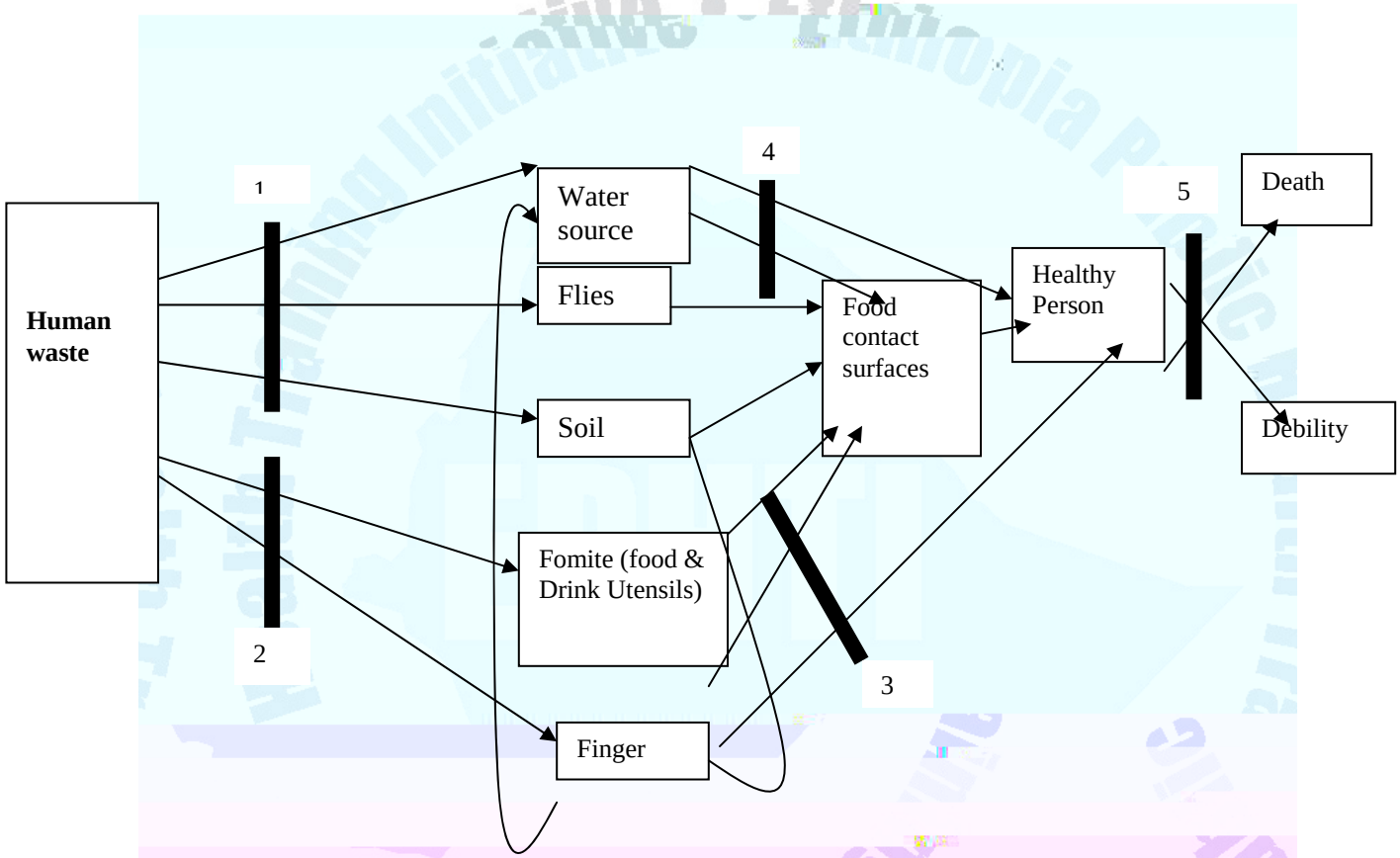
5. ***Use of Latrines:*** Diarrhoeal diseases are faeco-oral in transmission. Therefore, disposing of faeces more safely reduces the spread of diarrhea. Latrine ownership and use of latrine are associated with reduced risk of diarrhea.

6. ***Proper Disposal of the Stools of Young Children:*** Hygienic disposal of the faeces of young children is important. These stools are particularly dangerous because they transmit diseases to other children and parents.

7. ***Measles Immunization:*** In preventing measles, measles immunization also prevents the diarrhea that often accompanies or follows it. Diarrhea which is associated with measles is particularly severe, is often dysentery, and is more likely to lead to death than most diarrhoea in children. Up to 10% of children with measles and diarrhoea die.

Since diarrhea due to infection (the commonest type) is transmitted by fecal-oral route through food and drink, it may be generally classified as a disease of poor health promoting behavior (especially poor sanitation). This indicates that the disease, can be prevented successfully through a proper sanitation.

This is summarized by the " 5F" diagram (as it involve: Feces, Food/Fluid , Flies, fomites (utensils) and Finger) below.



1 = Barrier No.1(Constructing a sanitary latrine)
2 = Barrier No.2(Promote hygiene education for behavioral change)
3=Barrier No.3 (Proper washing, storing of utensils and hand washing before handling food)
4= Barrier No.4 (Protect water source)
5= Barrier No.4(Early case detection and treatment)

The Example of '5F' Diagram Indicates That

1. Human waste exposed to flies and food
2. Human waste contaminating water sources and food
3. Contaminated water, contaminates food or directly a healthy person.
4. Flies that have an access to human waste contaminate food.
5. Poor hygienic practice contaminates the cooking and eating utensils.
6. Flies could contaminate water and fomites
7. Flies could contaminate food
8. Contaminated food could be a health hazard for a healthy person.
9. The overall result will be debility or death

Barriers

In order to stop the transmission of diarrhea from the source, in this case the human waste, there could be two barriers:

1. Physical
2. Behavioral

1. Physical

Feces can be disposed by using an excreta disposal system. This discourages the breeding of flies and nuisance conditions created by the feces. It protects the soil from contamination and ultimately surface or ground water pollution by filth and pathogens (see barrier 1)

2. Behavioral

If barrier 1 is not available individuals and communities should get a safe water supply from a protected water source so that food preparation and drinking water will at least be safe(see barrier 2). Even if there is excreta disposal system (latrine) unless people use it persistently and wash their hands with soap after they come out of the latrine, it may be useless. A mother, or

caretaker who does not wash her hands after visiting toilet may contaminate food, food utensils and

other food contact surface (Barrier 3). As one can see from the above diagram, diarrhea prevention strategy should include all the five environmental domains, which are:-

a. Proper disposal of human feces
b. Protecting sources of water
c. Water and personal hygiene
d. Food protection and hygiene
e. Domestic and environmental hygiene

2.12 Learning Activities (Case Study) Continued

1. Read case study - the story of Kedija to start discussion on the problems faced by a family such as Kadija's.

   What caused Kadija's sickness

   What were the factors that exposed her to the infection

   Can you enumerate the physical, social, and biological factors that contributed to Kadija's death?

   What should have been performed by the family immediately after Kadija was sick?

   What should people in Kadija's village do to save their children from sickness and death?

   What would be the government's share to alleviate such common problem?

2. Cut all the boxes in the chart that shows transmission routes of diarrhoeal diseases and barriers, and ask groups to reassemble them again.

3. Use also the disease transmission posters for discussion of how that transmission in the poster actually happened.

4. What determines behaviors that promote diarrhoeal disease?

UNIT THREE

SATELLITE MODULES

UNIT 3.1

SATELLITE MODULE FOR HEALTH OFFICERS

UNIT:1 INTRODUCTION

1.1 Purpose Of The Module

The ultimate purpose of this training module is to produce Competent Health Officers who can correctly identify and effectively manage diarrhoeal cases both in clinical and community settings.

1.2 Direction For Using The Satellite Module

This satellite module can be used in the basic training of Health Center team particularly health officers who are in the training and service programs. In order to make maximum use of the satellite module, the health officer should follow the following directions.

1.2.1 Do the pretest for satellite module of Health Officers in section 2.1.2.1 and unit two of the core module

1.2.2 Check or read the core module very thoroughly

1.2.3 Read the case study and try to answer questions pertinent to it

1.2.4 Use listed references and suggested reading materials to supplement your understanding of the problem.

1.2.5 For total and comprehensive understanding of the causes (Ethnology/Pathogenesis), Epidemiology and prevention of diarrheal disease the health officer students are advised to refer to the core module.

1.2.6 Evaluate yourself by doing post-test in section 2.1, 2.1 unit 2 of the core module and compare your score by referring to the key given in unit seven section 7.2.1.

UNIT:2 SATELLITE MODULE FOR HEALTH OFFICERS

2.1. Pre and Post Test for The Satellite Module of Health Officers

See the pre and post tests for the health officers in the core module under unit 2, section 2.1.2.1

2.2. Significance and Brief Description of The Problem

See the part under unit 2 section 2.2 in the core module

2.3 Learning Objectives

For effective case management of diarrhoeal disease, the health officer student will be able to do the following at the end of the training.

1. Demonstrate the process of assessing a child with diarrhea
2. identify and describe the clinical manifestations complication in a child with diarrheal disease
3. List the diagnostic methods and procedures for a case with diarrhea
4. Describe the principles and methods of treatment of diarrheal disease
5. Select the appropriate treatment plan for a case of diarrhea
6. Identify and manage or refer timely, a case of diarrheal disease when needed
7. Demonstrate the appropriate management of cases of diarrheal disease
8. Describe the limitations and situation were antibiotics are use in the management of diarrheal disease

Complications of Diarrhea

Acute

- Electrolyte imbalance(sodium, potassium depletion)
- Dehydration, Hypovolemia, shock and Acidosis

In case of Bacillary dysentery

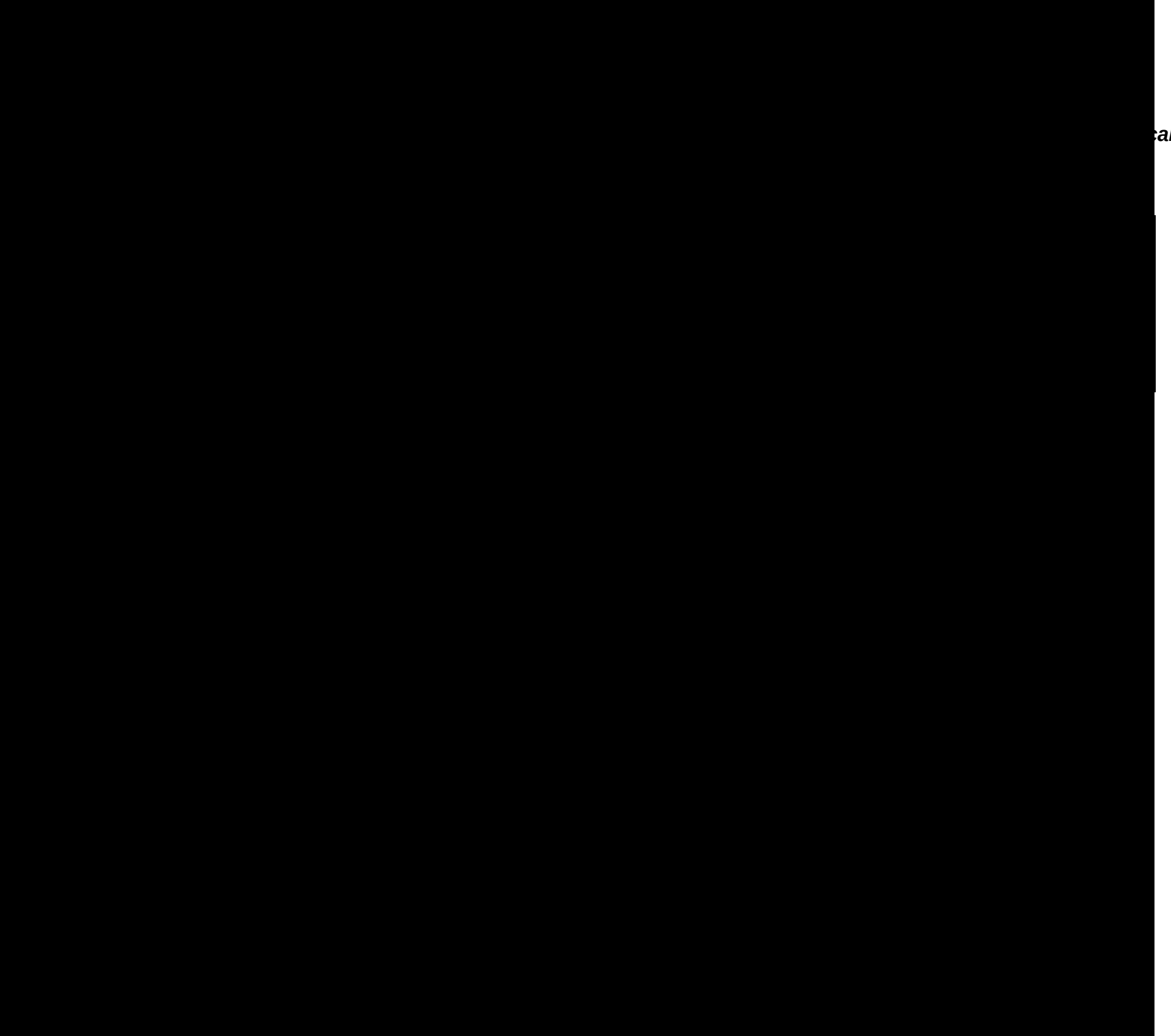
- Toxic mega colon
- Hemolytic uremic syndrome
- Reactive arthritis

Chronic

- Malnutrition

2.9 Diagnosis of Diarrhoeal Diseases

The clinical work up of diarrhoeal diseases is mainly based on four assessment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2. DYSENTERIES

	Shigellosis	Amebiasis	Severe amebiasis	Schistosomiasis	Malaria	Relapsing Fever
a. Epidemio-logy	Often other cases in family or village usually 48 hours or more	_____	_____	Patient comes from endemic area	Patient comes from endemic area	Occurs during "Season"
b. Onset	Abrupt	Gradual	Abrupt	Gradual	Abrupt	Abrupt
c. Systemic signs	Fever 40-41° chill often present. Severe dehydration may be present patient looks "toxic".	No or mild fever. No dehydration. Patient looks well	Fever 40-41° Severe dehydration. Patient looks "toxic"	Fever may or may not be present. May have cough, urticaria and myalgia. Portal hypertension may be present	Classic paroxysms usually present. However, fever may be absent	Cough, nose bleeding petacchiae Jaundice may be present
d. Abdominal signs	Crampy abdominal pain, generalized tenderness, most severe over lower quadrants,	Liver enlarged and tender in 25%. Mild abdominal . Pain. Some tenderness over ascending colon	As in amebiasis except abdominal pain is severe and distention present. Peritonitis is frequent	Crampy abdominal pain. Liver usually enlarged and often tender. Spleen may be very large.	May resemble shigellosis. Spleen often enlarged.	Crampy abdominal pain. Enlarge tender spleen
e. Vomiting	Usually present	Absent	Frequent	Rare	Occasionally	Rare
f. Diarrhea	Usually more than 20 stool a day. Stool lose and watery for the first few days may be Mucous and blood present. Many WBC in stool	3-10 stools a day. Stools have mucous and blood but maintain feculent nature. No WBC.	More than 20 stools day. Stools mall blood, mucous.	Usually less than 20 stools/day. Blood and mucous present	May closely resemble shigellosis. The stools may also be free of blood and resemble those of cholera	Usually less than 20 stool per day
g. Tenesmus	Common	Rare	Common	Occasionally	Rare	Rare
h. Laboratory	WBC 10,000 -15,000	WBC 12,000 - 25,000 Trophozoites of E.histolytical with ingested RBC seen in stool	WBC 12,000 - 25,000 Trophozoites of E.histolytical with ingested RBC seen in stool	WBC 15,000 or more with marked eosinophilia during toxic allergic phase. Otherwise WBC normal. Ova of S.mansoni seen in stool.	Positive blood smear for malaria	Positive blood smear for R.F
i. Course	Self limited ends after 7-10 days	Often history of several previous episodes of dysentery. Liver and brain abscess may develop later	Often ends in death. Liver and brain abscess may develop later	Exacerbations and remissions every 2-3 weeks. Portal hypertension, cirrhosis (?) and chronic fistulas may form	Self limited course. May end in death.	Self limited course

3.9 Case Management

GIVE EXTRA FLUID FOR DIARRHOEA AND CONTINUE FEEDING

Plan A: Treat Diarrhoea at Home

Counsel the mother on the 3 Rules of Home Treatment

- **Give Extra Fluid**
- **Continue Feeding**
- **When to Return**

1. Give extra Fluid (as much as the child will take)

- *Tell the mother:*
  - Breastfeed frequently and for longer at each feed
  - If the child is exclusively breastfed, give ORS/cereal based ORT or clean water in addition to breast milk.
  - If the child is not exclusively breastfed, give one or more of the following : ORS/, food-based fluids (such as soup, gruel(Atmit), rice water and yogurt drinks), or clean water.

It is especially important to give ORS/ Cereal Based ORT at home when;

The child has been treated with plan B or plan C during this visit

The child cannot return to a clinic if the diarrhoea gets worse.

♦ Teach the mother how to mix and give ORS. Give the mother 2 packets of ORS to use at home.

♦ Show the mother how much fluid to give in addition to the usual fluid intake:

Up to 2 years	50 to 100 ml after each loose stool
2 years or more	100 to 200 ml after each loose stool

♦ Tell the mother to:

Give frequent small sips of fluid from a cup.

If the child vomits, wait 10 minutes. Then continue, but more slowly

Continue giving extra fluid until the diarrhoea stops.

2. **Continue feeding (**With home made cereal based foods like "Atmit", "Genfo" , Juice especially made of pineapple.)

3. **When to return**

- When child develops fever
- If the child is getting weaker
- If the diarrhea does not decrease within three days

Plan B Treat Some Dehydration with ORS

Give in clinic recommended amount of ORS over 4 hours period

Determine amount of ORS to give during first 4 hours

Age	Up to 4 months	4 month up to 12 months	12 months up to 2 years	2 years up to 5 years
Weight	<6 kg	6 -10 kg	10 - 12 kg	12 - 19 kg
In ml	200-400	400 – 700	700 – 900	900 – 1400

**Use the child's age only when you do not know the weight. The approximate mount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) times 75.*

If the child wants more ORS than shown, give more.

For infants under 6 month who are not breastfed, also give 100-200 ml clean water during this period.

Show the mother how to give ORS solution

Give frequent small sips from a cup.

If the child vomits, wait 10 minutes. Then continue, but more slowly

Continue breastfeeding whenever the child wants

After 4 Hours

Reassess the child and classify the child for dehydration

Select the appropriate plan to continue treatment

Begin feeding the child in clinic

If the mother must leave before completing treatment

Show her how to prepare ORS and food based ORT such as 'Atmit" at home

Show her how much ORS to give to finish 4-hours treatment at home

Give her enough ORS packets to complete dehydration. Also give her 2 packets as recommended in Plan A

Explain the 3 rules of Home Treatment

1. **Give extra fluid**
2. **Continue feeding**
3. **When to return**

Plan C Treat Severe Dehydration Quickly

- Dehydration therapy using IV fluids or NG tube is recommended only for children who have severe dehydration.
- When giving IV therapy give large quantity of fluid quickly to replace the bodies large fluid loss.
- If the child can drink give ORS or Food based ORT by mouth until the drip is running.
- Then give
  - 30 ml / kg within 60 minutes for infant
  - 30 ml / kg within 30 minutes for children
  - 70 ml / kg more slowly to complete rehydration
- Reassess the child every 1-2 hours. If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml /kg /hour) or food base ORT as soon as the child can drink.
- Reassess an infant after 6 hours and a

3.10 Prevention

Refer to section 2.11 in the unit 2 of the core module

3.11 Post Test

See the pretest in the core module pertaining to health officers

4.0 Role and Task Analysis

Refer to unit 4 of the core module for the tasks expected of you.

5.0 Glossary and Abbreviations

Refer to unit 5 of the core module

6.0 References

Refer to unit 6 of the core module

7.0 Annexes

Refer to unit 7 of the core module for answer keys and other materials

UNIT 3.2

SATELLITE MODULE FOR

UNIT:1 INTRODUCTION

2.3. Learning objectives

The purpose of this satellite module is to equip the students (trainees) with the appropriate knowledge, and skills required to effectively identify and maniTm[skill3 Tw 12 0 e3niTm]-2scn125.04 555

2.4 Learning Activities : Case Study

Read Kedija's story very thoroughly so that you will be able to discuss questions that are posed in section 2.12 of this module

2.5 Definition

Refer to the core module unit 2, section 2.5

2.6 Epidemiology

See the core module unit 2, section 2.6

2.7 Etiology and Pathogenesis

See the core module unit 2, section 2.7

2.8 Clinical Features (Symptoms and Signs)

See the core module, unit 2, and section 2.8.

2.9 Diagnosis

See the core module unit 2, section 2.9

2.10 Case management

The best way to learn about dehydration and how patients respond is to check a dehydrated patient repeatedly during the entire four hours or longer course of therapy. The public health nurse (PHN) needs to know the signs and symptoms of dehydration very well. Try to see as many dehydrated patients as possible to learn how the signs can appear in different patients. Observe the different possible methods for administering rehydration solutions in use and administer the solution at the appropriate rate.

Classify Diarrhea

There are three possible classification of dehydration in a child with diarrhea

- No dehydration
- Some dehydration
- Severe dehydration

Nursing Management of Diarrhea

To replace water and salts lost in diarrhea select one of the following three treatment plans

1. Plan A-to treat diarrhea at home
2. Plan B-to treat some dehydration at the health facility with ORS
3. Plan C-to treat severe dehydration quickly with IV or NG rehydration

The Role Of PHN In Management Of Diarrhea At Home (Treatment Plan A)

Advise the mother to:

* Give extra fluid

- Breast-feed more frequently and longer time
- Offer ORS or clean water

• If not exclusively breast-fed advice to give one of the following

- ORS solution
- Food based fluids (Gruel made out of available cereals)
- Clean water

• Teach the mother how to mix and give ORS

* Steps for making ORS solution:

- Wash your hands with soap and water
- Pour all the powder from one packet in clean container
- Measure 1 litter of clean water
- Pour the water into the container

• Explain to the mother that she should mix fresh ORS or food based ORT

- Give frequent small sips from a cup or spoon
- Wait 10 minutes before giving more fluid if the child vomits
- Resume giving the fluid, but more slowly
- Continue giving extra fluid until the diarrhea stops.
- Give only ORS solution or Food based ORT and plain water in addition to breasts milk. if the child is under 6 months old and taking only breast milk

Instruct the mother when to return

- *passes many watery stools
- Vomit is repeatedly
- Is very thirsty
- Eats or drinks poorly
- Has fever
- Has blood in stool

The responsibility of PHN in managing some dehydration at ORT Corner with ORS: (Treatment plan B)

An ORT corner is an area in a health facility available for oral rehydration therapy (ORT). This area is needed, because mothers and their children who need ORS solution will have to stay at the clinic for several hours. When there are dehydrated patients, this conveniently located and adequately equipped ORT corner will help the staff to manage the patients easily.

Where to Locate ORT Corner:

- Locate in an area where staff frequently pass by but not in a passage way
- Near a water source
- Near a toilet and a washing facility
- In a pleasant and well ventilated area

After four hours of rehydration:

- Reassess and classify the child for dehydration
- Select the appropriate plan to continue treatment
- Begin feeding the child in clinic

- If the mother must live before completing rehydration
  - Show her how to prepare ORS solution at home
  - Show her how much solution to give to finish the 4 hours treatment at home
  - Give her enough ORS packets to complete rehydration
- Explain to the mother the three rules of home treatment

1. Give extra fluid
2. Continue feeding with home made cereal based fluids such as gruel(Atmit)
3. When to return

The responsibility PHN in treating severe dehydration: (Treatment Plan C)

- Dehydration therapy using IV fluids or NG tube is recommended only for children who have severe dehydration.
- When giving IV therapy give large quantity of fluid quickly to replace the bodies large fluid loss.
- If the child can drink give ORS by mouth until the drip is running.
- Then give
  - 30 ml / kg within 60 minutes for infant
  - 30 ml / kg within 30 minutes for children
  - 70 ml / kg more slowly to complete rehydration
- Reassess the child every 1-2 hours. If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml /kg /hour) as soon as the child can drink.
- Reassess an infant after 6 hours and a child after 3 hours. Then choose the appropriate plan

(A, B or C) to continue treatment.

Steps in Naso-gastric (NG) Tube Rehydration:

1. Use a clean rubber or plastic NG tube
2. Place the patient on his or her back with the head slightly tilted.
3. Measure the length of tube to be inserted by placing the tip just above the nose.
4. Moisten the tube with water-soluble lubricant or plain water, do not use oil.
5. Pass the tube through the nostril and gently advance it until the tip is in the back of the throat.
6. If the patient chocks, coughs repeatedly or has trouble breathing the tube has probably passed into the trachea. Pull it back 2-4cm until the coughing stops and the patient is comfortable. Wait a minute and then try to insert the tube again.
7. Advance the tube each time when the patient swallows until the mark reaches the nose.
8. Look into the patient's mouth to be certain that the tube is not coiled in the back of the throat. Confirm that the tube is in the stomach by attaching a syringe and withdrawing a little stomach fluid.
9. Fasten the tube to the

- When breast-feeding is not possible, milk formulas must be given. It is better to give formulas with a cup and spoon than bottle.
-

See unit 4 of the core module for the tasks expected to you

2.14 Glossary and Abbreviation.

Refer to unit 5 of the core module

2.15 Bibliography.

Refer unit 6 of the core module

2.16 Annex.

Refer to unit 7 of the core module for answer keys and other materials

UNIT 3.3

SATELLITE MODULE FOR

MEDICAL LABORATORY TECHNICIANS

UNIT 1: INTRODUCTION

1.1 Purpose of The Module

This module helps laboratory technicians to participate in the team management of diarrheal disease, with a particular emphasis on the laboratory investigations. The module is designed to be used by the medical laboratory technicians as a member of the health center team for both the pre-service and in-service training levels.

1.2 Direction for Using the Satellite Module

1. Do the pretest in section 2.1.2.3. in unit 2 of the core module
2. Read the core module thoroughly
3. Use listed references and suggested reading materials to supplement your understanding of the problem
4. Read Kedija's story in the core module and discuss the questions related to your profession
5. Do the post test in section 2.1.3 in unit 2 of the core module and evaluate yourself by referring to the key in unit 7, section 7.2.3.

UNIT 2: THE SATELLITE MODULE

2.1 Pre and Posttest

Refer to the core module unit 2, section 2.1.2.3

2.2 Significance and Brief Description of the problem

Refer to the core module unit 2, section 2.2.

2.3 Learning Objectives

At the completion of this module and with appropriate experience in the laboratooch61.5 52ratooch61.5 52ratooch61.5 52ratooch61.5 52ratooch61.5 52ratooch61.5 52r

2.4 Learning Activities(Case Study)

Refer to kedija's story in the core module and discuss on the following questions in the class. The instructor can assist you.

1. **Collect a Sufficient Quantity of Stool Specimens**.

The specimen should contain at least 4ml($4cm^3$) to prevent rapid drying of stools.

2. **Provision of a Container For Collection Of Stool Specimens**.

Specimen containers should be leak-proof, clean, dry and free from traces of disinfectant. One of the following types of containers for the collection of specimen may be given to the patient, the caregiver or to the mother:- A Waxed cardboard box, an empty tin with a lid, a light plastic box, a glass jar specially designed for stool collection, with a spoon attached to the stopper

3. **Labeling of Specimen Containers**

Ensure that the container is labeled correctly with :the date, the patient's name, the patients number (code), the time of collection and the type of specimen.

4. **Protect and Transport Specimen Adequately**.

Protect specimen from contamination with urine, dust, water, etc. and transport it to the laboratory in a suitable container.

5. **Examine Stool Specimen While it is Fresh**

A dysenteric fecal specimen should be examined immediately as it may contain motile forms of *E.histolytica* and *G.lamblia*. If large numbers of specimens are received at a time, pick out liquid stools and those containing mucus and/or blood should be examined first.

Things Not to Do While Handling a Stool Specimen!

1. Never leave stool specimens exposed to the air in containers with out Lids.
2. Never set aside stool specimen for examination at the end of the

morning (i.e. 2 or 3 hours later).

3. Never accept stools mixed with urine (e.g. in a pot or bedpan)
4. Never place the container with the stool specimen on the examination request form.

6. Referral of Stool Specimen For Examination.

When there are epidemic outbreaks of diarrhoeal disease and persistent diarrhea caused by etiologic agents, if there are no facilities in health center laboratories for the investigation, the specimen should be sent to the referral laboratories in a suitable medium or preservative for microscopic examination and culture. For each type of examination it is important to know which containers and preservatives to use, how much of the stool specimen to send, and how long the stool specimen will be kept.

Stool specimen for all cultures including vibrio cholera can be collected in Cary-Blair transport medium. It preserves for four weeks and a stool specimen for all cultures except vibrio cholera, can be preserved in buffered glycerol-saline in a bijout bottles for two weeks.

Stool specimen for parasite eggs, larvae and cysts can be handled in 30ml bottle containing 15ml of 10% formaldehyde solution. About 5ml of stool can be preserved and it keeps the stool almost indefinitely. The vegetative form of amoebae and Giardia can be preserved in 10ml tub e thiomersal, iodine and formldehyde solutions or polyvinly alcohol. The specimen can be kept indefinitly.

2.8.2. Laboratory Diagnosis Of Diarrhoeal Diseases

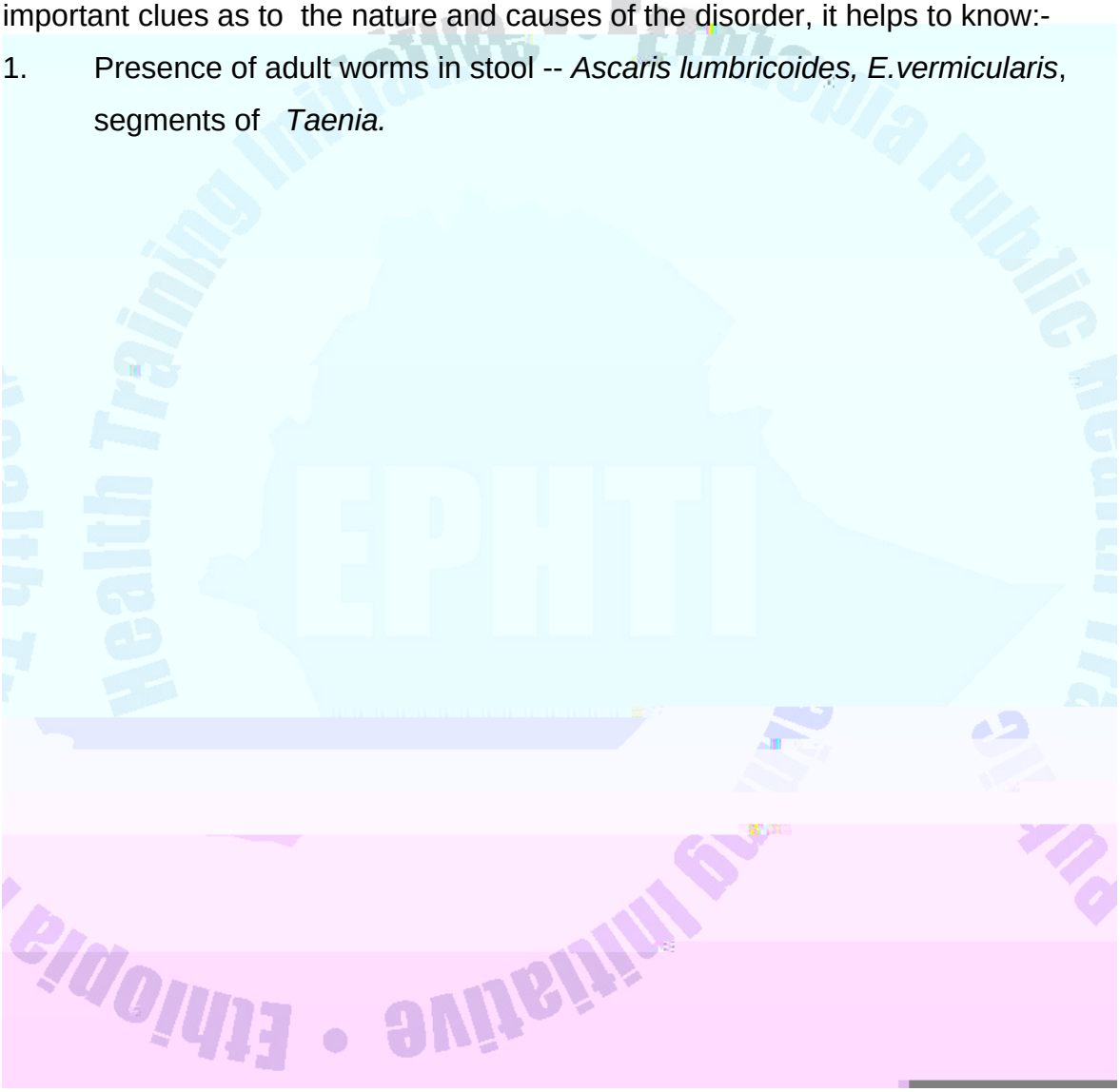
Usually the most important specimen for the diagnosis of acute diarrhoeal diseases is stool. In the case of persistent (chronic) and epidemic diarrheal diseases a well equipped laboratory is required for culture, sensitivities, serum electrolytes (Na, K, CO_2) and other testing, which are not typically available at the health center level. Macroscopic and microscopic examination of stool is sufficient for the health center based management of

diarrhoeal disease. Macroscopic and microscopic investigations are carried out in the diagnosis of diarrhoeal diseases.

1. Macroscopic Examination of Stool

Direct visual and chemical (pH) examinations of diarrhoeal stools may provide important clues as to the nature and causes of the disorder, it helps to know:-

1. Presence of adult worms in stool -- *Ascaris lumbricoides, E.vermicularis*, segments of *Taenia.*



Appearance of fecal specimens in some diarrhea disorders.

Possible cause	Appearance of stool
Rotaviruses Norwalk viruses Adenoviruses	

2. Microscopic Examination of Stool.

Routine microscopic examination of stool specimen with physiological saline and Dobell's iodine solution helps to detect and identify the stages of some parasitic organisms that may cause diarrheal diseases. Methylene blue smear preparation of fecal specimen helps to detect fecal mononuclear or polymorponuclear leukocytes (pus cells) that are mainly found in invasive diarrhea diseases caused by Shegella, Salmonella, Campylobacters. A Few leukocytes may be seen in amoebic dysentery and invasive strain of *Escherichia coli* (EIEC). Basic fuchsin smear preparation of stool specimens containing mucus, pus cells, or blood helps to detect Campylobacters.

2.8.3. Laboratory Procedures for Routine Microscopic Examination of Diarrhoeal Stool Specimens

2.8.3.1 Direct Microscopic Examination of Stool Specimen with Physiological Saline and Dobell's Iodine Solutions

Direct Microscopic Examination of stool specimens with Physiological saline and Dobell's Iodine solutions is used especially for the detection and identification of stages of intestinal parasites such as trophozoite and cyst of E.histolytica and G.lamblia, oocysts of I.belli, eggs of A,lumbricoides, T.trichiura, S.mansoni, and hookworms, and larvae of S.stercoralis. Also other intestinal parasites.

Materials Needed: Wooden applicator sticks, Microscopic slides, Cover slips, Dropping bottles containing physiological saline(0.85%w/v) and Dodell's , Iodine solutions, Microscope and Pasture pipette

Procedure:

1. Place a drop of physiological saline (0.85%w/v) in the center of the left half of the slide and place a drop of Dodell's Iodine solution in the center of the right half of the slide.
2. With an applicator stick, pick up a small portion of the feces (approximately) 2mg which is about the size of a match head) and add it the drop of saline.

Add a similar portion of stool sample to the drop of iodine.

3. Mix the feces with the drops to form suspensions.

4. Cover each drop with a cover slip by holding the cover slip at an angle of 30^0, touching the edge of the drop, and gently lowering the cover slip onto the slide so that air bubbles are not produced.

5. Examine the saline preparations using the 10X objective for motile forms of parasites especially for trophozoite stages of E.histolytica and G.lamblia. The trophozoite stage of E.histolytica ingests host's red blood cells.

6. Examine the iodine solution preparation using 40X objective to identify the cyst stages of protozoa. The iodine will stain the nuclei and the Glycogen mass of the cyst.

2.8.3.2 Methylene Blue Fecal Smear Preparation

Methylene Blue Fecal Smear Preparation helps to detect fecal leukocytes (pus cells). Normally leukocytes (white blood cells) are not found in stool. Microscopic examination of the feces for leukocytes usually helps in differentiating between bacterial dysentery that cause inflammation of the large intestine such as Shigellae, Salmonellae, and Campylobacters from amoebic dysentery, and diarrhea caused by invasive strain of Escherichia coli (EIEC), toxigenic Escherichia coli (ETEC), rotavirus and cholera in which there are a few or no leukocytes in the feces.

Materials Needed: Methylene blue staining solution, Slide, Cover glass, Microscope, Applicator stick and Pasture pipette.

Procedure:

1. Place a drop of methylene blue stain at the center of a slide.
2. Mix a small amount of stool specimen with the stain.
3. Cover it with a cover glass.
4. Examine the entire preparation using the 40X objective for fecal mononuclear

(not lobed) and polymorphnucear (a nucleus with two or more lobes) leukocytes.

2.8.3.3 Basic Fuchsin Fecal Smear Preparation

Basic fuchsin fecal smear preparation helps to detect Campylobacters in diarrhoeal stool specimens.

Materials Needed

1. 10g/l basic fuchsin
2. Slide
3. Microscope
4. Applicator stick

Procedure:

1. Make a tin smear of the specimen on a slide
2. When dry , gently heat fix
3. Stain by covering the smear with 10g/l basic fuchsin for 10-20 seconds
4. Wash well with water
5. Examine the smear for Campylobacters using the 100X oil immersion objective.

2.8.3.4 Modified Ziehl-Neelsen Staining of Fecal Smear

Modified Ziehl-Neelsen Staining of fecal smear helps to detect oocysts of

Procedure:

1. Prepare a thin fecal smear on a slide
2. Air dry the smear
3. AirTc -2seeu51tSixir dry the with methanol for 2-3 minutes smear
3.

Campylobacters:- Are small, delicate, spiral curved, S-shaped, short spirochaetal forms.

Leukocytes in Stool:

Size : 10-20Nm
Shape: rounded or slightly elongated, with an irregular outline
Content: refractive, clear and granular cytoplasm

Entamoeba Histolytica

Trophozoite

25Nm by 20Nm
Irregular in shape
Finger like pseudopodia
Active directional amoeboid movement
Single nucleus with central karyosome and chromatin granules on the nuclear membrane contains ingested host's red blood cells

Cyst

10Nm by 6Nm
Oval
2-4 nuclei
Contains remains of axonemes and parabasal bodies
Thread like remains of flagella

Giardia Lamblia: -

Trophozoite

10-12Nm by 6Nm
Pear-shaped
Sucking disc
Eight flagella
Two nuclei
Parabasal bodies
Axonemes
Active falling leaf type of motility

Cyst

10Nm by 6Nm
Oval
2-4 nuclei
contains remains of axonemes & parabasal

Isospora Belli: -

Oocyst

20-33Nm by 10-19Nm

Oval

Usually immature

Mature Oocyst contain two

sporocyst each with four sporozoites

Schistosoma mansoni: -

Egg
150Nm by 60Nm
Oval
Pale, yellow-brown
Lateral spine
Contain fully
developed miracidium

Ascaris lumbricoides: -

Eggs

Fertilized:

60Nm by 40Nm

Oval or rounded

Yellow-brown

Has albumin coat

Unsegmented fertilized ovum

Decorticated:

No albuminous coat
Smooth shell
Colorless or pale-yellow

Unfertilized:

Darker
Elongated

Trichuris Trichiura: -

Egg **Barrel shape**

50Nm by 25Nm

Yellow-brown

Colorless protruding mucoid plug at each polar end

Unsegmented ovum

Hookworms: -

Egg Colorless

Thin eggshell

Oval

65Nm by 40Nm

12. Glossary and Abbreviations

Refer to unit 5 of the core module

13. References

Refer to unit 6 of the core module

14. Annexes

Refer to unit 7 of the core module for answer keys and other materials

UNIT 3.4

SATELLITE MODULE FOR SANITARIANS

UNIT 1: INTRODUCTION

Diarrhoea is one of the killer diseases especially for underfive children in Ethiopia. According to the ministry of health, annual report 250,000 children of under five years of age die from disarrhoea.

The disease could be prevented and eliminated with successful sanitation program. Since diarrhoea is transmitted thr

2.4 Learning Activity (Case Study)

"The story of Kedija": Please refer to the story in section 4.1 in the core module and the exercise to section 2.9 in this unit.

2.5 Definition

Please refer to section 2.5 in the core module

2.6 Epidemiology:

Please refer to section 2.6 in the core module

2.7 Etiology and Pathogenesis;

Please refer to section 2.7 in the core module.

2.8 Primary Prevention and Control

Routes of Disease Transmission

The main routes of diarrhoeal disease transmission is fecal oral through contamination of food or drink by improperly disposed waste which contaminates:-

- Flies
- Surface runoff
- Contamination of soil

Even if there is a proper waste disposal facility, poor hygienic practice could contaminate:

- The hand
- Eating and drinking utensils

The food we eat , the water we drink, and the utensil we use to eat and drink could be contaminated from diarrhoea causing organisms. (see Figure1. In the core module)

The sanitation measures that has to be taken so that diarrhoeal disease transmission will not occur are to create barriers. The barriers should aim at:

Isolating the Feces so That:

- Flies will not breed
- Soil will not be contaminated with diarrhoea causing germs
- Water will not be contaminated with runoff.

Protecting the Water Sources

- At the source
- At home during storage and taking out from storage.

Personal Hygiene Practice

- Hand washing after visiting toilet
- Hand washing after cleaning work
- Hand washing before staring to cook or eat.

barrier) for diarrhoea. Isolation of feces can be effected by many types of latrine technologies such as the pit latrines. However, the most important thing to consider is

- Drawing water from storage using ladle or pour than dipping

3. Personal Hygiene

Personal hygiene especially hand washing is the most important factor in diarrhoeal disease transmission. Mothers or caregivers could contaminate food and drinks unless they practice proper hand washing.

What is proper hand washing? It is washing hand using soap, ash or any other cleansing materials:

- After using latrines
- After cleaning child bottom or clean child feces
- After cleaning houses.
-

5. Domestic and Environmental Sanitation

Many disease causing organisms arise from the human environment. The immediate human environment his house

1. **Behavioral Analysis Means Understanding what the Current Behaviour of People in the Communities are with Regard to:**

- Hand washing
- Food sanitation
- Having latrine or latrine use
- W0fSee1 gien

- Group communication
- Mass communication
- Interpersonal

Channels of Communication

Channels are tools and means by which message is communicated to the intended audience. The hygiene educator should prepare not only the messages but also the channels so that messages will be effectively delivered and understood by the target audiences. Channels are different for each method of communication. For example for mass communication we may have to use radio, TV or newspaper, but for person to person communication we should use posters, or flip charts. Some of the channels used for hygiene education are:

- Posters
- tape recorders
- flip charts
- TV
- Radio
- Newspaper
- Drama
- Songs
- Falk tales etc

Selecting Targets for Hygiene Education

Selecting targets for hygiene education is the other important thing that has to be considered when organizing hygiene education. Targets are selected by asking the following questions?

- To whom is this message appropriate
- When and where should it be given

- From fomite and finger

2.9.4 What should have been performed by the family immediately after Kedija was sick

2.9.5 What should the community affected do in the future in order to save their children from dying from causes of diarrhoea?

- Improve living conditions
- Change their hygiene practices
- Construct appropriate latrines
- Protect water sources
- Proper food hygiene

2.9.6 What should the health professionals do to alleviate such common problems ?

- Give hygiene education to all community members
- Encourage community members to construct latrines.

2.9.7 What should the government do to alleviate such common problems?

- Resources Allocation
- Addresses the problem
- Health policy

2.9.8 What factors contributed to kadja,s death ?

2.10 Role and task Analysis

Refer to the core module unit 4

2.11 Glossary & Abbreviation

Refer to the core module Unit 5

2.12 References

Refer to the core module unit 6

2.13 Annexes

Refer to the core module unit 7

UNIT 3.4

SATELLITE MODULE FOR

PRIMARY HEALTH WORKERS(PHWs)/

COMMUNITY HEALTH WORKERS(C P

2 Td(Y)Tj0.753 0.7

UNIT 1 : INTRODUCTION

1.1 Purpose & Use of the Module

Materialization of the Community based management of diarrheal diseases is made possible through training of PHWs/CHWs that are well equipped with the basic knowledge attitude and skill of diagnosing, treating, timely referring, controlling and preventing diarrheal diseases. Therefore, this satellite module will be utilized in the training of CHW to fulfil the aforementioned purposes.

1.2 Direction for the Use of the Module

1. Administer the pretest in section 2.2.5. in unit 2 of the cord module.
2. The satellite module can be used in the training or refreshment of PHWs/ CHWs by the health center team, NGOS and other like organizations.
3. Read the core module thoroughly before using this satellite module for the training of PHWs/CHWS
4. Read the story of Kedija and try to pose practical questions to the PHW/CHWS
5. Use more participatory and simple methods of training for this group.
6. Re-administer the post-test at the end of the training
7. Interpret this satellite module into the local language for better understanding if need arises

UNIT 2 : THE SATELLITE MODULE

2.1 Pre and Post Test

See the pre and post test for PHW/CHW in the core module section 2.1.2.5

2.2 Significance and Brief Descriptions of the Problem

The user of this module for training PHWs/CHW is highly advised to refer to the core module sections 2.2.

2.3 Learning Objectives

2.4 Learning Activities (Case Study)

Read kedija's story for the class(make them read) thoroughly so that they will be able discuss questions in unit 2, section 2.12 of this module.

2.5 Definition

Diarrhea is defined as passage of 3 or more loose (mucoid, bloody or water) stools in 24

2.9 Diagnosis

In diagnosing the types of diarrhea & the hydration status of the child, use the following modalities:

History

- Dietary history
- Frequency of diarrhea
- Volume of diarrhea
- Consistency of diarrhea
- History of passing urine in the last 24 hours
- History of Vomiting
- History of fever

Physical Examination

- Vital signs –Pulse rate, Respiratory rate, Weight
- Buccal Mucosa – wetness of tongue
- Presence of tears upon crying
- Irritability
- Skin turgor

2.10 Case Management

- Discuss and demonstrate food based ORT
- Advise the mother/care to giver more fluid without interruption
- Breast feeding with other supplementary foods should continue
- Give ORS/ Food based ORT solution to a child with diarrhea

- Loss of interest to drink and
- Bloody diarrhea refer to the next health institution urgently.

2.11 Prevention & Control

Give hygiene education on the prevention and risk factors of diarrhea

- Personal hygiene (hand washing)
- Environmental hygiene (housing & compound)
- Food hygiene (preparation& storage)
- Water hygiene (at source & at home)
- Waste disposal
  - Solid waste (proper disposal of refuse)
  - Human excreta (latrine construction and latrine cleanness
- Importance of ORS/Food based ORT in saving lives of Children with diarrhea
- Importance of immunization on prevention of diarrhea
- Importance of proper nutrition in prevention of diarrhea
- Report to next level health facility (health center team) in the case of unusual occurrence cases of diarrhea in excess of the normal expectancy (epidemic). In so doing the CHW/PHWs are part of the diarrhea prevention and control team and participant in the whole process.

2.12 Learning Activities (Case Study) Continued

Read kedija's story for the class(make them read) if need arises, translate it into the major local languages and discuss the following question in the class.

1. How does Kedija's Parent's taking her to the traditional healer contribute to her death from diarrhea?
2. If Kedija's parents come to see you first what would you do to address her problem?
3. What other factors contribute to development of diarrhea
4. What do you think are the preventive measures?

2.13 Role and Task Analysis

Refer to the core module unit 4

2.14 Glossary & Abbreviation

Refer to the core module Unit 5

2.15 References

Refer to the core module unit 6

2.16 Annexes

Refer to the core module unit 7

UNIT 3.6

TAKE HOME MESSAGE FOR THE MOTHERS/CAREGIVERS

TAKE HOME MESSAGE FOR MOTHERS/ CAREGIVERS

The care giver should bear in mind the following messages:-

a. The three rules for home treatment of diarrhea , these are:
   - Give more fluid continuously to a child with diarrhea including food based ORT according to the recipe
   - Continue breast feeding and giving other supplementary foods specially more fluid diet to a child with diarrhea
   - Take the child immediately to the nearest health institution if he/she has fever, vomiting, convulsion, refusal to drink or drowsiness with diarrhea

b. Get your child immunized for measles

c. Dispose the human waste (including children's excreta) and other wastes properly

d. Avoid bottles for feeding of children and infants. Instead use cup & spoon.

e. Keep the hygiene of your house and compound

f. Keep the hygiene of drinking water both at the collection site, and storage levels until it is served.

g. Keep the hygiene of food during preparation, storage and during serving.

h. Exclusively breast feed children up to 4-6 months based on their demands

UNIT FOUR

ROLE AND TASK ANALYSIS


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Table 4.2. Knowledge Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT	Activities
Knowledge	Describe the assessment of DD and its investigation	Enumerate the clinical manifestation and complications of diarrhea disease	Describe the complication and their manifestation	----	Describe the different methods of laboratory investigation for diarrhoeal diseases	. Perform soap (subjection objective .Assessment plan)

Table 4.3 Knowledge Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT	Activities
Knowledge	Describe the pathogenesis of diarrheal diseases	-Elaborate the mechanism or development of different types of diarrheal diseases.	---	---	---	Indicate the different steps existing in the development of different types of diarrheal diseases
	Elaborate methods of preparing ORT (oral rehydration treatment) for use at home.	Elaborate methods of preparing ORT (Oral rehydration) treatment for use at home	Elaborate methods of preparing ORT (oral rehydration ttherapy) for use at home.	-----	------	Describe the different ORT preparation at home (oral rehydration solution ,and cereal based home fluid).
	List the major information methods , and targets for health education in diarrhoeal diseases.	• Describe methods of giving health education on DD and identify targets groups areas of focus.	Describe methods of giving health in formation on management and prevention of diarrheal diseases	Describe methods of giving health information on management and prevention of diarrhoeal diseases.	Describe methods of giving health information on prevention and management of DD.	• Identify current behavior • Identify target behavior • Identify target audience •List methods of teachings

Table 4.4 Attitude Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT
Attitude	Advocate the utilization of ORS & food based ORT in reducing mortality due to DD.	Instruct CHW (community health workers) mothers and care gives in reducing mortality due to dehydration	Instruct CHW (Community health workers) mothers, and care givers in reducing mortality due to dehydration	Instruct CHW (community health workers) mothers and care givers in reducing mortality due to dehydration	Instruct CHW community health workers mothers and care givers. i reducing mortality due to dehydratio
	Promote feeding of infants (children) with case of DD	Advocate continued feeding of a child regard less of DD.	Advocate continued feeding of a child regard less of DD.	Advocate continued feeding of a child regard less of DD.	Advocate continued feeding of a child regard less of DD.
	Promote utilization of health service facilities for the treatment of diarrheal diseases in children.	Advice mothers care giver, and CHW to promote utilization of health services in DD of children.	Advice mothers care givers and CHW to promote utilization of health services. DD.	Advice mothers ,care gives and CHW to promote utilization of health services for DD in children	Advice mothers care givers and CHW to promote utilization of healt services for DD it children
	Up hold the idea that diarrhea is caused by micrograms not by evil eye or gods cures	Educate mothers, care givers and CHW that diarrhea is caused by microorganisms	Educate mothers care givers and CHW that diarrhoea is caused by microorganisms	Educate care givers and CHW that diarrhoea is caused by microorganisms	Educate care giv and CHW that diarrhoea is caus by microorganism

Table 4.5. Practice Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT
Practice	Demonstrate the process of assessing child with diarrhoea and identify its complications.	Take appropriate history and perform proper physical examination.	Asses vital signs and determine existence or note state of dehydration and malnutrition.	-----	------
	Demonstrate how to do macro and microscopic examination of the stool in case of diarrheal diseases.	Carry out macro-microscopic examination of the stool and identify the organism	-----	--------	Carry out macro & microscopic examination of the stool & identify the organism.
	Demonstrate the preparation of ORS and cereal based rehydration fluid to the care givers.	- Demonstrate and explain the preparation of ORS and cereal based rehydration fluids and their proper use.	Demonstrate and explain the preparation of ORS and cereal based rehydration fluids and their proper use.	Demonstrate the importance of clean water & utensils in the preparation of ORS & cereal based rehydration fluid.	
	Identify a case of diarrheal diseases and demonstrate its appropriate management.	• Demonstrate the management principle drugs , fluids, education) identify the complication and manage accordingly	Demonstrate appropriate feeding and rehydration and drug administration and also provide proper nursing care to the clients.	------	------

Describe the principle and treatment methods of diarrheal diseases	- Describe how to prepare ORT its administration - Describe drugs used in treatment of diarrhea & their

Knowledge


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Table 4.8 Practice Objectives and Essential Tasks of Primary Health Worker/Community Health Workers

	Learning Objective (Expected out come)	CHW	Care giver	Activities
Practice	Demonstrate preparation of ORS and cereal based rehydration fluids and that proper use. Identify a case pf diarrhoea disease and demonstrate appropriate management Demonstrate proper communication to mothers or care givers pertaining to diarrhoea.	Demonstrate preparation of oral rehydration fluid and their administration to the case of diarrhoea for care takers. Identify complications of diarrhea (sighs of dehydration and malnutrition) and advice the care giver to give more fluid and feed the child properly. Display Efficient communication skill with mothers or care givers on treatment and prevention of DD.	Demonstrate properly prepare and administer ORT for a child with diarrhoeal diseases. • Identify signs of dehydration and malnutrition so as to five fluid and more continued feeding in case of DD. -------	• Show materials and ingredients to be used in preparation are utilizatior ORT. • Identify sings and symp of diarrhoea and • malnutrition • Administer ORS and fo in child with diarrhoea pr . Identify ways of educatir mothers/ care gives.

UNIT FIVE

GLOSSARY AND ABREVIATIONS

Acute Diarrhea:- 3 or more abnormally loose or watery stools per day for less than 14 days.Acute diarrhea is caused by an infection of the bowel.

Anti-parasitic Drugs:- drugs for treating infections with parasites**.**

Dehydration:- Loss of a large amount of water and salt from the body.

Dysentery:- Diarrhea with blood in the stool.

Gruel:- a drink made by boiling meal of grains or legumes in milk or water until thick.


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UNIT SIX

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UNIT SEVEN

ANNEXS ANSWER KEY

7.1 Keys for Care Module

Q. No. 1	**D**
Q. No. 2	**A to E**
Q. No. 3	**A, B, C and E**
Q. No. 4	**A, D and E**
Q. No. 5	**A, B & E**
Q. No. 6	**A to E**
Q. No. 7	**E**
Q. No. 8	**B**
Q. No. 9	**B**
Q. No. 10	**A**
Q. No. 11	**B**
Q. No. 12	**D**
Q. No. 13	**A & B**
Q. No. 14	**E**
Q. No. 15	**B**
Q. No. 16	**D**
Q. No. 17	**B**
Q. No. 18	**B**
Q. No. 19	**D**

7.1.2 Key for the Satellite Modules

7.1.2.1 Health Officers

Q. No. 1	**A, C**
Q. No. 2	**E**
Q. No. 3	**A, to E**
Q. No. 4	**B, C and D**
Q. No. 5.	**C**
Q. No. 6	**D**

Q. No. 7. **A – Invasive diarrhea**

B – Motility diarrhea

C – Osmotic diarrhea

D – Secretory diarrhea

Q. No. 8 **C**

Q. No. 9 **Yes**

Q. No. 10 **E**

7.1.2.2 Public Health Nurse

Q. No. 1 **A**

Q. No. 2 **D**

Q. No. 3 **C**

Q. No. 4 **C**

Q. No. 5 **B**

Q. No. 6 **A**

Q. No. 7 **D**

Q. No. 8 **B**

Q. No. 9 **D**

Q. No. 10 **E**

7.1.2.3 MLT

Q. No. 1. **C**

Q. No. 2. **B**

Q. No. 3. **E**

Q. No. 4. **E**

Q. No. 5. **E**

Q. No. 6. **A**

Q. No. 7. **C**

Q. No. 8. **A**

7.1.2.4 KEY for Saniterians

1. Rota virus
2. Through contaminated
   - > water
   - > food
   - Finger
   - Fomite
   - Soil

1. Poor handling of water during storage
2. At the source…….contaminated soil contaminate food
   During food preparation…….poor food handling
   During storage……..by flies, cockroaches and rats
5 Hand washing practice using soap or ash
6 Person to person and group.
7 30 meters away from well water and 20 meters away from kitchen or dwelling
   reason is not to contaminate underground water source and avoid fly nuisance and contamination of food.
8. Dipping hand in stored water

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