

MODULE



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UNIT ONE

INTRODUCTION

1.1 Purpose and Use of the Module

This module is intended to serve as a general learning material about pulmonary tuberculosis by the health center team; Health Officers, Public Health Nurses, Environmental Health Technicians (sanitarians), and Medical Laboratory Technicians. It can also be used as a reference material for professionals working in health centre. The module may be used as a learning material in trainings, workshops, and seminars for members of the health centre team, community health workers, care givers and patients. The basic and general concepts about the disease and its causation, epidemiology, clinical picture, prevention and control strategies are discussed in simple and quite understandable way. It should be noted, however, that it is not a substitute for standard textbooks.

1.2 Directions for Using the Module

Before starting to read this module, please follow the directions given below:

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- Read the task analysis for the health centre team members (unit4) and compare with that of your own.

Note: You may refer to the list of glossary (unit5) and abbreviations (unit 6) at the end of the module for terms that are not clear.

UNIT TWO

CORE MODULE

2.1 Pre-Test

Answer the questions as appropriate on a separate answer sheet.

2.1.1 Part I: Pre-test questions for all categories of the health center team

Write true if the statement is correct or false if the statement is incorrect for questions 1-7; and give short answers for questions 8-12

- 1 Pulmonary tuberculosis is not a major public health problem in Ethiopia
- 2 Tuberculosis is a curable and preventable disease
- 3 Covering the mouth when coughing, can decrease the spread of pulmonary tuberculosis (PTB).
- 4 Shaking hands with a pulmonary tuberculosis patient can transmit the disease.
- 5 HIV/AIDS is a risk factor for developing pulmonary tuberculosis.
- 6 All patients with chronic cough lasting three or more weeks should be suspected as probable cases of pulmonary tuberculosis.
- 7 Follow up of cases of pulmonary tuberculosis is strictly the responsibility of health workers.
- 8 What are the risk factors for acquiring pulmonary tuberculosis?
- 9 What is the causative agent of pulmonary tuberculosis?
- 10 Mention the mode of transmission of pulmonary tuberculosis?
- 11 Write the most important and practical laboratory test to diagnose pulmonary tuberculosis?
- 12 What are the two recommended standard TB drug regimens?

2.1.2 Part II: Pre test questions for specific categories of the health center team

2.1.2.1 Questions to be answered by Health Officers

Write true if the statement is correct or false if the statement is incorrect for questions 1-10; and give short answer for questions 11-17.

- 1 Post primary pulmonary tuberculosis occurs due to re- infection only.
- 2 History of contact with smear positive adult PTB patient is one of the main criteria to diagnose PTB in children.
- 3 One can diagnose PTB if a one out of three sputum specimen is positive for AFB.
- 4 Most children with PTB are AFB positive on sputum examination.
- 5 Diagnosis of PTB by x-ray examination alone is reliable.
- 6 Patients with sputum positive PTB are treated with long course regimen.
- 7 INH is bactericidal and a commonly used anti-TB drug.
- 8 Thiacitazone can be given to a patient with PTB and HIV.
- 9 Ethambutol is contraindicated in children less than six years of age.
- 10 A patient is said to be treatment failure if she / he still remains sputum positive after two months of treatment.
- 11 Mention the two clinical stages in the pathogenesis of PTB?
- 12 Define a new smear positive PTB patient/ case.
- 13 List the important criteria to diagnose PTB in children.
- 14 What are the drugs used in the intensive phase of short course anti-TB chemotherapy for a newly diagnosed PTB smear positive patient?
- 15 What do you give for a three years old child who had close contact with pulmonary TB smear positive patient if the child has no signs and symptoms of PTB?
- 16 List the main side effects of INH and rifampicin.
- 17 What are the advantages and disadvantages of DOTS?

2.1.2.2 Questions to be answered by Public Health Nurses

Write true if the statement is correct or false if the statement is incorrect for questions 1-3; and give short answers for questions 4 and 5.

- 1 PPD is a specific diagnostic test for detection of pulmonary tuberculosis.
- 2 BCG can treat PTB.
- 3 BCG vaccine cannot prevent severe forms of TB.
- 4 Mention the essential anti-TB drugs.
- 5 State the action to be taken by the nurse for minor and major side effects of anti-TB drugs.

2.1.2.3 Questions to be answered Environmental Health Technicians (Sanitarians)

4. Identify the method that is least effective in self-protection from exposure to PTB?
 - a) Proper ventilation of living / working rooms effectively
 - b) Treating active PTB cases.
 - c) Wearing facemask to prevent inhaling infectious droplets.
 - d) Allowing entrance of adequate sunlight to rooms.
 - e) All of the above.
5. List five main preventive measures in the control of PTB.
6. Give one practical means of PTB control method at the source.
7. What are the major environmental control measures for PTB?
8. List six different teaching methods helpful to deliver messages about PTB prevention.

2.1.2.4 Questions to be answered by Medical Laboratory Technicians

Write true if the statement is correct or false if the statement is incorrect for questions 1-8 ; and give short answers for questions 9 and 10.

- 1 Sputum specimen taken at any time of the day is equally important for laboratory diagnosis of pulmonary tuberculosis
- 2 Acid fast bacilli are rod shaped organisms.
- 3 You must collect and examine two sputum smear samples from every pulmonary tuberculosis suspect.
- 4 Acid fast bacilli are observed through the microscope by oil immersion power

2.2 Significance and Brief Description of Pulmonary Tuberculosis

The ever-increasing prevalence of pulmonary tuberculosis in Ethiopia has been made worse by the alarmingly increasing incidence of HIV/AIDS. Pulmonary TB today in Ethiopia is important not only for the magnitude of its cases, but also for the long-standing nature of the disease. The protracted schedule of its treatment consumes the meager health resources and poses difficulties to properly comply to the treatment regimens. The mortality rate of the disease is also increasing in pace with HIV/AIDS. At present the benefits of early diagnosis and treatment are also being challenged by the emergence of drug resistant mycobacterium strains.

Although pulmonary tuberculosis is one of the most contagious disease, it is preventable and treatable. Therefore, understanding the basic principles of prevention and treatment and designing applicable control strategy play a great role in the reduction of morbidity and mortality in the country.

2.3 Learning Objectives

Upon completion of the module, the reader will be able to:

- 1 Recognize pulmonary tuberculosis as one of the most important public health problems.
- 2 Define the causative agent, pathogenesis and clinical features of the disease.
- 3 Describe methods for the diagnosis of pulmonary tuberculosis.
- 4 Recognize the importance of appropriate treatment of cases in the prevention of drug resistance.
- 5 Describe strategies for the prevention and control of the disease.
- 6 Appreciate the role played by each category of health professionals.
- 7 Describe the principle of management.

2.4 Learning Activity 1

2.4.1 Case Study

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2.4.2 Questions Related to the Case Study

Answer the following questions based on the case study given above.

- 1 What do you think the health problem of W/o Amina?
- 2 What do you comment on the advice given by neighbors?
- 3 How would you see the living conditions of Amina's family?
- 4 What measures would you take in the family?

2.5 Definion the adr 2stions baon bacteria.in the family?

In Harar Tuberculosis Control Center (Eastern Ethiopia), between 1996 and 1998, a total of 8,629 sputum specimens were examined, of which 1357 (15.7%) were positive for acid-fast bacilli.

Risk factors which are identified to be important for development of the disease are:

- Poor nutritional status/poverty.
- Infection with HIV.
- Increased virulence and /or increased dose of bacilli.
- Increased susceptibility of infants and the elderly.
- Pulmonary TB contacts: those with cavitory PTB are at higher risk than those with non-cavitory PTB. For infants, contact with non-smear positive PTB cases is even significant.
- Miscellaneous: Hormonal therapy, diabetes mellitus (three to four times increase of risk), alcoholism, silicosis, etc.

The disease is transmitted by means of invisible droplet nuclei containing the organisms that have left the reservoir during breathing, sneezing or coughing. Transmission generally occurs indoors where droplet nuclei can stay in the air for long time.



Figure 2.1. An open PTB patient is the main source of infection in community.

2.7 Etiology and Pathogenesis

Pulmonary tuberculosis is caused by the bacillus called *Mycobacterium tuberculosis*. Occasionally it can also be caused by *Mycobacterium bovis* and *Mycobacterium african* but of much less magnitude.

The organism is an acid-fast bacillus. It is a non-motile, non-spore forming, aerobic organism. It grows and multiplies slowly, and it is killed by heat, pasteurization, boiling and Ultra Violet (UV) light. The bacilli may live for long periods in the dark and when refrigerated. They do not survive long when exposed to daylight, but are very resistant to drying.

A healthy individual is infected by inhaling the droplets, which settle and grow in the lungs resulting in the development of primary infection, which usually passes unnoticed. Depending on the circumstances a person with primary infection may progress after a latent period of months or years to post primary TB, which results in more extensive involvement of the lung tissue.

2.8 Clinical Features

Suspect a patient for pulmonary tuberculosis when presenting with the following signs and symptoms:

- Persistent cough for more than three weeks
- Sputum production which may or may not be blood stained.
- Weight loss.
- Chest pain.
- Shortness of breath
- Intermittent fever, night sweats.
- Loss of appetite, fatigue and malaise
- History of contact with a smear positive PTB cases.

2.9 Diagnosis

- Clinical features (mentioned above),
- Laboratory diagnosis:
 - Sputum smear microscopy: It is the most important and practical confirmatory test. It involves the use of Ziehl Neelsen technique for acid fast staining.
 - Culture: It is usually employed for evaluation of anti-tuberculosis drug resistance but not for routine diagnostic purpose in Ethiopia.
- Tuberculin skin testing: Used for screening and diagnostic purpose in a community with low prevalence of TB. This is particularly helpful in children suspected of TB who are under six years of age and have not been vaccinated with BCG.
- Chest X-ray: May reveal tuberculous lesions in the affected lungs. But diagnosis by means of X-ray examination only, in patients suspected of PTB, is unreliable. It is only suggestive or supportive evidence.

2.10 Case Management

2.10.1. Aims of Anti

2.10.4 Drug Resistance

There are two types of drug resistance:

- **Primary resistance:** resistance to anti TB drugs in a person who has not taken anti TB drugs previously.
- **Secondary resistance (acquired):**

2.11 Prevention and Control

2.11.1 Objectives

- To interrupt transmission of the infection thereby reducing the incidence of the disease;
- To treat patients in order to achieve their cure and prevent death from the disease

2.11.2 Strategies

The WHO recommended treatment strategy for detection and cure of tuberculosis is Directly Observed Treatment, Short course. The five elements of DOTS policy package are:

- Government commitment to a national TB programme;
- Case detection through 'passive' case - finding (sputum smear microscopy for PTB suspects);
- Short-course chemotherapy for all smear - positive PTB cases (under direct observation for, at least, the initial phase of treatment);
- Regular, uninterrupted supply of all essential anti-TB drugs;
- Monitoring system for programme supervision and evaluation;

2.11.3 Preventive Measures

- Proper detection and treatment,
- BCG (Bacillus Calmete Guerin) vaccination,
- Preventive chemotherapy to high-risk groups,
- Improving housing conditions (proper ventilation and sunlight), and
- Health education.

2.11.4 Control Measures

- Passive and active case detection,
- Examination of contacts,
 - Provision of chemotherapy,
 - Absentee retrieval,
- Concurrent disinfection,
- Reporting of cases, and
- Surveillance and monitoring

2.11.5 Health Education

Health education ensures community involvement and raises the awareness about the effects and preventive measures of the disease. Health education should not be confined to those individuals, who come to health institutions, but should be given at different areas including schools, factories, or during important community gatherings, etc... It is important to include the following core points in informing about PTB using simple terms and based on scientific principles.

- Explain the causative agent.
- Explain how the disease is spread.
- Give clear instructions on the need for regular and uninterrupted treatment,
- Explain the importance of follow up.
- Explain the preventive and control measures.
- Encourage patients to undergo volunteer HIV counseling and test.

2.12 Learning Activity 2

Role Play (for group exercise)



UNIT THREE

SATELLITE MODULES

3.1 SATELLITE MODULE FOR HEALTH OFFICERS

3.1.1 Directions for Using This Module

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

3.1.2 Learning Objectives

After completion of this module the reader will be able to:

- Diagnose PTB in children and adults.
- Describe the common anti-TB drugs, their mode of action, the dose, route of administration, their adverse effects and contraindications.
-

Case study continued:

The health officer on duty, after assessing w/o Amina's result put her on the short course directly observed treatment(DOTS) further more the Health officer advised Amina t complete her initial (intensive phase) treatment by staying in town around the health center. Similarly, she was also informed to collect the drugs monthly for the continuation phase from the health center. W/o Amina insisted that she has five children at home where there is no body to take care of them at home. She requested if she could obtain the drugs from the clinic near her village. Nevertheless the Health officer replied that she was examined in the health center and should continue taking the medication being around the health center. W/o Amina now has no other options than following the advice given. Sometime she has to travel to back home to see her children. Under such circumstances she had missed taking the drugs for two to three days every week. However, the health center allowed Amina to take the drugs for the time she missed by considering her problems.

Answer the following questions based on the case study.

- 1 What do you advise Amina about her children?
- 2 What is your opinion about the treatment advice given to Amina at the health center?

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- Re infection means a repeated infection in a person who has already previously had a primary infection. The lesion usually affects the upper lobe of the lungs.

3.1.5 Clinical Features

In addition to what is mentioned in the core module, in some cases the patient may have clubbing of fingers and with purulent sputum, crepitations and/or bronchial breath sounds on auscultation. Chest examination may be normal, or have signs of lung collapse, fibrosis, or pleural fluid accumulation.

3.1.6 Diagnosis

3.1.6.1 In Adults

- Clinical Features.
- Sputum examination: three sputum specimens must be examined by Ziehl-Neelsen (acid fast) staining technique. PTB positive is diagnosed when at least two smear results are positive for AFB or one sputum specimen is positive with additional x-ray abnormality.
- Radiological examination:
- Diagnosis by means of X-ray examination only is unreliable. It should be interpreted in conjunction with signs and symptoms and it should be done after sputum examination.
- Tuberculin test:
- It is a purified protein derivative (PPD) injected intradermally on flexor surface of forearm between wrist and elbow. It is helpful in non BCG vaccinated children under six years of age. A reaction of 10 mm or more in children can be taken as very suggestive of TB.
- Sputum culture:
- It is complex and takes several weeks. Therefore, it is not useful as a primary diagnostic method.

3.1.6.2 In Children

Only small proportion of children with pulmonary TB are smear positive for AFB.

Diagnosis of TB can be made when any three of the following are present or two in case of protein calorie malnutrition (PCM).

- Strongly suggestive TB signs and symptoms.
- History of close contact with PTB smear positive adult.
- X- ray finding compatible with TB.
- Positive tuberculin test in non- BCG vaccinated children.

3.1.7 Case Management ➤

- Never fail to follow up the patient and make sure he/she has the full recommended course of treatment.
- Do not start tuberculosis treatment until a firm diagnosis has been made.

3.1.7.3 PTB Drugs and Treatment Regimens

- Drugs used in Ethiopia.
Essential anti tuberculosis drugs used in Ethiopia and their mode of action is given in the table 3.1.1 below.

Table 3.1.1: Anti tuberculosis drugs and their mode of action.

No.	Essential anti-TB drugs and their abbreviation	Mode of Action
1.	Isoniazid (H)	Bactericidal
2.	Rifampicin(R)	Bactericidal
3.	Pyrazinamide (Z)	Bactericidal
4.	Streptomycin (S)	Bactericidal
5.	Ethambutol (E)	Bacteriostatic
6.	Thioacetazone (T)	Bacteriostatic

- Contraindications and side effects of anti TB drugs:
 - Absolute contraindications:
 - Children below six years of age..... Ethambutol
 - Pregnancy..... Streptomycin
 - Epilepsy Isoniazide
 - Severe kidney damage Streptomycin and Ethambutol
 - Severe liver damage Rifampicin, pyrazinamide and Isoniazid
 - HIV infection Thioacetazone
 - Side effects:

Common and rare side effects of anti TB drugs are shown in the following table.

Table3.1.2: Side effects of Anti - Tuberculosis drugs.

Drugs	Common side effects	Rare side effects
Rifampicin	Jaundice, anorexia, vomiting, abdominal pain	Itching with/without rashes thrombocytopenia, anuria
Isoniazid	Jaundice, peripheral neuritis	Fever, skin rash, convulsion, psychoses
Pyrazinamide	Arthralgia	Gastrointestinal symptoms, skin rash, anemia
Streptomycin	Vestibule disturbance, deafness, renal damage (also to foetus)	Severe skin rashes
Ethambutol	Optic neuritis	Skin rash
Thioacetazone	Exfoliative dermatitis (involving mucus membrane)	

3.1.7.5 Case Definitions

New case: a patient who has never had treatment of TB or has been on treatment for less than four weeks.

Relapse case: a patient declared cured or treatment completed of any form of TB in the past, but who is found to be smear positive.

Treatment failure: a patient who, while on treatment remains or becomes smear positive at the end of fifth month or later after commencing treatment.

Defaulter: a patient who has been on treatment for at least four weeks and whose treatment has been interrupted for more than eight consecutive weeks or cumulative period of more than 12 weeks.

Treatment after default: A patient who had previously been recorded as defaulted from treatment and returns to the health service with smear positive sputum.

Cured: a patient who is smear negative one month prior to completion of treatment and at least

➤ **DOTS (Directly Observed Treatments Short Course):**

Indications of DOTS:

- Sputum positive new PTB cases,
- Sputum negative new PTB cases who are seriously ill,
- Relapse, treatment failures or return after default (all only when PTB positive after LCC),
- Return after a default who are PTB negative after DOTS,
- All forms of TB in children.

In DOTS, four drugs are given during the intensive phase and two drugs during the continuation phase. For detailed description see annex III.

➤ **Long Course Chemotherapy (LCC):**

This is a 12- month treatment regimen .It is prescribed to the following group of patients:

- New sputum negative patients with pulmonary tuberculosis,
- Sputum negative cases returning after defaulting long course chemotherapy,
- New tuberculosis patients who are eligible for DOTS but do not have access to treatment center which is prepared for DOTS.

In Long course chemotherapy (LCC) three drugs are given during the intensive phase (first two months) and two drugs are given during the continuation phase (last ten months). For detailed description see annex III.

➤ **Re-treatment regimen;**

Re-treatment regimen is prescribed for:

- Relapse after DOTS,
- Treatment failure after DOTS,
- Return after default who are PTB smear positive after DOTS.

It is important to decrease development of multiple drug resistance.

In re- treatment regimen five drugs are given during the first two Months, four drugs during the third month of the intensive phase and three drugs are given in the continuation phase for five months. For detailed description see annex III.

3.1.7.8 Follow-Up

Remember the following points on follow up of pulmonary tuberculosis patient on treatment.

Clinical assessment

- Disappearance of symptoms like; cough, fever, sweating, and loss of appetite.
- Measure body weight.
- Inquire about possible drug side effects.
- Inquire about drug compliance.

Laboratory assessment

- If the direct smear is negative at the end of eight weeks, the continuation phase can be started.
- If the smear is positive at the end of eight weeks of intensive treatment with DOTS, the intensive phase daily treatment should be continued for four more weeks with E, R, H, and Z. After this additional four weeks of intensive treatment, continuation phase must be started regardless of the result of sputum examination.
- If in the continuation phase of treatment the result of sputum at the end of fifth month is negative, the patient is allowed to continue with the same treatment. If the result of sputum is positive at five months or more after the start of chemotherapy, the patient is declared a treatment failure and must start a full course with re-treatment.
- Improvement in hemoglobin and erythrocyte sedimentation rate (ESR).

- If the patient sputum fails to smear convert at the end of three months of re treatment

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below.

1. Read the task analysis of the different categories of The Health Center Team on unit 4.
2. Do the questions of pre-test as a post-test.

N.B: Use a separate answer sheet.

3. Compare your answers of the pre and post- tests with the answer keys given on annex IV and evaluate your progress.

3.2 Satellite Module for Public Health Nurses

3.2.1 Directions for using this Module

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

3.2.2 Learning Objectives

After going through this module you will be able to:

- Perform the tuberculin skin testing procedure.
- Carry out the nursing management for PTB cases in health center and in home.
- Explain the dose, mode of action, side effect and contraindication of anti TB drugs.
-

- Don't clean the forearm with antiseptic. If you use soap and water, see the arm is dry before carrying out the test.
- Hold the syringe close and flat to the skin so that the tip of the needle touches the skin as it is introduced with the bevel up.
- The direction of the needle should be length wise on the arm. Use properly marked tuberculin syringe and a long intradermal needle.
- Inject 0.1 ml. of the tuberculin solution strictly intradermally producing a lump in the skin 5-6 mm. in diameter. You must produce a lump in the skin otherwise the test would be wrongly done.
- Mark the lump by encircling the site with a pen to ensure the accurate reading.
- Discard any unused tuberculin solution into a proper place.

3.2.3.3 *Reading and reporting the test result*

The result of the test is read after 72 hours in the following ways:

- Read the test reaction in a good light with the forearm slightly flexed at the elbow.
- First inspect the area for the presence of induration by slightly palpating across the injection site from the area of normal skin to the margin of induration.
- Then, the horizontal (transverse) diameter of the induration (not erythema) is measured in millimeter at its widest part i.e, transversely.
- Measure it with a transparent ruler of 10 cm in length and report the result to the medical officer. An induration measuring 10 mm or more is considered a positive

3.2.4 Nursing Case Management of PTB

It includes:

- Patient education on adherence to chemotherapy, importance of supplementary nutrition, prevention of transmission to other members of the family and drug resistance.
- Universal precaution must be used in hospitalized patients.
- Direct care provision for debilitated patients.
- Emotional support and change in behavior about misbelief of TB.

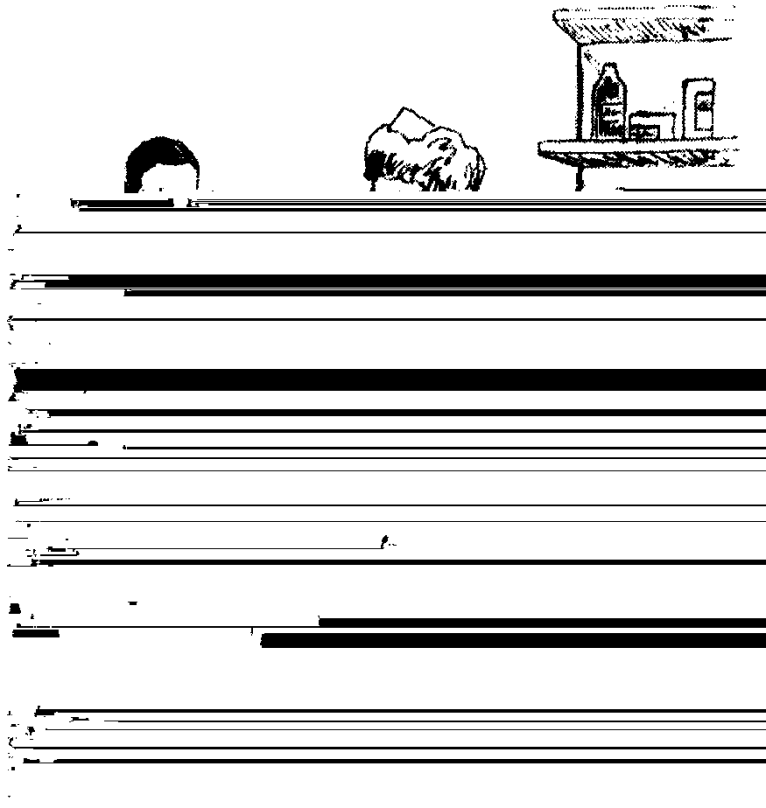


Figure: 3.2.1 Directly observed therapy helps to cope development of drug resistance.

Anti PTB drugs used in Ethiopia

Essential anti-tuberculosis drugs used in Ethiopia and their mode of action are given in table 3.2.1 below.

Table 3.2.1 Anti- tuberculosis drugs and their mode of action

No	Essential anti-TB drugs and their abbreviation	Mode of Action
1.	Isoniazid (H)	Bactericidal
2.	Rifampcin (R)	Bactericidal
3.	Pyrazinamide (Z)	Bactericidal
4.	Streptomycin (S)	Bactericidal
5.	Ethambutol (E)	Bacteriostatic
6.	Thioacetazone (T)	Bacteriostatic

➤ **Contraindications and side effects of anti-tuberculosis drugs**

➤ Absolute Contraindications:

The drugs listed below are absolutely contraindicated in the following specific groups.

- Children below six years--- Ethambutol
- Pregnancy ----- Streptomycin
- Epilepsy ----- Isoniazid
- Severe kidney damage--- Streptomycin and Ethambutol
- Severe liver damage ----- Rifampcin, Pyrazinamide and Isoniazid
- HIV infection ----- Thioacetazone

➤ Minor Side effects:

The following minor side effects may occur:

- Rifampcin----- Anorexia, vomiting, abdominal pain, itching with/without rash
- Isoniazid----- Fever, skin rash
- Pyrazinamid----- Arthralgia
- Streptomycin----- Pain in the site of injection
- Thioacetazone----- Nausea, vomiting , diarrhoea

- Actions to be taken by the nurse:
 - With persistent reactions (three to five days) discontinue the treatment temporarily.
 - Give symptomatic treatment.
 - Re-institute the treatment as soon as reactions disappear. If symptoms persist, consult the medical officer.
- Major side effects:

The following major side effects may occur and require immediate attention.

- Rifampicin-- Jaundice, thrombocytopenic purpura, and anuria
 - Isoniazid--- Jaundice, peripheral neuritis, psychoses
 - Pyrazinamide-- Acute gout, jaundice
 - Streptomycin--- Severe skin rashes, erythroderma, vestibule disturbance, deafness
 - Ethambutal----- Optic neuritis
 - Thioacetazone --- Exfoliative dermatitis (Steven-Johnson's Syndrome)
- Actions to be taken by the nurse:
 - Discontinue the treatment.
 - Consult a medical officer.
 - Refer the patient to the hospital for admission.

N.B. For more information on dosages of anti-tuberculosis drugs refer to annex III.

3.2.5 BCG Vaccination

BCG is a live attenuated strain of bovine tubercle bacilli. The vaccine protects children from severe forms of TB such as TB meningitis and miliary TB. There is no absolute contraindication of BCG vaccination except in children with AIDS. It is given as early as possible in life (preferably at birth). For dose and route of administration see table 3.2.2.

Table 3.2.2 Age, dose and route of administration of BCG vaccination:

Age of child	Dose	Route	Site of injection
<1 year	0.05 ml	Intradermal	Right upper deltoid
≥1 year	0.1 ml	Intradermal	Right upper deltoid

➤ Normal Reaction after BCG injection:

The BCG bacilli grow very slowly. A small red tender swelling about 10 mm appears around the place of immunization after about two-three weeks. Then, the swelling will become a small abscess. The abscess heals by itself and leaves a permanent round small scar about 5 mm. The scar is useful because it indicates that the child has had the vaccine.

➤ What to do in such reaction:

- Tell mothers about the normal reaction.
- Advise mothers not to put any medicine on the sore and to keep it clean.
- Instruct to leave it open or cover it with dry dressing only.

➤ What to do for abnormal reaction:

Sometimes there is severe local inflammation, or a deeper abscess or the lymphatic glands near the elbow or in the axilla swell. This may be because the needle was not sterile, deep injection under the skin given by mistake, or large dose of vaccine given.

- If the reaction remains local no treatment is needed, except a dry dressing.
- If a very large ulcer forms or if the lymphatic glands swell refer the child to the medical officer for advice. Some of these children may need treatment.

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

1. Read the task analysis of the different categories of the health center team on unit 4.
2. Do the questions of the pre-test as a post-test.

N.B: Use a separate answer sheet.

3. Compare your answers of the pre and post-tests with the answer keys given on annex IV and evaluate your progress.

3.3 Satellite Module for Environmental Health Technicians (Sanitarians)

3.3.1 Directions for using this Module

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

3.3.2 Learning Objectives

After studying this module the learner will be able to:

- Describe the methods of PTB control at the source.
- Explain the environmental control measures for PTB.
- State the principles of treatment in the control of PTB.
- Participate in vaccination programs.
- Give health education at individual, family and community levels

3.3.3 Learning Activity

A case study continued from the core module (section 2.4)

W/o Amina Salat is highly sociable with her neighbours. She used to call many of her immediate neighbours for the coffee ceremony. She usually serves coffee in the mornings and afternoons in her small and warm tukul where five to six people including herself enjoy the coffee drinking. Her neighbours observing Amina's frequent coughing, advised her to wear warm cloths and stay in the house because the cold weather may aggravate her disease which they consider it a disease caused by cold "Dhukuba Qilensa ("Bird Beshita"). Amina never covers her mouth when coughing.

Amina is also highly liked by small children in the community. Children of the immediate neighbors gather in the evenings (until they are called by their parents for dinner) around the fireplace in Amina's home with her children. These are mostly friends of her children. Amina usually sits beside the children telling them traditional folktales which they attentively listen. Nevertheless, these days her stories are frequently interrupted by the chest pain and rigorous coughing while trying to tell the children the stories. At times, she spits on to the ash near the fire place and often observes her sputum containing blood. But still the curious children wait for her to finish the stories for them. When she feels better she would continue to tell them the folktales.

Questions for Discussion

1. What is your opinion about Amina's relation with her neighbours in the transmission of PTB?
2. What do you think about the gathering of the small children around Amina to listen to her stories?
3. How relevant was the advice given from the neighbours about her disease "Dhukuba Qilensa "?
4. What advice would you give to the community members in Amina's village and to Amina?
5. What environmental measures do you suggest to prevent disease transmission in cases such as Amina's?

3.3.4 Prevention and Control

The elements in a sound control program will be based on all what is known of the epidemiology, pathogenesis, clinical aspects and bacteriology of the disease.

Specific measures aimed at the control of PTB are those which:

- Will enhance specific resistance,
- Foster early diagnosis,
- Prevent spread of infection, and
- Provide properly applied treatment and rehabilitation of patients.

Based on these principles, the following are recommended preventive measures in the control of PTB:

- Control at the source
- Environmental control
- Treatment
- BCG vaccination
- Health education

3.3.4.1 *Control at the source*

- Covering the mouth when coughing or sneezing:

As a general principle, it is more efficient to control a contaminant at the source than after it is dispersed in the environment. Effective chemotherapy is by far the most desirable form of source control, but transmission can occur before patients are suspected, diagnosed, and placed on effective therapy. The simplest mechanical method of control at the source is to cover the mouth when coughing or sneezing. At the mouth, respiratory droplets have not yet evaporated to become droplet nuclei. The droplets have enough momentum to impact the hand or tissue paper and thus be prevented from contaminating the air. While potentially helpful in reducing the number of droplet nuclei generated, covering coughs requires co-operation and does not constitute effective control alone.

➤ Face masks:

Ideally patients could wear facemasks continuously but are unlikely to co-operate. Masks can not contain the force and volume of vigorous coughing, become wet with potentially infectious secretions and may then become effective atomizers when struck by a blast of air during a cough. Therefore it is not an adequate form of source control, but it may serve to decrease the risk of transmission to other people. So a TB suspect or a patient if possible, should wear a mask when moving from one part of a hospital to another. Health workers often wear mask to protect themselves against TB. (E.g. when working in the TB ward). In fact a mask is generally not very good at protecting the person wearing the mask from inhaling other people's infectious droplets.



➤ Adequate Ventilation:

By room ventilation, either by opening windows or by forced air vents, micro organisms found in room air are moved to the outdoors and dilutes those remaining with fresh outdoor air. Good and adequate ventilation helps reduce PTB transmission indoors.

There are two forms of ventilation of rooms: dilution ventilation and exhaust ventilation.

- Dilution ventilation can be achieved through door and window openings by two means:
 - Through ventilation: this is where the orientation of windows or doors in a room is arranged in a face to face or parallel position to each other.
 - Cross ventilation: this is where the position of the openings of windows or the openings of the doors are oriented in a diagonal arrangement, i.e. located on adjacent walls.
- Exhaust ventilation is a system of expelling the polluted air from a room forcefully using mechanical methods such as fans and where there is a simultaneous replacement by fresh air. Air from isolation rooms should be vented to the outdoors or disinfected before being re-circulated. Air should flow from corridors into isolation rooms but where this is not possible, air in both rooms and corridors should be disinfected.

- Exposure To Direct Sunlight / Ultraviolet Germicidal Irradiation (UVGI):

UVGI is well suited to disinfect the air in buildings where a hazard of PTB transmission has been identified. Sunlight is a source of ultraviolet light, which can kill TB bacilli. Therefore, ideally wards should have large windows to allow the entrance of unobstructed sunlight. Similarly, homes should also have means to allow for direct entry of sunlight into the rooms.

3.3.4.3 Treatment

- Active PTB treatment:

3.3.4.5 Health Education

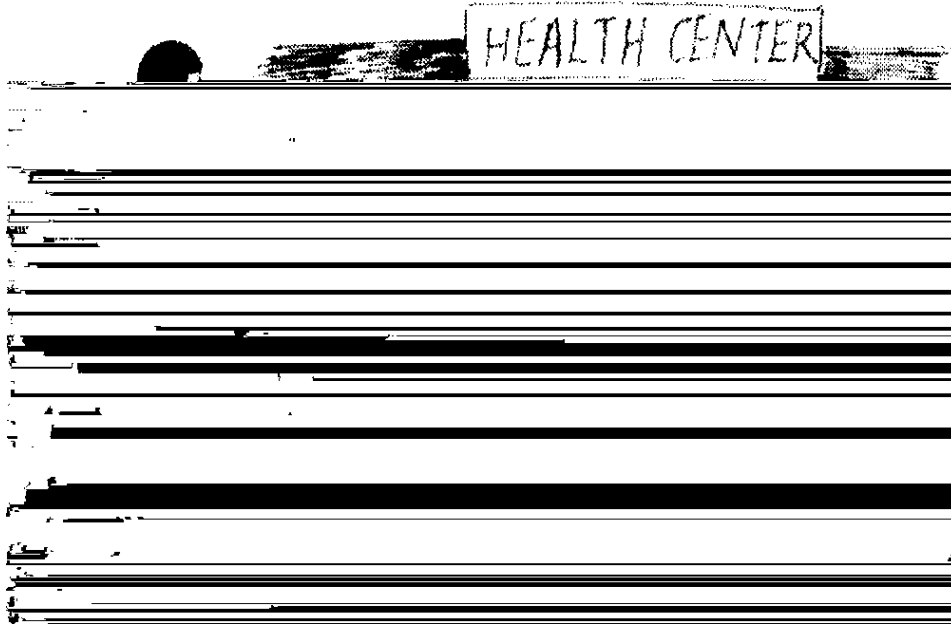


Figure 3.3.2 Proper health education ensures community involvement.

➤ Patient education:

PTB suspects and patients should be taught about simple measures how to decrease the risk of transmitting PTB. These include:

- Covering the mouth with the hand or using a handkerchief when coughing, or sneezing.
- Using sputum pots with lids.
- Advice to turn head aside not to directly cough on people.

➤ Public health education:

Education of the patient, family, contacts, health workers and community members in general about the disease as a public health problem and the importance of appropriate treatment is absolutely necessary.

Different methods of health education could be used to deliver the important messages in PTB prevention and control. The following methods may be used to teach people in an interesting way:

- Telling a story
- Using simple words
- Showing something/demonstration
- Singing of songs
- Using a drama / role play
- Encouraging discussions, etc.

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

- 1. Read the task analysis of the different categories of health center team on unit 4.**
- 2. Do the questions of the pre-test as a post-test.**

N.B.: Use a separate answer sheet.

- 3. Compare your answers of the pre and post-tests with the answer keys given on annex IV and evaluate your progress.**

3.4 Satellite Module for Medical Laboratory Technicians

3.4.1 Directions for Using this Module

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

3.4.2. Learning Objectives

At the end of this module, the learner will be able to:

- Collect sputum specimen in appropriate time using suitable containers.
- Identify the important dyes used in the Ziehl-Neelsen staining technique.
- Prepare sputum smear.
- Perform Ziehl Neelsen staining technique.
- Identify the acid-fast bacilli (AFB).
- Be aware of the possible causes of errors in Ziehl Neelsen staining technique.
- Conduct and keep appropriate recording and reporting systems.
- Practice quality control activities.

3.4.3 Collection of Sputum Specimens

For reliable laboratory diagnoses of sputum smear, a properly collected sputum specimen is mandatory. A pulmonary tuberculosis suspect should submit three sputum samples for microscopy. The chances of finding tubercle bacilli are greater with three sputum samples than with two samples or one sample. Secretions build up in the airways over night. So an early morning sputum sample obtained deep from the lung (not saliva) is more likely than a sample later in the day to contain tubercle bacilli. It may be difficult for an out- patient to provide three early morning sputum samples. Therefore, in practice an outpatient usually provides sputum samples as follows:

- Day one, sample one: Patient provides an “on the spot” sample under supervision when she / he presents to the health institution.
Give the patient a sputum container to take home for an early morning sample to be submitted for the following day.

- Day two, sample two: Patient brings an early morning sample.
- Day two, sample three: Patient provides another “on the spot “sample under supervision.

If a patient can't give a sputum sample, health personnel may advise him to produce a good cough and bring up some sputum. An inpatient can provide three early morning sputum samples under supervision.

N.B. For children who cannot spit out sputum, gastric wash is possible source of specimen.

3.4.4 Laboratory Diagnosis of PTB

3.4.4.1 *Microscopic Examination of Sputum for Acid Fast Bacilli (AFB)*



Figure 3.4.1 Sputum smear microscopy is the most important and practical method for the diagnosis of PTB.

5. Wash the stain with clean water.
6. Cover the smear with 3 % acid - alcohol for about 2 minutes until the smear looks pale-pink.
7. Wash off the stain with clean water.
8. Cover the smear with methylene blue (malachite green) stain for 30 seconds.
9. Wash off the stain with clean water.
10. Wipe the back of the slide and place it in a draining rack for the smear to air dry.
11. Finally, examine the smear microscopically with the oil immersion objective (100x) to look for AFB.

- Results of Ziehl Neelsen technique
 - Acid fast bacilli: red straight or slightly curved rods, occurring singly or in small groups.
 - Cells: blue/ green.

➤ Back ground material: blue /green

- Sensitivity of Sputum Smear Microscopy
- Sputum smear microscopy for tubercle bacilli is positive when there are at least 10,000 organisms present per one milliliter (ml) of sputum.
- False positive results of sputum smear microscopy

A false positive result means that the sputum smear result is positive even though the patient does not really have pulmonary tuberculosis. This may arise because of the following:

- Red stain stained by scratches on the slide.
- Accidental transfer of AFBs from a positive slide to a negative one.
- Contamination of the slide or smear by environmental Mycobacterium.
- Various particles that are acid fast, for example food particles, precipitates and other microorganisms.

- False negative results of sputum smear microscopy

A false negative result means the sputum smear result is negative even though the patient really does have pulmonary tuberculosis.

This may arise because of:

- Problems in collecting (patients provide inadequate samples, inappropriate sputum container used and sputum lasts too long before smear microscopy).
 - Processing (faulty sampling of smear, faulty smear preparation and staining).
 - Inadequate time and attention spent in examining sputum smear.
 - Misidentification of patient, incorrect labeling of sample and mistakes in documentation.
- Reporting of sputum smears

If any definite red bacilli are seen, report the smear as AFB positive and give an indication of the number of bacteria as present on table 3.4.1.

Table 3.4.1:Report of AFB sputum Examination.

Number of bacilli seen in a smear	Result reported
--	------------------------

B. Concentration technique using “Barakina”

Application of barakina to sputum specimen in concentration technique is used to kill some micro organisms, which are normal flora of upper respiratory tract and spitted out with sputum. The barakina also inactivates the virulence of Mycobacterium tuberculosis. More over, it also helps to digest the mycolic fatty acid found on the cell wall of the bacteria. Hence, the bacteria can easily concentrate through centrifugation from the sputum specimen and this enhances the chance of positivity.

- Procedure

1. Add approximately equal volume of sputum and 5% barakina in to 10 ml test tube.
2. Using vortex, shake well the specimen with “barakina”.
3. Centrifuge the mixed specimen for five minutes at 1500-2000 revolutions per minute (if there is no centrifuge put the mixed sample over night).
4. Decant the supernatant and make smear on microscopic slide using the sediment.
5. Stain the slide using acid fast stain.
6. Finally, using oil immersion objective, look for the presence or absence of the bacilli.
7. Record and report the result according to the system discussed under Ziehl Neelsen staining technique as indicated in table 3.4.1.

3.4.4.2 Culture

Culture is a process of propagation of microorganisms on artificial media which contains required nutrient that promote the growth of organisms. It is a complex laboratory test, which takes several weeks to yield results. It is therefore, not useful as a primary diagnostic method in our country. However, culture can be used in specialized laboratories for surveillance of drug resistance.

3.4.4.3 Quality Control

The precision and accuracy of microscopic diagnosis of pulmonary tuberculosis is influenced by many factors. Some of the factors that can affect the result are using of improperly prepared staining solutions and examination of stained smears for very short period of time.

Strategies that are used to get reliable and reproducible laboratory result is called quality control program. Some of the major components of quality control program are:

- Proper identification and instruction of patients.
- Using of non-saliva specimen.
- Checking of new staining solutions using known positive and negative sputum specimen.
- Examine at least 100 fields (for five minutes) before reporting the result. Generally, following of good laboratory procedural techniques will grant the accuracy and precision of test results.

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

- 1. Read the task analysis of the different categories of health center team on unit 4.**
- 2. Do the questions of the pre-test as a post- test.**

N.B: Use a separate answer sheet

3.5 Satellite Module for Community Health Workers

3.5.1 Introduction

3.5.1.1 Purpose and uses of the module

Community health workers are intended to use this module. It is believed to provide them with basic information needed at the grass-root level to serve the community in the prevention and control of pulmonary tuberculosis (PTB). It helps them to recognise their role in case finding and management necessary in prevention of the disease.

3.5.1.2 Direction for using this module

Start with the pre-test questions. Use a separate answer sheet.

Study the text including the task analysis.

3.5.2. Pre-test

Answer either "true" if the statement is correct or "false" if the statement is incorrect for questions 1-7 and write short answers for question 8.

1. Pulmonary tuberculosis is caused by cold air.
2. A person with long-standing cough could be suspected as a case of pulmonary tuberculosis.
3. We should not advise to open the windows in a house where there is a PTB patient.
4. Pulmonary tuberculosis cannot be cured by medicines (drugs).
5. Community health workers have great role in prevention and control of pulmonary tuberculosis.
6. Pulmonary tuberculosis can be transmitted by shaking hands of a pulmonary tuberculosis patient.
7. Doors and windows of houses should not be opened as external air can aggravate the spread of the disease.
8. List the methods used in the prevention and control of PTB.

3.5.3 Learning Objectives

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

- Recognize that PTB is a disease of public health importance.
- Identify the cause and mode of transmission of pulmonary tuberculosis.
- Recognize that PTB is a curable disease.
- Participate in the prevention and control of PTB

3.5.4 Significance of the Problem

The problem of pulmonary tuberculosis in the world in general and in Ethiopia in particular is increasing inspite of efforts made to alleviate its burden on socio-economic developments. This could be due to overcrowding, poor housing condition and ventilation, poor nutrition, inadequate entry of sun light, inadequate health service facilities, diseases like HIV / AIDS and lack of awareness of the people about the causes and prevention of the disease.

Therefore, the disease results in death of a large group of productive force which are useful for socio-economic development.

3.5.5 Definition, Cause and Disease Development Process of Pulmonary Tuberculosis

3.5.5.1 Definition

Pulmonary tuberculosis is a disease of the lungs. It is caused by germs. Germs are very small living things that cannot be seen by our naked eyes.

3.5.5.2 Disease Development Process

The germs that cause the disease after being inhaled with air get into the lungs of normal persons. In the lungs the germs multiply and destroy the lungs and the person gets sick.

3.5.6 Location and Functions of Human Lungs

Human beings have two lungs in their chest cavity, right and left lung. The function of these two lungs is for breathing in and out atmospheric air. When germs attack the lungs, the person will have breathing problem and may die from it unless the patient gets proper medical treatment.

3.5.7 Mode of Transmission and How Much the Disease is Common in Ethiopia

Pulmonary tuberculosis is transmitted when a patient coughs, sneezes, or spits. During these actions, the patient breathes out germs into the air, and when another person inhales air, the germs will enter the lungs along with the air and infection develops.

The disease is very common in our country. It affects all age groups in the community. For example, in Harar, in 1997/98 out of 4168 patients examined in a hospital 569 (14 %) were found to have this germ in their sputum. So we can see how much the disease is affecting the community.

3.5.8 Factors Favoring Transmission of Pulmonary Tuberculosis

➤ Over crowding:

A patient who has active tuberculosis may cough on other people living closer or sleeping together in overcrowded room. Thus, transmission of PTB can be facilitated.

➤ Lack of Ventilation:

A patient with cough may contaminate the air unless it is well ventilated by opening windows and doors in a household. This contaminated air will be inhaled by healthy people and may cause pulmonary tuberculosis.

➤ Immunization:

A child who is not vaccinated against TB is more likely to have a severe infection and die from it. The vaccine is called BCG. Hence, vaccinating children with BCG can reduce the chance of suffering and death from the disease.

➤ Under nutrition:

A person who is not properly fed with balanced food gets pulmonary tuberculosis easily. To prevent this people especially children need feeding with balanced diet.

➤ HIV / AIDS:

Any person infected with HIV / AIDS is more likely to get pulmonary tuberculosis and to die from the disease because of reduced body resistance. So we need to protect the community by providing health education on the preventive measures against HIV /

3.5.12 Task Analysis for Community Health Workers

Table 3.5.1 Knowledge -objectives and activities

Learning Objectives	Learning Activities
.To define pulmonary tuberculosis	<ul style="list-style-type: none"> - Study that PTB is disease of the lungs. - Study the parts and general functions of the lungs.
To describe the causes of PTB	<ul style="list-style-type: none"> - Identify that PTB is caused by germs and not by evil-eye , heredity or other factors.
.To state the modes of transmission of PTB	<ul style="list-style-type: none"> - Recognize that PTB is transmitted through breathing of air containing germs from a sick person when coughing and sneezing.
.To identify the major conditions that indicate PTB	<ul style="list-style-type: none"> - Study the signs and symptoms of PTB. - Understand the relation between HIV / AIDS and PTB.
.To study factors initiating occurrence of PTB	<ul style="list-style-type: none"> - Study the relation between poor housing conditions, malnutrition and lack of vaccination with BCG - Understand the importance of adequate treatment of PTB.
To identify the most important preventive measures of PTB	<ul style="list-style-type: none"> - State that early and adequate treatment of open PTB cases is important control measure. - State the need for covering of the mouth when coughing and sneezing. - Study the importance of good ventilation and direct sunlight into living rooms and the need to decrease overcrowding. - Study the importance of community health education including the need for proper nutrition and vaccination.

Table 3.5.2. Attitude- objectives and activities

Learning Objectives	Learning Activities
To appreciate that PTB is preventable, treatable and curable	<ul style="list-style-type: none">- Advocate PTB patients should receive adequate treatment.- Initiate patients to seek treatment early.- Give health education on prevention and control methods of PTB at any opportunity.
To believe that PTB is a public health problem	<ul style="list-style-type: none">- Give emphasis on health education to individuals, families and communities at any occasion.- Recognize the relationship between PTB and HIV/AIDS.

Table 3.5.3 Practice-objectives and activities

Learning Objectives	Learning Activities
To detect cases of PTB early	<ul style="list-style-type: none">- Identify and refer patients with signs and symptoms of PTB.- Record and refer suspected PTB cases.
To follow cases defaulting	<ul style="list-style-type: none">- Trace patients missing from treatment- Make follow up of referred PTB cases
To participate in preventive and control activities	<ul style="list-style-type: none">- Provide health education.- Mobilize the community for vaccination.- Counsel patients to take their medication properly.- Keep records of PTB cases.- Write reports about activities accomplished.

-
- **Now you are through with the module, but in order to evaluate yourself you need to do the pre-test as a post-test.**
 - **Use a separate answer sheet.**
 - **At last compare your answers of the pre and post- tests with the answer- keys given on section 3.5.13 and evaluate your progress.**

3.5.13 Answer Keys to Pre And Post-test for Community Health Workers

1. False
2. True
3. False
4. False
5. True
6. False
7. False
8.
 - a. Proper patient finding and referral
 - b. Immunization
 - c. Health education
 - d. Promoting sanitation
 - e. Follow up of patients and defaulter tracing.

3.6 Take Home Message for Care Givers/ Self-care

The following points are basic information on pulmonary tuberculosis (PTB).

- PTB is disease of the lungs.
- It is caused by Germs. Germs are small living things that cannot be seen by our naked eyes.
- The germs contaminate air when a PTB patient coughs or sneezes.
- The disease is transmitted by inhaling the air contaminated with the germs.
- The disease shows the following signs and symptoms:
 - Cough for more than three weeks
 - Sputum stained with blood
 - Fever
 - Night-sweating
 - Loss of appetite
 - Loss of body weight.
 - Generalized body weakness.
- The disease is curable with modern medicines.
- The medicines are taken for a long time. A patient must take them regularly without interruption as directed by health institution.
- Failure to take the drugs regularly as directed by health workers will aggravate the disease and the patient may die. Moreover, it is risk for the transmission of the disease.
- The disease can be prevented by the following methods:
 - Early detection and proper treatment of the patient.
 - Covering of the mouth when coughing and sneezing.
 - Allowing adequate ventilation and direct sunlight into the house.
 - Avoiding overcrowding.
 - Vaccination of children.
 - Improvement of nutritional status.
 - Prevention of HIV / AIDS.

Learning Objectives	Learning Activities			
	HO	PHN	EHT	MLT
To describe the global magnitude of the problem of PTB and its public health importance in Ethiopia	<ul style="list-style-type: none"> - Study the epidemiology - State the modes of transmission - Study the reasons for high prevalence of the disease 	<ul style="list-style-type: none"> - Study the epidemiology - State the modes of transmission - Study the reasons for high prevalence of the disease 	<ul style="list-style-type: none"> - Study the epidemiology - State the modes of transmission - Study the reasons for high prevalence of the disease 	<ul style="list-style-type: none"> - Study the epidemiology - State the modes of transmission - Study the reasons for high prevalence of the disease
To describe the treatment strategies of PTB and dangers of drug defaulting	<ul style="list-style-type: none"> - Study the treatment strategies and regimens, dosage, side effects and contraindications according to NTLCP - Study drug resistance and dangers of defaulting 	<ul style="list-style-type: none"> - Study the treatment strategies and drug regimens, dosage, side effects, and contraindications according to NTLCP - Study drug resistance and dangers of defaulting 	<ul style="list-style-type: none"> - Study the drug treatment strategies - Study the dangers of drug resistance and defaulting 	<ul style="list-style-type: none"> - Study the drug treatment strategies - Study the dangers of drug resistance and defaulting
To describe the methods of prevention of PTB	<ul style="list-style-type: none"> - Identify the proper PTB preventive methods - Case detection - Treatment - BCG vaccination - Preventive chemotherapy - Improving housing condition - Health education 	<ul style="list-style-type: none"> - Identify the proper PTB preventive methods - Case detection - Treatment - BCG vaccination - Preventive chemotherapy - Improving housing condition - Health education 	<ul style="list-style-type: none"> - Identify the proper PTB preventive methods - Case detection - Treatment - BCG vaccination - Preventive chemotherapy - Improving housing condition - Health education 	<ul style="list-style-type: none"> - Identify the proper PTB preventive methods - Case detection - Treatment - BCG vaccination - Preventive chemotherapy - Improving housing condition - Health education

Table 4.2 Attitude-Objectives and Activities.

Learning Objective	Learning Activities			
	HO	PHN	EHT	MLT
To give value that PTB is a major public health problem	- Advocate the social, economic and health impact of PTB	- Advocate the social, economic and health impact of PTB	- Advocate the social, economic and health impact of PTB	- Advocate the social, economic and health impact of PTB
To believe that prevention and control measures reduce the transmission of PTB	- Give emphasis on health education	- Give emphasis on health education	- Give emphasis on health education	- Give emphasis on health education 6
To believe that sputum smear microscopy for AFB is a key step in the diagnosis of PTB	- Give emphasis on sputum smear microscopy	- Give emphasis on sputum smear microscopy	- Give emphasis the importance of sputum smear microscopy	- Give emphasis on the

Table 4.3 Practice-Objectives and Activities

Learning objectives	Learning Activities			
	HO	PNH	EHT	MLT
To carry out appropriate laboratory examination procedures	<ul style="list-style-type: none"> - Do AFB staining - Interpret the result - Record and report 	<ul style="list-style-type: none"> - Collection of sputum specimen and registration - Recording the laboratory result 	<ul style="list-style-type: none"> - Give health education on the need for laboratory investigation 	<ul style="list-style-type: none"> - Collection of sputum specimen - Disinfection - Do AFB stain - Recording and reporting - Do quality control test

To participate in the

Learning Objectives	Learning Activities			
	HO	PHN	EHT	MLT
To carry out control measures of PTB	<ul style="list-style-type: none"> - Recording and reporting - Surveillance and monitoring - Case detection, tracing and follow up - Analysis of task 	<ul style="list-style-type: none"> - Recording and reporting - Surveillance and monitoring - Case detection, tracing and follow up - Do concurrent disinfection 	<ul style="list-style-type: none"> - Recording and reporting - Surveillance and monitoring - Detection of suspects - Case tracing and follow up - Do concurrent disinfection 	<ul style="list-style-type: none"> - Perform concurrent disinfection. - Surveillance and monitoring - Case tracing and detection

UNIT SIX

ABBREVIATIONS AND REFERENCE

AFB	Acid Fast Bacillus
AIDS	Acquired Immune-Deficiency Syndrome
BCG	Bacillus Calmette Guerin
DOTS	Directly Observed Treatment, Short Course(for TB)
EHT	Environmental Health Technician
EPI	Expanded Program on Immunization
HO	Health Officer
HIV	Human Immunodeficiency Virus
LCC	Long Course Chemotherapy
MLT	Medical Laboratory Technician
M.tuberculosis	Mycobacterium tuberculosis
N TLC P	National Tuberculosis and Leprosy Control Program
P.P.D	Purified Protein Derivative
PTB	Pulmonary Tuberculosis
TB	Tuberculosis
TLCT	Tuberculosis and Leprosy Disease Prevention and Control Team
UV	Ultra Violet
UVGI	Ultra Violet Germicidal Irradiation
WHO	World Health Organization

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UNIT SEVEN

ANNEXES

ANNEX I

Table 7.1. Tuberculosis Case Finding 1993 E.C. Data from DOTS Implementing Zones Compiled From Regional Quarterly Reports Submitted To the TLCP, MOH - Ethiopia

REGION	SMEAR - POSITIVE CASES STARTING TREATMENT	SMEAR-NEGATIVE
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REGION	PTB+ AGE < 15Y		PTB+ :TREATMENT PRESCRIBED				SMEAR AT 2 MONTHS OF PTB+ CASES REGISTERED								
	P+<15y	%New	SCC	% New	LCC	%New	Done	% Reg	Pos %	% Done	Neg	% Done	N.D	%Reg	
Tigray	80	4%	1817	99%	16	1%	1440	82%	47	3%	1393	97%	312	18%	
Amhara	316	6%	4303	80%	1077	20%	3091	78%	144	5%	2947	95%	859	2%	
Oromiya	752	7%	10612	99%	101	1%	8032	76%	176	2%	7856	98%	2556	24%	
Somali	123	8%	1535	95%	87	5%	1331	92%	173	13%	1158	87%	111	8%	
SNNP	641	8%	7439	91%	725	9%	5235	77%	229	4%	5006	96%	1535	23%	
Harari	6	3%	216	100%	0	0%	205	93%	13	6%	191	94%	16	7%	
Addis Ababa	120	3%	3821	100%	8	0%	3479	94%	122	4%	3357	96%	233	6%	
Dire Dawa	9	1%	666	100%	0	0%	660	93%	40	6%	620	94%	51	7%	
Grand Total	2047	6%	30409	94%	2014	6%	23472	81%	944	4%	22528	96%	5673	19%	

ANNEX II

REGION	PATIENTS ON LONG COURSE CHEMOTHERAPY												
	TOTAL	CUREED	COMPL	SUCCES	RATE	DIED	%	FAIL	%	DEFAULT	%	TRANSF	%
Tigray	26	18	5	23	88%	1	5%	0	0%	2	8%	0	0%
Amhara	522	82	246	328	63%	24	5%	9	2%	142	27%	19	4%
Oromiya	1315	512	384	896	68%	57	4%	7	1%	292	22%	65	5%
Somali	12	3	3	6	50%	0	0%	1	8%	1	8%	0	0%
SNNP	2173	589	901	1490	69%	100	5%	27	1%	336	15%	90	4%
Harari	-	-	-	-	0%	0	0%	0	0%	0	0%	0	0%
Dire Dawa	-	-	-	-	0%	0	0%	0	0%	0	0%	0	0%
Addis Ababa	17	13	-	13	76%	0	0%	2	12%	0	0%	2	12%
Total	4065	1217	1539	2756	68%	182	4%	46	1%	773	19%	176	4%

SCC+LCC	23656	13568	4628	18196	77%	1588	7%	272	1%	2897	12%	883	4%
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REGION	PATIENTS ON RETREATMENT CHEMOTHERAPY												REGISTERE	
	TOTAL	CURED	COMPL	SUCCES	RATE	DIED	%	FAIL	%	DEFAULT	%	TRANSF	%	D
Tigray	43	27	3	30	70%	8	19%	2	5%	3	7%	0	0%	43
Amhara	80	16	40	56	70%	6	8%	1	1%	10	13%	1	1%	80
Oromiya	473	296	46	342	72%	46	10%	13	3%	47	10%	25	5%	544
Somali	29	23	2	25	86%	2	7%	1	3%	1	3%	0	0%	29
SNNP	236	142	72	214	91%	10	4%	20	8%	10	4%	2	1%	236
Harari	8	6	-	6	75%	0	0%	1	13%	0	0%	1	13%	8
Dire Dawa	39	18	8	26	67%	5	13%	3	8%	2	5%	3	8%	39
Addis Ababa	210	153	10	163	78%	22	10%	3	1%	16	8%	3	1%	1121
Total	1118	681	181	862	77%	99	9%	44	4%	89	8%	35	3%	1100

Annex III

Treatment Regimen Recommended by Tuberculosis and Leprosy Disease Prevention and Control Team (TLCT), Ministry of Health

Table 7.3 Directly Observed Treatment Short Course (DOTS): 2S (RHZ) /6 (EH).

Duration of treatment	Drugs	Adolescents and Adults Pre-treatment weight			
		20-29kg	30-37kg	38-54kg	>55kg
Intensive Phase (8 weeks)	(RHZ 150/75/400)	1½	2	3	4
	S	.50gm	.75gm	.75gm	1gm
	Or	Or	Or	Or	Or
	E400	1	1½	2	3
Continuation phase (6 'months')	(EH 400/150)	1	1½	2	3

Key:

RH 150/75 Combined tablet consisting of 150 mg rifampicin and 75 mg Isoniazide.

E 400 Tablet consisting of 400 mg Ethambutol

Table 7.4 DOTS regimen for children of 6 and below or seriously ill:

2S (RHZ) 4(RH) or 2(RHZ)/4(RH)

Duration of treatment	Drugs	Child pre-treatment weight			
		Below 7kg	7-9 kg	10-12 ³ / ₄	13-19kg
Intensive phase (8 weeks)	(RHZ 150/75/400)	1/3	1/2	3/4	1
	S	.125gm	.125gm	.250gm	.250gm
Continuation phase (4 'months')	(RH 150/75)	1/3	1/2	3/4	1

S is to be used as the fourth drug in the intensive phase if the child is smear positive or seriously ill. During the intensive phase of DOTS, the drugs have to be taken under the direct observation of a health worker or the mother. During the continuation phase the drugs have to be collected every month and be taken under the direct observation of the mother.

Table 7.5 Long course regimen for TB: 2S(TH)/ 10(TH) or 2S(EH)/10(EH)

Duration of

Table 7.6 Re-treatment regimen: 2SE (RH) Z/1E (RH) Z/5E₃ (RH)₃

Duration of treatment	Drugs	Child pre-treatment weight	Adult pre-treatment weight		
		20-29kg	30-37%	38-54kg	>55kg
Intensive phase (8 weeks)	(RHZ 150/75/400)	1½	2	3	4
	S	.50gm	.75gm	.75gm	1gm
	E 400	1	1½	2	3
Intensive phase (third 'month')	(RHZ 150/75/400)	1½	2	3	4
	E 400	1	1½	2	3
Continuation phase (5 'months') (3 times weekly)	(RH 150/75)	1½	2	3	4
	H 100	1/2	1	2	3
	E 400	1	2	3	4

5 E₃ R₃ H₃= 5 months of treatment with a combination of E, R and H three times a week on alternating days.

Streptomycin should not be included in the re-treatment for pregnant women. Throughout the duration of re-treatment, including the continuation phase, the drugs have to be taken under the direct observation of a health worker.

Annex IV

Keys to Pre and Post-Test for the Health Center Team.

Part I (for section 2.1.1)

Answers for Pre and posttest for all Categories of the Health Center Team

1. False
2. True
3. True
4. False
5. True
6. True
7. False
8. Refer section 2.6, on risk factors
9. Mycobacterium tuberculosis
10. Air born
11. Sputum smears microscopy examination.
12. Short course directly observed treatment (DOT) and Long Course Chemotherapy (LCC)

Part II (for section 2.1.2)

Answers for Pre and post-test to Each Category of Health Center Team

For Health Officers (for section 2.1.2.1)

1. False
2. True
3. False
4. False
5. False
6. False
7. True
8. False
9. True
10. False
11. Primary pulmonary TB and post primary pulmonary TB
12. A patient who has never had treatment of TB, or has been on treatment for less than four weeks.
13. Diagnosis of TB can be made when any three of the following are present or two in case of protein calorie malnutrition.
 - Strongly suggestive TB sign and symptoms.
 - History of close contact with PTB smear positive adult.
 - X- ray finding compatible with TB.
 - Positive tuberculin test in non- BCG vaccinated children.
14. Rifampicin, INH, pyrazinamide and streptomycin or ethambutol.
15. Preventive anti TB chemotherapy for 6 months (INH.5 mg/kg body weight).
Jaundice, anorexia, peripheral neuritis etc
16. INH- jaundice, peripheral neuritis
Rifampicin- jaundice, anorexia, vomiting, abdominal pain, itching with or with out rash
thrombocytopenia. anuria
17. DOTs ensures a patient adherence to treatment. It is also given for short period of time (8 months instead of 12 months). However, DOTs modality of TB patient services should be available as close to home as possible.

For Public Health Nurses (for section 2.1.2.2.)

1. False
2. False
3. False
4.
 - a. Isoniazid (H)
 - b. Rifampicin (R)
 - c. Pyrazinamid (Z)
 - d. Streptomycin (S)
 - e. Ethambutol (E)
 - f. Thioacetazone
5. The action to be taken for minor side effect
 - a. With persistent side effect three to five days discontinue the treatment temporarily
 - b. Give symptomatic treatment.
 - c. Reinstigate the treatment as soon as side effect disappears. If symptoms persist consult the medical officer.

Actions for major reaction

- a. Discontinue treatment
- b. Call for consultation for a medical officer.
- c. Refer the patient to the hospitals for admission.

For Environmental Health Technicians (sanitarians) (for selection 2.1.2.3)

1. C
2. C
3. B
4. C
5.
 - a. Control at the source
 - b. Environmental control
 - c. Treatment
 - d. BCG Vaccination
 - e. Health education
6. Covering the mouth when coughing and sneezing or treatment.
7.
 - a. Ventilation
 - b. Avoid overcrowding
 - c. Exposure to direct sunlight.
8.
 - a. Telling a story
 - b. Using simple words
 - c. Showing something
 - d. Singing of songs
 - e. Using drama / role play
 - f. Encouraging discussion

For Medical Laboratory Technicians (section 2.1.2.4)

1. False
2. True
3. False
4. True
5. False
6. False
7. False
8. True
9.
 - a. Proper identification and instruction of patients
 - b. Using of non-saliva specimen
 - c. Checking of the quality of staining solutions
 - d. Examine at least 100 fields (for five minutes) before reporting the result.
10.
 - a. Carbofuchsin
 - b. 3 % acid alcohol
 - c. methylene blue

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