BANCROFTIAN FILARIASIS IN SOUTH EAST MADHYA PRADESH : PRE-CONTROL EPIDEMIOLOGICAL OBSERVATIONS

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ABSTRACT

Lymphatic filariasis caused by *Wuchereria bancrofti* is a major health problem next only to malaria. A study had been conducted to estimate the prevalence of microfilaraemia in a rural endemic community near Raipur. The incidence of microfilaraemia in the community was found to be about 14% when studied by night finger prick method. The incidence appears to be more in males as compared to females. The infection rate in vector population i.e., *Culex quinquefasciatus* was recorded at a rate of 10%. No relationship could be drawn between the rates of vector and human filarial infections or between the density of vector population and the rate of vector/human infection(s). Prior health education is essential before taking up control and preventive measures in given endemic zone.

KEY WORDS : Filariasis, *W. bancrofti*, microfilaraemia, transmission dynamics, frequency distributor, Vector-parasite relationship.

Filariasis has a global distribution and an estimated 751 million people live in areas where filaria transmission occurs. Human lymphatic filariasis caused by *Wuchereria bancrofti* is highly prevalent in India. Even though this disease does not prove to be fatal, it causes considerable morbidity in the affected community. The epidemiological situation in India is deteriorating further with the infection being spread to newer pockets coolly. An integrated vector control measures along with chemotherapeutic measures are essential for effective control of lymphatic filariasis in the community. A clear understanding of the prevalence, transmission dynamics of the infection and transmission potential of the vectors, however, is the prerequisite for formulating effective control strategies. Moreover, numerical estimates of various parameters associated with host-vector-parasite would help in construction of quantitative epidemiological models for lymphatic filariasis which would help in predicting the trans-

mission dynamics of the infection and efficacy of the control strategies taken up. Lymphatic filariasis has unusually complex and dynamic relationships because host infection levels, vector infectivity and disease expression change in a non-linear fashion with time. The present study was aimed at studying prevalence of microfilaraemia, vector infection and infectivity rates in a rural endemic community.

INFECTION RATE

A total of 1000 human subjects from a rural area near Raipur city of Madhya Pradesh were examined for microfilaraemia by night blood smear (20µl) examination. Microfilariae were detected in a total of 143 subjects thus giving an overall infection rate of about 14%. Percentage of infection seems to be the highest in the age group of 55-60 years in both males and females where as the lowest infection rate was recorded in the age group of 1-5 years. The infection rate was significantly higher in males (33.3%) as compared to females (17.4%). The highest incidence (38%) was found in 55-60 years age group of both the sexes. (Figs. 1&2).

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Fig. 1 : Age wise prevalence of microfilaraemia

Fig. 2 : Sex & age wise prevalence of Microfilaraemia

Fig 3 : Microfilariae density in relation to age

MICROFILARIAE DENSITY IN RELATION TO AGE

An average Microfilariae count of 19 per 20 μ l of blood among the infected subjects was observed. No significant difference in mean microfilariae count was observed between both the sexes of infected group. In female subjects, the highest microfilariae count (43 per 20 μ l of blood) was recorded in the age group of 45-50. In case of males, 20-25 age group showed the highest microfilariae count of 52 per 20 μ l of blood. The older population showed an average blood microfilariae density of 10 per 20 μ l. (Fig 3).

FREQUENCY DISTRIBUTION OF MICROFILARIAE CARRIERS

Analysis of frequency distribution of microfilariae counts indicates that majority of infected people have lower microfilariae count in their blood. More than 15% of infected subjects exhibited only one microfilaria per 20 μ l of blood. About 13% of infected subjects have the microfilariae count of only two per 20 μ l. Four to eight percent infected people have microfilariae count ranging between 3 to 7 per 20 μ l of blood. The proportion of sub-

jects with higher microfilariae count ($>10/20 \mu$ l) is around 2% of the total infected subjects (Fig.4).

CLUSTERING OF MICROFILARIAEMIA IN RELATION TO HOUSE-HOLD SIZE

About 119 families of the surveyed population has a house-hold size of <5 members. Of these, 36 families have been found to carry filarial infection. On the other hand, 45 of the 74 families with house-hold size >5 members carry filarial infection. The average number of infected subjects in smaller family size group (i.e. <5 members) is 1.43 where as the number is 2 in case of bigger families (with members >5).

FILARIAL INFECTION IN MOSQUITO VECTOR

A total of about 900 indoor resting mosquitoes (*Culex quinquefasciatus*) were collected from the survey zone and mosquitoes were dissected out individually for filarial infection. Different stages of filarial larvae were recorded in 92 mosquitoes out of 909 dissected out. Of the 92 mosquitoes with filarial infection, 29 carried microfilariae alone, 30 carried only 1st stage larvae and 12 contained only 2nd stage larvae. Nine mosquitoes had only

Fig 4 : Frequency distribution of mf carriers

L3 stage larvae.

Epidemiological studies carried out in other parts of the country reported microfilaraemia rates ranging from 0.1% (low endemic zones) (1). to 20% in hyper endemic zones. A study carried out by Ramaiah *et al* (2). recorded a microfilaraemic rate of 11.7% and disease rate of 11%. Analysis of mf infection rate with respect to age indicate a linear relationship up to 20-25 yrs age group. A gradual decline in mf rate had been observed thereafter upto 45 yrs age group which is followed by a peak infection rate at 60 yrs age group. similar observations had been reported at other endemic regions in Southern India (3) where the

appearance of microfilaraemia did follow, an age dependent curve, peaking at 16-20 yrs age class, than falling and levelling off in the older classes. This pattern of microfilaraemia prevalence in the endemic community suggests increase in resistance to infection resulting from prior experience of infection. The mf incidence is more in males (16%) as compared to females (12.5%). Similar observations were made in rural Tamil Nadu by Ramaiah *et al* (2). The importance of host age to the population dynamics of helminth infections of humans has attracted considerable attention in both emperical and theoretical studies. The major conceptual tool for examining age effects in the

size more than five. Vanamail *et al* (3) observed clumping of mf carriers in families with more than five members. Though, it has been advocated (4) that clustering is due to environmental factors,

the present study suggests that the age distribution in different families is an important factor that determines clustering mf carriers.

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