

**Demonstration of strategy for the elimination of  
Lymphatic filariasis (*W. Bancrofti*) in Nepal.**

**Final Report**

NHRC Library  
Accession No. 78  
Call No. ....

Submitted  
By

दस्तावेज नं. ... 2471 ...  
विषय ... NHRC ...  
मिति 15 NOV 2002

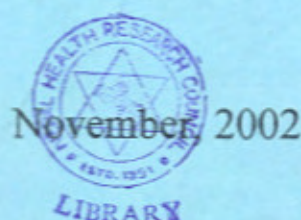
*Sarala Sherchand*

Principal Investigator:

Infectious and Tropical Diseases Research and Prevention Centre/ Nepal  
Tripureswar, P.O. Box: 10404, Kathmandu Nepal

To

Nepal Health Research Council (NHRC)  
Ram Shah Path  
Kathmandu Nepal



# Contents



NHRC Library  
Accession No. 78  
Call No. ....

Abbreviations.....	(i)
Summary of report.....	1
Introduction.....	2
General Objectives.....	3
Specific objectives.....	3
Materials and methods.....	3
Entomological survey.....	5
Results.....	5
Demographic socio characteristic of the study population.....	5
Ethnicity of the respondents.....	6
Ethnic wise occupational distribution.....	7
Educational status.....	7
Religion and respondents.....	8
Knowledge of lymphatic filariasis.....	8
Knowledge of sign/ symptoms.....	8
Knowledge on filarial diagnosis.....	9
Treatment seeking behaviour.....	10
Distribution of diseases in the study population.....	10
Use of bed net.....	11
Antigenemia and parasitological findings.....	11
Night blood examination.....	12
Entomological study on vectors.....	12
Discussion and Conclusions.....	12
Acknowledgements.....	14
References.....	14

## Annexes:

1. Map of study area.....	16
2. Recommendation towards lymphatic filariasis control strategy.....	17
3. Questionnaires	
4. Consent form	

## Abbreviations

ADL	Adenolymphangitis
CFA	Circulating filarial antigen
DHO	District Health Office
DEC	Diethylcarbamazine
EPR	Estimated positive rate
FCHV	Female Community Health Volunteer
HP	Health Post
HMG	His Majesty's Government
ICT	Immunochromatographic test
ITDRC	Infectious and Tropical Disease Research Centre
KAP	Knowledge Attitude and Practice
LF	Lymphatic filariasis
LHSB	Leg, hand, scrotum and breast
MF	Microfilaria
NHRC	Nepal Health Research Council
QC	Quality control
SHP	Sub-Health Post
TDR	Tropical Disease Research
VDC	Village Development Committee
VHW	Village Health Worker
WHO	World Health Organisation



# Demonstration of strategy for the elimination of *Lymphatic filariasis* (*W. Bancrofti*) in Nepal.

Principle Investigator: **Sarala Sherchand**

Infectious and Tropical Diseases Research and Prevention Centre/ Nepal  
Tripureswar, P.O. Box: 10404, Kathmandu Nepal

## Summary of report

WHO has identified lymphatic filariasis as a public health problem with its prevalence increasing all over the world. The two major species that cause lymphatic disease in humans are *Wuchereria bancrofti* and *Burgia malayi*.

An epidemiological survey was undertaken to determine the prevalence of disease due to lymphatic filariasis in Magaragadi VDC of Bardia districts of Nepal. The study population above 15 years of age was selected, and the immunochromatographic test (ICT Filariasis test) was used to screen for circulating filarial antigens (CFA). The prevalence of lymphatic filariasis from 500-sample population was 141 (28.2%).

Among 214 female mosquitoes caught, 2 were infective larvae of *Wuchereria bancrofti*, found from *Culex quinquefasciatus*.

In addition, information on people's knowledge, and behavior towards filariasis was also collected by means of structured questionnaire, presented and discussed in the study.

*Keywords:* lymphatic filariasis, *Wuchereria bancrofti*, epidemiology, and Nepal

## Introduction:

Human infection with *Wuchereria bancrofti* a debilitating parasitic disease known as lymphatic filariasis, is a major public health and socio-economic problem in many parts of the world. WHO has identified lymphatic filariasis as a public health problem with its prevalence increasing all over the world. The two major species that cause lymphatic disease in humans are *Wuchereria bancrofti* and *Burgia malayi*. At present, 1.1 billion people (20% of the world's population) in some 73 endemic countries located in tropical areas of the world (including Sub-Saharan Africa, Egypt, southern Asia, the western Pacific Islands, the northern coast of South and Central America, and the Caribbean), are at risk of infection mainly by *Wuchereria bancrofti*. Over one third of people with the disease living in the Indian sub-continent suffer from this disease. In India, currently 412 million people are exposed to the risk of infection, which reports 45 million infected. (WHO, 1998)

Throughout the world more than 120 million people are infected with *lymphatic filariasis* (about 107 million with *W.bancrofti* and 13 million with *B. malayi* or *B. timori*). On the basis of clinical view, 44 million currently suffering from one or more of the overt manifestations of the infection: lymphoedema and elephantiasis of the limbs or genitals, hydrocoele, chyluria, pneumonitis, or recurrent infections associated with damaged lymphatics. The remainder 76 million has infection (most often with microfilaria in their blood) with "preclinical" hidden damage of their lymphatic and renal system. This disease is thought to be caused primarily by adult worms, which live in the lymphatic vessels; the female worms release microfilariae which circulate in the peripheral blood are ingested by mosquitoes; thus, infected mosquitoes transmit the infection from person to person (Ottesen EA, 1985).

The infection of *lymphatic filariasis* in Nepal is one of the most neglected and hidden public health and socioeconomic problem (WHO, 2000). The aim of this project is to define the filariasis situation in selected district of Nepal. Using immunological test in circulating antigen and rapid diagnostic tool (ICT card test) with microfilaria slide examination will determine the prevalence of filariasis in the area. In addition to this study important information on knowledge, attitude and practices toward the filariasis was collected to determine the possible association with socioeconomic status of those



who are affected or have circulating antigens. This study will also determine the vector of diseases and its bionics in relation to transmission, which will be completed by April. The provision of single dose treatment covering more than 90% of selected areas will provide the strategy for the elimination of lymphatic filariasis disease and this will ultimately help to formulate future policies to elimination of filariasis in other endemic areas of Nepal. Only in physical crippling but also in serious psychosocial consequences. Furthermore, added to the direct economic costs of managing the acute and chronic manifestations of lymphatic filariasis, are the enormous indirect losses that follow from diminished productivity and incapacitation and which constitute a severe drain on local and national economies.

**General objective:**

To determine the filariasis situation and vector bionics in relation to transmission with elimination of *lymphatic filariasis* in an area of Bardia district as a model thus help future strategy to eliminate *lymphatic filariasis* in Nepal.

**Specific objectives**

- 1) To define the filariasis situation in selected area of Bardia district of Nepal.
- 2) To obtain data on knowledge, attitude and practices towards filariasis.
- 3) To determine the vector bionics in relation to human behavior.
- 4) To provide single dose treatment covering more than 90% of study population and to provide recommendation towards lymphatic filariasis control strategy in Nepal.

**Materials and methods:**

The study was conducted between October to December 2001 in Magaragadi VDC of Bardia district (Annex 1). For the post monsoon season and April and June for the pre monsoon season. Prior to research study in the VDC, our study team met with the VDC chairperson and local health worker. Starting with an introduction, explanation about the research study was also made. We asked for permission and also requested for their help. Next day the sample population was selected from every ward by the help of FCHV and VHW of the VDC. We then searched for people above the age of 15 years. The total sample size was 500.

The respondents were informed about the purpose of the study and requested to participate in the study. People who were convinced to participate in this study his/her consent was obtained, along with the consent the signature of a witness was also obtained. Their name, age, sex, occupation and level of education were recorded and they were asked a number of questions according to the questionnaire to obtain KAP on *Lymphatic filariasis*.

Blood sample of the participants were taken for the ICT test (Binax, Inc made ICT test kits in USA). The ICT filariasis whole blood a rapid immunochromatographic test for the qualitative detection of *Wuchereria bancrofti* antigen in whole blood. Two technicians worked together for the collection of blood for ICT.

The test was performed according to the manufacturer's instruction. One technician took out ICT card just before the test was performed and other technician explained the participant about finger prick and finger of the participant was wiped with spirit swab then wait till dry. The wiped finger was pricked with sterile lancet and capillary tube was filled up to the mark of 100ul. Used lancet was kept in a puncture proof container for the safe disposal. The participants were asked to press the pricked finger with sterile dry cotton. The blood from the capillary tube was then poured on the pink pad of the ICT card, watched till the pink area was wet and then it was closed with the other flap of the card. The card was pressed firmly along the entire area to the right of the window and the result was observed. The test was positive if the test has two lines (C and T) in the viewing window of the ICT card. People having positive of ICT card test were were chosen for the night blood collection. The participants for the night blood collection were being requested to participate. Used lancet cotton swabs and cover of the ICT was burnt at the end of the days work, remainder particles were buried in safe place.

The night blood was collected from 11pm to 2am by visiting the household. Blood smear on the slides were made and after drying identity number was written on the slides and kept in the slide box and brought to the center. Giemsa's stain was used for staining of slides and they were examined under the microscope using oil emersion.

Bottles for the urine were also distributed to all the participants and they were requested to bring urine sample. Urine samples were also brought to the center for the examination of chyluria and microfilaria.



Albendazole 1 tab to each participants were distributed and the participants who were ICT test positive DEC 100mg 3 tablets were given along with Albendazole in the first visit and in the second visit DEC 100mg 3tabs each to the ICT positive participants and Albendazole 1 tab each to all the people of Magaragadi VDC.

In the female population among the reproductive age (17-50years) group menstrual history was asked to find out pregnancy. Albendazole was not given to the pregnant women.

### **Entomological survey:**

For mosquitoes collection and entomological activities the study were performed covering 4 campsites. Using sucking tube method made morning and night collection of resting mosquitoes inside human dwelling.

Anopheles and Culex species were differentiated on the basis of their feeding and resting position (Anopheles inclined position and culex is horizontal position). The mosquitoes were dissected according to Mourya (2001) procedure as described briefly: All the live mosquitoes were anaesthetized and placed in a filter paper. The head of the mosquitoes were cut into two parts exactly from the middle of the thorax. Drops of 0.9% saline containing Triton-X 100 (Sigma Chemical Co., USA) were used to keep the cut-off portion of the thorax. The glands came out with ease without any difficulty, which was than immediately transferred to saline without Triton-X to avoid further exposure to the detergent. These were then examined under low power microscope for the presence of infected microfilariae larvae.

## **Results:**

### **Demographic socio characteristic of the study population:**

Socio-demographic characteristics of the people reveal the social and demographic status of the people in the society. At the same time the socio-demographic status attests on health and diseases including lymphatic filariasis of the people in a great deal. So the current study on lymphatic filariasis in Bardia district of Nepal, additional attempts had been made to obtain and analyze the socio-demographic data e.g., sex wise, caste/ethnicity, religion, occupation and educational status etc.



A total of 500 respondents (265) 53 % were the male respondents and (235) 47 % were the female. According to the age group 26-30 years of age group are the highest, (17.2%) (Table 1).

**Table 1. Demographic characteristics of the respondents**

Age group of the respondents	Male	Female	Total (%)
15-20	20	14	34(6.8)
21-25	39	40	79(15.8)
26-30	50	36	86(17.2)
31-35	41	29	70(14)
36-40	32	41	73(14.6)
41-45	20	17	37(7.4)
46-50	26	21	47(9.4)
Above 50	40	34	74(14.8)
Total	265	235	500(100)

**Ethnicity of the respondents:**

The highest number (38.8%) of respondents was Tharu, followed by Brahman /Chhetri (33.2%), Kami/Damai (16%) and the lowest (1.4%) were Muslim. Others represent the occupational castes like Dhobi, Badai, Darjee and Mochi which exist in terrain. Dhobi is the caste with occupation of washing cloths, Badai works as wood carpenter, Darjee is the tailor master by his caste and Mochi shoe maker according to his caste (Table 2).

**Table 2. Ethnic wise distribution of respondents**

Ethnicity	Number (%)
Brahman/Chhetri/Thakuri	166 (33.2)
Gurung/Tamang/Rai/Newar	44 (8.8)
Tharu/Majhi	194 (38.8)
Kami/Damai/Sarki	80 (16)
Muslim	7 (1.4)
Others	9 (1.8)

### Ethnic wise occupational distribution of respondents

In the study sample, the highest occupation 43% was farmers who were involved in agriculture and lowest 8% were from others (that represent retired, student, and work done by occupational castes like making shoes (Mochi), washing cloths (Dhobi) and also daily wages laborers). The distribution of ethnic wise occupational is presented in table 3.

**Table 3. Ethnic wise occupational distribution of respondents**

Ethnicity	Agriculture	Business	Service	Housewife	Others	Total
Brahman/Chhetri	45 (27%)	30 (18%)	33 (20%)	40 (24%)	18 (11%)	166 (100%)
Gurung/Tamang	17 (39%)	3 (7%)	9 (20%)	8 (18%)	7 (16%)	44 (100%)
Tharu/Majhi	125 (64%)	14 (7.2%)	10 (5.2%)	36 (19%)	9 (4.6%)	194 (100%)
Kami/Damai	26 (33%)	5 (6%)	9 (11%)	32 (40%)	8 (10%)	80 (100%)
Muslim	0 (0%)	5 (71%)	0 (0%)	2 (29%)	0 (0%)	7 (100%)
Others	3 (33.3%)	2 (22.%)	2 (22%)	2 (22%)	0 (0%)	9 (100%)
Total	216 (43%)	59 (12%)	63 (13%)	120 (24%)	42 (8%)	500 (100%)

### Educational status:

The educational status in the study population, 32.8% were illiterate, 15.8% were the literate and the highest education (9.2%) were from university education (Table 4)

**Table 4. Educational level of the study population:**

Education Level	Distribution
Illiterate	164 (32.8)
Literate	79 (15.8)
Class 1-5	73 (14.6)
Class 6-8	54 (10.8)
Class 9-10	84 (16.8)
University	46 (9.2)
Total	500 (100)

Note: Figures in parenthesis indicate percentages



**Religion and respondents:**

Nepal is officially a Hindu country. In Nepal other religion are Buddhist, Islamic, Kirati, Sikh, Lamaism, Animism, Bon, Christian etc but Central Bureau of statistics has mentioned only Hinduism, Buddhism and Islam. In the study population the highest number of population were Hindu (89.6%) (Table 5).

**Table 5. Religion of the sampled population**

Religion	Number (%)
Hindu	448(89.6)
Buddhist	40(8.0)
Islam	9 (1.8)
Others	3 (0.6)
Total	500 (100)

**Knowledge of Lymphatic filariasis**

In the study area, 33.2% of the respondents had knowledge about Lymphatic filariasis as depicted in table 6.

**Table 6. Knowledge of Lymphatic filariasis**

Knowledge	N= 500
Yes	166 (33.2%)
No	334(66.8%)

**Knowledge of Sign/Symptom of Filariasis:**

Only 166(33.2 percent) of sample population had knowledge on lymphatic filariasis. Among 166 of them 22% mentioned fever, 14% said headache whereas 3% of the respondents mentioned others (due to diarrhea, vomiting, burning micturation etc) as shown in table 7.

**Table 7. Knowledge of Sign/Symptom of Filaria:**

Sign/symptoms	Number (%)
Fever	36 (22.0)
Headache	23 (13.9)
Swelling of limbs	67 (40.3)
Swelling of lymph nodes	32 (19.2)
Milky urine	3 (1.8)
Others	5 (3.01)
Total	166 (100)

**Knowledge of prevention of filarial:**

79 respondents had knowledge on prevention of filarial. Many of them said that filarial can be prevented by using bed net, very few stated about environmental cleanliness (Table 8).

**Table 8. Knowledge of prevention of filarial:**

Knowledge	Number (%)
Yes	79 (48)
No	87 (52)
Total	166 (100)

**Knowledge on filarial diagnosis:**

The respondents were asked on diagnosis of filarial disease. 86% of the respondents had knowledge about the diagnosis of filarial disease. Among the 86 % most of the respondents said that the diagnosis is made by health persons (Doctor, Health assistants) and few of them expressed that blood should be examined for the diagnosis of filarial (Table 9).



**Table 9. Knowledge on diagnosis of filariasis:**

Knowledge	Number (%)
Yes	143 (86)
No	23 (14)
Total	166 (100)

**Treatment seeking behavior of the respondents**

In the current findings a total of 500 respondents, 37.8% of respondents used to consult modern medicine practitioner (Health Assistant, Doctor, Nurse and private practitioners), 41.8% consult traditional healer and 10% use herbal medicine for the treatment, whereas 3% of the respondent neither consulted medical treatment, traditional healer nor practiced self medication (Table 10)

**Table 10. Treatment seeking behavior of the respondents**

Type of treatment	Number of respondents (%)
Health institutions	189 (37.8)
Herbal medicines	50 (10.0)
Traditional healer	209 (41.8)
Worship God	20 (4.0)
Do nothing	15 (3.0)
Others	17 (3.4)
Total	500 (100)

**Distribution of diseases in the study population:**

The respondents were asked whether they were suffering from any kind of disease during study time. 159 (32%) of them mentioned that they were suffering from different types of diseases, where as 341 (68%) replied that they do not have any disease at present (Table 11). The respondents (159) who mentioned that they were suffering from any kind of diseases, 14.4% had headache, 18% had fever and sweating and 32% of respondents were suffering from diarrhea where as 8% complained others symptoms (Asthma, chest disease and gynecological problems (Table 12).

Table 11. Distribution of diseases in the sample population:

Disease	Number (%)
Yes	159 (32)
No	341 (68)
Total	500 (100)

Table 12. Distribution of diseases in the study population:

Diseases	Number (%)
Headache	23 (14.4)
Fever and sweating	29 (18.0)
Diarrhea	52 (32.7)
Burning micturition	11 (6.9)
Swelling	32 (20.)
Others	12 (8.0)
Total	159 (100).

**Use of bed-net:**

182 (36.4% people mentioned that they use bed-net.

**Antigenemia and parasitological findings:**

In the study area, 141 (28.2%) filariasis antigenemia were found to be positive. Among the 141 positive 81 was the male and 60 were the female as depicted in table 13.

Table 13. Results of ICT test, night blood examination and urinary deposit for MF:

No. Of blood samples	ICT-card tests Positive	Urine- MF No. (+Ve)	Night blood (Thick smear) No. (+ve)
500	141 (28.2%)	6/412 (1.45%)	14/72 (19.4%)

Among the 500 samples 412 urine samples were only collected as some mainly female hesitated to give urine samples due to shyness. In the total 412 urine samples 6 (1.45%) urine samples were found positive of microfilaria as shown in table 13.



### **Night blood collection and examination:**

Nocturnal periodicity of the microfilaria in the peripheral blood circulation during night time and is transmitted by night biting mosquitoes. The periodicity noted between 08-02.0 and the peak period in 24:00 mid night. From all ICT positive people, blood sample should also have been taken during night, but we could collect only 72 samples. The reason is due to current security and social situation, neither the people are allowed to enter inside the house at night nor they can come outside their house. Despite such situation, we have tried and collected 72 samples from the study area.

There were 14 (19.4%) microfilaria positive among 72 night blood samples (Table 13).

### **Entomological study on vectors:**

A total of 214 female mosquitoes were caught in the present study. Eight different species of mosquitoes were identified: 5 species of *Culex* (Cx.) and 3 species of *Anopheles* (An). 173 (81%) of these were culex species and 41 (19%) were anopheles species. Of the 106 female culex mosquitoes (*Cx. quinquefasciatus*, *Cx. tritaeniorhynchus*, *Cx. vishui*, *Cx. fuseocephalus* and *Cx. sinensis*) were dissected and 2 *Cx. quinquefasciatus* were found infective larvae of *W. bancrofti*. 26 anopheles mosquitoes were also dissected and found no infective filaria larvae. Due to political situation during study period we could not collect more entomological specimens, however, there is a need of further extensive study on vectors in the future.

### **Discussion and conclusions:**

Lymphatic filariasis has been identified as the second leading cause of permanent and long-term disability (WHO report, 1995). While acute episodic adenolymphangitis causes severe physical suffering, chronic disease such as lymphoedema and hydrocele cause permanent disfigurement and psychosocial problem (Pani *et al.*, 1995; Gyapong *et al.*, 1996; Molyneux *et al.*, 2000). They result in loss of work, productivity, direct and indirect economic loss and functional impairment (Srividya *et al.*, 2000; Haddix and Kestler, 2000; Esterre *et al.*, 2001). Consequently, the disease is a significant impediment to socio-economic progress of the endemic countries. Filariasis has been identified as a potentially eradicable disease (CDC, 1993; WHO, 1997) and the 50<sup>th</sup> World Health

Assembly 1997 passed a resolution that 'elimination of filariasis as a public health problem' should be considered a priority by member states (WHO, 1997). Delimitation of endemic localities is an essential prerequisite for planning control or elimination programmes. However, lymphatic filariasis is one of the few diseases for which information on the current global distribution and prevalence is not available.

The present study in Magaragadi VDC of Bardia districts of Nepal indicates that the prevalence of various forms of lymphatic filariasis still constitutes a major health problem of the community. A total of 500-study population 28.2% was found positivity of lymphatic filariasis. In Nepal, the prevalence (about 25%) of lymphatic filariasis and also detected *Culex (Cx.) quinquefasciatus* a vector in all the surveyed areas (Jung, 1973). Recently, a small study conducted by Pradhan *et al.*, (1998) in Gokarna VDC of Kathmandu valley reported that more than 12% of microfilaria infection in the community and 12 species of mosquitoes identified (*i.e.* *Anopheles (A.) nigerrimus*, *A. vagus*, *A. willmori*, *A. kessele*, *Cx. fuscocephala*, *Cx. gelidus*, *Cx. ptedovishmii*, *Cx. quinquefasciatus*, *Cx. sinensis*, *Cx. vishuni*, *Cx. whitmori* and *Cx. tritaeniorhynchus*). Among these species *Cx. quinquefasciatus* was found to be predominant. Spread in the geographical range and an increase in the prevalence of the disease are consequences of changes in the demographic characteristics of at risk countries. Crowded living conditions, housing quality, and inadequate waste disposal and sanitation facilities combined with seasonal migration between endemic rural areas and non-endemic urban areas contribute to the growing urbanization of this disease (Schweinfurth, 1983; Mak, 1986).

Lymphatic filariasis occurs in individuals of all ages and both sexes but prevails in those of low socioeconomic level (Ottesen *et al.*, 1997). As the chronic manifestations of lymphatic filariasis appear most frequently later in life, clinical and pathological investigation have focused on the adult population (Dreyer *et al.*, 2000; Taylor, 2000).

In the study districts, most of the people recognized the sign of lymphatic filariasis particularly elephantiasis by their social experience, but they had inadequate knowledge of recognition of adenolymphangitis (ADL), hydrocele, arm swelling and breast swelling as a disease of lymphatic filariasis. More than 50% respondents did not have knowledge on lymphatic filariasis. Regarding their treatment seeking behaviour in



the study districts, more than 37.8% people use modern medicine for the treatment and the rest treatment from traditional healer and self medication (Herbal).

Before applying any new strategies and methods of control in large-scale campaigns, reliable and practical techniques are needed to assess accurately and rapidly the distribution of infection, its level of endemicity, and the amount of associated disease. As lymphatic filariasis is a disease that is geographically widespread but often focal in distribution simple rapid methods for epidemiological survey the prevalence of infection are essential, such as the ICT-filariasis test.

In conclusion, this study will help us to obtain base line data of filariasis in the district and will contribute in the strategy to eliminate lymphatic filariasis programme in the future.

#### Acknowledgements

*This study was funded by a grant from the Nepal Health Research Council. I would like to thank our staff of Infectious and Tropical Disease Research and Prevention Centre/ Nepal: Mr. Biswa Kafle, Dr. Jeevan B. Sherchand, Dr. Shushil K. Shakya, Mrs. Bishnu Thakali, Mr. Ashok Chaudhary, Mr. Govinda Gurung, Mr. Jaya Singh Badal, and districts health officers, of Bardia district, VDCs chairman, FCHV and VHW for their help and cooperation.*

#### References:

- World Health Organization. Communicable Diseases Eradication and Elimination *Lymphatic filariasis* (CEE/FIL) 1998. WHO/FIL/99/197.
- Ottesen EA. Efficacy of diethylcarbamazine in eradicating infection with lymphatic dwelling filariae in humans. *Rev infect Dis.* 1985; **7**: 341-356.
- WHO. Preparing and Implementing a National Plan to Eliminate *Lymphatic Filariasis*. WHO/CDS/CPE/CEE/2000.15.
- Mourya DT. A Simple method for dissecting the salivary glands of mosquitoes. *Indian Journal of Malariology.* 2001; **38**: 43-44.
- WHO. World Health Report 1995, Geneva, World Health Organization, 1995.
- Pani SP, Yuvraj J, Vanamail P, Dhanda V, Grenfell BT and Bundy DAP. Episodic

- adenolymphangitis and lymphoedema in patients with bancroftian filariasis. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1995; **89**, 72-74.
- Gyapong JW, Adjei S, Gyapong M and Asamoah G. Rapid community diagnosis of lymphatic filariasis. *Acta Tropica*, 1996; **61**, 65-74.
- Molyneux DH, Neira M, Liese B and Heymann D. Elimination of lymphatic filariasis as a public health problem, *Lymphatic filariasis: setting the scene for elimination. Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2000; **94**, 589-591.
- Srividya A, Lall R, Ramaiah KD, Hoti SL, Pani SP and Das PK. Development of rapid assessment procedures for the delimitation of lymphatic filariasis-endemic areas. *Tropical Medicine and International Health*, 2000; **5**, 64-71.
- Haddix AC, Kestler A. Elimination of lymphatic filariasis as a public health problem. Lymphatic filariasis: economic aspects of the disease and programmes for its elimination. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2000; **94**, 592-593.
- Centre for Disease Control. Recommendations of the International Task Force for Disease Eradication. *Morbidity and Mortality Weekly Report*, 1993; **42**, 1-38.
- WHO. Lymphatic filariasis: *reasons for hope*. Geneva: 1997; World Health Organization. WHO/CTD/FIL/ 97.4.
- Jung RK. A brief study on the epidemiology of filariasis in Nepal. *Journal Nepal Medical Association*, 1973; **11**, 5-6.
- Pradhan SP, Shrestha I, Palikhey N and Uprety RP. Epidemiological study of *lymphatic filariasis* in Gokarna village development committee of Kathmandu valley during August and September, 1997. *Journal of Nepal Health Research Council*, 1998; **2**: 13-17.
- Schweinfurth U. Filarial disease in Ceylon: a geographical and historical analysis. *Ecology and Disease*, 1983; **2**: 309-319.
- Mak JW. Problems in filariasis control and the need for human behaviour and socio-economic research. *Southeast Asian Journal of Tropical Medicine and Public Health*, 1986; **17**, 479-485.
- Ottesen EA, Duke BOL, Karam M and Behbehani K. Strategies and tools for the control/elimination of lymphatic filariasis. *WHO Bulletin OMS* 1997; **75**: 491-503.
- Dreyer G, Noroes J, Figueredo-SJ and Piessens WF (2000). Pathogenesis of lymphatic disease in bancroftian filariasis. *Parasitology Today*, 2000; **16**: 544-548.
- Taylor MJ. Elimination of lymphatic filariasis as a public health problem: Wolbachia bacteria of filarial nematodes in the pathogenesis of disease and as a target for control. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2000; **94**, 596-598.





Figure 1. Map of Nepal: Location of study area

## Recommendation towards Lymphatic filariasis control strategy in Nepal

To fulfill the WHO global strategy, the control of lymphatic filariasis in Nepal a comprehensive approach should be initiated by following factors and stages:

### The parasite:

Elimination of the parasite may be done by treating the infected hosts with the appropriate drug (DEC 6mg/kg; Ivermectin 200mcg/kg; Albendazole 400mg). Even the best drugs cannot give a 100% cure rate. But this is very important and will decrease infection rates, intensity of infection and decrease morbidity and disease rates and will increase the health status and productivity of the community.

This may be done by mass treatment with standard dose, low dosage and medicated salt. But treatment alone is not sufficient because of the following problems. In a mass treatment it is extremely difficult to attain a 100% coverage. There are always people who will miss treatment for many different reasons (pregnant and lactating women, old and sick people, or people who are always during treatment). Moreover, even when a 100% coverage has been reached, population movement will cause positive persons to enter the treated area. These untreated people will become a source of infection. When the area becomes a transmigration area, these untreated positive people will be a source of infection for the new comers (Weil, 1999).

Although reinfection in lymphatic filariasis establish more slowly than other parasitic infections like malaria, Kalaazar etc, it will be cause of problem in the control (eradication) of lymphatic filariasis.

Moreover, in Nepal due to high prevalence of intestinal parasites mainly helminthiasis (Sherchand *et al.*, 1996,1997), the combination of albendazole 400 mg plus DEC 6 mg/kg as the preferred choice for community treatment of bancroftian filariasis because of its greater macrofilaricidal activity shown by the decline in filarial antigenaemia, its low cost and availability.

Combination therapy with the broad-spectrum anthelmintic albendazole provides an additional bonus in community treatment over DEC monotherapy because it provides



a benefit for many people who do not have filariasis by treating common intestinal helminthes.

#### **Disease control measures in reducing morbidity:**

Elephantiasis, lymphoedema and acute adenolymphangitis are the chronic clinical manifestations of lymphatic filarial disease. In most instances, a sense of hopelessness inhibited any active intervention; more aggressive approaches depended on surgery, but the sheer number of sufferers meant that only relatively few could benefit. Now, however, evidence from both careful clinical observations and immunohistological and bacteriological studies of tissue from lymphoedematous limbs, scrota, and breast indicates that bacterial and fungal super infections play an extremely important role in triggering the great majority of adenolymphangitis episodes in tissues whose lymphatic function had been compromised initially by damage from filarial infection (Gyapong *et al.*, 1996; Addis *et al.*, 1994; Witt *et al.*, 2001). Furthermore, the recurrent episodes themselves do additional damage to the lymphatic vessels and progressively exacerbate the lymphoedema and elephantiasis of the affected parts.

Simple hygiene measures, supplemented with antibiotics can have a profound effect in preventing debilitating and damaging episodes of adenolymphangitis and also promote repair and recovery of a considerable amount of the overt tissue damage caused by repeated filarial and bacterial infections. Effective hygiene measures are as follows:

- regular twice-daily washing of the affected parts with soap and water.
- raising the affected limb at night.
- regularly exercising the limb to promote lymph flow.
- keeping the nails clean.
- wearing shoes and
- using local antiseptic or antibiotic creams (or, in severe cases, systemic antibiotics) to treat small wound or abrasions.

Such measures help both to prevent the development of lymphatic disease in infected persons who are still asymptomatic and to halt its progression in those with a slight

degree of lymphatic damage who remain "in balance" until the affected part comes under pressure-stress, e.g. from prolonged physical work or standing. Even patients with advanced lymphoedema or elephantiasis can be helped by these simple methods, since lymphoscintigraphy studies have shown the presence of extensive collateral lymphatic channels which, if kept free from secondary infection, can serve to re-establish lymph flow (Ottesen *et al.*, 1997).

### **Elimination of the vector mosquitoes:**

Elimination of the vector control of mosquitoes in general may be carried out through: Control of the adult mosquitoes by using insecticides spraying at the biting and resting places. Therefore the correct places and timing should be determined. Spraying of the houses, while the transmission occurs in the field may cause a great economic loss. Elimination of man vector control is important by using repellent and screening of the houses when the transmission occurs indoors.

Control of the mosquito larvae may be done by using larvicides, predators and other enemies and pathogens (larvivorous fish, predators, bacteria and fungi), but the field application is still limited.

There are many problems in the above mentioned vector control.

Before the application of control measures, a thorough knowledge of the vector bionomics should be obtained. The biggest problem in using insecticides is the occurrence of insecticide resistance of the mosquito vector, usually caused by inappropriate application of the insecticide. The other measures as the use of larvicides, and enemies are not yet practical.

### **Control of the environment:**

In Lymphatic filariasis with reservoir host it will be extremely difficult to control the reservoir hosts, especially when the reservoir host consist of wild animals (*Presbytis cristatus*). Even domestic animals like cats it will be difficult to eliminate filariasis in these animals.



**Change of the environment:**

Change of the physical environment may cause elimination of the breeding places, resting and biting places (Michael *et al.*, 1996). Change of the environment can be done by making use of the breeding places (conversion of swamps into agricultural land or human habitation or conversion of wet rice field into dry rice field etc), cleaning resting places or using animals to change the vector from man biting into animal biting. Change of the socio economic environment. When the economic situation increases, people will change their habits, which will decrease man vector contact. Change of the socio-cultural environment is not the duty of the health sector and should be carried out in a multi sectoral approach and is a long-term programme but more sustainable.

**Multi sectoral approach:**

It is obvious that change of the environment is very important in eliminating filariasis. The change of the physical environment by clearing and converting the breeding, resting and biting places into useful land for agriculture and human habitation will eliminate the vector and chase away the animal reservoir and therefore eliminating the man vector contact.

This can only be done through a multi sectoral approach. Usually development of the area as changing swamps and forest areas into transmigration areas, will cause these changes. This is not the duty of the health sector, and filariasis may disappear. But without the involvement of the health sector, filariasis may increase or spread. Transfer of non immune population into an endemic area may cause enormous health consequences as may be seen in transmigration areas in Nepal and India, causing malaria epidemics and transfer filariasis into the new area. Therefore communication and coordination of all the sectors involved is necessary.

Hence, the fight to eliminate lymphatic filariasis is also a fight against poverty and social discrimination.





H.M.Gov. Redg. No.633-053-054

संक्रामक तथा रोकथाम केन्द्र  
Infectious & Tropical Disease Research & Prevention Centre, Nepal

1997

ITDRC / Nepal

Tripureswor, Trolley Bus Stop

Post Box No. 10404

Kathmandu, Nepal

Phone: 977-1-264115

E-mail: itdrc@healthnet.org.np

Photograph showing field study on Lymphatic filariasis.





**हात्ती पाइले रोग सम्बन्धी पथनावली:**

१. क्रम संख्या :  २. जिल्ला ३. मिति २०५८ ।  
 ४. गा.बि.स. ५. वडा नं.  
 ६. नाम : ७. उमेर ८. लिंग महिला । पुरुष  
 ९. व्यवसाय : १०. शिक्षा ११. धर्म
- |                  |            |        |
|------------------|------------|--------|
| कृषि             | निरक्षर    | हिन्दू |
| व्यापार          | साक्षर     | इस्लाम |
| नोकरी            | १-४ कक्षा  | बौद्ध  |
| दैनिक ज्यालादारी | ५-८ कक्षा  | अन्य   |
| मजदुरी           | ९-१० कक्षा |        |

१२. तपाईंलाई हात्ति पाइले रोग बारे थाहा छ ? सुन्नु भएको छ ? छ छैन ।
१३. हात्ति पाइले रोग लाग्दा के के हुन्छ ?
- (क) ज्वरो आउने (ख) हात खुट्टा सुनिने (ग) टाउको दुख्ने  
 (घ) अण्डा कोष । स्तन सुनिने (ड०) ग्रन्थीहरु सुनिने । (च) सेतो दूध जस्तो पिसाव आउने  
 (छ) अन्य :
१४. हाल तपाईंलाई कुनै रोग लागेको छ ? छ छैन ।
१५. यदि छ भने के के हुन्छ ?
- (क) टाउको दुख्ने (ख) जरो आउने (ग) पसिना आउने  
 (घ) दिसा लाने (ड०) पिसाब पोल्ने (च) शरिरको अंगहरु सुनिने (छ)अन्य
१६. सुनिएको भए कहाँ ?
१७. के हात्ति पाइले रोग रोकथाम गर्न सकिन्छ ? सकिन्छ । सकिदैन
१८. सकिन्छ भने कसरी ?
१९. हात्तिपाइले रोगको कसरी निदान गर्न सकिन्छ ? Yes NO
२०. यदि सकिन्छ भने कसरी ?
२१. तपाईंलाई रोग लाग्यो भने के गर्नु हुन्छ ?
- (क) केही गर्दिन (ख) स्वास्थ्य चौकी जान्छु (ग) जडीबुटी खान्छु  
 (घ) धामी भाक्ति गर्छु (ड०) पूजा गर्छु (च) अन्य :
२२. तपाईं कुलको उपयोग गर्नु हुन्छ कि हुन गर्दैन / गर्दिन, / थाहा छैन,
२३. गर्नु भने कति वटा कुल छ ?
२४. ICT test: Positive / Negative.

Signature

## Informed consent

I....., in return for the opportunity of participating as a subject in a research investigation on "Demonstration of strategy for the elimination of Lymphatic filariasis (W. Bancrofti) in Nepal", here by authorize the performance upon me of the following procedure:

I will be asked the questions by the interviewer on Lymphatic filariasis and my blood samples will be examined for the presence of microfilaria. I will receive the information about the result of the blood test and the medicine for the lymphatic filariasis, if my blood will be tested positive. I know that I would be provided anti-filarial drug.

This consent, I give voluntarily as the nature and purpose of the experimental procedure, the known dangers and the possible risks and complications have been fully explained me by the study team. I understand the potential benefits of the investigation to be the respondents, community people, and the nation.

I understand that as a participant, my rights will not be jeopardized that my privacy will be maintained and that the data obtained in this study will be used in a manner to maintain confidentially and personal rights.

I knowingly assume the risks involved and I am aware that I may withdraw my consent and discontinue participation at any time without penalty to myself.

Respondent's Name:..... Signature.....

**Witness:**

Name:..... Signature.....

Date.....



## Informed consent explanation form for persons who will be the participant:

**Title of the study:** "Demonstration of strategy for the elimination of lymphatic filariasis In Nepal."

**Participation information:** You are asked to participate in medical research study on filariasis. It is important that you understand the following general principles that will apply to all participants in the study:

1. Participation is entirely voluntary.
2. You may withdraw from this study at any time without penalty or loss of benefits.

**Purpose of the study:** Filariasis is a disease caused by the parasites that is transmitted during mosquito bites. After the transmission to human beings, the parasites invade and grow in the lymphatic vessels. If not diagnosed and treated promptly, filariasis can lead to severe disability due to the resulting lymphoedema and hydrocele. The recommended treatment is combination of anti-filarial drugs given once a year to all individuals living in endemic areas. The result of the study will provide to "Nepal Health Research Council" and "Ministry of Health" that will become very useful during filaria elimination program.

**Procedures to be followed:** The study technician will prick your finger for a drop of blood to find out if it has filariasis parasites. Your urine sample will be collected for examination of chyluria and microfilaria.

**Risks:** The risk from the participation of this study is minimal. Blood drawing may cause a slight pain and possibly a bruise at the site where blood is drawn.

**Benefits:** Your blood will be checked for filarial parasites. If you found to have filariasis, you will be treated free of charge.

**Assurance of confidentiality:** Your name and other records about you will remain confidential and will not appear when we present this study or publish its results.