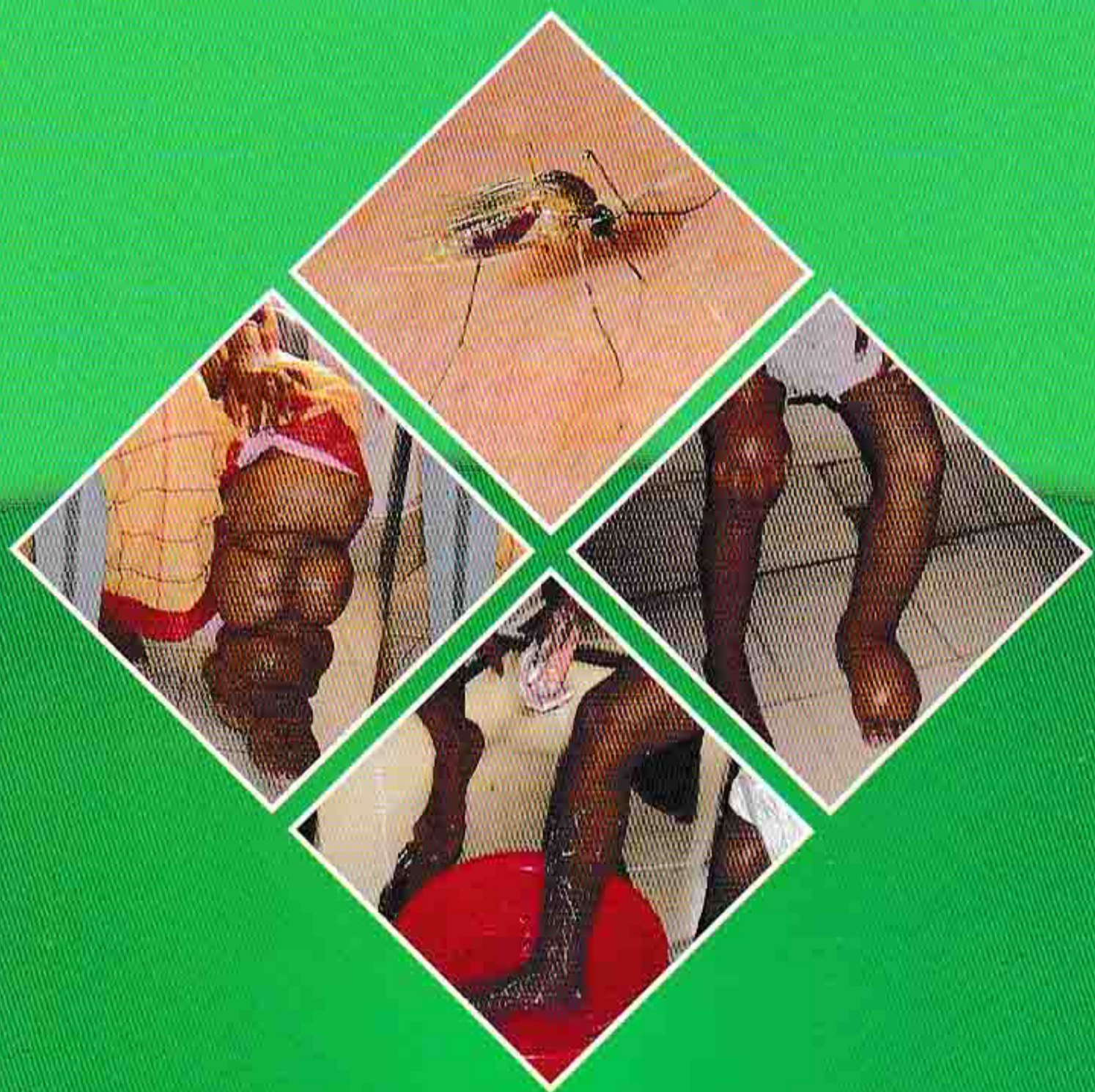
Hand Book for Doctors on Lymphatic Filariasis, Bangladesh



Filariasis Elimination and STH Control Program
Disease Control Unit
Directorate General of Health Services
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Dhaka, Bangladesh

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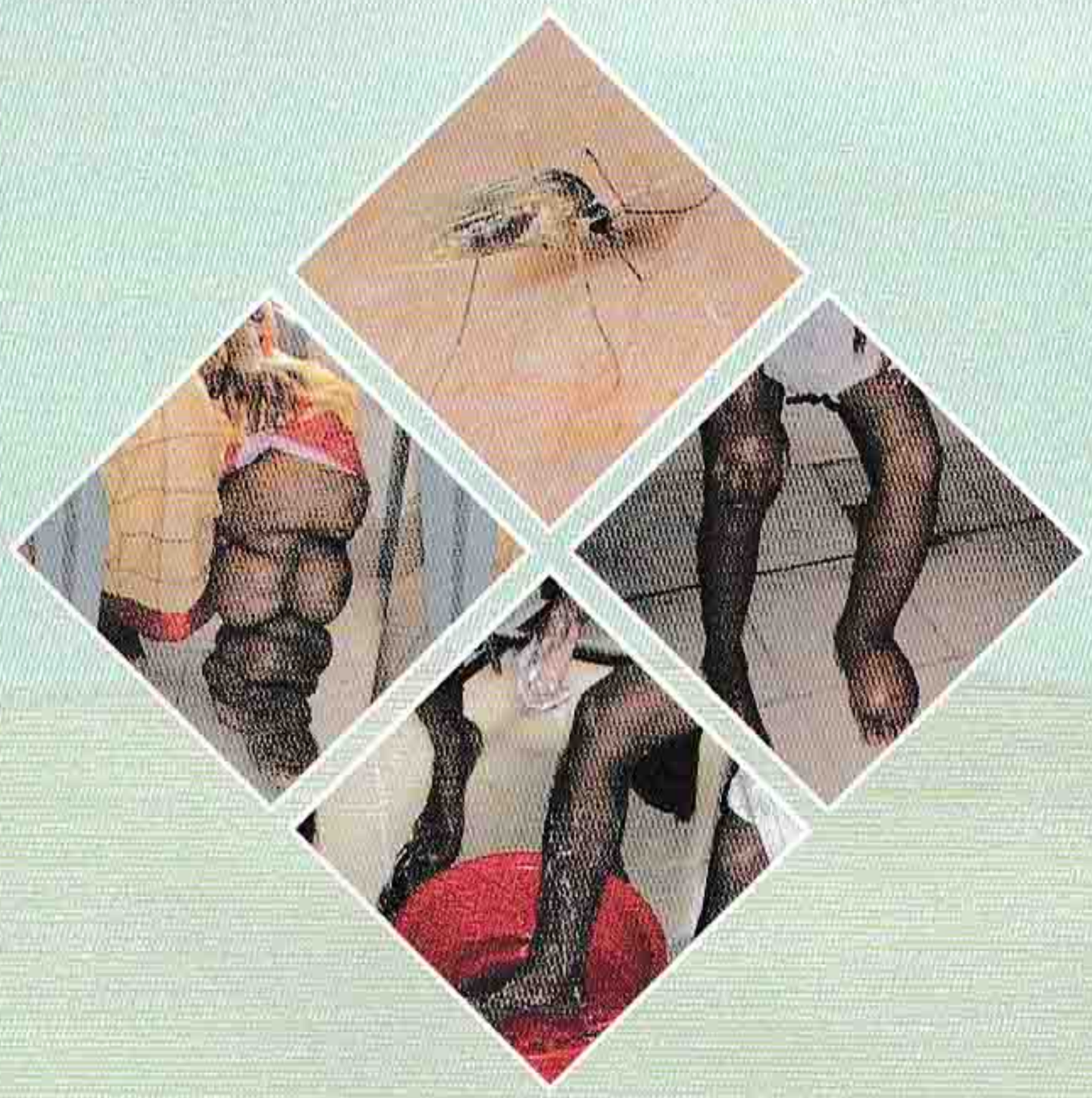

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END
NEGLECTED TROPICAL DISEASES
IN ASIA

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Hand Book for Doctors on Lymphatic Filariasis, Bangladesh

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Abbreviations

ALB	: Albendazole
CDC	: Communicable Disease Control
CNTD	: Centre for Neglected Tropical Disease
COMBI	: Communication for Behavioural Impact
CWW	: Children Without Worms
DAT	: Direct Agglutination Test
DDT	: Diethyle –Diphenyle- Trichloro Ethane
DEC	: Di-Ethyle Carbamazine
DGHS	: Directorate General of Health Services
EHA	: Emergency Humanitarian Action
ELF	: Elimination of Lymphatic Filariasis
EPI	: Expanded Program on Immunization
EPR	: Emergency Preparedness Response
GSK	: Glaxo Smith Kline
HNPSP	: Health, Nutrition & Population Sector Program
IACIB	: Institute of Allergy and Clinical Immunology in Bangladesh
ICT	: Immuno-Chromatographic Test
IEC	: Information, Education and Communication
JICA	: Japan International Cooperation Agency
LLIN	: Long lasting Insecticidal Treated Net
LQAS	: Lot Quality Assurance Survey
M&PDC	: Malaria & Parasitic Disease Control
MDA	: Mass Drug Administration
Mf	: Microfilaria
MOH&FW	: Ministry of Health & Family Welfare
MOU	: Memorandum of Understanding
NIPSOM	: National Institute of Preventive and Social Medicine
NTD	: Neglected Tropical Disease
STH	: Soil Transmitted Helminthes
TOT	: Training of Trainers
UH&FPO	: Upazila Health & Family Planning Officer
UHC	: Upazila Health Complex
WFP	: World Food Program
WHA	: World Health Assembly
WHO	: World Health Organization

Chapter I

1. Introduction

Filariasis is a vector borne parasitic disease caused by three closely related nematodes namely- *Wuchereria bancrofti, Brugia malayi* and *Brugia timori*. All these worms are transmitted to man by the bites of infected mosquitoes.

Filariasis is one of the most debilitating and disfiguring scourges among all diseases. Globally, 1.3 billion people are estimated to be at risk of infection and some 120 million people are infected in 83 countries. It is one of the major public health problems in South-east Asia. It is estimated that about 700 million people are living in areas endemic for lymphatic filariasis in SEAR. About 60 million people are infected in the region and about 31 million people have clinical manifestation of this disease.

Bangladesh is known to be surrounded by endemic area of filariasis particularly the north-east border area of India which is adjacent to the Assam, Bihar, West Bengal. It is a densely populated country situated in the Southeast Asian region. Out of 147 million people, about 20 million people of the area are suffering from the disease, most of which are children. Out of 64 districts of the country it is endemic in 34. It is estimated that about 70 million are at risk of infection and the most prevalent infective causative agent is Wuchereria bancrofti. Culex mosquito is found to spread the disease in Bangladesh. Clinical cases are reported from 51 districts. There is high endemicity of filarisis in Nilphamari, Thakurgaon, Dinajpur, Rangpur, Panchagarh, Kurigram, Chapainawabganj, Rajshahi and Lalmonirhat.

Filariasis was integrated with the Malaria and Vector Borne Disease Control (M&VBDC) unit in the DGHS till 2000. As filariasis is to be eliminated by 2020 as per 50th WHA resolution (WHA 50.29) of May 1997, GOB is also committed to eliminate it by 2015. Therefore, filariasis elimination programme was separated from M&VBDC unit of Directorate General of Health Services (DGHS) on 7 January 2001 by Ministry of Health and Family Welfare (MOH&FW). A National plan was approved for its elimination by 2015 starting from Panchagar district. The Elimination of Lymphatic Filariasis (ELF) Program started in January 2001 as a new Program under Ministry of Health & Family Welfare. The first Mass Drug Administration (MDA) was launched in 2001 in one district and gradually scaled up in 19 districts with an aim to eliminate filariasis.

The introduction in recent years of yearly safe single dose regimens with DEC alone or in combination with Albendazole for successive 5 years has been an important breakthrough in filariasis elimination as a public health problem.

2. Epidemiology:

2.1. Magnitude of LF

Globally, there are 120 million cases of lymphatic filariasis (LF) and 1,100 million individuals are at risk of filariasis. In India 429 million people are at risk of LF with 48.1 million cases which is 40.4% of total global cases. Bangladesh is surrounded by endemic area of filariasis particularly the north-east border area of India which is adjacent to Assam, Bihar, West Bengal. Lymphatic filariasis is prevalent

all over Bangladesh with high endemicity in the northern part. The exact figures of filariasis in Bangladesh are not known, but it is endemic in 34 districts out of 64 districts of the country as revealed by Immunochromatographic Test (ICT). The endemicity of filarisis is highest in Nilphamari, Thakurgaon, Dinajpur, Rangpur, Panchagarh, Kurigram, Chapai Noawabganj, Rajshahi and Lalmonirhat. It is estimated that about 70 million are at risk of infection, while 10 million people are with various forms of clinical deformity and another 10 million people are microfilaremics.

List of 34 districts Positive for Filariasis by ICT done in May – June 2004 & mf survey till 2008 are as follows:

Region/Province (Name) Division	List of LF Endemic Districts		List of LF Non-endemic Districts	
	Endemic (Red)	Population	Non-endemic (green)	Populations (in million)
Rangpur	Panchagar	1.07	Gaibandha	2.47
	Thakurgaon	1.5		
	Nilphamari	2.01		
	Lalmonirhat	1.36		
	Rangpur	3.01		
	Kurigram	2.28		
	Dinajpur	3.1		
Rajshahi	Nowabgonj	1.67	Joypurhat	.99
	Bogra	3.4	Natore	1.76
	Rajshahi	2.72	Naogaon	2.77
	Pabna	2.67		
	Sirajgonj	3.23		
Dhaka	Dhaka	15.5	Sariatpur	1.25
	Gopalganj	1.3	Madaripur	1.31
	Munshiganj	1.4	Faridpur	2
	Narsingdi	2.2	Rajbari	1
	Gazipur	2.3	Manikganj	1.51
	Jamalpur	2.4	Tangail	3.78
	Narayanganj	2.4	Sherpur	1.47
			Mymensingh	5.17
			Kishoreganj	2.96
			Netrakona	2.28
Khulna	Meherpur	.67	Khulna	2.73
	Narail	.8	Magura	,9
	Bagerhat	1.7	Jessore	2.86
	Chuadanga	1.17	Satkhira	2.14
	Jhenaidaha	1.7		
	Kushtia	2.01		
Barisal	Pirojpur	1.24	Bhola	2
	Jhalakathi	.8		
	Barguna	1.01		

Region/Province (Name) Division	List of LF Endemic Districts		List of LF Non-endemic Districts	
	Endemic (Red)	Population	Non-endemic (green)	Populations (in million)
Barisal	Barisal	2.97		
	Patuakhali	1.74		
Sylhet	Habiganj	2.0	Sunamganj	2.3
			Sylhet	2.95
			Moulvibazar	1.86
Chittagong	Feni	1.6	Brahmanbaria	2.75
	Laxmipur	2.0	Comilla	5.32
	Bandarban	.3	Chandpur	2.6
			Noakhali	2.98
			Khagrachhari	.6
			Rangamati	.6
			Chittagong	7.5
			Cox's Bazar	2
Total				
Sum of Population in each category of IU	**34**	**77.23 Million**	**30**	**72.81 million**

Endemic and MDA areas for Filariasis:

Situations:

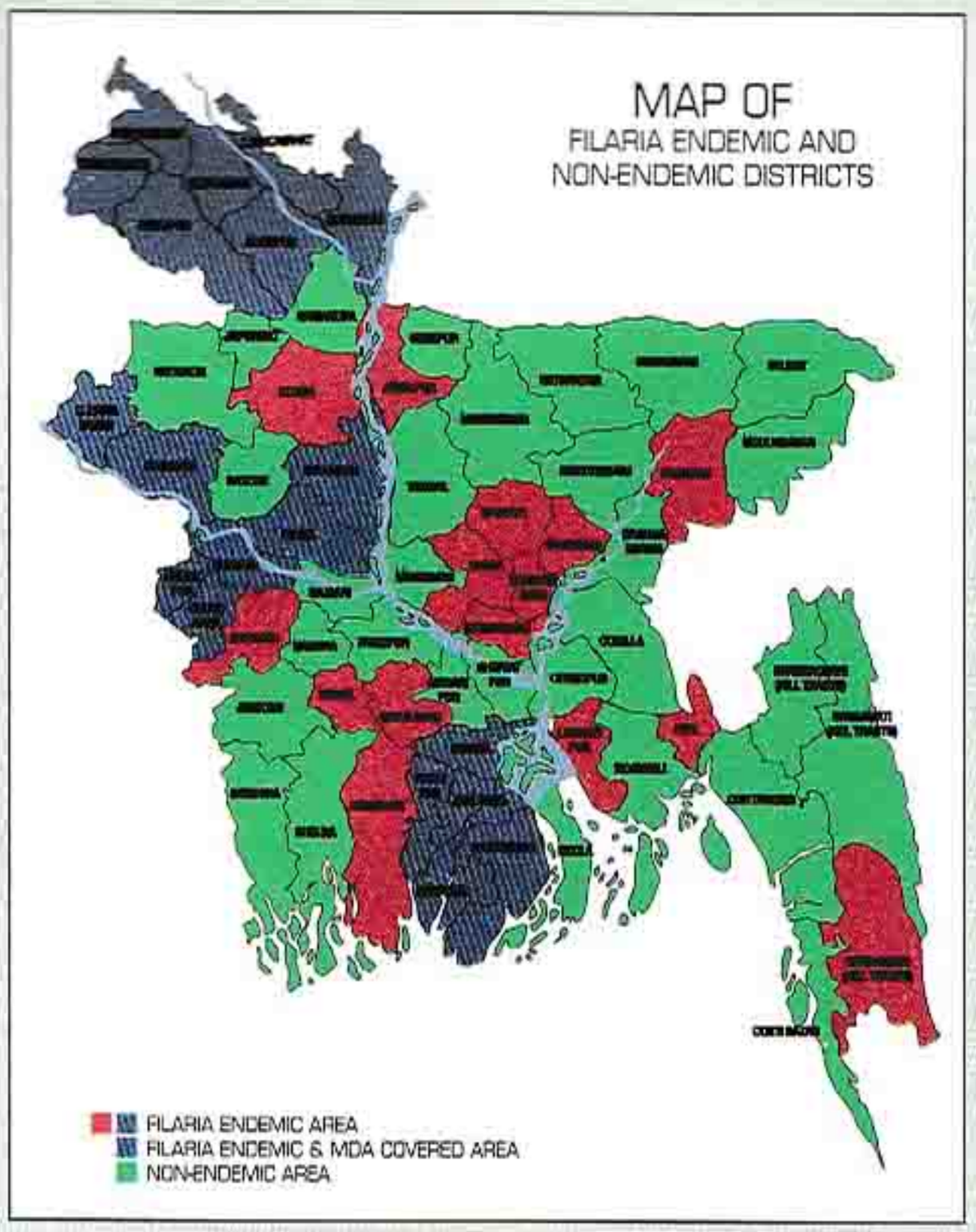
34 districts are at risk (ICT positive) – red & blue colour.
19 districts are positive for microfilaria & ICT - blue colour

Level of microfilaria:

Before MDA >1% up to 20%

Morbidity:

In endemic districts 2% -3.9%



2.2. Chain of infection

Agent

Wuchereria bancrofti is the only known agent causing lymphatic filariasis in Bangladesh. The adult worms are usually found in the lymphatic system of man. The females do not lay eggs but give birth directly to the larvae which are known as the microfilariae. The microfilariae live in the capillaries of the internal organs, most commonly in the lungs. They come out and appear in the peripheral blood at night between 10 P.M. and 4 A.M. and they retreat to their original positions in the lungs thereafter and stay there for all the while before moving again to the peripheral blood stream next night. The life span of the Mf is not exactly known, probably up to a year or more. The adult worms may survive for 15 years or more.

Reservoir

There is no evidence that W. bancrofti has animal reservoirs in Bangladesh.
In humans the source of infection is a person with circulating Mf in peripheral blood.

Host

Man is the natural host for LF. All ages are susceptible to infection. In endemic areas, filarial infection has been found in infant aged less than 6 months. Infection rates rise with age up to the age of 20 –30 years and then level off. After a few years at this plateau level, Mf rates may decline in middle and old age. Filarial disease appears only in a small percentage of infected individuals, commonly in the age group over 10 years.

Mode of transmission

Man is the definitive host and mosquito the intermediate host of Bancroftian filariasis. Filariasis is transmitted by the bite of infected mosquitoes. The parasite is deposited near the site of the puncture. It passes through the punctured skin or may penetrate the skin on its own and finally reach the lymphatic system. The dynamics of transmission depends upon the man-mosquito contact (e.g. infective biting rate).

Vector

Lymphatic filariasis is a vector-borne disease. It is transmitted from an infected person to a healthy one by mosquito bites. Female mosquitoes of different genera like Anopheles, Culex, Aedes, Mansonia transmit the disease in different parts of the world. Among the different types of filariasis, Bancroftian filariasis caused by nematode Wuchereria bancrofti is present in Bangladesh and so far detected it is transmitted by only one species of Culex mosquito, Culex quinquefasciatus. It is mainly an urban disease but also found in towns and rural areas in Bangladesh. There is no animal reservoir. The parasite develops only in man and mosquito. A microfilaria positive patient carries microfilariae in his blood. During feeding, mosquito ingests microfilariae with the blood-meal and these develop into infective stage after about ten days. When this mosquito bites another person the infective larva crawls on to the surface of the host's skin. It enters the skin through the biting wound and passes to the lymphatic system of the human being.

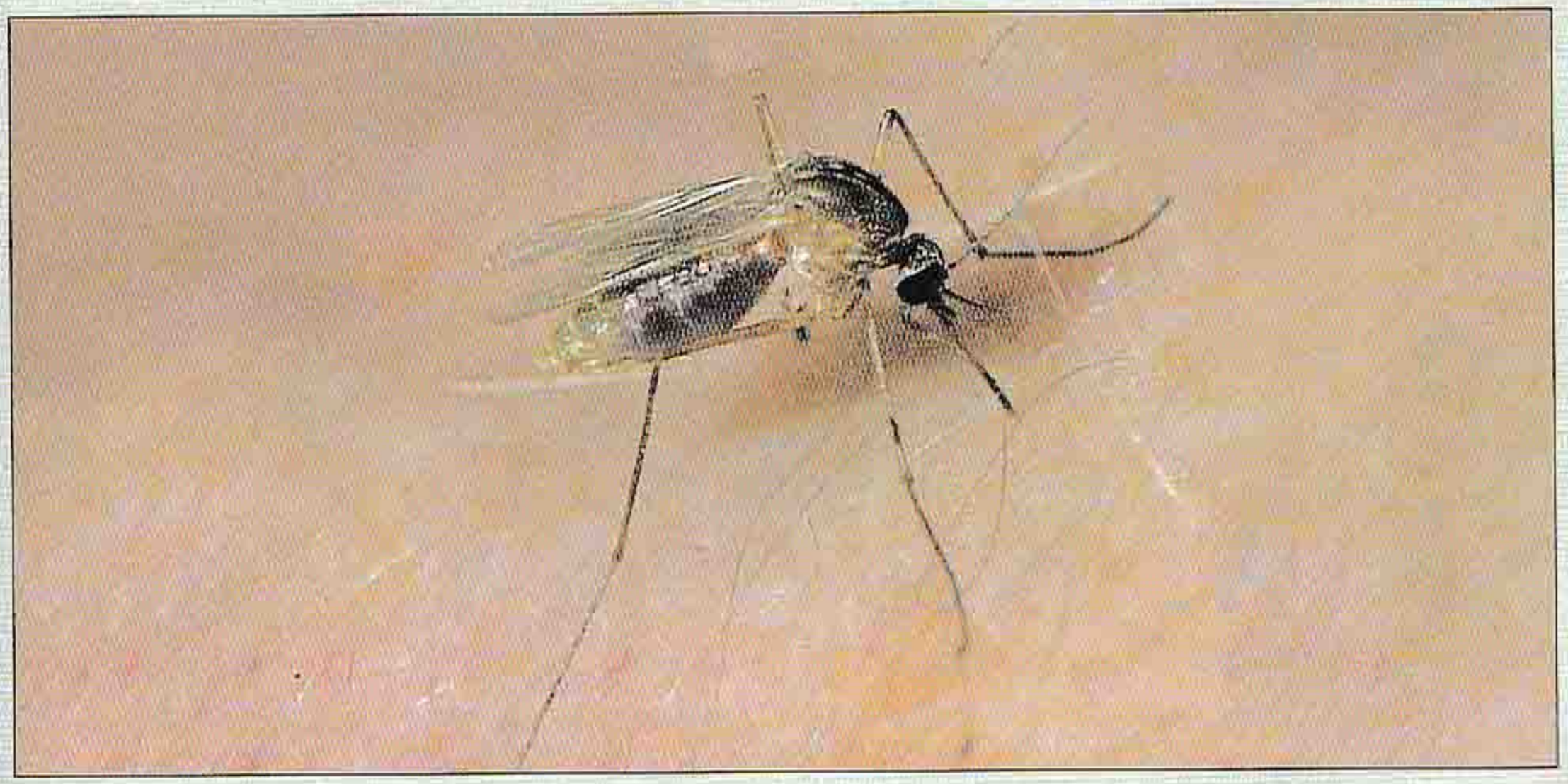


Fig. Culex quinquefasciatus mosquito

Cx. quinquefasciatus mosquito breeds in water polluted with organic debris such as rotting vegetation, household refuse and excreta. Larvae are commonly found in partially blocked drains and ditches, soak-away pits, septic tanks, abandoned pots and water storage jars containing polluted water. It is a mosquito that is associated with urbanization and towns with poor and inadequate drainage and sanitation. The species is a night biter. After feeding, most mosquitoes take rest in houses and others in outdoors.

Environmental factors

- Proximity to endemic areas of the neighboring country is an important factor in spreading the disease.
- Climate may influence the breeding of mosquitoes, their longevity and may determine the development of the parasite in the insect vector.
- Lymphatic filariasis may be influenced by bad drainage as vectors breed profusely in polluted water.
- Inadequate sewage disposal may aggravate the problem of filariasis.

Incubation period

The time interval between inoculation of infective larvae and the first appearance of detectable Mf is known as "pre-patent period". The time interval from invasion of infective larvae to the development of clinical manifestations is known as the "clinical incubation period". This period most commonly is 8 to 16 months but can be longer.

3. Diagnosis

Case definition

1. Suspected case:
   - ❑ Resident of endemic area
   - ❑ Positive family history
   - ❑ History of filariasis like symptoms for ≥ I month
2. Probable Case: Features of suspected case + Positive ICT
3. Confirmed case: Clinical case + Positive for microfilaria

Clinical manifestations

The pathogenic effects are produced due to the liberation of metabolites, antigenic materials and parturition products by adult worms inside the lymphatic channels resulting in immuno-inflammatory response. Mechanical blockage and irritaition due to movement of adult worm also contributre to the pathogenesis. Pathogenic effects due to microfilaria are seen while these are impacted in any parenchymatous organs. Accordingly, the immunopathogenic effects are the followings:

(1) lymphangitis, lymphadenitis and fever
(2) Hydrocele, elephantiasis, chyluria etc are due to blockage of regional Lymph channels
(3) Allergic reactions, such as rash, itching etc.
(4) Occult filariasis

Clinical manifestations come out as following ways:

1. Asymptomatic: After entering the human body, filarial parasites/microfilaria may remain silent for several years and they do not manifest any sign and symptoms. But they cause damage of the lymph glands of lung and kidney of the same host. Complications may appear thereafter if the host remains undetected or untreated. So it is recommended to examine blood of the at risk population in filaria endemic areas
2. Acute: Acute signs and symptoms may be observed in some cases like skin reaction, itching of body, redness of skin, rash, swelling of skin or lymph gland, occasional fever, cough, breathlessness etc. If the host remains undetected or untreated at that stage, complications like swollen organs or extremities may appear
3. Chronic: Patients are mostly detected at this chronic stage. Microfilaria cannot be detected in chronic cases. It takes several years to appear swelling of the affected organ after biting by the infected mosquito. The lymph channels become inflamed by the parasite, as a result of that circulation of lymphatics hamper and gradually the limbs become swollen. Commonly hands, feet, breast, testes are more affected and become disabled. Hydrocele of a boy of 11 years old or more in a filaria endemic area can be firstly considered as lymphatic filariasis
4. Acute on chronic: It shows inflammation of the affected limbs of the patient. It can be happened followed by itching of the skin. As a result of that the skin becomes red suddenly. Patient may suffer from high fever as well as headache. These are the features of acute on chronic cases

5. Occult Filariasis: The term occult filariasis refer to filarial infection in which the classical clinical manifestations and microfilaria are not present. It is believed to occur due to hypersensitivity reactions to microfilarial antigen. The best known example is "Tropical Pulmonary Eosinophilia" characterized by chronic cough, dyspnoea, fever and weight loss.

Stages of Lymphoedema of leg

Stage 1:

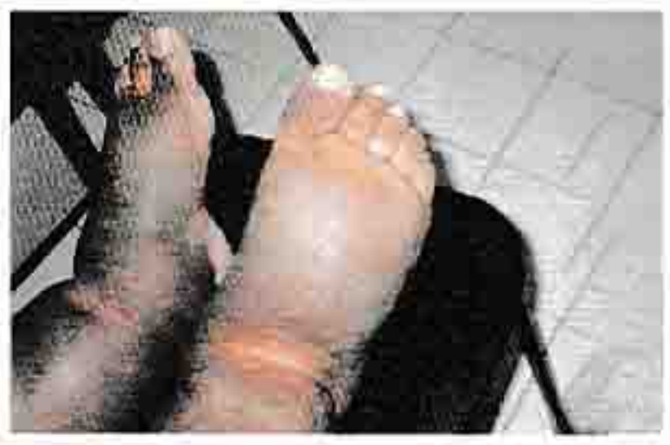
- Swelling reverses at night
- Skin folds - absent
- Appearance of skin – smooth and normal

Stage 2:

- Swelling is not reversible at night
- Skin folds - absent
- Appearance of skin - smooth, normal

Stage 3:

- Swelling is not reversible at night
- Skin folds – shallow
- Appearance of skin –smooth, normal

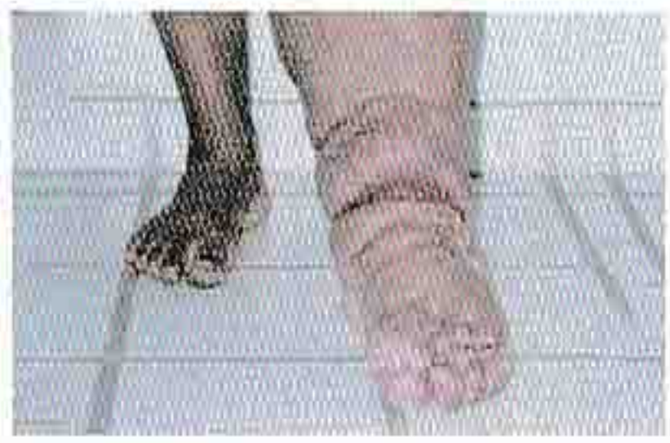


Stage 4:

- Swelling not reversible at night
- Skin folds – shallow
- Appearance of skin – Irregular, Knobs, nodules.

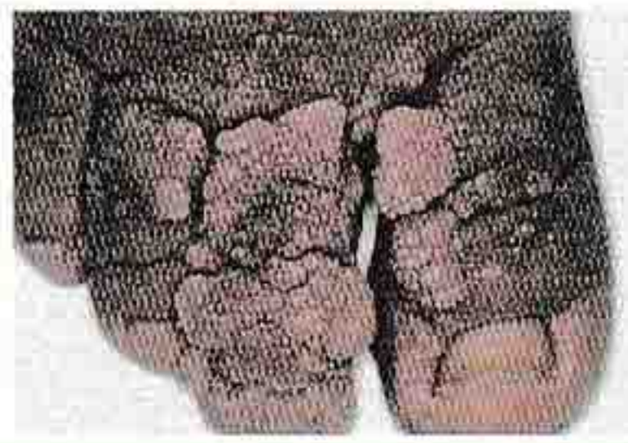
Stage 5:

- Swelling not reversible at night
- Skin folds – deep
- Appearance of skin – smooth or irregular



Stage 6:

- Swelling not reversible at night
- Skin folds – absent, shallow, deep
- Appearance of skin – wart-like lesions on foot or top of the toes

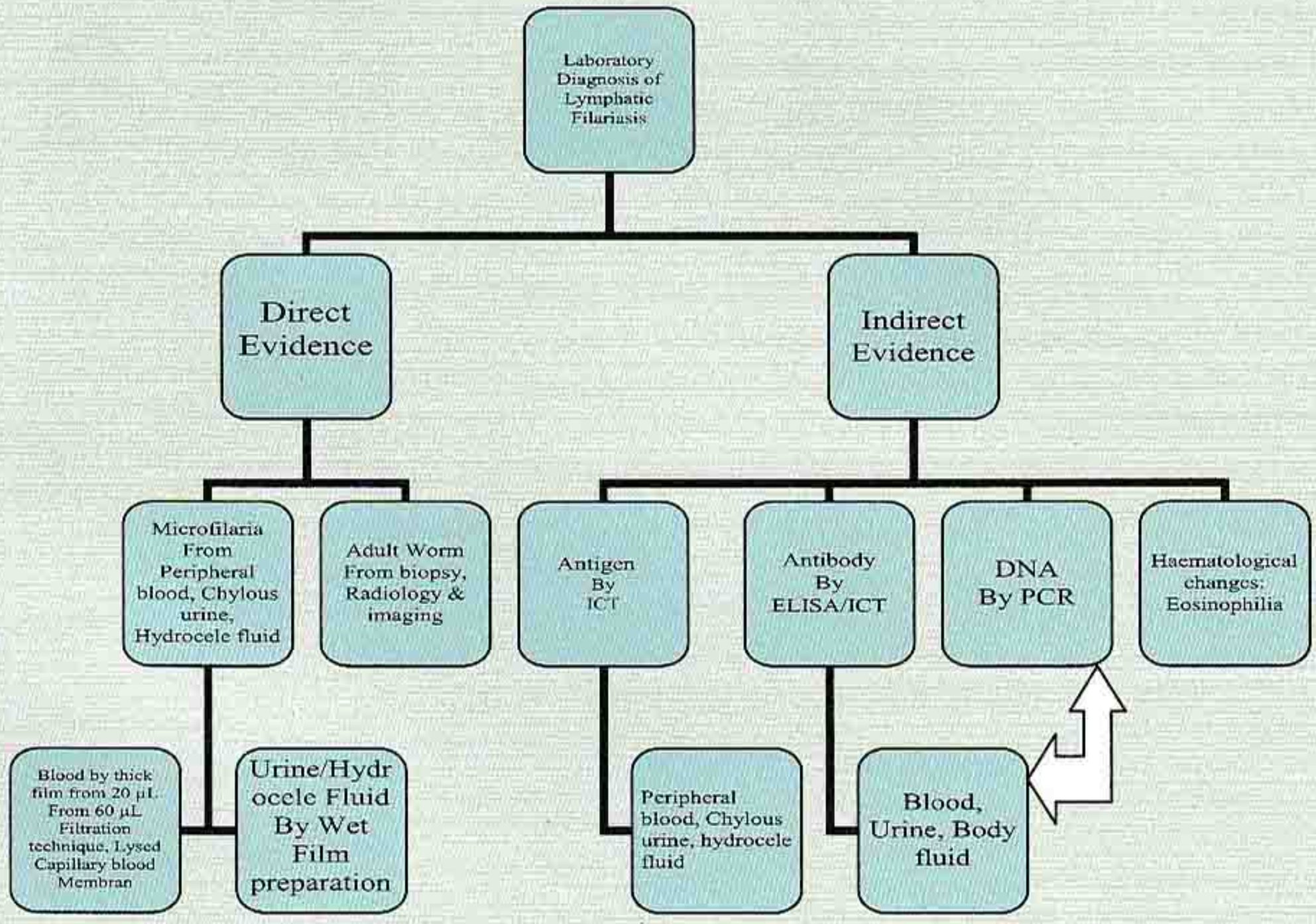


Stage 7:

- Swelling not reversible at night
- Skin folds – deep
- Appearance of skin – irregular
- Needs help with daily activities –walking, bathing, using bathroom, dependent on family or health care system

3.1 Laboratory Diagnosis

The diagnosis of lymphatic filariasis is based on clinical manifestations and laboratory investigations. Definitive diagnosis is made by direct demonstration of microfilaria in the peripheral blood, lymphatic exudates, hydrocele fluid, chyluria. Blood is collected at night between 10P.M. and 2 A.M. (throughout the 24 stained by Leishman stain. Immunological tests (CFT) are also helpful at times.



Demonstration of Microfilaria in peripheral blood

- Thick blood film from 20 µL blood: The thick film from capillary blood is still the most commonly used method for epidemiological assessment. By a deep finger prick between 10-00 PM to 2.00 AM at night, 20 µL of blood is needed. The smear becomes positive if microfilaria concentration remain as ≥30mf/ml of blood. It's reported sensitivity exceeds 50% with 100% specificity.
- Three line thick blood flim from 60 µL blood: This is an alternative practice for thick blood film survey. Recently, filaria elimination program has adopted this technique and proven its higher sensitivity. Here, more blood is used in a single slide making 3 lines of thick smears.
- Membrane filter concentration method: Though it needs large amount of venous blood, it is still one of the most sensitive currently available mehtod for detecting low-density microfilaria in the blood. Its detection range is below 30mf/ml of blood.
- DEC provocation test: Microfilaria is provoked to appear in the peripheral blood during daytime by giving a single tablet of DEC. The test is quite sensitive and specific. In some studies, increase of detection rate was found to be >50%.

ICT test (Antigen detection)

Rapid detection system of filarial antigen from blood by ICT is a highly scientific, popular and convenient method for individual and community diagnosis of microfilaremia. In surveys, it is the test of choice followed by confirmation of the case by mf detection. The test is based on lymphatic filarial worm specific monoclonal antibodies. So cross reaction is minimum. Its proven sensitivity and specificity is over 98%.

Antibody detection

a) Urine ELISA

It detects filaria-specific IgG4 and showed a sensitivity of 95.6% with W. bancrofti-infected patients in Sri Lanka, and a specificity of 99.0% with urine from non-endemic areas in Laos, Thailand, and Japan. Pertinent to the concept, urine ELISA as a non-invasive method, can play a significant role in finding out endemic foci by supplementing and verifying ordinary methods like night blood test. To identify new foci, filarial antibody detection has the advantage of higher sensitivity than antigen detection. In a study in Sri Lanka, urine ELISA obtained the positive rate 2.1 times higher than that of ICT test among children suggesting its high efficacy. When the elimination program reaches toward the final stage, complete surveillance to verify the absence of filariasis transmission is necessary in the previously filariasis-endemic areas and among the floating population. At this stage, most people will be microfilaria negative and there will be much fewer clinical cases than before. The significance of filariasis having been reduced, it will not be easy to get people's cooperation for the final stage of infection monitoring, especially when invasive painful diagnostic test is required. Urine ELISA will work well in this situation.

b) Blood ELISA

An ELISA was used to detect antifilarial IgG4 to recombinant antigen Bm14. Antibody responses were standardized using a positive control serum that was included on each plate as a standard curve.

A predetermined cutoff, based on the mean plus three standard deviations of the response of samples from non-endemic controls, was used to distinguish positive and negative results. In other study, ELISA from dried blood yielded 100% sensitivity and 94% specificity. Since, normal individuals from non-endemic area also showed antibody positive results, the test is not suitable for assessing infection status in elimination program.

c) Blood ICT

This is also a quite sensitive method but become positive in healthy individuals in endemic and non-endemic areas. This test also remain positive for a prolonged period after getting adequate MDA. As a result, this is not a suitable test for assessing prevalence and interruption of LF transmission.

d) Nucleic acid technique

PCR detection of DNA (if available) should be practiced while ICT positive case become negative for mf in blood smear. It is documented that detection range of mf by PCR is around 10mf/ml of blood.

e) Ultrasonography

f) Lymphoscintigraphy

Laboratory Procedure of thick film

Preparation of a thick blood film for examining microfilariae
For routine filarial microscopy, thick film is made on a glass slide.

Materials and reagents

1. Microscope
2. Clean glass microscope slides
3. Sterile blood lancets
4. Cotton wool
5. Grease pencil
6. 70 % Ethanol.

Method:

Blood to be examined for microfilariae is usually collected in the field or sometimes at a health centre.

1. With the patient's left hand palm upwards, select the third of fourth finger.(the big toe can be used with infants. The thumb should never be used for adults of children.) Use cotton wool lightly soaked in ethanol to clean the finger – using firm strokes to remove dirt and grease from the ball of the finger. Dry the finger with a clean piece of cotton wool
2. With a sterile lancet, puncture the ball of the finger using a quick rolling action. Applying gentle pressure to the finger, express the first drop of blood and wipe it away with dry cotton wool. Make sure that no strand of cotton wool remains on the finger.
3. Working quickly and handing clean slides only by edges, collect the blood as follows: Apply gentle pressure to the finger and collect drops. About this size . on to the slide wipe the remaining blood away with cotton wool.

4. always handle slides by the edges, or by corner, to make the thick film using the corner of the spreader, quickly join the larger drops of blood and spread them to make an even thick film
5. Allow the thick film to dry in a flat, level position protected from flies, dust and extreme heat .Label the dry film with a grease pencil by writing the patient' name or number and date

Staining of a thick blood film for examining microfilariae:

Staining is generally required to identify microfilariae in blood smears.
Technique for staining microfilariae

Materials and reagents

1. Microscope
2. Microscope slide
3. Giemsa stain
4. Methanol
5. Buffered water

Method:

1. Prepare a thick blood smear. Allow the smear to air- dry
2. Stain with Giemsa stain (diluted 1 in 20 with buffered water.pH 6.8) for 30 mts.
3. Examine the preparation under the microscope using the x 10 objective. If it is difficult to distinguish the nuclei of the microfilariae, return the slide to the giemsa stain solution for another 5-10 seconds.
4. Examine the preparation under the microscope. Use the x 10 objective first to locate the microfilariae; then identify the filarial species using the x40 and x100 objectives.

Results:

Under the light microscope, microfilariae appear (after appropriate staining) as primitive organisms. Serpentine in shape often enclosed in sheath and filled with the nuclei of many cell.

Not all species have a sheath. In those that do, the sheath may extend ashort or long distance beyond either extremity. In some species, depending on the stain used, the sheath displays a unique staining quality which aids in species identification.

Chapter II

Treatment

1. Mass Drug Administration (MDA)

National ELF programme use an annual single dose of DEC and Albendazole combination for MDA in Bangladesh. MDA is going on in 19 endemic districts based on microfilaraemia. During MDA oral drug administration is conducted once in a year for successive 5 years visiting house to house followed by registration of population in all endemic districts. Usually one drug distributor is assigned to cover about 200 houses for duration of 10 days. Door to door drug distribution and administration directly is done by Public Health and family planning field staff & volunteers (drug distributors) in both rural and urban areas. Drugs are not left out for any member of the house except in certain cases. The person who is present in the house, only he/she is given and swallowed the drugs in presence of field staff. It is important to observe the consumption of drug to ensure that the community takes the drugs. On the following days drug distributor will ensure the administration of drugs of left out cases. There would be supervised visit by supervising staff to assure administration of the drugs of left out cases.

Moreover, drugs are distributed and administered directly to mobile people as in school, college, madras, mosque, temple, cinema hall, market/ shopping places, slum, roads and other public meeting places. In some cases, drugs are left out for member of the house who is out of home for work. Household and mobile people's registration is done for each round of MDA. The MDA activities are supervised by scout leaders/teachers, Assistant Health Inspector (AHI), Sanitary Inspector (SI), Health Inspector (HI), Medical Assistant & SACMO, Medical Officer (MO), Upazilla Health and Family Planning Officer (UH & FPO), Family Planning Officer (FPO), Superintendent of Expanded Program on Immunization (EPIS), District Senior Health Education Officer (DSHEO), Deputy Director, Family Planning (DD,FP), Civil Surgeon (CS) and also officers from national /central level.

DEC and Albendazole are relatively safe drug. There is no significant side effects commonly happened in Bangladesh. If it happened patient will be referred to nearest health centre.

MDA will not affect the condition of patients with lymphoedema or hydrocele. The community will therefore not see the benefits of MDA till several years later. That's why the purpose of MDA must be clearly explained and the community should be informed that the MDA is to minimize the risks for their children and future generations. With this aim social mobilization is being carried out by miking, documentary film show, Information, Education and Communication (IEC) material distribution and observation of National Filariasis day on 15 January especially prior to each round of MDA. After each round of MDA, post MDA coverage survey was conducted to validate the reported coverage.

Treatment Regimen of Filariasis

There are three different treatment regimens are commonly practised in different countries and these are Diethylecarbamazine (DEC) and Albendazole (ALB); Ivermectine and ALB; DEC – Fortified salt. In Bangladesh, DEC and ALB is recommended by WHO to treat and prevent lymphatic filariasis.

a. Diethylcarbamazine

- Diethylcarbamazine (DEC) is both safe and effective. The dose of DEC that is most generally accepted for the treatment of Bancroftian filariasis - 6 mg/kg body weight as a single dose.
- For Brugian filariasis, recommended doses range from 3 to 6 mg of DEC/kg body weight.

Pharmacokinetic and Pharmacodynamics of DEC

It is rapidly absorbed after oral administration, reaching peak blood levels in 1-2 hours. It is also rapidly excreted – the blood half-life is only 2- 3 hours in alkaline urine and about 10 – 20 hours in acidic urine.

DEC causes rapid disappearance of Mf from the circulation. It is effective in cleaning Mf. The effect of the drug on the adult worm is uncertain. It has probably no effect on the infective stage larvae.

Toxic reactions:

DEC may produce severe side-effect. The reaction may be of two kinds-

a) Those due to the drug itself e.g. headache, nausea, vomiting, dizziness etc. These reactions are observed a few hours after the first dose of DEC and generally do not last for more than 3 days
b) Those which are allergic reactions due to destruction of microfilariae and adult worms, e.g. fever, local inflammation around dead worms, orchitis, lymphadenitis, transient lymphoedema and hydrocele.

The local reactions tend to occur later in the course of treatment and to last longer. If the drug is given in spaced dose, systemic reactions are much less frequent and less intense after the second dose and are rare after subsequent doses. These reactions disappear spontaneously and interruption of treatment is not necessary.

Management of Toxic reaction

- Itching, urticaria – Antihistamine, Corticosteroids
- Loose stool / Diarrhea - ORS
- Bed rest
- Drink plenty of water

b. Albendazole

It is being used with DEC to synergist its effect. This drug cannot kill adult worm but can suppress the reproduction. The usual dose of Albendazole is 400mg for all eligible people which start from the age of 2 years in MDA of Filariasis. It does not have significant side-effect as it is not absorbed in the intestine.

Chapter III

Filariasis Elimination in Bangladesh

Goal

To eliminate filariasis from Bangladesh by 2015

Objectives

- ❑ To reduce parasitic infection <1 per 1000 children in every implementation unit (IU) after 5 years of MDA
- ❑ To reduce morbidity providing community home based services

Activities of national lymphatic filariasis elimination program:

i) Mass Drug Administration (MDA)
ii) Morbidity control & Hydrocele repair
iii) Social Mobilization / IEC activities.
iv) Microfilaria and ICT Survey
v) Post-MDA Coverage Survey
vi) Developing human resources
vii) Collaboration
viii) Operational Research

Definition of LF elimination as a public Health Problem

LF elimination as a public health problem is defined as:

- ❑ Microfilaraemia rate < 1%
- ❑ Evidence that there is no new parasitic infection in the community i.e. 5- year cumulative incidence in children born in a given implementation unit (IU) after the start of MDA, is less than 1 per 1000 children.

1. Interruption of Transmission
   - by mass treatment of "at risk population"
2. Morbidity Control i.e. relief of sufferings
   - by community level care of those with disease
     - Lymphoedema
     - Acute inflammatory attack
     - Hydrocele

Mass Drug Administration (MDA):

In this approach, DEC is given to almost everyone in the community irrespective of whether they have microfilaraemia, disease manifestations or no signs of infection. It is generally accepted that mass therapy is indicated in highly endemic areas.

Mass treatment control projects using DEC have markedly reduced prevalence of W. bancrofti in many of the Pacific islands. For mass chemotherapy to be accepted, a good rapport must be established with the community before the treatment begins. This requires intensive health education of general public.

Following dose schedule of two drugs is being used in Filariasis Elimination Program in Bangladesh, which is recommended by WHO

Age group	Drugs used		Number of Tablet(s)	Period
	DEC(100mg)	Albendazole (400mg)		
2– 8 years	1	1	2	Successive 5 years
> 8 – 12 years	2	1	3	
> 12 years – all ages	3	1	4	

- *Doxycycline can be used to synergist the effect of DEC as 100mg orally daily for 6- 8 weeks.*

Contraindication of MDA:

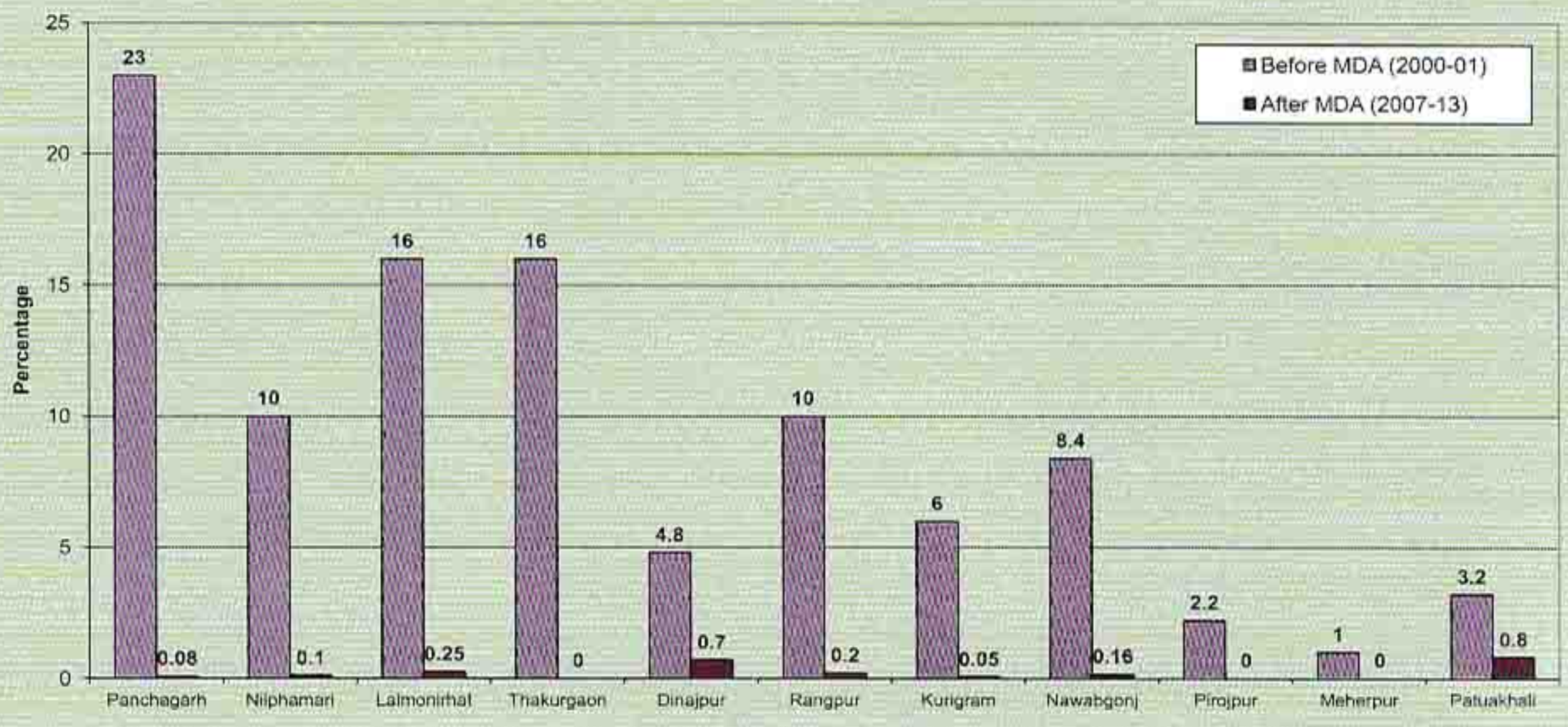
1. Children < two years of age
2. Pregnancy
3. Severely ill patients

Microfilaria (Mf) & Immunochromatographic test (ICT) Survey

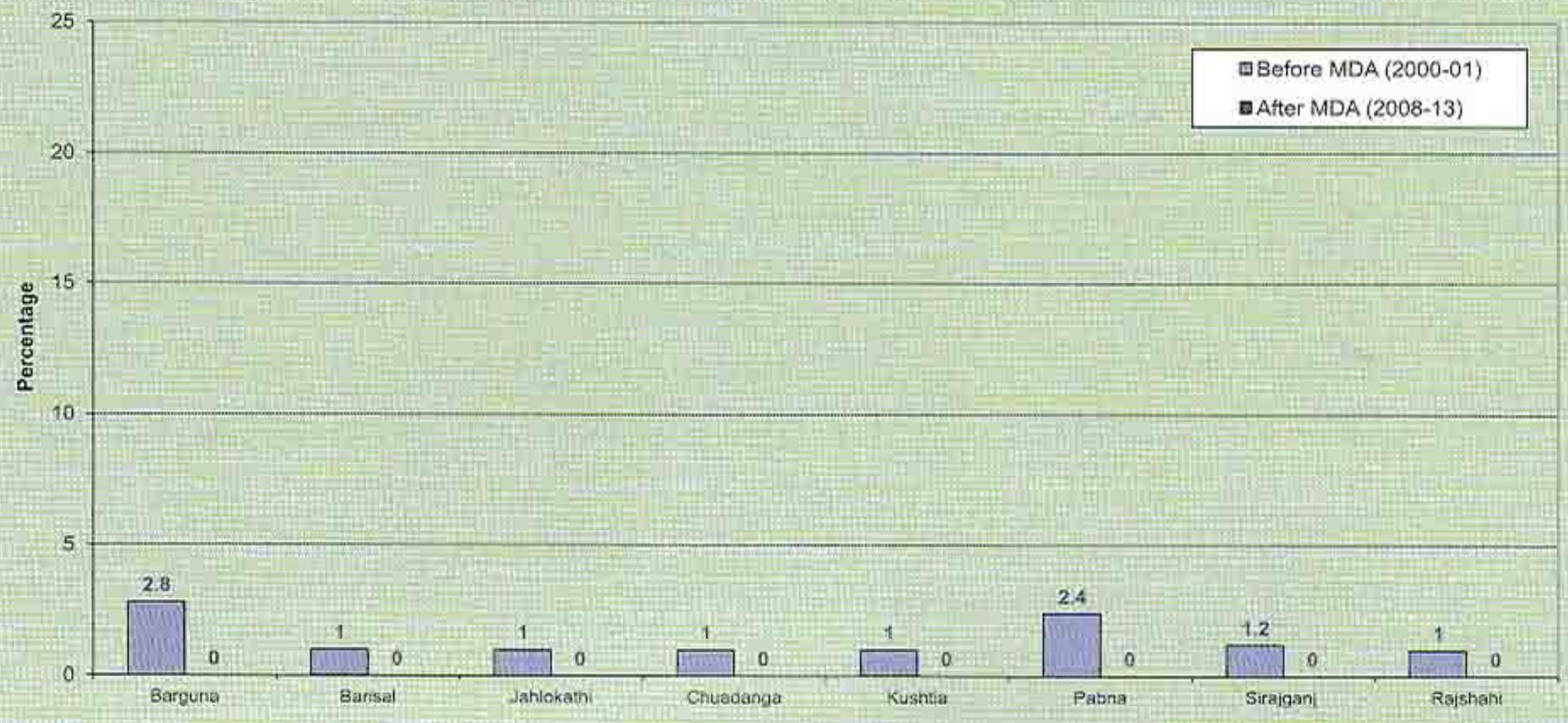
The prevalence and density of microfilariae, together with drug coverage, are the indicators for measuring the impact of MDA. The standard method of night blood surveys of the sentinel sites and cross check sites are used to determine the prevalence and density of microfilariae. As well as ICT survey is being conducted to follow up the progress of the program. According to post-MDA follow-up survey till 2103, Mf has come down to <1% to 0% in 19 districts which are as follows-

In 2009-2010: Meherpur, Dinajpur, Rajshahi, Patuakhali and Barguna
In 2011: Pirojpur, Kushtia, Chuadanga, Sirajgonj and Pabna
In 2012: Panchagarh, Thakurgaon, Nowabgonj, Barisal and Jhalokathi
In 2013: Rangpur, Nilphamari, Lalmonirhat and Kurigram

Achievement: Mf Positivity Rate (baseline and follow-up)



Achievement: Mf Positivity Rate (baseline and follow-up)



Chapter IV

Filariasis Elimination Strategy

The global strategy for elimination of lymphatic filariasis is now principally based on annual single dose treatment of all the eligible members of at risk endemic communities. The challenges are to achieve adequate treatment coverage and sustain drug delivery to all high risk.

Lymphatic filariasis elimination strategies are:

1. **Interruption of transmission**
   - Mass treatment of "at risk" population
   - Supplementary measures including Integrated Vector Management wherever necessary and feasible (WHO 2010)
2. **Morbidity control by Community level care of:**
   - Lymphoedema
   - Acute inflammatory attacks
   - Hydrocoele

Interruption of transmission:

A consolidated, evidence-based strategy to interrupt transmission of filariasis in an endemic country is the administration of effective antivfilarial drugs to the entire polpulation at risk.

There are two possible kinds of Mass Drug Administration (MDA):

- ❑ MDA using tablets: this consists of an annual single dose of a combination of two drugs (DEC/ Ivermectine + Albendazole) administered for at least five or six consecutive years to the entire eligible population living in an endemic areas, or until the criteria for stopping MDA is reached.
- ❑ MDA using diethylcarbamazine-citrate (DEC) fortified cooking salt: this involves the distribution of common salt fortified with DEC to the entire population of the endemic area for one or two years.

Successful implementation of MDA depends on various preparatory activities such as;

a) review and selection of available health staff and volunteers

b) orientation and training of the selected staff/volunteers

c) timely projection and procurement of quality drugs

d) In-country drug supply and distribution plan and its implementation

e) political commitment

f) mobilization of resources

g) advocacy and social mobilization including wide publicity about the dates and advantages of MDA

h) arrangements for prompt reporting and management of Severe Adverse Episodes (SAE).

Indicators to assess the ELF:

- ❑ reported coverage of MDA among eligible whole population
- ❑ Mf and ICT prevalence
- ❑ No of Morbidity kit distributed
- ❑ No. of training conducted
- ❑ No. of hydrocele operation
- ❑ Population under morbidity control

It is expected that elimination level will be achieved in each IU after 5-6 rounds of MDA, provided the annual coverage has been > 65% of total population and > 80% of the eligible population. Additional figures may be needed if coverage figures are low. All IUs will undergo stop-MDA procedures and post-MDA surveillance as per WHO guidelines.

WHO recommends evaluation of programme by independent experts every two or three years.

Criteria for Stopping MDA

It is expected that the elimination level will be achieved in each IU after 5-6 rounds of MDA, provided the annual coverage has been >65% of the total population and >80% of the eligible population. Additional rounds may be required if the coverage figures are low. All IUs will need to undergo stop-MDA procedures and post-MDA surveillance as per WHO guidelines.

Before stopping MDA, the ELF program needs assessment and evaluation.

Assessment of ELF Program

The effect of ELF can be assessed using clinical, parasitological and entomological methods.

i) Clinical parameters include the incidence of acute manifestations such as adeno-lymphangitis, epididymoorchitis etc and the prevalence of chronic manifestations such as lymphoedema, elephantiasis, hydrocele, chyluria etc.

ii) Parasitological parameters are:

a) Microfilaria rate-it is the percentage of persons showing Mf in their peripheral blood (20 cu. mm) in the sample population, one slide being taken from each individual.

b) Filarial endemicity rate-It is the percentage rate persons examined showing microfilariae in their blood, or disease manifestation or both

c) Microfilarial density-It is the samples from individual persons. It indicates the intensity of infection.

d) Average infestations are-It is the average number of Mf per positive slide, each slide being made from 20 cu. mm of blood. It indicates the prevalence of microfilaraemia in the population

iii) Entomological parameters comprise:

a) vector density per 10 man-hour catch
b) percentage of mosquites positive for all stages of development
c) percentages of mosquitoes positive for infecctive(stge III) larvae
d) the annual biting rate-for assessment of transmission
e) type of larval breeding places, etc.

The above parameters help to measure the conditions existing before and after control procedures began, and also to measure the progress of the control campaign against vectors from time to time.

Evaluation before stopping MDA: Understanding how different measures of infection are related to residual transmission is important for making programmatic decisions about stopping MDA. Ideally, program managers should be able to use simple tools and survey methods to determine whether infection rates are below the thresholds required to maintain transmission for different parasite-vector combinations. Microfilaremia is the gold standard for monitoring filarial infection. However, the sensitivity of blood tests for microfilaremia declines after MDA as microfilaria prevalence and intensity decrease. Rapid antigen tests are more sensitive than microfilaria detection and provide the additional advantage of daytime blood sampling in areas of the world where the parasite is nocturnally periodic. ELF guidelines for stopping MDA are based on the use of the antigen test in community-wide surveys. Questions about the sensitivity of antigen tests for monitoring filarial exposure have prompted consideration of the use of antibody tests. In principle, antibody tests provide a cumulative measure of filarial exposure and the detection of antifilarial antibody in children born after MDA reflects the potential for transmission.

Specific Steps to assess preconditions for stopping MDA

Steps 1- Mf survey will be done at night for all age group in sentinel site and spot check site . Five hundred persons are to be checked in each site. If Mf rates comes down to <1% then proceed for Step 2

Step 2- Transmission Assessment Survey (TAS)

1. Sampling site: Type – Evaluation areas - Communities - Schools	**2. Number :** All or fixed number	**3. Characteristics:** All are selected or fixed number randomly selected
4. Sampling population: - Age group: Children - 6-7 year old	**5. Sampling method:** • Cluster sampling or • Systematic sampling	**6. Diagnostic method and tool:** • Ag surveys • ICT Card Test

7. Target group:

- School entrants, assumed to be 6 year olds
- If school survey, 1st and 2nd graders
- If community survey, 6-7 year olds

8. Geographic area for (TAS) :

Evaluation Unit

9. TAS design:

LQAS or Cluster survey of a maximum of 1700 children

10. TAS cut-off criteria:

- In W. bancrofti areas, Ag <2% for Anopheles and Culex areas

11. Post-MDA surveillance survey design:

TAS

12. Post-MDA surveillance timing:

- 3 years after original survey
- 6 years after original survey

Sample sizes for TAS in Culex & Anopheles transmission areas

Pop. surveyed	LQAS Sample size	Critical cut - off	Cluster design Sample size	Critical cut off
400	284	3		
800	438	5		
1600	594	7	891	11
2400	614	7	1228	14
4000	690	8	1380	16
8000	766	9	1532	18
14000	774	9	1548	18
24000	778	9	1556	18
40000	842	10	1684	20

TAS : Major difference between cluster & LQAS surveys

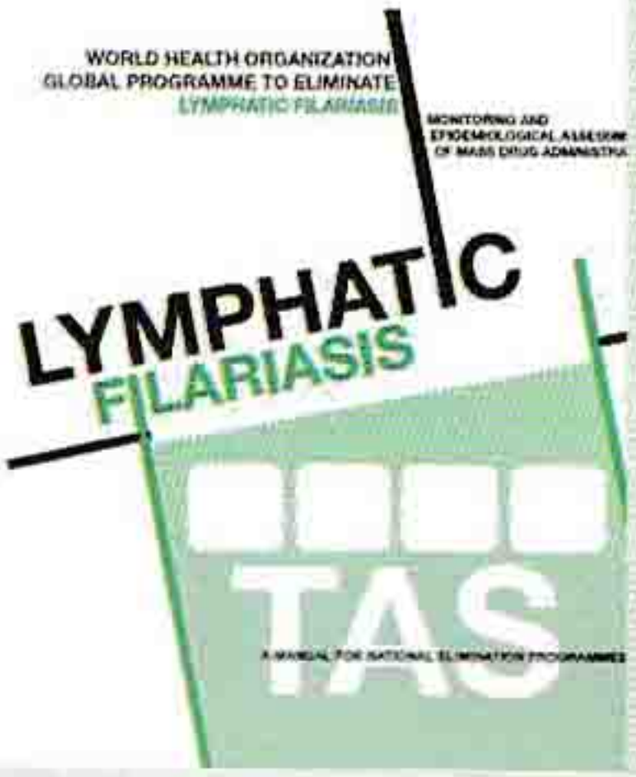
- In cluster survey, only limited number of schools need to be visited, but more students need to be sampled

In LQAS survey, more schools need to be visited, but fewer children need to be sampled.

Transmission Assessment Survey (TAS)

- TAS is the WHO recommended survey protocol to assess the status

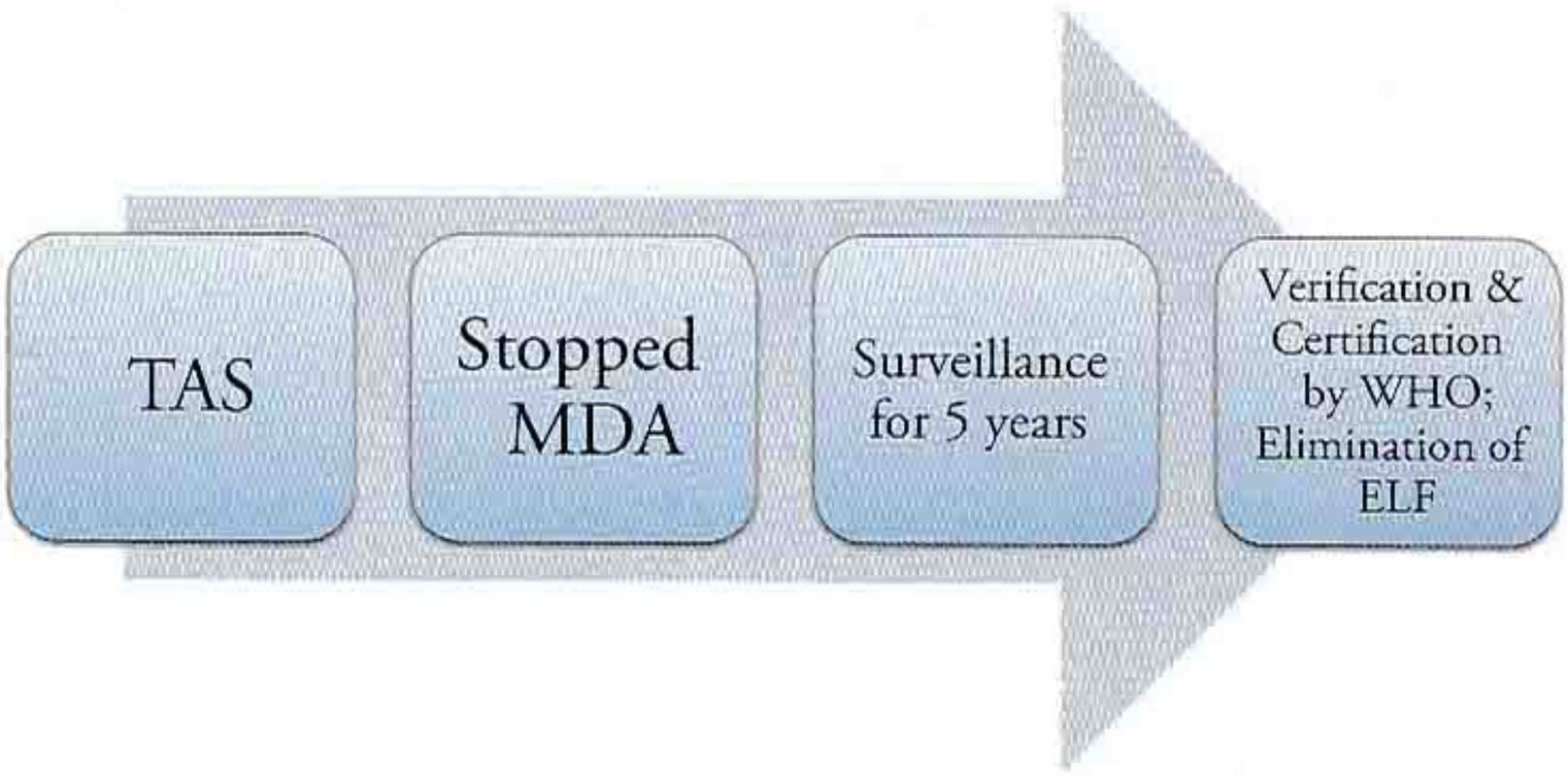
- Based on Mf survey report, Bangladesh ELF program conducted TAS in 15 districts till 2013 as a part of stop MDA in those districts following the preconditions of WHO.



Preconditions for conducting TAS

- Completion of at least 5 rounds of MDA
- Coverage rates > 65%
- Mf prevalence: < 1%

Steps to Declare Elimination



Chapter V

Morbidity Control

Morbid conditions are -

1. Lymphoedema - extremities, breast, genitalia
2. Urogenital – hydrocele, lymphoedema of scrotum and penis, chyluria
3. Skin –
   - Acute stage -itching, rash, inflammation
   - Chronic stage – elephantiasis,
   - Acute on chronic- Acute dermato-lymphangio adenitis (ADLA),

Problems due to Morbidity

Psycho-social problem:

- Marriage
- Sexual
- Divorce
- Aloof from the association, family etc.
- Depression, Suicidal tendency
- Diminishes self-esteem, petitioning

Economic problem

- Unable to perform daily activities, aloof from service, burden to the family, society and nation.

Morbidity Management

Filaria patients with damaged lymphatic vessels often have more bacteria on the skin than usual. The large number of bacteria on the skin, multiple skin lesions, slow lymph fluid circulation and the reduced ability of the lymph nodes to filter the bacteria cause inflammation characteristic of an acute attack. Repeated bacterial infections precipitate frequent acute attacks, which further damage the tiny lymphatic vessels in the skin, reducing their ability to drain fluid. This vicious cycle continues, aggravating the condition of the patient.

Good hygiene and treatment of entry lesions are important measures for managing lymphoedema. The patients should be encouraged to practice skin care and hygiene and to use proper footwear. The reduction in the frequency of the acute attacks in an indication that the patient's condition is improving. Effective, simple and cheap techniques have now been available to minimize the suffering caused by the acute and chronic manifestations of the disease.

Lymphoedema

Lymphoedema is due to dysfunction of the lymphatic vessels caused by the presence of the adult worms.

Effect of Lymphoedema

- ❑ Anatomy:
  - adult worms live in the lymphatic system
  - cause dilatation ***not obstruction***
  - dilatation leads to dysfunction

- ❑ Dysfunction
  - accumulation of fluid (oedema) in tissues
  - increased risk of infection
  - transport of bacteria to lymph nodes is impaired, thus bacteria multiply in the tissues

Causes of Lymphoedema

Lymphoedema results from dysfunction of lymphatic vessels

It may take a few years to appear after the initial infection. It occurs more commonly in the lower extremities, but can also affect arms, scrotum, vulva and breast. The lymphoedema, if not treated, will progress till a patient becomes disabled and dependant on other's help. Repeated acute attacks will make the disease worse and increase the lymphoedema.

Management of lymphoedema based on following principles – LF sufferers with lymphoedema – a swollen limb or other part of the body should take extra care with their skin to prevent wounds of any kind that can lead to acute attack.

1. Hygiene
2. Treatment and prevention of skin lesions
3. Exercise
4. Elevation
5. Shoes
6. Bandages
7. Psychosocial support and Rehabilitation.

1. Hygiene -Washing

LF sufferers with lymphoedema – a swollen limb or other part of the body should take extra care with their skin to prevent wounds of any kind that can lead to acute attack.

a) Supplies needed

b) Clean water at room temperature

i) Anti-septic soap (least expensive soap without perfume is usually the best)
ii) Bucket
iii) Chair/Stool
iv) Towel/Clean cloth
v) Footwear within easy reach
vi) Morbidity Kit-box containing anti-septic soap, towel, guaze, anti-fungal and anti-bacterial cream/ointment.

c) Check skin for

i) Entry lesions, including very small lesions between the toes that can hardly be seen

ii) Entry lesions between the toes may cause itching. Scratching can further damage the skin which can provoke an acute attack; tell patients to avoid scratching

iii) Toe nails should be trimmed in such a way that the skin is not injured

d) Wash the leg

Taking care of the skin means following simple, basic rules of hygiene as follows

- Wash the affected limb at least once a day with clean water at room temperature (do not use hot water) and anti-septic soap.
- Wash thoroughly, applying soap from the knee down; take extra care to wash gently in between the toes and folds using a clean cotton cloth or gauze
- Rinse the limb with clean water at room temperature
- Repeat the process of washing with soap and rinsing until the rinse water runs clean to remove all accumulated dirt

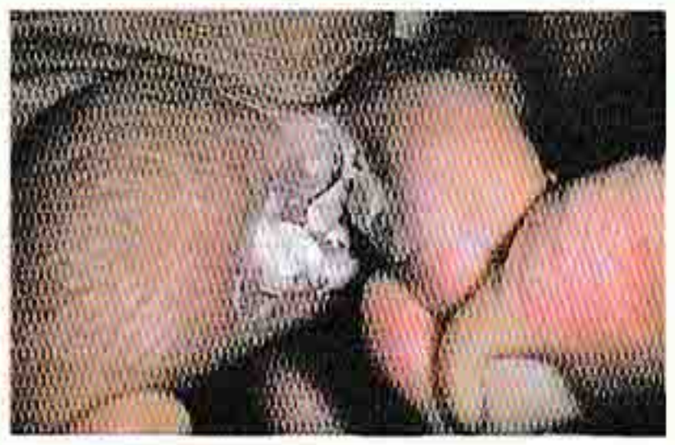
d) Dry the skin:

- Gently dry the skin well using a clean towel/cloth without rubbing the skin
- Make sure that the skin between the toes and skin folds are carefully dried.

These cleaning and care techniques also should be used for other parts of the body affected by LF

2. Prevention and care of entry lesion:

Entry lesions are defined as any break in the skin that enables dirt and germs to enter the body. Small wounds, blisters, minor cuts and scratches are entry lesions.



Entry lesions are common in patients with lymphoedema and are most frequently found between the toes and deep skin folds and also around the toe nails. Both fungi and bacteria can cause entry lesions. Fungal infection frequently damages the skin and creates entry lesions, especially between toes which may cause itching. The entry lesions allow bacteria to enter the body through the skin and this can cause acute attack. Fungi and bacteria can cause foul smell.

Fungal infection are usually white or pink in colour and do not leak fluid (oozing). Bacterial infections may leak fluid that is thin and clear or thick and coloured.

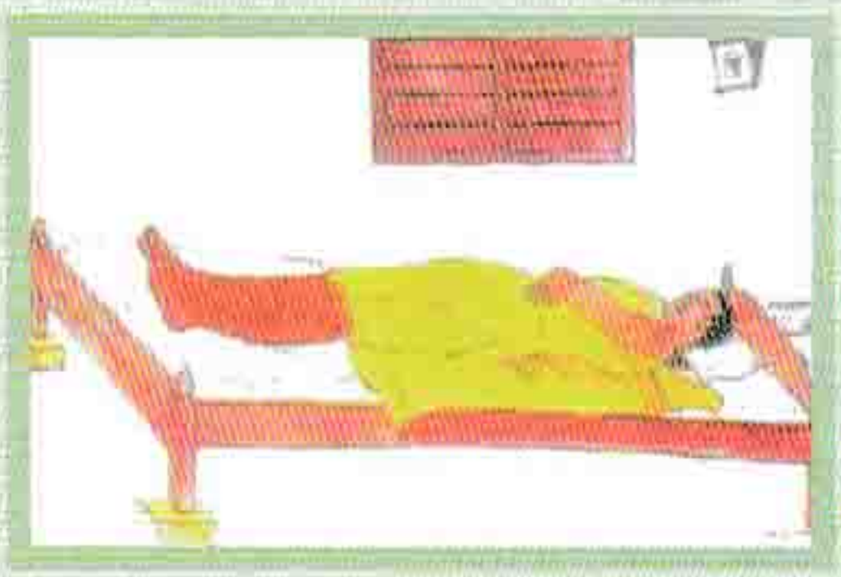
to do for prevention and care of entry lesions-

- Every time the limb is washed, the skin should be examined for entry lesion.
- Avoid scratching the skin.
- Entry lesion should be very carefully washed and dried
- If an entry lesion is infected medicated creams can be applied locally as needed (Anti- fungal, Antibacterial)
- Keep the area of lesion covered with light gauze to protect from flies.

3. Elevation:

Elevation is important for LF sufferers with swelling (lymphoedema) to prevent the accumulation of fluid in the affected part of the body. This is a very simple measure that can bring considerable relief.

- When sitting, the affected leg should be raised to hip level on a stool or chair or something similar



The leg should rest on a comfortable manner; if necessary, a pillow should be placed under the knee for support.

- When lying down, the leg should be elevated by placing a support, such as a brick under the foot of the bed, or pillow under the mat if person sleeps on the floor. The entire leg should be raised, not just the foot.
- If the arm, breast or scrotum is affected they can be elevated by placing a pillow or folded blanket under them at night.
- Please note that elevation should not be done if the LF sufferer is known to have cardiac problem.

4. Exercise

Frequent exercise of the limb will bring relief. The exercises can be done anywhere and at any time, whether sitting, standing or lying down, but should not be done during acute attack.

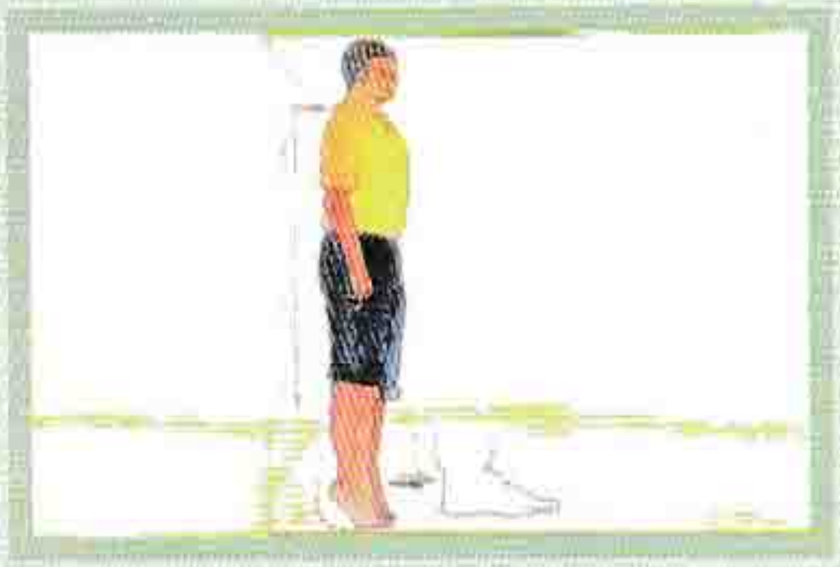
The following exercises are recommended and should be repeated 5 – 15 times each:

a) Standing (up on the toes exercise)

i) Stand on both feet slightly apart and holding onto a wall, tree, chair or person,

ii) Rise up onto the toes of both feet at the same time and then lower the heels on the ground.

iii) Repeat the exercise 5- 15 times or as often as comfortable. If the patient is unable to rise on both feet at a time , the exercise can be done for one foot at a time.



b) Sitting or lying down (toe point exercise)

i) While sitting or lying down, point toes towards the ground and then flex/bend them upwards, one foot at a time.
ii) Repeat 5 – 15 times or as often as comfortable
iii) Repeat with the other leg.

c) Sitting or lying down (circle exercise)

i) While sitting or lying down, move the ankle in a circle from the right to the left, one foot at a time.
ii) Repeat with other leg
iii) If sitting on the floor, protect the heel with a flat pillow.

5. Wearing appropriate footwear

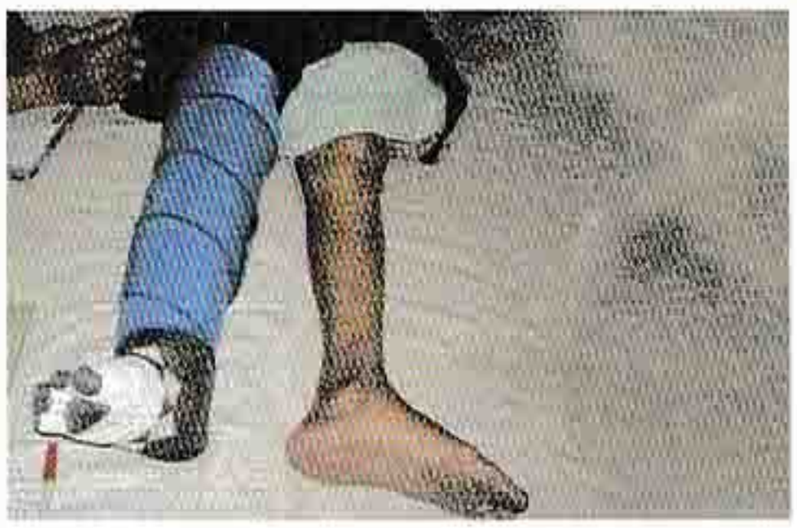
Wearing appropriate footwear is important for the following reasons:

i) It will protect the soles of the feet from injury that can lead to acute attack.
ii) The footwear should be comfortable, should not be tight, should allow air to circulate around the foot and should have a very low heel.
iii) Sandals are preferable.
iv) LF sufferers should make sure that the footwear does not cause rubbing or blisters because they can lead to acute attack.

If blisters develop, they should not be punctured and extra care should be taken until they are completely healed

6. Bandages

Twisted Tourniquet Technique (TTT) is being used to reduce lymphoedema.



7. **Reconstructive surgery-** Might help in some of the cases.

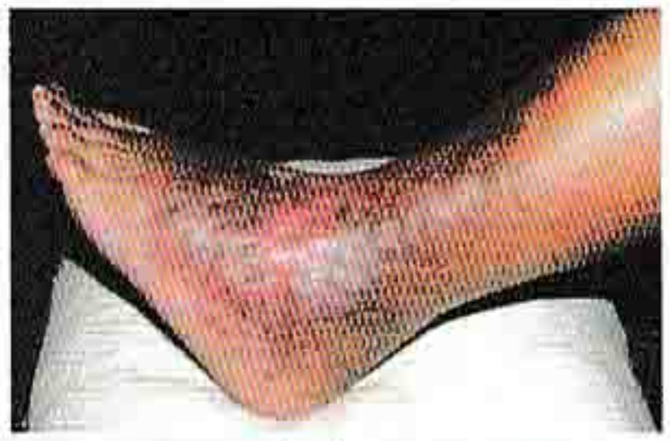
8. Psychosocial support and Rehabilitation

- Education – Audio-visual IEC activities in the community may enhance the education regarding the disease, its transmission, treatment and prevention which will ultimately remove stigma.
- Counselling - LF sufferers, their families and friends needs counseling on how to take care of affected limbs or other parts of the body especially during acute attack.
- Motivation – Patients should have enough motivation regarding hygiene-wash, exercise and wearing appropriate footwear.
- Socio-economic rehabilitation (SER) – The LF sufferers can be rehabilitated in their community followed by basic training on that particular issue with a grant/interest free loan.

Acute dermato-lymphangio adenitis (ADLA)

Assessment of Acute Attacks:

- Small wounds, blisters, minor cuts, scratches on the skin and in between toes, fingers and skin folds are the main causes of acute attack in LF sufferers with lymphoedema since they allow dirt and germs to enter the skin and cause infection.



- During acute attack, the skin becomes red, painful, hot and swollen. The LF sufferers also may develop general symptoms such as fever, headache, shivering and possibly nausea and vomiting. If the infection spreads, acute attack could endanger the life of the LF sufferers.
- Acute attack usually lasts for 3 –5 days and the LF sufferers may not be able to walk or get out of bed. The limb or other affected part of the body is extremely painful and even the lightest touch can be unbearable. Following acute attack, the skin becomes dry, peels, and may become darker in colour.

- Every acute attack worsens the lymphoedema so prevention is very important. This is why it is critical to teach the elements of home care to the LF sufferers and the family and friends.
- Most sufferers can easily care for acute attack at home starting with cooling the legs as soon as the attack starts.

It is important to emphasize that acute attack is a very serious condition. Even you do not see an LF sufferer during acute attack, there are signs that indicate a recent attack, such as dry, peeling skin, which may be darker in colour.

Management of Acute Attacks (ADLA):

There are certain measures that can be taken to prevent and reduce the severity of acute attack. These measures consist of educating LF sufferers and their families and friends in how to care for limbs (or other parts of the body) during acute attack. The main ways of managing acute attack are to relieve pain, ensure good hydration and provide rest.

Pain relief

- Pain relief is obtained by cooling the affected limb or other part of the body either by applying a clean cloth soaked in cold water and changing it as soon as it becomes warm, or by soaking the affected part in a bucket of cold water. The cooling process should continue until the pain subsides.
- Medicine can be given to bring down the fever, for example paracetamol.

Hydration

The LF sufferers should drink plenty of water.

Rest

The LF sufferers should rest, elevating the affected part of the body as comfortably as possible. Exercise should be avoided.

If acute attack does not subside and /or there is a very high fever, shivering, or confusion and if pain does not respond to the above measures within 24 hours, the LF sufferer should be referred to a primary health care unit where antibiotics, or other measures, may be prescribed by a doctor.

Treatment for uncomplicated ADLA

1. Analgesic such as paracetamol -1 gm given 3-4 times a day.
2. Oral antibiotic such as amoxycillin - 1.5 gm in 3 divided doses for at least 7 days. In case of allergy to penicillin, oral erythromycin (1 gm given 3 times a day) can be used.
3. Clean the limb with antiseptic
4. Check for any wounds, cuts, abscesses and interdigital infection (especially between the toes).
5. Clean with antiseptic. If local superficial skin infection is found give antibiotic cream, apply anti-fungal cream if interdigital infection is present.
6. Advise about prevention of chronic lymphoedema caused by lymphatic filariasis.
7. *Do not give antifilarial medicine.*

Home management includes drinking plenty of water, rest, elevation of the limb, wriggling the toes, cooling the limb with cold water and washing the limb if the patient can do it.

Follow up after 2 days at home. If situation does not improve, then refer the LF sufferer to a physician.

Management of severe ADLA

Immediate referral is needed to receive recommended antibiotic treatment.

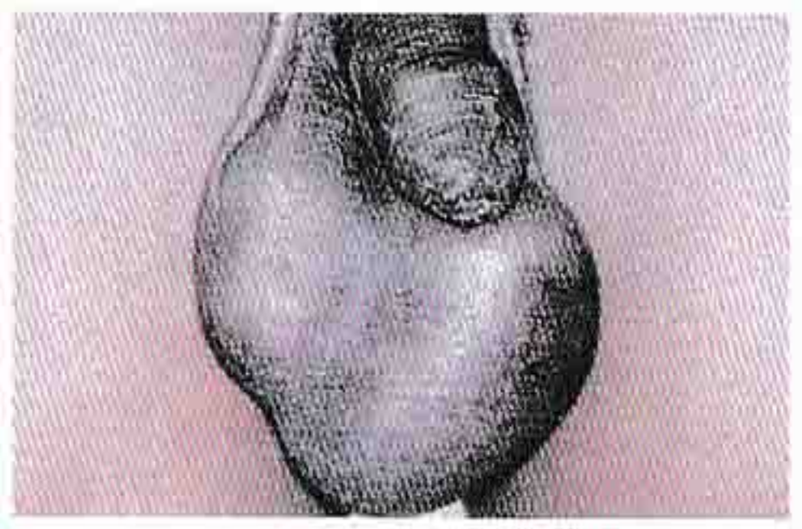
1. Intravenous Benzyle Penicillin (Penicillin G) 5 million units given 3 times a day or intramuscular procaine Benzyle penicillin 5 million units given 2 times/day until fever subsides, then give oral Phenoxymethylepenicillin (Penicillin V) 750 mg to 1 gm given 3 times a day for 7 days.
2. Incase of allergy to penicillin, give i.v erythromycin 1 gm 3 times/day or give other antibiotic according to local situation.
3. Analgesic/antipyretic such as paracetamol
4. Do not give any antifilarial medicine.

Urogenital Disease in Filariasis

1. Hydrocele
2. Lymphoedema of scrotum and penis
3. Lymph Scrotum
4. Chyluria

1. Hydrocele

i) Appearance of skin of scrotum and penis - normal
ii) Scrotal sac - enlarged
iii) Size - normal to large



Management of Hydrocele -

- Refer to surgeon for Surgery
  -Everson
  -Excision
- Counseling

2. Lymphoedema of the Scrotum or Penis

i) Skin of scrotum and penis – nodules, bumps or knobs, thickened, feels hard
ii) Size - large

Management of Lymphoedema of the Scrotum or Penis -

- Hygiene -Wash
  –Examine skin for entry lesions
  –Wash with soap and water
  –Dry

- Apply antibacterial/anti-fungal cream on entry lesions
- Treat acute attacks
- Prophylactic antibiotics
- Counseling
- Refer for possible reconstructive surgery

3. Lymph Scrotum

i) History of hydrocele surgery
ii) Skin of scrotum - blisters on skin
iii) Leakage of lymph fluid - clear, milky, or bloody
iv) Size - normal to large

Management of Lymph Scrotum -

- Hygiene
- Apply antibacterial/anti-fungal cream on entry lesions and leaking blisters
- Change dressing often
- Treat acute attacks
- Refer for
  –Prophylactic antibiotics
- Counseling

4. Chyluria

i) Milky Urine
   –Fat or blood in urine
ii) Difficult to urinate
iii) Weight loss
iv) Tiredness

Management of Chyluria -

- Eat a low-fat, high-protein diet
- Drink water
  –At least 1 glass every 1 to 2 hours during episodes
- Rest
  – Avoid lifting
  – Avoid stairs.

Chapter VI

Monitoring and Evaluation

Supervision, monitoring and evaluation

Proper supervision of each activity and close monitoring and evaluation should be built into all aspects, activities and all stages of the programme. This would include assessing results of mapping, Mf prevalence before and after MDA, reported and actual coverage, mid-term assessment/ evaluation and impact assessment, including impact of social mobilization, disability alleviation and other activities. It would be useful if the programme is periodically evaluated by independent experts. WHO recommends independent evaluation every two or three years.

It is expected that the elimination level will be achieved in each IU after 5-6 rounds of MDA, provided the annual coverage has been >65% of the total population and >80% of the eligible population. Additional rounds may be required if the coverage figures are low. All IUs will need to undergo stop-MDA procedures and post-MDA surveillance as per WHO guidelines.

National LF programme managers should refer to WHO Guidelines for Monitoring and Epidemiological Assessment of the Programmes to Eliminate Lymphatic filariasis (2005) for the steps and procedures to be taken for 'Stopping of MDA' and verification of LF elimination. Certification of the absence of transmission in a country is judged on the basis of an assessment of (a) reliability and adequacy of the original survey determining endemicity of LF in each IU; (b) reliability and accuracy of post-MDA surveys. The national authorities should have the reports of all the required surveys for submission to WHO.

Filaria survey

The size of the sample to be examined in a filaria survey varies with the type of survey, whether it is a routine survey or survey for evaluation.

Mass Blood Survey: The definitive diagnosis of lymphatic filariasis depends upon the demonstration of living parasites in the human body. This calls for a night blood survey.

The thick film: The thick film made from capillary blood is still the most commonly used method for epidemiological assessment. 20 cu. mm of blood is collected by a deep finger prick between 10 pm to 2 am at night. A thick smear is prepared on a glass slide and examined for Mf under low power.

Membrane filter concentration (MFC) methods: The most sensitive method currently available for detecting low-density microfilaraemia in the blood is by concentration techniques. It requires collection of blood by venepuncture and filtering large volumes of blood.

DEC provocation test: Mf can be induced to appear in blood in the daytime by administering diethylcarbamazine (DEC) 100 mg orally. Mf begin to reach their peak within 15 minutes and begin to decrease 2 hours later. The blood may be examined one hour after administration of DEC.

Clinical Survey:

At the same time when blood is collected, the people are examined for clinical manifestations of filariasis which should be recorded in the suggested schedule

Serological test :

Serological tests to detect antibodies to Mf and adults using immunofluorescent and complement-fixing techniques cannot distinguish between past and present infection, and heavy and light parasite loads in the human host. Recent interest has focused on the direct detection of parasite antigens in patient's blood or urine.

Xenodiagnosis:

The mosquitoes are allowed to feed on the patient, and dissected 2 weeks later. Whether other techniques may fail, this may succeed in detecting low-density microfilaraemia.

Entomological survey:

This comprises of general mosquito collection from houses, dissection of female vector species for detection of developmental forms of the parasite, a study of the extent and type of breeding places and other bionomics of mosquitoes. The impact of filariasis control programme can be assessed using clinical, parasitological and entomological methods. These are:

Clinical parameters

The clinical parameters measured are the incidence of acute manifestations (adeno-lymphangitis, epididymoorchitis, etc), and the prevalence of chronic manifestations (lymphoedema, elephantiasis, hydrocele, chyluria etc).

Parasitological parameters

These are: a) Microfilaria rate – it is the percentage of persons showing Mf in their peripheral blood (20 cu. mm) in the sample population, one slide being taken from each individual. b) Filarial endemicity rate – It is the percentage of persons examined showing microfilariae in their blood, or disease manifestation or both, c) Microfilaria density – It is the samples from individual persons. It indicates the intensity of infection d) Average infestation rate – It is the average number of Mf per positive slide, each slide being made from 20 cu. mm of blood. It indicates the prevalence of microfilaraemia in the population.

Entomological parameters

These comprise: a) vector density per 10 man-hour catch; b) percentage of mosquitoes positive for all stages of development; c) percentage of mosquitoes positive for infective (stage iii) larvae; d) the annual biting rate – for assessment of transmission; e) types of larval breeding places, etc.

The above parameters help to measure the conditions existing before and after control procedures began, and also to measure the progress of the control campaign against vectors from time to time.

Surveillance:

Surveillance has been defined as " the continuous scrutiny of the factors that determine the occurrence and distribution of disease and other conditions of ill health".

Surveillance after stoppage of MDA and monitoring of the elimination status will need to be a critical component. Efforts should be made to strengthen the necessary infrastructure, ensure capacity

building and mobilize resources. Sentinel and spot-check sites will help to ascertain the baseline parasitological and clinical indicators and also help monitor the trend and impact of MDA rounds on the indicators. Sentinel and spot-check sites will also serve to cross-check the reported coverage of MDA by being the sites of "observed" coverage. Each implementation unit should ensure regular surveillance as per WHO guidelines through the sentinel and spot-check sites.

Operational research

The implementation of MDA, disability prevention and other activities should be subjected to operational research in order to optimize and improve programme planning, management, monitoring and evaluation, identification of technical and Operational problems and appropriate solutions and assessment of impact. The main focus of operational research will be on assessing the impact, improvement of intervention and maintenance of elimination status. ELF programme may identify key operational constraints and undertake necessary operational research in collaboration with respective research institutes to resolve them.

Chapter VII

Prevention and Control of Lymphatic Filariasis

For prevention and control of LF, chemotherapy must be supplemented by effective vector control.

Integrated vector management

MDA could be supplemented with vector control measures by coordinating with the existing vector programs so as to accrue benefits to the ELF programme, according to need feasibility and availability of resources. The following vector control measures could be supplemented with ELF programme-reducing human-vector contact by environment management and promoting the use of long lasting insecticide treated bed nets; reducing vector population/density through chemical or biological methods; and reducing carrying capacity and breeding potential in an area through water management and environmental sanitation.

Filaria Control in the community

There are three reasons why filariasis never causes explosive epidemics -

a) The parasite does not multiply in the insect vector,
b) The infective larvae do not multiply in the human host,
c) The life cycle of the parasite is relatively long, 15 years or more.

These factors favour the success of control program. DEC is still the only drug available for chemotherapeutic control of filariasis. The administration of DEC can be carried out in various ways:

i) Mass Drug Administration:

By DEC and Albendazole once in a year for successive 5 years among at 'risk population' of the endemic area.

ii). Selective treatment

DEC is given only to those who are Mf positive. It is generally accepted that selective treatment may be more suitable in areas of low endemicity than in highly endemic areas.

iii). DEC medicated salt

The use of DEC – medicated salt is a special form of mass treatment using very low doses of the drug over a long period of time. Common salt medicated with 1 – 4g of DEC per kg has been used for filariasis control in some endemic areas of W. bancrofti and B. malayi, particularly after an initial reduction in prevalence has been achieved by mass or selective treatment of Mf carriers. Treatment should be continued for at least 6 to 9 months.

The combination of the long life of the adult parasite for several years and infectiousness of a patient with low parasitaemia represents a serious obstacle to control program based on chemotherapy alone. DEC medicated salt was implemented in China and found good result.

b. Ivermectin

Ivermectin is a semi synthetic macrolide antibiotic with a broad spectrum of activity against a variety of nematodes and ectoparasites. But not recommended for ELF in Bangladesh.

Personal prophylaxis –

The most effective preventive measure is avoidance of mosquito bites (reduction of man-mosquito contact) by using mosquito nets. Screening of house can substantially reduce transmission, but it is expensive.

Vector Control

Many years of experience with DEC chemotherapy or MDA has shown that even after treatment, some microfilariae still persist in the body and also new patients are coming up. So it has not been possible to prevent the spread of filariasis by the administration of DEC alone. In Panchagar district MDA has been started since 2001 but till now could not reach the goal. Chemotherapy must, therefore, be supplemented with an effective integrated vector control program, if the disease transmission has to be successfully prevented.

Where mass treatment with DEC is difficult, the control of filariasis must depend on vector control. Vector control may also be beneficial when used in conjunction with mass treatment. The most important element in vector control is the reduction of the target mosquito population i.e. Cx. quinquefasciatus in order to stop or reduce transmission quickly.

The prerequisite of vector control is that the community people of endemic area should have knowledge on the vector of filariasis, its biology and control measures. Information, Education and Communication (IEC) is a good approach to provide the knowledge. Control measures may be directed at either the immature aquatic stages or the adults or at both stages simultaneously.

A. Anti-larval measures

The ideal method of vector control would be elimination of breeding places by providing adequate sanitation and underground wastewater disposal system. Installation of modern sewage system might not be feasible in developing countries. Following measures may be applied. But these are more suitable for urban areas only.

i. Chemical Control

Cx. quinquefasciatus larvae have developed resistance to organochlorine insecticides and to some extent to organophosphate compounds, so selection of insecticide should be done carefully.

Mosquito larvicidal oil such as Flit MLO, Malariol HS and Paris green dust/granules are still effective against all pre adult stages due to their mechanical killing effect. Larval habitats should be sprayed at weekly interval. Relatively large dosage rates have to be applied because most insecticides are less effective in the presence of organic pollution which is characteristics of Cx. quinquefasciatus breeding places.

ii. Physical/Environmental control

Environmental management is the most efficient approach to the problem of controlling mosquito breeding. Filling in, drainage or removal of larval habitats can lead to permanent control though these approaches are not always feasible. Breeding in septic tanks, faulty soak-away pits, water storage jars can be prevented if these are kept properly covered. The household and the surroundings should be kept clean, especially the collections of water containing organic matters. This is to be done on a regular basis preferably once a week.

iii. Biological control

Because biological control methods (biocontrol) do not cause any chemical pollution, these are advocated as a better approach though they are more difficult to imvplement. Some predator fishes like Talapia, Gambusia if released in drains, they feed on mosquito larvae and control mosquito. However, polluted breeding sources are not suitable habitat for most fishes.

B. Anti-adult measures:

The main method of attack is larval control as Culex mosquitoes do not rest predominantly in houses as in case of Anopheles. Spraying the indoor surfaces of houses with residual insecticides is not usually applicable to Culex mosquitoes. Moreover, the vector mosquitoes of filariasis have become resistant to DDT, HCH and dieldrin. Synthetic pyrethroids are still effective.

Besides above mentioned control approaches, following tools are also pertinent:

C. Personal prophylaxis

The most effective preventive measure is avoidance of mosquito bites (reduction of man-mosquito contact). Houses with windows and doors can be covered with mosquito net screening, but it may be expensive for the people of endemic areas (slums etc). Use of insecticide impregnated mosquito nets is another good option to protect from mosquito bites. Recently, long lasting insecticidal nets (LNs) have been distributed by Govt. in highly malaria endemic areas of the country. These are being used against Anopheles mosquito for successful malaria control. Similarly LNs may be introduced in the filariasis endemic areas also. Suitable mosquito repellent can provide temporary protection. Wearing long sleeve clothes especially after dusk may prevent mosquitoes from biting

D. Integrated vector control

None of the above vector control measures applied alone is likely to bring about sustained control of filariasis vectors. An integrated or combined approach is needed to control filariasis vector using two or more strategies and approaches in optimum combination along with community participation.

The national programs for filariasis elimination need to be focused on increasing the awareness about the problems of filariasis, its vector and possible solutions. The strategy to be used comprises IEC. Filariasis Week or Fortnights may be organized to supplement filariasis campaign. In these campaigns, the health care workers and volunteers will visit house to house to increase awareness about filariasis in addition to clinical case search.

This knowledge and awareness campaigns are not adequate to motivate the affected people to take appropriate action as most filariasis patients are poor and illiterate. They have limited access to health care services. Therefore, linking an appropriate awareness campaign for prevention of filariasis for the targeted population with adequate service delivery facilities will be more effective.

Chapter VIII

Communication and Behaviour Impact (COMBI)

i. Community awareness and education

The success of the LF elimination programme including MDA implementation, achievement of high coverage and disability prevention/ alleviation will largely depend on community awareness, involvement and support. All available ways and means of information, education and communication (IEC) and all avenues of advocacy will need to be used to ensure the highest reach of the programme to the population.

ii. Advocacy and mobilization

In addition to creating awareness and IEC activities, it is important to undertake advocacy and social mobilization targeted at political, administrative and social levels. Advocacy should be targeted to the highest political level including the Heads of State and national/provincial/district level policy and decision makers.

Chapter IX

Partnership and Collaboration

Establishing partnerships and involvement of partners

The program is mainly funded by the Health, Population, Nutrition and Sector Development Program (HPNSDP) contributed by Government of Bangladesh and development partners leaded by World Bank. Other partners are as follows:

i) WHO: WHO provides technical and financial support

ii) Centre for Neglected Tropical Diseases (CNTD): CNTD is providing technical and financial support for MDA in one or two districts every year.

iii) Glaxo Smith Kline (GSK) is providing tablets albendazole free of cost and will provide till ELF.

iv) JICA has dispatched a total of 30 volunteers (JOCV) for providing support in Filariasis Elimination Program since 2004. They were involved in patient searching, post-MDA coverage survey, teaching to morbid patients with practical demonstration in self-care. At present, 6 JOCVs and 1 Coordinator are engaged in Filariasis Elimination Program. JICA also provided DEC tablets for MDA in Bangladesh in the year of 2006 and 2007.

v) USAID provides financial supports through FHI 360 both for Filariasis elimination and STH control program like social awareness, developing IEC materials, TAS, strengthening supervision and monitoring.

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Annex: Update on mapping of the distribution of lymphatic filariasis:

MDA stopped in 15 IUs (Districts)

Map showing interruption of transmission

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