

INCIDENCE OF FILARIASIS IN ENDEMIC AREAS BY MEANS OF FIELD SURVEY TO DETECT THE MF DENSITY, MF RATE, DISEASE RATE AND ENDEMICITY IN THE COMMUNITY

Viveka Vardhani V and Adinarayana R

Department Zoology & Aquaculture, Acharya Nagarjuna University, Nagarjunanagar-522 510

E-mail: vadlamudi-vv@yahoo.co.in

ABSTRACT

Lymphatic filariasis is a major public health problem affecting about 120 million people all over the world. India has a significant share in it. The effective cure and control of the disease depends on the topographical, ecological and assessment of epidemiological situations of the endemic area; they include the prevalence of the disease transmitting vectors and their control managements. In the present survey, it was found that the filarial endemicity rate was 6.0% and the rate of infection was above 1.5. The socio-economic conditions of the population were very poor and were not able to follow the personal protection methods. There is a need to check the topographical and ecological situations and to apply strict control activities to prevent the prevalence of disease.

Key words : Filariasis, field survey, microfilaria, endemicity.

INTRODUCTION

Human lymphatic filariasis results from infection with *Wuchereria bancrofti*, *Brugia malayi* and *B. timori*. It persists as a major course of clinical morbidity and significant impediment to socio-economic development in much of Asia, Africa and the Western Pacific as well as in certain regions of the Central and South America (Usha Singh *et al.*, 2003). About 120 million people are harboring lymphatic filariasis infection worldwide (Shenoy *et al.*, 2003; WHO, 2005). The number of lymphatic filarial cases in India is greater when compared to other countries of the world. Microfilarial (Mf) of nocturnally periodic *W. bancrofti* circulate in the peripheral blood of an infected human during 18.00 to 06.00 hours (Manson, 1883). The life span of microfilaria has been suggested to be 6-12 months (Goel *et al.*, 2006).

Recently, it is considered that the life span of mf be a couple of months ([http: filariasis](http://filariasis), 2008). Observations of Sivagnaname *et al.*, (2008) indicated that the post-rainy transmission months are suitable for conducting night blood survey for detecting Mf in filariasis elimination programmes. Acute bancroftian filariasis is characterized by the clinical observations of recurrent attacks of filarial fever associated with lymphoedema with pain and lymphadenopathy (cervical, axillary, inguinal and generalized) (Koya *et al.*, 1998). Clinical symptoms occur roughly 2-6 times per year, last for about a week, and then subside spontaneously. At this stage, the patients may or may not be microfilariaemic (Anil Prakash *et al.*, 1998; Mishra *et al.*, 2001 and Misra and Singh, 2003). Hydrocele, lymphoedema, elephantiasis and chyluria are the major lesions caused mainly by the blockage of lymphatics. After a five year study of rural

community for bancroftian filariasis in Andhra Pradesh, Rao *et al.*, (1978) and Rao (1979) reported that the youngest age for disease manifestation was 9 months for orchitis, 1 year for lymphadenitis, 4 years for hydrocele, 28 months for lymphoedema and 10 years for chyluria. The standard and reliable method for detecting infection is the detection of mf by finger prick during night time; this method is useful for the evaluation of control strategies for the control of lymphatic filariasis. Thus, a new vista opened to study the incidence of filariasis by means of field survey in certain endemic areas.

MATERIAL AND METHODS

Topography of the study area: Epidemiological survey was carried out in five habitations of the filaria endemic Palanadu area of Guntur district, Andhra Pradesh (India) by means of blood smear collection and observations of clinical and ocular filarial cases along with Doctors of medical profession. Field laboratory was established in the study area with all necessary laboratory materials. The population covered under survey habitation wise is as follows (Mahapatra and Das, 1995):

(ch I), grade II (ch II) and grade III (ch III) basing on the degree of manifestation as recommended by WHO (1992).

RESULTS

Observations of clinical and ocular filarial cases are shown in tables 1 to 7.

Disease cases:

In the filarial night survey conducted in five habitations, the number of persons surveyed include - 348 in Sattenapally, 192 in Guntur, 107 in Piduguralla, 276 in Atchampeta and 942 in Tangeda. Among these, the number of persons harboured microfilaria in their peripheral blood include – 6 in Sattenapally, 4 in Guntur, 3 in Piduguralla, 4 in Atchampeta and 29 in Tangeda. The number of persons suffering from disease manifestations and occult filariasis were 6 in Sattenapally, 2 in Guntur, 4 in Piduguralla, 3 in Atchampeta, 36 in Tangeda and 2 in Sattenapally, 3 in Piduguralla, 2 in Atchampeta and 8 in Tangeda respectively.

mf rate: Out of 1865 persons examined 46 microfilarial cases were detected. The mf rate was 2.46%.

S.No.	Name of the habitation	No. of houses visted	Population surveyed	
			Population covered	No. of blood samples collected
1	Sattenapally (Urban)	104	549	348
2	Piduguralla (Semi urban)	69	356	107
3	Guntur (Urban)	73	385	192
4	Atchampeta (Rural)	81	419	276
5	Tangeda (Rural)	318	1636	942

Filarial night survey: To assess the transmission potential of filarial disease in the community, blood samples were collected during 20.00 to 24.00 hours and microfilarial rate and mean average microfilaraemia density was determined (Singh *et al.*, 2002). Microfilarial rate (mf rate), mean density, diseases rate and endemicity rate were calculated following standard methods. The chronic filarial cases have been grouped into chronic filarious shade 1

Mean mf density:

Out of 46 positive microfilarial cases, 397 microfilarial parasites were detected. The mean mf density was 863.

Disease rate:

Out of 1865 persons, 51 persons were found suffering from disease. The disease rate was 2.73% .

Table 1. Details of Habitation wise Epidemiological situation

S.No.	Name of the Habitation	B.S. collected	Mf cases detected	Mf Rate (%)	Disease cases detected	Disease rate (%)	Endemicity rate (%)	Ocult cases detected
1	Guntur	192	4	2.08	2	1.04	3.12	-
2	Sattenapally	348	6	1.72	6	1.72	3.44	2
3	Piduguralla	107	3	2.80	4	3.73	6.55	3
4	Atchampeta	276	4	1.44	3	1.08	2.53	2
5	Tangeda	942	29	3.07	36	3.82	6.90	8
Total		1865	46	2.46	51	2.73	5.20	15

B.S. – Blood Smears

Mf - Microfilaria

Table 2. Age-wise and gender-wise Epidemiological situation

Age Group	No. of persons examined			No. of persons with Mf			No. of persons with disease			No. of persons with ocult cases			Grand Total cases		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
0.4	52	37	89	-	-	-	-	-	-	-	-	-	-	-	-
5-14	332	296	628	6	9	15	9	11	20	-	-	-	15	20	35
15-39	384	408	792	11	12	23	12	8	20	4	3	7	27	23	50
40 above	189	167	356	7	1	8	5	6	11	4	4	8	16	11	27
Grand Total	957	908	1865	24	22	46	26	25	51	8	7	15	58	54	112

M-Male, F-Female, T-Total, Mf-Microfilaria

Table 3. Age-wise endemicity of Lymphatic filariasis

Age group	Number of persons examined	Number of persons with Mf +ve	Number of persons with disease manifestation	Number of persons with Ocular filariasis	Total	Mf rate (%)	Disease rate (%)	Ocular rate (%)	Endemicity rate (%)
0-4	89	-	-	-	-	-	-	-	-
5-14	628	15	20	-	35	2.38	3.18	-	5.57
15-39	792	23	20	7	50	2.90	2.52	0.88	5.42
>40	356	8	11	8	27	2.24	3.08	2.24	5.32
Total	1865	46	51	15	112	Mean = 2.46	2.73	0.80	Mean = 5.19

Table 4. Details of Microfilarial Density

Age Group	Mf cases in males	Mf cases in females	Total mf cases	Total mf count	Mf density
0-4	-	-	-	-	-
5-14	6	9	15	74	4.93
15-39	11	12	23	280	12.17
40 above	7	1	8	43	5.38
Total	24	22	46	397	Mean = 8.63

Table 5. Field analysis of filarial endemicity

S.No.	Type of disease	No. of cases detected	Total cases
1	Asymptomatic (Microfilarial)	46	46
2	Disease manifestations		
a)	Acute cases		
1)	Filarial fever episodes	2	
2)	Adenolymphangitis	4	
3)	Lymphadenitis	3	9
b)	Chronic cases		
1)	Stage 1	2	
2)	Stage 2	2	
3)	Stage 3	5	51
4)	Stage 4	4	
5)	Stage 5	4	
6)	Stage 6	3	
7)	Stage 7	3	23
c)	Hydrocele	19	19
3	Ocult cases		
1)	Tropical Pulmonary Eosinophilia	05	
2)	Polyarthrititis	05	
3)	Monoarthrititis	02	
4)	Urticaria	03	15
	Total	112	112

Table 6. Disease-wise and gender-wise status of lymphatic filariasis

S.No.	Type of disease	Male	Female	Total
1	Microfilaria cases	24	22	46
2	Acute cases	04	05	09
3	Chronic cases	03	20	23
4	Hydrocele cases	19	-	19
5	Ocult cases	08	07	15
	Total	58	54	112

Table 7. Classification of characteristic features of filarial disease cases

S. No.	Organ affected	Acute cases	Stages of Chronic cases							Hydrocele	Grand Total	
			1	2	3	4	5	6	7			Total
1	Filarial Fever episode	2	-	-	-	-	-	-	-	-	-	2
2	Adenolymphangitis	4	-	-	-	-	-	-	-	-	-	4
3	Lymphadenitis	3	-	-	-	-	-	-	-	-	-	3
4	Right leg	-	1	1	2	1	2	1	1	9	-	9
5	Left leg	-	1	1	2	2	1	2	2	11	-	11
6	Both legs	-	-	-	1	1	1	-	-	3	-	3
7	Hydrocele	-	-	-	-	-	-	-	-	-	19	19
Total		9	2	2	5	4	4	3	3	23	19	51

Endemicity rate:

Out of 1865 persons surveyed, 46 persons were found to harbour microfilaria. 51 persons were showing signs and symptoms of filaria disease and 15 persons were suffering from occult manifestations. The endemicity rate was 5.19%.

Occult filariasis rate:

Fifteen children (5-14 years) were declared suffering from this disease syndrome. The rate of occult filariasis was 0.8%.

Pathophysiological analysis of the clinical lymphatic filariasis:

Out of the 112 detected, 46 (24 males and 22 females) were microfilarial cases, 9 (4 males and 5 females) were acute cases, 23 (3 males and 20 females) were chronic cases, 19 (males) were hydrocoel cases and 15 (8 males and 7 females) were occult cases. Lymphatic filariasis was found more in males (58 cases) than in females (54 cases) (Table 6).

Basing on the reports of NICD (2001), the clinical manifestation cases (51) were classified as follows: Swelling of right leg (9), left leg (11) and both legs (3) and hydrocele (19) and acute filariasis (9). It is interesting to note that children (5-14 years) with occult filariasis have shown the signs of persistent cough, fever, breathlessness or wheezing and eosinophilia.

DISCUSSION

Lymphatic filariasis continues to be a major cause of clinical morbidity with over one third of the world's population at the risk of infection. In spite of National Filaria Control Programme (NFCCP), lymphatic filariasis is showing an upward trend both in urban and rural areas of India. The high microfilarial rate and disease rate indicate the prevalence of disease transmission in the communities of Guntur, Piduguralla, Atchampeta, Sattenapalli and Tangeda. In the present findings, disease diagnosis is based on the demonstration of microfilaria in peripheral blood by parasitological examination of thick smear collected at night after staining. The time of collection of blood is inconvenient to both the patient and the investigation and also this method fails to detect the disease in the prepatent stage when mf are sparse and are sequestered in the tissue. Further microfilariae are not visible in the peripheral blood in acute, chronic and occult filarial infections. Clinical examination has limitation because the early manifestations of the disease are not consistent with all the cases. By the time, the manifestations are established it is too late. Occult filarial cases do not present clinical manifestations. This explains the need to develop suitable immunodiagnostic assays for individual diagnosis and for assessing the effect of control measures.

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