MODULE

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Leishmaniasis

Diploma Program
For the Ethiopian Health Center Team

Abyot Desta, Solomon Shiferaw, Andargachew Kassa,
Techalew Shimelis, and Simachew Dires

Debub University

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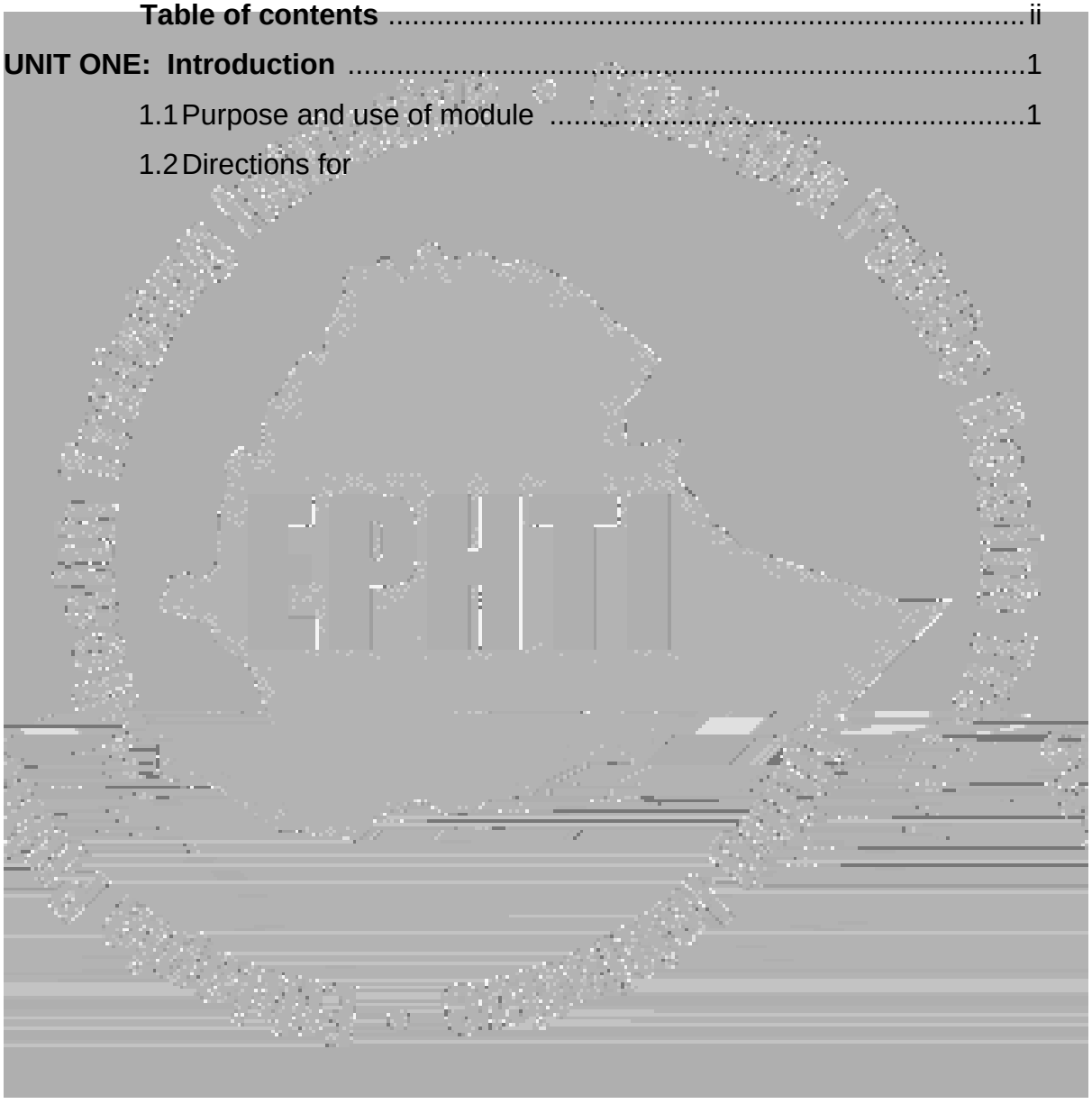


1.2 Direction for using the modules

- Try to study and answer all the questions in the pre-test that is for all Categories in the core module and specific questions to your category.
- Read and try to understand each of the learning activities
-

UNIT TWO

CORE MODULE

2.1 Pretest

Before going in to the core module, attempt to answer all questions.

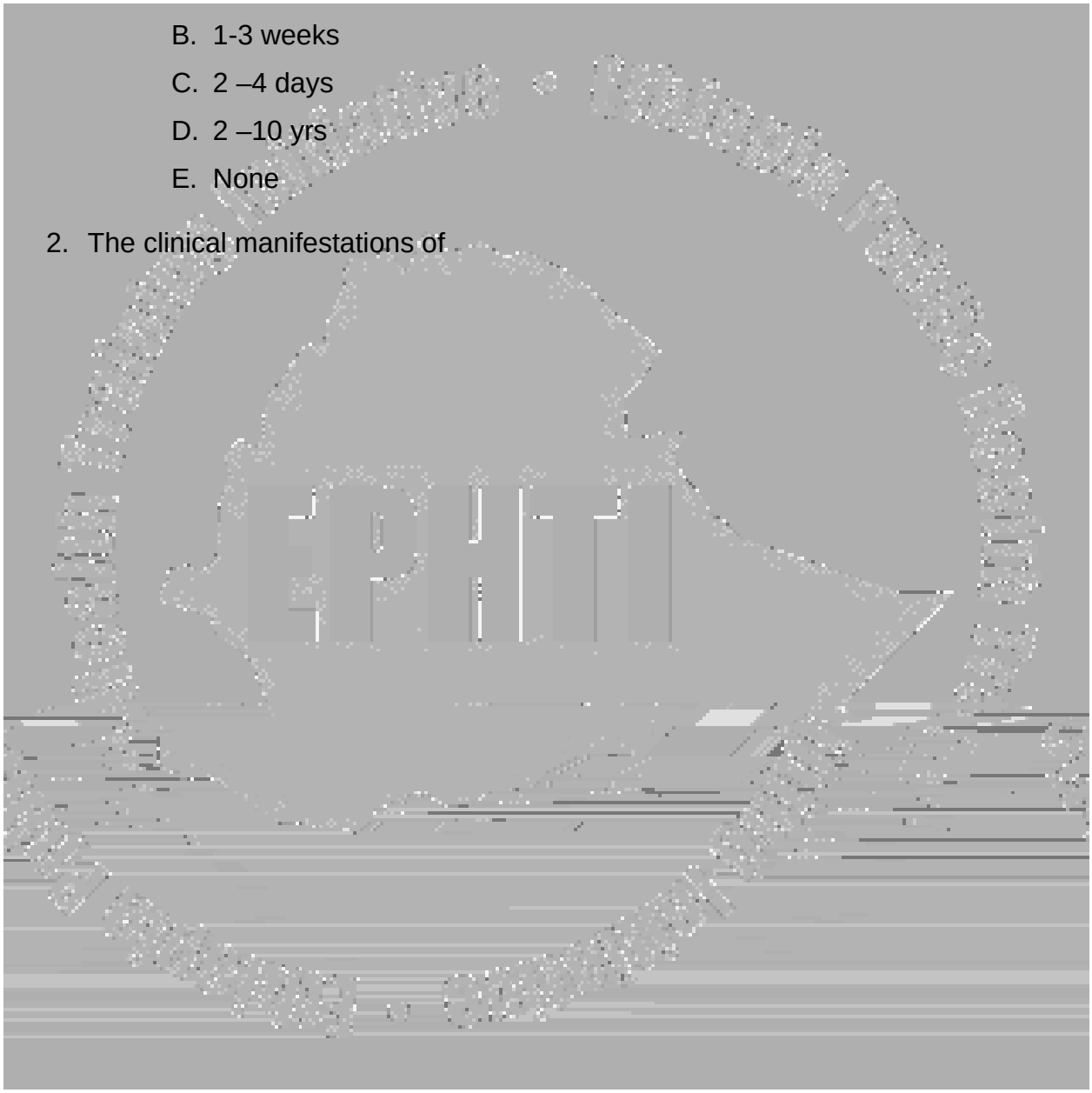
2.1.1 All categories of the Health Center Team

1. What group of organisms causes leishmaniasis_____?
2. The vectors important for leishmania transmission are called _____?
3. List the types of possible reservoir of the leishmania parasite
4. What types of Leishmaniasis do you know? _____
5. Which one is the commonest route of Leishmania transmission
    A. Blood transfusions
    B. Sexual
    C. Sand fly bite
    D. Transplacental
    E. Accidental inoculation
6. People at high risk of developing Leishmaniasis are
    A. Adults living in endemic areas
    B. Children in endemic areas
    C. Travelers to endemic areas
    D. Pregnant mothers
    E. B and C
7. What diagnostic method is commonly used in our set up
    A. Giemsa stain of aspirate and slit skin smear
    B. Culture
    C. Animal inoculation
    D. ELISA
    E. Biopsy
8. Which geographical sites of our country harbor the disease?
9. What general leishmania control measures could be taken?

2.1.2 Pre-test for specific categories of the health center team

2.1.2.1 Health Officer

1. Which one is the average incubation period of visceral leishmaniasis
    A. 2–6 months
    B. 1-3 weeks
    C. 2 –4 days
    D. 2 –10 yrs
    E. None
2. The clinical manifestations of



11. The management of visceral Leishmaniasis include

A. Correcting nutritional deficiency
B. Blood transfusion
C. Treating secondary infections
D. Treating with anti leishmania drug
E. All

2.1.2.2 Medical Laboratory

1. One of the following morphologic features cannot describe amastigote stage

A. Round to oval in shape
B. Has free flagellum
C. Has eccentric nucleus
D. Has no undulating membrane

2. _____ is the stage of leishmania detected from spleen aspirate

A. Promastigote
B. Amastigote
C. Trypomastigote
D. Epimastigote

3. _____ Causes visceral leishmaniasis

A. L.aethiopica
B. L.major
C. L.donovani
D. L.tropica

4. _____ is the stage of leishmania obtained from culture media

A. Promastigote
B. Amastigote
C. Trypomastigote
D. Epimastigote

5. Among the following diagnostic means one has little value in the diagnosis of cutaneous leishmaniasis.
    A. Examining slit skin smears for amastigotes
    B. Testing leishmania antibodies in serum
    C. Culturing the material collected from nodule
    D. None

6. In Formol gel (aldehyde) test, whitening and gelling of serum within 20 minutes indicate_____
    A. Positive test
    B. Negative test

7. Among the following tests one is non-specific for the diagnosis of VL
    A. ELISA
    B. IFAT
    C. DAT
    D. Formal gel test

8. One is not true when using Giemsa staining technique
    A. The stock should be diluted 1:10 to stain the smear
    B. Diluted Giemsa staining solution can be used for longer than 24 hour
    C. The PH of the solution should be 7-7.3
    D. Buffered saline can be used to dilute the stock stain

9. Among the following samples one is best for the diagnosis of cutaneous Leishmaniasis
    A. Spleen aspirate
    B. Bonemarrow aspirate
    C. Buffy coat smear
    D. Slit skin smear

10. Identify a species that is not relevant to Ethiopia
    A. L. donovani
    B. L. aethiopica
    C. L. major
    D. L. mexicana

2.1.2.3 Environmental Health Science

I**nstruction** – Choose the best answer

1) Why insecticidal control of sand fly larvae remains impossible?
   A. The breeding sites of most species are unknown or secretive
   B. Even when the breeding sites are identified, they are too diverse and impractical to reduce larval number
   C. Their larvae floats on water surface and hides itself
   D. A and B
2) Which of the following **<u>is not</u>** true about the external morphology of phlebotomus sandflies
   A. The palps are as long as the proboscis
   B. Hairy appearance
   C. Have long and stilt like legs
   D. Their wing held erect over
3) The eggs of sand fly are deposited:
   A. On surface water
   B. On cracks and holes in the ground
   C. On floating substance of water
   D. All
4) Larva of phlebotomine sand fly development depend on the following **<u>except</u>**
   A. Temperature
   B. Food supply
   C. Water flow
   D. Species
5) Phlebotomine sand fly have a relatively short flight range, so that it is easy to control by-------
   A. Insecticidal spray number 1. Wa25 TD-0Os0boTJ- I. .575 -31sthood n

6) Which of the following methods can effectively prevent phlebotomine sand flies?
   A. By destroying the reservoir
   B. By forest clearance
   C. By applying insecticides
   D. All

7) Which of the following is an impractical method of prevention of leishmaniasis?
   A. Environmental management
   B. Destroy the reservoirs
   C. Personal protective
   D. Applying insecticide

8) Which of the following **is not** the characteristics of phlebotomine sand fly
   A. Active during night and dusk
   B. Rest in dark moist areas
   C. Active only during the day
   D. Endophilic and exophilic

9) Which of the following is a protective method of leishmaniasis at the individual level?
   A. Reducing breeding sites
   B. Applying insecticides
   C. Using replants
   D. Forest clearance

10) The epidemiology of leishmaniasis largely determined by
   A. The species of sand flies, their ecology and behavior
   B. The availability of the wide range of hosts
   C. The species and strains of leishmania parasites
   D. All

11) "Forest – free- belt" means
   A. Afforestation

12) Old world Leishmaniasis is transmitted by-------

A. Phlebotomus species
B. Lutzomia species
C. Anopheles species
D. Culex species

2.2 Significance and brief description of Leishmaniasis

Leishmaniasis is one of the causes of morbidity and mortality in Ethiopia. It has been reported that cases of leishmaniasis occur in western parts of the country mainly but also in southern & eastern regions. People living in the low lands of aforementioned areas have always been at risk.

2.3 Learning objectives

Upon the completion of the activities in this module, the learner Will be able to:

1. Describe the causes and clinical pictures of Leishmaniasis
2. Make appropriate diagnosis of Leishmaniasis at individual and community level
3. Treat Leishmaniasis as recommended
4. Identify and name the different control measures for Leishmaniasis
5. Understand and identify the tasks and roles of the team members in a health Centre

2.4 Definition

Leishmaniasis are a group of parasitic diseases caused by protozoan flagellates of the genus Leishmania, transmitted through the infective bite of an insect vector, the phlebotomine sand fly.

2.5 Epidemiology

Magnitude

Global: Leishmaniasis is threatening 350million people in 88 countries on four continents. The annual incidence of new cases is estimated between 1.5 and 2 million.

There are estimated 12million cases worldwide. In numerous under developed countries, they remain a major public health problem.

Ethiopia: As mentioned earlier the disease affects people living in a significant portion of the country. Not a significant number of studies have been done in our country to determine the magnitude. The burden of visceral leishmaniasis is not well studied in Ethiopia. However, few reports substantiate the seriousness of VL in Ethiopia and neighboring countries. Surveillance of VL in Aba Roba community, Gemu Gofa has revealed an annual incidence of 5.2/1000 population. Other reports have identified endemic areas and sporadic cases in various localities. Recurrent epidemics of visceral leishmaniasis have occurred in Metema and Humera. Following agricultural development in the region a large number of labor migrants from the highlands were moved to the endemic areas in the late 1970 for crop harvesting. This led to out breaks of VL, which resulted in high morbidity and mortality. The overall prevalence of cutaneous leishmaniasis was 3.6-4.0%, with a peak value of 8.55 in the 0-10 years old age group in Ochollo (Gemu Gofa).

Geographical distribution

Global: Leishmaniasis are widely distributed around the world. They range over inter-tropical zones of America, Africa and extend in to temperate regions of South America, southern Europe and Asia. Their extension limits are latitude 45^0 north and 32^0 North.

Ethiopia: Several studies have definitively demonstrated that VL occurs in northwestern Ethiopia (Humera, Metema), Segen and Woito valleys in Gemu Gofa. Sporadic cases of VL have been diagnosed from Wolkayit Tsegede (Gondar), Gibdo, Raya, and Kobo (Wello), Kijawa (Gambella) and Gelana (Sidamo) and Genale (Bale) river basins. Recently a devastating epidemic occurred in Humera with an estimated annual incidence of 1,500-2,000 cases. Due to high mortality, occurrence of epidemics, and high incidence of the disease in 15-45 age group leishmaniasis has become one of the leading health problems in Ethiopia.

Cutaneous leishmaniasis (CL) occurs in highlands of Ethiopia. Transmission occurs in Cuttaber (Dessie), Aleku (Wellega), and Ochollo (Gemu Gofa). In Ochollo the overall prevalence of localized CL was 3.6-4.0%, with a peak value of 8.55 in the 0-10 years old age group. Sporadic cases of CL have been diagnosed from many localities in the northern, central, and southern high lands of Ethiopia.

Vector

Sand flies are Diptera of the family psychodidae, subfamily phlebotominae. Their life cycle includes two different biological stages; the flying adult and the development phases of egg, larva and pupa.

The adults are small flying insects of about 2-4mm in length, with a yellowish hairy body. During the day, they rest in dark & sheltered places. They are active at dusk & during the night.

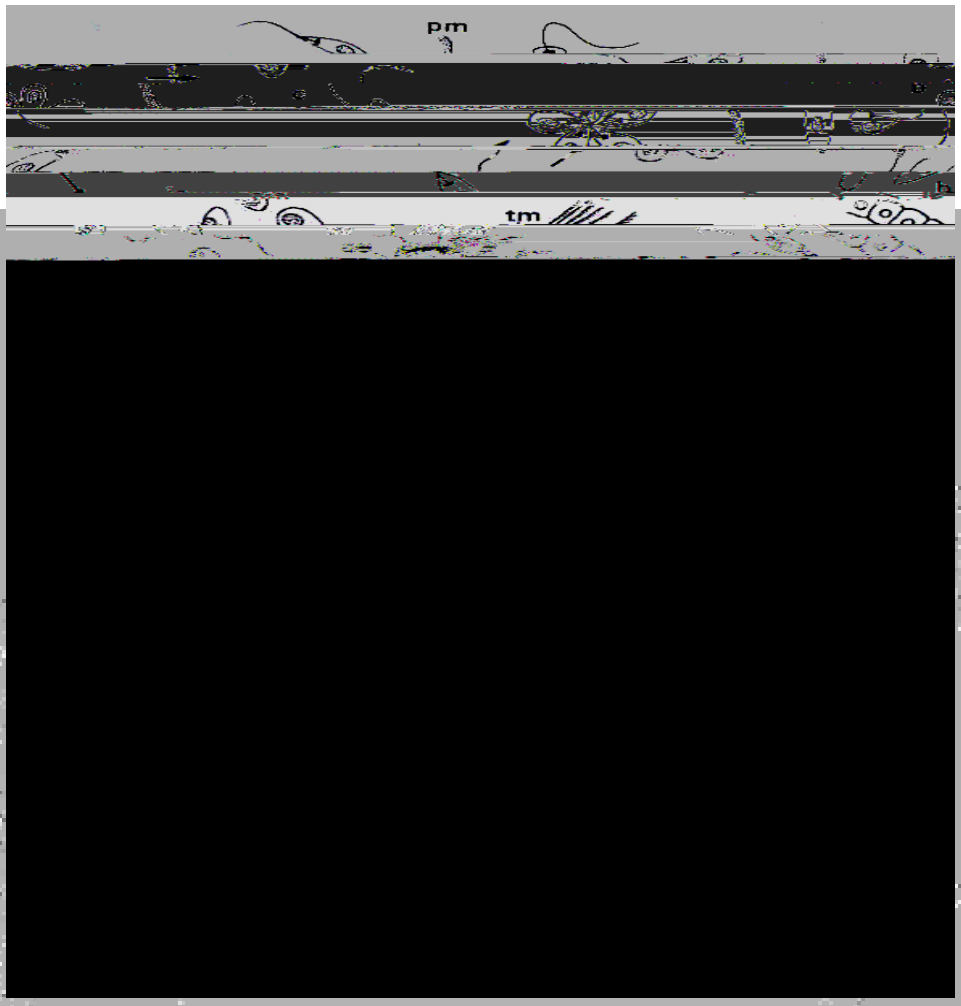
Both sexes feed on plants, but females also need a blood meal before they are able to lay eggs.

Reservoir

Most leishmaniasis is zoonosis and the reservoir hosts are various species of mammals. Depending on the focus, the reservoir can be either a wild or a domestic mammal. In particular cases, human beings can be the host also.

Life cycle

In nature, Leishmania are alternatively hosted by the insect (flagellated promastigotes) and by mammals (intracellular Amastigotes). When a female sand fly takes blood meal from an infected mammal; the insect ingests intracellular Amastigot. Inside the fly Amastigot are transformed in to flagellated promastigotes in the mid gut. The promastigotes migrate into the anterior portion of the mid gut. The bite of an infected sand fly deposits infective promastigotes in the mammals' skin, which are rapidly phagocytosed by the cells of mononuclear-phagocyte system. The intracellular parasites change into amastigotes, which multiply by simple mitosis.



Picture: Life Cycle of Leishmania Parasites

Transmission

Leishmaniasis is a vector borne disease. It is mainly transmitted from the reservoir host to the healthy individual by the bite of female phlebotomus sand fly. The inoculation of promastigotes through the sand fly bite is the usual method of leishmaniasis transmission.

In visceral leishmaniasis, a few cases of congenital and of blood transfusion transmission have been reported. Exchange of syringes has been incriminated to explain the high prevalence of L. infantum /HIV confection in intravenous drug abusers in southern Europe.

Predisposing factors

Young children, travelers who are non-immune, refugees displaced people and laborers entering in to leishmania area are groups who are at risk of getting leishmaniasis.

Population movements, such as rural to suburban migrations are factors for visceral leishmaniasis extension, by exposing thousands of non- immune individuals to the risk of infection. Economic developments resulting in movement of population caused dramatic out breaks in parts of

Symptoms and signs

- Fever

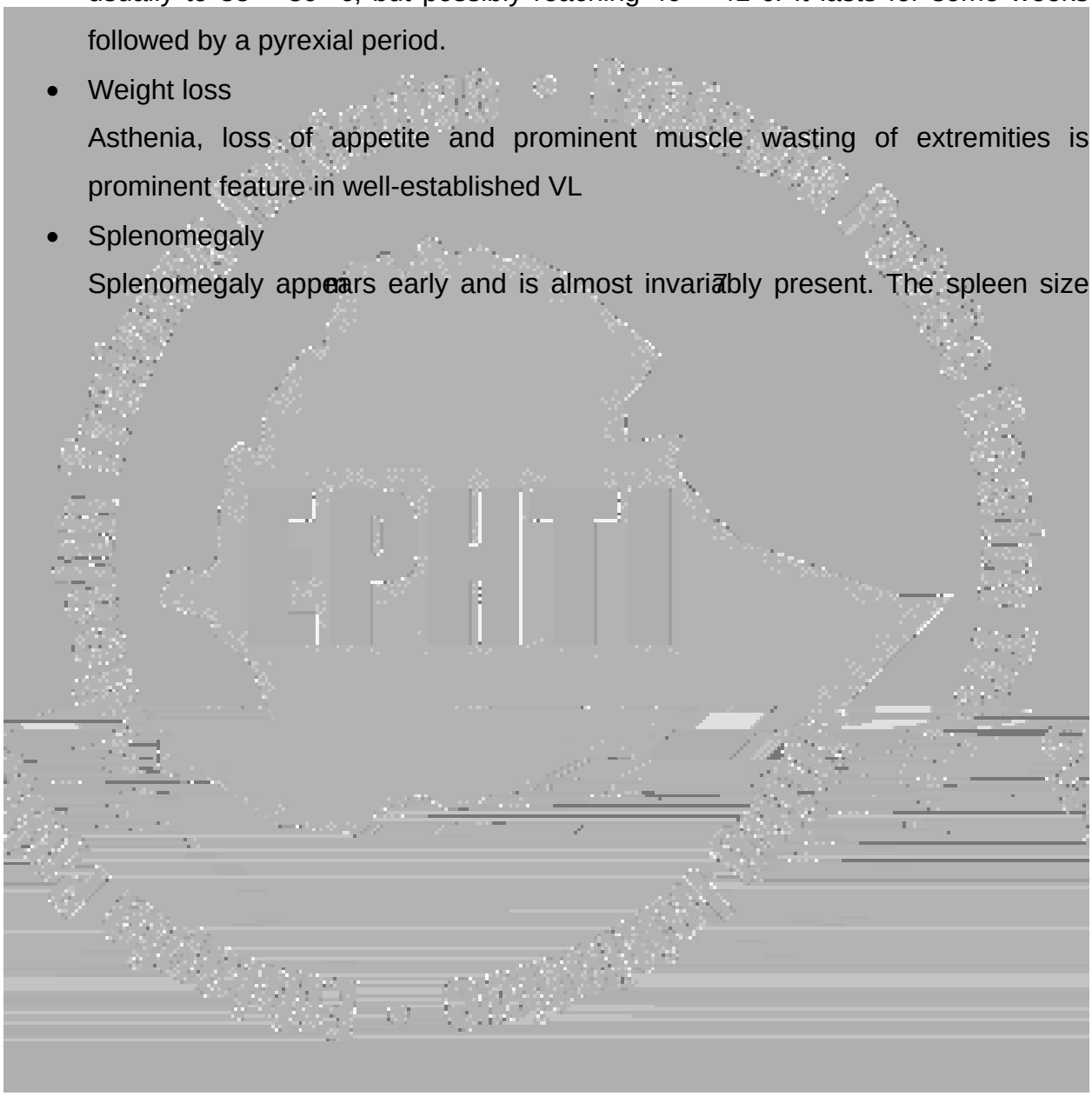
  Fever is the major symptom with rapid rise in sudden onset and slow rise in gradual onset. It is intermittent and irregular, with double or triple rise per day usually to 38 – 39^0 c, but possibly reaching 40 – 41^0c. It lasts for some weeks followed by a pyrexial period.

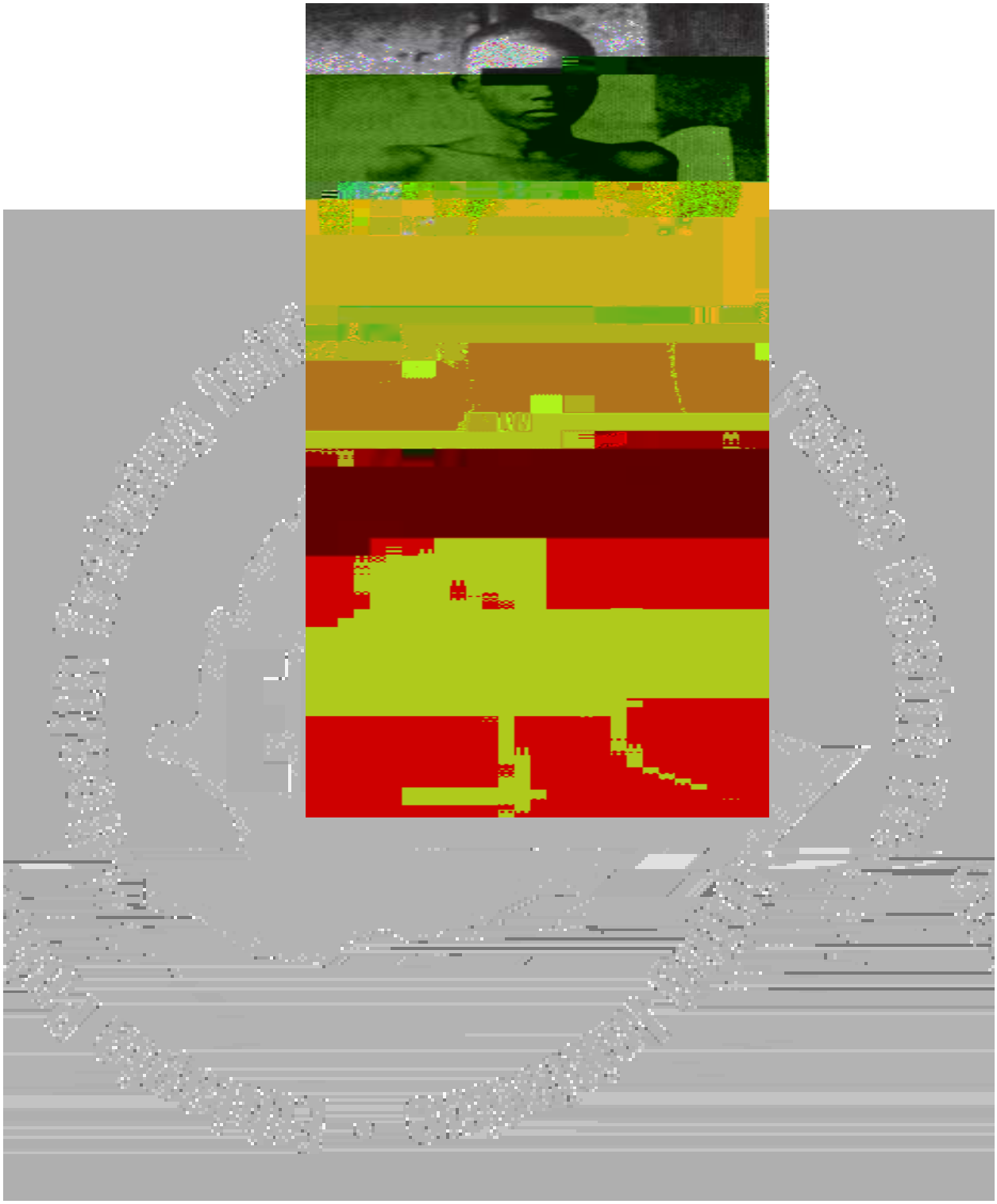
- Weight loss

  Asthenia, loss of appetite and prominent muscle wasting of extremities is prominent feature in well-established VL

- Splenomegaly

  Splenomegaly appears early and is almost invariably present. The spleen size 1





- Raised ESR, C reactive protein(CPR)

- Disturbed plasma protein profiles with low albumin levels and hyper gammaglobulinemia

(B) Cutaneous Leishmaniasis (CL)-Oriental sore

CL presents as skin lesions, which are generally localized, without involvement of the mucosa, and not generalized infection. They occur on exposed parts of the body accessible to sandflies: face, hands, forearms and lower limbs. Rarely, dermatotropic parasites may give rise to disseminated CL, with multiple nodules on large areas of the skin.

Localized Cutaneous Leishmaniasis (LCL): All species of Leishmania can cause localized CL.

- Incubation period ranges from weeks to months
- Starts as erythematous papule to reach its definitive size in a few weeks
- The mature lesion is well defined with regular outline, round to oval in shape, variable dimension (0.5 – 10 cm on diameter) and usually multiple.
- It can be ulcerative or dry with papulo nodular lesion covered by scales

Diffuse Cutaneous leishmaniasis (DCL): some specific species of Leishmania can cause a diffuse form of CL

- A non- ulcerative nodule rich in parasites represent this form of the disease
- Starts as an isolated nodule then joining to form large patches disseminated all over the body.

- It is related to a defective immune system of the patient. The lesions resemble that of leprosy and do not heal spontaneously and relapse is common after treatment.

(C) Mucocutaneous Leishmaniasis (MCL)

MCL is due to L braziliensis and L. Panamensis occasionally. It is seen in the New world and they call it “Espundia”.

It has two stages. The first one is a primary cutaneous lesion, which eventually is followed by mucosal involvement.

The cutaneous lesion is similar with localized cutaneous leishmaniasis and the mucosal involvement start with the nasal mucosa later on destroying the nasal septum. The buccal mucosa is involved at later stages and the disease can progress to lips, palate and larynx.

(D) Post Kala-Azar Dermal Leishmaniasis (PKDL)

After a latent period of 1 year following kala-azar cure, skin lesions can appear in around 20% of cases. Beginning as depigmented macules, turn in to papular and then to nodular eruptions. Located initially on the face they can extend to the whole body.

- Á Superficial skin/Mucosal scraping for cutaneous and mucocutaneous leishmaniasis

Detection methods

- The sample collected can be
  - Á stained with panoptic May Grunwald Giemsa stain

    Amastigotes seen in monocytes or out side; called

    Leishman Donnovan (LD) bodies
  - Á Cultured – NNN medium

    _Grow as promastigotes
  - Á Inoculated into lab animals(Golden Hamster)
  - Á Molecular diagnosis by DNA detection or PCR technique

2.9 Case management

(A)Visceral Leishmaniasis

1. Provision of

2-Amphotericine B

- powerful antileishmanial used in the treatment of severe Leishmaniasis (VL , MCL) or forms resistant to Antimonials
- it is alternative 1st line drug
- formulated as a colloidal suspension which is administered as slow (6–8 hr) IV infusion 0.5-1mg/kg dissolved in 500 ml dextrose 5% on alternate days
- 14-20 infusions for a total dose of 1.5gm

3-Pentamidine

- restricted to treatment of CL
- 4mg/kg per injection
- Im or IV on alternate days
- short courses (four doses) for CL
- Long courses (period of weeks) for resistant VL

Clinical response in visceral leishmaniasis is slow. The patient becomes afebrile after 4-5 days of treatment; other clinical symptoms and biological parameters slowly regress.

(A) Localized CL

Management depends on the type and characters of the lesions, the Leishmania species involved the risk of extension and patients preference.

Possibilities are abstention, local or systemic treatement.

(B) Diffuse CL

Once established, DCL has proved to be resistant to treatment. Systemic pentavalent antimonial can improve clinical situation. There is a need to try other new products like liposomal amphotericine B and IFNγ.

(D) MCL

It is important to give systemic treatment before primary cutaneous lesion extends to facial mucosae. Once it involves the mucosa, treatment should be fast and with antimonials injected for 28 days. Amphotericine B can be used for poorly responding cases.

2.10 Prevention and Control

Intervention strategies for prevention and control are hampered by the presence of many reservoir hosts and multiplicity of sand fly vectors. There are many eco–epidemiological entities each requiring distinct control strategies.

Prevention

Aim of prevention

- Avoiding host infection
- Preventing subsequent progression to disease

Strategies

- Early diagnosis and treatment
- Prevent intrusion of people in to natural zoonotic foci
- Protect against infective bites of sand flies
- Health education
- Community participation

Individual prevention

- Avoiding risk of exposure: Avoid vicinity of sand fly breeding sites or resting sites
- Mechanical means: self protection form sand fly bite by wearing clothes, bed nets
- Chemical means: repellants applied to the skin

Collective measures

- Forest clearance: establishment of forest free zone of about 400 meters

Control

Aim of control

- interrupt life cycle of parasite
- limit or eradicate the disease

Targets are the vector and the reservoir

Strategies

Depend on ecology and behavior of the main targets

- Case detection and treatment: when reservoir is human
- Wild reservoir control: when reservoir are rodents , not applicable to other mammals
- Sandfly control
  - Á Destruction of be3f Tw(re rodents , n5Am9. -f0.45 -1.725 TD0 Tc0 Tw<

- Increase use of insecticide impregnated bed nets
- Use of screen on windows
- Wearing protective clothing
- Applying insect repellants on the skin

3. Early reporting to nearest health institution when sympt

UNIT THREE

SATELLITE MODULES

3.1 SATELLITE MODULE FOR HEALTH OFFICERS

3.1.1. Introduction

3.1.1.1 Purpose

This satellite module is prepared for health officer students. The module emphasizes mainly areas which were not covered by the core module.

3.1.1.2 Direction

- Study the satellite module after going through the core module
- You are advised to refer to the core module whenever necessary
- After completing the satellite module answer all the questions in the pre and post tests
- Compare the results with the previous performance

3.1.2 Learning Objectives: after going though this module the reader will be able to

1. Diagnose the different forms of Leishmaniasis
2. Describe the common antileishmanial drugs, their dose, route of administration and adverse effects
3. Treat and follow patients having the different forms of Leishmaniasis
4. Organize Leishmania prevention and control programs

3.1.3 Definition

Leishmaniases refer to various clinical syndromes that are caused by obligate intracellular protozoa of the genus Leishmania (order kinetoplastida).

3.1.4 Epidemiology

Geographical distribution

Leishmaniasis is endemic in diverse ecologic settings in the tropics and subtropics, ranging from deserts to rain forests and from rural to peri-urban areas.

Visceral Leishmaniasis

VL, which has been reported in 47 countries and continues to be epidemic in eastern India, has emerged in new geographic areas (e.g. Southern Sudan, where persons of all ages have been affected), in new settings (e.g. suburban areas in northeastern Brazil, where most cases have occurred in children < 10 years of age) and among new host population (e.g. HIV infected persons).

Vector

Leishmaniasis is transmitted by the bite of female phlebotomine sand flies (genus phlebotomus (old world) or lutzomia (new word).

Sand flies are diptera of the family psychodidae, subfamily phlebotominae. About 800 species of sandflies have been described. Among these species, about 70 belonging to the genera phlebotomus and lutozomia, are proven or suspected vectors of Leishmania.

The adults are small flying insects of about 2-4 mm in length, with a yellowish hairy body. During the day they rest in dark and sheltered places (resting sites).

Reservoir

Leishmaniasis is typically a zoonosis, with rodents, small mammals and canines as common reservoir hosts and humans as incidental hosts.

In the old world, rodents and hyraxes are reservoirs of wild zoonotic cutaneous Leishmaniasis due respectively to L. major and L. aethiopica. In the new world, various Sylvatic mammals are reservoirs of American cutaneous Leishmaniasis.

Humans are the commonly recognized reservoir host of L.donovani visceral Leishmaniasis and L.tropica cutaneous Leishmaniasis

Life cycle:

Leishmania are alternatively hosted by the insect (flagellated promastigote) and by mammals (intracellular amastigote stage).

As the flies attempt to feed, they regurgitate the parasite's flagellated promastigote stage into the skin of mammalian hosts. Promastigotes attach to receptors on macrophages, are phagocytized, and transform within phagolysosomes into the non-flagellated amastigote stage.

Transmission

Inoculation of promastigotes through sand fly bite is the usual method of Leishmaniasis transmission and other routes remain exceptional.

In visceral Leishmaniasis, a few cases of congenital and of blood transfusion transmission have been reported. A case of direct transmission by sexual contact has been reported. Exchange of syringes has been incriminated to explain the high prevalence of L.infantum/ HIV co-infection in intravenous drug-users in southern Europe.

Etiology

Visceral leishmaniasis is typically but not exclusively caused by organisms of the Leishmania donovani complex (see table); old world cutaneous leishmaniasis by L.tropica, L.major, and L.aethiopica, new world (or American) cutaneous Leishmaniasis complex (see6te.qerD8ee6te.c0.0524 Tw3t has

3.1.5 Clinical features

Visceral Leishmaniasis: (in Hindi Kal-azar = 'black fever' indicating that the skin can turn gray)

Visceral infection can remain sub-clinical or can become symptomatic, with an acute, sub-acute or chronic course. In some settings inapparent infection far outnumber clinically apparent once: malnutrition is a risk factor for the development of disease.

Incubation period (IP) – usually ranges from weeks to months but can be as long as years.

- Typically the patients are cachetic, febrile and are heavily parasitized and have life-threatening disease.
- Splenomegally (with the spleen most often soft and non tender) typically is more impressive than hepatomegally, and the spleen can in fact be massive.
- Peripheral lymphadenopathy is common in some geographic areas, including Sudan.

Laboratory findings:

In advanced disease include;

Pancytopenia- anemia,leukopenia (neutropenia marked eosinopenia, relative lymphocytosis and monocytosis) and thombocytopenia- as well as

Visceral infection can relapse.

Diagnosis

- Demonstration of the parasite on stained slides or in cultures of a tissue aspirate or a biopsy specimen (e.g. of spleen, liver, bone marrow, or lymph node).
- Diagnostic yield is highest for splenic aspiration (specifically, as high as 98% for splenic aspirates versus less than 90 percent for other specimens), but this procedure can cause hemorrhage.

Patients who have kal-azar typically carry a relatively heavy parasite burden; develop high titers of antibody to Leishmania (diagnostically useful but not protective); and have undetectable leishmania-specific cell-mediated immunity. (With leishmanin skin test reactivity as well as lymphocyte proliferation noted only after recovery).

Differential diagnosis

Include other tropical diseases that cause fever or organomegally (e.g. typhoid fever, miliary tuberculosis, brucellosis, malaria with tropical splemomegally syndrome)

Treatment

1. The pentavalent antimonial compound- sodium stibogluconate (pentostam) – 20mg of sb^{v}/kg given IV or IM once daily for 28 consecutive days is first line therapy.
   - Typically patients feel better and become afebrile during the first week of treatment.
   - Abnormal laboratory findings and Splenomegally improve during therapy but may take weeks or months to resolve.
   - Reappearance of eosinophils in the leukocyte differential count is a good sign.
   - The best indicator of permanent cure is freedom from clinical relapse during at least 6 months of follow up.
   - Repeat tissue sampling is indicated if the patient's status is in question.
   - The possibility of HIV confection should be considered if the patient doesn't respond to therapy or repeated relapses.

2. In India (where unresponsiveness to sb^v therapy is becoming increasingly problematic, amphoterecin-B (0.5 to 1.0 mg/kg daily or every other day, given intravenously for a total close of 7 to 20 mg/kg) has been found to be a highly effective, though potentially toxic, alternative.
3. Pentamidine (2 to 4mg/kg daily for every other day, given intravenously or intramuscularly for at least 15 doses) is reasonably effective but may need to be administered in prolonged courses that are associated with toxicity.
4. Formulation of liposomal amphotericin-B may prove highly effective and less toxic
5. Various parentral agents have been advocated as adjuncts to accelerate or improve the response to sb^v therapy.
    - Aminosidine (12 to 15 mg/kg per day, IV or 1M)
    - Cytokine immunotherapy with subcutaneous injections of recombinant interferon-y or granulocyte macrophage colony-stimulating factor.
        - Allopurinol
        - ketoconazole

VL in HIV infected persons:

VL is becoming an important opportunistic infection among persons infected with HIV-1 in geographic areas in which both infections are endemic.

- To date, most co-infections have been reported from southern Europe, where Leishmania infantum is endemic and visceral is no longer primarily a disease of young children. Co-infections are reported from Ethiopia.
- In HIV-infected patients, even relative

- On the other hand, parasitologic diagnosis by noninvasive means is easier in the case of co-infected patients.
- Co-infected patients may initially respond well to anti leishmanial therapy, albeit with more drug toxicity than is experienced by most immunocompetent persons. However, co-infected patients commonly

example, in the old world, L.

Treatment

Decision about whether and how to treat depend or

Typically, the original cutaneous lesions in these cases were not treated or were in adequately treated.

Clinical picture:

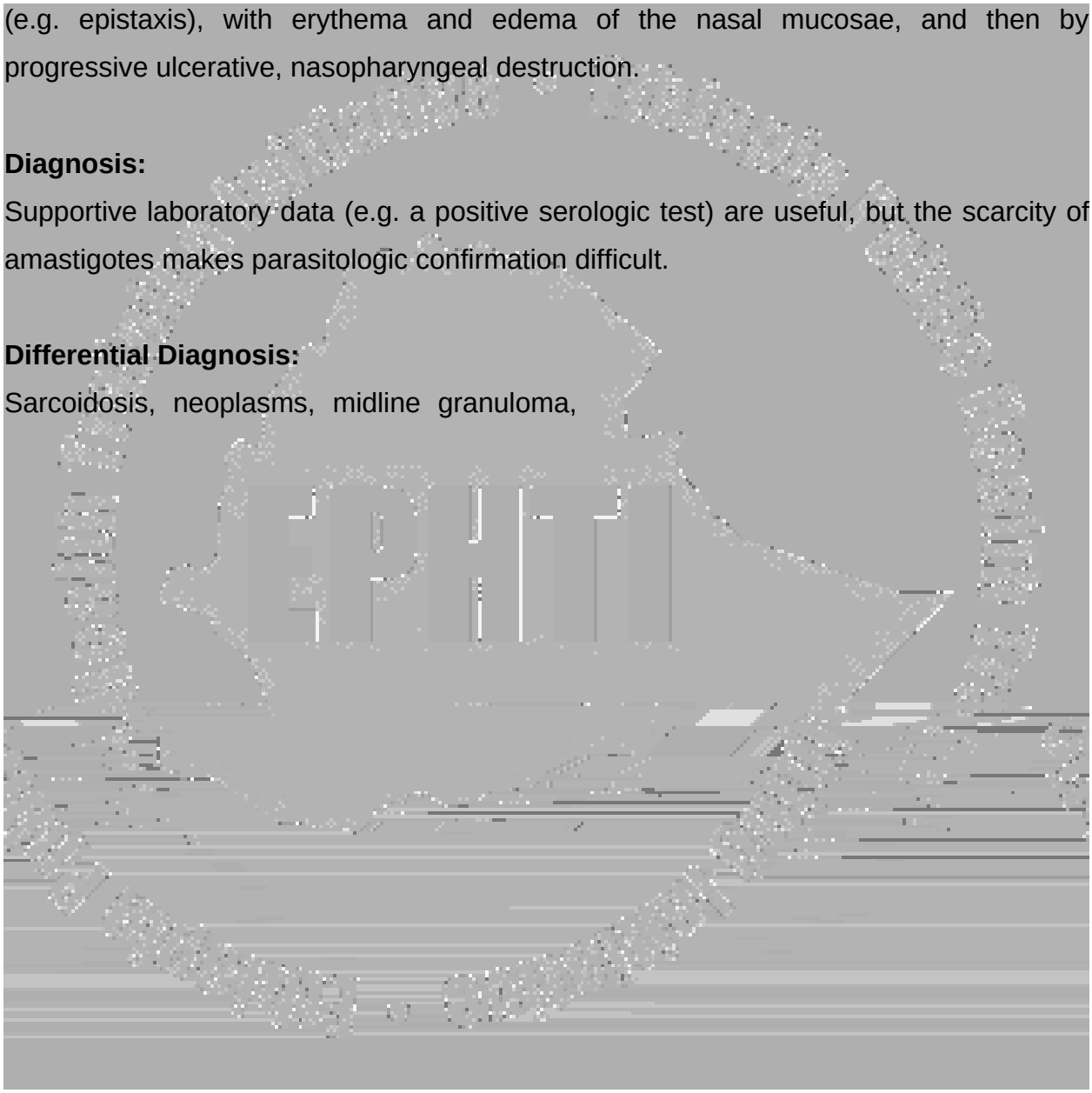
Mucosal involvement generally is manifested first by pesistent unusual nasal symptom (e.g. epistaxis), with erythema and edema of the nasal mucosae, and then by progressive ulcerative, nasopharyngeal destruction.

Diagnosis:

Supportive laboratory data (e.g. a positive serologic test) are useful, but the scarcity of amastigotes makes parasitologic confirmation difficult.

Differential Diagnosis:

Sarcoidosis, neoplasms, midline granuloma,



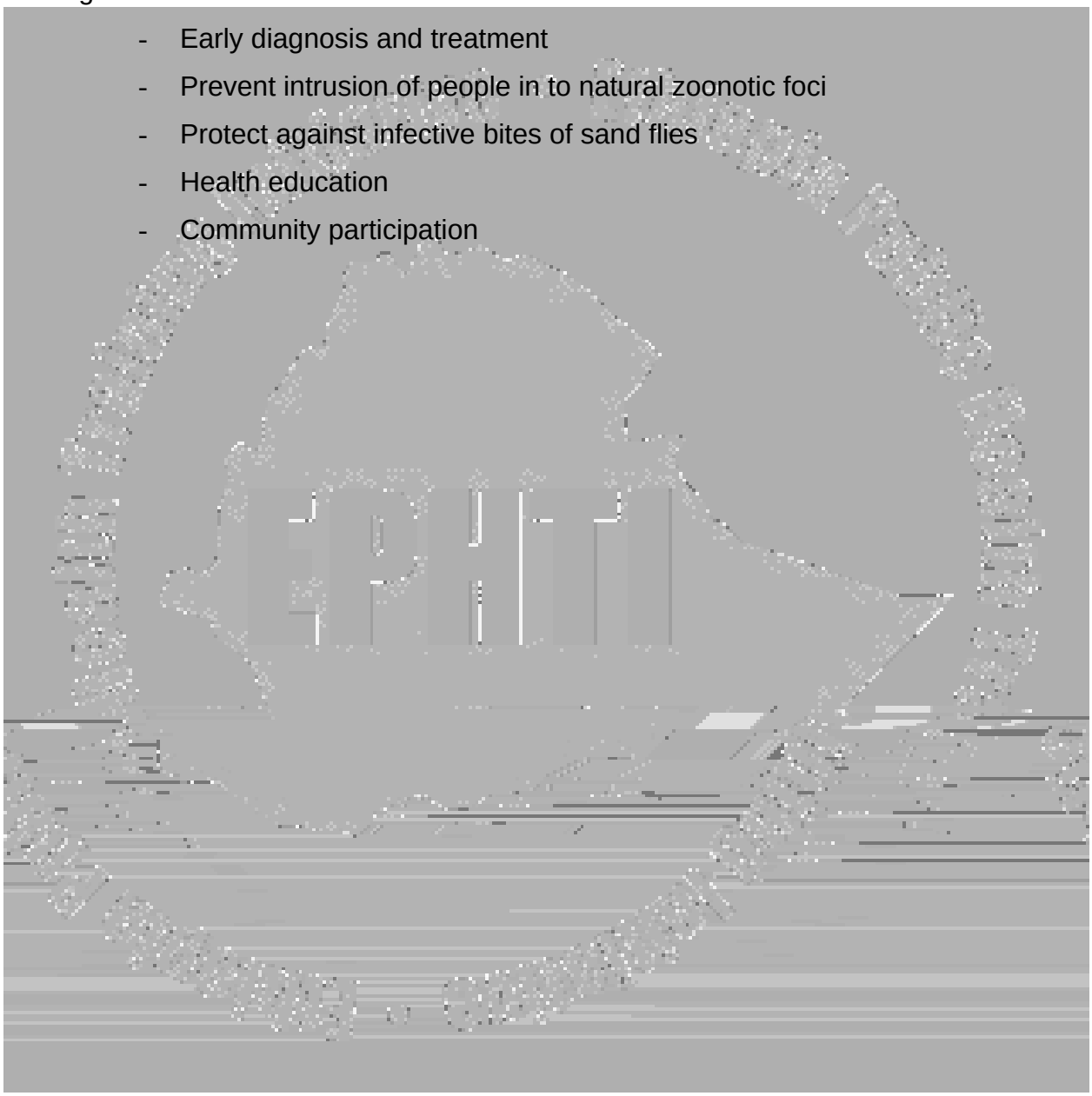
Prevention

Aim of prevention

- Avoiding host infection (Human or canine)
- Preventing subsequent progression to disease

Strategies

- Early diagnosis and treatment
- Prevent intrusion of people in to natural zoonotic foci
- Protect against infective bites of sand flies
- Health education
- Community participation



- Á Destruction of breeding sites
- Á Insecticide spraying

Other Methods

(i) Health talks

To individuals, groups and communities.

(ii) Mass media includes news papers , leaflets radio , television

(iii) Role plays and dramas

(vi) Community participation

For successful environmental management

- × mobilize community health workers, community leaders , women, other sector personnel such as in agriculture education , religious leaders etc
- × Train selected community members on Leishmaniasis

Topics for Health Education

1. Under taking Environmental control
   - forest clearance
   - Destroying rodent sites
   - Identifying sandfly breeding sites and destruction of those sites
2. Reduction of contact between people and sandflies
   - Selection of settlement sites , should be at least 400mts away form breeding and shading sites
   - Clearing trees and vegetation around living , working areas
   - Increase use of insecticide impregnated bed nets
   - Use of screen on windows
   - Wearing protective clotting
   - Applying insect repellants on the skin
3. Early reporting to nearest health institution
4. Community participation
   - Importance of community participation and
   - Intersectoral collaboration

5. Traditional healing practices

- Study the traditional treatment & patient care procedures of Leishmaniasis and identify useful and harmful traditional practices.
- Based on the information, discuss the findings with other professionals to substantiate the usefulness of the traditional healing practices. Then an attempt should be made to utilize useful traditional practices with in the health care system.

3.2 SATELLITE MODULE FOR PUBLIC HEALTH NURSES ON LEISHMANIASIS

3.2.1 Introduction

3.2.1.1 Purpose

This satellite module is prepared for public Health Nursing (PHN) with the main purpose of enabling them identify, mange and also refer patient with leishmaniasis in the context of the first referral system. It will also help them participate in the control and prevention program.

3.2.1.2 Directions

To better understand the disease particularly the cause, mode of transmission, incubation period, clinical manifestations, diagnosis, and the available treatments (surgical and medical) the Public Health Nurse is advised to read the core module and then the satellite module.

3.2.2. Learning objectives

At the end of the session the PHN should be able to:

1. List the various assessment considerations (focuses assessment for patent with leishmaniasis)
2. Describe the possible major nursing diagnosis expected from patient with

D. Domestic rodents

E. None of the above

2. Visceral leishmaniasis is characterized by

A. Fever, hepatosplinomegaly

B. Lymphadenopathy, anemia

C. Progressive emaciation and weakness

D. Only B and C

E. All of the above

3. Which of the following is true about the treatment of leishmaniasis

A. Pentavalent antimonials

B. Sodium stibo gluconate (pentostam®)

C. Cloroamphinicol and PPF

D. Amphotericin B (Fungizone®)

E. Only A, B and D

4. The mode of transmission for leishmaniasis is through the bite of infected

A. Female anophilus mosquito

B. Tse- Tse fly

C. House fly

D. Phlebotomine sand flies

E. Only A and D

5. The incubation period for leishmaniasis takes

A. At least a week, up to many months

B. From two days up four days

C. From two up to twelve hours

D. From twelve to twenty four hours

E. None of the above

Assessment

The history or subjective data includes

1. Exposure or visit to leishmania endemic area
2. History of bit of sand fly
3. History of wound, especially a persistent wound that took months to heal
4. Place of residence
5. Place of work

Pertaining to the physical examination

For cutaneous and mucocutaneous leishmaniasis

- Skin lesions; multiple or catalytic
- Character of the skin lesion
- Areas involved
-

-Generalized body weakness

-Fatigue

-General malaise

-Pallor of the skin and mucous membranes

- Anorexia
- Diarrhea (some times)
- Peripheral lymphadenopathy are among the signs and symptoms that a Public Health Nurses may give due attention during assessment of pt with leishmaniasis

During Nursing Assessment a PHN should also need to assess the patient's ability to visit the health center by him self as well as the patent's:

- Financial status
- Available resources that the patient has for hospitalization and
- Since this problem may attack all the family and the local community, the PHN needs to asses all the community, family especially children and also young adults for that they are the risk groups

Common Nursing diagnosis for a patent with Cutaneous Leishmaniasis

1. Altered skin integrity
2. Risk for impaired skin integrity related to changes in the barrier feature of the skin
3. Pain and itching related to the skin lesion
4. Body image disturbance related to the unsightly appearance of the lesion
5. Knowledge deficits about the treatment regimen

Nursing diagnosis for patient with visceral leishmaniasis includes:

1. Activity intolerance related to weakness, fatigue, and general malaise
2. Altered nutrition, less than body requirement related to anorexia

PLANNING AND IMPLEMENTATION

The major goals in the management of a patent with leishmaniasis of all types may include:

- Increased knowledge about the disease, its treatment and prevention
- Maintain tissue and skin integrity and prevention of potential complications
- Maintenance of normal body temperature
- Attainment of adequate nutrition
- Adaptation and adjustment to alteration in body image
- Maintenance of fluid and electrolyte balance
- Absence of pain
- Tolerance of daily activities

3.2.3 INTERVENTIONS

Note. Since the patient with leishmaniasis needs a long course of treatment in the hospital, the patient should be referred to a hospital. But the public health nurse will have a role in treating the patent before referral and also after the patent is discharged from hospital.

NB, since the patent with cutaneous or muco-cutaneous

- Á Teach the patent, family, and the community from which the patent comes about the disease, its cause, and also the way how it can be prevented.

3.2.3.2 Improving skin integrity and facilitating wound healing

- Á Assess and document the character of any lesion or any surgical site and drainage
- Á Use cotton ring to protect the skin lesion from pressure during sleeping or when the patent lies.
- Á Administer or apply prescribed medication(s) in a timely manner or demonstrate the way how the patient or family should apply the given medication.
- Á Infected lesions need to be treated with appropriate topical or systemic antimicrobial agents.
- Á Clean the wound with an antiseptic solution preferably with hydrogen peroxide) (H_2O_2) one or two times a day. It needs no dressing but the patient should be advised to maintain wound cleanliness. Demonstrating to the patient about techniques of washing and wound care is important.
- Á To avoid potential alteration in the skin integrity as a result of pruritis
    - ü Tell the patient not to scratch his body to prevent secondary infections.
    - ü Identify the cause of pruritis and remove the cause
    - ü Lubricate the skin with an emollient
    - ü Advise wearing soft cotton garments next to the skin
    - ü Nail care should be considered in order to avoid self-scratching injury while sleeping.

3.2.3.3 Attaining and Maintaining Adequate Nutrition

- Á Encourage a well balanced diet high in protein, high calories as well as fruits and vegetables based up on the socio economic status of the patient and locally available foods.
- Á Teach to avoid spicy (irritating) and gas producing foods
- Á Plan a dietary teaching session for patient and family.

- Advise about the importance of mouth care and exercise to increase appetite (avoidance of anorexia)

3.2.3.4 Tolerance of Normal activity

For patents that developed severe visceral leishmaniais and associated anemia the following nursing interventions are to be considered:

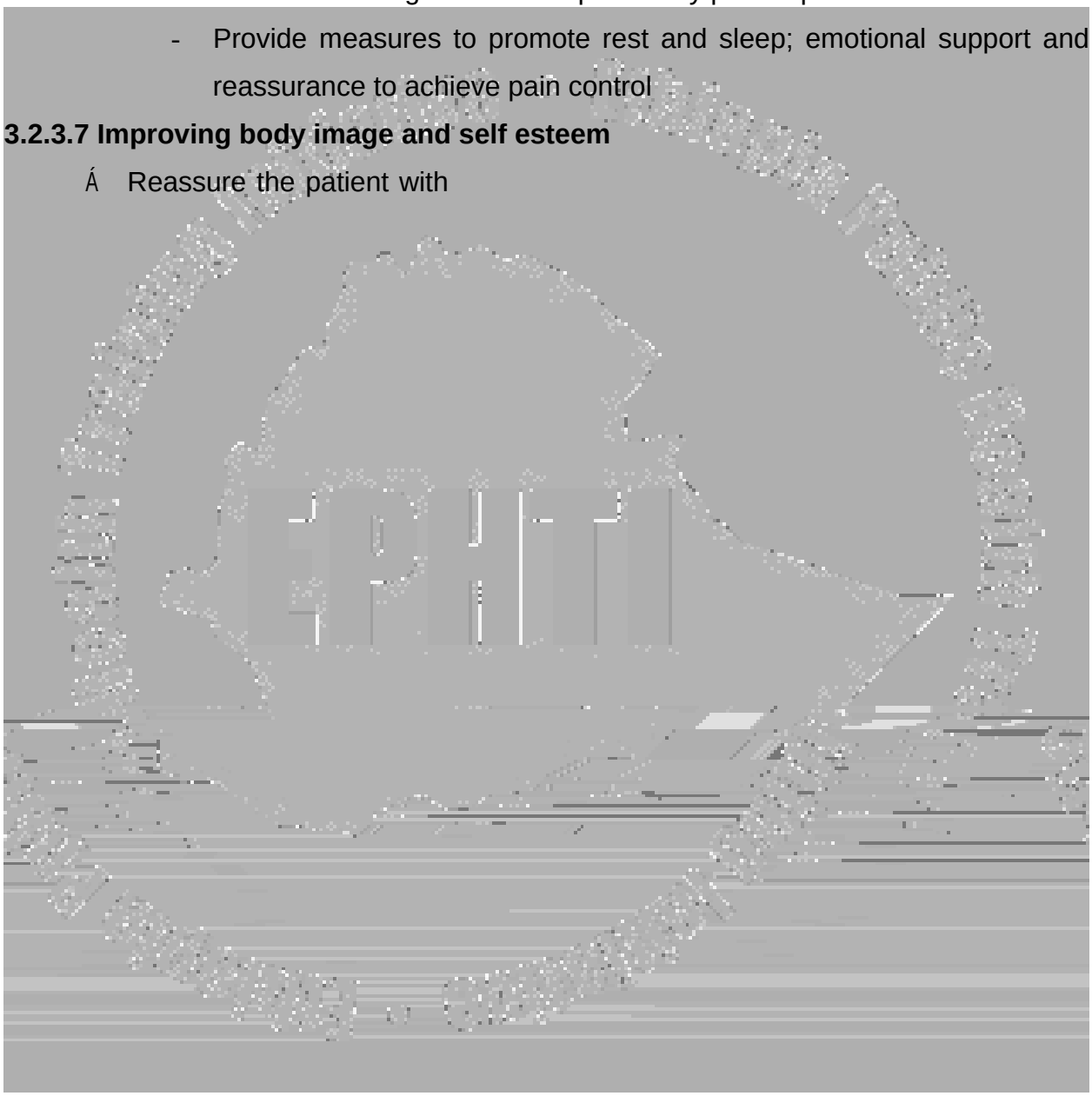
- Plan care to conserve strength, physical and emotional energy
- Encourage frequent rest periods
- Elicit family support for a restful environment
- Encourage ambulation and daily activities as tolerated
- Resume activities gradually as blood studies return to normal. Therefore monitor the Hgb or Hct level.
-

3.2.3.6 Absence of pain

- Assess for the presence and character of pain, behavioral responses and factors influencing the pain
- Administer prescribed analgesics as needed and observe for pain relief
- Administer analgesics before potentially painful procedures
- Provide measures to promote rest and sleep; emotional support and reassurance to achieve pain control

3.2.3.7 Improving body image and self esteem

Á Reassure the patient with



Post test

1. The control measures for leishmaniasis include all except:
    A. Detect cases systematically and treat rapidly
    B. Apply insecticides with residual action periodically
    C. Eliminate rubbish heaps and other breeding places
    D. All of the above
    E. None of the above
2. Why is the patient with leishmaniasis referred from health center to the regional hospital? It is become the treatment for leishmaniasis needs
    A. Leishmaniasis treatment needs hospitalization
    B. Leishmanial treatment requires longer treatment than possible at the health center
    C. In case of severe visceral leishmaniasis the patient may need blood transfusions
    D. The drugs to be given are usually, reserved for hospital use
    E. All are correct
3. The public health nurse is an ideal person to
    A. Identify the diseased person and at risk group
    B. Notify the condition to health center team.
    C. Provide pre- referral, intra- referral and follow up nursing care
    D. Teach the community about the disease and its prevention
    E. All are correct
4. During assessment of high-risk groups in the community the PHN should give due attention
    A. Older adults
    B. Young adults
    C. Children
    D. B and C are correct
    E. None of the above

3.3.3 Pretest

1. One of the following morphologic features cannot describe the amastigote stage:
   A. Round to oval in shape
   B. Has free flagellum
   C. Has eccentric nucleus
   D. Has no undulating membrane

2. _____ is the stage of Leishmania detected from a spleen aspirate
   A. Promastigote
   B. Amastigote
   C. Trypomastigote
   D. Epimastigote

3. _____ Causes visceral leishmaniasis
   A. L.aethiopica
   B. L.Major
   C. L.donovani
   D. L.tropica

4. _____ is the stage of leishmania obtained from culture media
   A. Promastigote
   B. Amastigote
   C. Trypomastigote
   D. Epimastigote

5. Among the following diagnostic tests, one has little value in the diagnosis of cutaneous Leishmaniasis.
   A. Examining slit skin smears for amastigotes
   B. Testing leishmania antibodies in serum
   C. Culturing the material collected from nodule
   D. None

3.3.4 Laboratory Diagnosis of Leishmaniasis

Leishmaniasis can be diagnosed in the laboratory by:

A. Hematological investigations

B. Parasitological examination

C. Serological diagnosis

3.3.4.1 Diagnosis of Visceral Leishmaniasis (VL)

The laboratory diagnosis of visceral leishmaniasis is based on

(A) Hematological investigations

In VL, blood cell production becomes depressed and white cells, platelets, and red blood cells become sequestered in the spleen. Patients become anemic, leucopenic, and thrombocytopenic. During treatment, a rising hemoglobin and white blood cell count indicate a good response.

The investigations include:

- Measurement of the hemoglobin (decreased value).
- White blood cell count (decreased count).
- Platelet count (decreased count).
- Erythrocyte sedimentation rate (raises due to increase in globulins)

(B) Parasitological examination

- Parasite can be demonstrated following staining and /or culture technique.

Staining techniques for smears

There are two staining techniques:

1. Giemsa's staining technique
2. Field's staining technique

1. Examination of Aspirates

Laboratory staff assist the medical officer performing the aspiration to ensure films of the correct thickness are made.

Note: a splenic aspiration must not be performed without training and experience because it may lead to fatal hemorrhage if done incorrectly.

Procedure for examining aspirates

1. Immediately after aspiration, make at least 2 thinly spread smears of the aspirate on clean slides. Only a small quantity of aspirate is required. Dilution with blood should be avoided.
2. Air- dry and then fix each smears, by immersing the slides in a container of methanol for 2- minutes
3. Stain the smears by the rapid Field's or Giemsa staining technique for thin films.
4. When the smear is dry, spread a drop of immersion oil on it and examine first

2. Using Pasteur pipette, aspirate

Rapid latex agglutination test

- ü The latex test is quicker and easier to perform.
- ü Equal volumes of test serum and sensitized dyed latex particles are mixed on a cavity microscope slide and rotated for up to 2 minutes.
- ü A positive test is shown by agglutination reaction

Note: sera from VL patients co infected with HIV may be (but not always) non-reactive in sero-diagnostic tests, including the DAT and latex agglutination test.

D. Other test

Formol gel (aldehyde) Test

- ü It is simple and inexpensive,
- ü The test is non- specific, which detects marked increases in IgG.

Procedure

1. Collect about 5 ml of venous blood in a dry glass tube and leave to clot.
2. When the clot begins to retract (30-60 minutes after collection) centrifuge the blood to obtain clear serum. If a centrifuge is not available, leave the specimen to separate overnight.
3. Transfer about 1 ml of red cell free serum to a small tube.
4. Add 2 drops of 40% formaldehyde solution and mix.
5. Allow to stand for up to 2 hours. Most positive tests, however, can be read after a few minutes.

Interpretation

Positive test: serum whitens and gels usually within 20 minutes (often within 5minutes).

Note**:** In early infections, whitening and gelling of the serum may take up to 2 hours

Negative test**:** serum remains unchanged or gelling only occurs within 2 hours. A negative test cannot exclude VL (test only becomes positive about 3 months after infection)

Note

-

C. Serological diagnosis

Serology has little value in diagnosis of CL, as antibody response is poor. There is, however, a cellular response, which is the basis of the Leishmanin skin test. In MCL, antibodies can be found in the serum.

Leishmanin test

In the test, 0.1 ml of well-shaken antigen is injected intradermally into the inner surface of the forearm.

A Control solution of 0.5 % phenol saline should be injected at a neighboring site at the same time. The diameter of induration is measured at 48 and 72 hours.

Interpretation

Positive reaction

The reaction is considered positive when the area of induration is 5 mm in diameter or more.

A positive reaction may be found in many persons from endemic areas who show no visible skin lesions but have been exposed to infection (test remains positive for life). A positive leishmanin test in children under 1 years of age from endemic areas is highly

3.3.5. Stages of Leishmania Parasite

Leishmania has two developmental stages

A. Amastigote stage - found in definitive host. Also known as Leishman Donovan body

B. Promastigote stage - found in the intermediate host and culture media

3.3.6. Identification features for the stages of Leishmania parasite

A. Amastigote stage

- Small, round to oval bodies measuring 2-4µm.
- Has no free flagellum
- Has no undulating membrane
- Can be seen in groups inside blood monocytes (less commonly in neutrophils), in macrophages, or lying free between cells.
- The nucleus and rod shaped kinetoplast in each amastigote stain dark reddish- mauve.
- The cytoplasm stains palely and is often difficult to see when the amastigotes are in groups

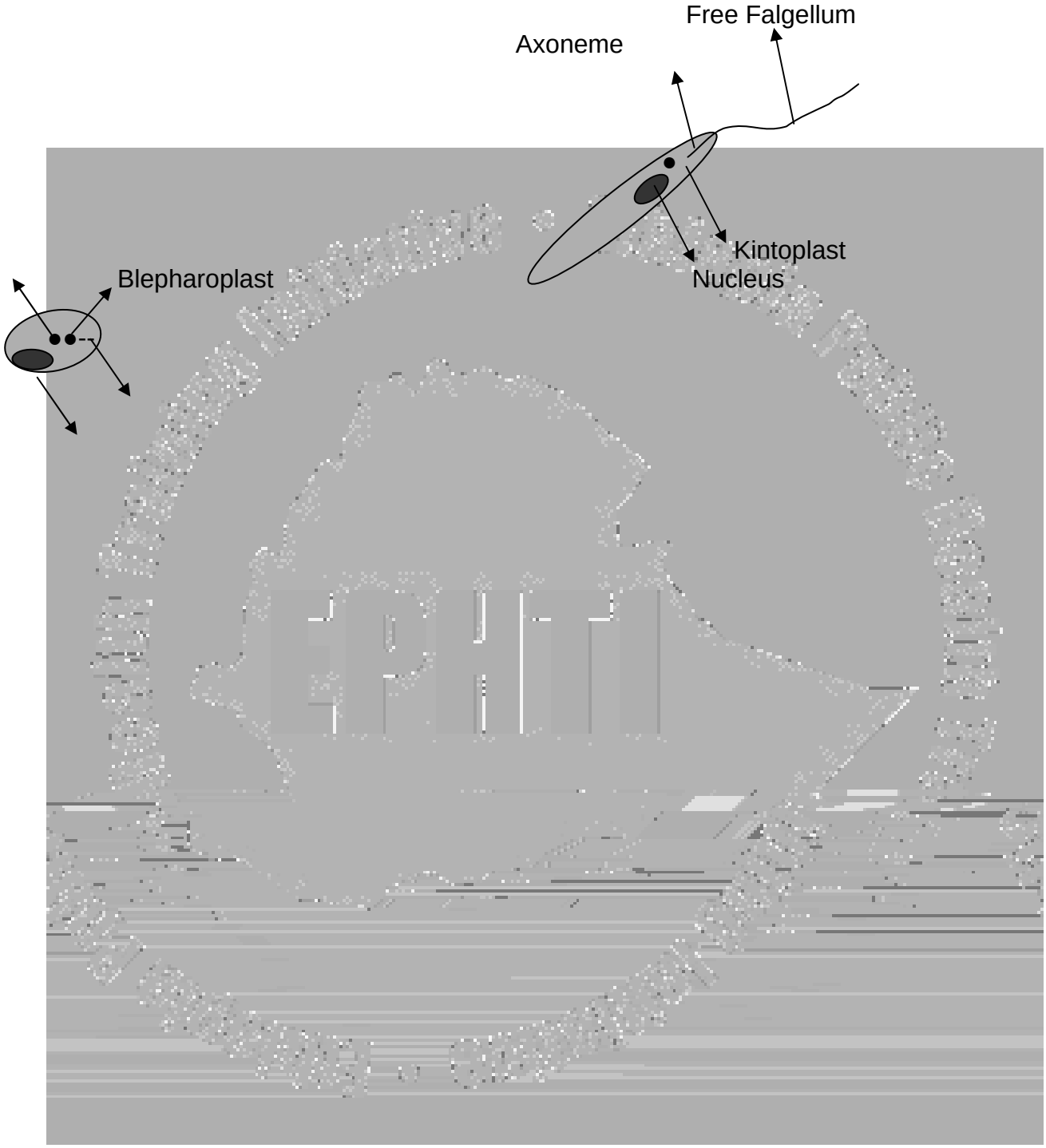
Promastigote stage

- Elongated in form
- Has single free flagellum
- Has no undulating membrane
- Nucleus is near the middle
- The kinetoplast is in the anterior portion

Note:

- Distinguishing leishmania species based on morphological criteria at the light microscope is very difficult and quite often geographical and clinical criteria are used to assist in identifying species.
- How ever there are some variations in size between species. For instance, L.mexicana amastigotes are larger than those of L. braziliensis and have a more centrally placed kinetoplast.

Alternatively immunological, molecular or biochemical criteria are needed to positively identify species.



Picture showing promastigote and amastigote stages of Leishmania parasite.

3.3.7 Post test

3.4 SATELLITE MODULE FOR ENVIRONMENTAL HEALTH OFFICERS ON LEISHMANIASIS

3.4.1. Introduction

3.4.1.1 Purpose and Use of Satellite Module

This satellite module is prepared for Environmental Health Technicians to enable them to focus on the effective prevention and control of leishmaniasis.

3.4.1.2 Directions

- Study the satellite module after going through the core module.
- Environmental health officers are advised to refer to the core module whenever indicated.
- Before & after completing the satellite module answer all the questions under pre-test and post-test respectively.
- Compare your results with the previous performance.

3.4.2 Learning Objectives

Upon completion of this satellite module you will be able to:

- Identify the potential sandfly breeding sites.
- Identify potential leishmania endemic areas and implement surveillance program.
- Identify the preventive and control measures of leishmania.
- List the intervention activities at different levels of health care.
- Identify the developmental stages of sandfly.
- State the methods of health education for action.
- Identify the external morphology of adult phlebotamine sand fly.

3.4.3 Pretest

I**nstruction** – choose the best answer

13) Why insecticidal control of sand fly larvae remains impossible?

A. The breeding sites of most species are unknown or secretive
B. Even when the breeding sites are identified, they are too diverse and impractical to reduce larval number
C. Their larvae float on water surface and hide themselves
D. A and B

14) Which of the following **is not** true about the external morphology of phlebotomus sandflies

A. The palps are as long as the proboscis
B. Hairy appearance
C. Have long and stilt like legs
D. Their wing held erect over

15) The eggs of sand fly are deposited:

A. On surface water
B. On cracks and holes in the ground
C. On floating substance of water
D. All

16) Maturation of larva of phlebotomine sand fly depends on the following **except**

A. Temperature
B. Food supply
C. Water flow
D. Species

17) Phlebotomine sand fly have a relatively short flight range, so that it is easy to control by-------

A. Insecticidal spraying
B. Protective clothes
C. Impregnated bed net
D. Repellants

18) Under which of the following methods phlebotomine sand fly can be effectively prevented?

A. By destroying reservoir
B. By forest clearance
C. By applying insecticides
D. All

19) Which of the following is impractical method of prevention of leishmaniasis?

A. Environmental management
B. Destroy the reservoirs
C. Personal protection
D. Applying insecticide

20) Which of the following **is not** a characteristics of pholebotomine sand fly

A. Active during night and dusk
B. Rest in dark moist areas
C. Active only during the day
D. endophilic and exophilic

21) Which of the following is a protective method against leishmaniasis at individual level?

A. Reducing breeding sites
B. Applying insecticides
C. Using repellants
D. Forest clearance

22) The epidemiology of leishmaniasis is largely determined by:

A. The species of sand flies, their ecology and behavior
B. The availability of the wide range of hosts
C. The species and strains of leishmania parasites
D. All

23) “Forest – free- belt” means:

A. Afforestation
B. Forest clearance
C. Kill wild reservoirs
D. Filling cracks or burrows

24) Old World leishmaniasis is transmitted by:

A. Phlebotomus species
B. Lutzomia species
C. Anopheles species
D. Culex species

3.4.4 Epidemiology

Leishmaniasis is a parasitic disease transmitted through the infective bite of an insect vector, the phlebotomine sand fly. The reservoir hosts are various species of mammals which are responsible for the long-term maintenance of leishmania in nature.

Leishmaniasis currently threatens 350 million men, women and children in 88 countries on four continents.

The genus phlebotomus and lutzomia are widely distributed in the tropics and sub-tropics. Phlebotomus species occur in Old World tropics, most of them inhabit semiarid savanna areas in preference to forested areas. Lutzomia occurs in the New World

Sand flies feed on plant juices but for the most part the females need a blood-meal in order to develop eggs. Blood is taken from humans and animals such as dogs, farm livestock, wild rodents, snakes, lizards and birds. Each sand fly species has specific preferences for its source of blood, but the availability of hosts is an important factor. The saliva of sandflies can enhance the virulence of inoculated Leishmania. Sandfly species are only important as vectors of leishmaniasis if they feed regularly on humans.

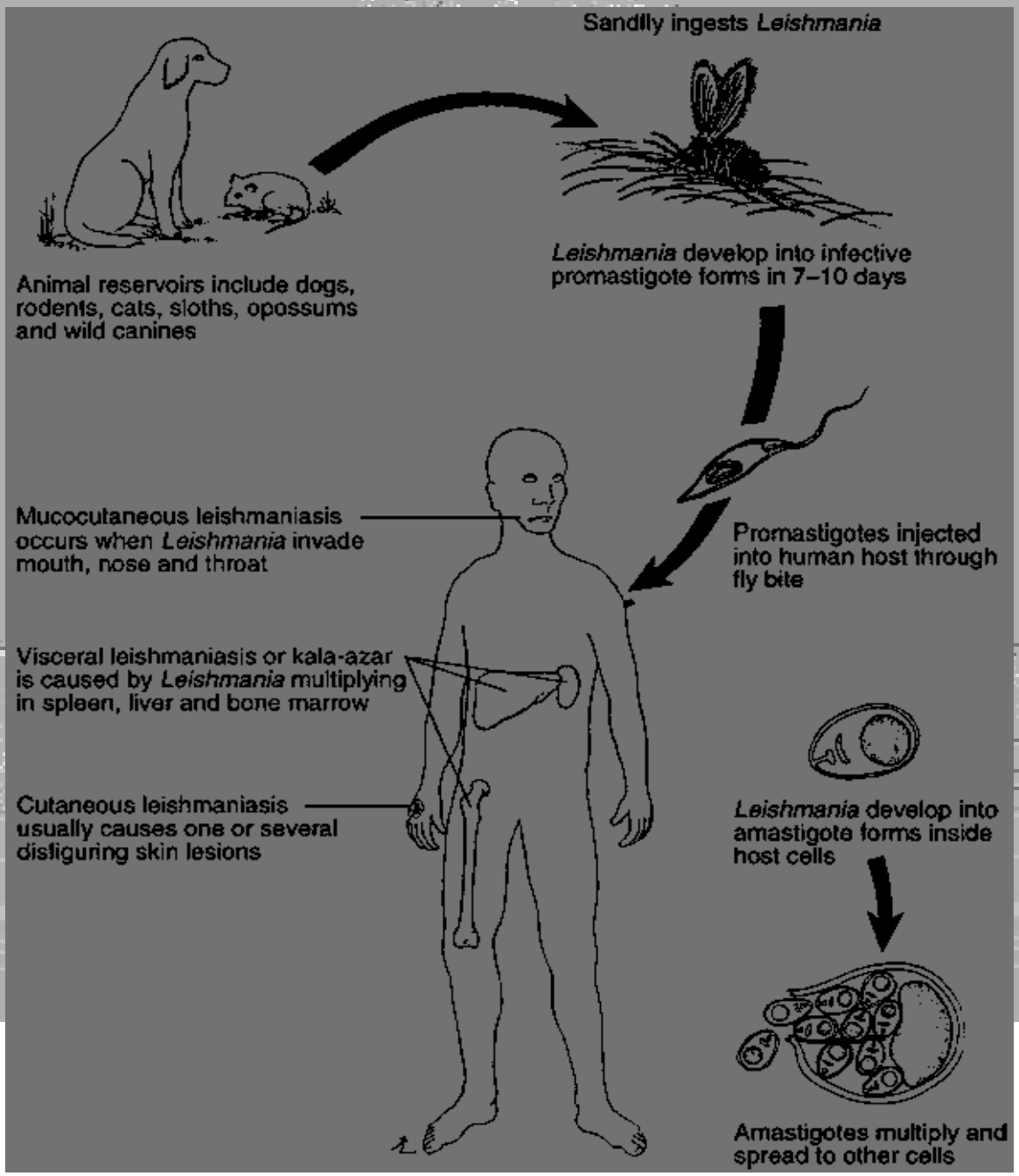


Fig. 1 Life cycle of leishmaniasis

- **The larval stage:** The larvae are mainly scavengers, feeding on organic matter such as animal feces, fungi, insect debris, decaying plant materials. Larval development is completed within 19-60 days depending on species, temperature and availability of food.

- **The pupa stage:** Prior to pupation the larva assumes an erect position in the habitat, the skin then splits open and the pupa wriggles out. The larva skin is not completely attached to the pupa.

- **The adult stage:** The adult emerge from the pupa after about 14 days then flies.

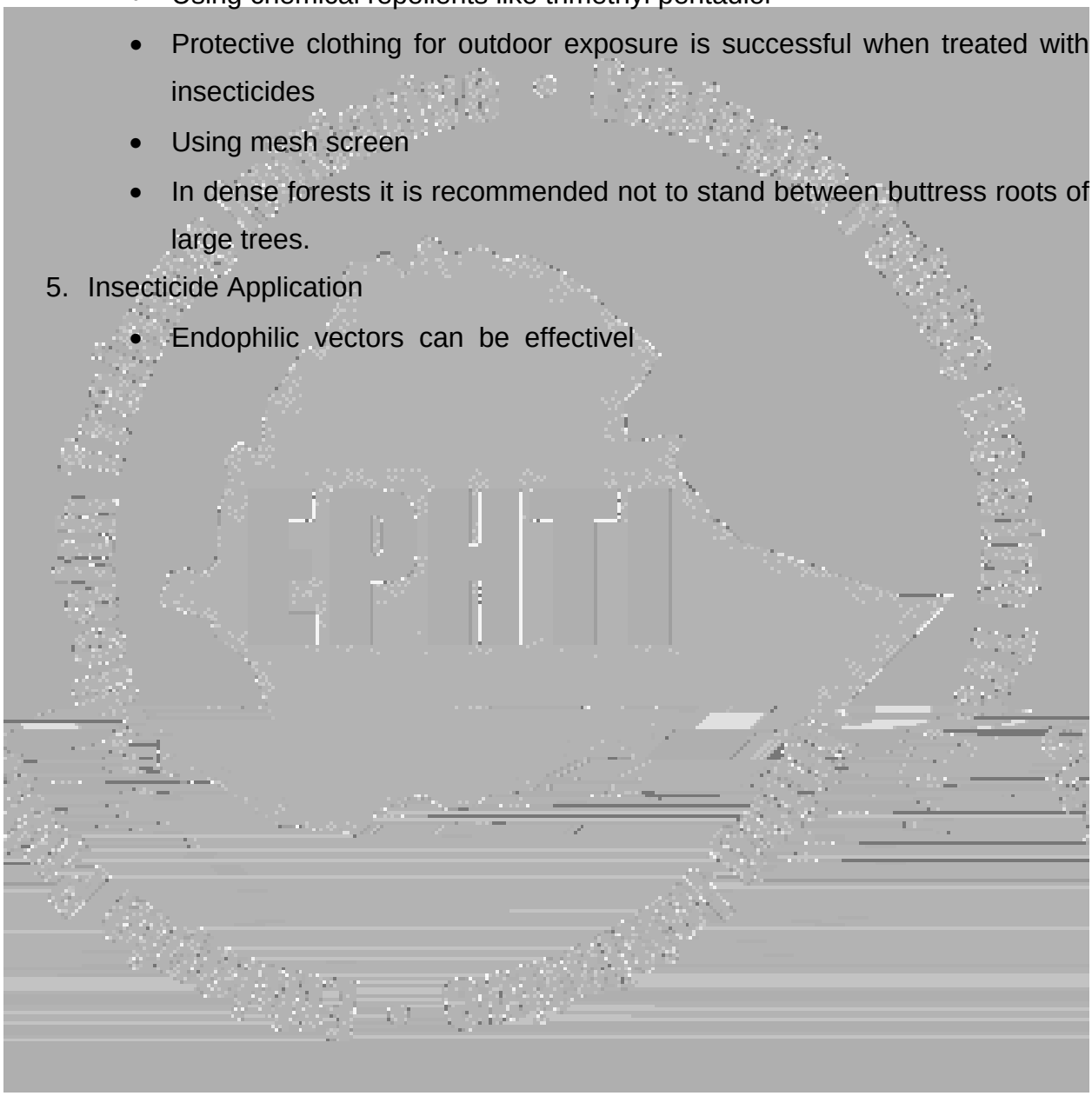
  The life cycle may last from 1 to 4 months, depending of species and temperature, although it usually lasts less than 45 days.

3.4.6 Prevention and Control Measures

1. At patient level
   - Active case detection
   - early treatment of cases
2. Basic sanitation
   - Waste management /garbage clearance/ and house improvement /by cementing and plastering/
   - Reducing breeding sites/places/ by filling any cracks, holes or burrows in the ground.
   - Forest clearance, bushes around houses 300-400 meters in width.
3. Control animal reservoir hosts

   Focus on destroying wild and domestic reservoir animals.
   - Dogs are reservoirs for many species of leishmania, control by destroying infected dogs.
   - Eliminating rock hyrax which is a wild animal reservoir in Ethiopia.
   - Destroy rodent reservoirs like the great gerbil

4. Personal Protection
    - Using fin-mesh bed nets or impregnated bed nets with various insecticides, including pyrethroid permetrin (300mg/m^3) or deltamethrin (15-25mg/m^3)
    - Using chemical repellents like trimethyl pentadiol
    - Protective clothing for outdoor exposure is successful when treated with insecticides
    - Using mesh screen
    - In dense forests it is recommended not to stand between buttress roots of large trees.
5. Insecticide Application
    - Endophilic vectors can be effectivel



-destroy animal reservoirs (dogs, rodents)

ü Community mobilization for environmental protection

Eg. -forest clearance around houses

-destroy animal reservoir and its burrows

- Demonstration

ü By using board/graph papers draw the life cycle of the vector.

Methods of Health Education

1. health talks with discussion

V

3.5 Satellite module for health service extension workers

Introduction

Purpose and uses of the module

This satellite module, which is an extension of the core module on Leishmaniasis, is intended to consider important issues that can help the community health workers (CHWs), especially in the prevention and control of Leishmaniasis.

Leishmaniasis is communicable disease that affects a considerable proportion of our society indifferent parts of the country. Prevention and controlling mechanisms have to be strengthened at the community level to decrease illness and death.

As a health agent of the community, your knowledge on Leishmaniasis will help to control the disease and save lives. That is why this short and precise satellite module is prepared for you to teach and work with community in the control and prevention of Leishmaniasis.

Direction for using the satellite module

- Try to study and answer all the questions in the pretest
- Read and understand the learning activity (Case study) and answer the questions that follow
- Read and understand the satellite module
- Compare your results using the keys after finishing the module

Pretest

- Describe the contributions of CHWs in the prevention and control of the disease at community level

Case study; Learning activity

Derege is an eleven-year-old boy who lives in Humera with his family. He, one day, became febrile and weak. He complained about his current feelings to his mother and was reassured. In the following days he continued to have same

Short notes

1 Definition

Leishmaniasis is a parasitic disease transmitted by a bite of an insect vector.

2 Areas affected

In Ethiopia, low lands along the western borders of the country, Eastern borders and portions of central Ethiopia harbor the disease. People living in these areas of the country have been suffering from the effects of the disease for a long period of time.

Most affected population group

Young children in endemic areas, People who are going to endemic areas in search of work, refuges and displaced people encroaching to endemic areas are at a higher risk of developing the disease.

Cause

Leishmaniasis is caused by germs, which are transmitted by the bite of an insect vector, which harbors the causative agent.

Vector

The vector is an insect fly, which are minute in size (2-4mm) with hairy appearance, long legs, black eyes, and erect wings over their body. They usually rest in sheltered, dark, and humid sites, tree holes, caves, burrows and rubbishes.

They are active during the night and most biting occurs outdoors but a few species bite indoors.

Reservoir

Most Leishmaniasis is contracted from animals, which harbor the parasites. It is from this reservoir that the vector brings the parasite to human beings. The reservoir hosts are rodents, hyraxes, dogs and other game animals, and in rare case human beings are found to be reservoirs.

Symptoms and signs

Leishmaniasis is a disease that can appear in two forms in our country. These forms of the disease are known as Visceral, and Cutaneous. The signs and the symptoms seen in these special forms are different.

Diagnosis

Knowing the symptoms of leishmaniasis is important for diagnosis of both forms of the disease. Final diagnosis needs laboratory confirmation. In visceral leishmaniasis aspirated fluid from the spleen or bone marrow is important to visualize the parasites .for cutaneous leishmaniasis also we need to take tissue from the lesion site and look for the parasites.

Role of the health extension package agent

Referral

A patient with suspected leishmaniasis showing the symptoms described above should be referred to a near by Health centre for further investigation and management. So the agent is required to assess the patient and make sure the patient is referred and gets better medical attention.

Prevention and control

Prevention

Strategies

- Early diagnosis and treatment
- Prevent intrusion of people in to natural zoonotic foci
- Protect against infective bites of sand flies
- Health education
- Community participation

Individual prevention

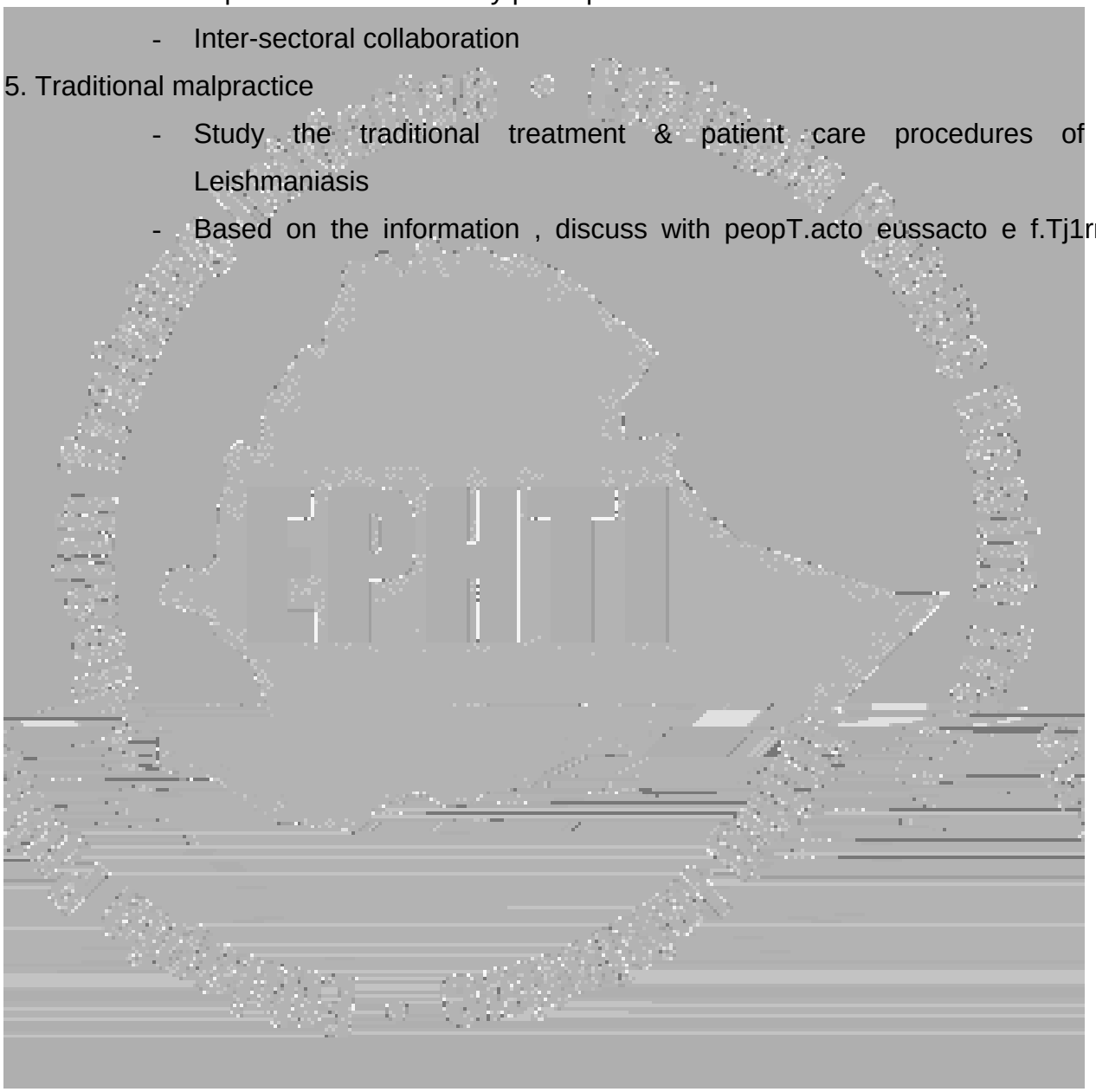
- Avoiding risk of Exposure: Avoid vicinity of sand fly development or resting sites
- Mechanical means: self protection form sand fly bite by wearing clothes, bed nets
- Chemical means: repellants applied to the skin

Collective measures

- Forest clearance: establishment of forest free zone of about 400 meter

- Wearing protective clotting
- Applying insect repellants on the skin

3. Early reporting to nearest health institution
4. Community participation
    - Importance of community participation and
    - Inter-sectoral collaboration
5. Traditional malpractice
    - Study the traditional treatment & patient care procedures of Leishmaniasis
    - Based on the information , discuss with peopT.acto eussacto e f.Tj1rma.72cc43nr



UNIT FOUR

ROLE AND TASK ANALYSIS

Table1: Knowledge-Objectives and Activities by Category of Health Proffessionals

Learning Objective	Activities			
	H.O	BSc Nurses.	EHO	MLT
Describe the causes of Leishmaniasis	Study the causes of Leishmaniasis	Study the causes of Leishmaniasis	Study the causes of Leishmaniasis	Study t he causes of Leishmaniasis
Describe the modes of transmission of Leishmaniasis	Study the modes of transmission	Study the modes of transmissions	Study the modes of transmission	Study the modes of transmission
Describe the life cycle of Leishmaniasis	Study the life cycle in definitive and intermediate hosts	Study the life cycle in definitive and intermediate hosts	Study the life cycle in definitive and intermediate hosts	Study the life cycle in definitive and intermediate hosts
State the diagnostic approach	Study the epidemiological pattern , the clinical features and laboratory methods of investigations	Study the epidemiological pattern, the clinical features & laboratory methods of investigations	Study t he epidemiologic al pattern Environmental factors	Study the laboratory procedures and interpretation of results
Describe the recommended treatment protocol	- Study the type , dose and routes of administration of drugs used for treatment of Leishmaniasis - Study the supportive measures for admitted patients - Study about side-effects of drugs -	- Study the types , dose and routes of administration of drugs used for treatment of Leishmaniasis - Study side effects of drugs Study about supportive measures	Study t he types & side effects of anti – Leishmania drugs	-study the types and dose of drugs
Describe preventive and control measures	Study the preventive and control measures including the indications for prophylaxis Study epidemiological factors related with Leishmaniasis	Study the preventive and control measures including indication for prophylaxis	Study the preventive and control measures	Study the preventive and control measures
Identity epidemiological factors related with Leishmaniasis	Study epidemiological factors related with Leishmaniasis	Study epidemiological factors related with Leishmaniasis	Study epidemiological factors related with Leishmaniasis	Study epidemiological factors Related with Leishmaniasis

Table 2 Attitude – Objectives and Activities by category of Students

Learning Objective	Activities			
	H.O	**P.H.N.**	**EHT**	**MLT**
Help believe that Leishmaniasis is preventable	Encourage preventive measure of Leishmaniasis Use different health education methods such as health talks , demonstration (campaign), mass media , community mobilizations Income specially mothers	Encourage preventive measure Use different health education methods such as health talks , demonstration(campaign.) mass medical community mobilization	Encourage preventive Measures of Leishmaniasis Use different health Education methods such as health talks , Demonstration (campaign) , Media Community Mobilizations	Encourage preventive Measures of Leishmaniasis Use different health education methods Such as health takes demonstration (campaign) Mass media community mobilizations
Help believe that Leishmaniasis is treatable	- Provide information that Leishmaniasis is curable if medication is taken at the right time dose and duration	Provide information that Leishmaniasis is curable if medication is taken at the		

Table 3 Attitude – Practical objectives and Activities by category of Students

UNIT FIVE

GLOSSARY

Amastigote: oval, nonflagellated morphological form found in some of the hemoflagellate life cycle

Axoneme: - intracellular portion of the flagellum

Blepharoplast: - Basal body structure in hemoflagellates from which the axoneme arises

Definitive host: - host in which the adult and/ or sexual phase of a parasite occurs

Flagella- Tail- like extensions of the cytoplasm which provide a means of motility

Intermediate host: Host in which the larval or sexual phage of a parasite occurs

Promostigotes: long, slender hemoflagellate morphologic form containing a free flagellum

Undulating membrane: - finlike structure that is connected to the outer edge of some flagellates

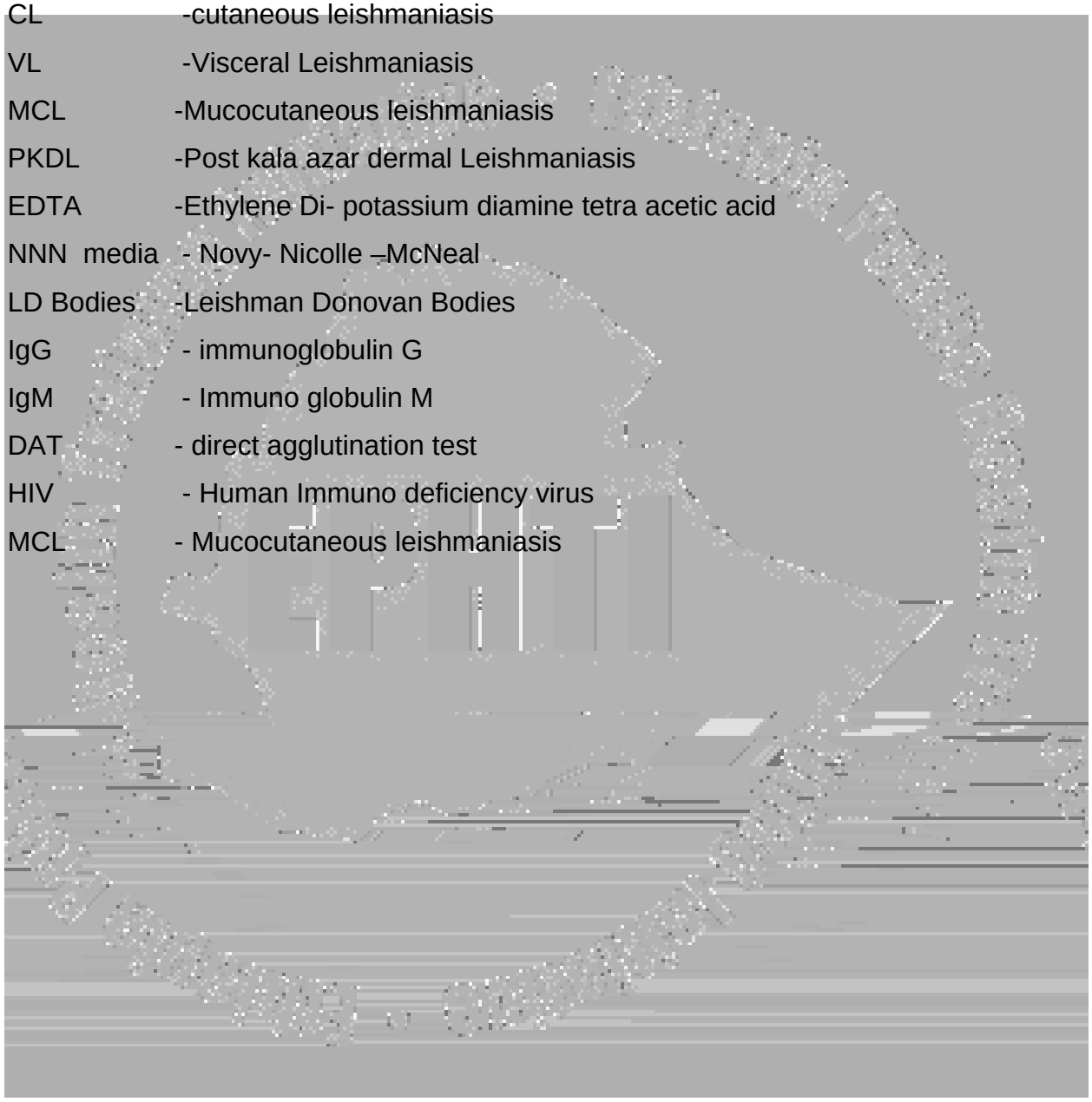
Erythrocyte sedimentation rate: - The length of fall of erythrocyte when anticoagulated blood is stand erected for 1 hour

Kintoplast: - Structure consisting of a dotlike blepharoplast and a parabasal body

UNIT SIX

ABBREVIATIONS

CL	-cutaneous leishmaniasis
VL	-Visceral Leishmaniasis
MCL	-Mucocutaneous leishmaniasis
PKDL	-Post kala azar dermal Leishmaniasis
EDTA	-Ethylene Di- potassium diamine tetra acetic acid
NNN media	- Novy- Nicolle –McNeal
LD Bodies	-Leishman Donovan Bodies
IgG	- immunoglobulin G
IgM	- Immuno globulin M
DAT	- direct agglutination test
HIV	- Human Immuno deficiency virus
MCL	- Mucocutaneous leishmaniasis



UNIT SEVEN

BIBLIOGRAPHY

1. Service M W, Medical Entomology for Students, 2nd edition, Chapman and Hall, New York, Philadelphia, 1996
2. Purdom P.W, Environmental Health, 2nd edition, Bruce Jouanovian Publishers, New York, 1980
3. Brunner and sudrath's text book of medical and Surgical Nursing, 9th edition
4. Pharmacology for Nurses
5. Gordon c. Cook and Alimudin Zumla, Manson's tropical Diseases, 21st edition, WB Sounders, 2003
6. Braunwald, Fauci, Kasper, Harrison's Principles of Internal Medicine, 15th edition, McGraw-Hill medical Publishing division, 2001
7. Lawrence M. Tierney.Jr,Stephen J. Mcphee,Current Medical diagnosis and treatment,42nd edition, Lange medical books/McGraw-Hill,2003

UNIT EIGHT

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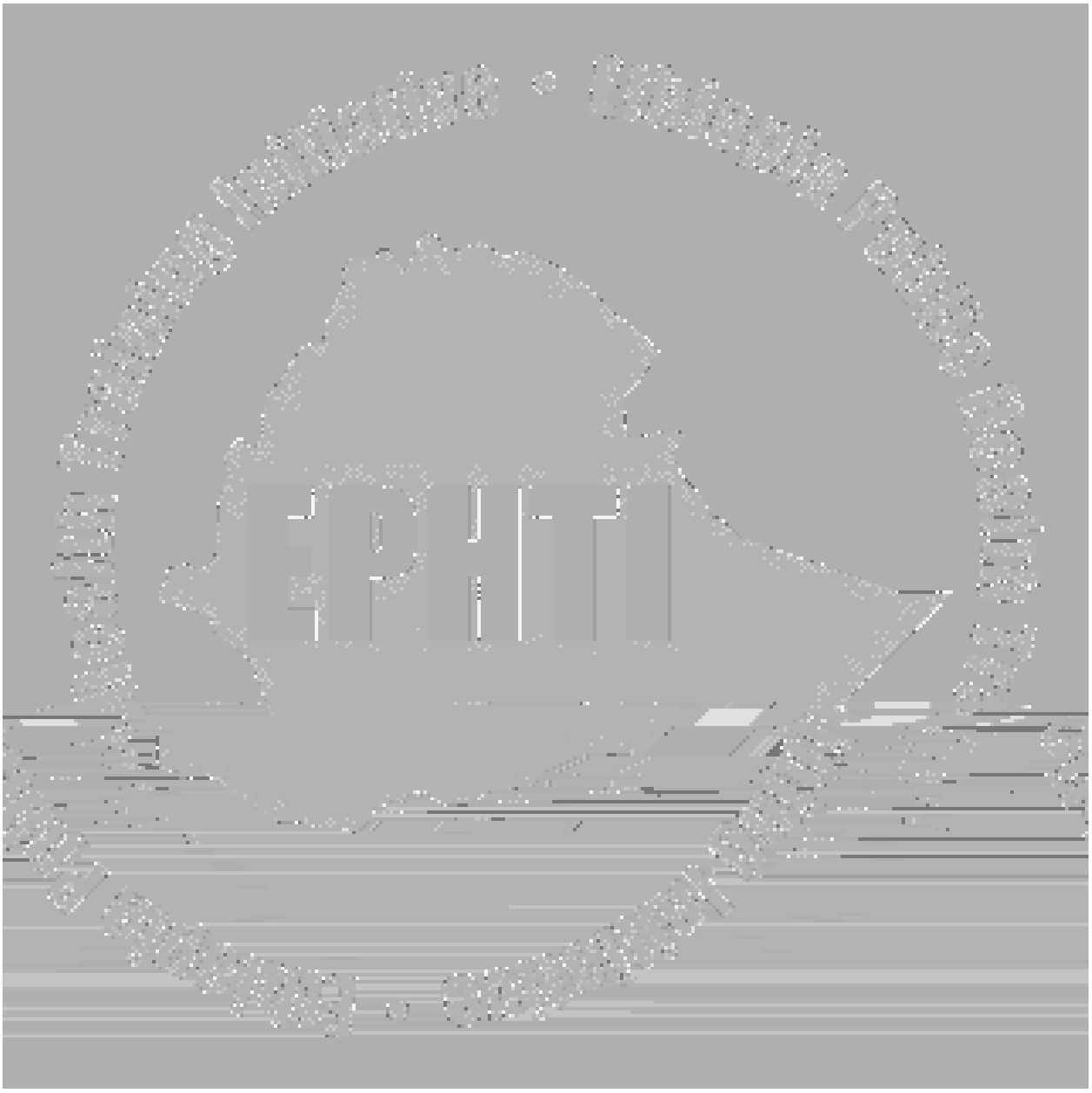
ANNEXES

8.1 Answer keys



8.1.3 for Medical Laboratory

1. B
2. B
3. C
4. A
5. B
6. A
7. D
8. B
9. D
10. D
11. C

8.1.4 For Environmental Health Science

1. D
7. B