SOCIO ECONOMIC FACTORS INFLUENCING THE PERSISTANCE AND CONTROL OF FILARIASIS IN KERALA - A CASE STUDY OF MALAYAN FILARIASIS IN CHERTHALA

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CERTIFICATE

Certified that the thesis entitled " Socio economic factors influencing the persistence and control of filariasis in Kerala-A case study of malayan filariasis in Cherthala" is the record of bona fide research carried out by Smt. B. Nandha under my guidance. The thesis is worth submitting for the degree of Doctor of Philosophy under the Faculty of Social Sciences.

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DECLARATION

I declare that this thesis is a bona fide research carried out by me under the guidance of Dr. Mary Joseph, Reader, School of Management Studies, Cochin University of Science and Technology. I further declare that this thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title of recognition.

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B.Nandha

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CHAPTER I

1. INTRODUCTION

The World Health Organization in the preamble to its constitution in 1948 set forth that "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition". Although health is recognized as a fundamental human right it is essentially an individual responsibility (WHO, 1973, 1977). In 1977, the World Health Assembly resolved that the main social target of Governments and of the World Health Organization in the coming decades should be 'the attainment by all citizens of the world, a level of health that will permit them to lead a socially and economically productive life - a goal that is termed as 'Health for All' by the year 2000 AD (WHO 1979,1981).

United Nations in 1979 adopted 'health as an integral part of socio economic development'. Health has also become a major instrument not only for overall socio economic development of the community, but also for the creation of a new social order (WHO, 1980). Health is a pre requisite as well as integral part of development. For instance, control of malaria epidemic led to a rapid economic development in many countries including India. Developmental projects which have neglected the health aspects have increased the spread of certain diseases e.g. Schistosomiasis, filariasis, malaria (Park *et al.*, 1986).

Developments in social sciences revealed that disease is a phenomenon of both biological and social nature. There are not only biological factors, but also social, cultural and psychological factors (non medical dimensions) which must be taken into consideration in defining health and illness. Therefore, health does not exist in isolation, it is influenced by a complex of genetic, environmental, social and economic factors related to each other. A permanent improvement in health is unlikely to be achieved without a corresponding improvement in the underlying social and economic conditions (Park, 1986). Consequently, health of a community is intimately related to its economic status and its social and political organization. There is little doubt that in many developed countries it is the economic progress that has been a major factor in reducing morbidity, increasing life expectancy and improving the quality of life.

The basic health issues in developed and developing countries in the second half of the 20th century show a major qualitative difference. In developed countries increasing number of diseases are caused by stress related factors, while in developing countries most diseases are caused by poor socio economic and environmental factors (Mc Robie & George, 1981). The economic characteristics of developing countries are reflected in their health characteristics. Infectious and parasitic diseases represent the most significant health problems. Vector borne diseases tend to be less serious as causes of mortality but are major problems as causes of morbidity in certain areas (Lee & Mills, 1985).

It is an established epidemiological finding that the prevalence and distribution of diseases is strongly influenced by economic factors. Life style is the most important factor influencing health and behavior today. It covers many aspects of human behavior like customs, culture and habits of human societies which favor the spread of disease including psychic factors. The psycho-social environment of man is unique and it is his own creation. It includes a complex of psycho social factors such as culture, customs, habits, beliefs, attitudes, religion, education, occupation, standard of living, social and political organization etc. Most of the social and economic factors are linked to life style and human behavior. Socio economic level is also an important variable in accounting for response to illness because in a very gross way differences in socio economic level encompass differences in health values, information concerning diseases, preventive planning, cultural expectations concerning health services, feeling of social distance between oneself and health practitioners and so on (Mechanic, 1969). Tropical parasitic diseases are intimately associated with human activity. In addition to their impact on human health, these diseases may produce severe social and economic effects. In a similar manner social and economic factors influence the extent of disease transmission and the applicability of disease control methods (Rosenfield, 1986).

Disease, disability and deformity has been man's heritage and it continues to be so, although it's pattern is changing. The relationship between man and his environment is a dynamic one and is also changing, either man alters his way of living to suit his environment,

or he modifies his environment to suit him (Malcolm, 1983). In this process, during the past half century the number of people at the risk of developing tropical diseases has increased (World Bank Report 1993). At least one quarter of the world's population are at risk from parasitic infections and majority of these infections are confined to the socio economically deprived areas (Rosenfield, 1984).

The past and current studies on the epidemiology of tropical diseases have vastly improved our ability to map the prevalence and incidence of specific tropical diseases in major areas of the world. While certain tropical diseases have now become less important than in the past, others have reemerged to cause serious concern at present. These diseases compound the already difficult task of achieving higher levels of human well being in rural communities of the developing world. These diseases are usually debilitating and sometimes lead to death. Morbidity and debility in addition to reducing income-earning capacity are in themselves unpleasant and thus justify some expenditures to reduce or avoid them. Moreover, morbidity and debility inflict diverse physical limitations and levels of discomfort depending on the individual and household circumstances. While a great effort has been made in the past towards understanding the epidemiological factors of disease transmission, especially emphasizing the life cycles of the parasites and their intermediate non human hosts or vectors, some attention has been given only recently to the role of human behavior in disease of disease transmission and for implementing appropriate control measures.

Among the various tropical diseases lymphatic filariasis has received adequate attention in recent times to strengthen research activities in social science aiding the control of the disease. Filariasis which is commonly known as elephantiasis is an important vector borne disease in the country. Vector borne diseases are common in rural India. Although some diseases are transmitted in urban areas, it is in rural areas where people are often at risk year round from one or more of the tropical diseases. If vectors are present along with infected humans, it will result in transmission. However vector control programs generally undertaken by governmental agencies have frequently yielded limited results because the villagers have tended to be passive onlookers rather than active participants (Rajagopalan & Panicker, 1986). Promotion of health and prevention of disease constitute the positive aspects of health and require much more conscious self-effort on the part of the people than the treatment of the disease (Sandhu, 1976).

The process of filarial uransmission is described as the agent-host-environment cycle with a triangular relationship. To prevent this disease the cycle could logically be disrupted by unhinging any one of its links. The mosquito, the intermediate host which is called 'vector' plays an essential role in the life cycle of the disease organism. The filarial parasite undergoes a portion of its life cycle in both the insect vector and the human host. When the vector feed on an infected host they draw into their stomach blood and tissue fluids along with disease causing organisms. Although the blood and tissue fluids are digested the disease organism

remains intact and may therefore be harboured to undergo an essential development in the life cycle within the insect vector. When the vector after an interval of time sufficient for the disease organism to complete its development, bites a human it usually transfers the disease organism along with its saliva (Bryan 1979). Thus the transmission occurs between humans through vector contact.

Prevention is accomplished by attacking the agent-host-environment triology at its vulnerable points. The sequence could be disrupted by altering the host to a non susceptible one or by blocking the organism's route by finding a means of killing the agent at its source. At this intersection, it is important to consider the socio-economic and cultural factors of the community as many of these factors are known to influence the persistence and control of filariasis. To make a change in the human factor, manipulation of these factors need to be explored. Transmission is not determined simply by biological and environmental factors however, but can also be influenced by socio economic variables particularly through the creation or destruction of breeding sites (Mak, 1986). An initiative to diminish the misery caused by filariasis is to promote research into the socio economic aspects of lymphatic filariasis (WHO, 1992).

1.1. Relevance of the study:

For many tropical diseases important barriers to progress are presented by the community itself by way of participation and compliance behavior. The success of disease control depends on the consideration of human behavior impediments. The apathetic attitude of the community may be traced to the traditional beliefs and practices regarding the causation and treatment of the disease. Even though control operations are often accepted by the community, they did not have the practice of following it up.

While culture helps man to adjust to his environment, it also interferes with his biological adjustment in many ways. Every culture offers many examples of patterns harmful to man's physical well being. The pattern of parasitic transmission in a given locality is a product of complex and dynamic interaction of the host, parasite and the environment. The relative significance of each variable vary with the situation. Among the most important host factors that influence the transmission of parasitic infection, culturally determined human behavior and socio economic status of the community are of prime importance.

For brugian filariasis, the host is the human being, agent the mosquito and the environment is the hydrophyte which promote the breeding of vector mosquitoes. In view of elimination of this disease, it is essential to bring a change in the attitude and practice of man

for effective implementation of any control strategy. This is because change in the human factor alone enhance the programme effectiveness.

The major emphasis with regard to filariasis control is on elimination of the parasite and its non human vectors through drugs to kill the parasite in people and pesticides to kill the vectors. Each of these control methods has its drawbacks (Rosenfield, *et al.*, 1980-81). The chemicals used to kill the vectors are also effective only in the short term and do not prevent re-infestation of vector habitats. Moreover each of them require a certain understanding on the part of the population at risk. This indicates the paramount need to undertake a study of the factors influencing the persistence and control of filariasis.

In general the behavioural sciences have contributed very little to filariasis research. Man's actions in creating vector breeding sites have been noted and discussed frequently in the filariasis literature, but virtually no systematic studies of these forms of behavior have been undertaken (Dunn, 1979). Human behavioural observations and inquires into values and attitudes affecting behavior that inhibits or promotes vector breeding are essential if any progress is to be made in developing self help programmes of vector control. Therefore, a systematic study on the socio-economic aspect of the community is warranted before undertaking any control programme against filariasis.

In view of this the present study has been carried out which reveals the knowledge, attitude and practice concerning the causation, transmission, treatment and control of the disease. Socio economic factors that influence the creation and maintenance of vector breeding habitats were identified. characterization and ranking of these sociological factors will be helpful in identifying the determinants of human behavioural changes towards the containment of the disease. Information on the existing indigenous perception of the disease and the factors that hinder the control will be useful in developing a sound strategy from the human angle, which can be put to practical use.

1.2. Objectives of the study:

The main objectives of the study is to identify and explain the socio economic and cultural factors underlying filariasis transmission and control. It aims to determine people's knowledge and cultural beliefs about filariasis etiology, transmission and symptoms, attitudes towards the disease and to determine the behavioural risk factors.

This includes:

1) A study of the human behavioural determinants resulting in the creation and maintenance of vector breeding sources.
2) Finding the relation between knowledge, attitude and practice with regard to filariasis transmission and control.

1.3. Methodology:

The study was carried out in Cherthala taluk, Alapuzha district, Kerala. This lies in the central coastal part of Kerala and is known to be endemic for brugian filariasis for more than five decades (Iyengar, 1938). This taluk is divided into 18 panchayats and 1 municipality. There are 95,875 households in this area with a population of about 4,77,819 (as per 1991 census). The panchayats for the study was selected based on the endemicity of filariasis. The panchayats were divided into three strata depending on the endemicity rate i.e. stratum 1 with high endemicity rate areas, stratum 2 with medium endemicity areas and stratum 3 with low endemicity areas. From these three strata two panchayats each were selected using the random method.

From each panchayat three categories of respondents were selected namely normals, Microfilaria positive cases and chronic cases of elephantiasis. Microfilaria positive cases are those having filarial parasite infection. This is a stage of filariasis in which an individual may harbour parasite without suffering functional impairments (Manun'ebo, *et al.*, 1994). A list of microfilaria positive and chronic cases of filariasis were collected and a random selection was done. Normals were also selected using the random method. Thus a two stage (area and respondent) random sampling method was used to select the respondents.

List of Panchayats in Cherthala taluk and their endemicity rates

Stratum	Sl.no	Name of Panchayat	Endemicity rate
I	1	Mararikulam	10.55
I	2	Cherthala South	13.97
I	3	Kadakkarapally*	15.47
I	4	Pattanakkad*	15.49
I	5	Vayalar	11.89
I	6	Cherthala municipal area	13.95
II	7	Kuthiathode*	6.00
II	8	Kodumthuruth*	8.31
II	9	Aroor	5.58
II	10	Thaikattussery	5.01
II	11	Thanneermukkam	5.56
III	12	Thuravoor*	3.54
III	13	Kanjikuzhi*	4.88
III	14	Panavally	0.55
III	15	Perumbalam	1.59
III	16	Pallipuram	4.03
III	17	Muhamma	3.41
III	18	Arookutty	0.11
III	19	Ezhupunna	0.76

Iyengar, M. O. T. (1938) Studies on the epidemiology of filariasis in Travancore. *Indian Med Res Mem.*, **30**: 33-8.

* Selected panchayats for the study.

As the study involves the knowledge, attitude and behavior of the population regarding the persistence of filariasis, households were taken as a unit. Random selection of 25 households each in normal category, microfilaria positive and chronic cases were done in each panchayat. A total of 450 households were selected for the study. An average of four

members of each household, two elders and two youngsters above the age of fifteen constitute the respondents of the study.

The study used both qualitative and quantitative data collection methods, since no single method could answer all the research questions and objectives being investigated. Method of data collection used was the semi structured interview utilizing a pretested schedule (TDR/SER/RP, 1994). An interview schedule was prepared to collect the required data. The schedule developed for this purpose combines questions that were structured and questions that were open ended and gave enough flexibility to accommodate various responses. Though this was the main tool for data collection the study has also resorted to uncontrolled observation, and focus group study (Dawson, 1993; Kitzinger, 1994 & 1995 and Feyisetan, 1994) which were helpful in understanding the qualitative dimensions of the problem.

The questionnaires were pretested on 50 people and any ambiguity in the question was corrected before the actual study was undertaken. The questions were in the order of knowledge about filariasis and its transmission, about water weeds including its uses and attitudes towards the proposed use of the plant and their real practice in the control measures of filariasis.

The Focus Group Discussion (FGD) is a qualitative research method increasingly advocated in medical research (Palm & Windhal, 1988; Khan & Manderson, 1992;). Focus group discussions are informal sessions in which participants are asked to discuss their perception on a specific topic. The discussions were specifically designed to yield information on the community's beliefs, values and understanding of health problems (Bash, 1987; & Jaffre and Prual, 1994) and permit rapid assessment of barriers to health behavior (Coreil, *et al.*,1989). A focus group guideline and a question guide was carefully designed and note taking facilitated data collection. The data was transcribed and translated. The content was analyzed. Three focus group discussions were conducted with 6-8 group size in the three endemic areas with high, medium and low endemicity rates. Participants comprised community leaders and knowledgeable community members. The members were selected by convenience sampling by picking out those persons who could provide the best information for the discussion and who were willing to participate. Their average age was 42 years.

The field survey was a revealing experience and it provided an excellent opportunity for gathering the required information. But, there were several difficulties in locating the households of microfilaria carriers. The interview was normally lengthy and took nearly two hours to complete. In several cases the interviews turned out to be a collective affair where members of several households participated and voiced their opinion on matters of common interest. The collective encounter were also advantageous in another respect that it could

highlight certain common practices and could also expose incorrect and indifferent responses. It took nearly four months to complete the field work.

1.4. Analysis of data:

The data collected through the interview schedule was substantial. They were coded appropriately especially the responses of open ended probing and fed to the computer for processing. Epi-info, Qartter Pro and SPSS software were used to analyze the data.

1.5.Limitations of the study:

The inadequacy of secondary data was one of the main limitations of the study. There were several difficulties in locating the chosen household. The similarity of names of the microfilaria positive also gave rise to a lot of confusion and it was time consuming. More over the microfilaria positive were hesitant to reveal that they were positive for filariasis once. The interviews with them took more time than the other two collections due to these reasons.

1.6. Organization of the study:

The study is organized in eight chapters. Introductory chapter gives a review of the

developments in the concept of socio economic factors of filariasis. This section includes objectives of the study, relevance of the study and concludes with the methodological design adopted for the study. The second chapter discusses the review of literature on the subject. The following chapter concentrates specifically on the prevalence of filarial disease. The fourth chapter is on the Study area and its characteristics. The fifth chapter discusses the Theoretical framework of the study. The sixth chapter discusses the data collected from the field on the community's perceptions of the disease. The next chapter concentrates on the relation between the perception and behavior of the study population. The final chapter provides a summary and conclusions.

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CHAPTER II

2. REVIEW OF LITERATURE

More than a hundred reports on various socio-economic aspects and consequences of filariasis and other related parasitic diseases were reviewed.

2.1. Historical note:

The earliest record of filarial infections in India dates back sixth century B.C by the famous physician Susrutha in chapter 12 of the Susrutha Samhita (Raghavan, 1957). The description of the signs and symptoms of this disease by Madhavakara (seventh century A.D) in his treatise Madhava Nidhana (chapter 39) holds good even today. According to its fundamental conception, Indian medicine attributed elephantiasis, Slipada to the derangement of the three dosas, wind (vata) bile (pitta) and phlegm (kapha). In the law books, elephantiasis was regarded as a punishment by destiny for the breach of vow of chastity in an early birth (Susrutha Samhita Bishagranta, 1911). Clarke in 1709 named elephantiasis of the legs in Cochin, South India, as "Malabar legs" (Anonymous, 1961).

For treatment, Indian physicians used blood letting (also recommended by numerous Greeks and Romans) and different kinds of plasters and ointments. They also applied heat. The patient was advised to eat or drink castor oil with urine for a month or take enemata. Slipada of more than a year's duration was regarded as incurable (Sasa, 1976).

The discovery of microfilaria in the peripheral blood of infected human hosts was made first in India by Lewis (1872) in Calcutta. In 1892 the role of mosquitoes in transmission of this disease was first reported by Manson in India. Spot surveys of filariasis were conducted in India before World war II by a number of workers such as Cruick Shank and Wright (Sasa, 1976) in Cochin. The earliest detailed report available on the prevalence of this disease caused by *Brugia malayi* infection in Kerala was by Iyengar (1932). It revealed that endemicity rate was as high as 48.1% in Cherthala region. Subsequently, Iyengar (1932, 1933 & 1938) conducted detailed epidemiological studies on filariasis in different parts of Travancore Presidency (Kerala) and confirmed the prevalence of this infection in various regions of central coastal part of Kerala. The adult worms of *B. malayi* then called as *Filaria malayi* of Brug (1927) were first discovered and described by Rao and Maplestone (1940) from a patient in Kerala. Three species belonging to the genus *Mansonia* of the subgenus *Mansonioides* were incriminated as main vectors of *B. malayi* in Kerala (Iyengar, 1932, 1933 & 1938).

2.2. Epidemiology of filariasis in Kerala

Filariasis has been reported to be persisting in different regions in this state with high prevalence among those residing in the low land coastal belt. Both *W. bancrofti* and *B. malayi* species are present and the latter is more prevalent here than in any other state of India (Sharma, *et al.,* 1976). A low coastal belt with many inland waterways and lagoons is the zone with most of the filariasis (Hawking 1973).

Filariasis in Kerala has been intensively investigated during the past six decades under the National Filaria Control Programme (NFCP). Filaria surveys were carried out by two units during the period from 1955 to 1960. Until 1969, 20 control units were functioning in the state. All nine districts in the state have been covered by the surveys and the population exposed to the risk of filariasis as estimated in 1964 was 4.0 million out of a total population of 16.9 million. Only 1.25 million people are being protected by antilarval measures (Basu *et al*, 1967).

Based on the survey results under NFCP in the coastal part of Kerala, the distribution of filariasis was reviewed by Joseph and Prasad (1967). Both *W. bancrofti* and *B. malayi* are found often co-existing in the same areas but the former is usually more prevalent in urban areas while the latter is mainly a rural infection. High microfilaria rate (13.6%) was observed

in Alleppey (both types of infections). Iyengar in 1932 reported that the type of filarial infection occurring in two adjacent coastal areas in North Travancore namely Cherthala and Ambalapuzha was different from the infection observed in other parts of India. This microfilaria was quite similar to *Filaria malayi* described by Brug (1927). Iyengar (1938) compiled a detailed report on the epidemiology of filariasis in Travancore. The taluks with extensive filarial incidence were Cherthala, Ambalapuzha, Kartikappalli, Karunagappalli, Vaikom and Paravoor.

Extensive studies on the epidemiology and transmission of *B.malayi* infection in India were made for the first time in India by Iyengar (1938). Bionomics of mansonoides mosquitoes including the egg laying habits, larval development, host plants, seasonal incidence of larvae and adults and feeding habits were investigated in detail. Based on this study Iyengar recommended control measures to the then Maharaja of Travancore to be undertaken in Cherthala and Ambalapuzha taluks. In Cherthala, the main measure for *B.malayi* control in the selected area of about 25 sq.miles was the removal of *Pistia* (the host plant of mansonoides larvae) by hand and was launched in October 1934 with special workers. Considerable reduction in mansonoides mosquitoes was observed as compared with the number of catches from an area without such operation. Blood surveys conducted in April 1937, three years after the introduction of the programme showed no new infection among seventy one two-year old children in the operational area where as 11 out of 56 children of

the same age group in the area with no such operation were found infected.

The first blood survey conducted by Iyengar (1938) showed very high endemicity rates ranging from 31.2% to 65.2% in different localities. The average microfilarial rate in this area was 29%, exclusively with *B.malayi* infection. Subsequently Jaswant Singh *et al* (1956) conducted epidemiological and entomological surveys of filarial infections in Cherthala Taluk and found that blood survey covering 3.3% of the total population for infection and disease signs showed that 20.9% showed infection and 23.8% clinical manifestations of filariasis. The youngest age of microfilaria carriers and clinical manifestation was one year old girl and three year old boy respectively.

Pilot studies were carried out in Cherthalla on the control of filariasis due to *Brugia malayi* in 1960 (Joseph *et al.*, 1960). The measures adopted to control mansonioides mosquitoes included indoor residual spraying with dieldrin and physical removal of hydrophytes. Diethyl Carbamazine Citrate (DEC) was used to treat microfilaria carriers as parasite control. The indoor application of dieldrin reduced the density of mansonia the main vector of *B.malayi*, but it had led to the remarkable increase in the prevalence of dieldrin resistant *Culex* mosquitoes. *Pistia* clearance was a lengthy process which had to be carried out continuously throughout the years; it was found impractical over large areas. Mass therapy with DEC was not a feasible preventive measure against *B.malayi* in Kerala because

with the best efforts, it had not been found possible to cover more than 50% of the target population due to refusals to take the drug for fear of adverse reactions.

2.3. Misconceptions about filariasis

Carme (1979) in his studies about the origin of the disease found that among the 127 patients interviewed who were suffering from filariasis in Tahiti, ancestral beliefs are still widely held. This is even after 25 years of antifilarial campaigns which have resulted in a drastic decrease in endemicity with almost no clinical incidence. It is disappointing that the involvement of mosquitoes is denied by a majority of patients. The explanations are to be found in the unusual evolution of this disease and in the small importance attached to sanitary education.

The publication on community participation in filariasis control gives the result of two studies carried out during the implementation of the filariasis control projects and immediately after the project operations. The two studies found that even though people had accepted the filariasis control project and participated at different levels in the research and control activities of the project, they still believed in causes other than mosquitoes and did not recognize mosquito control as the appropriate way of controlling filariasis (Muhondwa, 1983).

Lu *et al* (1983) investigated people's knowledge, attitude and practices with regard to filariasis in the Philippines. It was found that the disease is believed to be caused by exposure to coldness through contact with cold water after heavy work or via an open wound in the legs. The respondent could not distinguish between causation and transmission and only 39% felt that blood examination and physical examination could be a way of identifying filariasis. The majority of respondents believed that filariasis may be corrected by treatment such as surgery and medication, and that it could be prevented by refraining from carrying heavy loads and avoiding exposure to water.

The investigation on comparison of knowledge on filariasis and epidemiological factors between infected and uninfected respondents in a malayi community by Riji (1986) showed that the majority of respondents, whether infected or not, had some knowledge on filariasis. Education or sex did not seem to make a difference in the level of knowledge. But less than 10% in both groups said that filariasis was contracted through mosquito bites. Among the infected 14.8% thought that the filarial worm entered the human body through the consumption of unhygenically prepared food. The majority of respondents felt that susceptibility to filariasis had something to do with personal hygiene and proper meals.

A study on the knowledge, attitude and practices of the people of Sorsogon (Lu *et al.*, 1988) found that the disease is equated with signs which characterize later stages of filariasis

there by diminishing chances of an early detection. People believe the disease is caused by entry of coldness into a persons body through contact with water after heavy work.

In a recent study carried out in Cherthalla on Disease prevalence and misconception (Suresh & Panicker, 1989) it has been shown that age, education and economic status are the major demographic factors which have correlation with misbelief on the disease. High age, low education and low economic status are the attributes of misbelief bearers.

2.4. Socio-economic research on tropical diseases:

Six diseases viz. Malaria, Schistosomiasis, Filariasis, Trypanosomiasis, Leishmaniasis and Leprosy were chosen by WHO in collaboration with UNDP and World Bank as a compliment to its biomedical correspondents. Special Programme for Research and Training in Tropical Diseases initiates studies in 1979, on social and economic research which is open for participation to scientists on a world wide basis (WHO 1983).

Mushkin and Landefeld (1979) have analysed the general issues in evaluating the benefits from resources spent on reducing mortality and morbidity and biomedical research. Difficulties in measuring these parameters have also been emphasized. Prescott (1979) has critically reviewed the literature on the economics of three major parasitic diseases that

included malaria, filariasis and human Trypanosomiasis.

The second meeting of the scientific group on social and economic research recommended certain guidelines to assess the social and economic consequences of the tropical diseases (WHO, 1980). The report on the epidemiological, social and economic aspects of present and future methods of Chagas disease control, identifies various social and economic issues which should be further researched in order to improve control programmes, community participation and health education about Chagas disease.

Rosenfield (1980) emphasizes the need for designing socially and economically appropriate efforts to control the parasitic diseases in the developing countries. It is further concluded that by demonstrating the causes and consequences of the tropical diseases and the importance of social and economic aspects in controlling them, special research projects can provide the basis for designing and supporting needed control programmes which are both appropriate and effective. The success of such control programmes is essential if tens of millions of human beings are to have success in overcoming the myriad of barriers which are currently preventing them from sharing the benefits of economic development.

The issues and methods in assessing the social and economic consequences of tropical diseases have also been reviewed (WHO, 1980). A conceptual framework has been

suggested for further research and guidelines for research design, methodologies and implementation. Swollen leg in filariasis and blindness in onchocerciasis have been identified as handicaps and disables and included in international impairments, disabilities and handicaps (WHO, 1980)

Death may be a common consequence of the disease, which may influence the behaviour even of those who are only threatened by the disease (Popkin 1982). A household framework developed for examining the social and economic consequences of tropical diseases proposes to focus on the relationships between tropical diseases and their effects on the health status and functional capacity of the individual. By using a broadly conceptualized newhome economic framework the ultimate effect on the social and economic performance of the individual and household can be assessed (Popkin, 1982).

Assessment of a programme depends on the objective. Programmes may aim at halting transmission, reducing the number of persons infected, lowering the intensity of infection, slowing the emergence of chronic disease or minimizing the impact of disease on the economic and social life of victims (Klarman 1982). It is possible to control tropical diseases through changes in man's physical, social and economic environment (Malcolm, 1983).

While discussing the socio-economic considerations in the management of tropical pests and disease vectors, Rosenfield (1984) stresses the importance of taking into consideration cultural and economic factors when developing successful and realistic management strategies for tropical pests and vectors. Although important, physical, chemical and biological measures are not sufficient in themselves, they need to be complemented by measures to modify those human activities which increase pests population and lead to greater contact with disease vectors. Measures are also needed to increase people's acceptance of control methods. An optimal combination of measures will depend on knowledge of the underlying social and economic conditions and the availability of the appropriate technology.

Andreano (1983) in the economic issues in disease control and eradication, examines some of the methodological and measurement issues in assessing benefits and costs of vertical disease control and eradication projects. The paper also discusses the impact of improved health on rural output and employment, first in a simplified model and then in connection with the target group, or group at risk approach to disease control. A model and a framework for conceptualizing the relationship between the socio-economic circumstances of a household and the health care provided by the state have been developed (Hewavitharana, 1983).

Kaseje (1983) describes how a community can organize itself to address priority health problems. However, in the case study with malaria, it was reported that popular knowledge about the cause of malaria seemed to have changed very little during the project period in any of the areas. It has been shown in the control of bancroftian filariasis in rural areas that when the community is committed and actively involved in planning and implementing the anti-larval control operations the programme through community is feasible and effective (Narasimhan, 1983).

A brief overview of the research activities in 1983-84 of the social and economic research component of the UNDP/World Bank/WHO Special Programme on Training and Research in Tropical Diseases illustrates how some of the research results have been used in disease control activities in different countries (WHO, 1984).

While discussing the economics of parasitic diseases and research priorities, Rosenfield (1984) outlined that most of the studies which attempted to analyze the economic consequences of parasitic diseases and the economics of their control have usually relied on the tools of cost benefit analysis. They have not taken into account the epidemiology and natural history of the disease in estimating the associated economic losses, there by leading to inappropriate conclusions. To improve the usefulness and reliability of such studies, common protocols of conceptual and methodological approaches have been suggested and this

includes four components:

1. Baseline social, economic and cultural conditions influencing disease transmission.
2. Resources already invested in the health system and investments in other related sectors such as agriculture, housing, water supply and sanitation.
3. Health consequences resulting from (1) and (2) and,
4. Social and economic consequences resulting from (3).

This conceptual framework consist of baseline factors such as physical environment, social and welfare service infrastructure and household economic and social endowments which act as inputs to health promotion. The health outputs are the status measured in terms of morbidity and mortality as well as levels of impairment resulting from those outcomes. These health outputs form the basis for measuring the social and economic outcome or consequences of disease. The results of such studies could be used to inform national decision makers about the social and economic consequences of the parasitic diseases and their control and thus, should strengthen support for increased investment to reduce the parasitic disease burden in developing countries.

Emphasis has also been given to the necessity of fundamentally interdisciplinary approach, drawing on fields such as parasitology, vector biology, epidemiology,

anthropology, social psychology and sociology. Accordingly, sound evidence on the effects of disease and disease control on individuals and society can be obtained and analysed by utilizing skills and insights from the disciplines and possibly from the project community itself. It is further reported that morbidity and debility in addition to reducing income earning capacity are in themselves unpleasant and thus justify some expenditures to reduce or to avoid that. Moreover morbidity and debility inflict diverse physical limitations and levels of discomfort depending on the individual or household circumstances. Detailed management of physical impairment due to the diseases and their linkage to intensity of infection and severity of disease has only rarely been undertaken. Despite the widespread occurrences and obvious importance of these diseases, a few systematic studies of their impact on the lives of people are available.

In the review of social determinants of tropical diseases, the extended range of factors influencing or affecting disease transmission and the effectiveness of disease control are described (Warren, 1984). Social science and medical researchers have recently realized that changing attitudes and behaviour is not sufficient to reduce disease transmission and improve acceptability of control programmes. The scope of "social determinants" has now been broadened to take into account contributing factors other than individual (or community) behaviour and attitudes.

Two implications of the disease by the household have been outlined (Rosenfield, 1984). First the loss of marketable output due to an episode of disease and second, the impact of disease is likely to pervade the activities of the household. Endemic diseases affect the behaviour and well being not only of persons who fall ill but also of those who perceive themselves to be at risk from the disease and family members caring for the ill.

Malaria in relation to economy, culture and housing in Uraba was analysed by Agudelo (1987) which showed that three categories of conditions seemed to determine the differential distribution of malaria in the studied population: individual conditions especially age and sex, ecological, environmental and weather conditions, and socio economic conditions especially type of work, activity and living conditions.

2.5. Human behaviour and Tropical diseases:

Celia (1989) concludes that the behavioural factors relevant to the transmission of the filarial nematodes have been particularly neglected. The human behaviour which is important in promoting or inhibiting vector breeding is in particular need of research attention. Findings of this nature would assist in the design of more useful health education programmes. Mott *et al.*, (1990) in the article on Parasitic diseases and urban development discusses the distribution and epidemiology of parasitic diseases in both urban and peri-urban areas of

endemic countries which have been changing as development progresses. Cultural and social habits from the rural areas, such as type of house construction and domestic water usage, are adopted by migrants to urban areas and increase the risk of disease transmission which adversely affects employment in rural populations. As the urban health services must deal with the rise in parasitic diseases, appropriate control strategies for the urban setting must be developed and implemented.

Ovuga *et al.*, (1995) report that based on the results of a part of a multi-centre study whose objective was to determine the prevalence of onchocercal skin disease and its associated psychosocial importance in Nebbi district, Uganda, indicate that onchocercal skin disease is associated with a variety of psychosocial, physical and economic effects. The disease also leads to stigmatization of affected persons and their families. The health related human behaviour and in the transmission and control of arboviruses is also discussed (Monath 1988).

2.6. Economic aspects in tropical diseases:

It has been suggested that considerable innovation is needed in the methods of study on economics of tropical diseases (Rosenfield, 1984). The socio-economic and environmental factors affecting tropical disease control are discussed in detail at the meeting of the

Economics of Tropical Diseases (Herrin, 1988).

The multivariate analysis of the data from a household survey (Fernandex, 1988) showed that the marked differences in malaria prevalence within the same geographic area were associated with socio economic characteristics of the places in which they live and especially work.

The report (Paquco, 1988) on the economics of health, environment and disease control in tropical diseases presents a model for a general equilibrium analysis which links individual activities to environmental quality and the transmission of vector borne diseases. The paper continues with a discussion of a decentralized health strategy based on individual initiative, competitive markets and internalization of costs and benefits.

Andreano's review (1988) on the economics, health and tropical diseases with reference to the past economic research on tropical diseases, points out the shortcomings both in terms of the application of traditional economics to the subject areas and in terms of topics covered. A multivariate analysis of the data from a household survey showed that the marked differences in malaria prevalence within the same geographic area were associated with socio-economic characteristics of individuals or groups and the environmental characteristics of the places in which they live and especially work (Fernandez, 1988).

Samarasinghe (1988) discusses some of the macro economic developments and policy changes which have had a direct bearing on Sri Lanka's health sector. The developments over the years with regard to malaria, filariasis and leprosy are used as examples.

Wijeyaratne (1988) in the socioeconomic considerations in the control of Leishmaniases describes the various aspects of the leishmaniases and their control. It identifies the socio cultural and economic factors which have to be addressed by researchers and health authorities.

2.7. Disease control programmes and socio-economic research:

Even situations where already disease control programmes are already implemented but with limited success, it is necessary to undertake socio-economic research to identify the bottlenecks. Banguero, (1984) describes that in spite of the progress made to control tropical diseases, many developing countries in the world still show high rates of incidence. The resurgence of the disease leads one to think that traditional methods of controlling malaria are approaching the saturation point, and a reassessment of the determinants of the problem is needed in order to identify social and economic factors that might be playing an important role by themselves or in association with epidemiological or health determinants of the disease. Therefore there exists no controversy for the necessity to understand people's beliefs

and behaviour patterns if disease control programmes are to succeed as discussed elsewhere

UNDP/World Bank (1986)Special programme for Research and Training in Tropical Diseases reveals that succession to the way of health for all by the year 2000 can be achieved only in terms of popular participation in those health programmes which actually change people's lives. In the remaining time to the year 2000, a major change must evolve within the medical social sciences if it is to reverse their trend. The concept of an "abstract health culture" recognizes the strength of social, economic and political influences on human behaviour and traditions.

The vast majority of health related behaviour are strongly influenced by social and cultural factors. Without significant input from the social sciences in terms of analyzing the contexts and determinants of individual risk taking behaviour, epidemiological data can only provide a generally weak basis for the design of sound prevention strategies. Chen (1986) indicated socio-economic studies as one of the future research priorities with regard to tropical diseases.

2.8. Filariasis control:

"Control of malaria and filariasis vectors in South India" summarizes two vector

control projects in India (Rajagopalan, 1987). Project elements were health education, co-ordination of health activities and income generating schemes which also contributed to vector control.

Mak (1986), while discussing the problems in filariasis control and the need for human behaviour and socio economic research reports that transmission is not determined simply by biological and environmental factors, however but can also be influenced by socio economic variables particularly through the creation or destruction of breeding sites. For example, since economic activities are known to facilitate transmission of *W. bancrofti* in India and Sri Lanka where the vector mosquitoes breed in water that collects in discarded coconut shells and in the ponds used to process coconut fibers. Rural urban migration and urbanization also interact to facilitate the spread of *W. bancrofti* infections. This is believed to occur largely as a result of inadequate waste disposal and sanitation facilities, providing breeding sites for the vectors although the crowded nature of living conditions in urban areas in developing countries must also aid transmission.

Students' community has been identified as a potential force Nandha (1991) and the methods to motivate the students in disease vector control programme have been outlined with a case study to control brugian filariasis. Methods of motivating the community to screen individuals for filariasis through the filarial detection and treatment centres and

achieving intersectoral collaboration for the control of filariasis have been evolved and demonstrated successfully (Sabesan, 1991).

Fish culture as an income generating programme was demonstrated with vector control as a by product to control brugian filariasis. This economic incentive attracted the community to sustain the programme and the goal of controlling filariasis has been achieved (Panicker *et al.*, (1992). The importance of intersectoral collaboration has been emphasized for the control of vector borne diseases. The approaches followed to achieve this have been demonstrated for the control of filariasis by involving agencies such as National Bank for Agriculture and Rural Development (NABARD) and State Agricultural Department (Snehalatha, *et al.*, 1992).

An innovative strategy by converting filariasis control programme into a people's programme' (Panicker *et al.*, 1992), was designed by involving the target community and demonstrated in one of the highly endemic villages in Alappuzha district of Kerala.

2.9. Socio-economic research in lymphatic filariasis:

WHO (1992) in the informal consultation on evaluation of morbidity in lymphatic filariasis discusses an initiative to diminish the misery caused by filariasis is to promote

research into the socio economic aspects of lymphatic filariasis. It is hoped that this initiative will help to quantify the social and economic burden to individuals, communities and nations. Such quantification will help to unravel the 'hidden losses' to communities and also highlight the need to accord a high priority to lymphatic filariasis in the health programmes of nations. IN order to estimate the socio economic burden, it is planned to carry out studies in several endemic areas using common protocols and methodologies.

So far no systematic studies have been carried out on the socio-economic factors responsible for the persistence of filariasis. Where ever human factor has been dealt, it has been done only in a general way.

Survey of literature on filariasis earlier to 1974 failed to reveal even a single comprehensive study of human factors (cultural, social, psychological, behavioural or economical) affecting transmission and control of these diseases (Dunn, 1983) and human behaviour has been largely neglected in research on the parasitic diseases (Dunn, 1976 & 1979). Though various aspects in the control of *Wuchereria* and *Brugia* were considered, behavioural perspective of this infection has received relatively little attention.

Rauyajin *et al.*, (1993) in the recent advances in the social and behavioral aspects of filariasis discusses that despite an increased awareness of the significance of social and

behavioral influences upon various aspects of filariasis, there has been a relative lack of research that has specifically attempted to assess such factors from the outset. The results of those few studies that have been conducted concerning the roles of behavioral (knowledge, attitudes, beliefs, practices) and socio-cultural factors are reviewed in this paper, highlighting how an acknowledgment of such factors contributes of a greater understanding of the relevant issues, thus allowing for more relevant and feasible health education/ intervention programmes.

In the paper on the Problems with filariasis control in the Philippines (Belizario 1993) problems with filariasis control in the country are presented and discussed according to the political, economic and social behavioral aspects. The true impact of the problem has not been described lately, hence the need for epidemiological, social and economic impact studies.

The work of Gyapong, *et al.*, (1996) on Filariasis in northern Ghana: highlights some cultural beliefs and practices and their implications for disease control and reports on how some endemic rural communities in northern Ghana perceive and manage lymphatic filariasis. The disease was mainly attributed to supernatural and spiritual factors. Issues related to marriage, stigma, concealment and leadership are discussed. On the whole, the importance of social and cultural perceptions of a disease and its relevance to control cannot

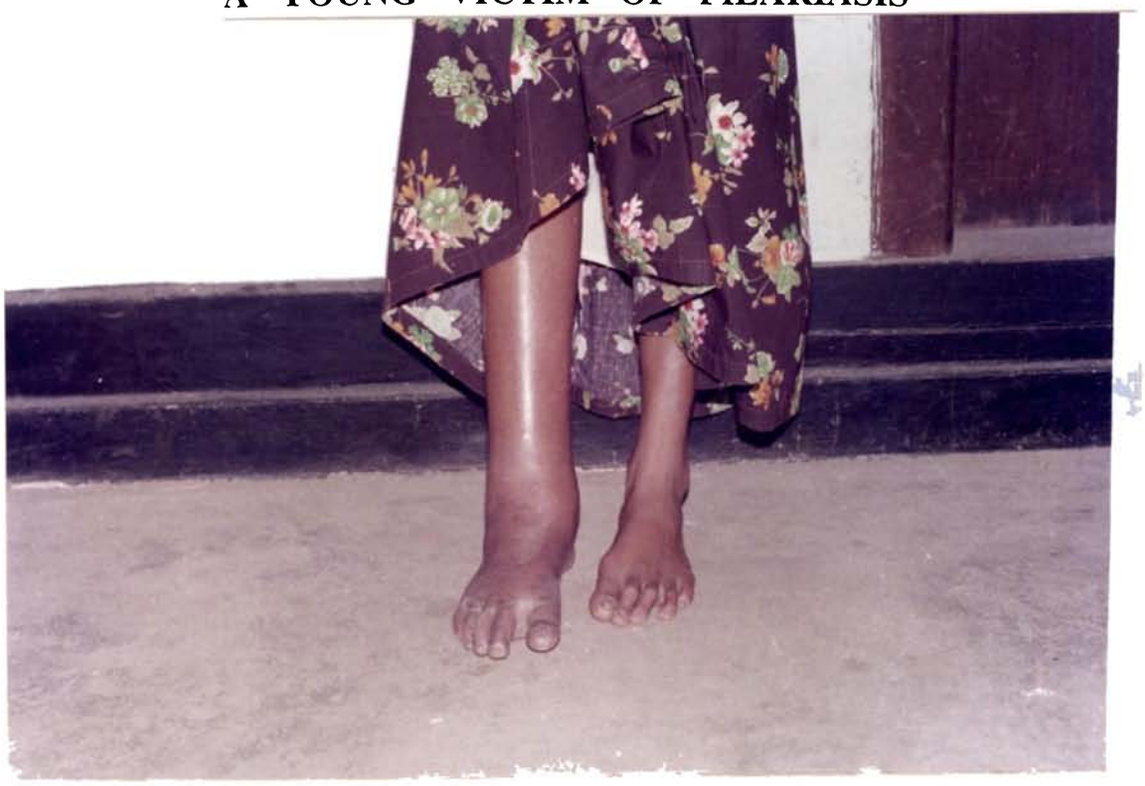
be over emphasized.

Studies on the social and behavioral aspects of filariasis transmission were conducted in the transmigration area of Kumpeh (Sudomo, 1993). Three methods were used in the study namely, interview, participation observation and focus group discussion. The community attitude towards control efforts against filariasis was positive, as evidenced by their readiness in being bled and their readiness to help change the environment which serves as mosquito breeding places.

A review on the social and economic factors and the control of lymphatic filariasis (Evans *et al.*, 1993) reveals that formal control programmes do not exist for lymphatic filariasis in much of the world. The literature on the social, economic and clinical impacts of the disease is so sparse as to provide virtually no guidance on whether the guidance should be accorded more importance in national or local public health programmes. This type of research is a major priority. Putting together what little is known about the socioeconomic determinants of filariasis with the fairly extensive experience in control leads to a finding that control programmes must be undertaken at the community level to be effective. The search for less expensive, yet effective, control options must continue, and this requires research not only into the costs of various options, but also into the determinants of community acceptance, compliance and participation.

The review of literature on various aspects of socio-economics of tropical diseases clearly shows the inadequacy of information which are essential for developing and or replanning appropriate intervention measures to control lymphatic filariasis. Therefore it is warranted to undertake systematic and in depth studies to elucidate required details on socio-economic aspects. In this context studies on the knowledge, attitude and practice of the community are felt essential in view of controlling filariasis.

A YOUNG VICTIM OF FILARIASIS



A CASE OF PAPPILOMATOUS ELEPHANTIASIS

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CHAPTER III

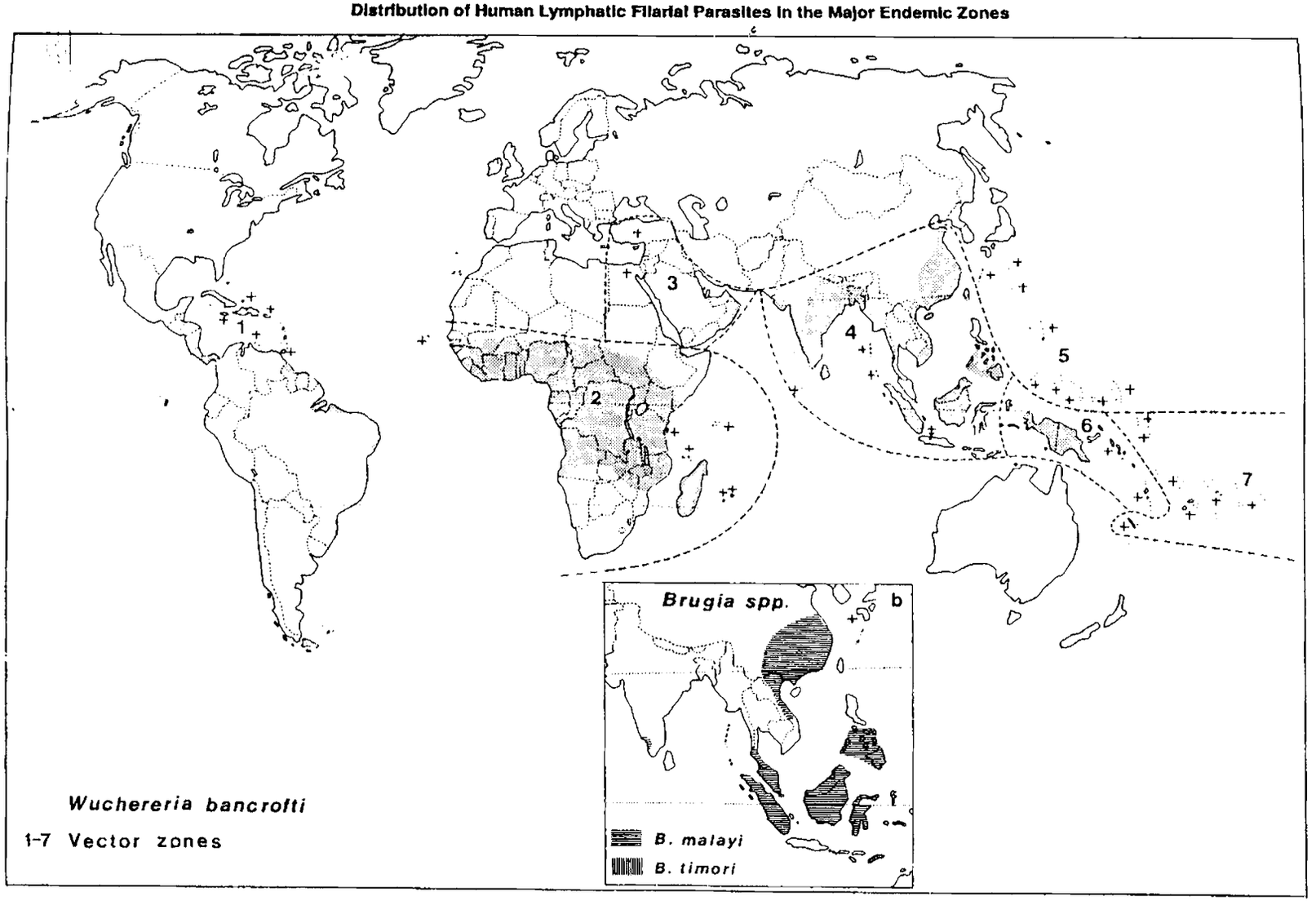
3. PREVALENCE OF FILARIAL DISEASE

Lymphatic filariasis is endemic in many tropical and subtropical countries of Africa, Central and South America, and Asia covering world wide a surface area inhabited by 2700 million people (56% of the world's population). 905 million people are at risk of infection and just over 90 million are actually infected (WHO, 1984).

Apart from their pestiferous nature mosquitoes play an important role in the transmission of human diseases. They act as vectors of many diseases in India.

3.1. Vector(s):

There is growing evidence that man made water bodies and pollution in both natural and man made water bodies can have a negative impact on health. These forms of pollution create conditions more favorable than before to intermediate hosts or vectors of parasite or infectious diseases (Hunter, *et al.* 1983) Mosquitoes are the most important single group of insects with regard to public health. It is a remarkably adaptable group with over 3000 species distributed throughout the world. Throughout human history



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mosquitoes have been a constant impediment to progress causing great suffering on account of their blood sucking habits and their ability to support and transmit disease causing organisms. They are well known as vectors of malaria, yellow fever, dengue fever, filariasis and most of the arthropod borne viral types of encephalitis.

Despite natural forces and the extension of environmental changes produced by man, mosquitoes continue to thrive wherever there are human populations. Since mosquitoes live in close association with man, traveling with and feeding on him, but existing for the most part as free living insects, they are particularly well adapted to harbor and transmit agents of disease. It is fortunate that a few species only are known to be natural vectors of disease.

Mosquitoes have four distinct stages in their life cycle namely egg, larva, pupa and adult. The first three stages are passed in water, but the adult is an active flying insect that feeds on blood or plant juices. The larva of all mosquitoes live in water. Although mosquito larva obtain their food from water, they must rise to the surface to breathe except larva of the genus mansonia which obtain air from the underwater portions of plants (WHO, 1972). The particular mosquito is transmitting brugian filariasis in the coastal belt of Kerala.

Among the vector borne diseases filariasis occupies a prominent position in India.

The major symptoms are attacks of fever, inflammation of the lymphatic system, a bronchial asthmatic condition and potentially the dramatically disfiguring disease, known as elephantiasis. A characteristic worth noting in filariasis is that filarial worms do not multiply in man. Hence, heavy infections, which are those most often causing disease in man, can build up only gradually as a result of repeated exposure to infection.

The consequences of filarial infection are many. All of these problems moreover have a cumulative, adverse impact on the individual, household, community and national levels (Rauyajin, 1995).

Filariasis is a group of diseases caused by nematode worms belonging to the order "Filarioidea" and transmitted to man by the infective bites of blood sucking arthropods (Sasa, 1976). Lymphatic filariasis is caused by three parasites *namely Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori* (Sasa, 1976). Filariasis caused by brugian species is commonly called as Brugian filariasis and that caused by *W. bancrofti* is known as bancroftian filariasis. The filarial parasites spend a major part of their life cycle in man the definitive host. A minor part is spend in the vector mosquito, the intermediate host. *Culex quinquefaciatus* is the major vector responsible for transmission of bancroftian filariasis and mansonia mosquitoes for transmitting Brugian filariasis (Sasa, 1976).

The filarial worm (7-10 cm long) lives in the lymph channels. Paired adult worms produce millions of larval forms called microfilaria (mf) that circulate in the blood stream. Female mosquitoes taking a blood meal necessary for egg laying, ingest mf from infected individuals. Over a period of 12 days the mf progress through several stages to an infective stage which escapes into a human's blood stream during another blood meal.

Filarial infections require repeated inoculation of infective larva, perhaps hundreds per year in order for the worms to reproduce successfully and produce microfilaraemia. Often the disease is asymptomatic initially with subsequent episodes of acute inflammation of the lymphatic system and fever with the chronic stage of 'elephantiasis' developing only after many years, if at all by which time the microfilaria have usually disappeared from the blood stream of the patient (White,1989).

This disease is characterized by the gradual swelling of the affected limbs, leading to deformity. As a result the earning capacity is affected and subsequent wastage of man power. Creating a feeling of inferiority it contributes to psychological distress of the victims.

3.2. Filarial situation in India:

India is one among the three countries in the world where the incidence of

filariasis is numerically great (Anonymous, 1961). Over a third of the world's population who are at risk of lymphatic filarial infection live in India (WHO, 1984). Though the disease is not fatal, it is responsible for considerable morbidity and social stigma especially among young adults and unmarried girls. and a large number of estimated population with chronic irreversible manifestations.

Number of people exposed to the risk of infection, mf carriers and people with disease during different years in India

Year	No. exposed to risk (millions)	No. of mf carriers (millions)	Diseased persons (millions)	References
1953	25	NA	NA	Raghavan (1963)
1962	64	5.3	4.4	ICMR (1961)
1970	136	11.3	8.0	ICMR (1971)
1976	236	18.0	14.0	Sharma, (1976)
1981	304	21.7	15.8	Sharma, *et.al* (1983)
1988	374	25.0	19.0	NFCP (1989)

NA- Not available.

Presently filariasis is rated as a major health problem in India, considering the increase in the trend of transmission spreading the infection to newer areas with a huge

population exposed to the risk of this infection. In India according to the latest estimates 374 million people are exposed to the risk of filarial infection with about 25 million carriers of microfilaria (mf) and further 19 million persons with the chronic disease (Sharma, *et.al.*, 1983). The prevalence of lymphatic filariasis has been showing increasing trend since initial estimates on the magnitude of the problem made in 1962.

3.3. Bancroftian filariasis:

Bancroftian filariasis due to Wuchereria bancrofti is the predominant type accounting for 98% of cases and is distributed widely in India. Malayan filariasis caused by *Brugia malayi* is limited to a few pockets of Kerala, Assam and Orissa where more than 90 million people are at risk (Das, 1976). Bancroftian filariasis is transmitted by *Culex quinquefasciatus*, a mosquito breeding in polluted water.

The vector mosquito has successfully exploited the environmental change brought about by man. Deterioration of sanitary conditions aided the sudden increase in the number of breeding habitats of the vector. Even though this species can breed in any aquatic habitat, highly polluted stagnant water bodies rich in organic matter provides an ideal environment for its proper development (VCRC 1988).

High density of *culex* mosquitoes is maintained in rural areas due to gross mismanagement of the environment. The high vector density in the urban areas is the direct consequence of unplanned urbanization and mismanagement of the environment over the years (Das, *et.al* 1989). Since a majority of the breeding habitats are created by bad engineering practices, permanent elimination of these habitats by better engineering practices leading to source reduction should be the first priority in controlling the vector. The control of these vectors are advocated through anti adult measures by residual spraying of insecticides and anti larval measures through elimination, reduction or modification of breeding habitat by simple sanitary measures. Environmental management is the most cost effective method of controlling culex vectors.

The clinical course of filariasis can be divided into asymptomatic, acute and chronic stages. The asymptomatic stage is characterized by the presence of microfilaria in the peripheral blood, although there are no clinical manifestations of filariasis. Some individuals remain asymptomatic for years while others progress more rapidly to the acute and chronic stages. The acute stage is characterized by recurrent attack of fever associated with inflammation of the lymph nodes (lymphadenitis) and lymph vessels (lymphangitis). Typically each attack of fever and lymphadenitis last for several days and usually subsides spontaneously following bed rest. Lymph oedema is quite often present in these fulminant episodes. Usually the oedema subsides after each episodic attack, but

with repeated attacks the oedema persists leading to chronic lymphoedema.

In bancroftian filariasis the major chronic signs are hydrocele, chyluria, lymphoedema and elephantiasis of the entire lower limb, arm etc. In brugian filariasis the leg below the knee and the arm below the elbow are affected.

3.4. Brugian filariasis:

Brugian filariasis with an estimated 8.6 million infected persons is known to be endemic in many parts of Asia and South East Asia and is causing increasing concern to the public health experts in India (Jain, 1989). As per the latest estimates 5.8 million infected persons are living in these countries (WHO, 1992). In India 0.35 million infected individuals have been reported from Kerala alone. It occurs mainly in the central part of Kerala with smaller pockets in Andhra Pradesh, Assam, Orissa, Madhya Pradesh and West Bengal (Sasa, 1976).

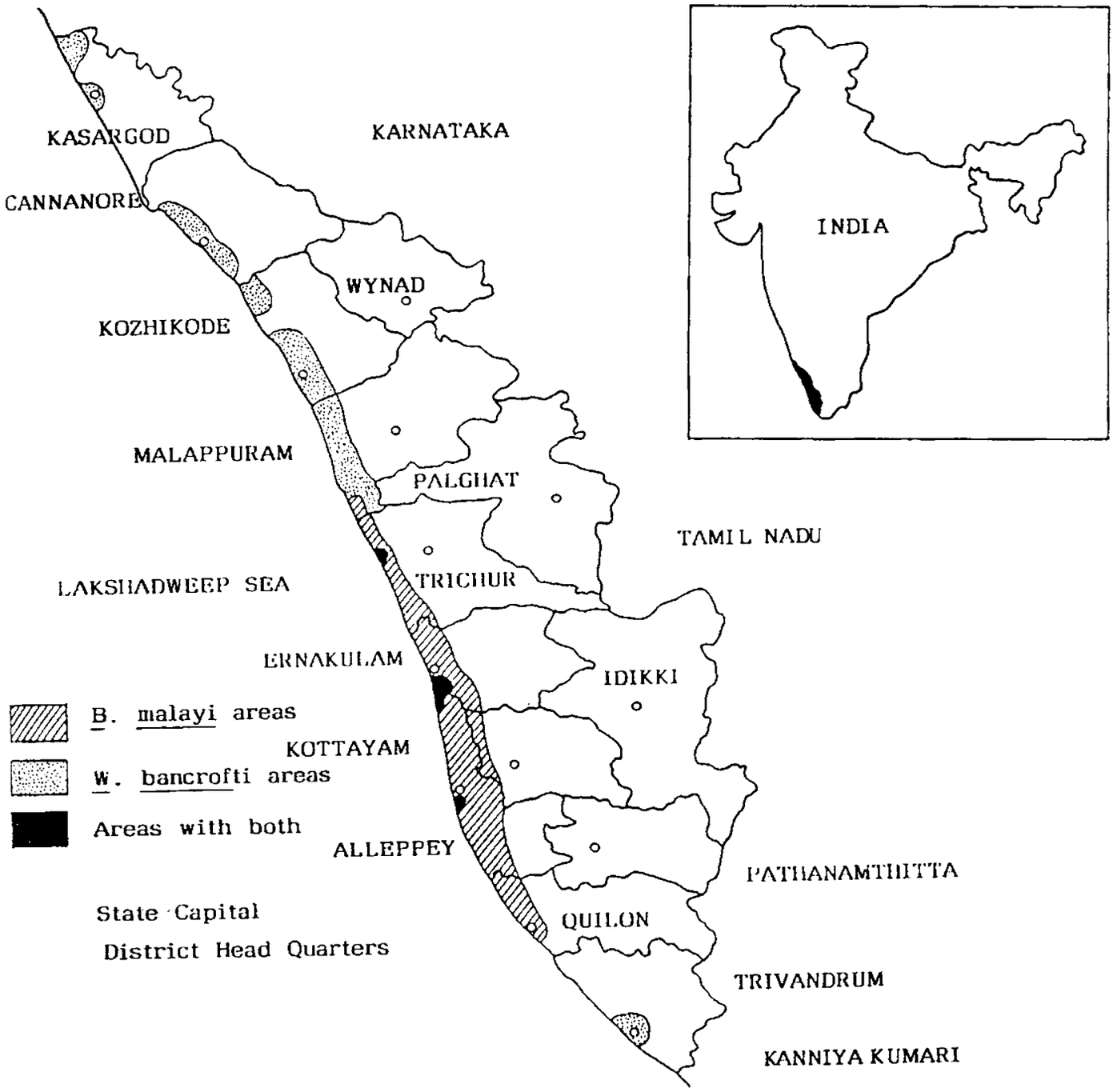
The largest single endemic tract due to *Brugia malayi* is along the central part of coastal Kerala covering a population of three million in about 1800 sq.km. Filariasis problem in the central coastal part of Kerala, in which the study area Cherthala taluk was recognized and reported as early as 1855 by Waring a durbar physician of the erstwhile

Travancore state based on an epidemiological survey (Iyengar, 1938). The severity of filariasis in Kerala and Cherthala in particular is well evident as the fact that the very first filariasis control programme has been initiated in Kerala much before independence by the Maharaja of Travancore. Malayan filariasis has gained a strong foothold in Kerala in Cherthala for centuries due to its multiple topographic, ecological and socio economic factors. Cherthala taluk with an area of 304 sq.km and a population of 4 lakhs is considered to be the hot bed of malayan filariasis since early part of this century. The population is more or less evenly distributed throughout the taluk which has only one small urban agglomeration, the Cherthala town.

The clinical signs associated with filariasis malayi are similar to those found in filariasis bancrofti but are generally more acute. Fever attacks and elephantiasis of the limbs are common, but the involvement of genital and urinary organs are usually absent (Sasa, 1976). The vectors are mosquitoes of the genera mansonia.

B.malayi infection is prevalent in rural areas which are flat and sandy with perennial ponds and backwaters showing prolific growth of floating vegetation. The pattern of breeding of mansonia mosquitoes is different from that of other mosquitoes. The mansonia mosquitoes the vectors of brugian filariasis breed in hydrophyte infested water bodies which are predominantly found in rural areas. Hence the disease distribution

DISTRIBUTION OF FILARIASIS IN KERALA



Reproduced from G. Joseph & B.G. Prasad [1967] *Indian. J. Med. Res.*, 55, 1259.

is mostly rural in contrast to bancroftian filariasis.

Rural Cherthala is largely inhabited by middle and low economic groups. Coconut is the major crop and coir is the notable cottage industry. There are innumerable ponds and canals dug mainly for irrigating the sandy terrain. Many of these ponds are used for husk retting and some for domestic purposes like bathing, washing clothes and for cooking. Floating weeds profusely grow in all these water bodies.

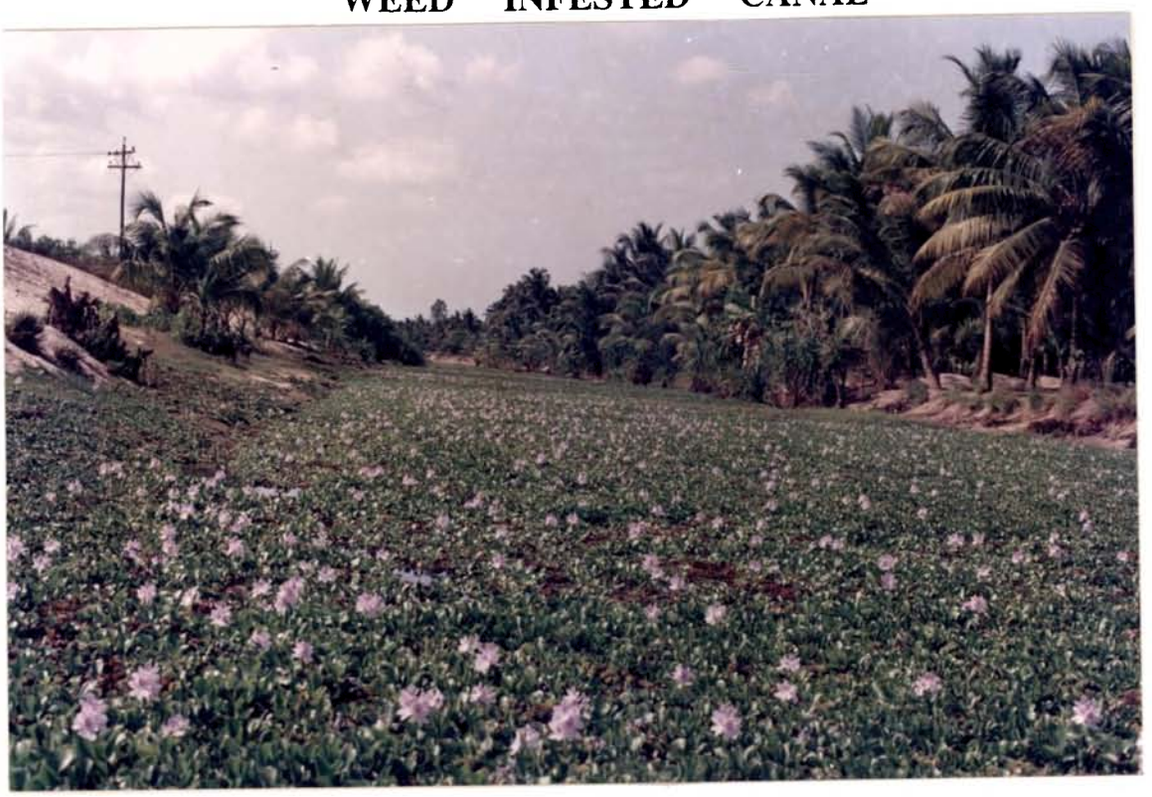
The area is highly waterlogged and the water bodies are infested with hydrophytes such as *Pistia stratiotes*, *Eicchornea crassipes* and *Salvinia molesta* which support the breeding of mansonia mosquitoes. Eggs are laid in clusters having 75 to 120 eggs in the under surface of fronds of these vegetation lying in proximity with water surface (Chandrasekharan, 1982). The larvae of these mosquitoes attach to the roots of hydrophytes for their oxygen requirement. Profuse breeding is associated with high organic pollution resulting from coconut husk retting or vegetable or animal dumps (Chandrasekharan, 1982).

A lot of misconceptions prevailed in the place regarding the causation of the disease. The common misconceptions were drinking polluted water, bathing in pond water surrounded by 'pandanus' plant, exposing foot in water after walking on hot sand,

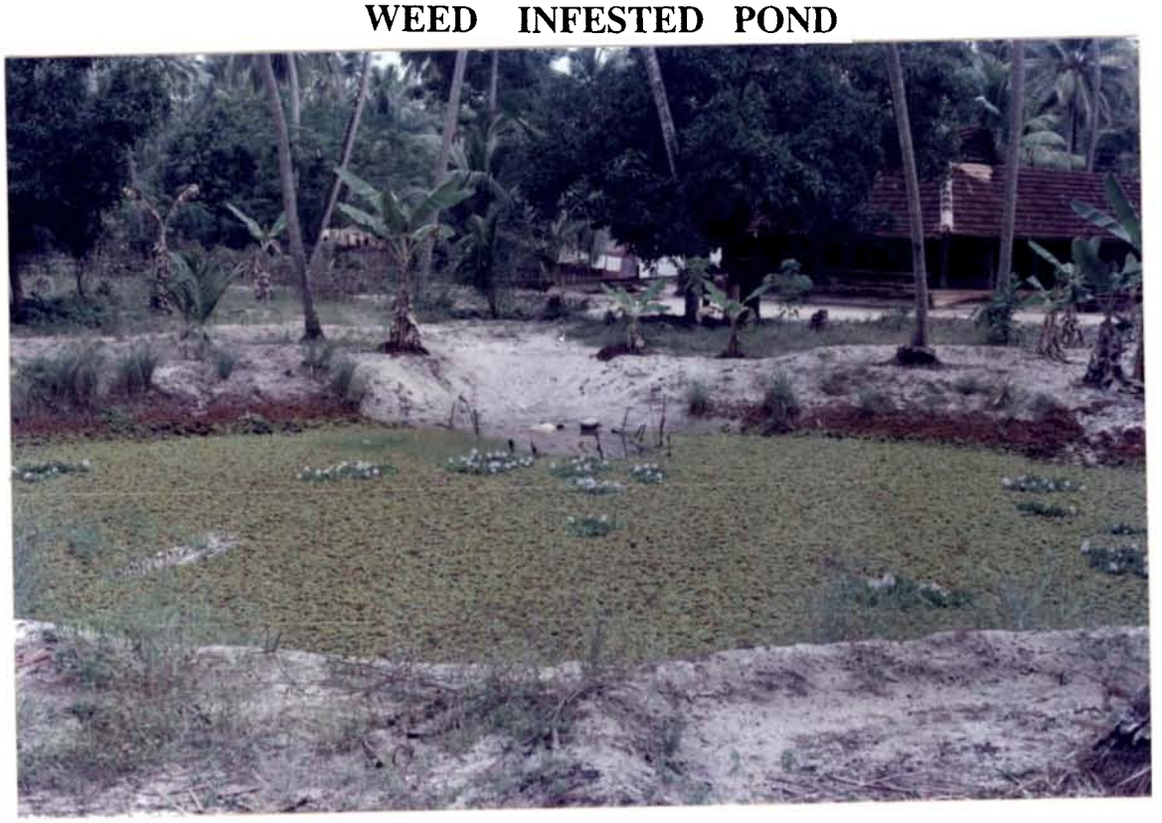
sprains and bruise, body nature, heredity, living habits, dirty surroundings, irregular routine, poor hygiene, deficiency of blood, fluid decent etc.

The control of this type of filariasis depends mainly on the two factors i.e. (1) destruction of breeding sites and there by controlling the emergence of mosquitoes and there by cutting transmission and (2) chemotherapy. The eradication of water weeds is not so easy as it has become the socio economic and cultural part of the people of Cherthalla. The control of filariasis has received a low priority in our national health policy. Though large population exposed to the risk of infection live in rural areas, the national programme covers the urban population (Anonymous, 1984).

WEED INFESTED CANAL



WEED INFESTED POND



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CHAPTER IV

4. STUDY AREA AND CHARACTERISTICS

4.1. Topography:

Cherthala taluk in Alleppey district lies between 09° 42'N latitude and 76° 20'E longitude. The taluk is bounded on the north by Ernakulam district, north east by Kottayam district, south by Ambalapuzha taluk and west by the Arabian sea. The flat and unbroken sea coast stretches for a distance of about 65 kms from south to north (Status paper 1980). The entire area of this taluk is in low land region. No western ghats bounds this area and thus there is no high land division. Three inter district rivers viz. Manimala, Pampa, and Achankovil discharge water into Vembanad lake which borders this taluk on its east.

Vembanad lake stretches over an area of about 295 sq.km. The entire area is influenced by intrusion of saline water and tidal waves and to prevent this, a mud regulator was constructed across the Vembanad lake between Thanneermukkom and Vechoor and is the longest mud regulator of its kind in India (Status paper 1980).

The total area of this taluk is 304 sq.km which accounts for 16.14% of the total geographic area of Alleppey district and 0.78% of the Kerala state (District Handbook 1986).

Nature has endowed this area with a wealth of water spread. The name Alappuzha means the land between the sea and network of rivers flowing into it. Cherthala is a taluk in the extreme north of Alleppey district. The water table is very high and people in this area have dug innumerable ponds for their domestic purposes. Rivers, many canals that criss-cross the entire taluk of Cherthala and backwaters have afforded an easy and cheap mode of transportation, from and to this area. This has contributed to a great extent for Alleppey emerging as a major commercial centre from the time immemorial and thus called 'Venice of the East'

4.2. Demography:

As per 1991 census the total population of this area is 477819. There are 95875 residential households. A study of the population figures since 1901 census shows that the population has been increasing decade after decade. During the past 70 years (1901-1981) the population in Alleppey district has shown an increase of 28.36%. Among the taluks of Alleppey district, Cherthala taluk has the highest population growth rate, the average being 14.50% (decadal growth rate 1971-1981). the urban population of this locality is 198342 and the rural population is 279477. Thus majority of the population is concentrated in rural areas of this taluk. The female population has out numbered the male population in both rural and urban areas. Male to female ratio for the whole taluk is 1:1.02. The population density in Alleppey district continues to be the highest among the districts of Kerala for the last few

decades. Cherthala taluk has a density of 1357/ sq.km as per 1971 census, which is higher than that of 1961 (672/sq.km). Cherthala has recorded a literacy rate of 82.96%. The literacy rate between the sexes showed that it is higher in males(51.10) compared to that of females (48.90). It is seen that among workers 3.98% are cultivators and 12.08 %are agricultural laborers. 4.68% were engaged in household industry. The work participation rate for females and males are 15.85% and 47.58%respectively.The average size of the family for the district was found to be 4.94 as per 1991 census The decadal growth rate of the population from 1981-1991 is 7.28%.

The major occupation of the people in this locality is agriculture, toddy tapping, coir industry and fishing. The socio economic status of the people in this locality is influenced by the coconut cultivation, as it provides means for the livelihood of rural population. The per capita income of the district was 987.02 during 1977-78 (Bureau of economics and statistics). Industrial development in this locality has been tardy. Among the traditional industries in Kerala coir industry occupies a very important position in terms of employment. It is estimated that 3.83 lakhs persons are directly employed in this industry in Kerala of which 84%are women (Coir board fortieth annual report 1993-94). retting, fibre extraction and spinning provide employment to a large number of households all along the coastal belt of the state. Manufacturing establishments are largely located in Cherthala and Ambalapuzha districts of Alleppey district. Coconut husk is the raw material for the coir

industry. Fibre extracted from the husk of the coconut is spun into yarn and manufactured into a wide range of products. Traditional methods are laborious and time consuming, but the end product is of superb quality. Coconut husks are retted or immersed in the ponds and backwaters. The husks are retted for 8-10 months till they become soft and fluffy. The retted husk is then beaten with a wooden mallet and the fibre is extracted. Prodigious number of ponds, availability of raw materials(husk of coconut), retting facilities and abundant labor force, especially women folk, are the main conducive factors responsible for the growth of coir industry. Though there are two types of coir industry, the cottage type and the factory type, the cottage type is confined to the rural area and involves manual beating, cleaning and spinning. The socio economic status of the rural population is thus mostly dependent on coir industry. The oil milling traditional industry is also present in this locality.

4.3. Climate:

This area has a tropical humid climate with oppressive summer and plentiful rainfall. The climate is moist and hot, dry in the interior region. This area gets the full benefit of both south west and north east monsoons. The average annual rainfall is 2680 mm. South west monsoon retreats from September onwards followed by north east monsoon which ceases during the month of December. The rainfall from May to September (south east) constituted 82.46% of the annual rainfall during the year 1990-91. June is recorded to be the rainiest

month with 1087 mm rainfall. The rainfall gradually decreases up to September. During October and November when south west monsoon retreats, rainfall is mostly in the form of thunder showers. The variation in rainfall from year to year in this locality is negligible.

Temperature fluctuates with in narrow limits in different months (minimum ranging from 21.56°C to 26.6°C, mean ranging from 25.6°C to 30.65°C and maximum ranging from 28.77°C to 35.16°C). March to May is the season of gradual increase in temperature. The period from January to May is hotter with the onset of south west monsoon by the end of May and temperature decreases and throughout the monsoon the weather is pleasant with moderate temperature. Following the withdrawal of south west monsoon temperature increases slowly.

The atmosphere is highly humid throughout the year, the relative humidity ranging from 70.66% and 97.88%. During the period of March to October, the winds are generally moderate. Lower variability in wind velocity between the months indicate fairly uniform rate of evaporation through out the year. The high humidity condition reduces evaporation to the extent that demand of water for crops is minimal in this area.

4.4. Land usage pattern and vegetation

The land usage pattern is an important factor in the creation of mosquitogenic

The land usage pattern is an important factor in the creation of mosquitogenic conditions. 93,238 hectares are brought under paddy cultivation in the district (District Handbook 1986). This reveals that the total cropped area was maximum in the district. The area virtually lacks forests. The increase in the area brought under agriculture implies that other forms of land were converted to more beneficial ones. Fallow lands in Cherthala accounts for 7.1sq.km. Coconut (*Cocos nucifera)* is cultivated on a large scale in this area. The presence of peaty soil and sand loam accounts for the predominance of this crop. Coconut is cultivated in an area of 59,354 hectares of Alleppey district which accounts to 8.82% of the total coconut area of the state, contributing to 9.27% of its coconut production. The yield of coconut in this area is also higher when compared to the rest of the districts. Cashew (*Anacardium occidentale*) forms 1.48% of the cash cropped area of the district. Banana (*Musa sp*) is also cultivated in a small scale in this area. Though tapioca (*Manihot utilissima*) cultivation is done at household level, it is not being done in large scale/ commercial level. Rice (*Oriza sativa*) is grown during monsoon periods in the low lying areas. The other crops of minor importance includes pepper (*Piper nigrum*), ginger (*Cingiber officianale*) and arecanut (*Areca catchu*) (Bureau of Economics and Statistics).

4.5. Health status of the population:

The people of Kerala enjoy a better standard of health than those in other states of India. In fact it is almost comparable to that of the developed countries. Though the system of

indigenous medicines was popular since olden days, facilities for prevention and treatment of diseases by modern medicine were also provided in the state. Every panchayat has now at least one dispensary. There is a well developed health care delivery system with a doctor population and bed population ratio which is the highest in the country. Today for every 15,000 population there is a Government Medical Institution. In other words the availability of institutions per thousand population is 0.4. The facility of beds under allopathic system per 1000 population is 1.33. The availability of registered medical practitioners per 1000 population is 1.35. The per capita expenditure on health services in the state rose from 2.50 in 1961-62 to 84.15 in 1991-92 (Census paper 1991, not available for Cherthala separately).

The all round improvement in health services has had it's impact on the health and longevity of the people. The crude death rate registered a marked decline. Along with the decline in the general death rate there have also been appreciable declines in the maternal and infant mortality rates. The birth rate in Alleppey district was found to be 15.53 in 1984 and death rate 4.71. The rate of still birth was 2.95, infant death 9.60 and maternal death 0.08.

From the data collected from the primary health centres from the year 1985, the major diseases in Cherthala Taluk are intestinal infectious diseases, infectious and parasitic diseases, disorders of the eye, tuberculosis, skin diseases etc. Among them intestinal infectious diseases ranks first followed by skin diseases. Among the vector borne diseases

only filariasis was recorded.

4.6. Socio economic status of the respondents:

Alleppey is a backward district in terms of the standard of living of the people. The majority of population of the district comprises agricultural labourers and coir workers. Most of these people live in huts. Though literacy rate in Alleppey district is the second compared to other districts, employment rate is not so proportionate to the literacy rate. The awareness of democratic equality and the land reform measures offered a feeling of equality to the individual. The high literacy level coupled with the achievements of the labour class has speeded up the breakdown of casteism and landlordism in the district.

The health status of the population is shaped by a variety of factors such as the level of income and standard of living, housing, sanitation, water supply, education, health consciousness, personal hygiene and by the coverage and accessibility of medical care facilities.

As per 1981 census, of the total population in Cherthala three fifths are Hindus and the rest are Christians and Muslims more or less in equal proportions.

The respondents of the study belong to the age above 15 years. The age wise distribution of the respondents among the three categories namely normals, mf positives and chronic patients are given in figure 1.

Since the chronic patients are mostly aged, the age classification for the chronic respondents shows an ascending trend, where as mf carriers shows a descending trend. The microfilaria are seen mostly in persons who do not have chronic swelling. The normals without any specific reason also shows a descending trend in age classification (Table.1).

Table.1

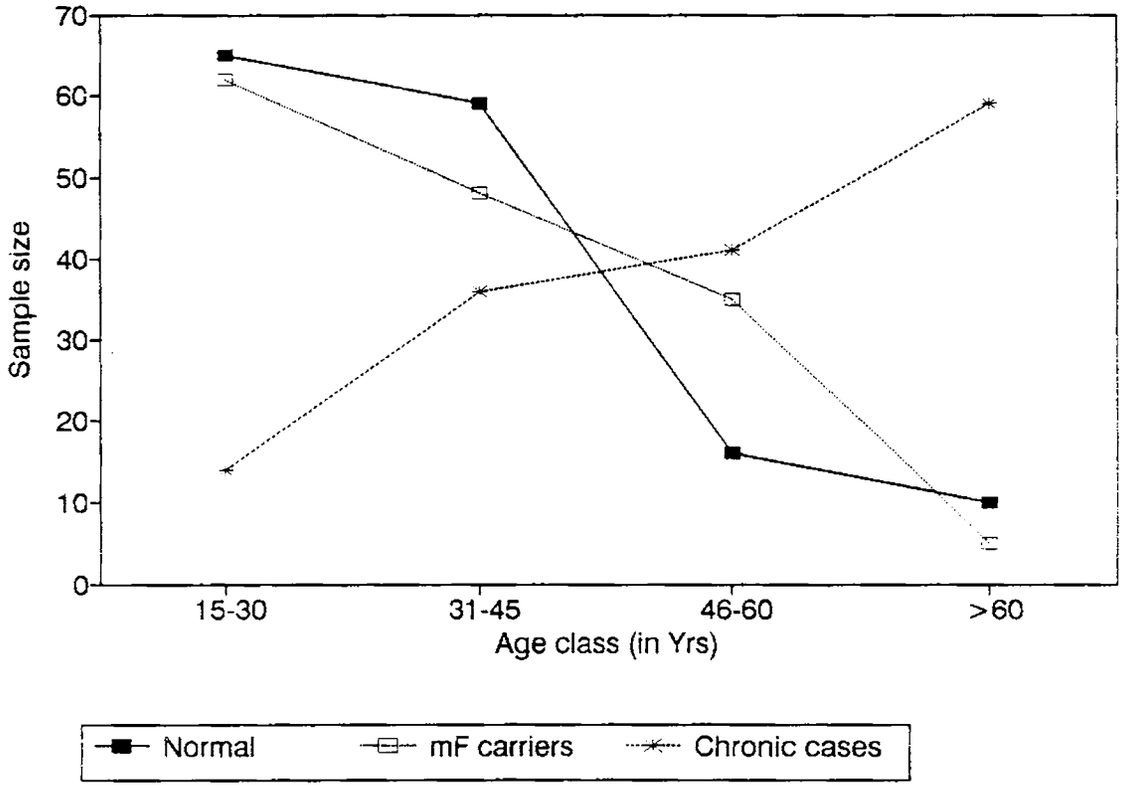
Age wise distribution of the respondents

Age class	Normals		mf positives		Chronic	
	No.	%	No.	%	No.	%
15-30	65	43.33	62	41.33	14	9.33
31-45	59	39.33	48	32.00	36	24.00
46-60	16	10.67	35	23.33	41	27.33
Above 61	10	6.67	5	3.33	59	39.33
Total	150	-	150	-	150	-

The male female classification shows some similarity among the three categories.

Figure 1

Distribution of respondents in relation to age and categories



Males constitute a higher percentage in all the categories than females (Figure 2). The male respondents constitute 60% of the total respondents and the females 40% (Table.2).

Table. 2

Sex wise distribution of the respondents

Sex	Normal		mf positive		Chronic	
	No.	%	No.	%	No.	%
Male	87	58.00	94	62.67	89	59.33
Female	63	42.00	56	37.33	61	40.67
Total	150	-	150	-	150	-

As far as religion is concerned 63.11% of the total respondents belong to Hindu religion and 28% to Christian religion and 8.89% belong to Muslim religion. Within the three categories 63.33% are Hindus. 28.67% are Christians and 8% Muslims among the chronic patients. Among the mf positives 70% are Hindus, 26% Christians and 4% Muslims. In the normal category 56% are Hindus. 29.33% Christians and 14.67% are Muslims (Figure 3).

Regarding the distribution of respondents in relation to income it was found that majority of the respondents belong to lower economic groups below an annual income of Rs 15000 (Figure 4). With regard to the distribution of the respondents according to the house type , majority irrespective of the categories were found to reside in semipucca houses. Below

Figure 2
Distribution of respondents in
relation to gender and categories

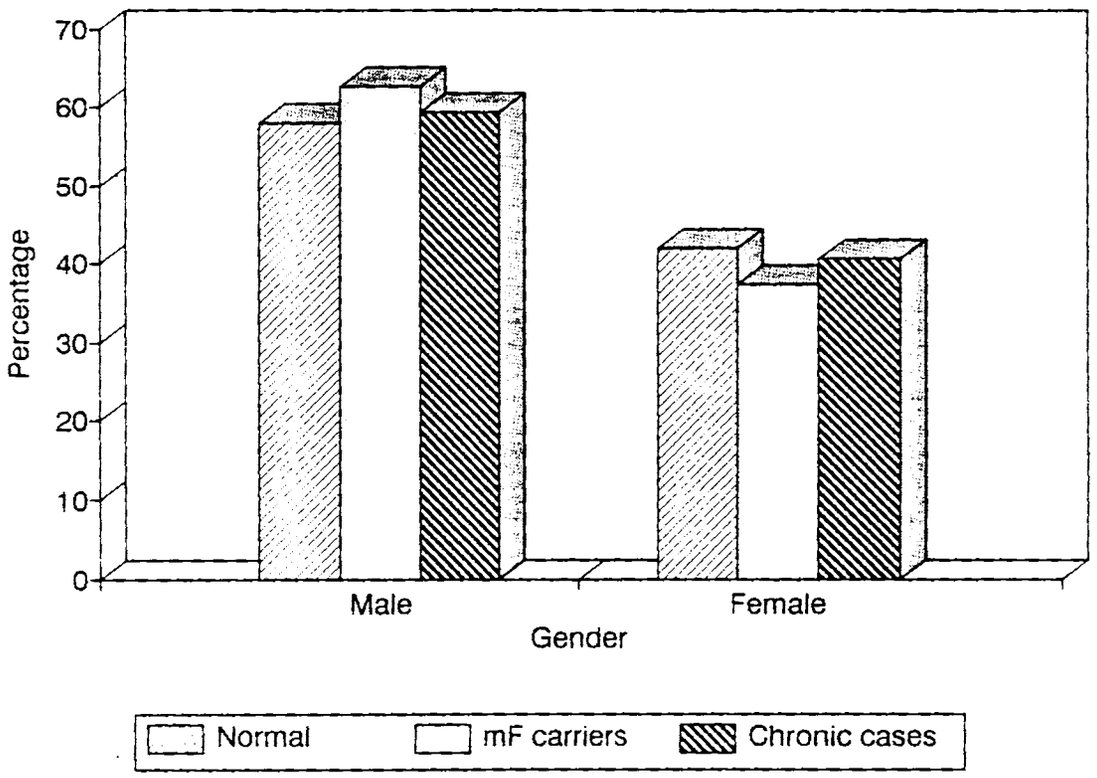


Figure 3

Distribution of respondents in relation to religion and categories

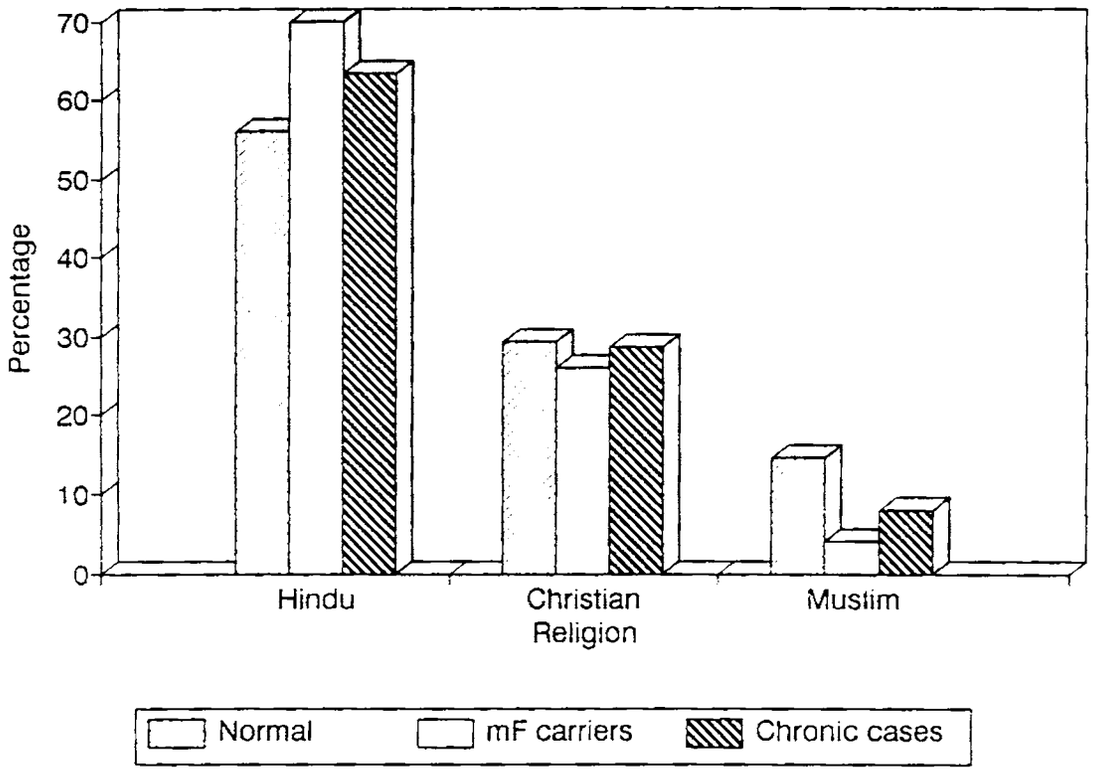
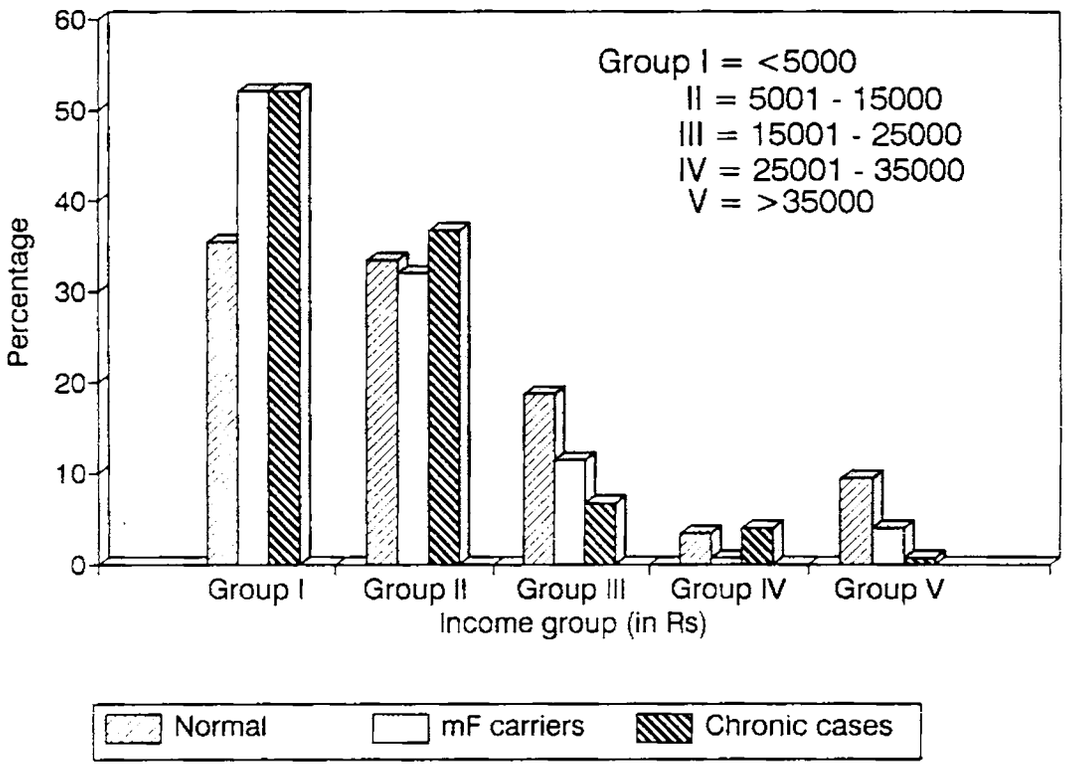


Figure 4

Distribution of respondents in relation to income and categories

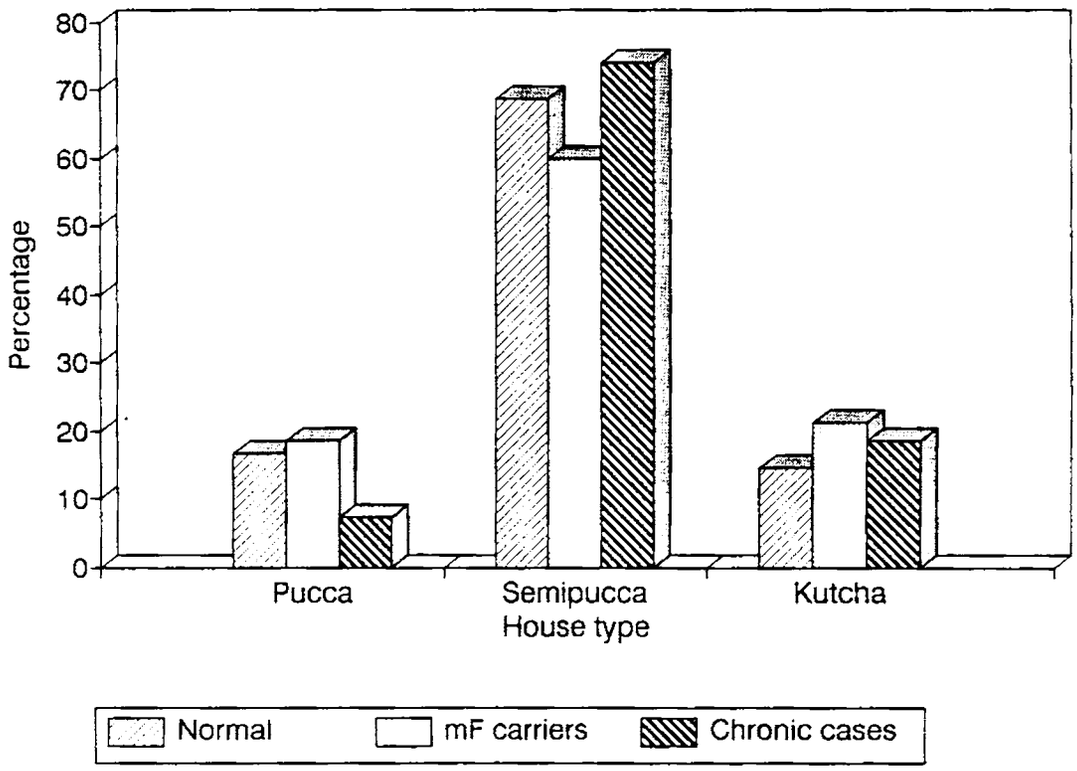


25% of the respondents were found to live in pucca as well as kutcha houses (Figure 5).

SMOKING AS A PERSONAL PROTECTION MEASURE

Figure 5

Distribution of respondents in relation to house type and categories



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CHAPTER V

5. THEORETICAL FRAMEWORK OF THE STUDY:

Social and economic consequences of filariasis can be grouped into four categories such as health consumption, social interaction, leisure and temporary loss of labour days due to inability to work and reduction in the efficiency of labour days supplied due to debility (Herrin 1988). Health consumption includes the pain, grief, suffering and loss of enjoyment from the presence of the disease. The stress and constraints imposed by disease presence within households comes in the social interaction and leisure. The consequences of filariasis infection are numerous. Many afflicted cases exhibit physical and mental disabilities, an impaired productive ability and an extremely low quality of life. These originate not only from the disease process itself but also from the social stigma attached to the afflicted person (Rosenfield, 1984). So disease intervention is an investment in human productivity. In seeking optimal intervention strategies the role of economic and social influences on filarial transmission should be understood (Banguero, 1984). These influences include the economic and social environment in which people live as well as behavioural aspects (Ogunmekan, 1983). They are the day to-day economic and social activities of individuals which bring them into contact with disease transmission process. Recognizing peoples attitudes and beliefs about the disease and about various approaches for preventing or controlling filariasis

is necessary for the design and implementation of successful control programme.

All actions and acts of man arise out of a resultant mental decision and the combination of all acts can be called behaviour (Ramachandran & Dharmalingam, 1976). The study of human behaviour is very useful to know how and why people behave in a particular way. A variety of factors from inside or within the individual as well as from the external world have been found to be responsible for patterns of behaviour in individuals or groups. Influences of human behaviour are motives, perception, values, beliefs, customs, attitude and learning. The beliefs and attitudes of people and ways of living and the patterns of taking action for getting themselves cured or treated have to be identified for assessing the socio-economic factors. The Knowledge, Attitude, Practice study (KAP) tells us what people know about certain things, how they feel and also how they behave (Ramachandran & Dharmalingam, 1976).

Taking a community as a whole there are many ideas, beliefs and also prejudices about various diseases that are commonly known in the community. It is these beliefs and attitudes which are helpful or obstructive for the prevention or control of any of the disease. Therefore it is essential to know the minds of the people and also their behaviour pattern . A KAP study will help in knowing whether the people are aware of the disease, it's causation and transmission and about the existing practices with their reasoning (Ramachandran &

Dharmalingam 1976). It will also be helpful in finding out how much the people have improved in their knowledge about the disease and whether and how much they have changed their behaviour for the better.

It is a common observation that the human behaviour is individualistic and at the same time a part of group behaviour. There are certain practices which are common in the entire group or community and these are because of long standing customs arising out of cultural beliefs and norms (Ramachandran & Dharmalingam, 1976)

5.1. Knowledge:

The acquisition of information to be made use of or at least kept recorded in the brain is known as knowledge (Ramachandran & Dharmalingam, 1976). This information may or may not be used on future occasion. The knowledge which is the collection of information on the basis of awareness has to be followed by behaviour or action. There can be behaviour or practice without a knowledge to initiate action.

5.2. Attitude:

With the knowledge or awareness it is able to develop a sense of like or dislike, pleasure or pain, joy or sorrow, anger or hatred etc. These are feelings which are experienced

by the mind and which make the person to be favourably disposed to anything. At the time the information is collected and stored in the form of knowledge, the experience of the brain is termed as 'Cognition' (Ramachandran & Dharmalingam, 1976). The superimposition of a feeling to cognition is called 'connation' or 'affect'. The combination of knowing about a thing and forming a tendency to react is the attitude of a person Attitude = Knowledge + feeling) (Ramachandran & Dharmalingam, 1976). If the attitude is favourable towards a thing the person likes to do the thing and is also ready and mentally prepared for such action. The general trend is that attitude follows the possession of knowledge but there can be instances when attitude has been framed without any basic knowledge. Attitude has three components. A cognitive component or knowing about something, an effective component or a feeling about it and a behavioural component or a tendency to take action (Ramachandran & Dharmalingam 1976). An attitude involves belief or disbelief, acceptance or rejection and favouring or not favouring some aspect of the environment.

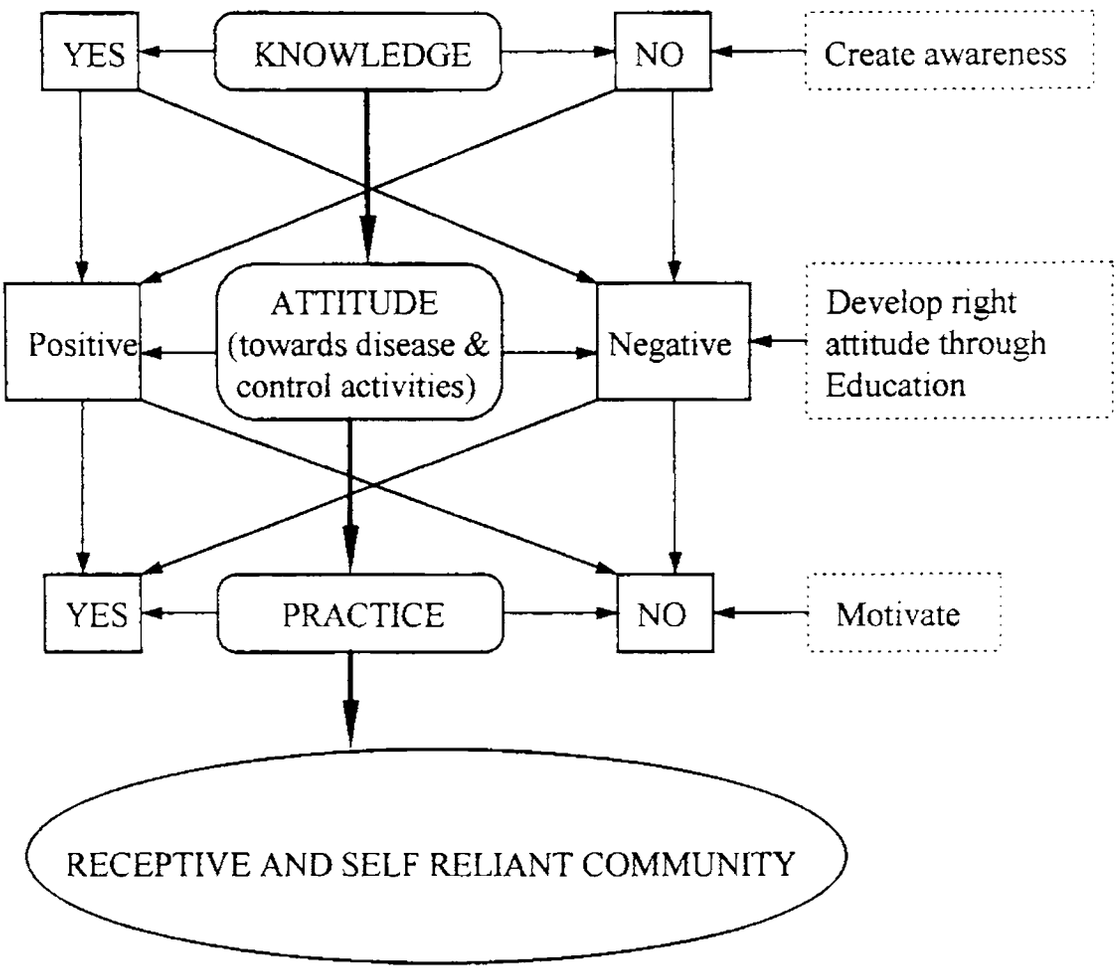
5.3. Behaviour:

To support the life process every living organism from the tiniest microbe to the most evolved mankind manifests or engages itself in actions which are purposeful. According to Oxford dictionary behaviour means "the way in which a thing or person acts, mode of behaviour, reaction under a set of imposed conditions". Since behaviour is mostly purposive

CHART I

CONCEPTUAL FRAME WORK

KNOWLEDGE, ATTITUDE AND PRACTICE ON CAUSATION, TRANSMISSION AND CONTROL OF BRUGIAN FILARIASIS

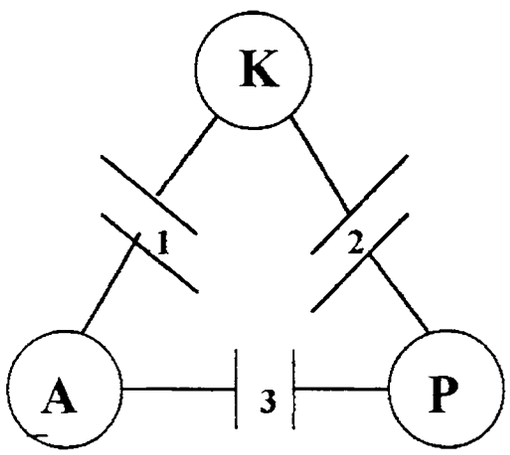


in character it is governed or influenced by a variety of factors which are required to satisfy motives. Action is mostly need based. Purposive behaviour is generally borne out of utilitarian gain for the individual. Behaviour is influenced to a large extent by individual perception and subjective facts. It has generally been described that behaviour is the consequence of a decision and the decision is preceded by knowledge and attitude. The individual first knows or gathers information about something and then by a process of further thinking and feeling develops an attitude which may be translated into action or behaviour of doing something which has been understood and liked. Social psychologists have established that there is a sequential relationship between knowledge, attitude and behaviour (Practice).

The rule that knowledge and attitude are necessary for behaviour is not universally applicable to every behaviour (Ramachandran & Dharmalingam, 1976). There can be knowledge and behaviour without attitude. There can also be behaviour even without knowledge and attitude. There can be only knowledge without attitude and behaviour. There are instances of behaviour which are just the opposite of either the knowledge or the attitude. The individual is doing something which he fully knows is neither good for himself nor acceptable by others. But still there is some other driving force which makes him do it. The phenomenon of justification is called 'Cognitive Dissonance' (Ramachandran & Dharmalingam, 1976). Cognitive dissonance is the separated or discriminated cognition of

ideas into two elements- one for knowing the thing as such and second for doing it in a different way. The theory of cognitive dissonance has been introduced by Festinger (Ramachandran & Dharmalingam, 1976). The belief or opinion of a subject may be viewed from two distinct angles with regard to an intellectual understanding of the thing and for translating into action.

How Cognitive Dissonance take place in the mind?



K = Knowledge, A = Attitude, P = Practice

1 - Disparity or separateness between the knowledge possessed and the attitude

2 - Disparity or separateness between the knowledge possessed and the manifested behaviour

3 - Disparity or separateness between the attitude and behaviour

Another aspect of cognitive dissonance which can occur strictly within the cognitive level itself without any connection between attitude and behaviour. It will be difficult for them to dispel a deep rooted belief and to accept something very new. Cognitive dissonance is of common occurrence in the context of preventive health care and it is actually a great obstacle for the acceptance of preventive health programmes.

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CHAPTER VI

6. PERCEPTIONS ON THE DISEASE

Among the respondents 86.67% were aware of the cause of the disease. The knowledge was higher among the mf positive (35.64%) than normals (34.36%) but relatively lower among chronic patients (30%). Among those who have had misbeliefs, chronic patients constitute the significantly (p=0.05) higher percentage (55%) than that of normals (26.66%) and mf positive (18.33%) (Table 3). This lack of knowledge could be a precipitating factor for not protecting themselves from the risk of infection and not attempting to seek health care at proper time and facilities.

Table. 3
Knowledge on the cause of the disease in relation to categories

Category	Original cause	Misbelieves	Total
Mf positive	139	11	150
	(35.64)	(18.33)	-
Chronic	117	33	150
	(30.00)	(55.00)	-
Normal	134	16	150
	(34.36)	(26.66)	-
Total	**390 (86.67)**	**60 (13.33)**	**450**

When this was analyzed in relation to gender 61.54% of the males and 46.67% of the females were reported to be aware of the disease.

The proportion of males with adequate knowledge was significantly higher than that of females ($p<0.05$). Age related analysis (Table 4) showed that the awareness was relatively more among the age class below 45 years with the least in the age class above 61 years. Therefore attention must be given in creating awareness with the older age class as the target. There was a significant negative correlation ($r=0.977$; $df=2$; $p=0.023$) between the age and the percentage of awareness.

Table.4

Knowledge on the causative agent in relation to age

Age class	Original cause		Misbeliefs		Total	
	No.	%	No.	%	No.	%
15 - 30	154	39.49	9	15.00	163	36.22
31 - 45	135	34.62	31	51.67	166	36.89
46 - 60	81	20.77	11	18.33	92	20.44
Above 60	20	5.13	9	15.00	29	6.44
Total	390	86.67	60	13.33	450	-

When asked about the duration of the disease persistence in Cherthala, 46.67% of the respondents reported that the disease is persisting between 51 and 100 years. This revealed that the problem is century old. When the reason for the persistence of the disease was enquired, majority of the respondents reported ignorance as the major cause (34.89%). However 16% of the respondents were of the view that the interaction between the mosquito, parasite and water weeds was the cause and 13.78% were of the opinion that it was because of the lack of taking treatment. 35.33% of the respondents could not give any reason for the disease persistence. Therefore steps to increase the awareness on the cause of the disease have to be undertaken while implementing the control measures.

Existence of Governmental organization for the control of filariasis was known by 56.88%. Therefore it is expected that over 50 percent of the people seek health care from the facilities through which appropriate treatment is offered. Among the source of information regarding the etiology of the filarial infection, majority of the chronic patients were interested to gather information on transmission from others. About 54% of the microfilaria carriers also had known from others. Lessons learned from own experience was more prevalent among the chronic patients (23.33%) as expected. However reading materials were found to be the major source for dissemination of information, particularly among the normals (80%). When this was analyzed irrespective of the infection, 50% of the respondents reported to have gathered information from others and this followed by media through reading materials. This

clearly shows that dissemination of knowledge on the transmission of disease will be effective if spread through press which can get further channeled through exchange between individuals.

About 41% of the respondents had the option that if a person in a family is infected with the disease, there is every chance for the other members of the family to get infection. Such a view was found to be more prevalent among the microfilaria carriers than the other categories. This experience is more relevant since close circuit transmission is evident from the epidemiological studies carried out in this area (Abida, 1992).

Earlier studies on the clinical manifestation has shown that the prevalence of this disease was clearly age dependent in both the sexes. It was lower fluctuating between 0.77 and 6.26, until 20 years of age and there after it showed a monotonic increase in both the sexes reaching a highest prevalence in the age class above 60 years. Though the prevalence was slightly higher among females (10.38%) than the males (9.17%) it was not statistically significant (Rajagopalan *et al.,* 1988). However, majority of the respondents (68.67%) are of the opinion that there is no priority regarding the gender. Similarly 75.56% of the respondent reported that it did not have any priority in relation to age though 12.67% reported that it affected mostly adults. This is true because the prevalence is clearly age dependent and due to very long patent period of infection and long history of natural progression of disease results

in its expression in older adults.

Majority (79.78%) of the respondents are of the opinion that this disease did not have any relation with occupation of the people. However 10% of the respondents are of the opinion that it affects people who are mostly engaged in fishing, 7.78% in coir making and 2.44% farmers (Table 5).

Table.5
Knowledge on the probability of risk of infection in relation to gender, age and occupation

Category	Gender				Age				Occupation			
	M	F	B	NP	C	A	B	NP	Fa	Co	Fi	NP
Normals	44	0	27	79	10	35	10	95	3	20	27	100
mf	18	0	27	116	9	14	8	119	0	9	10	131
Chronic	20	1	15	114	6	8	10	126	8	6	8	128
Total	82	1	58	309	25	57	28	340	11	35	45	359

M = Male, F = Female, B = Both, NP = No priority, C = Children, A = Adults, Fa = Farmer, Co = Coir maker, Fi = Fishermen

Nature of work could be a precipitating factor for the manifestation of this disease in addition to environmental factors such as pollution (Pradeepkumar *et al.*, 1991) due to husk

retting which promote profuse vector breeding which in turn make the situation more conducive for transmission.

Among the persons responded positively for the knowledge on the possibility of other family members contracting the infection from an infected person, 93.56% of the individuals were of the opinion that the disease spread from the sick person through the mosquito bite (Table 6).

Table.6

Knowledge on the transmission of the disease among the members of the family

Category	Inherited		Sleeping habits		Mosquito bite	
	No.	%	No.	%	No.	%
Normal	1	10	7	36.84	142	33.73
mf	2	20	4	21.05	144	34.20
Chronic	7	70	8	42.11	135	32.07
Total	10	2.22	19	4.22	421	93.56

However the proportion of people who reported the cause of such infection was relatively lower among chronic patients than normals and microfilaria carriers. Though negligible, some

people 2.22% still have the opinion that the disease is inherited. It is more among the chronic patients (4.67%). This is basically a common understanding because the disease is more clustered.

When the knowledge of the acute symptoms of filariasis was investigated, fever with chills, aching of the body, swelling of the groins, recurrent edema were reported to be the major acute symptoms by majority of the respondents (Table 7).

Table.7

Knowledge on the acute symptoms of the disease

Category	Had knowledge		Did not have knowledge	
	No.	%	No.	%
Normals	136	90.67	14	9.33
mf carriers	149	99.33	1	0.67
Chronic	150	100.00	0	–
Total	435	96.67	15	3.33

It was interesting to note that even among the microfilaria carriers who were asymptomatic and normals equals to the proportion of the chronic who could experience the symptoms are of the same opinion. This supports the fact that awareness among the people

was very high in this area irrespective of infection.The acute symptoms which include fever, adenitis, body ache and swelling are transient in nature and are normally shadowed due to over lapping of such symptoms due to common viral infections. Almost all the (96.67%) the respondents could answer this query positively. Knowledge on the acute symptoms did not differ markedly between different levels of endemicity. However, the proportion who reported occurrence of all the symptoms was significantly ($p=0.05$) different in high endemic areas (54%) from that of medium (27.7%) as well as low (35.46%). This is an example to show knowledge is acquired either from self experience or reported experience.

Chronic manifestation had different stages while the disease progresses (Pani *et al.*, 1990). Persistence of oedema leading to skin change resulting in elephantiasis and finally result in nodular outgrowths (Prathibha *et al.*, 1991). When the chronic symptoms were asked, majority of them reported elephantiasis as the symptom and only a few of them know about nodular outgrowth as one of the symptoms of this disease. However, the proportion of respondents who gave this answer was relatively lower among the normals.

It is interesting to note that all the 450 respondents could spell out one or another chronic manifestation of this disease (Table 8). In the high endemic area where one could expect more number of cases with papillomatous growth, majority of the people reported elephantiasis as the symptom.

Table.8

Knowledge on the chronic manifestation of the disease

Category	Elephantiasis		Nodular outgrowth	
	No	%	No	%
Normal	87	25.36	63	58.88
mf carrier	127	37.03	23	21.49
Chronic	129	37.61	21	19.63
Total	343	76.22	107	23.78

In the disease progression, lymph fluid accumulates due to blockage of lymph vessel by the parasites (WHO, 1992). Sprain also causes inflammation though fluid does not get accumulated. When the etiology of edema was enquired most of the respondents (73.98%) reported that fluid accumulation was the cause for edema. However, 15.72% reported that blockage of lymph vessel was the cause. Sprain was reported to be the cause for edema by 10.3% of the respondent (Table 9). This clearly indicates that though negligible, some proportion of people possibly mistake filarial manifestation as sprain. The proportion of people who did not know clearly how edema occurred was as low as 18%.

Table. 9
Knowledge on the occurrence of edema

Category	Blockage of fluid		Sprain		Fluid accumulation		Total
	No	%	No	%	No	%	
Normals	43	36.75	4	3.42	70	59.83	117
mf positive	10	7.46	19	14.18	105	78.36	134
Chronic	5	4.24	15	12.71	98	83.05	118
Total	58	15.72	38	10.30	273	73.98	369

Though one cannot expect the people to know the etiology of the disease more scientifically which is more complex in the case of filariasis, when a query was projected on the possibility of a person harboring the parasite without any external symptoms, majority of (91.13%) individuals who responded positively were of the opinion that it could. This is not uncommon as the treated microfilaria carriers did not show any clinical manifestation supporting this view (Pani *et al.*, 1990). It is also interesting to note that significantly all the microfilaria carriers were of this opinion when compared to normals (76.60%), but not with chronic cases (93.65%). This could be related to their experience since all the microfilaria carriers are normally asymptomatic (Pani *et al.*, 1991).

Table.10

Knowledge on the occurrence of filarial worms in the human body

Category	Blood vessel		Lymph		Leg		Total	
	No.	%	No.	%	No.	%	No.	%
Normal	38	22.89	20	48.78	34	54.84	92	34.20
mf carrier	93	56.02	20	48.78	9	14.52	122	45.35
Chronic	35	21.08	1	2.43	19	30.65	55	20.45
Total	166	36.89	41	9.11	62	13.78	269	59.78

Among the total 450 respondents 36.89% reported that the filarial parasite live in blood vessels. The reason for this answer could be due to the fact that peripheral blood is examined for the presence of microfilaria. Only 9.11% could tell that the worms live in the lymphatic system.13.78% of the people were under the view that the adult worm live in the legs (Table 10). As many as 181 respondents could not answer this question.

As many as 78.89% of the respondents answered for the query on whether this disease could be prevented. Of them 97.46% were of the view that it was possible to prevent this disease and only a negligible percentage (2.53) answered it could not be prevented (Table

11). There was no variation in the knowledge on this aspect between villages and areas in relation to infection 95 could not answer this question.

Table.11

Knowledge on the preventive measures

Category	Can be prevented		Not prevented		Total	
	No.	%	No.	%	No.	%
Normals	126	36.42	4	44.44	130	36.62
mf carrier	123	35.55	2	22.22	125	35.21
Chronic	97	28.03	3	33.33	100	28.17
Total	346	97.46	9	2.53	355	78.89

When asked about the methods of prevention from the contraction of filariasis, as high as 78.22% respondents could say some or other preventive measures against filariasis. Even though avoiding persons with the disease is a misbelief, 5.39% of the respondents reported that this to be followed as a preventive measure. From the vector point of view, clearing the weeds from the breeding places of mosquitoes was suggested as a preventive measure by the majority (63.64%) of the respondents. This is a desirable knowledge which could be effectively exploited to involve them in vector control programms of deweeding which is

being carried out through community participation in the locality (Panicker *et al.*, 1992).

Table.12
Methods of prevention from the contraction of filariasis

Cate-gory	Avoid persons with disease	Clear breeding sites	Personal protection	Blood Test & treatment (selective therapy)	Preventive treatment (mass therapy)	Total
Normal	11 (8.53%)	85 (65.89%)	16 (12.40%)	15 (11.63%)	2 (1.55%)	129 (36.64%)
mf carriers	7 (5.60%)	80 (64.00%)	31 (24.80%)	5 (4.00%)	2 (1.60%)	125 (35.51%)
Chronic	1 (1.02%)	59 (60.20%)	36 (36.70%)	2 (2.04%)	0 -	98 (27.84%)
Total	19 (5.39%)	224 (63.54%)	83 (23.58%)	22 (6.25%)	4 (1.42%)	352 (78.22%)

Personal protection was reported to be a preventive measure by 23.58% of the people. Blood examination and treatment though not a preventive measure, it could help in reducing parasite load and there by interrupting transmission. This was suggested by 6.25% of the people. From the chemotherapeutic point of view, preventive treatment was suggested by 1.42% of the respondents (Table 12). This also will help in implementing mass treatment to

contain this disease (Panicker *et al.*, 1990).

All the microfilaria carriers were aware of the blood examination as a diagnostic procedure for filariasis. This is because, all of them had undergone at least once with the procedure. Among the chronic respondents, 96% of them could tell blood examination as a diagnostic procedure while it was 96.67% among all the categories. Though physical examination was enquired as one of the diagnostic procedures, none of them said this as a common procedure which is seldom necessary for chronic cases.

All the microfilaria carriers and chronic cases reported that blood examination is to be done at night. Among the normals 94% were aware that blood smear should be checked at night hours. 2.45% did not respond to the answer (Table 13).

Table.13

Knowledge on the time of blood test for filariasis

Category	Night	Day/Anytime	No response	Total
Normal	141 (94.00%)	4 (2.67%)	5 (3.33%)	150
mf carrier	150 (100.00%)	_	_	150
Chronic	144 (96.00%)	_	6 (4.00%)	150
Total	435 (96.67%)	4 (0.89%)	11 (2.45%)	450

Over 88 per cent of the respondents had the knowledge that water weeds are the breeding sources of mosquitoes that transmit rural filariasis (Table 14). Open drains, stagnant water pools and sceptic tanks also facilitate the breeding of mosquitoes, but they are not responsible for transmitting brugian filariasis. This shows that general awareness on mosquito breeding sites is high among the respondents. Only 9.33% of the respondents did not know the answer for this question.

Table.14

Knowledge on the breeding site of mosquitoes that transmit brugian filariasis

Category	Open drains	Stagnant water	Water weeds	Septic tanks	Total
Normal	3 (2.16%)	31 (22.30%)	103 (74.10%)	2 (1.44%)	139
Mf carrier	0 -	6 (4.29%)	134 (95.71%)	0 -	140
Chronic	0	3 (2.33%)	126 (97.67%)	0 -	129
Total	3 (0.74%)	40 (9.80%)	36 (88.97%)	32 (0.5%)	408 (90.67%)

It is clear from the above tables that the respondents of all the three categories namely normals without disease, mf positive who are carriers of the disease causing parasites and chronic elephantoid patients are aware of the disease, its cause transmission and prevention. Level of knowledge did not show any difference between areas with varying endemicity rate.

All the participants of the three focus group discussions also had good knowledge on the disease filariasis, its cause, transmission and control. 22% of the participants felt that the disease persists in Cherthala because of the peculiarity of the sandy terrain, and the poor quality of water in this area. The presence of plenty of disease carrying mosquitoes and the disease carriers was reported to be the reason for the persistence of the disease by 78% of the respondents.

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CHAPTER VII

7. COMMUNITY PRACTICE ON PREVENTION AND CONTROL OF FILARIASIS AND ITS RELATIONSHIP WITH KNOWLEDGE:

Behavior according to the oxford dictionary means "the way in which a thing or a person acts, conducts manners. mode of behavior, reaction under a set of imposed conditions". All over the world it has been observed that individuals behave differently in different situations and there are also group behaviors which can be changing in each situation.

Learning is the process of acquiring knowledge. Knowledge may be acquired and stored merely for information or may help in doing various things in life. Behavior can become learned behavior after experience gives a gain or reward or when the result is painful or unpleasant. Unless there is an inherent desire on the part of the individual or group to acquire some knowledge for the sake of change of behavior, a learning situation will not obtain.

According to Edward Thorndike's Law of effect, when the association between a particular stimuli and response is resulting in a satisfying state of affairs, the bond between the response and stimulus is strengthened. Conversely when the resultant state of affairs is not rewarding the bond is weakened. In daily life we often tend to repeat what is pleasant or

helpful to us.

When the relationship between filariasis prevalence and houses with diseased individuals other than the respondents was analyzed, on an average the disease was found to be prevalent in 14.67% of the total houses of the diseased respondents. In at least 17.33% of the houses with microfilaria cases either microfilaria carriers or diseased individuals were found to coexist and it was 12% among the chronic patients (Table.15). This is mainly due to the clustered type of distribution of filarial infection. Occurrence of more than one person with infection in a family was evident in 14.67% of the houses.

Table.15

Relationship between filariasis prevalence and houses with diseased individuals other than the respondents

Diseased individuals	Mf positive	Chronic	Total (Mf + Chronic)
Parents	22(64.70)	12(35.29)	34(77.27)
Spouse	1 (33.33)	2 (66.67)	3 (6.82)
Children	0	1 (100)	1 (2.28)
Others	3 (50)	3 (50)	6 (13.64)
Total	26 (17.33)	18 (12.00)	44 (14.67)

Figure in parenthesis denote percentage

The association of disease between children and parents was found to be higher than between other groups. The probability of contracting infection from infected elders appears to be more when the prevalence of Mf carriers in houses with already diseased individuals is analyzed. This shows that close circuit transmission is also a factor in the transmission of brugian filariasis through mansonia mosquitoes for which the breeding sources and in turn the human baits are at proximity to each other.

The practice of seeking different types of treatment was analyzed among the respondents. Though Kerala being a place where Ayurvedic treatment was popular from time immemorial, only 5.18% of the patients were reported to be under Ayurvedic treatment. This shows that history of experience in filarial treatment must have diverted them from their traditional choice of treatment facilities. Consequently majority (90.24%) of the patients opted the practice of taking Allopathy medicine. It is important to note that 4.57% of the patients did not prefer any treatment. This was due to their experience of no improvement of any kind in a short period of observation, in the case of chronic patients. Among the microfilaria positive cases they were not convinced that they are infected with the disease. Microfilaria carriers are generally asymptomatic and there are reports of total absence of acute attacks in about 5% of chronic individuals (Pani *et al.*, 1990). This might have been the reason for not anticipating the risk of disease and hence treatment.

In the treatment of microfilaria carriers, discontinuation of the drug which is given as a standard course for twelve days is very common (Krishnamoorthy *et al.*, 1990). This is mainly due to the side reactions which are very common and are related to parasite level. Completion of full course of treatment was assessed among the microfilaria carriers and the diseased individuals. Interestingly among the microfilaria carriers, significantly a higher proportion of individuals (73.33%) completed the course (Figure 6). The proportion of chronic patients who had the practice of regularly taking the treatment was as high as 82.66%. In both chronic patients and microfilaria carriers the percentage of patients who did not complete treatment fluctuated between 17.33% and 26.67% (Table 16).

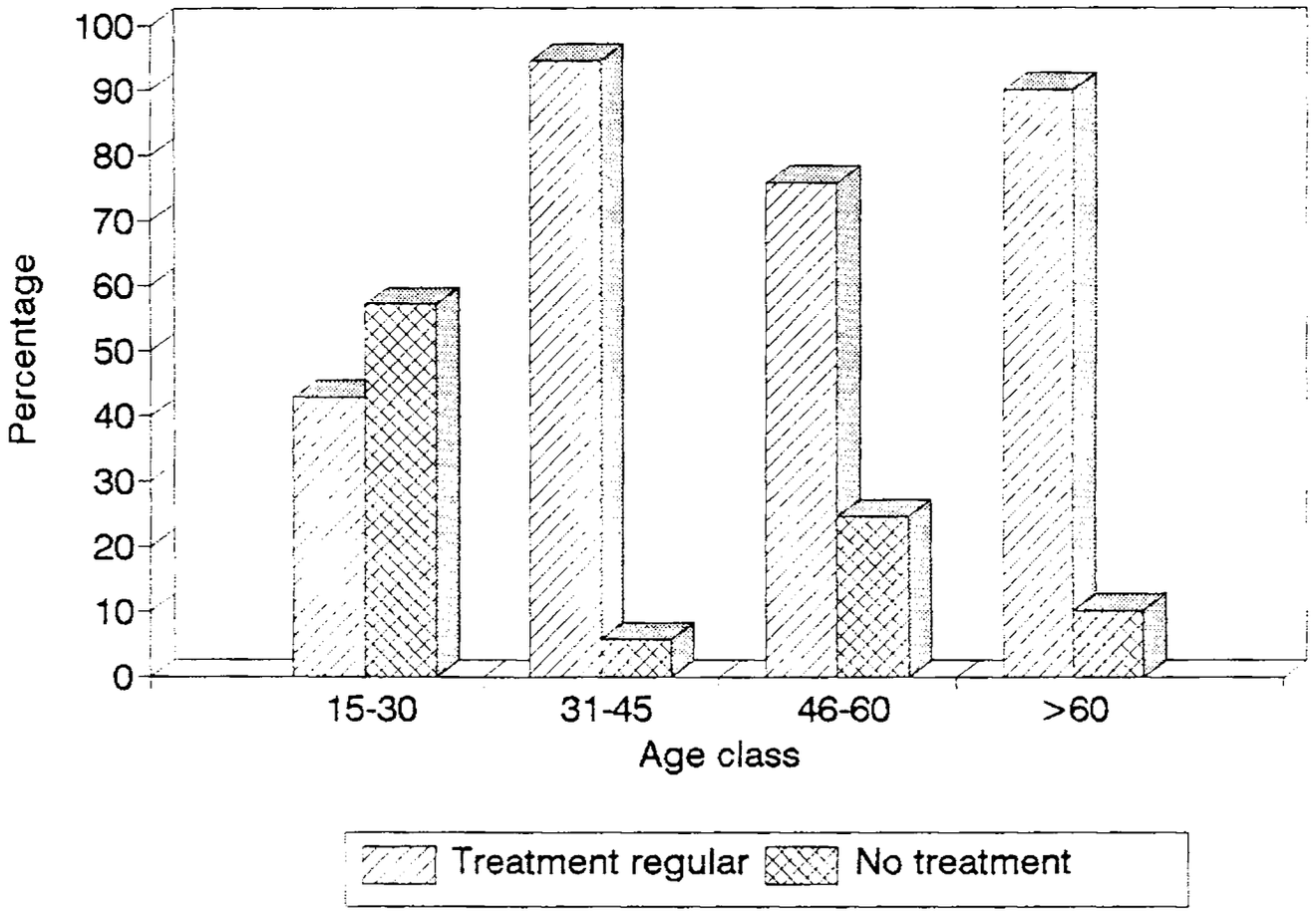
Table.16

Treatment in relation to age

Age class	Completed and regular		Not regular & no treatment	
	Chronic	Mf +ve	Chronic	Mf +ve
15 - 30	6(4.83%)	50(45.45%)	8(30.76%)	12(30.00%)
31 - 45	34(27.41%)	27(24.54%)	2 (7.69%)	21(52.50%)
46 - 60	31(25.00%)	30(27.27%)	10(38.46%)	5(12.50%)
61 & above	53(42.74%)	3 (2.72%)	6(23.07%)	2 (5.00%)
Total	124(82.67%)	110(73.33%)	26(17.33%)	40(26.67%)

Figure 6

Treatment practice among chronic patients in relation to age



When the practice of taking treatment was analyzed in relation to the age it was found that younger chronic patients and older microfilaria carriers showed lower proportion in completing the treatment.

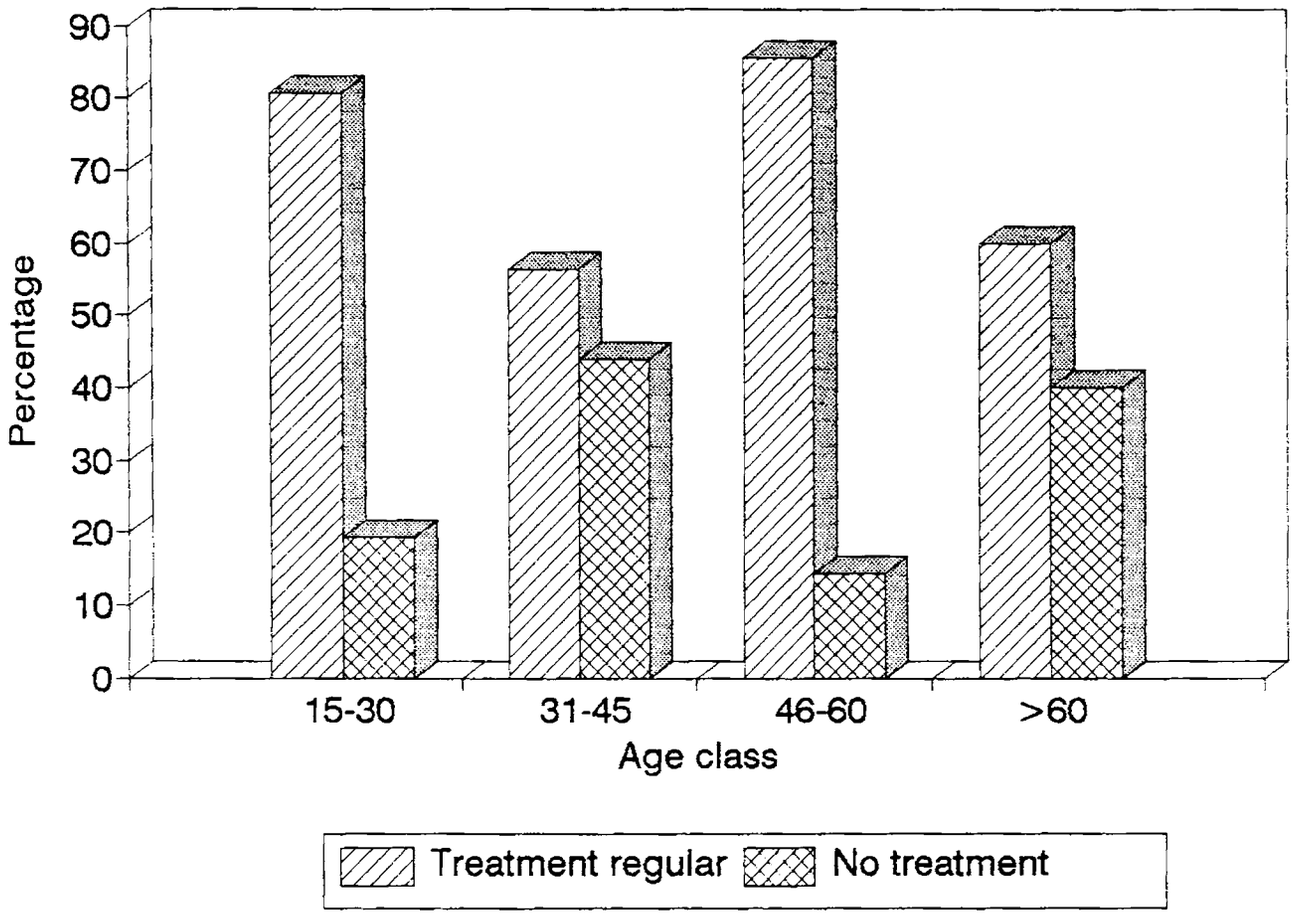
Behavior can become learned behavior after experience gives a gain or reward. This clearly shows that the treatment which has been taken by the people have responded positively to their health. Only a less percentage of the microfilaria carriers and chronic patients have not completed the treatment regularly.

When the reason for incomplete treatment was enquired, 60.61% of the total 66 respondents who reported to have discontinued the treatment was due to side reaction. Only 7.60% of the patients reported weakness and fatigue as the reason for not taking treatment regularly. However this was higher among the chronic patients who had to continue the medicine on long term basis. As expected it was more (60.61%) among the microfilaria carriers who discontinued the treatment (Table.17).This again is due to the parasite related reactions. As anticipated with slow improvement on short term treatment, about 39.40% of the patients among chronic did not have the practice of regularly continuing the treatment.

When the relationship between educational level of the people and completion of full course of treatment by taking regularly was analyzed, it showed a significant (χ^2 = 13.33;

Figure 7

Treatment practice among mF carriers
in relation to age



p<0.05) association (Table.18). Higher the educational status, higher the percentage of people completed the treatment (Figure 8).

Table.17

Reason for not practicing the conventional course of treatment

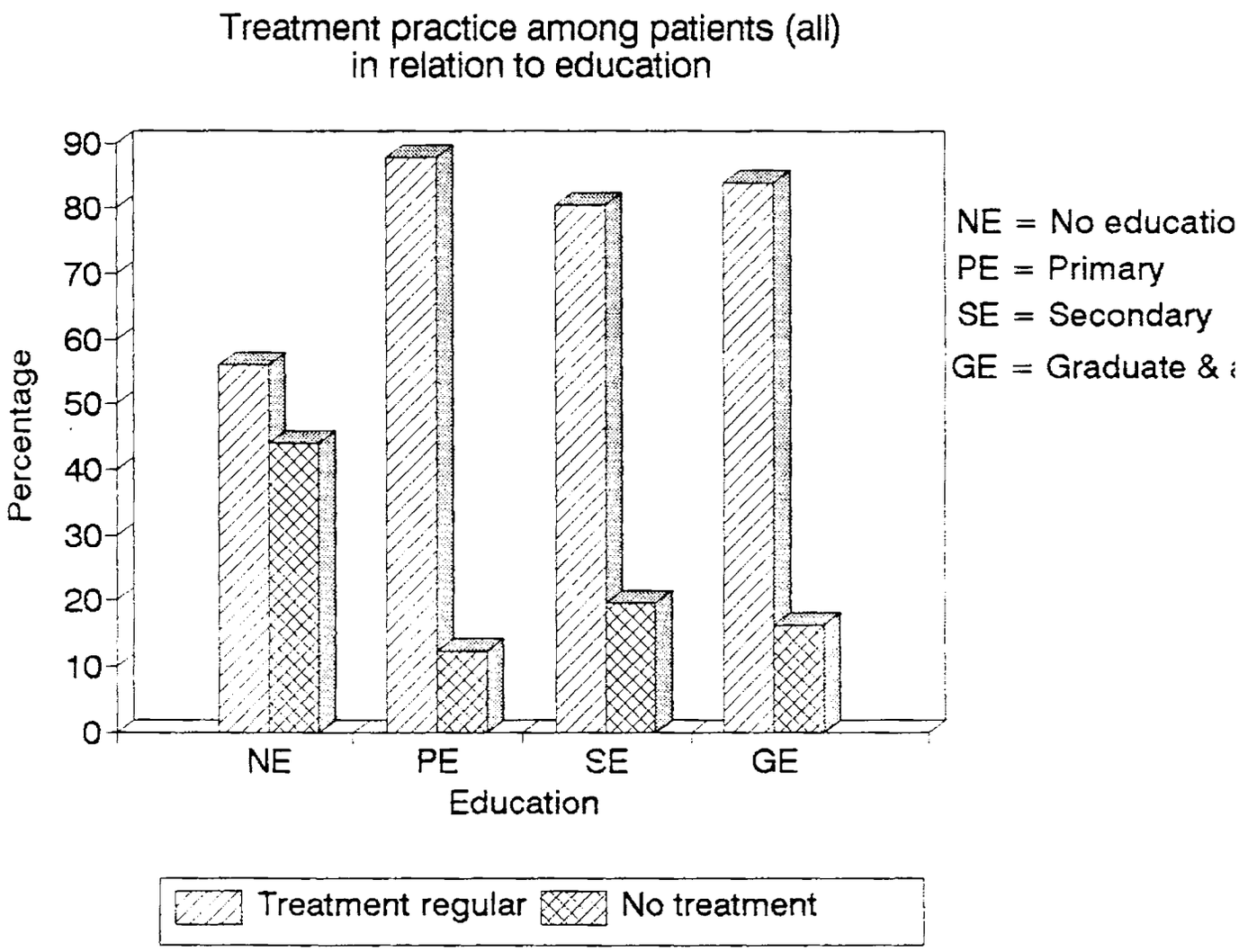
Category	Side reaction	Fatigue	No improvement	Total
Mf carriers	27 (67.5%)	2 (5.0%)	11 (27.5%	40 (60.6%)
Chronic	13 (50.0%)	3 (11.5%)	10 (38.5%)	26 (39.4%)
Total	40 (60.61%)	5 (7.6%)	21 (31.8%)	66 (22.0%)

Table.18

Treatment in relation to education

Education	Completed and regular		Not regular and no treatment		Total
	No	%	No	%	
No formal education	14	5.74	11	19.64	25
Primary	79	32.38	11	19.64	90
Secondary	99	40.57	24	42.85	123
Graduate & above	52	21.31	10	17.86	62
Total	234	78.00	66	22.00	300

Figure 8


Treatment practice among patients (all)
in relation to education
Percentage
90
80
70
60
50
40
30
20
10
0
NE
PE
SE
GE
Education
NE = No educatio
PE = Primary
SE = Secondary
GE = Graduate &
Treatment regular
No treatment

Analysis in relation to occupation showed that over 51.82% of the people who were casual laborers were found to complete the treatment regularly (Table.19). The percentage of people completing regular treatment was however low among business community (Figure 9). The association between the practice of treatment and occupation was thus found to be significant ($\chi^2 = 13.02$; $p<0.05$).

Table.19

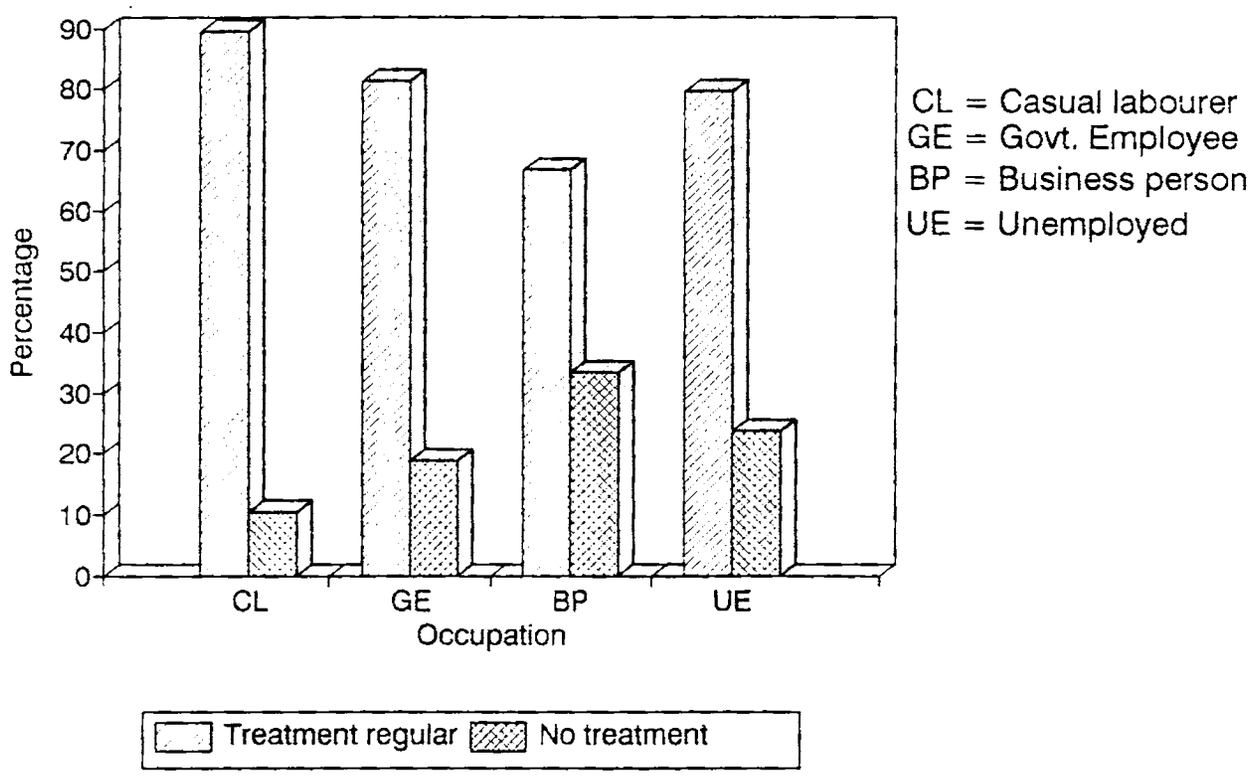
Treatment in relation to occupation

Occupation	Completed and regular		Not regular and no treatment		Total
	No.	%	No.	%	
Casual labourer	128	51.82	15	28.30	143
Govt. job	48	19.43	11	20.75	59
Business	26	10.53	13	24.53	39
Unemployed	45	18.22	14	26.42	59
Total	234	78.00	66	22.00	300

The most obvious form of deliberate health promotive behavior is usually described as personal protective. Personal protective behavior in the case of vector borne diseases begins with the efforts of individuals or families to minimize biting contact, principally by the use of sleeping nets, house screening, mosquito coils, smoky fires, application of domestic

Figure 9

Treatment practice among patients (all) in relation to occupation



insecticides, skin repellents etc. In traditional societies these actions are usually undertaken to reduce the nuisance problem the problem of mosquitoes or other biting vectors as pests or irritants (Dobbins *et al.*, 1975).

Practice of using repellent mats which is common now a days in urban situations mainly due to mosquito biting nuisance was found to be not so popular among the respondents in this rural area. Considerable proportion of people also reported as using mosquito nets. But however the extent of this usage particularly whether everyone in a family was using the net was not known.

Table.20

Relationship between filariasis prevalence and personal protection

Type	Normal		Mf +ve		Chronic		Total	
	No.	%	No.	%	No.	%	No.	%
a.	60	41.67	46	31.94	38	26.39	144	32.00
b.	90	29.41	104	33.99	112	36.60	306	68.00
Total	150	-	150	-	150	-	450	-

a: Using personal protection

b: Not using personal protection

Mosquito nets are known to offer total protection if used properly. Only 32% of the total respondents interviewed reported to practice any one of the personal protective measures against filariasis (Table.20).In general it is very low when the severity of mosquito menace and consequent disease contraction is considered.

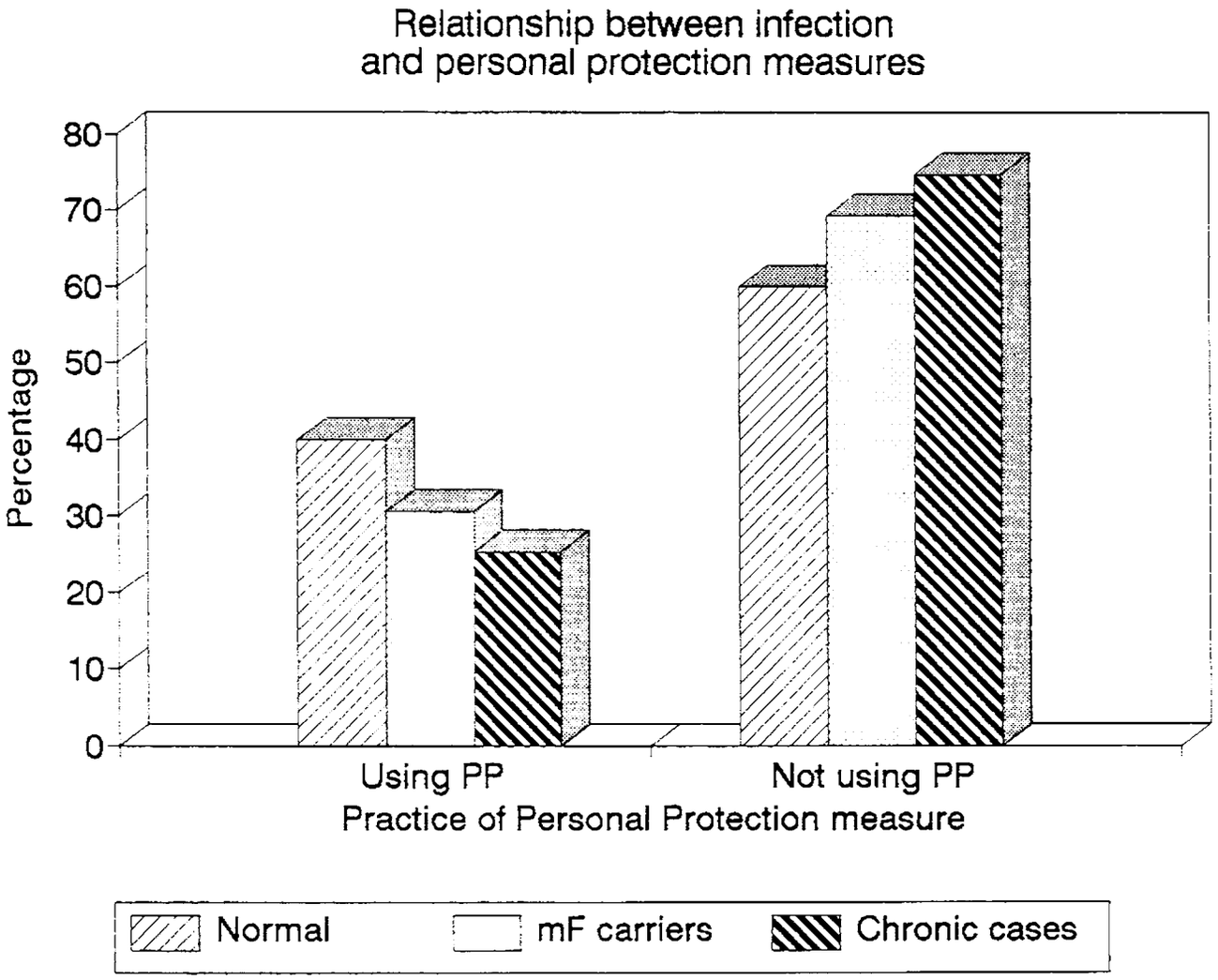
Further analysis in relation to individuals with infection and normals it showed a significant association (χ^2 = 10.51; $p<0.05$). Among the normals, 41.67% of the people reported to practice personal protection measure (Figure 10). Among the chronic patients it was as low as 26.39% followed by 31.94% of the microfilaria carriers. It is an implicit indication of infection and disease prevalence if they are at the risk of infection in the event of not protecting from mosquito bites.

Table.21
Personal protection in relation to age

Age class (years)	Using personal protection	Not using personal protection	Total
15-30	58 (40.28%)	83 (27.12%)	141
31-45	43 (29.86%)	100 (32.68%)	143
46-60	20 (13.89%)	72 (23.53%)	92
61 & above	23 (15.97%)	51 (16.67%)	74
Total	144 (32.00%)	306 (68.00%)	450

Figure in parenthesis denote percentage

Figure 10


Relationship between infection
and personal protection measures
Percentage
80
70
60
50
40
30
20
10
0
Using PP
Not using PP
Practice of Personal Protection measure
Normal
mF carriers
Chronic cases

Lower economic level in the rural community is also a factor limiting the use of persona protection measures which are expensive. Similarly there was a significant association (χ^2 = 10.12, $p<0.05$) between the age classes and the proportion of people practicing persona protection (Table.21). Higher proportion of younger age class people was found to use persona protection measures.

Table.22

Personal protection in relation to education

Type	Personal protection		Total
	Using	Not using	
No formal education	14 (9.72%)	16 (5.23%)	30 (6.67%)
Primary	27 (18.75%)	93 (30.39%)	120 (26.67%)
Secondary	39 (27.08%)	138 (45.09%)	177 (39.33%)
Graduate & above	64 (44.44%)	59 (19.28%)	123 (27.33%)
Total	144 (32.00%)	306 (68.00%)	450

Figure in parenthesis denote percentage

Though significant ($p<0.05$) difference in the proportion of people using personal protection was noticed between different groups of individuals in relation to their education, there was no association observed. This could be due to the affordability of the individuals and not the education level.

Occupation of the endemic community was found to influence significantly the practice of personal protection measures. People engaged in jobs were found to use personal protection measure to a level of 70% (Table.23).

Table.23

Personal protection in relation to occupation

Type	Personal protection		Total
	Using	Not using	
Casual labourer	53 (36.81%)	178 (58.17%)	231
Govt. job	49 (34.03%)	31 (10.13%)	80
Business	17 (11.81%)	30 (9.80%)	47
Unemployed	25 (17.36%)	67 (21.89%)	92
Total	144 (32.00%)	306 (68.00%)	450

It is necessary to identify the reason for not practicing personal protection measures against vector contact. This is in view of developing appropriate methods to enhance the practice of such measures to protect from the risk of infection. When the reason for not using any personal protective measure was analyzed it was found that majority of the people (76.14%) reported that economic constraint was the reason. This was considerably higher among the chronic patients (41.20%) than that of microfilaria carriers (32.19%) and normals (26.61%). This further supports the fact that this disease is more among economically weaker

group. No faith in the personal protective measure was felt by 62% of the respondents. Inconvenience was felt by 17.65% of the respondents who could not follow personal protective measures (Table.24). This clearly shows that economic condition could be attributed as the reason for not following any personal protective measure (Figure 11).

Table.24

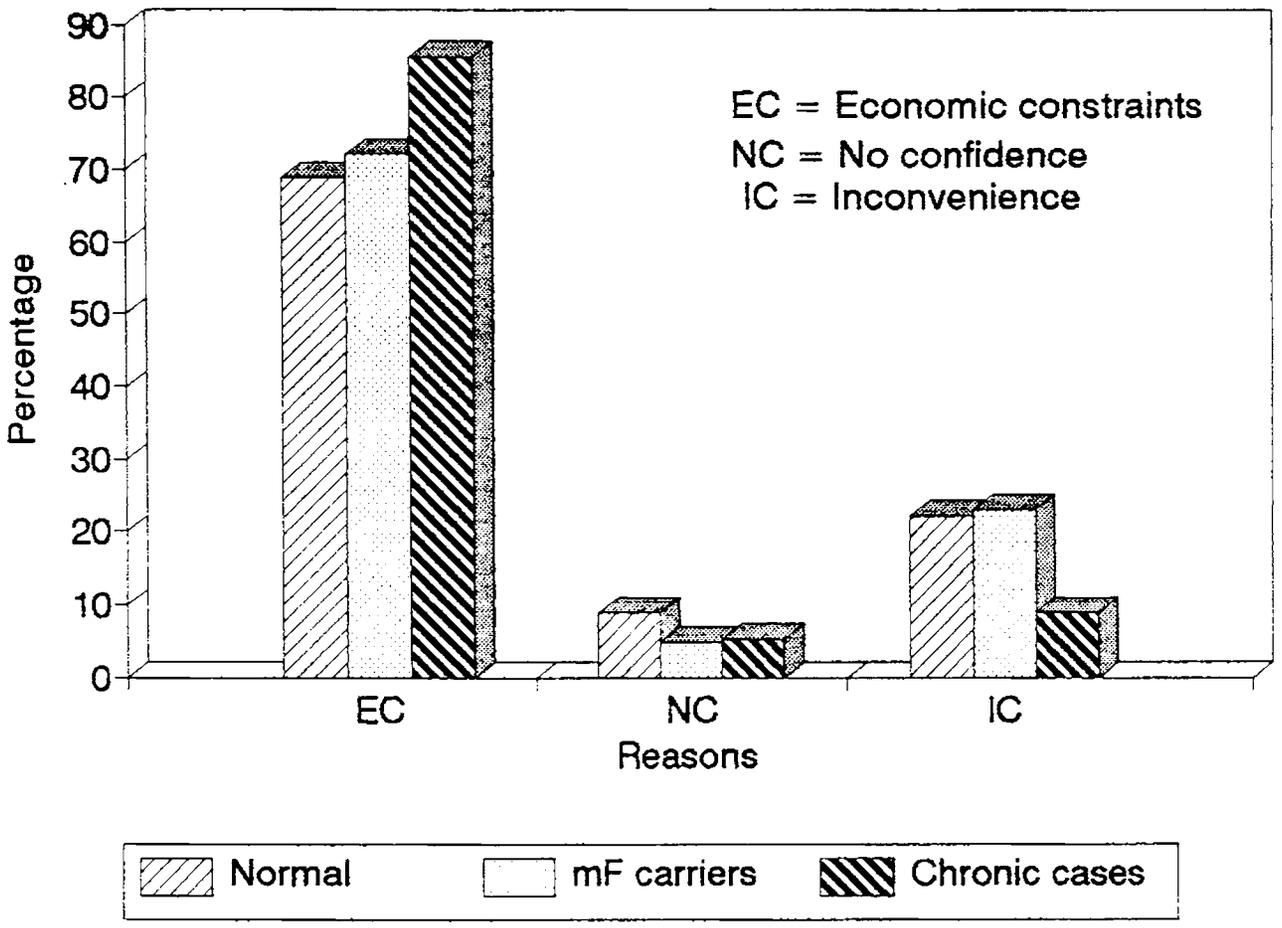
Reason for not using personal protection

Type	Normals	Mf +ve	Chronic	Total
Economic constraints	62 (26.61%)	75 (32.19%)	96(41.20%)	233(76.14%)
No confidence	8 (42.10%)	5 (26.32%)	6(31.57%)	19(62.09%)
Inconvenience	20 (37.04%)	24 (44.44%)	10(18.52%)	54(17.65%)
Total	90 (29.41%)	104 (33.92%)	112(36.60%)	306(68.00%)

Majority of the respondents did not take the preventive dose of antifilarial drugs. This did not vary between normals (94.67%), microfilaria carriers (94%) as well as chronic cases (94%). Similarly no marked difference was noticed in areas with different endemicity. As this strategy developed and demonstrated recently, lack of awareness could be the reason for such a vast gap in adopting this measure. Among those who had taken the preventive dose 38.46% reported to have taken at an interval of once a year, 7.7% at an interval of twice a year and 53.84% only once so far.

Figure 11

Reasons for not using Personal protection measures among categories



The reason for not opting preventive dose of diethyl carbamazine citrate was analyzed and it was found that majority (64.62%) had told that no serious consideration was given while 3.3% had different reasons. While 10.98% of the respondents were of the view that they had no faith in preventive measures, none of the microfilaria carriers said that facility was available locally. Only 11.53% of the normals and chronic patients project the same reason for not taking preventive treatment. No reason could be attributed by 9.2% of the respondents. The situation was similar in all the categories of respondents. In addition to personal protection, some effort to control vector breeding is a supplement approach and this can be considered as an important strategy.

Table.25

Relationship between filariasis prevalence and mosquito breeding sources near the vicinity of the house

Type	Normal	Mf +ve	Chronic	Total
Ponds with weeds	117	125	131	373
	(31.36%)	(33.51%)	(35.12%)	(82.89%)
Ponds without weeds	33	25	19	77
	(42.86%)	(32.47%)	(24.68%)	(17.11%)
Total	150	150	150	450

Analysis on the prevalence of vector breeding source (ponds with weeds that support vector breeding) in relation to disease prevalence showed that the proportion of ponds with

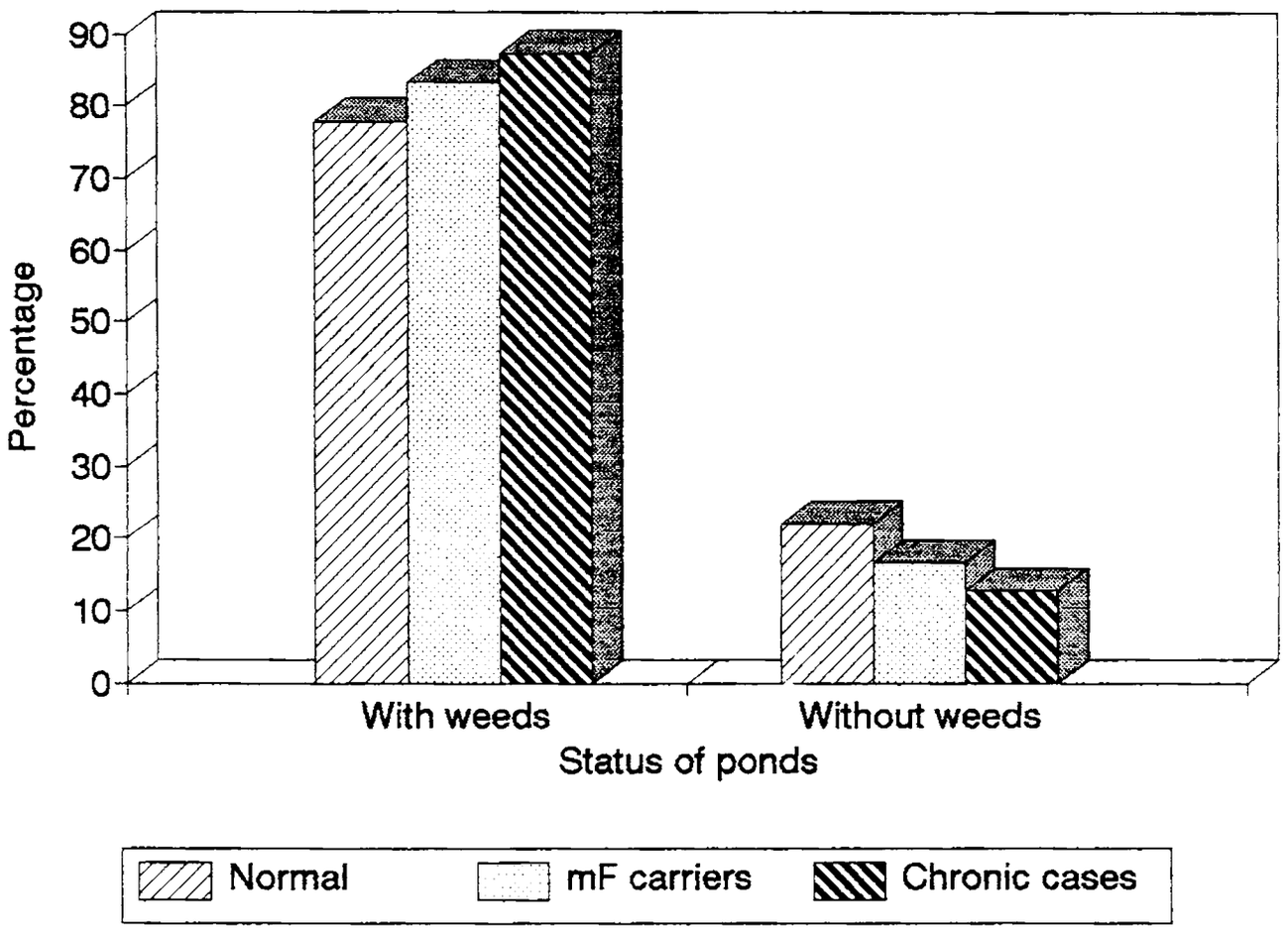
weeds was more within the vicinity of the residence of both microfilaria carriers and chronic cases (Table.25). From this it is inferred that prevalence of vector breeding sources act as one of the determinants for effective transmission of the disease.

The proportion of ponds without weeds was found to decrease from normals (42.86%) to microfilaria carriers (32.47%) and chronic cases (24.68%). This shows that epidemiologically the prevalence of infection increases with increased proportion of ponds with weeds (Figure 12). Another indication is that this situation continues despite the fact that majority of the people are aware of the relation between weed vector and filariasis.

The practice of the local populace in maintaining the ponds is another factor that reduces weed infestation as seen in the case of normals. In this locality people have the practice of desilting and deepening of the ponds at least once in two years depending on their convenience and affordability. It is reported that minimum Rs. 500 is required for this purpose. This was reported to be the cause for the absence of weeds among 24.24% of the normals. They also have the habit of removing the excess of sprouting vegetation so as to make the ponds usable for their domestic/agricultural work. This was reported to be the reason for the disappearance of weeds in 27.3% of the respondents without any filarial infection. The rest 48.46% had removed weeds after knowing about the relationship between filariasis and weeds. However, removal of weeds once in two years or as and when the deepening of the pond is due will not be useful to prevent or control weeds and there by

Figure 12

Status of ponds at proximity of houses among categories



vector proliferation to the satisfactory level. It may delay in the establishment of weeds in the ponds and it has been estimated to be 2 months during hen vector breeding is constrained.

Behavior that enhances transmission of filariasis is deliberate, behavior and action taken with no consideration of their possible impact on filarial transmission and control is non deliberate behavior.

Table.26

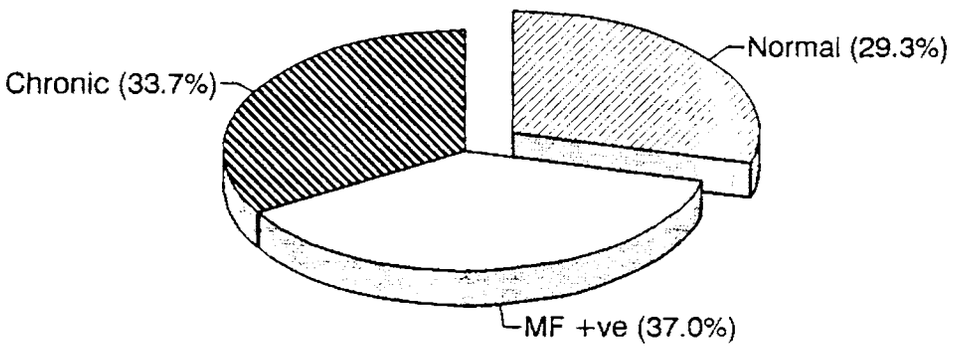
Practice in the maintenance of weeds in ponds

Category	Deliberate growth	Non deliberate growth	Total
Normal	80(29.30%)	37 (47.12%)	117
Mf +ve	108(37.00%)	17 (27.73%)	125
Chronic	103(33.70%)	28 (31.15%)	131
Total	291(78.02%)	82 (21.98%)	373

Weeds are reported to be grown deliberately by 78.02% of the respondents irrespective of the groups (Table 26). Among the normals it was the lowest (68.3%) which was significantly different from other categories (χ^2 = 11.49, p<0.05). Among the microfilari positive and diseased individuals it was as high as 86.4% and 78.63% respectively (Figure 13). This clearly shows that epidemiologically conducive environment

Figure 13

Practice of deliberate growing of weeds
in ponds in relation to categories



was prevalent among the infected and diseased individuals. When the reason for the deliberate growth/maintenance of weeds was asked, 69.76% of the respondents said that it was used for manure purpose (Table 27). There was no marked difference in attributing this reason between the groups. Therefore this practice is common in this area where availability of conventional green manure is very meager.

Table.27

Practice in the maintenance of weeds in ponds and reasons

Category	Deliberate growth	Non deliberate growth	Reasons				
			Manure	Clean	Reli-gious	Habit	Deci-sion
Normal	80	37	62	5	3	13	10
	(27.49)	(45.12)	(30.54)	(38.46)	(75.00)	(32.50)	(32.26)
Mf +ve	108	17	74	4	1	15	9
	(37.11)	(20.73)	(36.45)	(30.76)	(25.00)	(37.50)	(29.03)
Chronic	103	28	67	4	0	12	12
	(35.39)	(34.15)	(33.00)	(30.76)		(30.00)	(38.71)
Total	291	82	203	13	4	40	31
	(78.01)	(21.90)	(69.76)	(4.47)	(1.37)	(13.75)	(10.65)

Figure in parenthesis denote percentage

Though it remains to be a fact that presence of weeds could reduce pollution and keeps th water clean from dirt and keeps water cool, such reasons were attributed only by 4.47% of th respondents. Further, this practice is followed traditionally and people have become habitual wi

such practice. This was revealed from the answer of 13.75% of the respondents. Another factor is that people are under influence of following the decisions made by the head of the family. The respondents who still follow the ideas of the elders in such matters constitute 10.65 % of the respondents. Though negligible, 1.37% respondents have weeds in their ponds as these ponds are maintained for performing religious activities pertaining to the Serpent God, and so there is no human access which facilitate the growth of weeds. So ritual behavior is one another factor for the perennial growth of weeds.

According to 21.98% of the respondents who are not growing weeds deliberately, but have weeds in their ponds the reasons for weed infestation were faster regrowth of the vegetation and non availability of laborers to clear ponds of hydrophytes.

Majority of the participants of the focus group discussion felt that the weeds are a must in this sandy terrain to prevent water evaporation and also to help to retain water under the crops. The weeds were said to maintain the water quality and keeps the water cool. Some people felt that growing weeds is an evil as it helps in breeding mosquitoes which transmit filariasis.

When the attitude of the people was analyzed in relation to knowledge and perception on the causation of the disease, it showed a significant ($\chi^2 = 24.47$; $p<0.05$) association. Positive attitude towards the removal of weeds was evident more among those who were aware of the causation of the disease and its relation with aquatic weeds.

About 79% of the people were found to have right attitude and correct knowledge towards the removal of weeds (Table 28). However 20% of the people who have the adequate knowledge on actual cause of the disease do not have the right attitude towards weed removal. These people are reported to depend on the aquatic weeds for green manure for their crops. It is interesting to note that 50% of the people who did not have the correct knowledge towards the causation of the disease have the right attitude towards weed removal. The rest of the people (7%) had neither correct knowledge nor right attitude.

Table.28

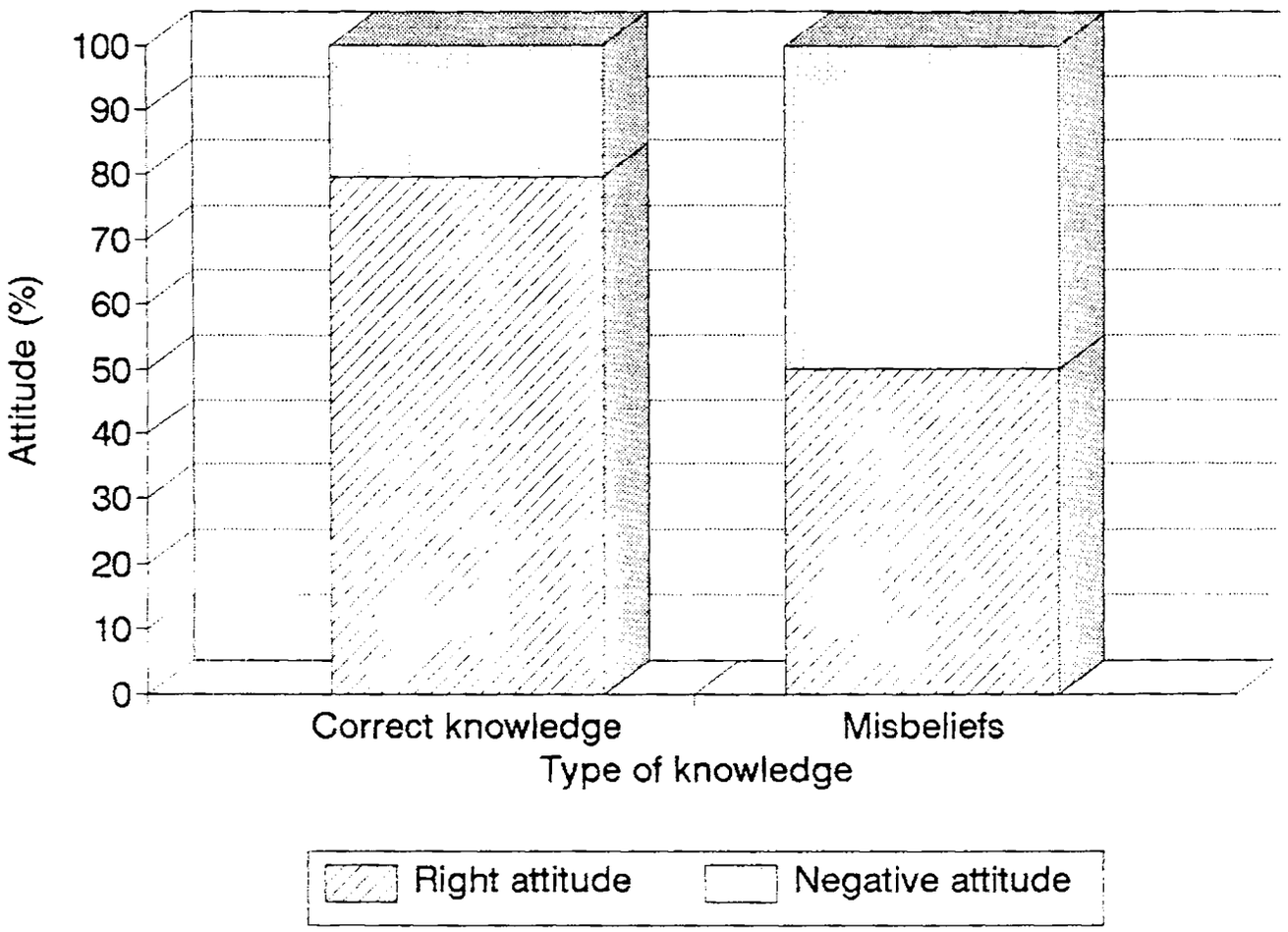
Knowledge on the cause of disease and attitude towards weeds removal

Type	Essential	Not essential	Total
Actual cause	310 (79.49%)	80 (20.51%)	390 (86.67%)
Misbeliefs	30 (50.00%)	30 (50.00%)	60 (13.33%)
Total	340(75.56%)	110 (24.44%)	450

Among the respondents who felt weed removal is essential and who had correct knowledge on the cause of the disease, chronic patients constituted relatively a lesser proportion. All the respondents who had adequate knowledge on the relation between weeds and disease did not feel the necessity of deweeding their ponds (Figure 14).

Figure 14

Relationship between knowledge and attitude in weed removal



About 60% of the respondents who had the right attitude deliberately grow the weeds. While 19% of them grow weeds not deliberately, the rest (21%) reported that ponds in and around their houses were free from weeds by nature (Table 29). Thus, majority of the people do not practice the removal of weeds despite the knowledge and right attitude. Practice is influenced by the requirements and a wrong practice with awareness of the consequences is the result of exerting priority towards the needs.

Table.29

Attitude towards removal of weeds and practice in growing weeds

Attitude	Growth of weeds		No weeds	Total
	Deliberate	Non deliberate		
Essential	186 (59.62%)	60 (19.23%)	66 (21.15%)	312
Not essential	105 (79.09%)	22 (15.94%)	11 (7.97%)	138
Total	291 (64.67%)	82 (18.22%)	77 (17.11%)	450

The situation in the study area is such a practice due to the priority of requirements. To b the people to practice the right methods for the control of filariasis it is therefore necessar suggest alternative ways so as to shift their priority by fulfilling their needs. There is significant association ($p<0.05$) between knowledge and practices on weed growing (Table Figure 15).

Figure 15

Relationship between knowledge and practice in weed removal

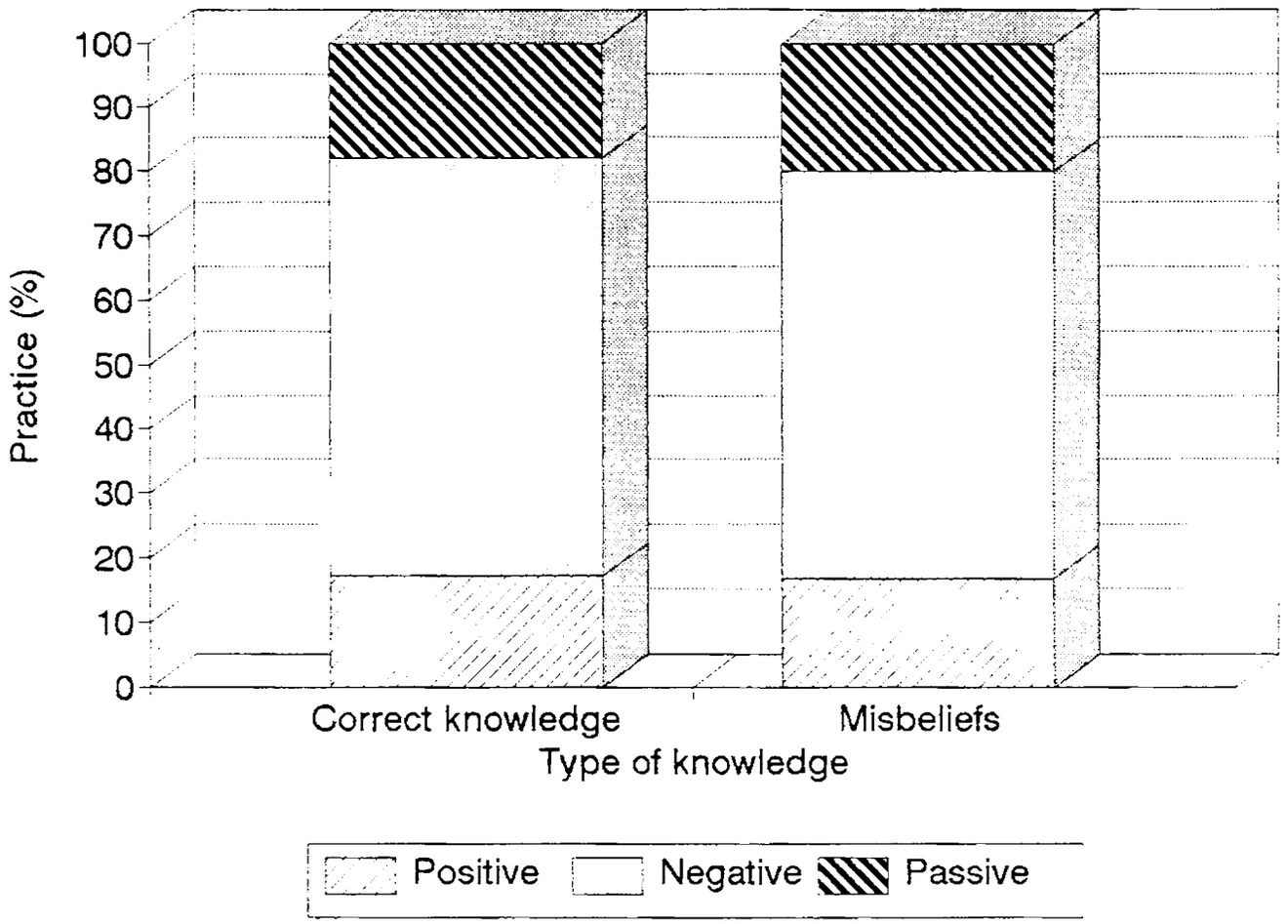


Table.30

Knowledge on the cause of disease and practice on weed removal

Knowledge	Growth of weeds		No weeds	Total
	Deliberate	Non deliberate		
Actual cause	253 (64.87%)	70 (7.95%)	67 (17.17%)	390 (86.67%)
Misbeliefs	38 (63.33%)	12 (20.00%)	10 (16.67%)	60 (13.33%)
Total	291 (64.67%)	82 (18.22%)	77 (17.11%)	450 -

Table.31
Participation in control activities in relation to infection

Category	Participation	Non participation	Total
Normal	68 (40.24%)	82 (29.18%)	150
Mf+ve	51 (30.18%)	99 (35.23%)	150
Chronic	50 (29.59%)	100 (35.59%)	150
Total	169 (37.56%)	281 (62.44%)	450

There was relatively a higher proportion of normals who are participating in the control programme that are being implemented in the study area when compared to other groups (Table 31). There was no significant ($p>0.05$) difference in the proportion of people participating in the programme between normals and infected individuals.

There was a significant (χ^2 = 12.29; p<0.05) association between age and lack of time for participating in control program. Lack of time was found to be a reason among 54% of the people (Table 32). This was higher (30.46%) in the age class between 46 to 60 years (Figure 16). This group can be considered to be the group having more responsibilities and the chances of sparing time for such activities might be less.

Table.32
Reason for non participation in relation to age

Age class	Reason				Total	
	Lack of time		Not concerned			
	No.	%	No.	%	No.	%
15 - 30	36	23.84	29	22.31	65	23.13
31 - 45	41	27.15	19	14.62	60	21.35
46 - 60	46	30.46	37	28.46	83	29.53
61 & above	28	18.54	45	34.62	73	25.98
Total	151	53.74	130	46.26	281	-

Among the respondents who did not have any formal education, 50% reported that they could not participate in control activities. Equal proportion of people mentioned that they were lacking time and not interested in participation (Table 33). Among the literate, there was a gradual decrease in the proportion of people not participating in control activities with increase in education level.

Figure 16

Reasons for non-participation in the control activities in relation to age

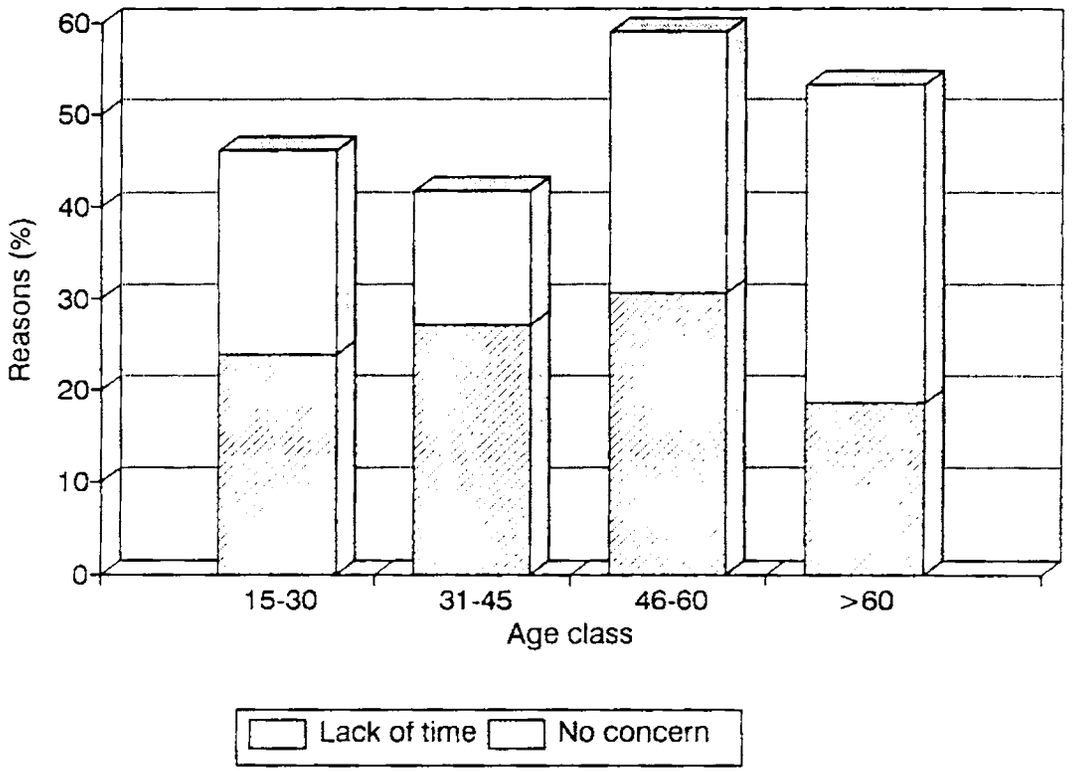


Table.33

Reason for non participation in relation to education

Type	Lack of time		Not interested		Total	
	No.	%	No.	%	No.	%
No formal education	9	5.96	9	6.92	18	6.41
Primary	47	31.13	42	32.31	89	31.67
Secondary	69	45.69	42	32.31	111	39.50
Graduate & above	26	17.22	37	28.46	63	22.42
Total	151	53.74	130	46.26	281	62.44

Among the reasons for not participating in control programme, lack of time was the primary reason among all the groups of people in relation to education except the graduates among whom lack of concern/interest was the major reason. However, there was no significant ($p>0.05$) relationship between education level and reasons for not participating in control programmes. When the reasons for not participating in control programmes was analysed in relation to occupation, it showed no significant ($p>0.05$) relationship. Lack of time was again the major cause except among the unemployed as expected.

Analysis on the knowledge on preventive measures and practicing personal protection measures shows that 79.56% of the people had the correct knowledge, but of whom only 32.96% of the people were practicing personal protection measures. The reasons are varied (Table 34).

Table.34

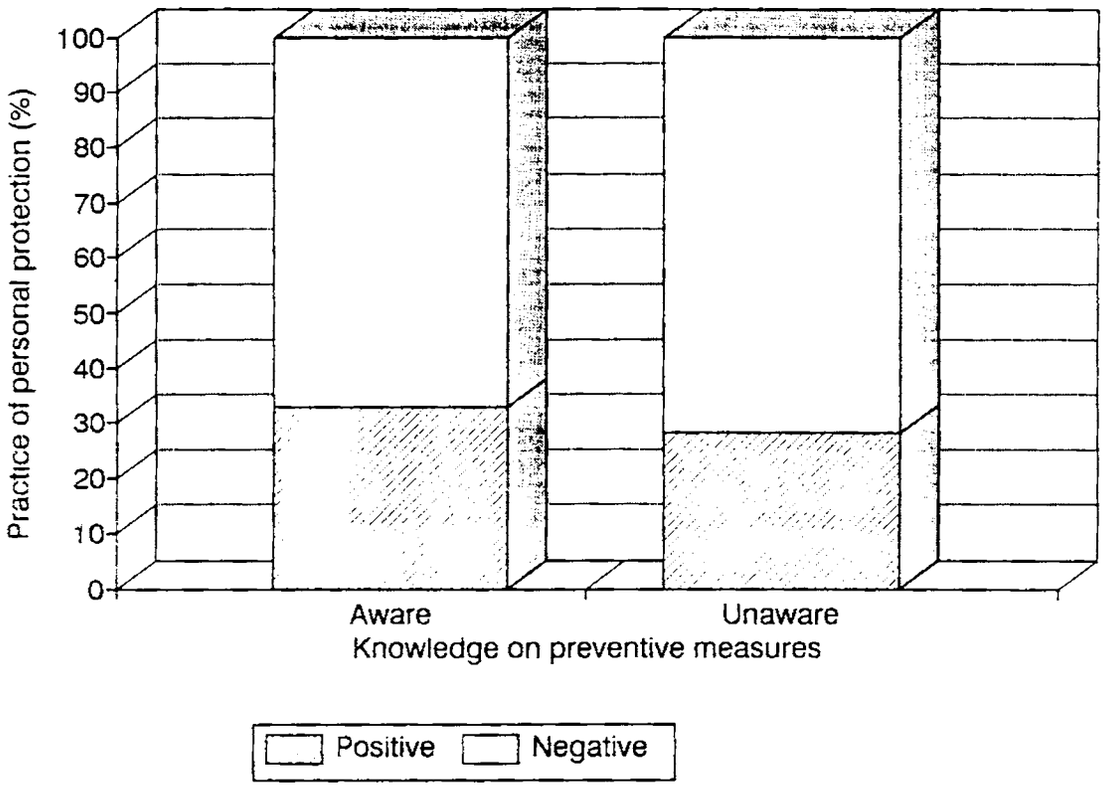
Knowledge on preventive measures and practice on personal protection

Knowledge	Practicing personal protection		Total
	Using	Not using	
Yes	118 (32.96%)	240 (67.04%)	358 (79.56%)
No	26 (28.26%)	66 (71.74%)	92 (20.44%)
Total	144 (32.00%)	306 (68.00%)	450 -

Among those who did not have the knowledge 28.26% of the people were practicing personal protection measures (Figure 17). This clearly shows that knowledge alone does not influence practice among the people. The possibility of using some other green manure was probed to those 69.76% of the respondents who have been growing weeds deliberately for green manure. About 93% of the category was of the opinion that no other green manure is suited to this sandy terrain. They opined that only the water weeds which are available in bulk at their door step and which grows with out any effort are the cheap and simple source of green manure. In addition they also believe that they serve as mat with high water retaining capacity to prevent evaporation. It was said that the hydrophytes are fleshy, decays faster and is therefore good for crops. Though negligible, 7% of the respondents said that filariasis is seen to occur at its chronic stage at old age and so the other age groups need not bother much and thus justifying the practice of growing weeds for manure purpose.

Figure 17

Relationship between knowledge and practice of personal protection methods



It was said that water weeds give the result immediately in terms of yield. Among the 203 respondents who use water weeds as manure, 22.66% did not use any other manure expect weeds for all their plantations and got a very good yield. Their view was that to wait for a long time without growing weeds is like wasting time and the crops give them financial returns.

When asked about their suggestion to control the disease the participants of the focus group discussions opined that by giving timely treatment to all the diseased/microfilaria carriers the disease transmission can be stopped. Some of the participants felt the necessity of implementing a law to prevent growing weeds in ponds. Some remarked that compulsory deweeding in all the ponds with sufficient manpower will help in controlling the disease.

7.1. Relationship between knowledge, attitude and practice:

The relationship between awareness, attitude and practice was analysed in deweeding to control the vectors, in practicing personal protection measures to prevent disease transmission and in undertaking treatment to prevent acquisition of disease. A dichotomous tree has been prepared to illustrate the relationships for each group.

The percentage of respondents who had correct knowledge, positive attitude and right practice in keeping the ponds free from weeds resulting in eliminating vector breeding was 10.67, 16.67 and 10.00 respectively among chronic, mf positive and normals (chart II to IV). The overall percentage was 12.44, indicating that this segment of the community does not contribute to the persistence of disease. However, a change in KAP is essential for the rest of the community to ensure their participation in the control programme.

The knowledge on personal protection measures is meager in general. Among the chronics it is relatively higher (chart V) followed by mf positive category (chart VI). Among the normals it was the least (chart VII). The proportion of respondents who have the correct knowledge, positive attitude and right practice is negligible, accounting for only 5.78 % of the respondents. However, considerable number of people practice personal protection measure with out having adequate awareness but with positive attitude. This is an example of "Cognitive dissonance". This practice cannot be considered sustainable since it is not based on correct knowledge. Therefore this segment of the people need to be educated.

Treatment seeking practice was analysed only among the chronic and mf positive respondents. Majority of the respondents was found to have adequate awareness on the treatment for filariasis. Interestingly about 50% of these respondents did not express positive attitude. However, except two chronic patients all the others reported seeking health care for filariasis. This can be considered as a classic example of "need based" practice. The negative

attitude can be related to the non-response to treatment for chronic manifestation of filariasis which is generally irreversible (chart VIII). A similar picture is observed in the case of mf positive cases (chart IX). In this category the negative attitude can be related to the experience of side/adverse reactions following the treatment which compel most of the people to discontinue the therapy.

Chart II

KAP FOR WEED REMOVAL BY RESPONDENTS OF CHRONIC CATEGORY

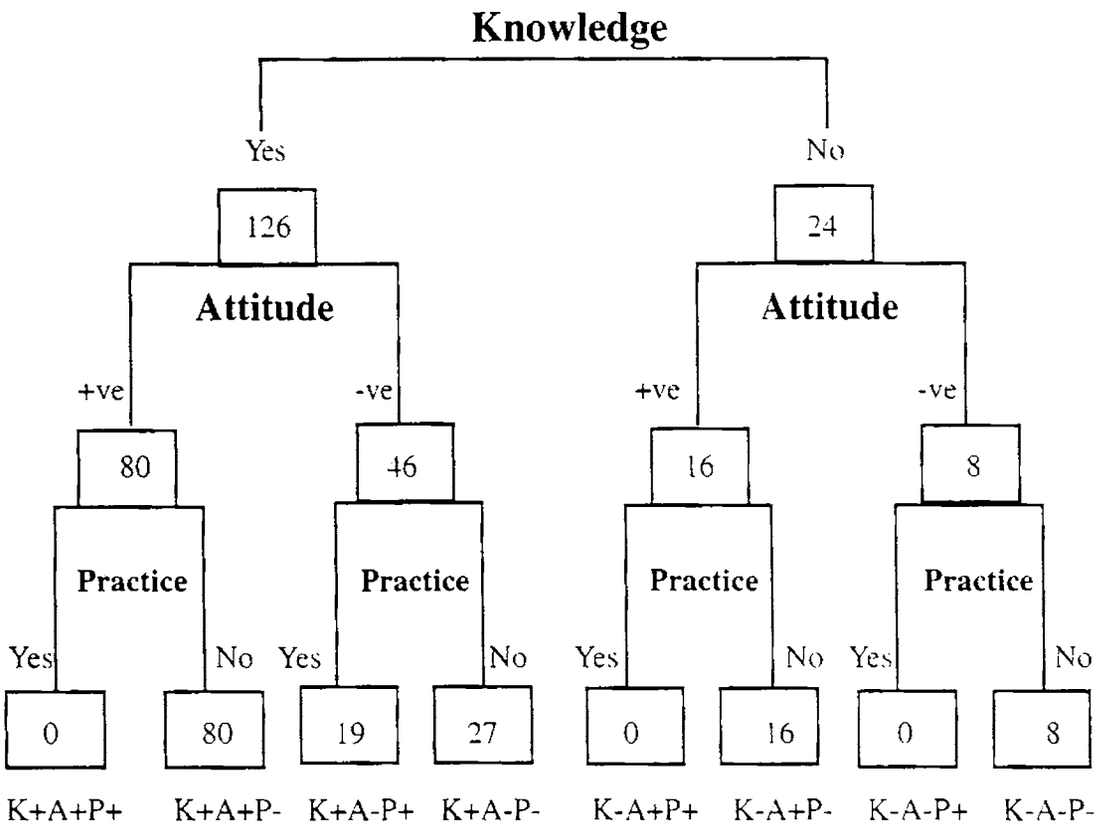


Chart III

KAP FOR WEED REMOVAL BY RESPONDENTS OF Mf POSITIVECATEGORY

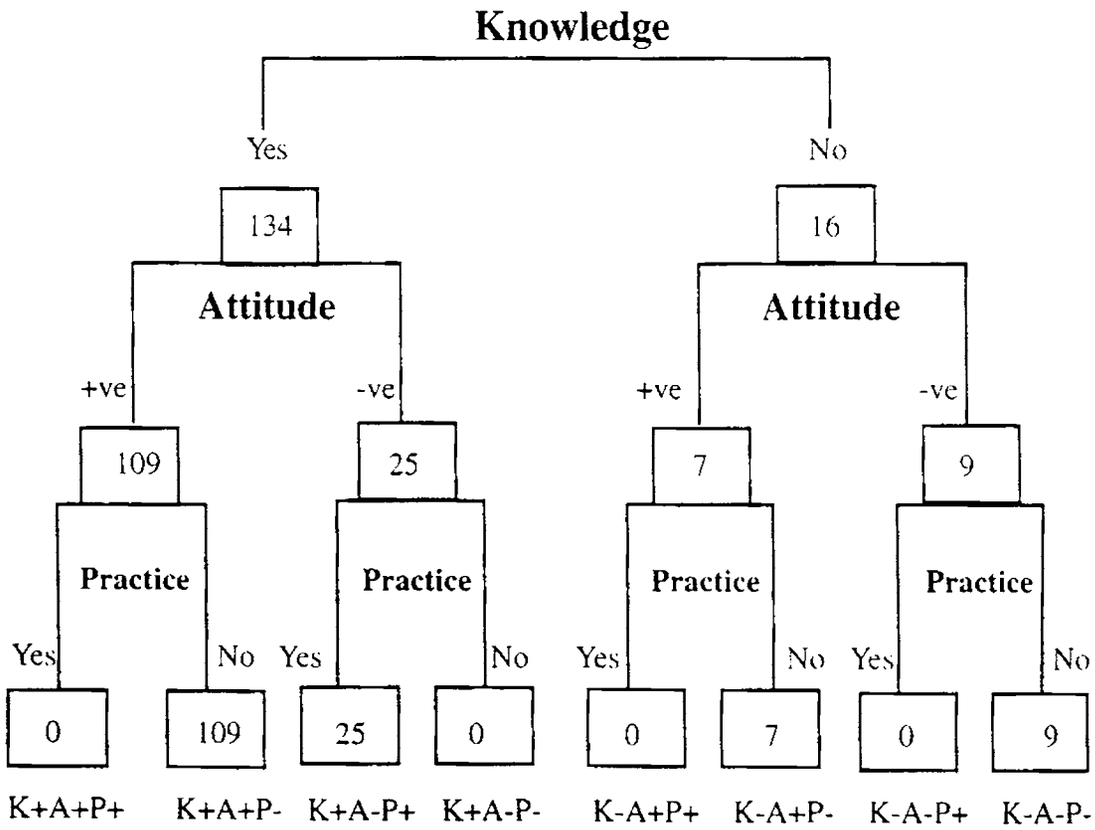


Chart IV

KAP FOR WEED REMOVAL BY RESPONDENTS OF NORMAL CATEGORY

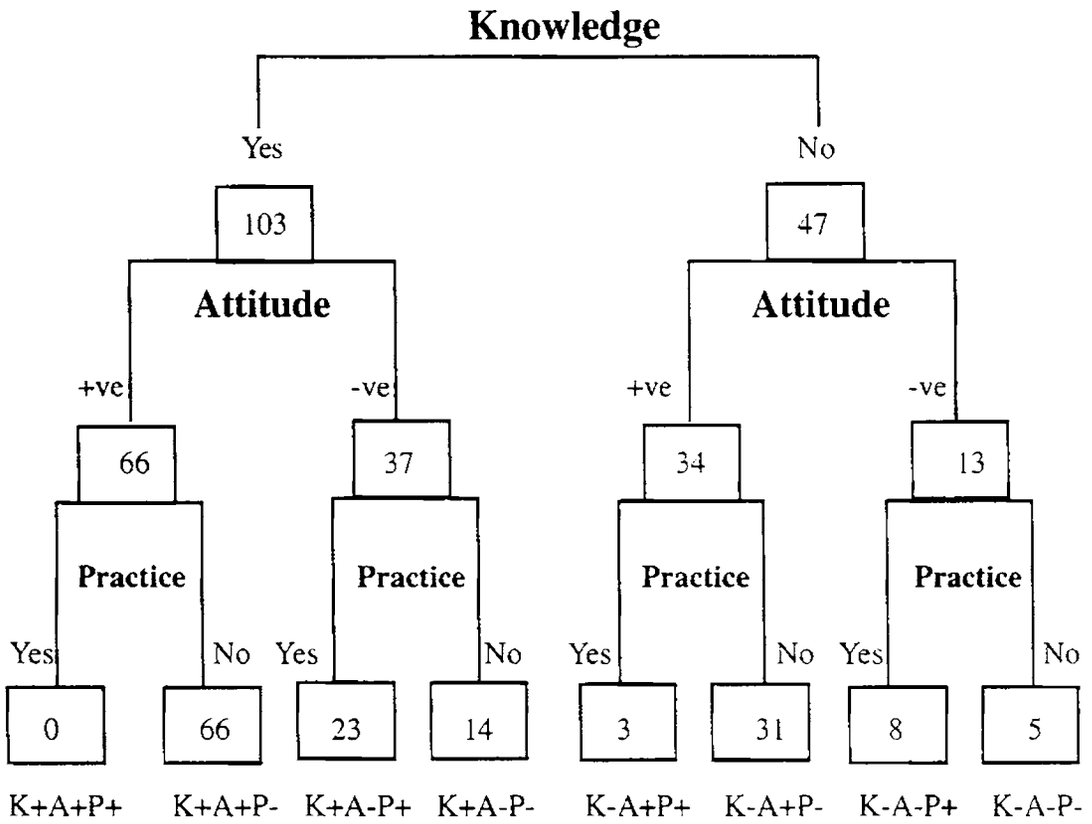


Chart V

KAP FOR PERSONAL PROTECTION BY CHRONIC CATEGORY

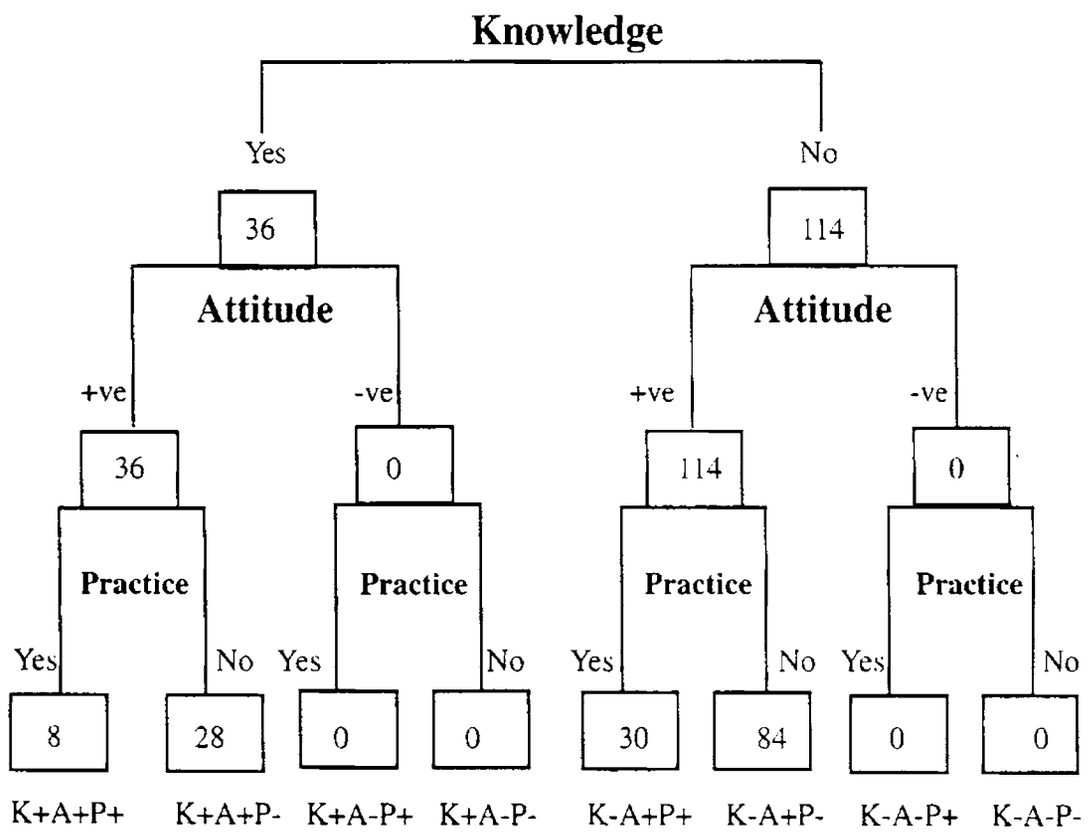


Chart VI

KAP FOR PERSONAL PROTECTION BY Mf POSITIVE CATEGORY

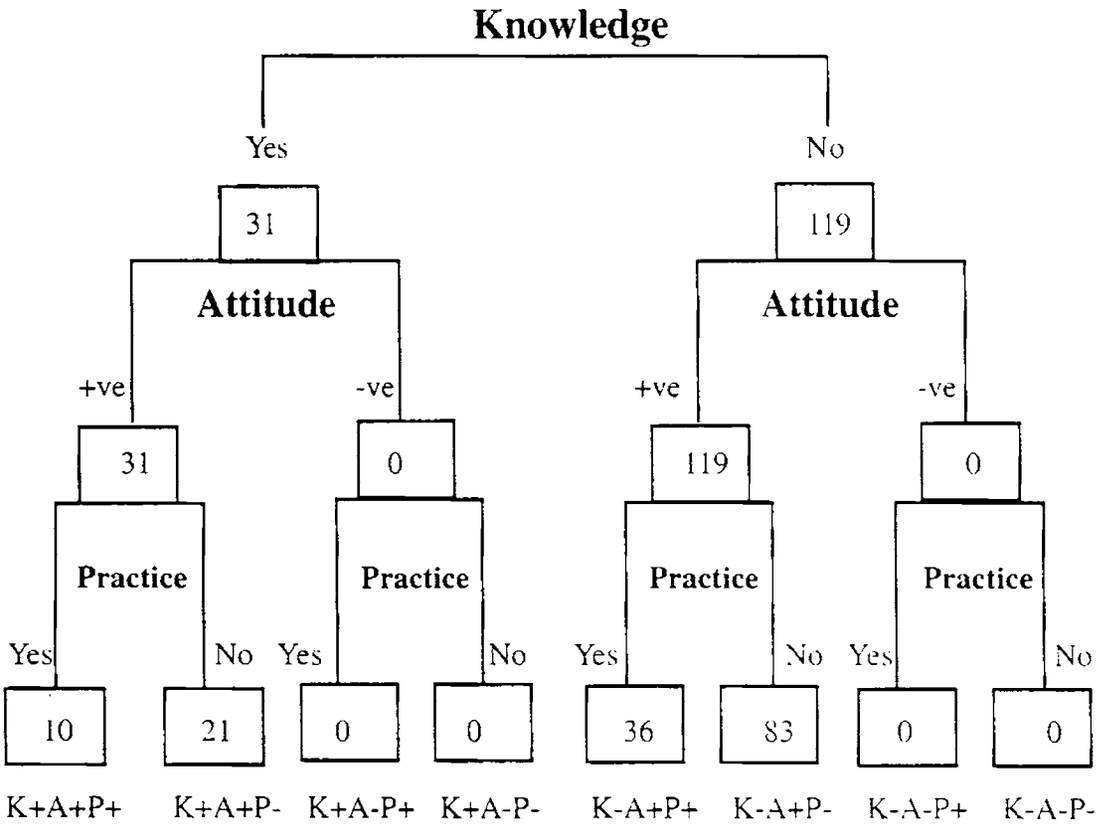


Chart VII

KAP FOR PERSONAL PROTECTION BY NORMAL CATEGORY

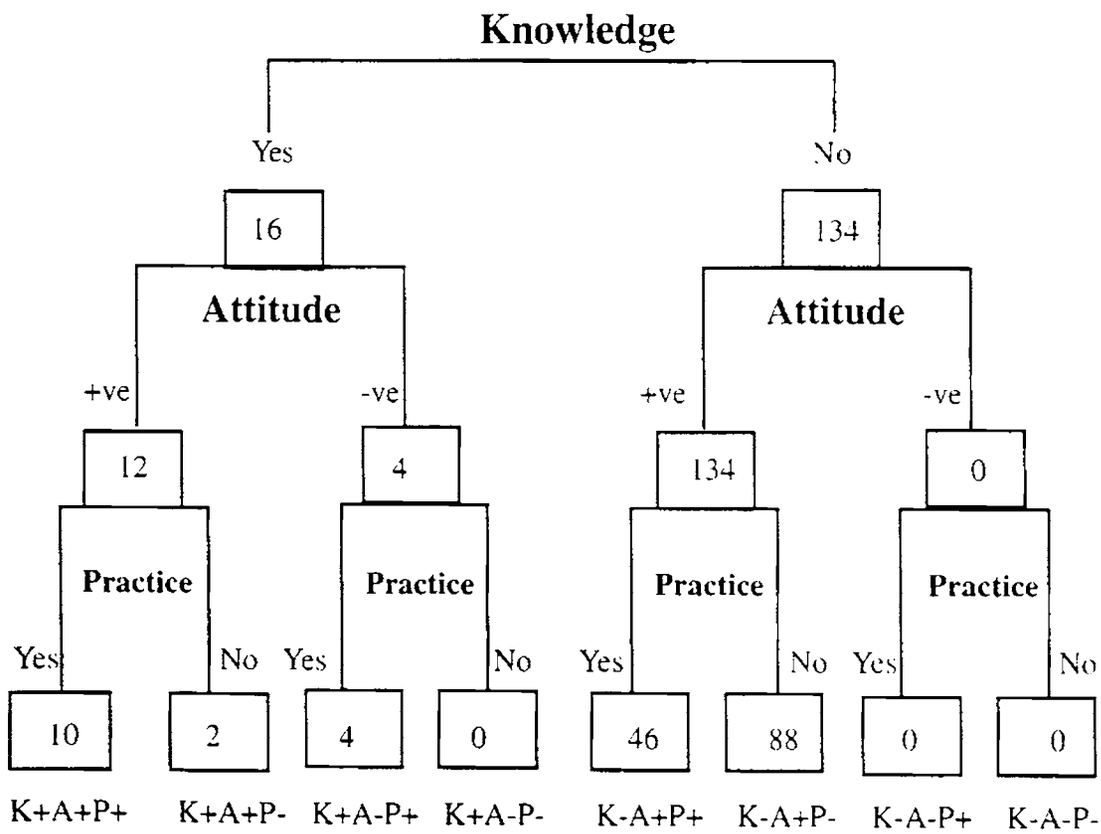


CHART VIII

KAP ON TEATMENT SEEKING BY CHRONIC CATEGORY

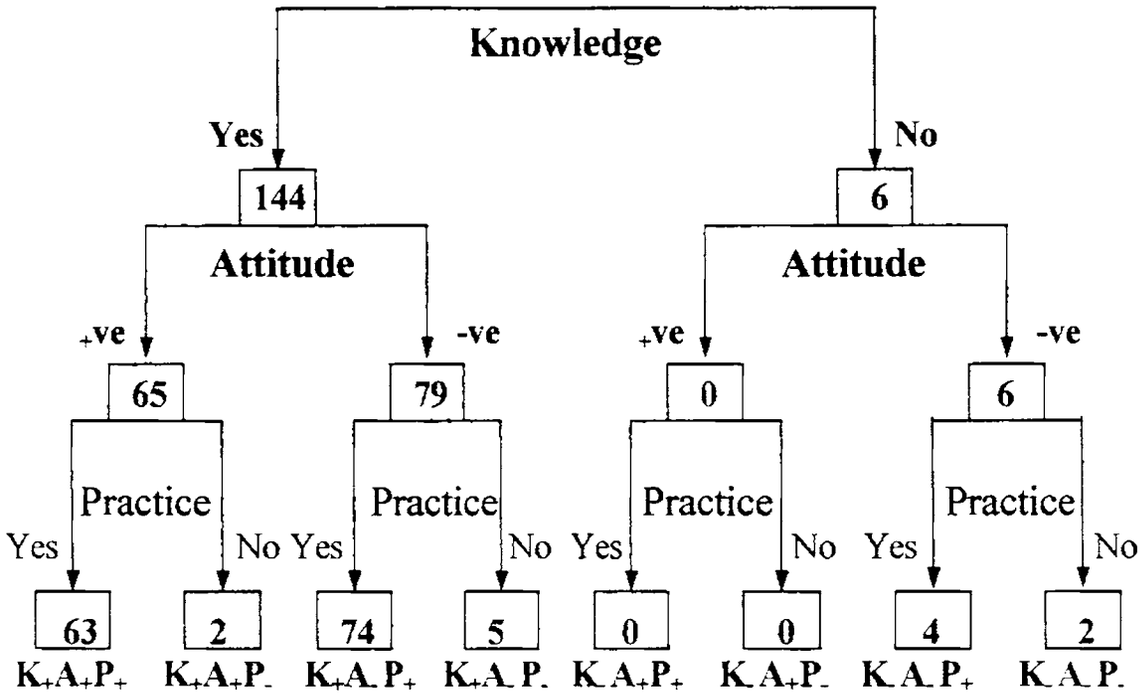
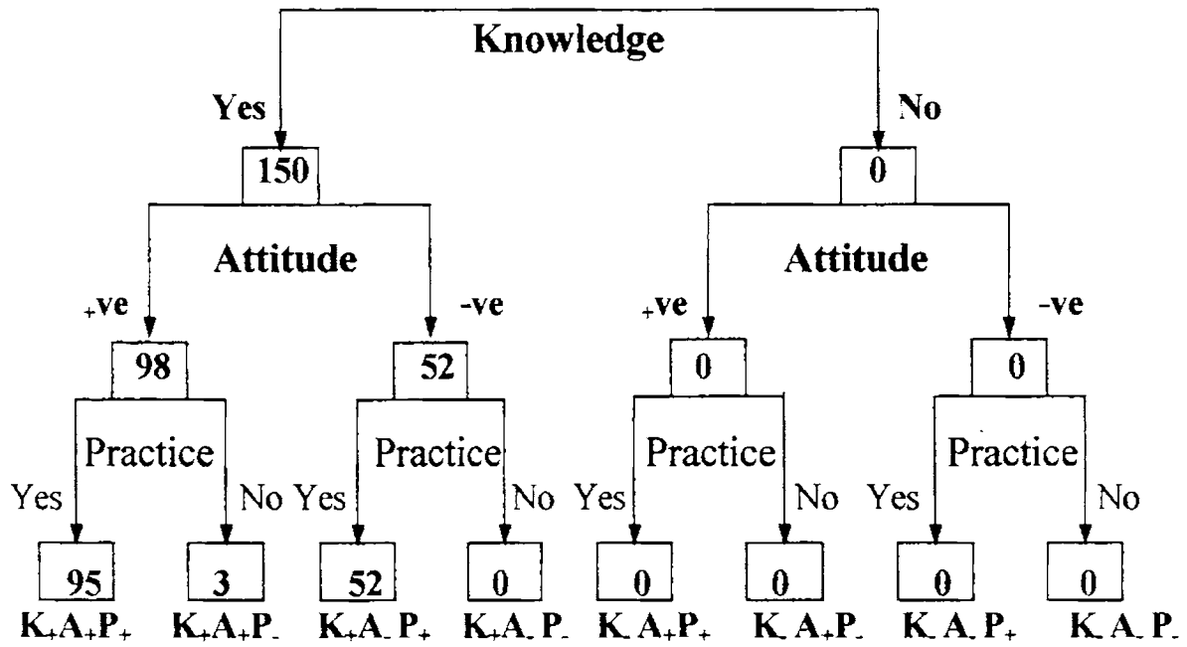


CHART IX

KAP ON TREATMENT SEEKING BY MF POSITIVE CATEGORY



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CHAPTER VIII

8. RESULTS AND DISCUSSIONS:

For every decision to be taken for change of behavior, the individual is subject to internal influences and influences from outside. The internal influences are from the individual perception. The external forces are a multiplicity of social, economic and physical forces. Kurt Lewin has given a scientific description of these forces as in a magnetic field. He compares them to the positive and negative magnetic waves and says that a set of forces which are stronger will decide the occurrence of motivation. First there should be initiative, in this the mind starts thinking as to whether a change in behavior is of utilitarian gain or not. This is followed by formation of attitude. The next stage is direction. In this the behavior is directed towards the attainment of the goal. The third stage is that of sustained behavior. This means the individual is accustomed to behave in the same manner after having experienced and realized the beneficial results of the changed behavior.

Non material culture refers to patterns of living practices, values, customs, attitudes etc. The need determine many acts and functions and what has been going on is followed from generation to generation. Culture is therefore integrated with the socio economic conditions and also the biological needs. It consist of a shared behavior which is recognized, approved and cherished by the society. This undergoes changes rather gradually and slowly because it is a well known fact that habits formed overtime are difficult to be given up. It is the result of experience. Habit denotes any regularly repeated action that is learnt by an

individual and is observable by others (Ramachandran & Dharmalingam 1976).

It is the behavior part which is of considerable importance. At the same time the knowledge or understanding of reasoning behind the behavior and the formation of favorable attitude to result in a health related behavior are also equally important. Unless there is a desire or tendency to do something, mere acquisition of knowledge will not help. According to Roger's model for adoption process the five stages are awareness stage, interest stage evaluation stage, trial stage and adoption stage. Based on the information that has been collected as means to the solution of the problem the individual exercises his mind to analyze various plus and minus points and also the utilitarian gain immediately as well for long term and above all the option or support that he has to get from the family and community.

The study results revealed that the respondents are well aware of filariasis and they believe that it has been endemic for more than a century. Most of the respondents are clear o its etiology, symptomatology, mode of transmission and means of prevention because they have either directly experienced the disease or they have learned about filariasis through discussions with infected persons or from helping afflicted family members, friends, relatives or neighbors. Filariasis is not perceived as a severe disease, since it does not cause death However the respondents recognize that it would have negative impact on one's productivity and quality of life if the fever episodes are frequent.

The people's view on preventive measures is not uniform. Practice of personal preventive measures is mainly based on experience. The people in this locality are found to have sympathetic attitude towards the patients. But the patients themselves feel that they are denied of status. The attitude of filarial patients towards weeds removal is found to be the major obstacle in carrying out vector control operation through physical removal of weeds. Majority of the respondents are convinced that weeds are useful and can be used as manure for their plantations. They also believe that the weeds when applied to plants can retain the moisture during summer there by reducing the frequency of watering. They are reported to be conceived traditionally. More over the level of knowledge on matters related to health, the response of a person to a morbidity episode, the recovery and rehabilitation are all affected by the persons level of income as reported by Mechanic (1969). Socio economic variable is an important variable in accounting for response to illness because in a very gross way differences in socio-economic level encompass differences in health values, understanding and information concerning the disease, future and preventive planning etc (Mechanic 1969). About 80% of the respondents of the study are below the annual income of 15000 and so they practice to continue the habit of growing water weeds for their plantations instead of spending for fertilizers (chemical manure).

Innumerable number of ponds and canals are dug to water the coconut and other tuber plantations. The sandy terrain of this area is one another aspect which necessitates constant watering of the plantations. Water is drawn for this purpose during summer either manually or by using motor pumps. Having experienced with the varied benefits of weeds, the people started maintaining weeds in their ponds deliberately for which no concentrated effort is

necessary. They feel that when weeds are strewed around the plantations, as sponge it retains water thereby the frequency of watering the plants. They also believe that these plants as a mat on the water surface reduce the water evaporation to a considerable degree during summer. It is also believed that these plants prevent water to get heated up and there by keep the water cool. As known, they also believe that these plants act as anti pollutant by absorbing unwanted elements in the water there by keeping it clean. So in addition to the economic benefit in using it as manure, the people have found many other uses for the weeds. Under these circumstances the ill effects of these plants are undermined.

Even though majority of the people belonging to all the three categories were aware of the disease their practice towards prevention was not found to be related to their knowledge. The economic level of the people compel them to use what gives economic benefit. The need based approach was found to be one of the aspects for the persistence and control of malayan filariasis in the coastal belt of Cherthala. One another aspect of economic constraint was the reason for not practicing personal protective measure. Another reason is that people are under the influence of decisions made by the head of the family whose ideas are followed in this matter also. Another belief was that weeds keep the water clean, cool and prevent water evaporation. Some of the ponds are designated as holy ponds for performing the religious rites of the Serpent God and hence where human access is denied thereby weed proliferation is promoted. Such a habit of deliberately growing weeds remains to be a social factor which favors vector breeding in these water bodies of this area. The people in this coastal belt has cultured this habit and practiced for years and is still continuing despite their awareness on its consequences in the persistence and spread of filariasis transmitted by the vector mosquitoes

that are supported by the floating aquatic weeds. So the two major preventive measures, deweeding of domestic water bodies and personal protective behaviour are hindered due to the socio economic factors. Since the culture in a society is the result of collective thinking or behavior it is not easy for changes to take place quickly unless there is a threatening situation. The present study is a classic example to demonstrate this phenomenon.

8.1. Suggestions and recommendations:

Based on the results of the analysis of the present study, the issues of filariasis control in this area can be resolved by two ways. Creating awareness is of paramount importance. Educating the people who are unaware of certain facts is simple and there are many methods available which can be designed based on the socio-economic characteristic of the target community. But, to remove misconceptions is critical. Concentrated efforts are necessary for this purpose. When planning awareness programmes therefore it is necessary to understand all the prevailing misconceptions and the programme need to be oriented towards this.

Personal protection measures can protect an individual from the risk of infection. However with the given financial constraints expressed by the respondents it is evident that not all the people can practice any of the personal protection measures. Community based programme is therefore necessary to contain the problem which is a major public health concern in this areas as a cause of morbidity and social stigma.

Development of programmes which can generate income to the people is very important when long term activities are aimed involving the community. Substitution of alternative green manures may be useful in discouraging the people to grow aquatic weeds for the manure requirements. Similarly to keep the ponds free from weeds naturalistic methods such as stocking the ponds with phytophagous fishes can be useful which does not require recurrent activities of weed removal. As demonstrated by through Technology Mission Project undertaken in this area, polyculture using edible and fast growing fishes including weedivorous fishes is a viable solution to prevent vector breeding. In addition to generating income to the people, long term vector control can be achieved as a by product. Local bodies or concerned Government departments can take necessary action to implement the programme with some financial assistance through banking institutions. Integration of income generating programme with the disease control programme has thus been successfully demonstrated by the Vector Control Research Centre in this locality. This programme is well recognized internationally as a successful programme of filariasis control through sustained community participation.

8.2. Future research:

The present study showed that community perception is the major determinant of community participation in disease control programmes. Therefore health education campaigns should be intensified to create awareness on the cause, transmission and control of filariasis. The results of the present study may be useful in characterizing the community based on the socio-economic indicators. This can remain as a guide in designing appropriate

strategies by identifying effective and potential IEC (Information, Education and Communication) tools suiting to the target community. Thus future research can be focused on the evaluation of various IEC tools so as to incorporate in the filariasis control programme in this locality.

8.3. Conclusion:

The KAP study in Cherthala clearly indicates that there is a distinct possibility of filariasis control through community participation with the level of perception, degree of attitude and extent of practice towards prevention and control of disease. To create a self reliant community however some measures are required. The bottlenecks include misconceptions and health care seeking for the treatment of filariasis. Also to convert need based practice into prevention based practice measures to enhance perception and enlist community involvement are required. Consequently a self sustained activity leading to spontaneous disappearance of infection can be achieved. Health care providers can assist the community as an external catalytic agent to ensure sustainability. Measures towards this direction will be useful to achieve the final goal of elimination of the foci of filarial infection from Cherthala.

8.4. Contribution of the researcher:

The finding of the study can be taken into account while planning or modifying community based control programmes. Creation of awareness on the disease alone is not sufficient. The need of the people should be identified and on fulfillment of the same they

can be guided into action. The results of the present study can be served as a guideline to the policy makers while planning large scale filariasis control programme with community participation.

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ANNEXURE I

THE INFLUENCE OF SOCIO ECONOMIC FACTORS IN THE PERSISTANCE AND CONTROL OF FILARIASIS

IN KERALA- A CASE STUDY OF MALAYAN FILARIASIS IN CHERTHALA

INTERVIEW SCHEDULE

Date

Household information

1. Household No.
2. Panchayat
3. Name of Respondent & Address

4. Age :
5. Sex 5.1 Male 5.2 Female
6. Marital Status 6.1 Married 6.2 Unmarried
7. Educational Qualification

7.1 Illiterate 7.2 Literate 7.3 Primary
7.4 Secondary 7.5 Graduate 7.6 Post Graduate
7.7 Professionals 7.8 Technical 7.9 Others [Specify]

8. Occupation

8.1 Casual labourour 8.2 Fisherman
8.3 Coir making 8.4 Agriculture
8.5 Business 8.6 Govt Servant
8.7 Professionals 8.8 Others [Specify]

9. Family size
10. No of working members in the family
11. Religion

11.1 Christian 11.2 Hindu
11.3 Muslim 1.4 Others [Specify]

12. Residential status

12.1 Kutcha 12.2 Semi 12.3 Pucca

13. Length of residence in the Taluk

13.1 Since birth 13.2 Migrated (Duration)

14. Annual income of the family
    From wages/Salary
15. Annual income from busk
    retting and coir making
15. Annual income from Agriculture
17. Annual income from others [Specify]

KNOWLEDGE

18. What are ponds used for

18.1 Drinking water 18.2 Irrigation 18.3 Retting husk
18.4 Domestic purposes 18.5-All the above 18.6 Others [Specify]

19. Is there weeds in all the water bodies

19.1 No 19.2 Yes 19.3 Almost all

20. For what purposes water are grown

20.1 Manure 20.2 Keeps water cool 20.3 Keeps water clean
20.4 Prevents water evaportaion 20.5 Prevents algae formation
20.6 Habitual 20.7 Lack of man power to remove weeds
20.8 No access to the pond as it is maintained for religious purposes

20.9 No reasons 20.10 Others [Specify]

21. Do you know of a disese called filariasis 21.1 No
21.2 Yes

22. What according to you causes the disease
221. Filarial worm 22.2 Pathogen
22.3 Bacteria 22.4 Do not know 22.5 Others [Specify]

23. For how long this disease has been persisting in Cherthala
23.1 10 Years 23.2 11-50 Years 2.33 51-100 Years
23.4 101 and above 23.5 Do not know

24. Do you know why the disease in persisting in Cherthala?
24.1 Interaction of the Host, parasite & mosquito
24.2 Ignorance of the people 24.3 Host factors
24.4 No proper treatment 24.5 Do not know 24.6 Others [Specity]

25. Do you know of any organisation working for filariasis control for the past 50 years in Cherthala?
25.1 No 25.2 Yes

26. If yes please name it
26.1 State Filaria Control Works 26.2 N I C D
26.3 V C R C 26.4 Private 26.5 Others [Specify]

27. What is the possible cause of this disease?
27.1 Contamination through drinking water 27.2 Inherited
27.3 Infection through mosquito bite
27.4 Walking on hot sand and dipping leg in cold water
27.5 Sprains 27.6 Bathing in ponds surrounded by pandanus
27.7 Curse of God 27.8 Change of oil 27.9 Related to work
27.10 Do not know 27.11 Others [Specify]

28. What is the basis for your answer to the previous question
28.1 Observation of a filariasis patient 28.2 Heard from others
28.3 Own experience 28.4 From reading materials
28.5 Others [Specify]

29. If any member in the family has this disease, Is it possible for other members of the family to have this disease?
29.1 No 29.2 Yes 29.3 Do not know 29.4 Others [Specify]
29. a If yes, What is the reason
29 a1. Sleeping habits 29.a. 2 Same food eaten
29 a 3 Contracted from sick person through mosquito bite
29. a. 4 Inherited 29 a.5 Others [Specify]

30. Who do you think will be more prone to have this disease?
In terms of :

a.) Sex
30.1 Male 30.2 Female 30.3 Both
30.4 No priority 30.5 Do no know

b.) Age
30.6 Children 30.7 Adults 30.8 Both
30.9 No priority 30.10 Do not know

c.) Occupation
30.11 Farmer 30.12 Coir maker 30.13 Fisherman
30.14 Do not know 30.15 Do not know

31. What are the acute symptoms of this disease?
31.1 Aching of the whole body 31.2 Fever with Chills

31.3 Swelling of glands in the groins & Auxills
31.4 Recurrent oedema 31.5 All the above
31.6 Do not know 31.7 Others [Specify]

32. What are the chronic symptoms of this disease?
32.1 Oedema 32.2 Elephantiasis
32.3 Nodular out growth 32.4 others [Specify]

33. How does persistant oedema occurs?
33.1 Blockage of Lymphatic vessels 33.2 Sprains
33.3 Fluid accumilation 33.4 Do not know 32.5 Others [Specify]

34. Can a person harbour the parasite without showing any external symptoms?
34.1 No 34.2 Yes 34.3 Do not kow

35. Where do filarial worms live in the human body?
35.1 Blood vessels 35.2 Stomach 35.5 Lymphatic system
35.4 Legs 35.5 Do not know 35.6 Others [Specify]

36. Is this disease curable
36.1 No 36.2 Yes 36.3 Do not know
36. If yes how
36 a.1 Modern medicines 36.a.2 Through surgery
26.a.3 Blood examination, detection and treatment
36.a.4 Others [Specify]

36.b If no why
36.b.1 No treatment for worms
36.b.2 Worms cannot be discharged 36.b.3. Others [Specify]

37. Can this disease be prevented?
37.1 No. 37.2 Yes. 37.3 Do not know

38. What preventive measures do you know
38.1 Avoid persons with the disease
38.2. Clear breeding places of mosquitoes
38.3 Use personal protection 38.4 Blood test and treatment
38.5 Preventive treatment 38.6. Do not know
38.7. Others [Specify]

39. Do you know that mosquitoes are transmitting the disease
39.1 No 39.2 Yes 39.3 Do not know

40. What is the diagnostic procedure for filariasis
40.1 Blood examination 40.2 Physical examination
40.3 Do not know 40.4 Others [Specify]

41. When is the blood test done
41.1 Night 41.2 Day 41.3 Any time
41.4 Do not know 41.5 Others [Specify]

42. Do you know where mosquitoes that transmit rural filariasis breed
42.1 Open drains 42.2 Stagnant water 42.3 Water Weeds
42.4 Sceptic tanks 42.5 Garbage 42.6 Do not know
42.7 Others [Specify]

ATTITUDE

43. What do you feel about the extent of mosquito menace in your locality
43.1 Extreme 43.2 Moderate 43.3 Low 43.4 Others [Specify]

44. What do you feel about the disease
44.1 Curable 44.2 Not curable 44.3 Not a killer disease
44.4 Creates morbidity 44.5 Others [Specify]

45. What is your attitude towards night blood test every six months
45.1 Essential 45.2 Not Essential 45.3 Others [Specify]

46. What is your attitude towards taking preventive treatment for filariasis
46.1 Essential 46.2 Not essential 46.3 Others [Specify]

47. What is your attitude towards a chronic filarial patient
    47.1 Sympathy 47.2 Hatred
    47.3 No ill feeling 47.4 Others [Specify]
48. What is your attitude towards removal of water weeds that promote the breeding of mosquitoes that transmit rural filariasis?
    48.1 Essential 48.2 Not essential 48.3 Others [Specify}
    a. If not essential reasons
    48.a.1 All are not attacked by the disease
    48.a.2 Weeds are a must for agriculture
    48.a.3. Should use some other way to kill mosquitoes
    48.a.4. At old age oedema occurs 48.a. Others [Specify]

PRACTICE

49. Is there anyone in your family with filariasis
    49.1 No. 49.2 Yes
    a. If yes whom
    49.a.1 Self 49.a.2 Father 49.a.3 Mother
    49.a.4.Brother 49.a.5 Sister 49.a.6 Son
    49.a.7. Daughter 49.a.8. Others [Specify]
50. What is the mode of treatment taken
    50.1 Ayurveda 50.2 Homeopathy
    50.3 Allopathy 50.4 Naturopathy
    50.5 Not taking treatment 50.6 Others [Specify]
51. Is the treatment
    51.1 Regular 51.2 Not regular
    51.3. Completed 51.4 others [Specify]
52. If not Completed/irregular why}
    52.1 Side reaction 52.2.Fatigue
    52.3 Medicine does not suit 52.4. Others [Specify]
53. Frequency of attack of filaria fever
    53.1 No fever 53.2 Frequently 53.3 Once a year
    53.4. Many times a year 53.5 Others [Specify]
54. If working, mandays lost in a year.
55. Expenditure towards treatment annually
56. Are you using any self protection measures
    56.1. Mosquito net 56.2. Repellant cream 56.3. Repellant coils
    56.4. Repellant mats 56.5 Fumigants 56.6 Fan
    56.7 preventive dose 56.8 Not using 56.9 Others [Specify]
56 a) If not using why ?
    56 a.1 Economic constraints 56 a.2 Allergic / Inconvenience
    56a.3 No Confidence 56 a.4 others (Specifify)
57. Have you taken preventive dose for filariasis
    57.1 No 57.2 Yes
    a. If yes at what intervals
    57. a. 1. Once a year 57.a.2 Twice a year 57.a.3 No frequent intervals
    57.a.4 Once in life time 57.a.5. Others [Sepcify]
    b. If no why
    57.b.1. Facilities not available locally 57.b.2. No faith
    57.a.3. Have not thought about it 57.b.4. Others [Specify]
58. Do you have a pond in your house
    58.1. No 58.2 Yes

59. If yes, have you got hydrophytes in the pond
    59.1 No 59.2 Yes
60. If yes, what type
    60.1 Floating 60.2 Submerged
61. If no when did you remove
    61.1 after knowing about the connection between filariasis and weeds
    61.2. Remove automatically twice a year
    61.3 Sprouting vegetation is removed everytime 61.4 Others [Specify]
62. Do you grow water weeds deliberately
    62.1 No 62.2 yes
62. a. If yes why
    62.a.1. For manure 62 a 2 To keep water clean 62.a.3 To keep water cool
    66.a.4. To prevent growth of algae 62.a.5. To protect fishes from kingfisher
    62.a.6. To prevent water evaportaion
    62.a.7. Pond used for religious purposes-no human access
    62.a.8. It has become a habit 62.9. Head of the familys, decision
    62.a.10. Others [Specify]
62. b. If no what is the reason for growth of weeds
    62.b.1. Regrowth fast 62.b.2. Lack of manpower to remove. 62.b.3. Others [Specify]
63. Have you or any member of the family participated in any of the filariasis control activities.
    63.1 No. 63.2 Yes
63. a If no why
    63.a.1 Do not know 63.a.2 Not interested 63.a.3 Lack of time
    63.a.4. Preventive programmes are not long lasting
    63.a.5. Others [Specify]
63.b If yes how
    63.b.1. Volunteer FDC 62.b.2. Shramadaan 62.b.3 FDTC Volunteers
    63.b.4. FILCO member 63.b.5. SFC Member 63.b.6. Fish culture
    63.b.7 Green manure programme 63.b.8. Others [Specify]
64. How do you expect filariasis to be controlled?
65. Why dont you use some other green manure instead of water weeds
[Asked to respondents who grow hydrophytes deliberately]

ANNEXURE II

Question guide for Focus Group Discussion

1. What do you know about filariasis, its cause, transmission and control?

2. Why is this disease persisting in Cherthala?

3. What is the necessity of growing weeds in ponds?

4. How can you control this disease, give suggestions?