

EPIDEMIOLOGICAL SURVEY OF BANCROFTIAN FILARIASIS IN TANGEDU (GUNTUR, AP)

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ABSTRACT

Filariasis is major public health illness in Tangedu (Guntur District) (Andhra Pradesh) (India) and 30-32% of the population is estimated to be at high risk. In spite of repeated attempts to control filariasis, the disease transmission is perennial and persistent mostly transmitted by *Culex quinquefasciatus*. The transmission of lymphatic filariasis is correlated with Mf rate, disease rate, infection rate and infectivity rate and found that the disease transmission is very high in Tangedu.

INTRODUCTION

Human lymphatic filariasis results from infection with *Wuchereria bancrofti*, *Brugia malayi* and *B. timori*. *W. bancrofti* is prevalent in tropical Africa, South East Asia, Papua New Guinea, Philippines, Candelonia and Thailand. *B. malayi* is spread over South and South East Asia (WHO, 1992). *W. bancrofti* and *B. malayi* co-exist in many places and the mf of these species can be identified based on the measurements of various body characters (Raina *et al.*, 1990; Rajendran *et al.*, 1997); the identification of species (mf) is very important in epidemiological surveys. There are 120 million people harbouring lymphatic filariasis infection world wide (Shenoy, 2003). Lymphatic filariasis (LF) contributes a significant impediment to socioeconomic development in much of Asia, Africa and the western Pacific as well as in certain regions of the central and South America (Singh *et al.*, 2003). LF has been a major public health problem in tropical and sub tropical countries next to malaria (Michael *et al.*, 1996). Bancroftian filariasis is the most predominant infection contributing 99.4 % of the disease problem in India. Human bancroftian lymphatic filariasis (BF) can be differentiated into asymptomatic microfilariaemiae, acute manifestations, and disease manifestations including hydrocoele and occult manifestations (Das *et al.*, 1990; Harinath *et al.*, 2000). The clinical symptoms of BF include filarial fever associated with lymphoedema with pain and lymphadenopathy (Ravindran *et al.*, 1994). The susceptibility/survival analysis of *Culex quinquefasciatus* infected with *W. bancrofti* showed that the parasite load in the mosquito is a risk factor for vector survival (Kumar *et al.*, 1996; Kumar, 1997; Krishnamoorthy *et al.*, 2004).

One of the essential requirements (for effective filarial control programme) is a precise and accurate diagnostic test for detection of the infection in individual cases as well as in mass scale in field surveys. The precise diagnosis of filariasis is presently based on the demonstration of microfilariae in night blood and clinical observations for acute or chronic manifestations of the disease. The adult female may produce mf at least for a period of five years and the life span of the mf has some influence on the dynamics of transmission of filariasis (Narasimham *et al.*, 1984; Vanamail *et al.*, 1990; Paily *et al.*, 2009). The occult manifestations can not be diagnosed either by the method of night blood smear examination or by the symptomatology. It can be diagnosed by the method of immunodiagnosics – detection of filarial antibody and antigen by Enzyme Linked Immunosorbent Assay (ELISA). The study on survey of bancroftian filariasis in Tangedu will help in implementing the protection measures against the disease. This may also help in finding out the population of vector species in Tangedu (AP), India.

MATERIALS AND METHODS

Epidemiological survey was carried out in Tangedu which is the rural filarial endemic area of Palanadu (Guntur District) (A.P) (India). Tangedu is surrounded by hillocks and forest, located very nearer to river side belt of Krishna River. Night survey of blood smear collection was conducted during 20.00 to 24.00 hr following standard methods. During the survey, 318 houses were visited, 1636 population surveyed and 942 blood samples were collected. Blood smears were obtained by the finger prick method. A thick blood smear was prepared

on grease free microslide and allowed it to dry over night and stained in the Jaswanth Singh Bhattacharyaji stain - I and buffer solution. The stained blood samples were examined under the compound microscope for the presence of microfilarial parasites. The filariometric parasitic indices were calculated as given below:

$$\text{Mf rate} = \frac{\text{Total no. of persons found to harbour mf}}{\text{Total no. of blood samples examined}} \times 100$$

$$\text{Mean mf Density} = \frac{\text{Total no. of microfilariae}}{\text{Total no. of blood samples +ve for mf}}$$

$$\text{Disease rate} = \frac{\text{Total no. of persons showing signs and symptoms of filarial disease manifestations}}{\text{No. of persons examined for filarial disease}} \times 100$$

The lymphatic filarial cases were classified into acute clinical filariasis and chronic clinical filariasis (WHO, 1992).

RESULTS AND DISCUSSION

Positive cases: In the filarial night survey conducted in Tangedu, 942 persons were surveyed following the method of Rajendran *et al.*, (1997) (Table 1). Among 942 cases, 29 were found to harbour microfilaria in their peripheral blood. Also, among these 942 cases, 36 and 8 were suffering from disease manifestation and occult filariasis respectively. Filariometric parasitic indices like mf rate, disease rate, endemicity rate and occult cases were found to be 3.07 %, 3.82 %, 6.90 % and 8 respectively.

Table 1: Epidemiological situation in Tangedu

Blood Samples collected	Mf cases detected	Mf rate (%) (positive cases)	Disease cases detected	Disease rate (%)	Endemicity rate (%)	Occult cases Detected
942	29	3.07	36	3.82	6.90	8

Categories of microfilaria cases (24 males + 12 females)

Acute cases		Chronic cases		Hydrocoel cases	
Male	Female	Male	Female	Male	Female
05	08	06	04	13	NIL

Vector density:

<i>C. q</i>	Female <i>Anopheles</i>	Other species	Total mosquitoes collected
2184	417	185	2805

C.q-Culex quinquefasciatus

Patho-physiological analysis of the clinical lymphatic filariasis

Out of 36 microfilarial cases detected (24 males, 12 females), 13 (5 males, 8 females) were acute cases, 10 (6 males, 4 females) were chronic cases and 13 (13 males only) were hydrocoel cases. Eight (5 males, 3 females) occult cases were evident. Lymphatic filariasis was found more in males (24 cases) than in females (12 cases) (Table 1).

Entomological evidences: A total of 2805 mosquitoes were in collected in 280 households in Tangedu, out of which female *Culex quinquefasciatus* were 2184, female *Anopheles* 417 and other species 184.

Determination of vector man hour density: It is determined by the calculation of vector mosquitoes in a stipulated time (15 minutes) in 10 houses in each multiplied by 10. The Man Hour Density recorded is 312.0 in Tangedu. The calculated

vector infection rate and vector infectivity rate are 1.23% and 0.44%. The identification of vector mosquito blood meal reveals the specification of the vector towards the host which influences the transmission potential of the disease in a community. The human blood index determined is 58.0%. The correlation of transmission potential of lymphatic filariasis with entomological parameters revealed the positive Mf rate (3.07%), disease rate (3.82%), vector 10 MHD (312.0%), infection rate (0.97%), infectivity rate (0.44%) and mosquito blood meal positivity for human blood (58.0%). These observations reveal that the transmission potential was found to be high in Tangedu.

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 India, in spite of National Filarial Control Programme (MFCP) being in operation for about five decades, the disease is showing an upward trend both in urban and rural areas of the countries. The topographical and ecological conditions of the filarial endemic area were favourable for vector breeding. Drainage system and low lying areas are promoting the high densities of vector population. The high vector density, vector infection rate, vector infectivity rate, human blood index, microfilarial rate and disease rate indicate the prevalence of high disease transmission in the communities of Tangedu. *Culex* and *Anopheles* mosquitoes were found as vectors of human lymphatic filariasis in the present study as suggested by WHO (1989). The entomological and parasitological parameters of the present studies confirm the correlation between the host, parasite and the poor sanitary conditions in the communities of Tangedu. The transmission of the disease was so high because of the non-availability of

accurate diagnosis of the disease and imperfect chemotherapeutic applications. The occurrence of 2184 *Culex* mosquitoes (out of 2805 mosquitoes) in the study area confirm the observations of Das (1976), Rajagopalan *et al.*, (1977), Rajagopalan and Das (1987) and Paily *et al.*, (2007) who reported *Culex quinquefasciatus* as vector of *W. bancrofti* in India. Majority of the people in the study area had no knowledge about the disease, its symptoms, and mode of transmission and method of prevention. The present study reveals the poor knowledge on the cause, prevention, control, transmission and treatment of filariasis. Hence, appropriate health education programmes may help to disease control in this rural area.

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