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Lymphatic Filariasis in Northern Part of Bangladesh

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Abstract: The present study was carried and compiled out in Nilphamari District to find out the prevalence and risk factors for filariasis. In the present study 258 infected persons out of 580 persons were included from 1112 families of 19 villages more 6 upazillas. In contact through questionnaires, from the District Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj were selected and from each union, three villagers were studied randomly. The current status of filariasis in Nilphamari Sadar and Paurasava was 3.76, Sayedpur 4.6, Domar 5.58, Dimla 6.79, Joldhaka 4.6 and Kishoreganj was 5.42%. It was found that 47.68% patients were males and 52.32% were females. This disease was more prevalent among the inhabitants in the age-group of 41-60 years. It was found that 47.5% patients were illiterate. The second highest infected people were educated upto primary and secondary levels (31.3 and 13.2% respectively). Illiteracy is one of the major social risk factors of this disease. It was also observed that only 19.38% patients used mosquito curtains while others can not afford these for every member of the family. Poverty is also a major risk factor for this disease transmission. Among the patients, about 41.1% were labourers and 23.1% were house-wives. Most of infected patients were very poor.

Key words: Filariasis, Endemic, Prevalence, Age-group, Sex, Low socio-economy

Introduction

Lymphatic filariasis (LF) is caused by a number of nematode parasites eg.- *Wuchereria bencrofti, Brugia malayi* and *Brugia timori* – and is transmitted by mosquitoes (WHO, 2002). Of the three parasite species, *W. bancrofti* accounts for nearly 90 percent of LF infections worldwide. *B. malayi* is prevalent only in some parts of South and Southeast Asia, and *B. timori* is found only in Indonesia. It is the world's second leading cause of permanent disability and a major impediment to socioeconomic development. Lymphatic filariasis is one of the most disfiguring diseases and a major cause of clinical morbidity. The disease is endemic in 83 countries with more than a billion people at risk of infection and some 120 million people clinically affected worldwide (GAELF, Global Alliance for the Elimination of Lymphatic Filariasis). In 1992, the WHO Expert Committee estimated that 78 million people were infected (WHO, 2002, Dreyer *et al.,* 1997). This estimate was later revised to 119 million, and current estimates indicate that LF is responsible for the loss of 4.6 million DALYs (Disability-adjusted life years) per year (Gyapong *et al.,* 2002).

In Bangladesh, the disease is present all over the country with the highest endemicity in northern part of the country. It is totally neglected for years. Filariasis Elimination Programme was started on 7th January 2001 as a new programme under Disease Control Unit of the Bangladesh government. The first MDA (Mass Drug Adminstration) was launched on 9th November 2001 at Panchagar District. Out of 147 million people, about 20 million people of the area have been suffering from the disease, most of which are children. The exact figures of filariasis in Bangladesh are not known, but it is endemic in 34 out of 64 districts of the country. There is high endemicity of Filariasis in Nilphamari, Thakurgaon, Dinajpur, Rangpur, Panchagar, Kurigram, Gaibandha, Chapai Nowabgonj, 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 diagnosed by microfilaria survey. Clinical cases are reported from 51 districts (WHO, 2002).

Filariasis is the highest disease burden on any tropical disease except malaria. This disease takes a large toll on individuals both through physical disability and social stigmatization. This disease is manifested by enlargement of the limbs, scrotum, and other extremities is the result of long-standing infection (Babu *et al.,* 2002). As worms block the lymph vessels, edema occurs, and in times the deposition of

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connective tissue cells and fibers contribute to elephantiasis. Forty million people have clinical manifestations of the disease (including swelling of limbs, hydrocele, and acute adenolymphangitis), 120 million are infected in 80 countries and one billions live are at risk of infection, (Ottension, 2000). Nearly 60% of the LF problem is in the Southeast Asia region; 30% in the African region; 5% in the Eastern Mediterranean region; 4% in the Western Pacific region and 1% in the American region.

Several species of *Culex, Anopheles*, *Aedes*, and *Mansonia* mosquitoes are involved in the transmission of LF. *C. quinquefasciatus* is the major vector in Africa, Asia, and South America and transmits nocturnally periodic *W. bancrofti*. Filariasis caused by *W. bancrofti* has generally been considered an urban infection on the Indian sub-continent, as the breeding conditions preferred by the usual vector, *Culex pipiens* antigens (*Culex quinquefasciatus*) are to be found more frequently in towns. Bancroftian filariasis has however been found in rural areas especially in northern India. About 90% of the population of Nilphamari district (Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj) lives in a rural environment and investigations on filariasis in this setting were undertaken (Rahman *et al.,* 2008).

The utility of predator fish as destroyers of mosquito larvae with special reference to their habits and habitat under same ecological conditions. Southwall (1920) found the *Channa* as a useful mosquito larvivore in East India. Russel and Rao (1940) stated the mosquito control by fish can give clear cut result only in certain restricted types of breeding places such as wells, tanks, pools or in any place where vegetation gives little protection to mosquito larvae (Mulla *et al.,* 1975). A number of fishes and insects has been tested in the laboratory to evaluate their predatory role against mosquito larvae (Chakraverthy *et al*., 1976). Resistance to DDT, Malathion and other organophosphate insecticides by the mosquito of Dhaka city has already been reported (Ottensen, 1997). Use of chemical insecticides for mosquito control is expensive and liable to develop resistance against those insecticides. Mosquitoes of Dhaka city has already developed resistance against some insecticides. On the other hand mosquito control by using biological agents is non-hazardous and could be less expensive if applied judiciously.

A significant number of research works have been done for a long time and is still going on both international and national level. Bary *et al.* (1971) surveyed Thakurgaon to determine the prevalence and distribution of human filariasis. Emaciation of microfilariae and clinical manifestation was obtained from peripheral blood smears and physical examination of 9,624 inhabitants. The clinical manifestation rate of 10 % consisted primarily of genital hydrocoel and elephantiasis in the scrotum in the male population and lymphoderm and elephantiasis of the limbs were observed in both sexes.

He also investigated filariasis in entire Thakurgaon and revealed a microfilaria rate was 16.8% and a disease rate of 10.1%, the neighboring districts like Rangpur and Pabna, as well as Barisal in the south also had relatively high prevalence and positive cases were found throughout the Chittagaong Hill Tracts. A highly endemic focus was found among tribal people in the Matamuhuri River Valley. This emphasized the focal nature of filariasis infection, which seems to be true for Bangladesh. Only a few instances of microfilariae were found in Dhaka city. Positive cases were found in the two extreme corners of Bangladesh, Tetulia in the Northwest and Teknuf in the Southeast.

An study in the epidemic prone area like Thakurgaon of Bangladesh has been done and 4.20% of the people were found infected by filariasis. Among the respondents 55.67% were illiterate. The sanitation was very poor and low income groups were more affected and females were more susceptible than males (Rahman *et al*., 2008). They also reported that, it is creating a major health problem in these areas and perhaps spreading silently to the other adjacent districts of Bangladesh. The objective of the present work was to find out the prevalence and epidemiological aspects of filariasis especially in the northern part (Nilphamari District) of Bangladesh.

Materials and Methods

The study was carried out from door to door through direct observations and recording in the questionnaire. The research strategy provides the basis for a full range of social, economic and environmental factors in the development of an integrated disease control program. In order to achieve the aim, research was conducted within each domain of interest, which in this case includes the community, provider and

program/policy domains. These include village/ community members, upazilla health officers. At the national level, the opinions of the managers and staff of specific disease control programs are also gathered in semi-structured interviews focusing on integration of their programs.

Study area: The rural areas named Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj upazilla of Nilphamari district were selected for the study. These are all epidemic prone areas in the Nilphamari District. The rural areas namely the villages were Topamari, Ramnagar, Itakhola of Nilphamari Sadar and Paurasava, Kamarpukur, Belpukur and Bangalipur of Sayedpur, Bamunia, Jorabari and Borogari of Domar Thana; Bolapara, Chaknai and Goyabari of Dimla, Kathali, Dharmapal and Mirganj of Joldhaka, Nitai, Borovita and Putimari of Kishoreganj in Nilphamari District were selected for the present study.

Duration of study: The study was conducted between January, 2009 to December, 2009.

Results and Discussion

The present investigation was carried out among the rural people of the villages of six different Unions of Nilphamari District. These are Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj. From each Union, three villages were selected randomly.

Current status of the disease filariasis: In Nilphamari Sadar and Paurasava union, the investigation was carried out in Topamari, Ramnagar and Itakhola village. In Topamari, it was found that the rate of infection was 3.78% (Table 1) and similarly, in Ramnagar, the infection was 3.32% (Table 1). In Itakhola, the rate of infection was 4.2%. It was found that on an average 3.76% people were infected by filariasis among the three villages of this Union (Table 1).

In Kamarpukur the rate of infection was 5.48%. In Domar Union, within three different villages, in Bamunia 7.21%, in Jorabari 5.7%, while in Borogari, the infestation was 3.83%. It was found that averagely 5.58% people were infected in the three villages of this Union (Table 1).

In Dharmapal, among families which posses total 281 family members. The total rate of infection was 3.7%. In Mirganj, The total rate of infection was 5.7%. The rate of infection was higher (7.1%) than other Union. In Borovita village, the rate of infection was 3.8% (Table 1).

Distribution of infected person according to sex:

Nilphamari Sadar Paurasava: The ratio of male and female of infected person was about 1:1. In Itakhola it was found that 48.49% infected persons were male and 51.51% female. Sayedpur: 46.37% infected persons were male and 53.63% female. Domar: The prevalence of male patients were 49.50% and female 50.50%. Dimla: It was observed that 48.22% infected persons were male and 51.78% were female. Joldhaka: 43.48% infected persons were male and 56.52% were female. Kishoreganj: The prevalence of infected male was 47.72% and 52.28% were female (Table 2).

From the present study it was evident that females were more susceptible for filariasis than males. Most of the people of that region are very poor and have no electricity and cannot afford mosquito nets for every family members.

Age distribution of the infected persons:

Nilphamari Sadar and Paurasava: In Topamari village the highest infestation was found under the age group of 41-60 years. In Ramnagar village the highest prevalence found in the age group of 21-40 years; in Itakhola majority of the infected persons were under the age group of 41-60 years. **Sayedpur:** In Kamarpukur village the highest infestation was under the age group of 21-40 years. **Domar:** In Bamunia and in Jorabari, the most of the infected persons were under the age group of 21-40 year. **Dimla:** In Bolapara the highest infectation was under the age group of 21-40 years. .**Joldhaka:** In the village Kathali most of the infected persons were under the age group of 41-60 years. **Kishoreganj:** In Nitai and Borovita, highest infestation was under the age group of 21-40 & 41-60 years respectively (Table 3).

Endemicity of lymphatic filariasis in Bangladesh: Microfilaria infection and clinical manifestation rates increased with ascending age group. An endemicity rate of 24.2% and a medium microfilaria density of 14.0 microfilariae per $20m^3$ of peripheral blood indicated a moderately endemic focus of filariasis that serves as a reservoir of infection and constitutes a significant public health problem in Thakurgaon. The District Health Authority has not taken any step to control the alarming situation of the disease in

Kishoreganj and Syedpur of Nilphamari District. There is a filaria endemic area in Mirpur-12 under Kurmitola camp of Dhaka city. Rural to urban migration and increasing urbanization facilitate spreading of filariasis. The published information show that filariasis is present in Bangladesh with different endemicity and the highest prevalence is found in Northern Districts of Bangladesh. Effective control measures are yet to be taken there. Factors responsible for poor control of filariasis include poor facilities for early detection by blood examinations, lack of knowledge among the people about the disease superstition, wrong beliefs about the disease etc. (Khanum *et al*., 2012).

According to programme coverage in WHO LF database, 34 Districts, are endemic for filariasis in Bangladesh (WHO, 2007). Wolf and Aslam (1972) worked on night blood microfilaria in all 17 of East Pakistan revealed Dinajpur District, in the Northwest corner of the province to have the highest prevalence of filariasis. Fourteen percent of the people examined in the institutions and villages throughout the District were found to be blood positive for *Wuchereria bancrofti* and disease manifestation primarily hydroceles were also common. Hydrocele has been recognized as a common on occurrence in the District for over a hundred years, and doctors at the local hospitals frequently perform surgical repairs of hydrocele. Surveys were made in 39 institutions, consists of 27 hospitals and 12 students hostels (WHO, 2004).

Successful control of lymphatic filariasis requires a package of interventions, many of which depend on their compatibility with local socio-cultural factors to be meaningful and active community involvement (Ottesen, 2000). An indispensable element among interventions is health education. It is necessary thorough health education to advance a broader biomedical knowledge on transmission, disease etiology and treatment (Mulla *et al.*, 1975). A study in Ghana has showed that most houses in a LF endemic area had mud walls and thatched roofs (Gyapong and Gyapong, 1996) and the study also supports that due to the high illiteracy and poverty, peoples do not use bed nets for sleeping. The poor environmental conditions of the houses provide room for mosquito breeding. This is also consistence with the present study where most patients did not use bed nets and bushes were present near the dwelling places of most respondents. Gyapong *et al.* (2002) studied the socio-economic impact of lymphatic filariasis in a rural community in northern Ghana. By 2005, all nine endemic countries eg., Bangladesh, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-L'Este had started implementing mass chemotherapy, aimed at eliminating lymphatic filariasis as a public health problem by 2020 (GAELF).

Table 1. Current status of 'filariasis' in the study areas (Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka & Kishoreganj)

Zone	V villages	Total families	Total members	No. of affected person	Percentage(%)	Average
Nilphamari	Topamari	68	311	12	3.78	
Sadar and	Ramnagar	53	247	8	3-3.32	**3.76%**
Paurasava	Itakhola	75	361	15	4.2	
	Kamarpukur	59	279	15	5.48	
Sayedpur	Belpukur	67	324	12	3.82	**4.6%**
	Bangalipur	65	315	16	4.7	
	Bamunia	46	203	14	7.21	
Domar	Jorabari	76	342	18	5.7	**5.58%**
	Borogari	57	290	11	3.83	
	Bolapara	80	387	22	5.68	
Dimla	Chaknai	47	132	9	6.81	**6.79%**
	Goyabari	65	299	24	7.9	
	Kathali	43	203	8	4.6	
Joldhaka	Dharmapal	63	281	9	3.7	**4.6%**
	Mirganj	75	354	21	5.7	
	Nitai	56	293	19	7.1	
Kishoreganj	Borovita	74	355	14	3.8	**5.42%**
	Putimari	43	204	11	5.38	
Total	Nilphamari district	1112	5180	258	4.98	

Table 2. Distribution of respondents according to age groups

Zone	Villages	Age group				Total
		0-20	21-40	41-60	60+	
Nilphamari Sadar and Paurasava	Topamari	3	2	5	2	12
	Ramnagar	2	3	2	1	8
	Itakhola	2	4	5	4	15
	Total	7	9	12	7	35
	Percentage	20%	25.7%	34.2%	0-20.1%	100%
Sayedpur	Kamarpukur	2	5	4	4	15
	Belpukur	2	3	5	2	12
	Bangalipur	3	5	5	3	16
	Total	7	13	14	9	43
	Percentage	16.4%	30.2%	32.5%	20.9%	100%
Domar	Bamunia	2	5	4	3	14
	Jorabari	4	6	5	3	18
	Borogari	2	3	4	2	11
	Total	8	14	13	8	43
	Percentage	18.6%	32.6%	30.2%	8.6%	100%
Dimla	Bolapara	4	7	6	5	22
	Chaknai	2	3	3	1	9
	Goyabari	6	9	6	3	24
	Total	12	19	15	9	55
	Percentage	22%	34.5%	2-7.2%	16.3%	100%
Joldhaka	Kathali	1	2	3	2	8
	Dharmapal	2	3	3	1	9
	Mirganj	4	6	7	4	21
	Total	7	11	13	7	38
	Percentage	1-8.4%	28.9%	3-4.21%	18.6%	100%
Kishoreganj	Nitai	4	6	6	3	19
	Borovita	2	5	4	3	14
	Putimari	2	3	4	2	11
	Total	8	14	14	8	44
	Percentage	1-8.2%	31.8%	31.8%	18.2%	100%
Nilphamari district	Total	49	80	81	48	258
	Percentage	1-8.93%	31.05%	31.4%	18.78%	100%

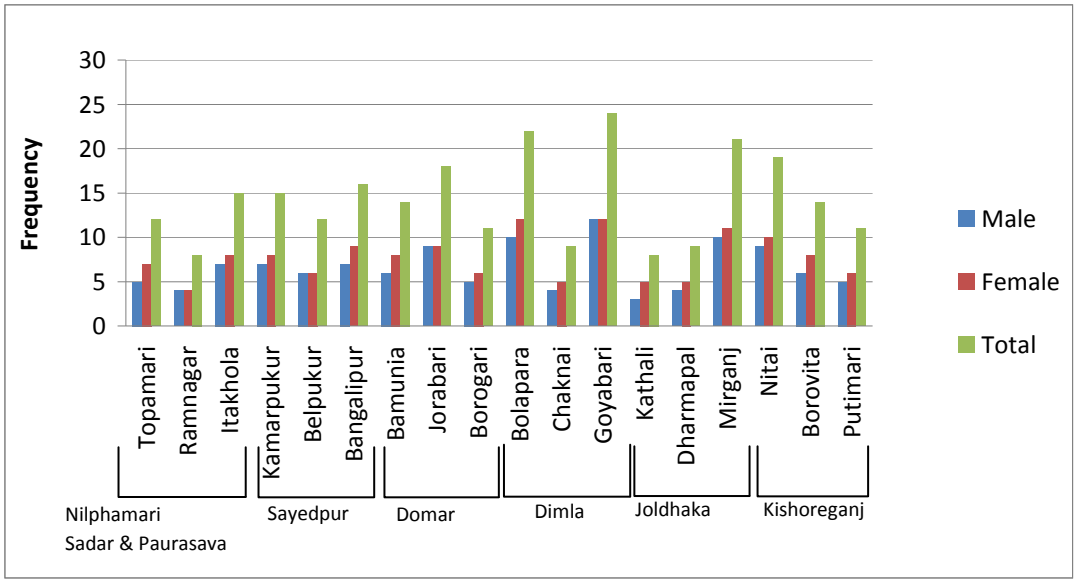

Fig. 1. Distribution of response according to sex of the patients.

Patients infected with *Wuchereria bencrofti* causing lymphatic filariasis.

Patients with chronoc stages of lymphatic filariasis and secondary infection and ulceration on skin of effected areas.

Conclusion

Much attention has to be taken to prevent disability and control morbidity associated with lymphatic filariasis. Existing clinics and upazilla health complexes use so far on temporary basis method to treat clinical filariasis and impart health education on prevention of secondary infection. Training programmes on hydrocoelectomy have been held in some districts of Bangladesh with Japanese assistance and hospital has been set up as an active center for the treatment of lymphoedema and hydrocoele. However, much more concentrated efforts are to be given in this line.

References

Babu, B.V., Nayak, A.N., Acharya, A.S., Jangid, P.K. & Mallick, G. 2002**.** The economic loss due to treatment costs and work loss to individuals with chronic lymphatic filariasis in rural communities of Orissa, India. *Acta Trop.*, **82**(1): 31-38**.**

Babu, B.V. & Kar. S.K. 2004. Coverage, compliance and some operational issues of mass drug administration during the programme to eliminate lymphatic filariasis in Orissa, India. *Trop. Med. Int. Health*. **9**: 702-9

Bary, C., Ahmed, A. & Khan A.Q. 1971**.** Endemic filariasis in Thakurgaon, East Pakistan. *Am J Trop Med Hyg*. **20**: 592-597.

Chakraverty, R.K., Sen, T., Dutta, A., Hair, N.R.V. & Rao, C.K. 1976. notes on some screening of some indegienous fishes on predatory activity against *C. quinquefasciatus* larvae. *J. com. Dis*, **8**: 84-85

Dreyer, G, Noroes, I, Roach, A. & Addiss, D.G. 1997. The silent burden of sexual disability associated with lymphatic filariasis. *Acta Tropica.* **63:** 57-60**.**

Gyapong, J.O., Kumarswami, V., Biswas, G. & Ottensen, E.A. 2002. Treatment strategies underpinning the global program to eliminate Lymphatic Filariasis. *Expert Opinion on Pharmacotherapy*, **6:** 179-200**.**

Gyapong, J.O. & Gyapong, M. 1996. The epidemiology of acute adenolymphangitis due to lymphatic filariasis in Northern Ghana. *Am J Trop Med Hyg.* **54**(6): 591-595**.**

Khanum, H., Sarker, S.S.N.N., Hossain, M.M.. Musa S. & Farhana, R. 2012. Occurrence of hydrocoele in Thakurgaon,an epidemic prone area of Bangladesh. *J. Nat. History (*India). **8**(1): 11-17.

Mulla, M.S., Darwazeh, H.A. & Major, G. 1975. Field efficacy of some promising mosquito larvicides and their effect on non-target organisms. *Mosq. News*. **35:** 179-185**.**

Ottesen, E.A. 2000. The global programme to eliminate lymphatic filariasis. *Trop. Med. Int. Health*, **5**(9): 591-594**.**

Ottensen, E.A., Duke, B.O., Karam, M. & Behbani. K. 1997. Strategies and tools for the control/elimination of lymphatic Filariasis. Bull. WHO. **75**(6): 491-503.

Rahman, A.B.M., Khanum, H., Chowdhury, M. & Farhana, R. 2008. Current status and endemicity of filariasis in Thakurgaon, northern part of Bangladesh. *Bangladesh J. Zool*. **36**(1): 111-116

Ramaiah, K.D. & Das P.K. 2004. "Mass Drug Administration to Eliminate Lymphatic Filariasis in India." *Trends in Parasitol.* **20**(11): 499–502**.**

Russel, P.P. & Rao, T.R. 1940. On habitat and association of species of anophelene larvae in south-eastern Madras. *J. Malay. Inst. India.* **3**: 153-178.

Southwell, T. 1920. Fish and mosquito larvae in Bengal Bihar and Orrissa, India. *Ann. Trop. Med. And Parasitol. Liverpool,* **14***:* 181-186.

WHO 1992. Lymphatic filariasis: the disease and its control. *Fifth report, expert committee on filariasis*, Geneva. 71**PP.**

WHO 2002. Lymphatic Filariasis: The Disease and Its Control. Technical Report. **71**: 21-323**.**

WHO 2004: Lymphatic filariasis: progress of disability prevention activities. *Weekly epidemiological record*, **79:** 417-24**.**

WHO 2007. Global Programme to eliminate Lymphatic Filariasis. Ann. Rep. Filariasis. **28**: 7-8.

Wolf, M.S. & Khan, M.A. 1972. Filariasis in East Pakistan. *Trans R Soc Trap Med Hyg*; **65:** 63-69**.**

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