Prevalence of Bancroftian filariasis (Elephantiasis) in Coimbatore district, Tamil Nadu – A comparative study between urban and rural areas

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Abstract

A survey on the prevalence of human lymphatic filariasis was conducted in three rural and one urban areas in Coimbatore District, Tamil Nadu, between October 2006 and March 2007 revealed that the infection is more in rural than urban areas and number of microfilarial positivity was more among males than females. The infection was higher in the age group of 20 - 40 years and no infection at the age groups of ≤ 10 and 50 - 60 years.

Keywords : bancroftian filariasis, disease prevalence, elephantiasis, microfilarial assessment, Wuchereria bancrofti

INTRODUCTION

Filariasis is caused by three speices of parasitic worms – *Wuchereria bancrofti, Brugia malayi* and *B. timori* and its major clinical manifestations are elephantiasis and hydrocele (Storey, 1993). It is one of the most important public health problems in India, Africa, Southeast Asia and Pacific countries (Rudra and Chandra, 2000). It is endemic in many parts of India especially in Uttar Pradesh, Bihar, Orissa, Kerala, Karnataka, Andhra Pradesh, Maharashtra and Tamil Nadu states (Murthy *et al.*, 2004). The Indian Government during the year 1955 started the National Filarial Control Programme (NFCP).

This disease is transmitted from man to man through the bites of vector mosquitoes and Culex quinquefasciatus is the major vector. The microfilaria are found in the peripheral blood in the night time (Khan et al., 1999), and its density is maximum in peripheral blood during midnight (2200 h - 0200 h) and absent during day time. Thus the microfilariae are with nocturnal periodicity. The adult worms live in the lymph node and produce microfilaria within 70-80 days and microfilaria may then be detected in the peripheral blood. The fecundic life span of Wuchereria bancrofti is 5 years and Brugia malayi is 3 years (Maizels and Lawrence, 1991). It mainly affects lymphatic system and causes hydrocele, elephantiasis and tropical pulmonary eosinophilia (Chernin, 1983). Lymphatic damage can occur early in life and abnormal lymphatics (dilated, tortuous and bizarre) are commonly seen in asymptomatic microfilaremic individuals also.

The acute filariasis is characterized by fever, lymphadenitis and retrograde lymphangitis; the pathogenesis is not clear but a transient Arthus type reaction to worm antigens and secondary bacterial

*Corresponding Author email: prachanna_76@yahoo.co.in infections were observed (Kazura *et al.*, 1993). The widely used drug to combat filariasis is Diethyl Carbamazine Citrate (DEC) which is administered in lymphatic filariasis elimination programmes also. As preventive measures, anti mosquito activity is useful (Ottenson, 2000). The present study investigated the prevalence of microfilaraemia in Coimbatore district of Tamil Nadu, South India to assess the prevalence levels of lymphatic filariasis.

MATERIALS AND METHODS

Study area and patients

The survey on the prevalence of bancroftian filariasis was conducted in both hospital wards and in field. The study was conducted in three rural areas – Othakkalmandapam (RA₁), Veeriyankadu (RA₂) and Ponnapur (RA₃) and one urban area of Coimbatore town (UA₁) in Coimbatore District, Tamil Nadu during October 2006 to March 2007. The Government of Tamil Nadu, Directorate of Public Health and Preventive Medicines (DPHPM) sent detailed proforma for strengthening the laboratory services for the diagnosis of filariasis to all the primary health centers. The night blood survey was undertaken using the guidelines of National Filariasis Control Programme (NFCP). In this study, a total of 1100 smear samples were collected (650 – UA₁; 126 – RA₁; 190 – RA₂ and 134 – RA₃).

Night blood surveys for microfilaria

Door to door night blood surveys from 2100 h to 2400 h were carried out in RA₁, RA₂, RA₃ and UA₁. Blood smears were collected from the inhabitants for microfilarial (Mf) occurrence. To ensure maximum coverage, repeated visits were made to the households which were found locked and the absentees were contacted during next visit (Lim *et al.*, 2001). The microfilaria comes to the peripheral blood only during night time and this phenomenon is described as nocturnal periodicity. Hence, the peripheral blood was collected in the night time for the detection of microfilariae. The subjects for this investigation included those having clinical manifestations like fever, chills, myalgia, arthralgia swollen lymphatics, lymphadenitis and hydrocele (Ghosh *et al.*, 1999).

Sample collection and processing

Before sample collection, the glass slides were cleaned thoroughly using a standard protocol (Abaru and Denham, 1876). Then the peripheral blood samples were collected from all the subjects, smears were prepared, the slides were allowed to dry and kept in slide box until staining (Webber, 1997). The blood smears were stained within 24 hours using Giemsa stain, examined for the presence of filarial worms (Suzuki and Seregeg, 1979) under microscopy and the microfilariae were counted (Bell, 1967). The following statistical formulae were followed to interpret the data.

1. Microfilarial Prevalence Rate (MPR) is calculated as

Number of night blood smears positive for microfilaria ---- x 100
Total number of night blood smears taken and examined

2. Filarial Disease Rate (FDR) is calculated as

MPR + FDR 3. Filarial Endemicity Rate is calculated as ----

RESULTS AND DISCUSSION

Most of the rural subjects included in this study are with agricultural background. Percentage profile with various clinical manifestations of filariasis cases are given in table 1. Among the 450 people sampled from Coimbatore rural areas, 126 are from Othakkalmandabam (RA₁), 190 from Veeriyankadu (RA₂) and 134 from Ponnapur (RA₃). In this present study, a total of 27 microfilarial cases were detected from rural areas of which 6, 9 and 12 were from RA₁ RA₂ and RA₂, respectively. A total of 10 positive cases (infection rate of 1.54%) were recorded in urban area. The microfilarial rates of infections were 4.8% in RA_1 , 4.7% in RA_2 , 8.9 in RA_3 and 1.5% in UA_1 . From the results, it is evident that the infection prevalence is higher in rural than in urban areas. This is in accordance with that of Rajagopalan et al. (1977), Sharma and Rathaur (1999), Ramaiah et al. (2000) and Prabakar and Jebanesan (2004).

The percentage occurrences of filariasis among rural males are 5.4% (RA₁), 4.2% (RA₂) and 10.7% (RA₃) and in urban it is 1.5% (UA₁) (Table 2). In females the

Table 1. Common symptoms/sign observed amongsuspected cases of filariasis in Coimbatore District,Tamil Nadu, South India

Symptom/Sign	96
Fever	100
Head ache	100
Myalgia	90
Arthralgia	80
Lymphodema	76
Chyluria	9
Hydrocele	4
Hand Swelling	4
Speenomegaly	0
Renal Failure	0

positivity prevalence rates are 3.8%, 6.4%, 6% and 1.7% among $RA_1 RA_2 RA_3$ and UA_1 respectively. Thus in this study higher percentage of filariasis has been recorded in males than females which was similar to the earlier reports of Pani *et al.* (1991), Palanivel *et al.* (1996) and Ramaiah *et al.* (2000).

The results of the present study indicated that 25 males and 12 females were microfilarial positive in rural areas, among which 12 and 5 were in the age group of 30 - 40for the respective sexes. It is also interesting to note that no microfilaria positive case could be recorded in the age group of 0 to 10 and 50 - 60 years in both the rural and urban areas whereas higher incidence was found in the age group of 35 years and above. Similar findings were reported by Wilson (1961), Panigua et al. (1983), Palanivel et al. (1996), Prakash et al. (1998), Sharma and Rathaur (1999), Ramaiah et al. (2000) and Joel et al. (2005) also. However, comparison of older age groups with others provided no indication that a decline would start at a later age and the occurrence of decline was not related to the overall Mf prevalence and seems to be a chance occurrence.

The functional impairment caused by lymphatic filariasis was assessed through quality and quantitative methods in rural areas of Tamil Nadu as the disability was found among cases in rural areas. With the personnel interview with the suspected cases, 66% of them said that their occupational activities were hampered by the disease. This observation is also similar to the previous reports (Pani *et al.*, 1983; Panigua *et al.*, 1983; Ramaiah *et al.*, 2000). Males were found to be more prone to this infection perhaps due to their clothing and outdoor sleeping patterns.

Table 2. Occurrence of microfilaria positive cases and percentage of occurrence among the males and females of both urban and rural areas of Coimbatore district, Tamil Nadu, South India (Othakkalmandapam (RA_1), Veeriyankadu (RA_2) and Ponnapur (RA_3))

Area	Total Examined	Total number of microfilaria positive cases		Percentage Prevalence	
		Male	Female	Male	Female
Urban-UA, Coimbatore Rural -	650	7(π =470)	3(<i>n</i> =180)	1.5	1.7
RA ₁	126	4(<i>n</i> =74)	2(<i>n</i> =52)	5.4	3.8
RA ₂	190	θ(π=143)	3(<i>n</i> =47)	42	6.4
RA3	134	9(<i>n</i> =84)	3(<i>n</i> =50)	10.7	6.0

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