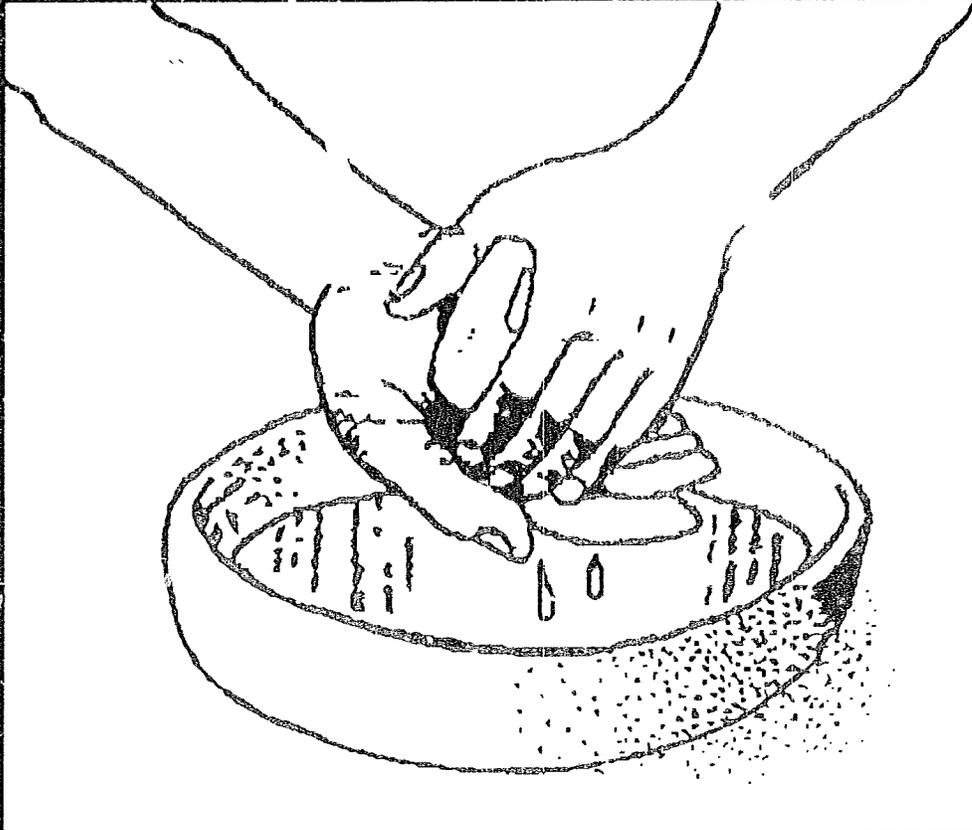


**TRAINING FOR THE CONTROL  
OF DIARRHOEAL DISEASES**

**INTERMEDIATE LEVEL**

**MODULE 2 - APPENDIX**

**CHOLERA**



Management Sciences for Health  
**PRITECH**  
Technologies for Primary Health Care

1987

**MODULE 2 - APPENDIX**

**CHOLERA**

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**MANAGEMENT SCIENCES FOR HEALTH  
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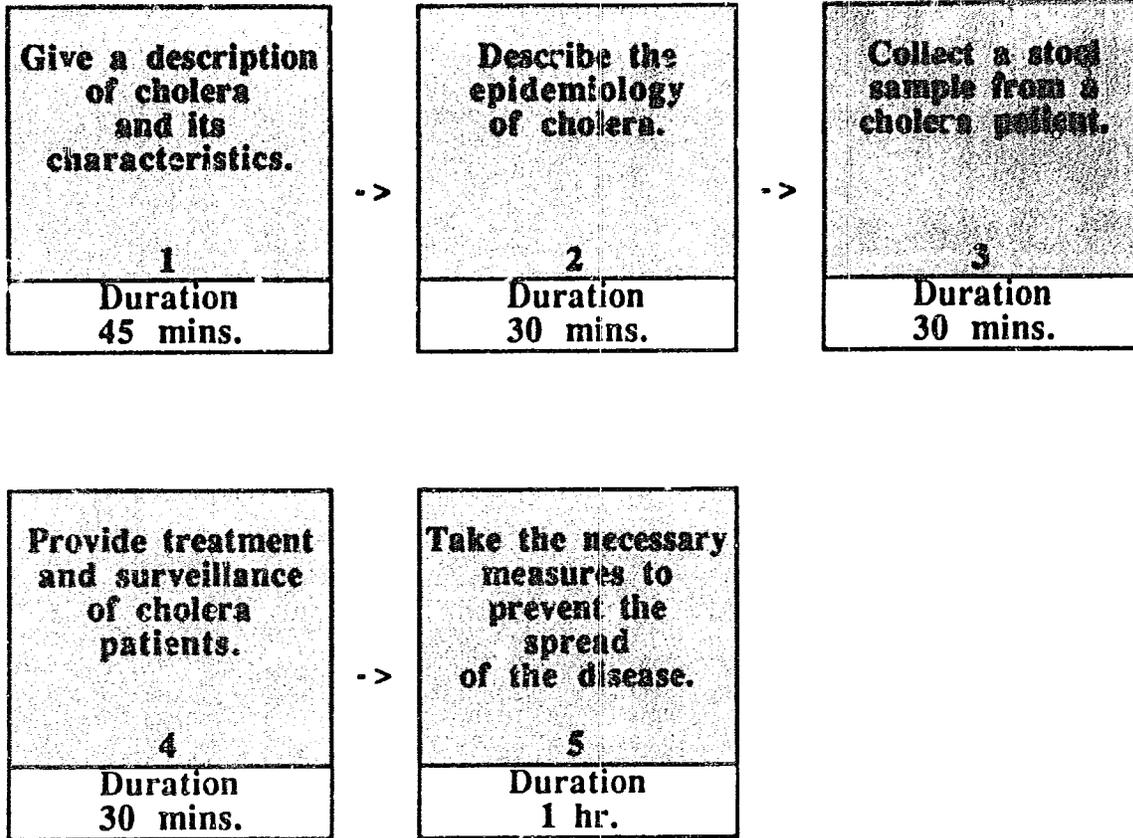
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## MODULE 2 - APPENDIX

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These basic facts about cholera complete the material seen in Module 2

The following diagram lays out the learning objectives. These objectives are based on the tasks that the student will carry out after his studies. The information provided and practical exercises are designed to facilitate learning.



# INTRODUCTION

## LE CHOLERA

The seventh cholera pandemic, which began in Indonesia in 1961, reached the African continent in 1970. Since that time more than 40 countries in the region have been affected, and in certain countries, the disease has become endemic from then on. The epidemic affected nearly all the countries in the sub region. Although beginning in 1972, a drop in the number of cases was noted, cholera has never completely disappeared from the sub-region, and certain countries, such as Ghana in 1983, have experienced flare ups of the epidemic.

Since June, 1984, the number of cases reported has increased considerably in some countries of the sub-region, particularly in Burkina Faso, Mali, Mauritania, Niger, and Senegal.

It has been shown that 90% of the cases of cholera can be treated effectively with oral rehydration, if begun quickly. For this to happen, a sufficient supply of ORS packets must be available at the right time and at the right place.

# DEFINITION AND CHARACTERISTICS OF CHOLERA

## LEARNING OBJECTIVE 1

Give a description of cholera and its characteristics.



## EXERCISE

Ask students what they already know about the subject of this objective.

Write down their ideas and discuss.

### 1. Definition

Cholera is an acute, contagious infection caused by a toxin which can present a variety of clinical forms.

The cholera vibrio is not an invasive micro organism. It remains in the intestinal lumen and secretes a toxin that stimulates the formation of 3.5 adenosine mono-phosphate (cyclic AMP) which causes the enormous secretion of liquid (up to 15 litres every 24 hours) and electrolytes.

### 2. Acute dehydration or serious form.

#### Onset

The onset of diarrhoea is explosive, without prodromal symptoms, and is sometimes associated with abdominal pain. Stools are abundant, and initially fecal in composition, but become liquid as the disease progresses. The clinical picture is completed by vomiting, cramps, and signs of dehydration.

#### Period of the Illness

This phase (stage) is reached a few hours from the onset of the disease. The patient now has explosive, odorless, non-faecal diarrhoea the colour of rice water, in which are suspended varying quantities of whitish flakes, known as riziform or rice-like grains. Diarrhoea is frequent and continuous, with its volume varying from 1/2 litre to 1 litre of liquid stools per hour. Vomiting is frequent and in most cases patients complain of abdominal pain and muscle-aches (myalgia).

Upon examination, the patient shows all the typical signs of severe dehydration: sweaty face with prominent cheek bones, recessed eye sockets, stiff hands, highly evident skin-fold. The patient is conscious but can not stand up and has a hoarse or aphonic voice. The abdomen is soft, rarely distended, blood pressure is very low and can often not be taken using a cuff, the pulse is evasive, and difficult to take, there is no diuresis (urinating) and the temperature is between 36 and 37 degrees Centigrade.

### **3. Development of the disease and complications**

Without treatment, cholera results in death in 60% of the cases. With treatment, all the effects of the disease are reversible. The symptoms disappear and once the patient has been rehydrated, diuresis reappears. (The patient begins to urinate once again). The duration of the disease depends on the quality of the treatment and on how soon it begins after the onset of the disease.

If rehydration is insufficient, the following phenomena can develop:

- 3.1 Persistence or return of dehydration, hypovolaemia and shock.
- 3.2 Persistence of nausea and vomiting, due to acidosis or non-corrected hypovolaemia with hypotension.
- 3.3 Kidney failure (renal insufficiency) due to prolonged or repeated periods of hypovolaemia of the renal tissue.
- 3.4 Interruption of pregnancy, particularly in the third trimester
- 3.5 On the other hand, if the patient is over rehydrated, this will result in metabolic disorder characterised by tetany acute pulmonary oedema and/or cerebral oedema that could lead to hypoglycaemia or hypopalaemia in the child.
- 3.6 Convulsions in the child.

### **4. Transmission**

Transmission of the disease can be direct or indirect. Vibrios can be expelled through stools or vomiting. The level of vibrios that can be found in the excreta varies according to the clinical form of the disease. (Each millilitre of contaminated feces contains between 10 million and 1 thousand million vibrios.)

Direct transmission occurs through oral-fecal contamination between people, whereas indirect transmission occurs principally through contaminated food or water. The role played by flies in the carrying of vibrios is not yet clear. Cholera is thus a disease caused by fecal contamination.

**LEARNING OBJECTIVE: 2**

**Describe the epidemiology of cholera.**



**EXERCISE:**

Ask students what they already know about the subject of this objective.

Write down their answers and discuss.

**Epidemic Cholera**

There are two types of epidemic: the outbreak or explosive epidemic and the protracted epidemic. The outbreak which is due to a common source or which is spread by a common means is characterised by the large number of cases that appear in a community in a short period of time (1 to 5 days).

With the protracted epidemic, a small number of cases are registered each day or each week for several weeks.

**Endemic Cholera**

The endemic form of cholera is the result of a balance between infection and immunity. The cases of infection increase when the collective immunity decreases (weakens, diminishes), and vice versa. Asymptomatic carriers certainly play an important role in endemic cholera.

**The transmission of cholera**

Cholera appears particularly in areas where acute diarrhoea is present, that is to say where conditions favor the spread of the pathogenic agent from one person's stool to another's mouth. The germ can be transmitted accidentally through drinking water and inadequate excreta disposal facilities or through personal or food hygiene practices that leave something to be desired. It has been observed that cholera germs multiply in many different cooked foods that are left sitting at room temperature.

**Other factors that favor the spread of cholera include:**

- manual care of a sweating cholera patient.
- cleaning corpses of people who have died from cholera.
- large gatherings of people for market days, pilgrimages or celebrations, and particularly for funerals of people who have died of cholera.
- washing the anal area with the hand following defecation.
- using dirty hands to eat from a common bowl.
- spreading human fertilizer for vegetable gardening.

## DIRECT DIAGNOSIS

### LEARNING OBJECTIVE 3.

Collect a stool sample from a cholera patient.



### EXERCISE:

Ask students what they already know about the subject of this objective.

Write down their answers and discuss.

Successful treatment of cholera does not depend in any way on the results of laboratory examinations. However, in order to confirm the presence of an outbreak, mobilise national and international resources, and determine the epidemiological features, it is essential to have competent laboratory support.

Bacteriological examination of stools from diarrhoea patients, particularly those suspected epidemiologically and/or clinically of having cholera, is the only means of detecting the entry of *V. cholerae* 001 into new areas. Environmental sampling as indicated by careful epidemiological investigation, including the use of Moore swabs for sewage sampling, may help to define the modes of spread, persistence, and disappearance of infection in a community. The laboratory must make available appropriate and cold transport media and keep clinicians in hospitals and epidemiologists informed of all results, using the most rapid means of communication. National laboratories may contact WHO to arrange for any necessary technical cooperation with specialised laboratories if required, for example, to characterise an atypical strain, determine the antibiotic-sensitivity pattern, etc.

## Transport

If plating out of the sample can be done within 12 hours, then alkaline peptone medium with potassium tellurite and taurocholate added, or alkaline peptone water (3% saline) can be used.

In cases where transport requires several days, Cary-Blair or Venkatraman-Rama-Krishnan mediums are used. They allow the reisolation of the vibrio after several weeks.

The procedure recommended by BARUA is very useful in regions where transport poses a problem. It consists of dipping absorbent paper strips into stool samples. These strips are then placed in small plastic envelopes that are sealed with cellophane tape to keep them from drying out (which can occur at 34 degrees).

This method keeps the vibrio alive for several weeks.

## Examination of stools in the laboratory

In cases where transportation time is short, the sample contained in the transport medium is incubated at 37 degrees for 3 hours and then plated out on selective and non-selective gel cultures. If transportation time is more than 6 hours, the sample is placed directly in the culture medium.

## TREATMENT

### LEARNING OBJECTIVE 4:

**Provide treatment and surveillance of cholera patients.**



### EXERCISE:

Ask students what they already know about the subject of this objective.

Write down their ideas and discuss.

The treatment of cholera is now well defined. The main objective of treatment is rehydration of the patient, which is the only means of preventing the deadly development of the disease. Treatment against the infection is sometimes necessary as well.

## Rehydration

The symptoms of cholera are the result of the loss of water and salts in the stool (and vomitus), which produces dehydration, acidosis, and hypokalaemia. Treatment consists of replacing water and electrolytes in the proportions lost. Most cholera cases can be adequately treated by the oral administration of a glucose-electrolyte solution, the contents of which approximate the water and electrolyte composition of the diarrhoeal stool. Intravenous saline solutions containing alkali and potassium salts are usually required only for the initial rehydration of severely dehydrated patients who are in shock or unable to drink. For oral rehydration, an Oral Rehydration Salts (ORS) solution is recommended. ORS is available in packets and is ideal for use at the periphery, so should preferably be reserved for that purpose. In hospitals and health centres where large volumes are consumed daily, the solution can be made in the required volume by weighing out the individual ingredients supplied in bulk containers.

Intravenous fluid is needed more often by cases of cholera than by cases of diarrhoea due to other causes. Ringer's Lactate (Hartmann's Fluid) is the fluid recommended, as it is commercially available and its composition is suitable for treatment of all acute diarrhoeas in all ages; glucose saline solutions, glucose solutions, and physiological saline solutions are not appropriate. However,

usually during an epidemic, 80-90% of cases can be treated by oral rehydration alone using ORS. Most cases requiring intravenous fluid initially can thereafter be treated with ORS until diarrhoea stops. See Module 2 for the practical application of this treatment.

## Adjuncts to Therapy

In severe cholera cases, antibiotics have been shown to reduce the volume and duration of diarrhoea, the requirements for fluid replacement, and the period of vibrio excretion.

Antibiotics should be given orally. Vomiting usually stops within a few hours of beginning rehydration, making this possible.

It is neither urgent nor of additional benefit to use injectable antibiotics, which are expensive. Tetracycline is the antibiotic of choice (in adults - 500mg every 6 hours, and in children - 50mg/kg/day, every 6 hours, for 48 or 72 hours). Chloramphenicol is almost equally effective and can be given in the same dosage as tetracycline, but it is not as free from side-effects. Doxycycline, a long-acting tetracycline, can also be used when available, in a single dose of 300mg for adults and 6mg per kg of body weight for children below 15 years of age. When strains are resistant to tetracycline and chloramphenicol, one may use furazolidone (in adults - 100mg every 6 hours, and in children - 5mg/kg/day, every 6 hours, for 72 hours), erythromycin (in adults - 250mg every 6 hours, in children - 30mg/kg/day divided into 3 doses, over a 72 hour period), or trimethoprim- sulfamethoxazole (8mg of trimethoprim and 40mg of sulfamethoxazole per kg/day divided into 2 doses, over a 72 hour period). For young children, tetracycline syrup may not be available in some countries, in which case liquid preparations of erythromycin or trimethoprim- sulfamethoxazole can be used.

Resistance of *V. cholerae* to tetracycline and other antibiotics has become a problem in a few areas and is suggested by an inadequate clinical response after administration of the antibiotic. Thus, it is important to determine the antibiotic susceptibility of newly isolated vibrios in an area and to be aware of the resistance pattern of the organism in adjacent geographic areas.

Sulfadoxine (fanasil) has been used in one dose for the treatment of cholera, but resistance to it has been found in a few countries in Africa. Also, while it is effective, potentially serious and fatal adverse reactions (e.g. Stevens-Johnson syndrome) can occur following even a single dose. This is the reason for the drug not being recommended nowadays.

No other antidiarrhoeal, antispasmodic, cardioactive, or corticosteroid drug has any place in the medication of cholera patients.

## Measures to be taken

The main activities are:

- case finding
- the treatment of cases, including suspected cases
- chemoprophylaxis of close contacts
- health education concerning appropriate hygiene and sanitation measures
- daily gathering of data and notification of health authorities
- placing a stock of treatment supplies and equipment in high risk zones
- provisional measures to restrict public gatherings.

## Case finding

Faced with several cases of sudden diarrhea in a given community, the nurse should:

- report them to the health authorities.
- collect stool samples and immediately send them to the central facilities within three hours.
- look for other cases in surrounding communities.
- contact local authorities concerning measures to be taken.

## Chemoprophylaxis of Contacts

Mass chemoprophylaxis is gradually replaced by a more selective use of anti-microbials which is limited to the patient's close contacts, particularly in families where several cases have been detected.

Given the secondary effects of sulfadoxine reported in medical literature, priority should be given to the use of doxycycline which can be given in a single dose for the treatment of close contacts.

## PREVENTING THE SPREAD OF THE DISEASE

### LEARNING OBJECTIVE 5:

Take the necessary measures to prevent the spread of the disease.



### EXERCISE:

Ask students what they already know about the subject of the objective.

Write down their ideas and discuss.

### Health education of the population

The improvement of health facilities, the provision of potable water and food safety measures supported by a programme of health education are the principle activities of both the short-term and long-term struggle against cholera. Although the present socio-economic situation in many developing countries does not permit rapid progress in this area, several simple measures can be very helpful. For example, a recent study in India concluded that correct storage of household water in earthen (clay) jars or other narrow-necked containers will sharply reduce contamination. The consumption of cooked food only while it is still hot and the washing of hands with soap after going to the W.C. and before preparing or eating food are examples of additional practical and effective measures in the fight against cholera. By using the personnel and the various resources available along with an intensive programme of health education that promotes realistic practical measures, a lot can be accomplished in even the most hopeless situations.

Communication and health education will be used to reinforce all measures that are taken in the fight against cholera.

### Daily gathering of data

Each day, data should be gathered on:

- the number of cases.
- the number of deaths.
- the stock of medicines available.

### Placing a stock of treatment supplies and equipment in high risk zones

Ensure that in high risk zones health facilities (dispensary or health post, village health huts, or other facilities that could carry these products) a sufficient stock of supplies for the treatment of patients and prophylaxis, is available.

Based on a system of monitoring of the treatment supplies used, the nurse (health agent) should replenish stocks by ordering them on time.

Nurses should contact high-risk villages to deliver treatment supplies and make sure that at least one person knows how to use them (ORS packets, liquid bleach).

## Measures to restrict public gatherings

The particular role played in the spread of cholera by customs related to funerals is now clearly established (documented). In particular, these include the washing of the corpse under unhygienic conditions and funeral ceremonies involving the gathering of relatives and friends of the deceased for a common meal.

The imposition of restrictions on travel and trade between countries or different areas of one country cannot prevent the introduction of cholera as it is extremely difficult, even with enormous efforts, to detect and detain all infected persons. Such an imposition encourages the suppression of information, which impedes bilateral and international collaboration and preparatory efforts for cholera control in neighbouring countries. The use of check-posts at borders to detect infected persons by laboratory examination has proved to be an ineffective exercise. A "cordon sanitaire" of this kind also diverts manpower and resources from more effective activities, particularly home visits for early case detection and health education.

## CONCLUSION

In the light of experience acquired in cholera control around the world, this brief presentation has concentrated on the limitations of certain strategies such as quarantine ('cordon sanitaire') excessive use of laboratory examinations, mass chemoprophylaxis and vaccination. The advantages for the struggle against cholera that are gained by the creation of a programme to fight diarrhoeal diseases have also been emphasized. The creation of programmes to fight diarrhoeal diseases allows the early discovery and treatment of cases of cholera on the community level. This forestalls panic and limits the movement of people in case of an epidemic.

This presentation has also emphasized the benefits for the population of the country as well as for neighbouring countries of early detection of epidemics and the reporting of existing cases, as well as the need for adequate training and supervision of health agents.