MODULE

Onchocerciasis

For the Ethiopian Health Center Team

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Preface

Onchocerciasis, also called “river blindness” is a tissue parasite transmitted by the vector black fly similum. The microfilriae is responsible for the lesion in the skin and eye. It is not only the disease that causes personal suffering but also of very high socio economic significance in most endemic areas of Ethiopia. It is one of the diseases comprised in prevention & control program.

The health team who are working at lower health care delivery system, lack references and the surveillance of onchocerciasis is still weak in most health services. Considering the responsibility and involvement of the Health Centre Team in onchocerciasis control program the Carter Centre initiated & assisted the preparation of this module.

The module is designed for the Ethiopian Health Centre Teams who are expected to work at district level. The information contained in this module will benefit the health professionals working at middle health care level. By studying this module, the Health Center Team will have current knowledge and reliable information on morbidity, mortality and trends of the disease in order to guide onchocerciasis control program.

The purpose of this self-learning module is to provide the mid level health professionals with the necessary knowledge and skills to competently care for the patient & community at large.

This module is intended to cover the main aspects of onchocerciasis. It is hoped that this module has been prepared in a suitable form for use more selectively by the Health Centre Team. It is of course not intended to provide complete instruction, but intended for use as a guide. It needs to be suppl292t8-ats

UNIT ONE
INTRODUCTION

1.1. Purposes and uses of the module

This module is prepared for Health Officers, Professional Nurses, Environmental Health officers and Laboratory technologists who need to work as cooperative team members. Other categories of staff such as clinical nurses and health centre team in the service areas could use the module too.

The module will serve as a practical guide to the management of Onchoserciasis. It enhances the theoretical knowledge acquired in the different disciplines with practical approach. However, it is not meant to substitute for other reference materials and text books.

The module will also help individuals to work together as a team. The core module emphasizes the areas that need to be known by all categories of health centre team members. The satellite modules however concentrate on specific tasks and skills that need to be acquired by each category of the health centre team. The contents of the satellite modules include portions that are not addressed by the core module, but are essential for each professional category.

After going through the module, the reader will be able to appreciate the contributions that could be made by each health centre team member and caregiver/self-care taker. Above all, it enables them to identify the tasks and activities required in preventing and controlling onchocerciasis.

1.2. Directions for using the module

To be well equipped with the necessary knowledge and provide competent care for a patient with onchocerciasis by using this module, follow these directions:

- Study and answer all the questions in the pre-test that correspond to all categories in the Core Module, and to the specific questions that correspond to your category in the respective Satellite Modules.
- After the pre-test go through the core module

- Each category of the health centre team should read their respective satellite module
- Answer all the questions in the pre-tests and compare your results using the keys after finishing the core and satellite modules
- Study and discuss the specific learning objectives, activities and roles of each category of the health centre team.

UNIT TWO

CORE MODULE

2.1 Pre-test for all Categories of the Health Centre Team

Attempt all of the following questions.

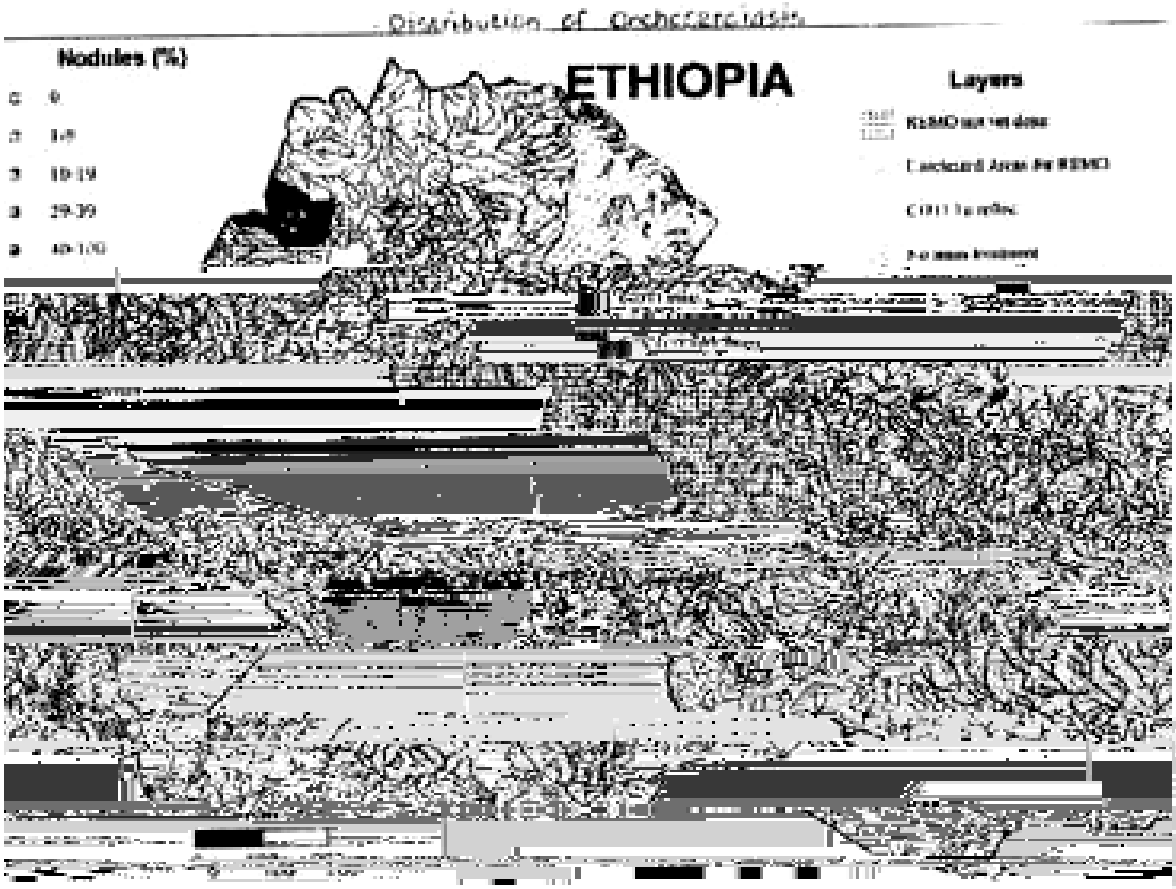
1. What is the etiologic agent of onchocerciasis?
2. _____ is the important vector in the transmission of onchocerciasis
3. How much of the Ethiopian population do you think is at risk of getting onchocerciasis?
4. How is onchocerciasis transmitted?
5. List the complications of onchocerciasis.
6. Discuss the differential diagnoses of onchocerciasis.
7. Which of the following is (are) not clinical manifestations of onchocerciasis?
    A. Subcutaneous nodules

2.4 Definition

Onchocerciasis (river blindness) is a chronic parasitic disease affecting skin and eyes. The adult worms live inside fibrous nodules in subcutaneous tissues.

Ethiopia:

In Ethiopia 7.3 million people are at risk of infection and 1.38 million people are estimated to be affected by the disease. The endemic areas extend from the northwest part to southwest part of the country that borders the Sudan. The main endemic focal areas in Ethiopea are Kefa-Sheka and Bench Maji zone in south west and Pawi –Metema in North West.



2.6.2. Susceptibility

- Race

All persons in endemic areas, regardless of race, are at risk of infection. Socioeconomic differences (occupation as related to exposure to black fly bites, i.e., farmers, fishermen) have been clearly identified as a contributing factors.

- Sex

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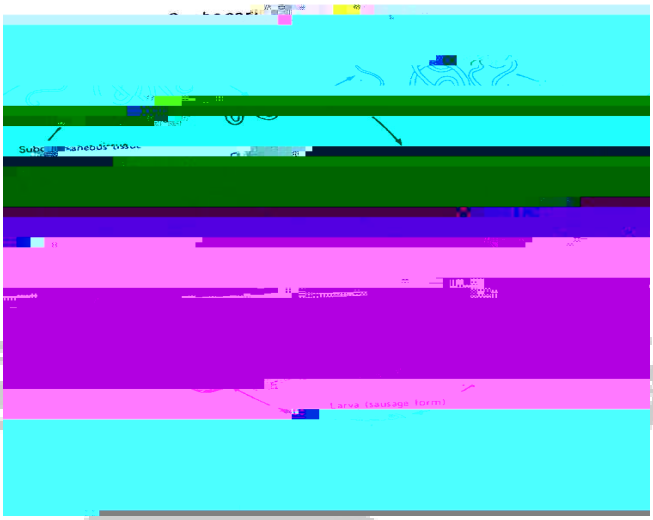

Fig 2.2. Life cycle of Onchocerca volvulus

2.7. Clinical features

HISTORY

- People are living or coming from onchocerciasis endemic areas
- The earliest and most troublesome symptom of onchocerciasis is itching which may be severe.
- Itching is most severe over the sites of highest microfilarial concentration, generally over the lower trunk, pelvis, buttocks, and thighs.
- Other symptoms are subcutaneous nodules, lymphadenopathy, visual changes (can range from reduced vision to frank blindness) and weight loss

- Subcutaneous nodules on the face, back, shoulder, hip, or trunk onchocercomata (containing adult worms).

Late signs

- Lichenification (hyperpigmentation, thickening of the skin with increased skin markings)
- Lizard skin (dryness, roughness and scaling of the skin)
- Leopard skin (atrophy with depigmented and hyperpigmented lesions usually pretibial area)
- Lymphedema (persistent swelling of legs)
- Hanging groin (atrophy of the skin and redundant folds with enlarged inguinal lymphnodes)
- Atrophy of the skin (thinning of the skin with loss of skin markings hanging skin folds seen around the buttocks)
- Redness and swelling of the skin resembling erysipelas rarely occur as Erysipelas de la Costa.

Eye involvement

Early sign

- Reduced vision
- Keratitis (redness and dryness of eyes)
- Iridocyclitis (redness around the cornea, photophobia and pain)
- Sclerosing Keratitis (pain and haziness of cornea)

Late sign

- -Sight impairment and blindness

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	resemble onchoceracal atrophy for patients less than 50 years old.
Other post-inflammatory/post-traumatic hypopignentation	The shins are a common site for trauma; resemble onchocercal depigmentation for confluent patches of depigmentation surrounding “spots” of normally pigmented skin.

2.9. Diagnosis

A presumptive diagnosis can be made based on a history of exposure in an endemic area, the presence of subcutaneous nodules, or typical skin and ocular signs.

B. Skin snip: Identification of microfilariae in skin snips or of the adult worms from excised or aspirated nodules confirms the diagnosis.

C. DEC patch test

A mixture of 10% DEC and Nivea cream is applied under an occlusive dressing; the occurrence of a localized inflammatory resp

microfilarial levels must be repeated at annual or semiannual intervals for the duration of the lives of adult worms, which may be as long as 13 to 14 years.

Additional treatment

- Control itching with antihistamines
- Keratolytic preparations to resolve lichenfication
- Emollients to prevent dryness of skin
- Antibiotics for secondary bacterial infection

Surgical Care: Removal of all subcutaneous nodules can be curative; however, many nodules are difficult to find. And in conditions where lymphedema and elephantiasis develop, the redundant fibrous tissue can be removed surgically.

2.11. Prevention and control

The primary objective of onchocerciasis control strategies is to reduce community microfilarial burdens to levels that are associated with negligible morbidity. The major control strategies for onchocerciasis is through:

Vector control using larvicides to reduce the black fly population. This method of control is expensive and difficult to administer over remote areas.

Mass treatment with ivermectin is employed in areas of high endemicity and has successfully reduced the morbidity associated with onchocerciasis in treated populations by reducing the microfilarial burden.

Education of people in endemic areas is a crucial aspect of lowering the transmission rate

2.12. Prognosis:

- Patients undergoing ivermectin treatment every 6-12 months for the lifetime of the adult worm (approximately 12 y) have resolution of early, reversible lesions and most eye findings and most dermatitis

- Patients with scarring of the cornea, chorioretinitis, blindness, skin atrophy, and depigmentation do not improve with treatment.
- Patients who are blind have an increased mortality rate and a shortened life expectancy.

2.13. Case study

After he had this problem for almost two years, Aba Temam, complained about his skin problem to his friend. His friend said “You know, the local drugs don’t help at all! well, may be you should go and see a medical doctor. Jimma is close by; why don’t you go there?”

Aba Temam thought about this for some time; after a week he decided that his friend was probably right and came to the Department of Dermatology at Jimma University Specialized Hospital.

The attending dermatologist recorded in the chart:

Localised, pigmented plaque lesions with pigmented, oedematous and thickened skin on the left leg, thigh and gluteal area combined with few papules and a solitary lesion around the knee; mild pigmentation and thickening of skin on the right leg.

Having a pretty firm suspicion about the underlying disease (but not being quite sure about the possible differentials), the physician sent her patient for appropriate tests.

Group Exercise 2

2.1. What other examinations would you do?

2.2. What are the appropriate tests?

Aba Temam was told to go to the laboratory, where a skin snip was done.
On the paper the lab technician had given him, the Dermatologist could read:
Multiple microfilariae from left leg lesion.

Therefore, the diagnosis of onchocerciasis was confirmed.
The physician prescribed him tablets, some lotions and gave him advice.
Aba Temam thanked the physician and he was glad that finally something could be done against the itching...

Group Exercise 3

Based on the case history given above, try to answer the following questions.

1. What do you think is the mode of transmission of the disease?
2. In which parts of the country is the disease common?
3. How do you treat this patient?
4. Discuss the prevention measures.

UNIT THREE

SATELLITE MODULE FOR HEALTH OFFICERS

3.1. Introduction

3.1.1. Purpose

This satellite module is prepared for the health officer category. The module emphasizes areas not covered by the core module that are of particular concern to the health officer.

3.1.2. Directions

- After the pre-test go through the satellite module
- Readers are advised to refer to the core module whenever indicated.
- After completing the satellite module retake and answer all the pretest questions under section 3.2.
- Compare your results with that of the previous pretest taken

3.2. Pre-test for Health Officers

1. The average incubation period of onchocerciasis is_____.

2. How can you differentiate onchocerciasis from other disease that manifest with skin lesions?

3. Define onchocercomata.

4. Describe onchocercal lesions in the anterior and posterior segments of the eye.

5. Skin manifestations of onchocerciasis do not include:-

A. Acute papular dermatitis

B. Chronic papular dermatitis

C. Depigmentation

D. Bulae

6. The suitable breeding site for onchocerca volvulus is

A. Well oxygenated running water

B. Lakes and ponds

C. Stagnant water

D. waste matter

7. The drug of choice for onchocerciasis is ivermectin.

A. True B. False

8. Actions to prevent onchocerciasis include all of the following except:

A. Mass treatment in endemic areas

B. Larviciding C. Distribution of bed net D. Educating the people

3.3. Learning Objectives

After completing this module the reader will be able to:

1. Describe the life cycle of onchocerca volvulus.

2. Describe the burden of the disease in Ethiopia.

3. Describe the clinical features and identify suspected cases of onchocerciasis

4. Mention the possible complications of onchocerciasis

5. Describe the laboratory procedures to diagnose onchocerciasis

6. Mention and apply treatment modalities for onchocerciasis

Atrophy of the skin is relatively common in highly endemic areas. Atrophic skin adopts many of the characteristics of aging such as loss of elasticity and contours; the skin appears excessively wrinkled and is often very thin. There may be hair loss and reduced sweating.

Punctate keratitis is opacities of the superficial corneal stroma. They can be seen by the naked eye or visualized using a slit lamp.

Anterior uveitis is due to invasion of the iris and ciliary body by microfilariae. These lesions may be asymptomatic or accompanied by redness of the eye chemosis, excessive lacrimation , pain and visual disturbance.

- *Posterior segment*

The posterior segment of the eye may be involved in chronic and heavy infections; causing inflammatory damage to the retina and optic nerve.

Chorioretinitis in onchocerciasis is a slowly progressive and insidious condition taking many years before visual loss is evident.

Post-neuritic optic atrophy is the lesion most commonly affecting the optic nerve and reflects previous episodes of active inflammation. Acute optic neuritis is observed rarely.

Other complications

- Nakalanga dwarfism from pituitary involvement
- Epilepsy (associated, but not a proven complication)
- Posttreatment arthritis and tenosynovitis
- Reproductive abnormalities (secondary amenorrhea, spontaneous abortion, and infertility).

3.6. Differential diagnoses (see the core module)

3.7. Diagnosis

A presumptive diagnosis can be made based on a history of exposure in an endemic area, the presence of subcutaneous nodules, or typical skin and ocular signs.

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3.8. Treatment

Goal:

Prevent complication

Alleviate symptoms

Pharmacologic treatment

Ivermectin

Ivermectin is the drug of choice. Ivermectin is well-tolerated and highly effective microfilaricidal drug that rapidly reduces microfilarial numbers in the skin. Treatment with ivermectin decreases transmission, improves dermatitis, and decreases prevalence of blindness. Because it does not kill or sterilize adult worms treatment to suppress dermal microfilarial levels must be repeated at annual or semiannual intervals for the duration of the lives of adult worms, which may be as long as 13 to 14 years.

Standard dosage

150 µg/kg for one dose.

Contraindications

Conditions associated with an impaired blood-brain barrier because penetration into the central nervous system can cause lethargy, ataxia, tremors, and death.

Main drug interactions

None.

Main side effects

Ivermectin is generally well-tolerated. Main side effect is associated with relatively mild adverse reactions caused by microfilarial killing (the Mazzotti reaction) especially those with short exposure histories.

Caution is needed in those with a possible exposure history to loaisis as the death of *Loa loa* microfilariae may cause severe or fatal encephalitis.

Precautions

The drug is not approved for use in children weighing less than 15 kg, in pregnant women, and in mothers nursing 1-week old infants.

Suramin

The only macrofilaricidal drug not recommended for routine use in patients with onchocerciasis. Because of significant toxicity, it should be considered for use only in exceptional cases with medical supervision:

Additional treatments (see the core module**)**

Other treatments

Surgical Care: Removal of all subcutaneous nodules can be curative; however, many nodules are difficult to find.

3.9. Prognosis:

- Patients undergoing ivermectin treatment every 6-12 months for the lifetime of the adult worm (approximately 12 y) have resolution of most eye findings and most dermatitis.
- Patients with chorioretinitis, blindness, skin atrophy, and depigmentation do not improve with treatment. Patients who are blind have an increased mortality rate and a 10-year life expectancy

UNIT FOUR

SATELLITE MODULE FOR BSc

PROFESSIONAL NURSES

4.1 Introduction

4.1.1 Purpose:

A number of communicable diseases cause significant disruption in social and health services. Onchocerciasis is a public health problem of villagers. It is not only a disease of public health importance but also a disease of very high socioeconomic significance.

It causes a great deal of personal suffering and is a major economic influence in Africa. The economic, health and social consequences of onchocerciasis are devastating. It debilitates the young adult male farmer who then cannot farm (work) or cannot care for their children or the young men leave heavily infected areas. The black fly breeds in rapidly flowing water along the most fertile banks of rivers and streams. Fertile riverbanks at endemic areas are abandoned for fear of contracting the disease and people move to less fertile grounds, disrupting a stable village economy. Those large tracts of fertile land are depopulated. Farming communities are regaining their lost land and people are again planting crops and reaping harvest when there is a proper onchocerciasis control program is present. Onchocerciasis is one of the skin diseases comprised in prevention and control program.

Nurses who are working at midlevel and lower level health care units lack references. Unfortunately the surveillance of onchocerciasis is still weak in lower health services.

By nursing assessment, diagnosis and intervention, the nurse will learn how to make positive changes in the community through health education, training Extension Package Health Worker, proper supervision and follow-up and record keeping and reporting. The purpose of this self-learning module is to provide the mid- level health professionals with the necessary knowledge and skills to competently care for the patient and community at large. The information contained in this module will benefit the health professionals working at lower health care level. By studying this module the Health Centre team should have knowledge and reliable information on morbidity, mortality and trends in

order to guide onchocerciasis control program. It is of course not intended to provide complete instruction, but intended for use as a guide. It needs to be supplemented by standard books and periodicals. The authors therefore encourage further reading to enrich your knowledge and maintain skills.

4.1.2 Directions for using this module: -

- Before reading this part, be sure you have completed the pre-test and the core module.
- Continue reading the satellite modules for diploma nurses and Extension Package Health Workers in order to supervise them properly.

4.2. Pre-Test

1) Onchocerciasis is transmitted by the vector _____that prefers to breed in _____:

2) One of the following is **NOT** the clinical picture of onchocerciasis

A. Skin lesions B. Eye lesion

C. Elephantiasis D. Hydrocel

3) The less toxic drug of choice which is used in community directed treatment to prevent blindness in onchocerciasis is

A. Diethylcarbamazine B. Hetrazan

C. Mass chemotherapy D. Ivemectin

4) Onchocerciasis diagnosis is confirmed by:

A. Blood film B. Urine examination

C. Skin snips D. Marked increase of eosinophilia

5) The common features of onchocerciasis and its consequences include the following except**:**

A) Blindness C) Dermatititis

B) Nodule D) Hemorrhage

6) Which one the following onchoserciasis drugs has nephrotoxic effect which should not be recommended in routine treatment is ?

A) Ivermectin C) Diethylcarbamazine

B) Suramin D) Mectizan

7) During training Extension Package Health Workers the professional nurse should focus on:

A)_____

B)_____

C)_____

D)_____

8) Some of the common therapeutic problems of ivermectine in the onchocerciasis control program are:

A) _____

B) _____

C)_____

D)_____

9) The present contraindications to ivermectin include:

A) _____

B) _____

C) _____

D)_____

4.4. Some common features of onchocerciasis

Onchocerciasis or “river blindness” is a tissue parasite transmitted and spread by the bite of the vector small black fly similum. When the adult female worm release microscopic microfilarie in to the body the microfilariae cause continuous debilitating itching.

The following sign and symptoms have to be considered:

The disease in Ethiopia is mainly characterized as causing a wide spectrum of skin lesions ranging from intense itching to gross changes in elasticity resulting in hanging groin, lizard like skin appearance and color changes.

A) **Onchocercal dermatitis or skin atrophy**: which manifests

1. Skin conditions:

1.1 Early signs

- Persistent pruritis, erythema and edema of the skin.
- Papular, pustular, nodular or urticarial lesions on the back, thighs, buttocks, extensor surfaces of upper and lower limbs maybe confined to one anatomical region only.
-

2. Eye involvement

2.1 Early signs

- Reduced vision
- Keratitis (redness dryness of eyes)
- Iridocyclis (redness around the cornea, photophobia and pain)
- Sclerosing keratitis (pain and haziness of cornea)

2.2 Late sign- the most severe effect of the disease includes visual impairment and blindness.

-Weight loss-which is not directly related to onchocerciasis but may be due to social and mental impacts related with the disease.

The microfilaria can cause eyesight damage and potential blindness when they enter the eyes.

Unlike reports from West Africa the rate of blindness from onchocerciasis is not that significant in Ethiopia. If not treated in a timely fashion, blindness occurs by the colonization of microfilariae in the eyes. However, blindness caused by onchocerciasis (river blindness) is rare before the age of 30.

Fig.4.1. Onchocerciasis and its consequences.

Professional nurses working at midlevel health care are based not only on knowledge of the physical causes and feature of onchocerciasis but also on socio-economic impact.

Personal effects of onchocerciasis; physical and social health problems include:

- Disability
- Change in life style
- Social isolation
- Financial cost or burden

4.4.1. Complication

Nodule

Hydrocele

Secondary infection

Blindness

4.4.2. Diagnosis of onchocerciasi

4.5. Nursing Management andPrevention

4.5.1. Nursing Assessment, Diagnosis and intervention

Nurses should understand the nature of onchocerciasis, related factors and defining the characteristics of the problem and nursing diagnosis through proper assessment.

Examine by removing all clothing.

Check for the presence of nodules, atrophied and pigmented skin and pruritus to properly record the situation.

Examine the scrotum properly by using torch

Perform Proper visual test and record by using E-chart and define blindness corresponding to the inability to count finger at a distance of 3 meters.

4.5.2. Nursing Diagnosis:

Anxiety related to skin disease and its appearance

Anxiety related to nocturnal itching

insomnia (loss of sleep) related to nocturnal itching

Anxiety related to poor vision

Altered in comfort; chronic pain related to the illness

Ineffective coping ability with the problem

Fear of family disruption related to the illness

Impaired tissue integrity related to persistent and chronic itching as secondary to skin infection.

Potential for complication (secondary to skin infection) related to continuous itching and scratch

Anxiety related to psychosocial problem

Knowledge deficit about the illness

4.5.3. Measures of prevention and control

Onchocerciasis is a preventable disease.

Control and prevention is better than cure in this disease.

Preventing infection through primary prevention activities (vector control) and regular use of ivermectin is the most cost-effective public health strategy.

Fighting onchocerciasis commonly known as river blindness is not only the responsibility of the health sectors alone, it should involve

multi-sectoral organization. Close collaboration with other sectors and the community, families, school children (who mostly play at the river side) is important.

Professional nurses should combat onchocerciasis in coalition with different organizations working in control program by involving EPHW in community based and home based control program.

Measures for prevention and control of onchocerciasis include:

ii) Early diagnosis and treatment

iii) Improved personal or environmental hygiene.

iv) Effective vector control

v) Community health education

Onchocerciasis management can be addressed by:

Strengthening infrastructure

Training health workers in the community

Annual treatment of endemic communities suffices to reduce the:

Parasite load

Prevent new cases of blindness

Improve anterior segment eye lesion

allevatesonchodermatitis

Weekly aerial application of larvicide to the breeding site of black flies has effectively interrupted the disease transmission. Because of the large surface of the river and springs application is difficult. There are few reports on the effectiveness of repellents against black fly.

4.5.4. Drug Treatment:

Nurses should understand whom to treat:

- Infected people who have left the endemic areas
- Those whose eyesight is becoming impaired.
- Those incapacitated by itching
- Those incapable of avoiding reinfection i.e. livingin endemic Area.

NB: Because of its sever side effect diethylcarbamazine (DEC) is not recommended.

4.5.4.1. Suramin: -

a) Is the only drug in current use capable of killing adult worms.
b) It is a toxic drug that nurses should be aware to identify and understand allergy to suramine which are:

Fever,
Urticaria,
Arthritis
Exfoliative dermatitis that can be controlled by corticosteroids:- predinsone is given in a dose of 20 mg three times daily, then the dose should be reduced gradually.

Its use requires close nursing supervision during administration.

Suramin must be freshly dissolved from powder immediately before use. Ordered dose (five doses) of 20mg/kg are given IV at weekly intervals. The drug is nephrotoxic (the nurse should collect urine specimen for test before each injection). **If protein and casts are present the drug should be withheld.**

4.5.3.2 Ivermectin:

a) The drug of choice to treat or combat river blindness without severe side effects is ivermectin (Mectizan). Ivermectin has been successfully used in treating onchocerciasis.
b) The most recent development in the prevention of blindness from onchoserciasis is ivermectin:- a non-toxic microfilaricide suitable also for large-scale or community based treatment. Nurses should understand this drug does not affect adult worms but a single oral dose once or twice each year kills the microfilariae, thus stopping the onset of blindness and the skin disease.
c) Nurses should understand the contraindication and possible side effects of giving ivermecitin.

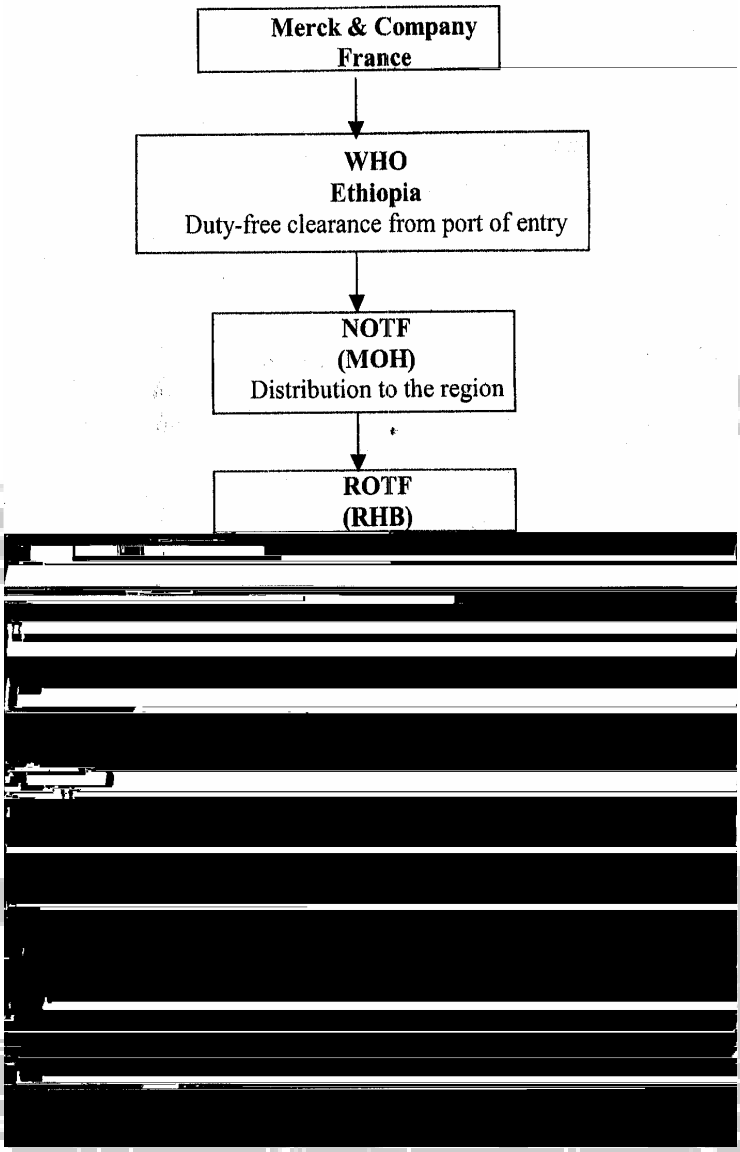
Present contraindications to ivermectin include:

- Pregnant women
- Mothers in the first month of lactation
- Children under the age of five years
- Children under 15 kg body weight.
- Those severely ill

Since 1987, ivermectin is supplied free of charge in which the annual treatment is recommended at a dose of 150 microgram per kilogram of body weight. The ivermectin (Mectizan) treatment chart must be used.

Fig.4.2. Mectizan treatment chart.

Professional nurses working at mid-level should be aware about ivermectin distribution from production to community level which is one of the cornerstones for the control program sustainability for timely request and distribution.



Some of the common therapeutic problems of ivermectine in OCP are the:

- Muscular and joint pain, sever itching, fever, dizziness, vomiting, head ache, diarrhea, redness of the eye

Adequate, secure distribution mechanisms and health care infrastructure are essential in insuring ivermectin reach those who need them at all level.

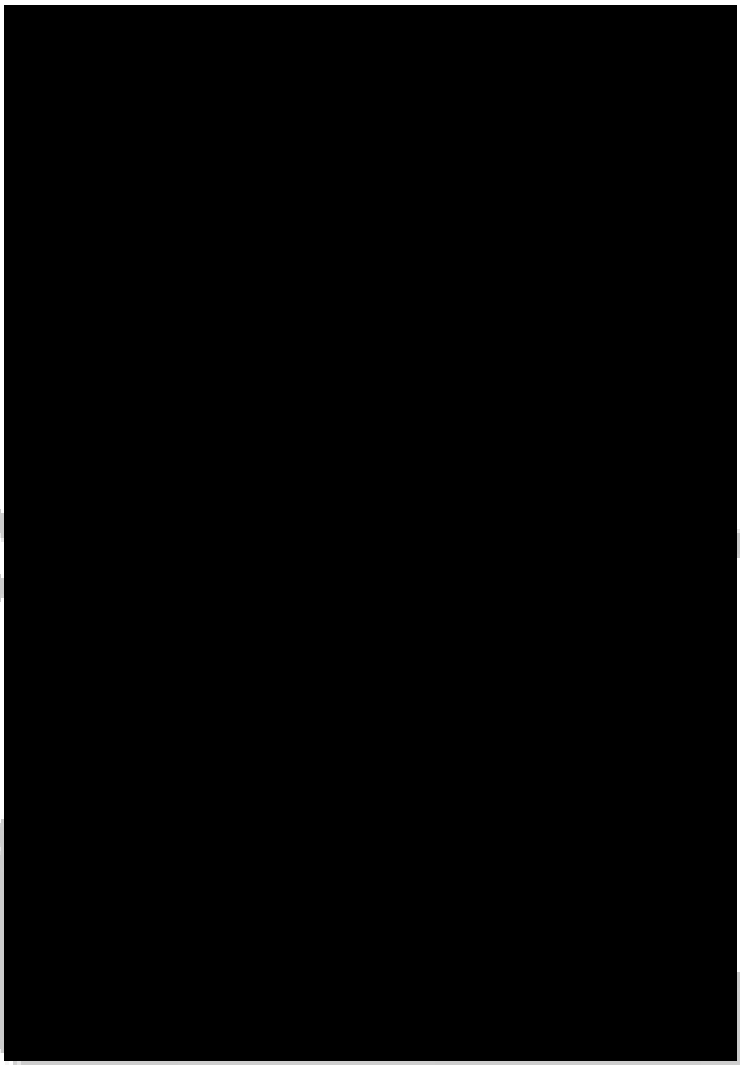


Fig 4-3 Main activities of the Onchoserciasis control Task Force at various level

4.5.4 Nursing intervention and supportive care

Problems that should be relieved by proper nursing care are:

- Sever itching (mostly in the night) and other aspects of skin manifestation having serious psychological and socioeconomic consequences that can never be underestimated. E.g. studies reveal that the skin manifestation of onchocerciasis to be more important than blindness, because of their effect on relation ship and marriage prospects.
- Loss of sleep that often leads to fatigue during the day which in turn results in low productivity and economic activities is a common occurrence in onchocerciasis affected communities.

- Provide antihistamine andapply soothing lotion.
- Pruritus is often caused by excessive drying of skin especially in older patients i.e. the severity is highest in old persons if involved.

To minimize migration of the microfilaria to the periphery the night clothes must be light.

Dry skin is characteristically flaky and easily susceptible to injury and irritation.

Bathing should be limited & bath less frequently, especially when the outdoor temperature and humidity are low.

If soap is used it should be thoroughly rinsed from the skin for the reason the residue soap left on the skin predisposes or causes irritation dryness and break down of the skin.

Advice the patient to avoid wearing garments made of woolen fabrics since wool tends to irritate dry skin. Wash garments made of wrinkle-resistant fabrics once or twice before wearing them.

Add moisture to the air through humidifier when the skin is dry.

Increase fluid intake when the skin is dry.

Use an emollient, which is an agent used to soften, soothe, and protect dry skin after it is cleansed. Emollient or moisturizing creams do not add moisture to the skin. Rather, the film they leave on the skin retards normal moisture evaporation and helps to hold down the scaly skin surfaces. Cocoa butter, petrolatum jelly and lanolin are effective emollients and are used in many emollient creams.

Avoid defating agents, such as alcohol, on dry and easily injured skin.

Oil may be added to the bath water, but care should be taken because oil makes the bath tub slippery.

Lotions and moisturizing creams should be applied regularly to promote rehydration of dried areas.

Involve the target communities in the decision making process from the initial stages of the program and throughout the various stages of the control program.

Health education and promotion aimed at changing individual and community behaviour:

Teach specific vector control and personal protection measures

Initiate school health program

Initiate home visiting by diploma nurse and Extension Package Health Workers.

Proper instruction & teaching to prevent accident due to poor vision.

Supporting device is necessary when there is a problem of hydrocele.

Involvement and Mobilizing community and intersectoral collaboration for participation is essential to successful implementation of OCP.

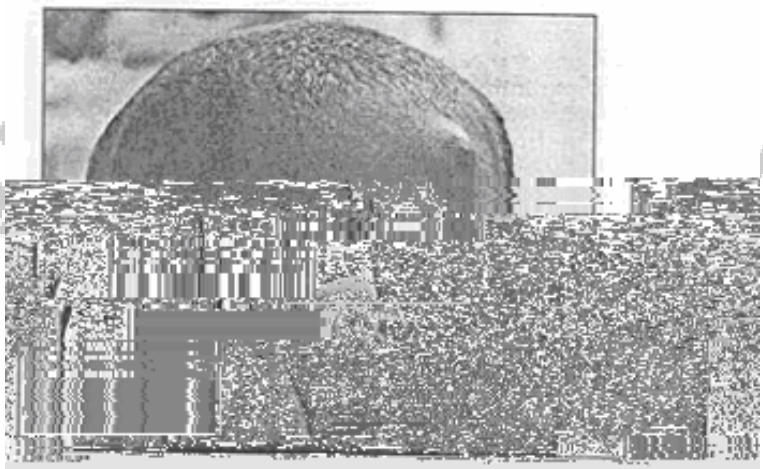
A treatment plan must be according to the policy and approval by the Ministry Of Health.

The ability to maintain required medical records and to report adverse reaction, communication and referral system need sufficient resources to be maintained to sustain the treatment programs for a minimum of five years.

There must be an agreement to integrate ivermectin into

4.5.5 Referral:

Nurses should refer patients with a module containing adult worm on the head region which is indicated because of increased risk of serious ocular disease. Degree nurses should instruct diploma nurses and Extension Package Health Workers, when to refer a patient to the next level of health care.



Personal record sheet: -nurses should record age, sex, locality, birth place and duration of stay at present address for follow-up. If the care of onchocerciasis is to be effective and appropriate the professional nurse must have knowledge of the importance of socio cultural influences and specific control measure.

4.5.6 Summary:

Onchocerciasis prevention & control program must move beyond providing drug treatment. i.e. to include counseling to social & economic problems that arises due to the disease and its consequences. Effective control of onchoser

Considering its awful consequences on public health and socio economic development nurses in close collaboration with the other sectors, families, affected communities school children other professionals, donors andinternational agencies & national control programs should fight this human scourage.

Are you through with the core and satellite module? If so read the modules of other categories. Check the pre-test and answers.

UNIT FIVE

SATELLITE MODULE

FOR BSc MEDICAL LBORATORY PERSONNEL

5.1 Introduction

5.1.1 Purpose:

This satellite module is planned to give pertinent and simple methods for laboratory diagnosis of O.volvulus.

5.1.2 Directions:

- Read the core module before starting this part.
- Attempt the pre-test before reading this part.

5.1.3 Pre-test for laboratory personnel.

There is only one correct choice for each question. Attempt all.

1. Early immature stage of filarial worm is called
   A. Amastigote
   B. Microfilariae
   C. Metacercaria
   D. All
2. O.Volvlus adult worms are located in
   A. Blood cells
   B. Skin nodules
   C. Small intestine
   D. A and B
3. In Giemsa stain preparation,microfilariae of O.Volvulus appears as.
   A. Hooked tail
   B. Tail with nuclei to the end.
   C. Globular head
   D. None

4. Serology test has not widely applied in diagnosis of onchocerciasis because
    A. The test Is costly
    B. Filarial worms are less antigenic
    C. Cross- reactivity
    D. All
5. Which is not site for skin snip
    A. skin from center of nodule
    B. buttock area
    C. skin over ribs
    D. None
6. Slide technique of skin snip preparation
    A. Gives more microfilaria yield
    B. Does not require physiological saline
    C. Gives poor microfilaria yield than tube method
    D. None
7. Which one is not used in differentiation of microfilarae of filarial worm
    A. Presence of absence of sheath
    B. Position of nuclei in the anterior part
    C. Tail nuclei arrangement
    D. Color of microfilariae.
8. Number of skin snips should be taken before issuing negative result.
    A. 2
    B. 4
    C. 6
    D. 8
9. Patient for skin snip examination for onchcerciasis should.
    A. sit for half an hour under direct sun light
    B. sit for half an hour under shed
    C. A and B
    D. All

10. Which one is not required for slide technique of skin snip preparation.

A. Slide
B. Centrifuge
C. Saline
D. Cover slip

5.1.4 Learning objectivies

After reading the text, the laboratory personnel will be expected:

-

Methods of laboratory diagnosis

- Parasitological /skin snip/ method.
- Provocative test method
  - Mazzottie reaction.
  - Patch test
- Serological test methods
- Nucleic acid amplification method

5.2.1 Parasitological test /skin snip test /

It is the most useful diagnostic procedure. It is bases on finding O. volvulus microfilariae in the skin snips. The natural habitats of the larval are connective tissue and cutaneous layers in the vicinity of the parent worm, as well as in the stratum germinativum and the corneal conjunctiva.

Bloodless skin snip should be taken after a patient has rested away from direct sun light for half an hour.

5.2.1.1. Where to collect specimen

A) Patients with nodules

Look for nodules:

- On the chest (over the ribs)
- On the hips
- One the legs (tibia)
- On the back (shoulder blades)

Take the specimen from the skin in the center of the nodule.

B) Patients without nodules

Take specimens from

- The top of the buttocks (the upper outer part where intramuscular injections are given)

If the examination gives negative result, take specimen from:-

- The calf (upper outer part)
- The back (center of shoulderblade)

It is recommended that 6 specimens (2 from buttocks, 2 from calves, and 2 from shoulderblades) be examined before reporting a negative result.

5.2.1.2. Test principle

Two to six skin snips are taken from an area of maximum microfilarial density. Biopsy specimens are placed in normal saline on a slide or in a test tube for a length of time. The saline is then examined for microfilariae that migrate from the tissue. If no microfilariae are seen, the preparation should be left overnight and examined for microfiliariae the next morning.

There are two types of skin snip techniques. These are

- Slide technique
- Test tube technique

Tube method is a more reliable technique. It is recommended in areas where onchocericiasis is less endemic. Is also used to confirm negative results with slide technique results.

5.2.1.3. Slide technique procedure

Materials Needed:

Sterile needle
Sterile razor (scalpel)
Spirit swab.
Slide
Cover slip

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Procedures

1. Immerse the skin snip in 2ml of physiological saline in a centrifuge tube. Incubate at room temperature over night.
2. Using forceps, remove the skin snip, place it on a slide, and cover with a cover glass.
3. Centrifuge the contents of the tube at a medium speed (approximately 2000 RPM) for 5-10 minutes. Remove or discard the supernatant fluid. Transfer the entire sediment to a slide.
4. Examine the skin and the sediment microscopically for a microfilaiae using 10 x objective with the condenser iris closed sufficiently to give good contrast

NB: - The microfilaria from skin snips appear colorless, transparent, and actively motile and non periodic.

5.2.1.5. Species confirmation of microfllariae of filarial worms

Microfilaria of filarial worms differ from one another on the bases of in their: -

Size

Presence or absence of sheath

Distribution of nuclei at in the caudal Region of the Larvae.

Periodicity of thei

5.2.1.6.Features of O.volvulus Microfilariae under Giemsa stain.

- Size – large: measures 240-360 x 5-9 µm
- Has no sheath
- Has pointed tail without nuclei
- Has globular head.
- Anterior nuclei positioned side by side.

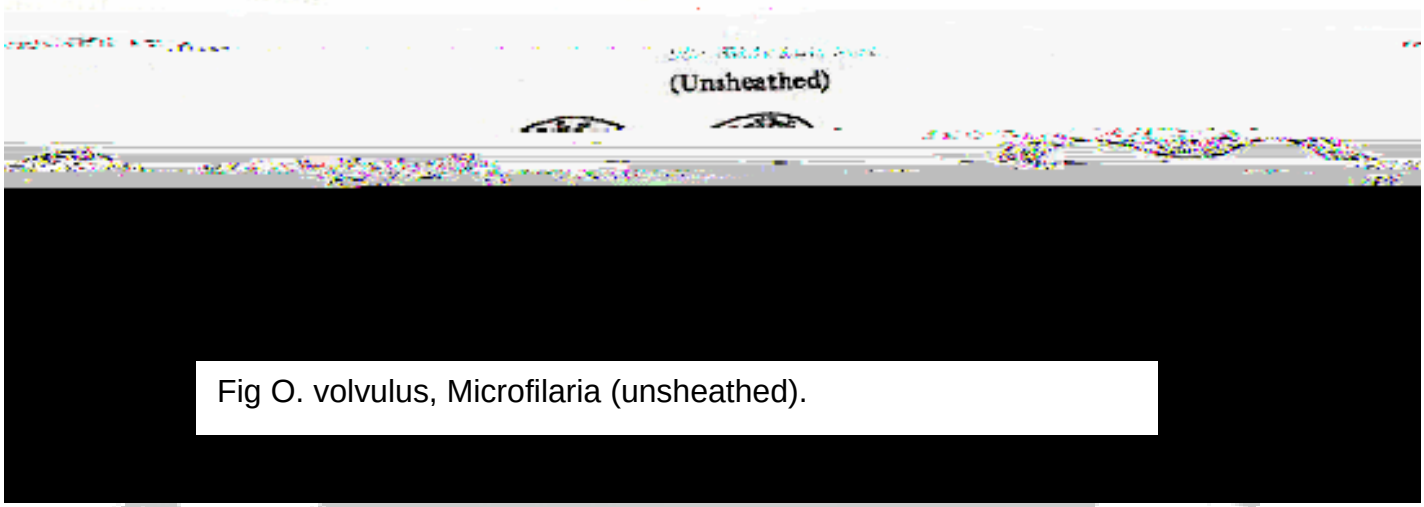

Fig O. volvulus, Microfilaria (unsheathed).

Table- Morphological feature of O. Volvulus microfilariae, which aid in differential diagnosis form other filarial warm larvae found in the skin.

Spaces	Size	Sheath	Body & tail	Other points
O.volvulus	Large & thick 240-300 x 5-9 mm	No	Head is slightly enlarged. Anterior nuclei positioned side by side. There are no nuclei in the end of the tail which is long and pointed.	Differentiation is easy from M. streptocerca, but more difficult from M. 033ardi

M.streptocerca	Small & thin 180-240 x 4.5 mm	-	Anterior nuclei are positioned in a single file. Nuclei extend to the end of the tail, which is rounded, and usually hooked.	Differentiation is from O.volvulus is by its smaller size, single file anterior nuclei & tail feature.
M. ozzardi	Small & thin 150-200x 4.5 mm	-	Anterior nuclei are positioned side by side. There are no nuclei in the end of the tail, which is long & pointed.	Differentiated from O. volvulus mainly by its smaller size and different shaped head.

Demonstration of adult worm inside the excised nodule can also be a diagnostic method.

Features of Onchocerca volvulus adult worm are: -

Location – Nodules of subcutaneous tissue

Size – male – 1.9 – 4.2cm by 0.13 –0.21mm.

- Female – much longer than male, measures 33.5 –50cm by 0.27 – 0.40mm

Appearance – white, opalescent & transparent with transverse striation on the cuticle.

Note – during heavy infection microfilariae can also found in urine, blood, and other body fluids.

5.2.2. Provocative test methods

This method depends on the body's allergic response to destroyed microfIlariae by diethylcarbamizine (DEC).

5.2.2.1. Mazzotti reaction

Test principle**:**

A dose of 50 mg of DEC is given and usually followed 15-30 minutes, or occasionally hours later by intense itching and erythema caused by allergic reaction to the destroyed

The method is not popular because the response is very intense in heavily infected individuals such that it may result in collapse, shortness of birth, coughing and vertigo. To minimize this it is advisable to provide smaller doses (10-20mg) for patients from endemic area. Or restrict the test for a patient with negative skin snip test result.

5.2.2.2. Patch test

Principle of the test:

The test involves applying topically a small amount of 10% DEC in Nivea lanolin cream to an area of skin about 5mm in diameter and covering the area with a dressing. The area is inspected 8, 12, 12, 48 and 72 hours later. A positive test is shown by a papular eruption developing 8-24 hours after applying DEC. The

Patch test is simple, sensitive and has only limited itching thus; it can be used in countries where onchocerciasisis is endemic.

Test preparation:

Dissolve 10 gm DEC in 100 ml Nivia milk (Nivia skin cream) and store on ice. Patches are prepared by soaking 3 cm by 2 cm. Filter paper in the 10% DEC Nivia cream solution. Apply the patches on the body preferably on the above mentioned body area where microfilariae are in high density.

5.2.3. Immuno diagnosis

- Current serological tests use blots of finger-prick blood collected on filter paper.
- Reported sensitively is 70-80%, and specificity is 96-100%
- Serological diagnosis cannot reliably distinguish past infection from current infection.

5.2.4. Nucleic acid amplification tests

- Assays based on polymerase chain reaction (PCR) are highly effective in diagnosis of onchoceriasis, although cost and technical issues keep this from routine use.
- PCR based assays may also be used to detect infection in black fly vectors.

5.2.5. Examination of other body fluids

Microfilariae have been found in urine and cerebrospinal fluid (CSF) of some infected individuals in hyper endemic areas.

Pretreatment with small dose of DEC mobilizes microfilriae to the urine. Microfilariae may then be observed on microscopic examination. Urine examination is not a diagnostic substitute for skin snips.

In high level parasitemia , mirofilariae may be observed in the CSF.

UNIT SIX

SATELLITE MODULE FOR

ENVIRONMENTAL HEALTH OFFICERS

6.1. Introduction

6.1.1. Purpose and use of this satellite module

This module is intended to be used by environmental health officers and provide them with basic information that are not discussed in the core module but basic to undertake prevention and control activities.

6.1.2. Directions for using the module

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

Continue reading this satellite module.

6.1.3. Pre-test for environmental health technicians

1. One of the following statements is wrong

   a) Because of the feeding and metabolic requirements of the black fly

3. Select the correct statement

a) The ultimate goal of African Program for Onchcerciasis Control (APOC) and thus Ethiopian Program for Onchocerciasis Control (EPOC) is to eliminate onchocerciasis as a disease of public health and socio-economic development importance.

b) The main control approach employed by EPOC is control of the disease by establishing community-directed treatment with the drug ivermectin (CDTI), supplemented with vector eradication in a few isolated foci.

c) To eliminate the vector and hence the disease is one of the objective of APOC and EPOC.

d) All

4. Personal protection measures to prevent from being bitten by black flies include

a) Proper clothing
b) Insect repellents
c) Avoiding washing of the body in fast flowing streams or rivers
d) A and B
e) All

5. Select the false statement about black flies

a) Adult Black flies are quite small
b) The wings of black fly are colorless or almost so
c) The wings are short and broad
d) Black flies have humped thorax
e) None

6. Vector Control of black flies needs the knowledge of:

a) Breeding sites
b) Dispersal potential /flight range
c) Resting place
d) Life cycle of the vector species
e) A and C
f) All

7. Adult populations of black flies are difficult to control because of

a) Insecticide resistance

6.3. Black flies (Simuliidae)

Simuliidae are in the class insecta and order diptera. Black flies have a worldwide distribution with the exception of a few islands. There are nearly 1720 species in 26 genera. However, only four genera Simulium, Prosimulium, Austrosimulium and Cnephia contain species that bite people.

Medically, Simulium is by far the most important genus as it contains many vectors. In Africa, species in the S. damnosum complex and S. neavei groups and in Central and South America, species in the S. achraceum, S. metallicum and S.exiguum complexes transmit the parasitic nematode Onchocercia volvulus which cause human onchocerciasis (river blindness).

6.3.1. External morphology

The Simuliidae are commonly known as black flies. But in some areas, in particular Australia, they may be called sand flies. As this terminology is confusing because of biting flies of the family ceratopogonidae, and flies of the subfamily phylebotominae, which also sometimes called sand flies, it best be avoided. Adult black flies are quite small, about 1.5-4mm long, relatively stout bodied and, when viewed from the side, have a rather humped thorax (see figure 1). As their vernacular name indicates they are usually black in color but many have contrasting patterns of white, silvery or yellowish hairs on their bodies and legs, and others may be predominantly or largely orange or bright yellow.

Black flies have a pair of compound eyes, which in females are separated on the top of the head (a condition known as dichoptic); in the males the eyes occupy almost all of the head, and touch on top of it and in front above the bases of the antennae (a condition known as holoptic). In the males, but not females, the small lenses are larger on the upper than lower half of the eyes. The antennae are short, stout, cylindrical and distinctly segmented (usually 11 segments) but without long hairs.

The mouthparts are short and relatively inconspicuous but the five-segmented maxillary palps, which arise at their base, hang downwards and are easily seen. The mouthparts, being short and broad, do not penetrate very deeply into the host's tissues. Teeth on the labrum stretch the skin, while the rasp-like action of the maxillae and mandibles cuts

through it and ruptures the fine blood capillaries. The flies then suck up the small pool of blood produced. This method of feeding is ideally suited for picking up the microfilariae of O. volvulus, which occur in human skin not blood.

The thorax is covered dorsally with very fine and appressed hairs, which can be black, white, silvery, yellow or orange and may be arranged in various patterns. The relatively short legs are also covered with very fine and closely appressed hairs and may be unicolors or have contrasting bands of pale and dark color.

The wings are characteristically short and broad and lack scales and prominent hairs. Only the veins near the anterior margin are well developed; the rest of the wing is membranous and has an indistinct venation. The wings are colorless or almost so. When at rest the wings are closed over the body like the blades of a closed pair of scissors.

The abdomen is short and squat, and covered with inconspicuous closely appressed fine hairs. The genitalia are not conspicuous in either sex. Black flies are most easily sexed by looking at the eyes.

6.3.2. Life cycle

Black flies breed in flowing water but the type of breeding place differs greatly according to species. Breeding habitat can very from small trickles of water, slow flowing streams, lake outlets and water flowing from dams to fast flowing rivers and rapids.

When first laid the eggs are pale and often whitish but darken to a brown or black colour. They are about 0.1-0.4 mm long, more or less triangular in shape but with rounded corners and have smooth unsculptured shells (fig 2.a). Usually 150-800 eggs per female are deposited in sticky masses or strings on a level with, or just below the water surface, on aquatic plants, or on logs, water-splashed rocks, or other solid surfaces in or at the edge of the water. Commonly the female drops eggs while flying over the water surface; some species will hover and oviposite through a thin film of water that covers sand, rock, or vegetation; others will settle and oviposite on water-lapped surfaces at the water's edge. There may be a few favored oviposition sites in a stream or river, resulting in thousands of eggs from many females being found together. Simulium damnosum, for example, frequently has such communal oviposition sites.

Eggs of S. damnosum hatch with in about 1-2 days but in many other tropical species the egg stage lasts 2-4 days. Eggs of some species inhabiting temperate and cold northern areas may not hatch for many weeks and some species pass the winter as diapausing eggs.

There are six to nine (usually seven) larval instars and the mature larvae is about 4-12 mm long, depending on the species, and is easily distinguished from all other aquatic larvae. The head is usually black, or almost so, and has a prominent pairs of feeding brushes, while the weekly segmented, cylindrical body is usually grayish, but may be darker or some times even greenish. The body is slightly swollen beyond the head and in most, but not all species, distinctly swollen towards the end. The rectum has fingerlike rectal organs, which on larval preservation may be extruded and visible as a protuberance from the dorsal surface towards the end of the abdomen. Ventrally, just below the head, is a small pseudopod called the proleg, which is armed with a small circlet of hook lets.

Larvae do not swim but remain sedentary for long periods on submerged vegetation, rocks, stones and other debris. Attachment is achieved by the posterior hook-circlet (caudal/anal sucker) tightly gripping a small silken pad. This is produced by the larva's very large salivary glands and is firmly glued to the substrate. Larvae can nevertheless move about and change their position. This is achieved by alternatively attaching themselves to the substrate by the proleg and the posterior hook-circlet, thus they move in a looping manner. When larvae are disturbed they can deposit sticky saliva on a submerged object, release their hold and be swept down stream for some distance at the end of a silken thread. They can then either swallow the thread of saliva and regain their original position, or reattach themselves at sites further downstream. Larvae usually orient themselves to lie parallel to the flow of water with their head downstream. They are mainly filter feeders, ingesting, with the aid of large mouth brushes, suspended particles of food. However, a few species have predacious larvae and others are occasionally cannibalistic. Larval development may be as short as 6-12 days depending on species and temperature, but in some species may be extended to several months, and other species larvae overwinter.

Mature larvae, which can be recognized by a blackish mark termed the gill spot (the respiratory organ of the future pupa) on each side of the thorax, (figure 2) spin, with the silk

produced by the salivary glands, a protective slipper-shaped brownish cocoon. This cocoon is firmly stuck to submerged vegetation, rocks or other objects and its shape and structure vary greatly according to species. After weaving the cocoon the enclosed larvae pupates. The pupa has a pair of usually prominent, filamentous or broad thin-walled, respiratory gills (see figure 3). Their length, shape and the number of filaments or branches provide useful taxonomic characters for species identification. These gills, and the anterior part of the pupa, often project from the entrance of the cocoon. In both tropical and non-tropical countries pupal period lasts only 2-6 days, and is unusual in not appearing to be dependant on temperature.

On emergence adults either rise rapidly to the water surface in a protective bubble of gas, which prevents them from being wetted, or they escape by crawling up partially submerged objects such as vegetation or rocks. A characteristic of many species is the more or less simultaneous mass emergence of thousands of adults. On reaching the water surface the adults immediately take flight. The empty cases, with gill filaments still attached, remain enclosed in their cocoons after the adults have emerged and retain their taxonomic value. Consequently, they provide useful information on the species of simulids that have recently bred and successfully emerged from various habitats. A few African and Asian black fly species have a very unusual aquatic existence. For example, in East Africa larvae of S. neavei (except first instars) and pupae do not occur on submerged ro

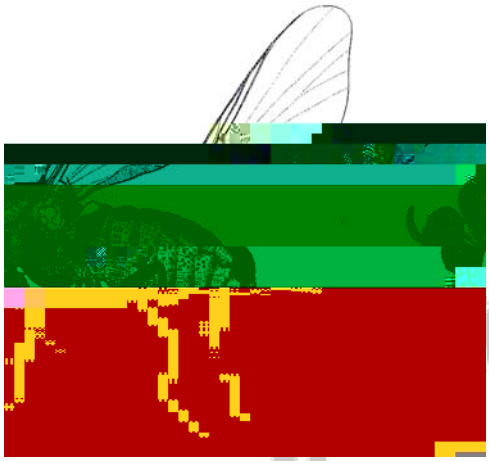

Fig.1. Adult Black fly in lateral view.

Fig.2. a) Simuliid egg; b) Lateral view of the last larval instar showing the body covered in minute dark setae and with dorsal tubercles.

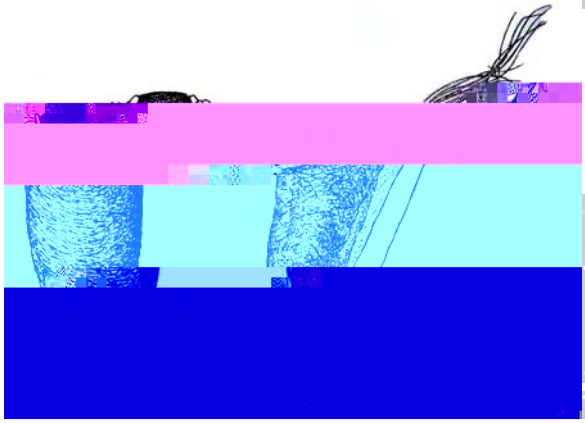

Fig.3. Simuliid pupae in cocoons. a) Dorsal view with broad and short respiratory filaments; b) Lateral view with long thin respiratory filaments.

6.3.3. **Adult behavior and disease transmission**

Both male and female black flies feed on plant juices and naturally occurring sugary substances, but only females take blood meals, which is necessary for maturation of eggs. Biting occurs out doors at almost any daylight hour, but each species may have its preferred times of biting. For example, in Africa S. damnosum has a biting peak in the morning and another in the afternoon, where as in South America S. ochraceum bites

sexually mature adult worms in the human hosts. The development is completed only by the time of the third blood meal.

Many of the microfilariae ingested during feeding are destroyed or excreted, but some penetrate the stomach wall and migrate to the thoracic muscles where they develop into sausage shaped stages and undergo two molts. A few survive and elongate into thinner infective larvae, which pass through the head and down the short proboscis. Once the infective third stage larva in the proboscis penetrate the host's skin when females alight to feed, they may develop into adults producing microfilariae that may in turn be ingested by black flies thus completing the life cycle of the parasite (see the figure of life cycle in the core module). The interval between the ingestion of microfilariae to the time infective larvae are in the proboscis is between 6-13 days. The time between the entry of the larvae (L_3) and the appearance of onchocercal symptoms, the incubation period, varies from one to three years.

For the black fly to function as a vector it must survive the laying of two batches of eggs.

6.4. Prevention and Control of onchocerciasis

There are no animal reservoirs, so the disease is not a zoonotic. Black flies are the only vectors for transmitting onchocerciasis. There are no effective vaccines or chemoprophylactic agents for the disease. The prevention and control measures are vector control, chemotherapy, and personal protection measures

gained in OCP, the sponsoring agencies and the NGDO Group launched, in 1995, a second programme to combat the rest of Africa's river blindness named the African Programme for Onchocerciasis Control (APOC).

APOC is a bigger partnership programme than OCP including 19 Participating Countries with effective and active involvement of the Ministries of Health and their affected communities, several international and local NGDOs, the private sector (Merck & Co., Inc.), donor countries and UN agencies. The World Bank is the Fiscal Agent of the Programme and WHO is the Executing Agency of the Programme. The Community-Directed Treatment with Ivermectin (CDTI) is the delivery strategy of APOC. It empowers local communities to fight river blindness in their own villages, relieving suffering and slowing transmission. After just 8 years of operations, APOC has established 107 projects, which in 2003 treated 34 million people in 16 countries. The programme intends over the following years to treat 90 million people annually in 19 countries, protecting an at risk population of 109 million, and to prevent 43 000 cases of blindness every year.

Ethiopia is a member of the APOC, which was established in December 1995. APOC was built on the success of the onchocerciasis control program in West African countries, which now have reached to the verge of eliminating the disease. APOC is unique partnership that

Goal

The ultimate goal of APOC and thus EPOC is to eliminate onchocerciasis as a disease of public health and socio-economic development importance.

Objectives

- To establish effective and self-sustainable CDTI through out the endemic areas
- To eliminate the vector and hence the disease

Strategy

CDTI is the main strategy of APOC and EPOC.

6.4.1. Vector Control

Once the life cycle of *O. volvulus* and the role of black flies in transmitting infection had been established, it become clear that control of the disease might be feasible by attacking the vector. Vector control needs knowledge of breeding sites and certain factors such as dispersal potential and resting sites.

6.4.1.1. Larviciding

The only practical method at present available for the control of black flies is the weekly application of insecticides to their breeding places to kill the larvae. Insecticides need be applied to only a few selected sites on watercourses for some 15-30 minutes, because as the insecticide is carried downstream it kills Simuliid larvae over a long stretches of water. The flow rates of the water and its depth are used to calculate the quantity of the insecticide to be released.

The formulations of the insecticides that are used for large-scale campaigns must be highly effective against the vectors, but safe for the rest of the environment. The constituents should be biodegradable but there must be maximum “carry” downstream

Africa required users to adopt a strategy of alternating insecticides with different modes of action, if possible, so as to forestall the appearance of new resistance (Table 1). Because of the need for rotation, six insecticides are now used in the OCP area, namely temephos, pyraclofos, phoxim, permethrin, carbosulfan, and Bacillus thuringiensis serotype H-14 (B. Bacillus thuringiensis serotype H-14). Temephos and pyraclofos, both organophosphorus compounds, are regarded as the most effective larvicides; they have fairly low operational doses, and a carry of as much as several tens of kilometers when water levels are high. Pyraclofos tends not to be used in rivers with discharge rates above 300m

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[b]Indicates the level of overdosing at which fish and shrimps may be endangered; the multiplication factors apply to the value for dosage(l) per m^3/s river discharge given in column 3.

- Spray of insecticides could be hazardous to the environment and vegetation unless applied with care
- It is also expensive requiring facilities for spray and importing of chemicals

6.4.1.2 Adulticiding

Adult populations are difficult to control because of thei

- Damming a stream or river to reduce the speed of the water flow and then reduce the amount of dissolved oxygen and eventually the immature stage (larvae) will die due to lack of oxygen
- Selective bush clearance with caution to avoid exacerbating ecological problems
- This environmentally safe vector control measure. It is also less expensive and feasible in many oncho endemic Africa Countries, where resources for OCP not well established.

6.4.1.5. Integrated vector Control

The integrated vector control of onchocerciasis requires the availability of a range of methods, including both medical treatment, in the form of chemotherapy and nodulectomy, and techniques aimed at suppressing the vector. At present, vector control is based entirely on the use of chemical or biological larvicides. In integrated vector control, all appropriate technological and management techniques are used to suppress the vector populations in cost effective manner.

The development of effective macrofilaricide and microfilaricidal drugs suitable for large-scale treatment of onchocerciasis and better formulations of chemical and biological larvicides for Simulium species would allow the broad integration of control techniques and resources and the use of chemotherapy in association with vector control.

Ivermectin is an effective microfilariacidal and should be used in conjunction with vector control methods. It has also a positive effect in the general health due to its impact on other parasites such as intestinal worms, lice and scabies.

6.4.2. Medical Treatment

As a microfilaricide for the treatment of human onchocerciasis only ivermectin has proved to be both highly effective and well tolerated and it may be necessary to take the drug for at least the life span of adult worms (since it does not kill the adult worm), i.e. up to 15 years.

6.4.3. Personal protection measures

Black flies bite during daytime hours and out of doors. Personal protection measures to prevent from being bitten by the flies include:

Proper clothing

Insect repellents: some protection, usually lasting up to 2 hours can be gained by use of repellents such as diethyltoluamide(deet), dimethylphthalate(dimp), and butyryl-tetrahydro quinoline.

Avoiding contact with fast flowing streams or rivers, such as bathing

6.4.4. Health education

Health education provision about mode of disease transmission and prevention and control methods to the populations living in onchocerciasis prone areas is essential.

6.5. Entomological Assessment

Entomological methods are required to carry out research and surveys in all onchocerciasis control areas and they are vital for the smooth operation of control programmes. In control programmes this type of assessment has four objectives:

a) To provide pre-control data or to determine:
   i. The identify, distribution, and abundance of vectors;
   ii. Their susceptibility to operational larvicides,
   iii. The intensity of transmission (annual transmission potential)
b) To evaluate the immediate effects of the insecticide treatment (or other approach) on the aquatic and adult stages of the vector (s)
c) To provide up-to-date information on the physical state of the rivers so that insecticide application techniques and dosages may be adapted accordingly
d) To measure the effect of control methods on annual biting rate (ABR) and annual transmission potentials (ATP)

6.5.1 Techniques employed in entomological assessment

Surveys of black fly larvae in appropriate aquatic habitats provide an immediate and direct means of checking the effectiveness of larviciding or as means of breeding site identification to apply larvicides.

The capture and dissection of adult flies can be used as a means of following the dynamics of simulium populations and vector infectivity, and hence the level of potential transmission of the parasite

a) Surveys of aquatic stages

Pupa and larvae can be collected from submerged vegetation, sticks, dead leaves, and rocks in fast flowing rivers or from artificial substrates. Special crab traps are needed to monitor the S. neavei group. Collection sites should be varied from time to time to give the greatest possible fluvial coverage. Representative samples of larvae should be preserved in carnoy's fixative for cytotaxonomic determination. Adult may be reared from pupae for morphological and biochemical studies. Larval chromosomes and the morphology of adult flies are then examined to identify the species present.

To assess the effectiveness of larviciding, larvae surveys are carried out at sites selected 24-48 hours after the insecticide has been sprayed, to establish whether the pre-imaginal stages (larvae and pupa) of hocees. Sp795 to i igsim.sites se adc0.0278 ptnatprovide an imml

These are normally sited at the riverbank or at another place where biting flies are known to accumulate and this makes it easier to evaluate the impact of larvicidal operations.

In tropical locations, catching is carried out form 07:00 to 18:00 (i.e. 11 hours a day), the vector collectors working alternate hours. In onchocerciasis control programmes this method has proved both reliable and extremely sensitive for the assessment of vector population fluctuation.

C) Identification and dissection for parity and parasites

Samples from each hour are identified and dissected so that their parity (parous or nulliparous) can be physiologically determined by the examination of the ovaries and parous flies are then examined further to detect possible infection with O. volvulus.

A high proportion of nulliparous females indicate incomplete control, probably resulting from shortcomings in larviciding or the colonization of untreated tributaries. A high proportion of parous females indicates aging of the local black fly populations, which reflects either successful larviciding or the presence of migrated female flies.

6.5.2. Transmission indices

The most important determinant of the burden of infection in a community is the infective density of the vector. The biting density of black flies can be measured by regular dawn to dusk catches using human bait at selected site

MTP = MBR X Total No. of O. volvulus L_3 larvae in the head

UNIT SEVEN

SATTELITE MODULE FOR EXTENTION PACKAGE HEALTH WORKERS

7.1. Introduction

7.1.1. Purpose of the module:

Extension package health workers (EPHWs) are intended to use this module for their home-based management of onchocerciasis.

Nurses who are working at lower level health care units and those who supervise the Extension Package Health Workers are also intended to use the module, so that they can guide them properly,

It guides the EPHWs working at lower health care unit and community level during community directed treatment with ivermetin.

Gives basic information needed in the prevention and control of onchoceciasis

Helps to conduct home visit for case finding and management.

Provide reliable information on morbidity pattern of the disease

7.1.2. Directions for use the module:

Start with doing the pre- test by using a separate sheet.

Study the text including the task analysis.

7.1.3. Learning objective:

After reading this module the learner will be able to:

Recognize that onchocerciasis is a disease of public health importance.

Identify the cause and mode of transmission of onchocerciasis.

Recognize that onchocerciasis is a preventable disease

Participate in community-based distribution of ivermectin in the onchocerciasis control program.

Teach the community how to prevent onchocerciasis.

Describe the life cycle of the black fly

Describe adult black fly behaviors that is very important in the prevention and control of black flies

Undertake appropriate prevention and control measures to combat onchocerciasis

Organize and mobilize the community for effective onchocerciasis prevention and control

7.1.4. Pre-Test

Write true or false for the following questions.

1 Onchocerciasis is transmitted by Aedes mosquito.

2 Onchocerciasis is a disease that cannot be prevented

3 Blindness in onchocerciasis can best be prevented by early diagnosis and treatment.

4 Community mobilization and home based management of onchocerciasis in identified endemic area is the responsibility of EPHW

Multiple choice questions

5. One of the following statements is wrong

a) Because of the feeding and metabolic requirements of the larvae, black fly eggs are laid in well-oxygenated waters.
b) O.volvulus can only be transmitted by black flies of the genus Simulium
c) It is only the female black fly that bites humans
d) Transmission of onchocerciasis usually occurs close to black fly breeding sites in fast following rivers, giving rise to the apt term ‘river blindness’ for this disease.
e) None

6. The best practical method at present available for the control of blackflies is:

a) Insecticide spraying of vegetation thought to harbour resting adult flies
b) Environmental management
c) Weekly application of insecticides to their breeding places to kill the larvae
d) Personal protection measures

7. Adult populations of black flies are difficult to control because of

a) Insecticide resistance
b) Broad dispersal potential
c) The wide variety of resting places
d) All except A e) All

Short answer questions

8. Write the name of the drug that is currently used in the onchocerciasis control program.
9. List the typical characteristics of the small black fly that helps to differentiate it from other flies.

7.2. Definition

Onchocerciasis, or “river blindness” is filarial parasitic disease affecting the skin and eyes. The adult worm lives inside fibrous nodules in the subcutaneous tissue. The fertilized female worms release thousands of microfilariae that migrate through the lymphatic vessels and cause inflammatory reactions responsible for the skin and eye lesions where they die and degenerate.

7.3. Cause

Onchocerciasis is caused by macrofilarial worm Onchocerca volvulus

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The history should determine:

People living or coming from onchocerciasis endemic areas.

Presence of persistent itching with skin lesions.

Periodicity of itching (When does the itching get worse?

day time/evenings)

Intensity (severity) of itching (How much the itching interferes with the persons daily activity?)

The distribution of the skin lesions (Which parts of the body are most affected)

7.5. Signs and Symptoms

1. Skin conditions:

1.1 Early signs

- Persistent pruritis, erythema and edema of the skin.
- Popular, pustular, nodular or urticarial lesions on the backa00 Tc.on th 4fc4r

2. Eye involvement

2.1 Early signs

- Reduced vision
- Keratitis (redness dryness of eyes)
- Iridocyclis (redness around the cornea, photophobia and pain)
- Sclerosing keratitis (pain and haziness of cornea)

2.2 Late sign- the most severe effect of the disease includes visual Impairment and blindness

7.6. Diagnosis

The Extension Package Health Worker must observe such skin conditions according to sign and symptoms.

If they are doubtful during home visits they should send for further investigation (laboratory investigation skin snip).

Identify typical differences with other skin diseases having similar characteristics, e.g. scabies.

7.7. Management

Main control strategies of onchocerciasis are early diagnosis, prompt treatment and selective vector control.

Itching which is sever during the night must be distinguished from scabies. Nurses should teach and show clear distinction between onchocerciasis and scabies.

How the drug should be distributed (for example, at central place, house-to-house & at clinic)

When the drug is distributed

They must list the contraindication and side effects during ivermectin treatment so as to refer ill person timely manner.

Ivermectin is contraindicated to:

- Pregnant mothers
- Severely ill patients
- Lactating mothers for a child less than 1 week
- Height less than 90 cm or body wt less than 15 kg.

Rehabilitation – when blindness occurs as a consequence of onchocerciasis, social, psychological and vocational rehabilitation. EPHWs can actively participate the blind person needs physical if they are guided properly.

EPHWs provide family- centred survey and case management by providing ivermectin.

EPHWs teach the community they serve to wear long sleeved clothes and about typical characteristics of black flies to prevent the bite of the black fly.

Keep records properly to report periodically. There are two record books:

o Mectizan treatment record book.

o Drug reaction record book for mectizan.

Monthly report

Prevention and control:

- The disease is diagnosed by its characteristics and confirmed by skin snip.
- The disease is preventable. Early diagnosis and start of the treatment is important. The patient must take the drug ivermectin once or twice per year for the recommended period of time.
- Fail-pJ-1ntime. blindness occurs a0.07

- Early diagnosis and treatment (early start of ivermectin) and continued periodically (at least once a year)
- Preventing secondary infection and early treatment when the problem arises.
- Health education of the family & the community on the importance of:
    - o

o

Any individual showing skin manifestation and who does not improve with symptomatic or supportive treatment within five to ten days.

Onchocerciasis is caused by infection with the filarial worm O. voluvulus. The microfilaria is one stage of the worm, but microfilaria does not cause onchocerciasis by itself

UNIT EIGHT

GLOSSARY

GLOSSARY

- *Biopsy*- Tissue taken for examination from living organism.
- *Collapse*- to fall down suddenly.
- *Giemsa stain*- Romanousky stain used to stain blood cells and parasites.
- *Mectizan: a synonoum of ivermectin*
- *Microfilaria*- Immature first stage of larva of filarial worm.
- *Nodule*- a small round swelling.
- *Oil emersion objective*- Microscope eye piece of 100x magnification.
- *Patch*- a pad worn over an injured body part.
- *Serological test*- A test method which bases on antigen antibody reaction.
- *Sheath*- Cover fitting closely over the larvae.
- *Skin snip* – Sharp and quick cut of skin with scissors or razor blade.
- *Topical*- external application of drug usually ointment.
- *Vertigo*- A feeling of loosing one's balance.

UNIT NINE

ABBREVIATIONS

- DNA-deoxyribonucleic acid
- ELISA- Enzyme linked immuno assy.
- PCR- polymeraze chain reaction
- WHO-World Health Organization.
- OCP: Onchocerciasis control program
- APOC- African Program for Onchocerciasis Control
- EPOC- Ethiopian Program for Onchocerciasis Control
- CDTI- Community –directed treatment with the drug ivermectin
- NGDOs- None governmental development organizations
- NOTF- National Onchocerciasis Task Force

UNIT TEN

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UNIT ELEVEN

ANNEXES

ANSWER KEY

Answer keys to pre-test for all categories

1. Onchocerca volvulus
2. Black fly of the genus Simuluim
3. 7.3 million
4. through the bite of infected black fly during a blood meal
5.
6. See the core module
7. E
8. D
9. B
10. B

Answer keys to pre-test and post-test for Health Officers

5. E 6. A 7. A 8. C

Answer keys to pre-test for professional nurses

1. Simulium, fast running oxygenated water
2. C
3. D
4. C
5. D
6. B
7. A. drug B. community mobilization C. health education
   D. record keeping and report E. sustainability of drug distribution
8. Muscular and joint pain, sever itching, fever, dizziness, diarrhea, vomiting, headache, redness of the eye, etc.

9. Pregnant woman

-Mothers in the first month of lactation

-Children under the age of five years and less than 15kg body weight

-Those severely ill

10. Woolen clothes tend to irritate dry skin.

Answer keys to pre-test for laboratory students

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