

## LYMPHATIC FILARIASIS IN NILPHAMARI DISTRICT: AN ENDEMIC AREA IN BANGLADESH

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**Abstract:** The present study was carried out in Nilphamari district, Filaria Hospital of Nilphamari district and from randomly selected three villages of Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj. The objectives of this study were to find out the status of lymphatic filariasis (LF) in Nilphamari district: An endemic area for LF in Bangladesh. The investigation was carried out among the inhabitants of the villages and the outdoor patients of Filaria Hospital in Nilphamari through a formatted questionnaire. The current status of this disease was 4.43% in Nilphamari Sadar and 3.25% in Paurasava, 4.10% in Sayedpur and similarly 4.82% in Domar, 5.86% in Dimla, 3.85% in Joldhaka and 4.70% in Kishoreganj. In Nilphamari district, it was found that male were more susceptible (58.84%) than female (41.16%). 76.22% male patients had hydrocoele and the disease showed its highest prevalence (41.16%) in the age group of 41-60 years.

**Key words:** Lymphatic filariasis, prevalence, endemic area

### INTRODUCTION

Mosquitoes are the only known vectors of lymphatic filariasis. *Culex quinquefasciatus* has been recognized as the vector of nocturnally periodic *W. bancrofti*. In African region, two freshwater breeding mosquitoes of *Anopheles gambia complex*, namely *Anopheles arbinenses* and *Anopheles gambia* are known as the filarial vectors. But in Libaria, *Anopheles nile* and *Anopheles hancock* have been incriminated as vector of filariasis. *Anopheles danotities* and *Anopheles dirus* have been found to be responsible for filariasis in western Pacific and in Southeast Asia, respectively. In Thailand, *Aedes niveus* and *Aedes poecilus* in Philippines have been incriminated as the vectors of *Brugia malayi*. *Anopheles barbirostris* has been reported as the vector of *Brugia timori* infection in Timor, Indonesia. *Mansonia* mosquitoes, *Mansonia annulifera* and *Mansonia uniformis* are vectors of *Brugian filariasis* in India (WHO 1998). *Culex quinquefasciatus* was found to be the only vector for bancroftian filariasis of nocturnal periodicity in Bangladesh (Khan and Wolfe 1972, Ahmed 1986).

It is estimated that 250 million people throughout the world are infected with *Wuchereria bancrofti* and *Brugia malayi* infections. *W. bancrofti* is endemic form in most of the tropical and subtropical regions of Asia, Africa, Latin

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Sri Lanka, Maldives and Pacific islands, while *B. malayi* are seen in most of the countries of South-east Asia including India, Indonesia, Malaysia, Singapore, Central China, Thailand, Cambodia, Laos and South Korea and also in African sub-continent viz. Egypt, Gambia, Ghana, Nigeria, Guinea, Rhodesia and Nyasaland and Comoro island (census of Bangladesh - population and housing 2011, WHO 2014).

Filariasis is a severely debilitating and stigmatizing disease caused by the parasitic roundworm of Filarioidea type called *Wuchereria bancrofti* (CDCP 2010), classic causative agents of this disease in humans and is transmitted by mosquitoes. It is primarily a disease of the poor in tropical countries and is caused by three species of nematodes which are transmitted to humans by several genera of mosquitoes (Molyneux and Zagaria 2002). *Culex* sp. mosquitoes are the main vectors for transmission in Bangladesh. This disease is manifested by enlargement of the limbs, scrotum, and other extremities, is not the initial effect but the result of long-standing infection (Khanum et al. 2013). As worms block the lymph vessels, edema occurs, and in times the deposition of connective tissue cells and fibers contribute to lymphatic filariasis (LF).

The most spectacular symptom of LF is thickening of the skin and underlying tissues - which was the first disease discovered to be transmitted by mosquito bites (WHO 2013). LF is one the major leading causes of disability worldwide with the estimation of the global burden of the disease to be 5,644,000 Disability Adjusted Life Years (DALYs) (WHO 2004). This is the highest disease burden of any tropical disease except malaria. Lymphatic filariasis is one of the leading causes of physical deformation and disability in the world. Forty million people have visible ailments, 120 million are infected in 80 countries and one billion live in risk of infection (Ottenson 2000). In 2000 over 120 million people were infected, with about 40 million disfigured and incapacitated by the disease (WHO 2017).

The Filaria Hospital at Syedpur was established in 2001 and located in Syedpur, Nilphamari district; a part of highly endemic northern region. It has started functioning from 1 January, 2003. The hospital is the only specialized hospital of this kind in Bangladesh and globally. The Filaria Hospital has been providing morbidity control services to filariasis patients to reduce their sufferings. As a part of this activity the hospital has been conducting training to Government Health and Paramedical Health staff, NGOs, rural medical practitioners, volunteers etc. The hospital is able to provide support and train thousands of affected people every year.

The objectives of the work were: (i) To determine the prevalence of filariasis in six unions of Nilphamari district (Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj) in relation to age and sex of the patients and (ii) to observe the sign and symptoms of filariasis among the patients.

### **MATERIAL AND METHODS**

The study was conducted in Filaria Hospital of Savar, Filaria Hospital of Nilphamari, and other Thana Hospitals of Nilphamari and the rural areas namely Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj thana of Nilphamari district. These are epidemic prone areas in the Nilphamari district. The study design is a multistage sampling design with stages of selection at the following levels: district, Thana, road, hospitals and village. The study was done during the period of January, 2012 to December, 2012. The present study plan was prepared which was followed strictly and those are - preparation of a map of the study area, identification of the hospitals, meeting with Civil Surgeon and health officers of the study area, local leaders for cooperation and coordination, collection of relevant information of the study area and hospitals, and environment, etc.

In the present study, total 16731 families with 91945 members were investigated in six unions (Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj) from Nilphamari district. Data were collected through observation and questionnaire filling up. The schedule for data collection consisted of respondent's demographic socio-economic information, variables such as age, sex, educational qualification, economic condition, knowledge about disease, their attitude and practice towards the prevention and control of the disease. Finally tabulated data were analyzed and interpreted through the computer using the software, SPSS, MS Excel and MS Word.

### **RESULTS AND DISCUSSION**

A total of 3841 persons (4.43%) were found infected with filaria among the six unions. The highest percentage of infection was in Dimla (5.86 %) and lowest in Nilphamari Sadar (3.25%) (Table 1). Wolf and Khan (1972) surveyed for night blood microfilaria in 17 districts (East Pakistan) and revealed that Dinajpur district, in the northwest corner of the province had highest prevalence of filariasis. Fourteen per cent of the people were examined in the institutions and villages throughout the district and found blood positive for *Wuchereria bancrofti* and hydrocele has been recognized as a common occurrence in the district for over a hundred years. A survey on filariasis in the entire Thakurgaon district

was carried out by Bary *et al.* (1971) and revealed a microfilaria rate of 16.8% and a disease rate of 10.1%. Survey carried out by NIPSOM in Thakurgaon district found that the microfilaria rate was 27.13 % (73 positive out of 269 blood samples) (Ahmed 1986). In 2009, Ahmed also studied the endemic areas of northern part of Bangladesh which includes some unions of Nilphamari district.

According to Saha and Mohanta (2011), 33.39% were male and 66.41% were female out of 2,32,005 populations of Kisorgonj and Sayedpur Thana under Nilphamari district. In the present study, 58.84% were male and 41.16% were female out of population (91945) of Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj from Nilphamari district (Table 2).

**Table 1. Prevalence of filariasis in the people of the study area (Nilphamari Sadar and Paurasava, Sayedpur, Domar, Dimla, Joldhaka and Kishoreganj)**

Union	Total families surveyed	Total members	No. of infected person	Prevalence (%)
Nilphamari Sadar	6490	35662	1159	3.25
Sayedpur	803	4415	181	4.10
Domar	1268	6971	336	4.82
Dimla	2804	15410	903	5.86
Joldhaka	2652	14572	561	3.85
Kishoregang	2714	14915	701	4.70
Total in Nilphamari	16731	91945	3841	4.43

**Table 2. Prevalence of filarial patients according to sex in Nilphamari district**

Union	Male % (number)	Female % (number)	Total % (number)
Domar	64 (2 15)	36 (121)	100 (336)
Kishoregang	56.78 (398)	43.22 (303)	100 (701)
Nilphamari Sadar	48.23 (559)	52.77 (600)	100 (11 59)
Sayedpur	56.90 (103)	43.1 (78)	100 (181)
Joldhaka	79.68 (447)	20.32 (114)	100 (561)
Dimla	59.58 (538)	40.42 (365)	100 (903)
Prevalence % (number) in Nilphamari	58.84 (2260)	41.16 (1581)	100 (3841)

In the present investigation, highest percentage found in 41 - 60 age group (34.9) (Table 3) and lowest in 0 - 20 age group (17.78) (Table 3). According to Islam (2004), the highest percentage of infected persons was under the age group 31-40 years (30.69). Hawlader (2007) found the highest percentage (43.18) was from the age group 41 - 60 years and which is similar with the

information by Saha and Mohanta (2011) stated that 6 - 15 years, showed the lowest rate (1.92) of infection.

In 2007, Hawlader also worked on lymphatic filariasis in Pirganj, Pirgacha, Taraganj and Gangachara unions of Rangpur district. In 2011, Saha and Mohanta studied Kisorgonj and Sayedpur thana under Nilphamari district. According to them, average 1.34% people were infected with filariasis out of 2,32,005 populations in those area. The highest percentage of infected unions was Alam Biditor (1.35) under Kisorgonj thana and lowest infected union was Khatamadhupur (0.21) under Sayedpur thana.

**Table 3. Prevalence of patients in different age groups**

Union/Thana	Age group (years)			
	0 - 20	21 - 40	41 - 60	60 +
Domar	20% (67)	30% (101)	34% (114)	16% (54)
Kishoregang	17% (119)	32% (224)	33% (232)	18% (126)
Nilphamari Sadar	7% (197)	24% (278)	39% (452)	20% (232)
Sayedpur	15% (27)	28% (51)	38% (69)	19% (34)
Joldhaka	18% (101)	27% (151)	36% (202)	19% (107)
Dimla	19% (172)	36% (325)	30% (271)	15% (135)
Prevalence (%)	17.78% (683)	29.41% (1130)	34.9% (1340)	17.9% (688)

**Table 4. Prevalence of patients according to sign and symptoms in Nilphamari district**

Union	Swelling of legs % (Number)	Swelling of hands % (Number)	Swelling of breast % (Number)	Hydrocele % (Number)	Others % (Number)	Total % (Number)
Domar	56.55 (190)	3.57 (12)	0.3 (3)	36.31 (122)	3.27 (11)	100 (336)
Kishorgonj	62.48 (438)	7.85 (55)	2.43 (17)	25.10 (176)	2.14 (15)	100 (701)
Nilphamari Sadar	78.08 (905)	3.36 (39)	0 (0)	17.52 (203)	1.04 (12)	100 (1159)
Sayedpur	50.83 (92)	23.20 (42)	1.10 (2)	21 (38)	3.87 (7)	100 (181)
Joldhaka	19.61 (110)	0.71 (4)	5.53 (31)	73.44 (412)	0.71 (4)	100 (561)
Dimla	58.80 (531)	3 (27)	2.77 (25)	34.77 (314)	0.66 (6)	100 (903)
Prevalence % (Number)	59 (2266)	4.65 (179)	2.0 (76)	32.92 (1265)	1.43 (55)	100 (3841)

According to Table 4, in Nilphamari district, among the total (3841) infected patients, highest 59% (2266) had swelling of leg, 32.92% (1265) had hydrocele,

4.65% (179) had swelling of hand, 2% (76) had swelling of breast and 1.43% (55) had others.

*Current status of the outdoor patients in Filaria Hospital of Nilphamari: Sign and symptoms according to different age groups of patients in Filaria Hospital of Nilphamari (July, 2011 - June, 2012):* In Filaria hospital of Nilphamari district, among the total patients (2709) lymphedema with lower limbs had 1.85% (50), hydrocele had 4.47% (121) and other symptoms had 0.70% (19) under the age group of 10-19 years. Total 7.02% (190) were under the age 10-19 years (Table 5). Out of 2709 patients, lymphedema with lower limbs had 3.84% (104), hydrocele had 7.60% (206) and other symptoms had 0.60% (16) under the age group of 20-29 years. Total 12.04% (326) were under the age 20-29 years (Table 5). In the age group 30 - 39 years, out of 434 (16.03%) patients, 4.47% (121) were with lymphedema in lower limbs, hydrocele had 10.60% (287) and other symptoms had 0.96% (26) (Table 5).

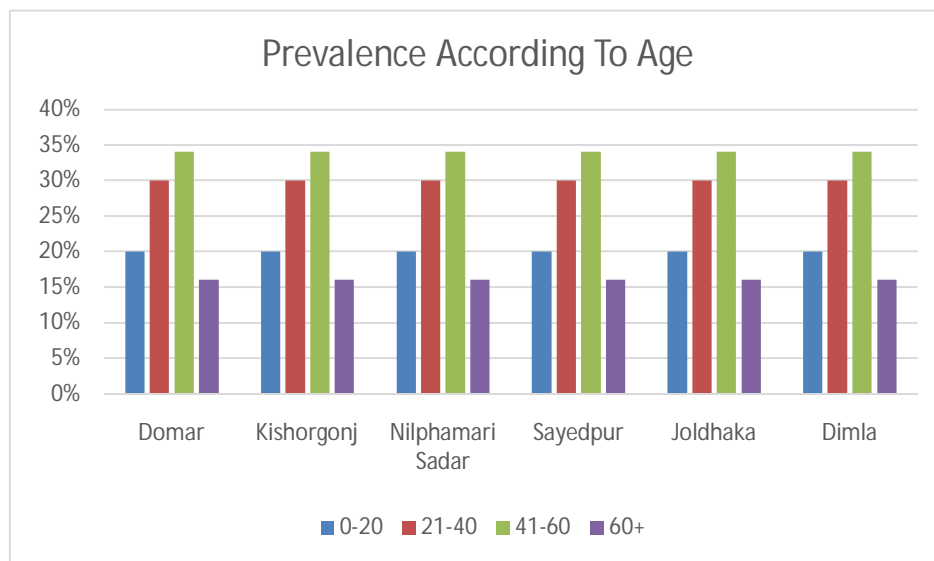


Fig. 1. Prevalence of filarial patients according to age in Nilphamari district.

Under the age group of 30-39 years old, lymphedema with lower limbs had 6.64% (180), hydrocele had 14.73% (399) and other symptoms had 0.66% (18). Total 22.03% (597) were under the age 40-49 years (Table 10). Lymphedema with lower limbs had 8.45% (229), Hydrocele had 15.39% (417) and other symptoms had 0.22% (6) under the age group of 50-59 years. Total 24.06% (652) were under the age 50-59 years (Table 5).

Lymphedema with lower limbs had 3.76% (102), hydrocele had 9.23% (250) and no other symptoms found under the age group of 60-69 years. Total 12.99%

(352) were under the age 60-69 years (Table 10). Lymphedema with lower limbs had 1.51% (41), hydrocele had 4.32% (117) and no other symptoms found under the age group of 70+ years. Total 5.83% (6) were under the age 70+ years (Table 5).

The highest prevalence of filariasis (24%) was found under the age group of 50-59 years, second highest was 22.03% under the age group of 40-49 years. Lowest were 5.83% and 7.02% in the age group of 70+ and 10-19 years orderly. In Nilphamari Filaria Hospital among the total outdoor patients (2709) lymphedema with lower limbs had 30.52% (827), hydrocele had 66.34% (1797) and others had 3.14% (85) in total (Table 5).

**Table 5. Sign and symptoms according to different age groups of patients in Filaria Hospital of Nilphamari**

Name of hospital	Age groups (years)	Sign and symptoms			Total % (number)
		Lymphedema with lower limbs % (number)	Hydrocele % (number)	Others % (number)	
Filaria Hospital of Nilphamari	10 - 19	1.85 (50)	4.47 (121)	0.70 (19)	7.02 (190)
	20 - 29	3.84 (104)	7.60 (206)	0.60 (16)	12.04 (326)
	30 - 39	4.47 (121)	10.60 (287)	0.96 (26)	16.03 (434)
	40 - 49	6.64 (180)	14.73 (399)	0.66 (18)	22.03 (597)
	50 - 59	8.45 (229)	15.39 (417)	0.22 (6)	24.06 (652)
	60 - 69	3.76 (102)	9.23 (250)	0 (0)	12.99 (352)
	70 +	1.51 (41)	4.32 (117)	0 (0)	5.83 (6)
	Total % (number)	30.52 (827)	66.34 (1797)	3.14 (85)	100 (2709)

**Table 6. Length of illness in different age groups**

Name of hospital	Length of illness (years)	Sign and symptoms			Total % (number)
		Lymphedema with lower limbs % (number)	Hydrocele % (number)	Others % (number)	
Filaria Hospital of Nilphamari	0 - 4	3 (80)	9.70 (263)	1.33 (36)	14 (379)
	5 - 9	3 (81)	11.44 (310)	0.55 (15)	15 (406)
	10 - 14	2.80 (76)	11.96 (324)	0.77 (21)	15.53 (421)
	15 - 19	2.62 (71)	11.11 (301)	0.52 (14)	14.25 (386)
	20 - 24	2.80 (76)	9.97 (270)	0.55 (15)	13.32 (361)
	25 - 29	1.44 (39)	6.38 (173)	0.14 (4)	7.96 (216)
	30+	3.87 (105)	15.65 (424)	0.41 (11)	19.93 (540)
	Total % (number)	19.5 (528)	76.22 (2065)	4.28 (116)	100 (2709)

**Table 7. Prevalence of patients in Filaria Hospital of Nilphamari during the period of July, 2011 to June, 2012**

Year	Month	Male % (number)	Female % (number)	Total % (number)
2011	July	6.83 (185)	3.65 (99)	10.48 (283)
	August	5.1 (138)	2.73 (74)	7.83 (212)
	September	4.68 (127)	2.52 (68)	7.21 (195)
	October	4.21 (114)	2.10 (57)	6.31 (171)
	November	4.43 (120)	2.21 (60)	6.64 (180)
	December	4.72 (128)	2.36 (64)	7.08 (192)
2012	January	4.95 (134)	2.47 (67)	7.42 (201)
	February	5.5 (149)	2.77 (75)	8.27 (224)
	March	5.80 (157)	2.91 (79)	8.71 (236)
	April	6.09 (165)	3.06 (84)	9.15 (249)
	May	6.57 (178)	3.33 (90)	9.90 (268)
	June	7.27 (197)	3.73 (101)	11 (298)
Total % (number)		66.15 (1792)	33.85 (917)	100 (2709)

*Length of illness of the patients in Filaria Hospital of Nilphamari (July, 2011-June, 2012):* In Filaria Hospital of Nilphamari, among the total outdoor patients (2709) the highest 19.93% (540) had been suffering for above 30+ years, 15.53% (421) had been suffering for 10-14 years, 15% (406) had been suffering for 5-9 years, 14.25% (386) had been suffering for 15-19 years, 14% (379) had been suffering for 0-4 years, 13.32% (361) had been suffering for 20-24 years and the lowest 7.96% (216) had been suffering for 25-29 years (Table 6). During the study period the highest prevalence among the outdoor patients was found in month of July, 2012 (11%) and lowest in month of October, 2011 (6.31%) (Table 7).

### CONCLUSION

Lymphatic filariasis is one of the most disfiguring diseases and a major cause of clinical morbidity. It was found that this disease showed its highest prevalence in the age of 41-60 groups and 45% patients were illiterate. So, illiteracy is one of the important social risk factors of this disease. The socio-economic factors like poverty, illiteracy etc. are vital reason of the disease. So it can be revealed that the endemicity of filariasis is due to the environmental conditions and the climatic factor such as temperature, rainfall, humidity etc. were suitable for the parasite's existence of the study areas were very much suitable for breeding activities of the vector of filariasis, beside this negligence of the government is another national problem for the disease filariasis.



Government should take proper step, such as increase awareness, distribute leaflet having the information about filariasis and its control and prevention, increase the rate of education, appoint the sufficient health workers to those area to ensure the proper health management, broadcast how filariasis may be prevented, cured or control on TV etc. Only one arrow is easy to bend off, but ten bundle arrows are much stronger. So everybody should come forward to control this national problem.

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