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Lymphatic Filariasis, Household Environment and Human Behaviour: A Study among the Rural Population of Coastal Orissa

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INTRODUCTION

Lymphatic filariasis is an important public health problem in many tropical and sub-tropical countries of Asia and Africa. The global burden of lymphatic filariasis was estimated to be loss of 8,50,000 of disability adjusted life years (DALY's) (World Bank, 1993). Even though the disease does not kill, it is ranked as the second leading known cause of disability world wide (Ottessen et al., 1997). As per recent estimates, in India about 454 million people with 29.2 million microfilaria carriers and 22.5 million clinical cases are spread in 13 states and 5 Union territories. India contributes 74 per cent of endemic population and 81 per cent of disease burden in the South East Asian region (WHO, 2000). Since participation as well as acceptance of the target population are important components of any disease control strategy, it is necessary to understand the target population's behaviour, knowledge and perception with respect to transmission and control of filariasis. The unscientific human practice, behaviour and unclean environment create congenial atmosphere for the transmission of the disease. Such information is scanty, as very few studies have been carried out to understand these issues. The present paper describes the results of a detail investigation into household environment and their behavioural patterns related to lymphatic filariasis in rural coastal Orissa, India.

MATERIAL AND METHODS

Study Area: The study has been undertaken in Khurda, one of the coastal districts of Orissa. The study area is known for its endemicity for lymphatic filariasis caused by *Wuchereria bancrofti*, which is mainly transmitted by *Culex quinquefasciatus* (Das, et. al., 1998) with the disease rate of 12.5 (Babu et. al., 2001). The study area is rural in nature and the people mainly depend upon agricultural and related activities such as agricultural labour. Their socio-economic status varies from lower to medium income class. Oriya is the local language of the people.

Study Design: For this study, 12 villages were selected randomly and house to house census has been undertaken. The information collected during census is total number of family members, their gender, age and occupation for each member. Also, it is attempted to record the presence of any overt filarial condition among the household members. Altogether a total of 377 patients with different overt chronic filarial manifestations were identified. From this a cohort of 63 patients (12 male elephantiasis + 22 female elephantiasis + 21 hydrocele + 7 elephantiasis & hydrocele + 1 breast swelling) was selected following stratified random sampling method for this study.

From these twelve villages, two villages were selected for identification of acute filarial cases. Acute clinical case is characterised by the presence of local signs and symptoms such as pain, tenderness, local swelling and warmth in the groin, with or without associated constitutional symptoms such as fever, nausea or vomiting, and these cases were monitored in these two villages for every fortnight for a period of one year. During every fortnightly visit, the incidence of acute cases was recorded for a period of one year. For the individuals identified as affected with acute attacks during the fortnight, the clinical symptoms and their duration were recorded. Thus a total of seventy-three cases of acute filariasis were detected.

For examining various aspects of human behaviour and their environmental components, in a case control design, age, sex and occupation matched controls were selected for all the 63 chronic and 73 acute patients, from the nearest household. Care has been taken to see that the controls have no history of either chronic or acute filariasis. The consent of the respondents (both patients and controls) was obtained by explaining

Table 1: Distribution of filarial cases and controls according to various parameters

Characteristics	*Chronic cases (n=63)*	*Controls (n=63)*	*Chi-square*	*Acute cases (n=73)*	*Controls (n=73)*	*Chi-square*
Education						
Literates	57.14	55.56	0.03	63.01	63.01	0.00
Illiterates	42.86	44.44		36.99	36.99	
Ethnicity						
Scheduled caste	7.94	11.11		19.18	23.29	
Scheduled tribe	12.70	12.70	0.53	15.07	16.44	
Backward classes	61.90	61.90	35.61	28.77		
Others	17.46	14.29		30.14	31.50	
Type of Family						
Nuclear	65.08	52.38	0.55	50.68	46.58	0.25
Joint	34.92	47.62		49.32	53.42	
Housing Type						
Thatched	85.71	79.37		71.23	86.30	
Tiles	12.70	9.52	4.94*	13.70	4.10	5.71*
Slab	1.59	11.11		15.07	9.60	
Eletrification						
House electrified	41.27	36.51	0.30	72.60	64.38	1.14
Houe not electrified	58.73	33.49		27.40	35.62	
Cattle-shed						
House with cattle shed	71.43	66.67	0.33	79.45	83.56	0.41
House without cattle shed	28.57	33.33		20.55	16.44	
Logged Water						
Surrounded logged water	44.44	47.62	1.45	67.12	65.75	0.03
No logged water	55.56	52.38		32.88	34.25	
Use of Bed Net						
Using	39.68	42.86	0.13	38.36	42.46	0.26
Not using	60.32	57.12		61.64	57.54	
Use of Mosquiot Repellent						
Using	25.40	38.10	2.34	24.66	46.57	7.65*
Not using	74.60	61.90		75.34	53.43	

*$p<0.05$

the purpose of the study. In–depth interviews were undertaken by using a pre-tested interview schedule. The quantitative data were analysed by using chi-squares for assessing the difference between patients and controls in various aspects their behaviour.

RESULTS AND DISCUSSION

Communities within endemic areas differ in the proportion of people who are microfilaraemic and the density of the microfilaria that are detected, and in the prevalence of clinical symptoms (Sasa, 1976), suggesting different intensities of infection and associated risk factors. But within the community also, disease cases cluster by geographical location and by households. This clustering may occurs due to varied household environments and human behaviour. The distribution among chronic and acute filarial cases along with their controls by different variables is presented in Table 1. There is no difference, in literacy status between diseased and controls. Similar study from Kenya (Mwobobia and Mitsui, 1999), established a positive relationship with education of household heads with protection against man-vector contact. Regarding ethnicity, also, no differences are recorded, which may be due to selection of occupation-matched controls for each diseased case. Some studies (Paniagua et al., 1983 and Nathan and Stroom, 1990) have shown that race has been linked with differential microfilaria rate. In Costa Rica (Paniagua et al., 1983) it was suggested that the length of historical contact with the disease might be an explanation.

But this is less likely to have been pertinent to Guyana in which a genetic predisposition to infection was postulated (Nathan and Stroom, 1990). Another study from Kenya reported similar findings, with black Africans having a higher prevalence of infection than Arabs living in the same area. These differences were attributed to differences in housing condition (Wijeys and Kinyanjai, 1977). Rao et al. (1980) did not attempt to explain the lower infection rates found in Brahmins compared to other castes in Andhra Pradesh. In the present study, significant variation is found in housing type of diseased cases and their controls. Wijevs and Kinyanjui (1977) reported higher prevalence of infection and disease in poor part of the town and suggested that particular types of houses might be more attractive to the vector, Rao et al. (1980). Where unable to find any correlation between infection and type of housing in a study in Andhra Pradesh. However a recent study on rural community of Varanasi, North India (Baruah and Rai, 2000) concluded that the construction of houses plays an important role in the vector's resting preference, leading to higher density in poorly constructed houses, thereby increasing the possibility of infection within them, and thus maintaining a higher potential for filarial transmission around its inhabitants. The electrification of the house has also no influence on the prevalence of the disease. Similarly other ecological and behavioural aspects such as presence of cattle-shed, logged water around the house, and uses of bed-net did not show any differences between diseased and normal groups, However there are more number of people using mosquito repellents in normal control group than in diseased people. A study on 5 to 14 years old children from Brazil (Braga et al., 1998) shown an association between microfilaraemia and use of bed-net in addition to number of individual per household, presence of microfilaraemia in the household and length of time living in the area. The hypothesis that affluent groups are better able to protect themselves from mosquitoes by using bed-nets, by using mosquito repellents and by having better quality housing is to be tested. A study of Grove et al. (1978) on agricultural community of Philippines has linked income or wealth variables with microfilaria prevalence. They developed an index of wealth based on the existence of internal plumbing, ownership of land, buffaloes and radio, and found that prevalence of infection and disease were negatively correlated with the index. There are some studies showing association between disease prevalence and household environment. Raccurt et al. (1988) showed that he prevalence of microfilaraemia in Haiti was greater in areas surrounding a rum distillery, which produced waste material, in which the vector bred. El-Ridi et al. (1984) and Hyma et al. (1989) suggested that prevalence was greater in the slums of urban areas in Egypt and India respectively, which is due to poor sanitation.

None of the studies including the present study could infer any association of infection/ disease prevalence with household environmental or behavioural aspects. None of the studies provide conclusive evidence that the difference in disease prevalence within communities can be attributed to actions which individuals have taken to alter the chance of acquiring lymphatic filariasis. It is understood that it is not possible to identify individual risk factor for this complex disease. Most of the people within the endemic community eventually became infected, and no specific risk factors have yet been identified that predispose individuals to a particular type of pathology. This implies that control programmes must be aimed at community level rather than at individual level.

KEY WORDS Lymphatic filariasis. Elephantiasis. Hydrocele. Human Behaviour. Risk Factors. Orissa. India.

ABSTRACT The present paper reports the results of an investigation into household environment and their behavioural patterns related to lymphatic filariasis in rural coastal Orissa, India. It could not infer any association of disease condition with any household environmental or behavioural aspects except the housing type and use of mosquito repellents. It is understood that it is not possible to identify individual risk factor for this complex disease. Most of the people within the endemic community eventually became infected, and no specific risk factors have yet been identify that predispose individuals to a particular type of pathology. This implies that control programmes must be aimed at community level rather than at individual level.

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