This text has been drafted with financial assistance from the Commission of the European Communities. The views expressed herein, in no way reflect the official opinion of the Commission.

The procedure, explanations and treatment given in this publication are based on research and consultation with medical and nursing authorities. They all reflect accepted medical practices. Nevertheless they cannot be considered absolute and universal recommendations. The authors, the editor and the publisher disclaim responsibility for any adverse effects resulting directly or indirectly from the suggested procedures, from any undetected errors, or from the reader’s misunderstanding of the text.
Dear Readers,

Tuberculosis (TB) is a single infection that takes a great toll of life each year. World-wide in 1995, there were about nine million new cases of TB with more than two million deaths. According to WHO (1997), 95% of TB cases and 98% of TB deaths are in developing countries.

Poor knowledge about the cause and prevention of the disease are assumed to be the main reasons of its spread. Failure to perceive the importance of completion of treatment regime are giving rise to Multi-drug resistant TB (MDR-TB). Men, women and children, all are affected by this disease.

Keeping this in mind, Health Messenger has published this special issue on TUBERCULOSIS. Our goal is to provide basic information on TB to people dealing with the health of their community. Most of the articles are contributed by experienced health personnel. Some social aspects of TB are also highlighted in this issue.

All comments regarding the magazine and its contents are welcome for its future improvement. We look forward to working more closely with our readers in the near future.

Sincerely,
Editor
Dr. Seerat Nasir
စိုက်ပျိုးရေး

စိုက်ပျိုးရေးရာတွင် အသုံးပြုသောအရည်အချင်းများ
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Tuberculosis: An Introduction

This article will focus on some basic information regarding tuberculosis: cause, mode of transmission, classification.

Tuberculosis (TB) is a highly infectious disease taking a great toll of lives each year. It is caused by an acid fast bacilli (AFB) called *Mycobacterium tuberculosis*. Tuberculosis is the world’s foremost cause of death among adults from a single infectious agent. One third of the world’s population is infected with TB; about 9 million become sick with TB each year and more than 2 million people die. In South East Asia, at least 1 in 3 people are infected with TB and every year one million people die from this disease in this region.

Why is TB still a problem?

Inadequate TB control programs, poverty, population growth and HIV has been found to enhance the spread of TB.

- Incomplete TB treatment gave rise to Multi-drug resistant TB (commonly known as MDR-TB), which is a serious problem in poor TB control programs.

- HIV and TB go hand in hand. TB grows with the increase of HIV. As HIV attacks the immune system, the person is easily infected by the tuberculosis bacteria.

- Poverty, overcrowding and poor nutrition combine to create conditions that favor the spread of TB. People dwelling in urban slums, prisoners and refugees are particularly affected.

- Some social factors are also responsible for the spread of TB. Social stigma regarding TB is so strong that people try to conceal the disease or are afraid to reveal that they have TB. Fearing divorce or abandonment, some married women with TB are reluctant to seek treatment.

Lack of education and proper knowledge of TB is another cause of its spread.

How is it transmitted?

The TB bacteria spread through the air when a person with infectious lung TB coughs or sneezes. Tiny droplets containing the germ, which cannot be seen with the naked eye, float in the air until someone else breathes them in. The germs are carried to the lungs where they take shelter and grow. Besides the lungs, TB can also attack other parts of the body, for example, lymph nodes, meninges (membrane covering the brain), bone & joints, gastrointestinal tract, kidneys, etc. Tuberculosis is classified according to the site of attack. The classification of TB is shown in Figure 1.

The impact of TB on society

TB is not only a health problem but also a social problem. Families and communities suffer severe economic and social effect long after a TB patient had died. Although TB affects people in their economically active years, this
disease has lasting impact on children and families, particularly in developing countries. First the cash income of a family is lost when the wage earner is too ill to work, which imposes an immediate and powerful hardship on the family. Next, capital is lost as the family has to use their savings, in cash or kind, to treat the infected person. The end result is, a family turns to be permanently poverty-stricken. The loss of mothers and wives has enormous impact on the fabric of family life. Children are often left destitute and orphaned.

Who is vulnerable to TB?

Anybody can be infected by TB. Continuous exposure to the germ can infect, men women and children. Some other predisposing factors like, poor socioeconomic condition, malnutrition, overcrowding, may cause someone to be vulnerable to TB.

![Figure 1. Classification of TB](image)

**Figure 1. Classification of TB**

- TB organism enters the body
- Asymptomatic infection
- Pulmonary
  - With or without cavitation
  - Severe forms
    - TB Meningitis
    - Miliary TB
  - Others
    - Lymph nodes
    - Pleural effusion
    - Pericarditis
    - Bone & joints
    - Ascites
    - Gastrointestinal tract
    - Kidney
    - Skin
    - Eye

*Courtesy: Global Tuberculosis Programme, WHO, 1997*
In some refugee camps, where there is overcrowding and poor nutrition, refugees are particularly at risk for developing TB.

**How to control the spread of TB?**

'Prevention is better than cure' runs the proverb. As TB is a curable disease, proper diagnosis and cure of infectious cases of TB is the most effective method of preventing the transmission of TB. Diagnosis can be done by (a) laboratory examination of sputum, (b) chest x-ray, (c) culture positive pulmonary TB, (d) tuberculin test, (e) bacteriology/histology [in case of non pulmonary TB].

BCG vaccination is found effective in preventing severe forms of TB such as meningitis in children. BCG is strongly recommended for all newborn children and any children up to the age of 5 years who have not already received it.

Ensuring good ventilation and reducing crowding can reduce the transmission of TB.

Health Education is important for preventing the transmission of TB by increasing the awareness of people and the community. The health education programs targeting communities should focus on three essential elements:

- Removal of stigmatization of TB
- Early (self) referral of TB suspects
- Emphasis on continuity of treatment

All these are discussed elaborately in the following articles.

**References:**

4. NGOs & TB Control: Principles and Examples for organizations joining the fight against TB, WHO, New Delhi, 1999
Drug-Resistant Tuberculosis

Dr. Holger Savert, WHO

Control strategies in Thailand

A report released recently by the top U.S. and international health agencies confirmed that tuberculosis "hot zones" are emerging around the world where people are nearly helpless to protect themselves from drug resistant strains. This could soon ignite a new wave of virtually incurable tuberculosis worldwide. The study, titled Anti-Tuberculosis Drug Resistance in the World, was based on quality control and proficiency testing performed by an international network of 22 prestigious laboratories, as well as actual surveys done in 50,000 TB cases in 35 countries.

In each of the "hot zones," the disease is often resistant to the commonly prescribed drugs isoniazid and rifampicin. This makes TB an incurable disease for anyone who does not have access to the most sophisticated and expensive healthcare. In industrialized countries, MDR-TB can raise treatment costs 100-fold – up to US$250,000 per patient.

One-third of the countries surveyed had MDR-TB levels in between 2 and 14 percent of all cases. This would suggest that there are already many countries with 1,000 or more MDR-TB cases.

The hot zones identified in the report include India, Russia, Latvia, Estonia, the Dominican Republic, Argentina and the Ivory Coast. Scientists expressed concern that many of the hot zones are regional centers of travel, emigration and international economic activity, and admitted that little can be done to prevent people infected with drug-resistant TB from traveling and spreading the bacilli to other countries.

The survey did find evidence that most drug-resistance can be prevented by addressing the bad TB treatment practices which initially cause it. The report documents for the first time the link between poor treatment of tuberculosis and the spread of drug resistant strains. Conversely, where a TB treatment strategy known as DOTS is in place, the level of drug resistance is low.

Inconsistent or partial treatment of TB is the root cause of MDR-TB. Many patients fail to take all their medicines consistently because of the extended treatment period or because they no longer have any of the outward symptoms of the disease. In addition, many doctors and health workers prescribe the wrong drugs or the wrong combination of drugs. DOTS addresses many of these issues.

The study found that levels of resistance to a single drug - usually isoniazid - are alarmingly high. Presence in the community of single drug resistance means that the tuberculosis bacillus has to mutate just once more to achieve
multidrug-resistance – making the disease more deadly and difficult to treat.

Each of the identified hot zones has MDR-TB levels that threaten to overwhelm current TB control programs and spread disease to populations throughout the world. In Latvia, for example, 22 percent of TB patients had resistance to two or more anti-TB drugs.

The region of Russia surveyed showed a 7 percent rate of multidrug resistance among TB patients; in the Dominican Republic, there was 9 percent combined resistance; and in Delhi State, in India, 13 percent of all TB patients were ill with MDR-TB.

The DOTS strategy focuses on the cure of every TB case. Good TB control which cures patients has proved successful in preventing drug resistance in greatly differing countries such as Algeria, Chile, Korea, Tanzania and New York City. Dramatic neglect of these well-known principles is what has fueled the global TB epidemic and is why WHO declared TB a Global Health Emergency in 1993.

Thailand has responded to the rise of the TB epidemic by introducing DOTS since 1996. By July 1999, 40% of all districts in the country were covered.

What is NEW about the new TB control strategy in Thailand?

Before 1996, results of the TB control program in Thailand were not good. Less than 50% of all patients finished their treatment and were proved to be cured at the end. The reason was non-compliance: many patients stopped taking their drugs as soon as the bad symptoms of TB (fever, cough, weightloss etc.) had stopped. There was nobody who made sure that the patients had taken the drugs for the complete duration of six months that is necessary. The new policy has changed this! The most important point about the new control strategy is that every patient will have a personal supervisor who will make sure that all drugs are taken for six months.

Since many patients live far away from the hospital, such close supervision cannot be performed from the hospital. It was necessary to decentralize TB treatment to the health center level. Those patients who live close can visit the health centers daily to take their medicine under supervision by health center staff. For others, alternative personal supervisors are village health volunteers or family members. They will be visited regularly by health center staff to make sure that there are no problems during treatment.

What about diagnosis?

Sputum smears are the main diagnostic tool for TB patients. Good quality smears can only be done if large numbers of slides are examined. This would not be the case at health centers. Diagnostic services therefore remain at the hospital level, but once the diagnosis is made patients are referred to the health center level for treatment. This applies to all hospitals at district and provincial levels, and also to the TB zonal centers:

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<th>Diagnostic services</th>
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<td>Zonal TB Center</td>
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<td>District Hosp.</td>
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 Somebody has to co-ordinate all these activities at the health center level and to check that all patients receive high-quality care. To do this, district TB Co-ordinators (DTCs) at the district health offices were trained. The DTCs will be in regular contact with the health centers, check the patient treatment cards and help the health center staff with any problems they face.

With all these new structures in place, TB control should work well. However, the performance of each district needs to be regularly assessed to identify problem areas where provincial
DOTS တွင် အခြေခံချက်များကို ထိန်းသိမ်းပေးပါသည်။

**DOTS**

**Directly Observed Treatment**

**D**irectly observed treatment (DOTS) သည် ကျောင်းလေး အသုံးပြုသော အခြမ်းအနားများ အပေါ် အခြေခံချက်များကို ထိန်းသိမ်းပေးသည်။

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**T**reatment သည် စိုက်ပျိုးခြင်း နှစ်သက်တောင်ရှိုင်းခြင်းနှင့် အခြေခံချက်များကို ထိန်းသိမ်းပေးသည်။

**S**hort-course သည် ကျောင်းလေး အသုံးပြုသော အခြမ်းအနားများကို ထိန်းသိမ်းပေးသည်။

အခြေခံ DOPTS သည် ကျောင်းလေး အသုံးပြုသော အခြမ်းအနားများကို ထိန်းသိမ်းပေးသည်။
or regional level assistance is required. A new recording and reporting system was therefore introduced, which allowed to evaluate the treatment results for all patients under care in one district. This is a key component of the new strategy, and without it, there would be no information on the success or failure of the new strategy. Many training and supervision activities will be conducted to help staff at all levels understand their new roles and make sure that in the future, all TB patients in Thailand will be cured and the spread of MDR is stopped.

**Keys for success:**
1. supervision
2. decentralization (HC)
3. monitoring (DTC)
4. recording and reporting

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**DOTS: Directly Observed Treatment, Short-course**

"DOTS is the most effective means available to stop the spread of tuberculosis" (Dr. Arata Kochi, Director, Global TB Programme)

DOTS is the only control strategy to consistently produce 85% cure rates.

**Directly:**
Resources should first be directed towards identifying sputum smear positive cases for treatment, as these people are the sources of infection. Until high cure rates are achieved, programmes should not actively search for other people in the community who might have TB, as this diverts scarce resources from curing the worse-affected cases who are spreading the disease.

**Observed:**
Patients must be observed swallowing each dose of their medicines by a health worker or trained volunteer.

**Treatment:**
TB patients must be provided complete treatment and be monitored to ensure that they are being cured.

**Short-course:**
The correct combination and dosage of anti-TB medicines — known as short-course chemotherapy — must be used for the right length of time. These drugs provide a knock-out punch to kill the TB bacilli. They include isoniazid, rifampicin, pyrazinamide, streptomycin and ethambutol.

Governments must support the DOTS strategy emphatically and make TB control a high political priority.
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ပုံစံများအားလုံးကို အကျိုးအမြင့်ပြုပါ။
The diagnosis of pulmonary TB is not easy. The main clinical symptom is cough. Cough due to an acute infection will usually be clearing up, or will have gone by 3 weeks; but cough due to tuberculosis will be unchanged or will get worse. This article will provide information on how to diagnose a TB case.

**Clinical symptoms of Tuberculosis**

Pulmonary TB will be suspected for all patients who have had a cough for more than 3 weeks. Persistent cough is usually accompanied by one or more of the following symptoms:

- Weight loss
- Tiredness
- Fever
- Night sweats
- Chest pain
- Shortness of breath
- Loss of appetite
- Productive cough (cough with sputum production)
- Hemoptysis (coughing up blood)

A person with extra-pulmonary TB may have the following general symptoms:

- Weight loss, Fever, Night sweats.

If a patient has any of these symptoms think of him as a tuberculosis suspect and proceed to sputum test. Because some time it is difficult to find AFB (Acid Fast Bacillus) in the sputum, repeat three times (= 1 set) the collection and examination of the sputum.

**Results:**

*Smear-positive pulmonary TB*

**EITHER:** a patient with at least two sputum specimens positive for acid-fast bacilli by microscopy;

**OR:** a patient with at least one sputum specimen positive for acid-fast bacilli by microscopy and radiographic abnormalities consistent with pulmonary TB; and a decision by a physician to treat with a full curative course of anti-TB chemotherapy;

**OR:** a patient with at least one sputum specimen positive for acid-fast bacilli by microscopy, which is culture positive for *M. tuberculosis*.

*Smear-negative pulmonary TB*

**EITHER:** a patient who fulfills all the following criteria:

- two sets (taken at least 2 weeks apart) of at least two sputum specimens negative for acid-fast bacilli on microscopy;

- radiographic abnormalities consistent with pulmonary TB and a lack of clinical...
response despite one week of a broad-spectrum antibiotic;

* a decision by a physician to treat with a full curative course of anti-TB chemotherapy;

**OR:** a patient who fulfills all the following criteria:

* severely ill;
* at least two sputum specimens negative for acid-fast bacilli by microscopy;
* radiographic abnormalities consistent with extensive pulmonary TB (interstitial or miliary);
* a decision by a physician to treat with a full curative course of anti-TB chemotherapy;

**OR:** a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.

N.B. It is apparent from the above definitions that in the absence of culture, standard chest radiography is necessary to document cases of smear-negative pulmonary TB.

**Differential diagnosis**

It has to be remembered that symptoms which characterize suspected tuberculosis cases can be found in other diseases like cancer, severe pneumonia, bronchiectasis, chronic bronchitis and paragonimus. South East Asia is a major endemic area for paragonimiasis (name of the disease due to Paragonimus Westermani, the lung fluke, an oval fluke worm or flatworm of reddish brown color, which is acquired through the ingestion of infected freshwater crabs or crayfish. In human, it is usually found in the lungs and sometimes in the pleura, liver, abdominal cavity, and elsewhere. It causes the disease known as parasitic or oriental hemoptysis). Paragonimus and Tuberculosis symptoms are similar. It is also difficult to identify paragonimus on sputum examination.

If a patient is A.F.B. negative (checked 2 times), with symptoms such as cough for more than 3 weeks, with blood, loss of weight, loss of appetite... we should think of paragonimus. The laboratory should check for paragonimus. A curative treatment named Praziquantel exists for paragonimus. Under strict medical supervision, if the laboratory exams are negative, a trial treatment can be given (be careful of the contraindications of the treatment and the posology or dosage system).

The flow chart gives you a procedure to follow.

**References:**

Pulmonary TB SUSPECT

Sputum AFB MICROSCOPY

AFB+++ AFB++ AFB+-

X-ray & medical officer's judgement

Yes TB

Repeat AFB & microscopy

AFB+++ AFB++ AFB+-

Treat smear positive PTB

AFB+-

Treat smear negative PTB

AFB--

No improvement

X-ray & medical officer's judgement

Yes TB

Consider other diagnoses

Improved (not TB)

No improvement

Treat with praziquantel for paragonimus

improved (not TB)

Broad spectrum antibiotics

No improvement

Improve (not TB)
မြင်ရွေးမှု - အချက်အလတ်:

...
Specimen Collection: Sputum Test

Dr. Philippe Gaerio, SMRU-Wellcome trust

The diagnosis of pulmonary TB depends on the microscopic examination of the sputum. The quality of sputum collection is an important step of the diagnosis and should be monitored carefully by medical staff.

Persons suspected of having pulmonary TB should have at least three sputum specimens examined by smear. A health care worker should coach and directly supervise the patient at least for the first time sputum is collected. It is best to obtain a series of three early morning specimens collected on different days.

Patients should be properly instructed how to produce a good specimen. They should be informed that sputum is the material brought up from the lungs and that mucus from the nose and throat and saliva are not good specimens. They should be instructed to follow these steps for producing a sputum specimen.

Quality of sputum collection is the responsibility of medical staff: medic, nurse or laboratory technician

Tell the patient to:
- Clean and thoroughly rinse the mouth with water.
- Breathe deeply three times (there would be a tickling feeling at the end of a very deep breath).
- Cough hard after the third breath, and try to bring up sputum from the depth of the lungs.
- Spit the sputum into a container, collecting at least one teaspoonful.

- Remain in the same place until coughing stops.

Coaching patients individually on how to expectorate can facilitate sputum collection.

Unsupervised patients are seldom successful in providing an adequate specimen, especially the first time. The amount of coaching required on later visits will depend on individual patient needs.

Gastric aspiration can also be used to obtain swallowed sputum specimens, but it is uncomfortable and invasive. It is, however, the best way to obtain specimens from infants and some young children who cannot produce sputum even with aerosol inhalation.

During specimen collection, patients produce an aerosol that may be hazardous to health care workers or other patients in close proximity. For this reason, precautionary measures for infection control must be followed during sputum induction:
- Don’t do it in a closed room. If possible the patient should be outside.
- In case of naso-gastric aspiration, use normal universal precaution.
Laboratory Diagnosis of Tuberculosis

The Ziehl-Neelsen Staining Technique

There are different methods for the diagnosis of tuberculosis in the laboratory. The most world-wide used is the microscopic detection of AFB (Acid Fast Bacilli) with the Ziehl-Neelsen staining technique.

Personal safety precautions

The organism responsible for tuberculosis is a bacteria called *Mycobacterium tuberculosis*.

W.H.O (World Health Organization) has classified microorganisms in 4 “risk groups” according to the danger they represent to the lab technician and the community.

*Mycobacterium tuberculosis* is classified in risk group III.

1. General safety rules

- Food is a good way to get infected: EATING IN A LAB IS NOT PERMITTED (Fig. 1).
- KEEP CHILDREN OUT OF THE LAB (Fig. 2).
- The laboratory must be kept neat, clean and free of materials not useful to the work.
- A special place, separated if possible, should be kept for the smearing and staining of sputum. This place should be well ventilated (but not windy) and with as much light as possible.
- This TB working area should have a bench with all the material required and a closed dust bin.
- No material should leave this place.
- Materials used in other department should not be brought to this place.
- While working, only one lab technician should do the smearing and staining; no other person should be in the room (the person on afternoon duty should process sputum).
- The bench must be decontaminated everyday after smearing with alcohol or with a chlorine or a bleach solution.
- The content of the bin must be disposed of daily and incinerated, someone has to be responsible for that.
- Specimen should be collected in a clean (need not to be sterile), dry, wide-necked and leak-proof container with a screw top. The specimen pot for stool samples is good for this purpose.

The plastic bag system widely used on the thai-burmese border is not recommended.

2. Safety rules applying to the worker.

- Wearing a “duck” mask with micro-pore filtration < 140 μm is recommended (Fig. 4). Surgical masks and cotton masks give a false impression of safety.
Fig. 3. Materials required for Ziehl-Neelsen staining technique
Picture taken at MSF TB lab, Maeda refugee camp.

- သင့်အား ဗြိတိုလိုက်တွေ့ရစေရန် အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း
- အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း မိမိ၏ ကိုယ်စားပြုဆောင်မှုန်းမှုများ တွေ့ရစေရန်
- အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း မိမိ၏ ကိုယ်စားပြုဆောင်မှုန်းမှုများ တွေ့ရစေရန်
- အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း မိမိ၏ ကိုယ်စားပြုဆောင်မှုန်းမှုများ တွေ့ရစေရန်

ဥပမာ:
- သင့်အား ဗြိတိုလိုက်တွေ့ရစေရန် အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း
- အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း မိမိ၏ ကိုယ်စားပြုဆောင်မှုန်းမှုများ တွေ့ရစေရန်
- အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း မိမိ၏ ကိုယ်စားပြုဆောင်မှုန်းမှုများ တွေ့ရစေရန်
- အရည်အသွေးများ ဗိုလ်ချင်းစွမ်း မိမိ၏ ကိုယ်စားပြုဆောင်မှုန်းမှုများ တွေ့ရစေရန်
- Wear gloves while smearing and fixing. remove and dispose of them before leaving the working area.

- Always wash your hands when work is completed.

**SPECIMEN CONTROL AND LABELLING**

If the lab technicians are in charge of the sputum collection they should explain well to the patient how to produce a good specimen (refer to the sputum collection article).

Specimen should always be brought on the bench of the TB working area and no others places.

You will have to check:

1. That the pot (not the lid) is correctly labeled with the name of the patient and the date.
2. That a request form has been sent along with the specimen and is correctly filled with at least Name, Age, and Sex.
3. The quality of the sputum:
   - Good sputum contains particle of pus (white, yellow or green), thread of fibrin, thick mucus and occasionally brownish streaks of blood. It comes from the lungs.
   - Bad sputum is a liquid secretion, transparent and bubbly coming from the mouth: this is Saliva. *Never process a saliva specimen*. Report on the request form and in your logbook: Inadequate specimen saliva.
4. The quantity of the sputum you need to have is at least a teaspoonful.

**SMEARING**

1. **Material needed:** (Fig. 3)
   - New slides with one end frosted for labeling. Do not re-use old slides as scratches can lead to false positive results.
   - Pencil.
   - Examination gloves and "duck" mask.
   - Bamboo or wooden sticks.
   - Wide-mouth pot with sand immersed in alcohol (old methanol can be used).
   - Spirit lamp, matches.
   - Dustbin.

2. **Method (follow the order for safety):**
   - Take a slide and check if it is clean.
   - Label the slide with the patient’s name and the date.
   - Put the gloves and mask on.
   - Light the flame of the spirit lamp.

**FIXING**

There are 2 methods: Heat fixation and Alcohol fixation.
• အားလုံးကို ကြက်ကလေးဗေဒန corticosteroidcs ကို အသုံးပြုသည်။
• ကြက်ကလေးဗေဒန corticosteroidcs ကို အသုံးပြုသည်။
• ကြက်ကလေးဗေဒန corticosteroidcs ကို အသုံးပြုသည်။

စာပေကြောင်းတစ်ခုခုကို အတိုက်အတွယ် အသုံးပြုသည်။
• ကြက်ကလေးဗေဒန corticosteroidcs ကို အသုံးပြုသည်။
• ကြက်ကလေးဗေဒန corticosteroidcs ကို အသုံးပြုသည်။

Fig. 5. Opening the specimen container
Picture taken at MSF TB lab, Maela refugee camp.
1. **Heat fixation:**
   - After checking that the smear is completely air-dry, rapidly pass the slide (smear uppermost) through the flame of the spirit lamp.
   - Caution: OVERHEAT can damage organisms and alter their reaction to the stain. After passing the slide through the flame 3 times, it should be possible to lay the slide on the back of the hand without feeling uncomfortably hot.

2. **Alcohol fixation:**
   - After checking the smear is completely air-dry, fix with 1 or 2 drops of 70% v/v methanol or ethanol (absolute methanol or ethanol can be used but needs to be diluted with clean water to a 70% v/v solution).
   - Leave the alcohol on the smear for a minimum of 2 minutes or until the alcohol dries on the smear.

**Important remarks:**
- Alcohol fixation is less damaging for organisms and cells.
- Alcohol fixation kills *Mycobacterium tuberculosis*, while heat fixation does not kill the bacilli. Therefore if stain is to be delayed it is safer to use alcohol fixation.

**STAINING**

1. **Staining principle:**
   - *Mycobacterium tuberculosis* is a bacillus that can be stained with carbol fuchsin (red dye). After staining an acid decolorizing solution is applied which removes the red dye from the background cells, tissue fibres and any organisms in the smear except those that are acid fast.

   Bacilli like *Mycobacterium tuberculosis* that retain (hold fast to) the carbol fuchsin are referred to as AFB: Acid Fast Bacilli.

   Following decolorization the smear is counter-stained with methylene blue, which stains the background material and provides a good contrast against which the red AFB can be seen.

2. **Staining technique:**
   - **Important note:** There is two Ziehl-Neelsen techniques: the hot staining technique and the cold staining technique. Only the cold one is described here.

   The important point to note is that the carbol fuchsin solution used in the hot staining technique is less concentrated than the one used in the cold one. Therefore if you do the cold technique with a carbol fuchsin solution prepared for the hot technique (solution less concentrated) you have good chance that *Mycobacterium tuberculosis* bacilli will not take the dye!

   So you should always know for which of the 2 methods your carbol fuchsin solution is intended for.
   - Cover the slide with filtered carbol fuchsin for 5 minutes.
   - All cells and organisms are colored in red.
   - Wash off the stain with clean water.
   - Cover the smear with 3% v/v acid-alcohol for 2 minute or until the smear is well decolorized.

   All cells and organisms are decolorized EXCEPT AFB, which retains carbol fuchsin.
   - Wash well with clean water.
   - Cover the smear with methylene blue for NOT MORE THAN 30 seconds.
   - All cells and organism (except AFB) are stained lightly in blue.

**Fig. 6.** Red acid fast bacilli (AFB) (co$\text{\&}$) of *Mycobacterium tuberculosis*, as seen with the 100x oil objective.
   - Wash with clean water.
   - Allow the slide to air-dry.

**Note:** *Mycobacterium tuberculosis* is killed after staining. Stained slides are not infectious.

**READING AND REPORTING OF RESULTS**

1. **Appearance of Mycobacterium tuberculosis**
   - They are red, straight or slightly curved, often appears not uniformly stained: areas of the bacilli deeper red than others (Fig. 6).
Fig. 7, Reading the smear

<table>
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<tr>
<th>Resource Type</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Issue 1</td>
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</tr>
<tr>
<td>Issue 2</td>
<td>2</td>
</tr>
<tr>
<td>Issue 3</td>
<td>3</td>
</tr>
<tr>
<td>Issue 4</td>
<td>4</td>
</tr>
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</table>

**Table:**

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<th>Description</th>
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<tbody>
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<tr>
<td>2</td>
<td>Issue 2</td>
</tr>
<tr>
<td>3</td>
<td>Issue 3</td>
</tr>
<tr>
<td>4</td>
<td>Issue 4</td>
</tr>
</tbody>
</table>

**Legend:**

- Issue 1: Description 1
- Issue 2: Description 2
- Issue 3: Description 3
- Issue 4: Description 4
They can appear singly, in small group (like a Chinese letter) or in big packs (less frequent).

2. Reading of the smear
   With immersion oil objective (X100), condenser up, diaphragm fully open.
   All areas of the smear should be looked at (Fig. 7).
   AT LEAST 300 FIELDS (TAKES 15/20 MINUTES FOR A COMPETENT LAB TECHNICIAN) MUST BE EXAMINED BEFORE REPORTING A NEGATIVE RESULT.

3. Reporting the results
   Report the results on the request form and in the lab logbook as follow:

<table>
<thead>
<tr>
<th>Number of AFB found</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>No AFB seen in 300 Fields</td>
<td>No AFB seen</td>
</tr>
<tr>
<td>1-2 bacilli / 300 fields</td>
<td>AFB rare</td>
</tr>
<tr>
<td>1-9 bacilli / 100 fields</td>
<td>AFB +</td>
</tr>
<tr>
<td>1-9 bacilli / 10 fields</td>
<td>AFB ++</td>
</tr>
<tr>
<td>1-9 bacilli / field</td>
<td>AFB +++</td>
</tr>
<tr>
<td>&gt; 9 bacilli / field</td>
<td>AFB ++++</td>
</tr>
</tbody>
</table>

LIMITATIONS OF THE DIAGNOSIS
- List of the main causes that may decrease drastically the sensitivity of the diagnosis:
  - Specimens badly collected are unlikely to show AFB.
  - Bad technique in smearing or staining.
  - Sensitivity is directly related to the time spent reading the smear. It should never be less than 15 minutes for a negative slide.

QUALITY CONTROL
- When you have positive sputum, make some extra smears that you alcohol fix. Do not stain and store in a clean and dry box. The ideal is to have a stock of slides with high and low AFB positivity.

At regular intervals and when a new batch of stain is started, two sputum smears of known high and low positivity should be stained with the routine smears to check that the carbol fuchsin dye, staining technique and microscopical examination of smears are correct.

These slides can also be used to assess the quality of lab technicians in staining and reading.

LAST WORD
- Keep in mind that Paragonimiasis is also a lung disease (caused by a Parasite: Paragonimus westermani) in which symptoms are similar to those of tuberculosis. This parasite is ingested when eating uncooked river crabs or shrimps and is common on the Thai-Burmese border.

Sputum can have characteristic rusty color.

Therefore it is strongly recommended to systematically look for paragonimus in every sputum.

This is done by making a wet preparation between a slide and a cover slip, directly after smearing.

Take care as wet preparation can contaminate (may contain AFB). Follow the safety rules used for smearing.

Reading with objective x10 (condenser down, diaphragm slightly open) can be done while the TB smear is air-drying.
Treatment of Tuberculosis of The Lungs (Pulmonary TB) Dr. Jonathan Nield, MSF

WHY TREAT TUBERCULOSIS (TB)?
By treating Tuberculosis we try to do 3 things:
1. Stop people dying from TB (if untreated 50% patients die in 5 years);
2. Reduce damage of the lungs by the TB disease;
3. Avoid people being infectious to others and thus prevent the spread of TB (untreated 20% chronic cases).

WHICH MEDICINES ARE USED TO TREAT TB?
There are 5 main medicines used to treat TB:

1. ISONIAZID (H) Tablet 100 mg / 300 mg
2. Rifampicin (R) Capsule 150 mg / 300 mg / 450 mg
3. Pyrazinamide (Z) Tablet 500 mg
4. Ethambutol (E or M) Tablet 200 mg / 400 mg / 500 mg
5. Streptomycin (S) Injection vial 1 g

Sometimes 2 others are used:
THIACETAZONE (T) Tablet 150 mg
P.A.S. (P) Granules in g

In some special circumstances some other drugs may be used, such as Ethionamide, Prothionamide, Cycloserine, Capreomycin, Kanamicin, Amikacin, Ofloxaclin, Rifabutin.

HOW ARE TB MEDICINES USED?
Drugs used to treat Tuberculosis should be given in combinations of at least 2 drugs and often 3 or 4 together. This is to prevent the TB bacteria from adjusting and getting used to one medicine so that the drug stops working (that is, the TB bacteria become resistant to the drug). It is much more difficult for the TB bacteria to adjust to and become resistant to 2 or more drugs at the same time. For this reason a person suffering from TB should never be given only one drug alone and if the first treatment is failing the medic should never add only one drug to the treatment.

TB drugs are often used in two phases: an “initial” phase often lasting 2 months with 3 or 4 drugs used together, and a “continuation” phase often lasting 4 or 7 months using 2 or 3 drugs together.

The drugs can be given daily or intermittently, which means 3 times a week (at higher doses). Usually the drugs are given daily, but whichever is chosen, only a recognised drug regime in which the combination and dosages and length of treatment have been proved to work in a scientific trial should be used. If the health worker is not sure of all these 3 aspects of the treatment, he must check before prescribing the
drugs. He should always write down the drug regime (combination / length of treatment / dosages) on the patient’s record at the start of the treatment.

**HOW TO WRITE THE TREATMENT REGIME?**

A short way of writing the treatment is often used. For example, the most common treatment used in Thailand and many other countries is written:

2 HRZE / 4 HR

To read this short way you have to know that:

- the symbol divides the “initial” phase from the “continuation” phase;
- the numbers indicate the number of months the treatment has to be taken (length of the treatment).

In this example the “initial” phase is 2 months and the “continuation” phase is 4 months.

- the capital letters indicate which drugs the patient will take every day during the two phases.

2 HRZE means that for the first “initial” phase of 2 months the patient is given every day four drugs: isoniazid (H), rifampicin (R), pyrazinamide (Z) and ethambutol (E).

4 HR means that for the next 4 months “continuation” phase, the patient is given every day two drugs: isoniazid (H) and rifampicin (R).

A fully intermittent regime of 4 drugs, 3 times a week for 6 months is written: 6E,2HR,2Z.

A regime with a daily initial phase and intermittent continuation phase is 2EHRZ / 4H,R.

**HOW IS THE DOSE WRITTEN?**

Isoniazid and Rifampicin are always written in milligrams (mg).

One thousand milligrams equals one gram (1000mg = 1g).

Care must be taken when writing the doses of Streptomycin, Pyrazinamide and Ethambutol. These can be written in milligrams or grams e.g. Streptomycin 0.75g or 750mg, Pyrazinamide 1.5g or 1500mg, Ethambutol 1.2g or 1200mg. Great care must be taken to write clearly the mg or gram and to write the dot (decimal point) if you use gram.

**HOW LONG IS THE TREATMENT?**

The minimum length of the treatment depends on which drugs are used. Sometimes, if the patient and bacteria are slow to improve, the treatment is made longer. Also some more serious forms of TB (e.g. TB meningitis) are treated for a longer period.

Length of the treatment depends on:

1. **Drugs used**
   - drugs available
   - patient factors = “contraindications” (reasons for not giving a drug).

2. **Part of the body affected** (lungs, brain, bone, etc.)

3. **Response of patient**
   - sputum microscopy
   - clinical assessment.

**SIX (6) MONTHS REGIMES WITH ‘H’ ‘R’ and ‘Z’**

A minimum time for treatment is 6 months if pyrazinamide (Z) is used for at least two months and isoniazid (H) and rifampicin (R) for the whole 6 months: 2HRZ / 4HR.

Adding ethambutol (E) or streptomycin (S) does not shorten the treatment: 2EHRZ/4HR or 2SHR/4HR it only strengthens the treatment against resistance.

**NINE (9) MONTHS REGIMES WITH ‘H’ and ‘R’**

If no pyrazinamide is used and the treatment includes rifampicin (R) throughout, the treatment must be at least 9 months: 9HR or 2EHR/7HR or 2SHR/7HR.
<table>
<thead>
<tr>
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<th>အက်စ်စ်အတွက်</th>
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<td>١٠٠ mg</td>
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<td>၆၀၀ mg</td>
<td>၀ g</td>
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<td>၅၀ g</td>
<td>၀ g</td>
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<td>မြင်ခြင်းစေ့</td>
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</table>

(ပါးမြစ်စေ့တွင် အက်စ်စ်စေ့တွင် ဖောင်ရေးမလိုက်တာ ဖောင်ရေးမလိုက်)
TWELVE (12) MONTHS REGIMES
WITH ‘H’
If no rifampicin is included, a minimum of 12 months treatment is needed and often 18 months.

For example: 2SHE/10HE or 2SHT/10HT or 2SHP/10HP.

Rule
- include H + R + Z = 6 months
- include H + R (throughout) = 9 months

2EHRZ/6HE – no rifampicin in the “continuation” phase.
2SEHR/6HR – used when Z can not be used but eyes, ears and kidneys are healthy.

If Z were added to the 12 month regimes (without R), it might be possible to shorten the treatment, but possible combinations of this type have mostly not been tested in clinical trials and thus cannot be used.

Where H can not be used a 9 month regime 2SERZ/7ER has been shown to be effective.

Doses used for daily treatment of pulmonary TB in adults

<table>
<thead>
<tr>
<th>Drug</th>
<th>Daily Dose</th>
<th>Max Daily Dose</th>
<th>Adjust for age</th>
<th>Do not give if</th>
</tr>
</thead>
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<tr>
<td>ISONIAZID</td>
<td>5 mg / kg</td>
<td>300 mg</td>
<td>not usually</td>
<td>jaundice</td>
</tr>
<tr>
<td>RIFAMPICIN</td>
<td>10 mg / kg</td>
<td>600 mg</td>
<td>not usually</td>
<td>jaundice</td>
</tr>
<tr>
<td>PYRAZINAMIDE</td>
<td>30 mg / kg</td>
<td>2.5 g</td>
<td>not usually</td>
<td>gout, liver problem, jaundice</td>
</tr>
<tr>
<td>ETHAMBUTOL</td>
<td>15 mg / kg</td>
<td>1200 mg</td>
<td>yes</td>
<td>poor eyes, kidney failure, unconscious, child below 8, deaf</td>
</tr>
<tr>
<td></td>
<td>25 mg / kg</td>
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<td>max 15mg/kg over 45 years</td>
<td></td>
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<tr>
<td></td>
<td>initial phase (max 2 months)</td>
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<td></td>
<td></td>
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<tr>
<td>STREPTOMYCIN</td>
<td>15 mg / kg</td>
<td>1 g</td>
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<td>poor hearing, kidney failure, pregnancy, blind</td>
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<td></td>
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<td></td>
<td>max 0.75 g over 45 years</td>
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Health Messenger ISSUE 7. DECEMBER, 1999
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<td>၄၃၉</td>
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<td>၄၄၀</td>
<td>ကြွက်ထောက်ပံ့ချက်များ တင်သင့်ပါသည်။</td>
<td>၄၄၀</td>
<td>ကြွက်ထောက်ပံ့ချက်များ တင်သင့်ပါသည်။</td>
</tr>
</tbody>
</table>
WHEN SHOULD SOME DRUGS BE AVOIDED (CONTRAINDICATIONS)

The health worker must ask all patients about their age, eyesight, and hearing and about jaundice and gout.

Ethambutol
Young children should not be given ethambutol as they can not warn if their eyesight is affected.

Ethambutol should also not be given to anyone with poor eyesight or very poor hearing (because deaf people depend on their eyes more) and should not be used in kidney failure.

The higher dose of ethambutol should be avoided in older people and the lower dose of 15 mg/kg should also be the maximum for people with diabetes or hypertension whose eyes and kidneys may have been damaged.

Ethambutol is removed from the body by the kidneys and too much ethambutol in the body damages the nerve to the eye causing loss of sight (dose related toxicity causing optic neuritis).

Streptomycin
Streptomycin is also removed from the body by the kidneys and too much drug causes damage to hearing and the kidneys.

Kidney function reduces with age as do hearing and eyesight. Over 45 years of age the daily dose should not be higher than 0.75 mg and it should not be used in people with weak kidneys, poor hearing or blindness.

Pyrazinamide
Pyrazinamide should be avoided in people with liver failure or hepatitis (jaundice) and with a history of gout.

Rifampicin
Rifampicin usually does not cause major problems. It should be avoided in significant liver failure.

Isoniazid
Isoniazid usually does not cause major problems. The dosage should be reduced in significant renal failure.

Regimes which may be used if one or more drugs can not be used

<table>
<thead>
<tr>
<th>Cannot give</th>
<th>Reason</th>
<th>Use</th>
<th>Total length</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Resistant to H alone</td>
<td>2SERZ/7ER</td>
<td>9 months</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Not available</td>
<td>2SHE/10HE</td>
<td>12 months</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>Gout</td>
<td>2EHR/7HR</td>
<td>9 months</td>
<td>Gout most often affects big toe</td>
</tr>
<tr>
<td></td>
<td>Liver failure</td>
<td>2SEHR/6HR</td>
<td>8 months</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Poor eyesight Under 8 years</td>
<td>2SHRZ/4HR</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td>E+S</td>
<td>Renal failure Very poor eyes or Very poor hearing</td>
<td>2HRZ/4HR</td>
<td>6 months</td>
<td>Elderly, diabetic, high blood pressure</td>
</tr>
<tr>
<td>R+Z</td>
<td>Severe liver failure</td>
<td>2SHE/10HE 2SHE/10S,H₃</td>
<td>12 months</td>
<td>Alcoholic or hepatitis with jaundice. Good kidneys needed</td>
</tr>
</tbody>
</table>
မြန်မာ့စာတန်းအချက်အလက်များအနေဖြင့် စာသားနှင့် အရေများကို ဖော်ထားပယ် ပြုပြင်ပေးသည်။

<table>
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<tr>
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<th>ဖော်ထားပယ် ပြုပြင်ပေးသည်</th>
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<td>ဖော်ထားပယ် ပြုပြင်ပေးသည်</td>
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<td>အမည်ပေးချက် ကို ပြုပြင်ပေးသည်</td>
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<tr>
<td>အရေများ ကို ပြုပြင်ပေးသည်</td>
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ပြုပြင်ပေးသညဵကြား၀င်မှုအတွက် အရေများကို ပြုပြင်ပေးသည်။
## The main side effects of TB drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Effect</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethambutol</td>
<td>reduced vision</td>
<td>➔ STOP IMMEDIATELY</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>hearing loss</td>
<td>➔ if tinnitus*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➔ if prolonged dizziness*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➔ if reduced hearing</td>
</tr>
<tr>
<td></td>
<td>skin rash</td>
<td></td>
</tr>
<tr>
<td>Pyrazinamide</td>
<td>gout</td>
<td>➔ STOP</td>
</tr>
<tr>
<td></td>
<td>toxic liver damage</td>
<td>➔ STOP</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>“allergic” hepatitis</td>
<td>➔ STOP IF JAUNDICE. May start again later with care (“desensitise”)</td>
</tr>
<tr>
<td></td>
<td>peripheral neuropathy</td>
<td>➔ PREVENT WITH VITAMIN B6 (10 mg daily)</td>
</tr>
<tr>
<td></td>
<td>skin rash</td>
<td>➔ TREAT WITH VITAMIN B6 (100 mg daily)</td>
</tr>
<tr>
<td>Isoniazid</td>
<td>“allergic” hepatitis</td>
<td>➔ STOP IF JAUNDICE. May start again later with care (“desensitise”)</td>
</tr>
<tr>
<td></td>
<td>peripheral neuropathy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>skin rash</td>
<td></td>
</tr>
<tr>
<td>Thiactzone</td>
<td>skin rash</td>
<td></td>
</tr>
<tr>
<td></td>
<td>skin rash with mucous membranes (eyes, mouth, anus, genitals) involved</td>
<td>➔ STOP and never give again</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Summary

1. TB can be CURED.
2. Use combination treatment, e.g. 2EHRZ/4HR.
3. Make sure a scientifically proven regime is used. (All the regimes in this article are proven treatments).
4. Use the correct combination, length and dose of medicines.
5. Never use or add only one drug alone.
6. Ask the patient about problems that might make a drug not acceptable (jaundice, gout, poor eyesight, poor hearing).
7. Check the age and weight of the patient and check whether the dosage of drugs is correct for that age and weight.
8. Tell the patient about possible side effects of drugs and what to do if they occur.
9. Listen to the patient and try to help him understand his illness, treatment and how it will affect his life.
10. Always check the sputum before starting and before stopping treatment and before changing any drugs (including the change from “initial” to “continuation” phase, after 2 months).
<table>
<thead>
<tr>
<th>လေး</th>
<th>ငါး</th>
<th>ပိုး</th>
<th>သာ</th>
<th>တိုး</th>
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</thead>
<tbody>
<tr>
<td>ပျမှုရောင်းပေး/ ပျမှုရောင်းပေး</td>
<td>ပျမှုရောင်းပေး</td>
<td>ပျမှုရောင်းပေး/ ပျမှုရောင်းပေး</td>
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</tbody>
</table>

**စာရင်း**

- regime (ဗိုလ်ချုပ်အား)
- tinnitus (သင်္ဆောင်ခြင်း)
- dizziness (တိတ်ရောက်ခြင်း)
- peripheral neuropathy (ပိုးချိန်စစ်ဆေးခြင်း)
### Summary of some proven treatment regimes

<table>
<thead>
<tr>
<th>6 MONTHS</th>
<th>8 MONTHS</th>
<th>9 MONTHS</th>
<th>12 MONTHS</th>
<th>18 MONTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2HRZ / 4HR</td>
<td>2EHRZ / 6EH</td>
<td>9HR</td>
<td>2SHE / 10HE</td>
<td>2SHEZ / 16HE</td>
</tr>
<tr>
<td>2EHRZ / 4HR</td>
<td>2SEHRZ / 6HR</td>
<td>2EHRZ / 7HR</td>
<td>2SHT / 10HT</td>
<td>2HEZ / 16HE</td>
</tr>
<tr>
<td>2SHRZ / 4HR</td>
<td>2SHR / 7HR</td>
<td>2SHP / 10HP</td>
<td>2SHE / 10S,Hj</td>
<td>2SHE / 10S,Hj</td>
</tr>
<tr>
<td>2EHRZ / 4H3R3</td>
<td>2SERZ / 7ER</td>
<td>2SHE / 10S3Hj</td>
<td>2SHE / 10S3Hj</td>
<td></td>
</tr>
</tbody>
</table>

This article is meant for improving the knowledge on treatment of TB. Health workers are hereby requested to follow the protocol usually adapted by their respective organizations.

### Glossary
- **regime:** a strictly regulated scheme of medicine
- **tinnitus:** a noise in the ears, as ringing, buzzing, roaring, clicking, etc.
- **dizziness:** a sensation of unsteadiness with a feeling of movement within the head.
- **peripheral neuropathy:** functional disturbance and/or pathological changes of the peripheral nervous system.

### References
Pregnancy does not change the course of active TB or place women at greater risk of disease reactivation. However, a pregnant woman with infectious pulmonary tuberculosis may infect her unborn or newborn child. Most commonly the newborn is infected shortly after birth from airborne bacilli (from the mother’s cough) and this causes miliary TB or TB meningitis by the time the infant is 2 or 3 months old. It is rare for the infant to have been infected in the uterus (spread from the mother’s blood across the placenta to the foetus). In such cases there can be stillbirth or if liveborn, the newborn has low birth-weight, fever, respiratory distress, hepatosplenomegaly (enlargement of liver & spleen), and is at high risk of dying if not treated rapidly. Treatment of the mother with active disease during her pregnancy removes the risk to the foetus. It is important to diagnose and start treating a woman with pulmonary TB during pregnancy. During antenatal care a women with a cough lasting more than 4 weeks should be given extra attention and when suspected of having TB, have sputum sent for microscopy.

**Obstetric problems for pregnant women with TB**

All pregnant women should attend antenatal care and especially women under TB treatment. Routine antenatal care should be provided. However, foetal growth, anaemia and nutrition need extra attention. Women with TB diagnosed during pregnancy are often underweight and their foetus is growth retarded. Extra nutrition is required.

If lung function is badly affected by TB then late pregnancy and labour can be more difficult for the woman. Induction of labour, 48 hours after giving a course dexamethasone for foetal lung maturation (from 26 weeks gestation), can be considered if the woman is struggling to maintain the pregnancy. Oxygen therapy and vacuum extraction (but not for premature infants) may be required in the 2nd stage of labour, if maternal or foetal distress is present.

**Drug use in pregnancy**

Untreated TB is a greater risk to the mother and infant than the possible side effects of the drugs used for treatment. Isoniazid is considered the safest drug for use in pregnancy but should be given with vitamin B6 supplements to eliminate the risk of toxicity to the infant’s and mother’s nervous system. Streptomycin (or drugs of the same family such as kanamycin) should be avoided in pregnancy (if there are alternative drugs available), as it can cause deafness in as many as one in six babies. Use ethambutol instead of streptomycin. Ethionamide or
မယ်လာမီးချိန်ကို ရောက်ရှိရမည်။ သူများအကြောင်း နေထိုင်ရာစီးပွားရေး အရေးကြီးမှုများကို အားလုံးကို အရှင်အဝေးသော သဘာဝိုင်းနှင့် ကောင်းမွန်ခွင်များအား ပြုလုပ်ပါ။

ကြက် ကလေးများအားလုံးကို အားလုံး အနေဖြင့် မိုးအား ချောင်းဆောင်ပါ။

မိုးမိုးစွဲဆောင်ရွက်လျင်မှာ လူနေထိုင်ရာ စီးပွားရေး အရေးကြီးမှုများကို အားလုံးကို အရှင်အဝေးသော သဘာဝိုင်းနှင့် ကောင်းမွန်ခွင်များအား ပြုလုပ်ပါ။

(3) သူများအကြောင်း နေထိုင်ရာစီးပွားရေး အရေးကြီးမှုများကို အားလုံးကို မိုးအား ချောင်းဆောင်ပါ။

(4) ကြက် ကလေးများနှင့် ပတ်သက်ရာ စီးပွားရေး အရေးကြီးမှုများကို အားလုံးကို မိုးအား ချောင်းဆောင်ပါ။

(5) အကွေးကွေးမှုသာ ပြုလုပ်ရမည်။ အခြား ပတ်သက်ရာ စီးပွားရေး အရေးကြီးမှုများကို အားလုံးကို မိုးအား ချောင်းဆောင်ပါ။

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Depo provera ကို အသုံးပြုပါ။ အားလုံးကို ဝါကျောင်းသားများပေါ် ပေါင်းစည်းပါ။

medroxyprogesterone acetate ကို အသုံးပြုပါ။ အားလုံးကို ဝါကျောင်းသားများပေါ် ပေါင်းစည်းပါ။

Norplant ကို အသုံးပြုပါ။ အားလုံးကို ဝါကျောင်းသားများပေါ် ပေါင်းစည်းပါ။
prothionamide can cause abnormalities of development in the foetus. Just a few weeks after starting treatment the woman will no longer run the risk of infecting her child because during the first few days of isoniazid treatment about 90% of TB bacilli are killed.

If pulmonary TB is diagnosed (i.e. the mother is sputum positive) at the time of birth the pregnant woman should be given the standard treatment.

a) If the infant is ill at birth and congenital TB is suspected then full antituberculosis treatment is required.

b) If the newborn is well, MSF recommendations depend on whether tuberculin testing is available or not:

1) No tuberculin testing available: start the baby on isoniazid prophylaxis, dose 5-10mg/kg per day for 6 months. If there is a lot of primary isoniazid resistance full treatment of the newborn should be considered.

2) Tuberculin testing is available: prophylaxis can be given to the newborn for 2 months and then the newborn can be tuberculin tested. If this is negative and the mother is no longer infectious the isoniazid can be stopped and BCG given. If the tuberculin test is positive then chemoprophylaxis should continue for a total of 6 months.

c) Breast-feeding should always be encouraged and the mother and child must not be separated in such cases.

**Tuberculosis and Family Planning**

There are two reasons why all women of child-bearing age who are on TB treatment need to be advised about family planning: 1) to prevent the risk of toxic drug effects on the foetus and 2) to avoid the combined stress of TB and pregnancy on the mother. Sexually active women should be given effective family planning while they are on TB treatment.

Remember that rifampicin increases the metabolism of oestrogens and make the contraceptive pill less effective. The pill will not be effective at the normal dose and is best avoided.

The most effective contraceptive method to use for women having TB treatment is a non-hormonal method, such as the IUD (Intra-Uterine Device). Condoms can be used but only if both the partners realize the importance of using them every time they have sex. Depo provera can be used but 150mg of medroxy-progesterone acetate every 10 weeks is recommended (normally every 12 weeks) and women need to be counselled about menstrual changes such as spotting. No studies have looked at the use of Norplant and TB treatment.

**References:**


မြှုပ်နှံခဲ့သည့်စာမျက်နှာပါးမှုအတွက်

ကျွန်ုပ်တို့သည် ပြည်ထောင်စုထိုင်းနိုင်ငံ အမျိုးသားများအတွက် ကျွန်ုပ်တို့၏ စိုက်ထိုးမှုများကို ဖော်ပြပါသည်။

အနေဖြင့် မြန်မာ့စိုက်ထိုးမှုများကို ဖော်ပြပါသည်။

စိုက်ထိုးမှုများကို ဖော်ပြပါသည်။

စိုက်ထိုးမှုများကို ဖော်ပြပါသည်။

စိုက်ထိုးမှုများကို ဖော်ပြပါသည်။
Tuberculosis in children represents 5-15% of the total number of TB cases worldwide. The presentation of TB in children is slightly different from that seen in adults and has specific problems. It is, therefore, important to be aware of these differences when we approach TB cases or suspects who are children. Children below five are also more susceptible to TB infection.

**Mode of transmission**

Airborne transmission is the most common mode of TB infection in children. This usually results from contact with an infected adult, usually parents, relatives, neighbors and/or teachers.

**Pathogenesis of infection**

Most of the TB infection occurs due to airborne transmission and inhalation of the bacilli into the lungs. In developing countries, it is common for children to be exposed to the TB bacteria at an early age. The bacteria, once in the lungs, try to multiply and increase in number. On the other hand, the immune responses of the body tries to control the bacteria. During this process in which the bacteria is fighting with the immune cells of the body, there is some damage to the lung tissue as well as enlargement of nearby lymph nodes. The area of the lung that is damaged along with the enlarged lymph nodes is called the 'Primary Focus'. From this stage the infection can proceed in two ways.

1. Usually, the immune response of the body is good enough to limit the infection. When this happens, the child does not develop active TB and the lung damage may gradually heal. Sometimes, a few bacteria may remain in the lung but the number is not large enough to cause active disease. However, these bacteria may get activated later in life and cause active disease. This activation may be caused by exposure to more TB bacteria and also depressed immune response.

2. If the immune response is poor or factors increasing susceptibility to infection are present (outlined below) the child may develop active TB. This is because the defense mechanism of the body is unable to fight off the bacteria and limit its multiplication.

**Susceptibility of children to TB infection**

The following factors may affect a child's susceptibility to TB infection.

1. Extent of exposure - The extent of exposure is extremely important. The longer the contact with the infected person, the more likely the child will develop TB.

2. Immune status - This is an important factor. BCG vaccination has been shown to be
useful in reducing severe disease as well as extrapulmonary TB. On the other hand, diseases that reduce the immune response of a child (HIV) and some drugs (Steroids) can increase the susceptibility towards TB.

3. Other diseases - Measles and Whooping cough can increase the susceptibility to TB.

4. Nutritional status - Malnutrition is an important contributory factor. TB infection can cause malnutrition and malnutrition can increase susceptibility to TB, which creates a vicious cycle.

5. Ventilation - Inadequate ventilation predisposes to transmission of TB because it increases the extent of contact.

**CLINICAL FEATURES**

The signs and symptoms of TB in children include the following:

**Symptoms**

1. Failure to gain weight or loss of weight.
2. Low energy, weakness.
3. Cough
4. Irritability
5. Fever

**Signs**

1. Clubbing (sometimes)
2. Crepitation (crackles) of the lungs [Commonly Upper Lobe]
3. Wheeze
4. Signs of Pleural Effusion
5. Painless enlarged lymph nodes
6. Abdominal distension

*Failure to gain weight is one of the most important clues in the diagnosis of TB in children because it can cause the vicious cycle of TB and malnutrition.*

**Diagnosis**

The diagnostic methods used for TB are the same as that used in adults and are described in the relevant article. Diagnosis of TB can be more difficult in children and therefore there is a greater tendency to miss the diagnosis.

Sputum AFB testing in children is not as useful as it is in adults. This is because a large number of children with TB are smear negative. It may be due to the fact that sputum collection in children is not very reliable. It is difficult to explain the production of good quality sputum to children and ensure their compliance.

**Treatment**

Treatment of cases must be done in accordance with protocols of the National TB control program recommendations. Standard TB protocols are outlined in the article on TB Treatment.

Parents should be explained in detail how important it is to complete TB treatment. It should be explained that it is dangerous to discontinue treatment before completing the course, even though the child might look and feel better. Encouraging adequate nutrition should also be stressed.

**Prophylaxis**

This is a controversial topic especially in areas with high transmission and where most of the population have been immunized with BCG. However, it has been recommended in children below five who are household contacts of a TB patient as it reduces the incidence of severe disease. INH is given in a dose of 5mg/kg daily for a period of six months as a prophylactic measure.
မိုးဗားခြင်း

ဘုံနှင့်အားလုံးပြုသော အားလုံးနစ်ဆိုင်ရာ ပေါင်းစည်းချက်တွေ အတွက် ပြုစုသော အလိုအပျဳားများ

ပြုစုချက်တွေကို ပြုစုပြီးနောက် လူမှော်ကြားခြင်း

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<table>
<thead>
<tr>
<th>Term</th>
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<tr>
<td>Pathogenesis</td>
<td>မိုးဗားခြင်း</td>
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<tr>
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<td>လေ့လာချက်</td>
<td>Clubbing</td>
</tr>
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<td>စံပါရောင်ချက်</td>
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<tr>
<td>Wheeze</td>
<td>အရွှေ</td>
<td>Wheeze</td>
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<tr>
<td>INH: isoniazid</td>
<td>အိလ်စ္စား</td>
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</table>

INH (5mg/kg/day)
However, its compliance must be ensured because otherwise it may lead to INH resistance. Compliance may be difficult because the child may not have any sign and symptom of TB and the parents may forget or resist giving the child medication. For these reasons INH prophylaxis is not recommended in refugee settings.

**Congenital TB**
This is an extremely rare condition. It occurs as a result of blood spread by a TB infected mother via the umbilical cord. It can also occur due to aspiration of infected amniotic fluid.

This condition requires aggressive therapy with anti-TB drugs and is associated with a very high mortality (more than 50%).

**Infants born to mothers with TB**
In case of infants born to mothers with active TB, the following simple guidelines are advised:

1. Allow the child to stay with the mother and continue breastfeeding.
2. If the mother is smear negative, give the infant BCG.
3. If the mother is still sputum AFB positive assess the child carefully:
   - if the child is ill, congenital TB should be suspected and full anti-TB treatment should be given.
   - if the child is well consider prophylaxis with INH (5mg/kg/day) for six months. Alternatively, give INH for two months and then do a tuberculin test. If positive continue for another four months. If negative, stop INH and give BCG vaccination. Do not administer BCG while the child is receiving INH prophylaxis.

**Score system for the diagnosis of TB in children**
This system has been devised to improve the diagnosis of childhood TB. Each clinical feature can be assigned with a numerical score as per the chart below. The higher the score, the higher the likelihood of TB. A score of 7 and above indicates a high likelihood of TB.

**References**

**Glossary**

- **Pathogenesis:** the development of a disease
- **Susceptibility:** the state of being readily affected or acted upon; lack of immunity.
- **Clubbing:** a proliferative change in the soft tissues about the terminal phalanges of the fingers or toes.
- **Crepitation:** a sound like that made by rubbing the hair between the fingers, or like that made by throwing fine salt into a fire. Usually caused due to inflammation of the pleurae (covering of the lungs).
- **Wheeze:** a whistling sound made in breathing.
- **Pleural effusion:** presence of fluid in the pleural space.
- **Prophylaxis:** the prevention of disease; preventive treatment; the prevention of infection in an individual.
- **INH:** isoniazid.
<table>
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<th>၂</th>
<th>၃</th>
<th>၄</th>
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<td>၁-၃</td>
<td>&gt;၃</td>
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<td>၆၀-၁၀</td>
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ပြည်သူများအတွက် ထောက်ပံ့
### Score system for the diagnosis of TB in children

**Score chart for the diagnosis of TB in children**

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<tr>
<th>Feature</th>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Score</th>
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<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>duration of illness (weeks)</td>
<td>&lt;2</td>
<td>2 - 4</td>
<td></td>
<td>&gt;4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nutrition (% weight for age)</td>
<td>&gt;80</td>
<td>60 - 80</td>
<td></td>
<td>&lt;60</td>
<td></td>
<td></td>
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<tr>
<td>family history of TB</td>
<td>none</td>
<td>reported by family</td>
<td>proved sputum positive</td>
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<td></td>
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<tr>
<td>tuberculin test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>positive</td>
<td></td>
</tr>
<tr>
<td>malnutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>not improving after 4 weeks</td>
<td></td>
</tr>
<tr>
<td>unexplained fever and night sweats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>no response to malaria treatment</td>
<td></td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>lymph nodes</td>
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<tr>
<td>joint or bone swelling</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>abdominal mass or ascites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.N.S. signs and usually abnormal C.S.F. findings</td>
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<td></td>
</tr>
<tr>
<td>angle deformity of spine</td>
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</tbody>
</table>

**TOTAL SCORE**
Ma Khin's Case

Dr. Cynthia Maung

Ma Khin, a 39 year old female, mother of four children, had been experiencing abdominal discomfort and dyspepsia for six months. Her bowel habit changing between constipation and loose motion. The stool was foul smelling with no blood or mucus. Gradually she lost appetite and felt tired & weak. She also had low grade fever with night sweating. She had no other problem.

On 13 July, 1999, she came to the clinic with the following complaints:
- Colicky abdominal pain for 2 months which got worse the previous 3 days
- Loose motion once or twice a day

After examining her it was found that she had slightly distended lower abdomen with a lower abdominal mass after palpation. The mass was like a 6-week size uterus, firm in consistency with undefined margins, surface was matted and freely mobile. There was tenderness in the lower abdomen especially on the mass. On percussion, no free fluid was detected but dullness on the mass. Auscultation revealed decreased bowel sounds.

The medic diagnosed Ma Khin to be a case of pelvic inflammatory disease (PID) and she was treated accordingly with antibiotics. Ma Khin was feeling better after the treatment. On the fifth day of treatment (July 18, 1999), the symptoms improved, temperature was normal and no more tenderness was present on the mass. But the size of the mass did not change.

Then a vaginal examination was done. The uterus appeared to be normal in size, left and right fornices were clear, nothing was detected in the Pouch of Douglas and no blood or discharge was noticed. Several investigations were done too which included sputum test for AFB, x-ray chest, blood for ESR and hemoglobin. An ultrasound of the abdomen was done.

Sputum test was negative for 3 consecutive days, chest x-ray clear, ESR 75mm/1st hour and hemoglobin as 9.7 gm/dl. Ultrasound showed mesenteric lymphadenitis.

On the 25th of July, the doctors started the treatment of Tuberculosis with Isoniazid (300mg), Rifampicin (300mg), Ethambutol (800mg) and Pyrazinamide (1000mg), all for once daily dosage.

On 25th of August, Ma Khin’s condition improved. She had good appetite and the mass reduced in size (5cm x 5cm). The treatment continued.

Ma Khin's case was an unusual one. She was detected to be suffering from mesenteric lymphadenitis which is not so common.
Abdominal regions. The abdomen can also be divided into nine regions. Lines are superimposed over internal organs.
**Discussion**

The following points can be taken for discussion:

1. What are the differential diagnosis of mass in the lower abdomen?
2. What are the clinical manifestations of tuberculous abdomen?
3. How to describe the abdominal mass?

**1) Differential diagnosis of mass in lower abdomen**

- Appendicular mass
- Amoeboma
- Tubovarian mass
- Ovarian cyst
- Myoma uterus
- Carcinoma cecum
- Tuberculous cecum
- Tuberculous mesenteric lymphadenitis

**2) Clinical manifestations of tuberculous abdomen**

- Abdominal pain 90%
- Fever 60%
- Loss of weight 60%
- Ascites 60%
- Changes in bowel habit
- (constipation and/or loose motion) 60%
- Night sweats 37%
- Abdominal mass 26%

**3) How to describe an intra-abdominal mass**

- Site (locate by nine regions or four quadrants)
- Shape (rounded, oval, irregular)
- Size
- Consistency (soft, cystic, firm, hard)
- Tenderness
- Mobile or fixed
- Percussion

Abdominal quadrants. Lines are superimposed over internal organs to demonstrate the relationship of the organs to the quadrants.

**Glossary**

**Colicky**: affected by colic, that is, acute abdominal pain characterized by intermittent visceral pain with fluctuations corresponding to smooth muscle peristalsis (characteristic worm-like movement of the gut)

**Fornices**: the recess formed between the vaginal wall and the vaginal part of the cervix, subdivided into anterior, posterior and two lateral.

**Pouch of Douglas**: a pouch formed by the peritoneum between the rectum and uterus.

**Mesenteric lymphadenitis**: a condition clinically resembling acute appendicitis, in which there is inflammation of the mesenteric lymph nodes receiving lymph from the intestine.

**Ascites**: effusion and accumulation of serous fluid in the abdominal cavity.
ဗိုလ်ချီ (၅) ဆိုလိုသည်။

သို့မှသာတွေရေးပြီးစီးဆောင်ရွက်သောအခါလည်းကျင်းပမှုမှားကြောင်း ဖြစ်စေရာ၀င်ကြီးကို ဖော်ပြပေးနေသည်။ ပြည်သူများအားလုံးတွင် အခြေခံသူ့မှာ ဖော်ပြပေးကြည့်ခြင်း ထို့ဖြစ်စေရာ၀င်ကြီးအား ဖော်ပြပေးပြီး ချစ်နေသည်။

ဆိုလိုသည်။ ပြည်သူများအားလုံးတွင် အခြေခံသူ့မှာ ဖော်ပြပေးကြည့်ခြင်း ထို့ဖြစ်စေရာ၀င်ကြီးအား ဖော်ပြပေးပြီး ချစ်နေသည်။

ဗိုလ်ချီ (၆) နေ့

ဆိုလိုသည်။ ပြည်သူများအားလုံးတွင် အခြေခံသူ့မှာ ဖော်ပြပေးကြည့်ခြင်း ထို့ဖြစ်စေရာ၀င်ကြီးအား ဖော်ပြပေးပြီး ချစ်နေသည်။

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Tuberculosis is not only a health problem, but also a social problem. TB attacks a person physically, mentally, as well as socially. This article will focus on some social problems faced by the TB patients. It is based on several interviews done with TB patients at Noh Poe camp and Mae Tao clinic, Mae Sot. Mya Saw, medic in charge of TB patients at Noh Poe and Aung Mon at Mae Tao clinic are thanked for interviewing and translating during the interview.

Case 1: Min Min Oo

The little boy sat on a bench at Dr. Cynthia’s clinic. His thin body made him look much younger than his 11 years and his black, liquid eyes spoke of sadness and despair. The boy had tuberculosis.

Four years ago Min Min Oo’s mother died. He thought that she died of heart failure. According to the clinic staff, his mother died of TB. He has a brother who is only one year younger to him. Min Min Oo lives with his father and grandfather. After the mother’s death, his father lost interest in family life. But continued to provide them with food.

For the last 6 months Min Min Oo was not feeling well. He lost appetite, coughing very often and had chest pain and occasional fever. Min Min Oo went to school regularly but could not play with his friends as before. He became tired easily. His father took him to Mae Tao clinic and later was tested AFB positive. Now he has been treated for TB for 3 months.

Min Min went to Myanmar one year back. There he stayed with a relative who had a big lump on his neck. Someone told him that man had tuberculosis and now he thinks he got TB from that man.

Since he came to know of the disease, he was afraid that it would not be cured. But now, after receiving treatment, he feels better and happy that he will be alright. He said that his teachers knew about his disease and had asked him to cover his mouth while coughing. His friends play with him but they do not eat together. At home, he has separate plate and cup for his use. Before, he slept with his mother and brother, and now he sleeps alone. He does not like to be separated from his friends and his family; but hopes that after he is fully cured, he will be able to participate with his friends again.

Case 2: Mya May

Mya May (55 years) sat on a bench waiting for the laboratory reports. Her thin face looked worried and she could not breathe well. She said that she became tired easily for the last 12 months and could not work in the field. Mya May had been experiencing coughing and dyspnoea (difficulty in breathing) for more than 5 months. By the time we were interviewing, the reports arrived. The x-ray showed mild pleural
မိဘမှာ ပြောဆိုပါက ကြက်များကို များပြောဆိုပါက သင့်တွင် ဖြစ်ရမည်။

ရွေးလိုင်းပါက ကြက်များကို ပြုပြင်ပြောဆိုရမည်။

အရင်နားပါက ကြက်များကို ပြုပြင်ပြောဆိုရမည်။

အရင်နားပါက ကြက်များကို ပြုပြင်ပြောဆိုရမည်။

အရင်နားပါက ကြက်များကို ပြုပြင်ပြောဆိုရမည်။

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အရင်နားပါက ကြက်များကို ပြုပြင်ပြောဆိုရမည်။

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effusion (presence of fluid in the pleural space) and the AFB test was positive.

Once a beautiful lady, Mya May had now a skeleton like appearance. Her first husband died 35 years ago and she got married again with her present husband. All her three children from her previous husband were in Myanmar. Although she had no children with her second husband, they were happy, she said.

Mya May’s life has been affected badly by her illness. Her husband, who was older had to take care of her. He brought her to the clinic for check up. It was difficult for them to come to the clinic, as both of them were old. She was worried that her neighbors might steal her chickens or other household things while they were away. They have decided to hire a boy from their village to look after her during her stay at the clinic. Her husband would go back and take care of the household matters. She thought that the disease was due to her smoking habit and everything would be all right once she was cured.

she could catch the disease.

Ma Aye was worried when she came to know about her illness. Being sick, she could not continue her job as a maidservant, whereas, her husband had malaria and was unable to work in the fields. Already her family had monetary problem and she wanted to get well as soon as possible. She felt sad that it would take long to be cured. On the other hand, she was happy to know that the disease is curable.

With her enlarged lymph glands she was thought to have AIDS and was rejected by her relatives. The neighbors did not allow their children to play with hers. As two of the elder daughters were working in other parts of Thailand, she felt sorry for the younger ones. Above all, she thought her two younger daughters had TB too. In fact they were also treated with isoniazid as a prophylactic measure.

Case 4: Mahn Kyi

Mahn Kyi had been suffering for three

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Case 3: Ma Aye

Ma Aye was suffering from coughing, chest pain, fever at night time, one and a half years ago. She had some enlarged lymph glands at the cervical region. She came to clinic for a check-up. After biopsy it was found that she had TB lymphadenitis. She had no idea from where years from some ailments like coughing, which was not disturbing. He went to the Noh Poe hospital and was given some cough syrup. Later, he suffered from loss of appetite and weight and lacked energy. As the cough grew worse and as there was more weight loss, he became suspi-
cious of the illness and went for advice to the Noh Poe hospital. After being diagnosed for Tuberculosis, he felt sad. Later, he was happy knowing that the disease was curable. Mahn Kyi’s wife left him when he was detected to have tuberculosis. It was heartbreaking for him. As he recalled, they never had any argument or fight during their married life. However, after she came to know that Mahn Kyi had TB, her behavior changed. She was afraid of contracting the disease. Finally she went away with another man.

Case 5: Khin Lay Kyi

Khin Lay Kyi (27 years) has been married for 6 years. She has a 5 year old son. Her husband owns a saw mill. Being a housewife, Khin Lay Kyi had nothing else to do than to take care of her family and her nephew. She lived with her husband’s family.

Two years ago Khin Lay experienced pain in the lower abdomen for two months. She was also losing weight. Then she went to Mae Tao clinic for advice. After testing it was found that she had TB. According to the clinic records, she had TB of the uterus. She took medicine for nine months and also underwent an uterine operation. The doctors advised her not to become pregnant within three years.

Khin Lay is sad these days while she plays with her nephew. She wants more children, particularly a baby girl. Her husband wants too. Even though he does not say anything to her, Khin Lay finds it painful not to have a child when they want it. She wants to make sure whether she has the ability to conceive again.

Discussion

If we look into these five cases, we can see, besides physical discomfort caused by tuberculosis, the disease caused social problems. Inability to work due to weakness caused by the disease made the patients suffer financially. The disease prevented them from performing their normal activities, like playing with friends, taking care of household matters. The disease also caused rejection by others as seen in May Aye’s case. TB caused marital disharmony in Mahn Kyi’s life. Finally, Khin Lay also suffered mentally from her inability to produce more children caused by TB. While treating TB, we should, therefore, take into consideration the social and psychological aspects of the disease.
TUBERCULOSIS (TB) IS CURABLE IF PROPER MEDICINES ARE TAKEN REGULARLY

STOP GOING TO SCHOOL DURING THE INITIAL PHASE OF THE DISEASE (IF YOU HAVE TB OF THE LUNGS OR THROAT). You may be infectious. After taking TB drugs for a few weeks, you will feel better and you may no longer be infectious to others.

DON’T STOP TAKING MEDICINES. TB bacteria die very slowly and it takes at least six (6) months for the medicines to kill all the TB bacteria.

You will probably start feeling well after only a few weeks of treatment. BEWARE!! The TB bacteria are still alive in your body. You must continue to take your medicine until all the TB bacteria are dead, even though you may feel better and have no more symptoms of TB disease. If you take your medicine as doctors or medics tell you, the drugs will kill all the TB bacteria. This will keep you from becoming ill again.

If you don’t take the medicine regularly or discontinue the medicine:

It’s very dangerous. The TB bacteria will grow again and you will remain sick for a longer time. The bacteria may also become resistant to the drugs you are taking. You may need new drugs to kill the TB bacteria and these drugs must be taken for a longer time and usually have more serious side effects.

PLEASE INFORM YOUR MEDIC OR DOCTOR IF YOU HAVE ANY OF THE FOLLOWING SYMPTOMS

- no appetite
- vomiting
- fever for 3 or more days
- tingling sensation of fingers or toes
- easy bleeding
- dizziness
- easy bruising
- ringing in the ears
- nausea
- yellowish skin or eyes
- abdominal pain
- skin rash
- aching joints
- tingling or numbness around the mouth
- blurred or changed vision

Please continue your medicine if your urine, saliva, or tears turn to orange colour. They are minor problems caused by Rifampicin.

HAVING TB WILL NOT STOP YOU FROM LEADING A NORMAL LIFE. When you are no longer infectious or not feeling sick, you can do the same things you did before you had TB. The medicine that you are taking should not affect your strength, sexual function, or ability to work.
INFORMATION FOR THE HEALTH WORKERS DEALING WITH TB PATIENTS

Listen to the patient

Try to be helpful and polite

Explain clearly about his/her illness, how to take the medicines and for how long

Explain what side effects might occur and what to do if they do occur

Try to explain that even if he feels better, he/she must finish all the treatment to stop the illness returning (relapsing)

Explain that TB can be cured if all the medicines are taken properly for the correct number of months

Ask if the patient has any questions and try to answer them clearly

Ask about his/her family, work and home and think about how his/her illness and treatment will affect these

Courtesy: Dr. Jonathan Nield, MSF
Shwe Lin and U Ba Tin have been suffering from cough and weight loss for the last 6 weeks. They became tired easily.

The brothers went to the clinic for a check-up. Their sputum was tested.

"You have TB", said the medic. "Don't worry, take the medicines regularly and you will be cured."

Shwe Lin and U Ba Tin started taking their medicines.
Take your medicines regularly, get cured of TB

5A
"After one month... I'm feeling better."
5B
"Hey look, I'm strong again", boasted U Ba Tin.

6A
Shew Lin continued the treatment.
6B
"I'm perfectly alright now. No need of these useless drugs", thought U Ba Tin.

7A
"After 6 months.......... Hurrah, I'm cured!"
7B
"Alas, I will die. I should have taken the medicines regularly".
Ten Questions

1. Name of the germ that causes TB is...

2. TB is transmitted by:
   a) Sneezing and coughing
   b) Sexual intercourse
   c) Shaking hands

3. TB may attack the following parts of the body:
   .......................................................... ..........................................................

4. The major signs of tuberculosis are:
   a) ............................................................... ..........................................................
   b) ............................................................... ..........................................................
   c) ............................................................... ..........................................................
   d) ............................................................... ..........................................................
   e) ............................................................... ..........................................................

5. Name 5 drugs used for the treatment of TB.
   ............................................................... ..........................................................

6. Answer True (✓) or False (x)
   a) Coughs are common, so if it lasts more than 3 weeks there is no need to worry. ( )
   b) Evening rise of fever is normal because of the cool evening air. ( )
   c) Failure to gain weight is one of the most important clues in the diagnosis of TB in children. ( )
   d) The latest treatment for tuberculosis is long and lasts for one year. ( )
   e) Missing a few days of treatment is not important. ( )
   f) Tuberculosis treatment should be followed daily for 6 months. ( )
   g) Taking daily regular treatment will prevent the spread of tuberculosis in the family. ( )

7. It is best to obtain a series of ............................................................... ..........................................................
   specimens collected on different days.

8. ............................................................... should be avoided in pregnancy.


10. DOTS means ............................................................... ..........................................................

You will find the answers in the next issue no. 8.

Answers to questions of Issue No. 6

1. a  5. asthma  9. hip-bone and thigh bone
2. b  6. long, short, flat, irregular  10. abortion
3. 60-80/min  7. ears and the nose
4. wrist, ear, neck, groin, foot  8. lower jaw fractures
CASE DEFINITION OF TUBERCULOSIS PATIENT

Patients upon entry should be defined according to their previous treatment history. This is important for the assessment of treatment results.

New cases: This includes patients who have never been treated for TB, and other patients who received less than 1-month treatment in the past.

Relapses: Patients who were declared “cured” after a complete treatment, who returned smear positive are defined as relapse cases.

Failures: Patients who completed properly 5 months or more of treatment, and still on that treatment at the time of testing, and who remain or become again sputum positive.

Treatment after interruption (TIA) (Return after default): This includes patients who had taken more than 1 month treatment before, stopped treatment for more than 2 months and are again sputum positive (sometimes smear negative but still with active TB as judged on clinical and radiological assessment).

Chronic cases: Chronic cases are those who continue to be smear positive after the completion of a retreatment regimen.