

***Wuchereria bancrofti* Filariasis Study in Relation to Socio-medical Aspect**

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Abstract

Introduction	WHO has identified lymphatic filariasis as a public health problem with its prevalence increasing all over the world. The disease causes a disabling and socio-economic problem in many parts of the world.
Objective	The aim of this study was to define the filariasis situation in selected district of Nepal in relation to people's knowledge, and behavior towards filariasis.
Methods	The study was conducted in Magaragadi VDC of Bardia district 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 antigen (CFA). In addition, information on people's knowledge and behavior towards filariasis was also collected by means of structured questionnaire.
Results	The overall prevalence of lymphatic filariasis from a 500-sample population was 28.2%. During the study period altogether 214 female mosquitoes were caught, 2 were infective larvae of <i>Wuchereria bancrofti</i> , found from <i>Culex quinquefasciatus</i> . In the study district, most of the people recognized the sign of lymphatic filariasis with 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.
Conclusions	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.
Keywords	Lymphatic filariasis, <i>Wuchereria bancrofti</i> , Socio-medical study, 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 "pre-clinical" hidden damage of their lymphatic and renal system. This disease was thought to be caused primarily by adult worms, which live in the

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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 biologies in relation to transmission. 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 for 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.

The aim of this study was to define the filariasis situation and its vector in selected district of Nepal in relation to people's knowledge, and behavior towards filariasis.

Materials and Methods

The study was conducted between October to December 2001 in Magaragadi VDC of Bardia district (Annex 1). A total of 500 blood samples was collected from above the age of 15 years. 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 been obtained. Their name, age, sex, occupation and level of education was recorded and they were asked a number of questions according to the questionnaire to obtain KAP on *Lymphatic filariasis*.

Blood samples 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 was performed. Two technicians worked together for the collection of blood for ICT. The test was performed according to the manufacturer's instruction. People having positive ICT card test were chosen for the night blood collection. 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 was distributed to each participants 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 then 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 characteristics of the respondents

Out of a total of 500 respondents, (265) 53 % were the male respondents and (235) 47 % were the females. According to the age group 26-30 years of age group were the highest (17.2%) respondents (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 were tharus, followed by Brahman /Chhetris (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.

Ethnic wise occupational distribution of respondents

In the study sample, the highest occupation 43% was farmers who were involved in agriculture followed by housewife (24%); service (13%); Business (12%); and the 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).

Educational status

The educational status in the study population were 32.8% illiterate, 15.8% literate and the highest (9.2%) were from university. Whereas 14.6%, 10.8% and 16.8% were from class 1-5, class 6-8 and class 9-10 respectively.

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 (90.6%).

Knowledge of lymphatic filariasis

In the study area, 33.2% of the respondents had knowledge about Lymphatic filariasis.

Knowledge of sign/symptom of filariasis

Only 33.2 % of sample population had knowledge on lymphatic filariasis. Among 166 of them 22% mentioned fever, 14% said headache, 40.3% expressed swelling of limbs, 19.2% respondents mentioned swelling of lymph nodes, about 2% mentioned milky urine, whereas 3% of the respondents mentioned others (due to diarrhea, vomiting, burning micturation etc).

Knowledge of prevention of filarial

79 (48%) respondents had knowledge on prevention of filaria. Many of them said that filarial can be prevented by using bed net, very few stated about environmental cleanliness.

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 a few of them expressed that blood should be examined for the diagnosis of filaria.

Treatment seeking behavior of the respondents

In the current findings out of a total of 500 respondents, 37.8% of respondents used to consult modern medicine practitioner (Health Assistant, Doctor, Nurse and private practioners), 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.

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. 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 diarrhoea where as 8% complained other symptoms (Asthma, chest disease and gynecological problems).

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 were males and 60 were females as depicted in table 2.

Table 2. 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%)

Out of 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 2.

Night blood collection and examination

Nocturnal periodicity of the microfilaria in the peripheral blood circulation during nighttime 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 only 72 samples were collected. The reason is due to current security and social situation.

There were 14 (19.4%) microfilaria positive among 72 night blood samples (Table 2).

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 (*C. quinquefasciatus*, *C. tritaeniorhynchus*, *C. vishui*, *C. fuseocephalus* and *C. sinensis*) were dissected and in 2 *C. quinquefasciatus* were found infective larvae of *W. bancrofti*. 26 anopheles mosquitoes were also dissected and no infective filaria larvae was found.

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 50th 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% were 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. psedovishnui*, *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.

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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.

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