

*Original Article*

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## Prevalence of Filariasis in the Endemic Areas of Thiruvananthapuram Corporation - A Cross Sectional Survey

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### Introduction

Lymphatic filariasis is one of the oldest and most debilitating tropical diseases. An estimated 120 million people in 72 countries were infected in 2010, and an estimated 1.39 billion live in areas where filariasis is endemic. Approximately 40 million people suffer from the stigmatizing and disabling clinical manifestations of the disease, including 15 million who have lymphoedema (elephantiasis), and 25 million men who have urogenital swelling. Though Lymphatic filariasis is endemic in India it is not uniformly distributed. It is the matter of concern that, over the decades filariasis has been steadily spreading in India. Several factors have been held responsible for the spread of the disease including increase in population, increase in indiscriminate construction activities, increase in urbanization and slum proliferation. Kerala is one of the endemic states of filariasis. A survey conducted in 11 districts of Kerala showed that the Microfilaria rate of 0.16% in 2004, rose to 0.44 in the year 2007.

### Background

Lymphatic Filariasis (LF) is an important parasitic disease primarily affecting the lymph vessels of the body and is estimated to infect globally over 120 million people and this disease ranked as the second most common cause of physical disability (WHO, 1995). The incidence of Malaria in urban setting is a growing concern in many regions of the world and individual risk factors need to be identified to take control strategies (Fabian M, Gabriel C, Alvaro M, 2000). Guidelines on Elimination of Lymphatic Filariasis in India (2010) highlighted that indigenous Lymphatic Filariasis cases are reported from 20 states.

From these states 250 districts have been identified as endemic for Filariasis, with a population about 600 million are at risk. Early diagnosis assumes great importance, because the dilatation of the lymphatics is the basic pathology induced by the adult worms. Once it is established irreversible even with treatment (Freedman et al., 1995). The Immunochromatographic test (ICT) shows that 97% sensitivity, 99% specificity, 97% positive predictive value and 99% negative predictive value in Filarial antigen detection (Rahmiah et al., 2001). Lymphatic dilatation predisposes the lymph stasis, secondary bacterial infections, precipitating Adenolymphagitis (ADL), development of lymphoedema and its progression (Shenoy et al., 2003). Tobias E et al (2007) stated that environmental changes due to water resources development projects lead to a shift in vector species composition and generally to a strong proliferation of vector population, and also stated that there is a need to assess and quantify changes of Lymphatic Filariasis transmission parameters and clinical manifestations.

It is estimated that Filariasis responsible for the loss of about 0.63% of per capita GNP in India (Ramaiah et al., 2000). Babu BV et al (2002) reported that chronic Filariasis patients lose a total of 68 days of work per year, which is equivalent to 19% of the total working time of the year. According to Nujum ZT (2004) the prevalence of Filariasis in Thiruvananthapuram Corporation was 3.38%. A parasitological survey at Chavakad, Thrissur district shows that the highest infection rate registered for *Wuchereria bancrofti* was 1.5% while it was 0.3 for *Brugia malayi*. Infection with *Wuchereria bancrofti* constituted 87.88% of the total 33 Microfilaria cases. Ramesh et al (2009) highlighted climate changes in India is likely to expand the Geographical distribution of vector borne diseases. Prevalence of Bancroftian Filariasis was consistently lower in

females of reproductive age. Fisherman, farmers and cattle rearers were the most affected occupational categories (Anosike JC, Onwuliri CE, 1995).

### Objective

Estimate the prevalence of Filariasis in the Endemic Areas of Thiruvananthapuram Corporation.

### Methodology

The present study was conducted in the endemic pockets of Thiruvananthapuram Corporation, which have been identified by National Vector Borne Disease Control Programme (NVBDCP). It consists of seven wards. Cross-sectional survey approach was used to estimate the prevalence of Filariasis. The data were collected from 1050 adults of >18 years residing in these wards. The sample size was calculated using P as 0.16%, q as 0.84%, and d as 20% of p. The sample size obtained was multiplied by 2 in order to adjust for cluster effect. Total population in these seven wards was about 47752 and were scattered around seven wards. There were 15 clusters from these wards and cluster size was 70. The data collection period was three months.

The data collection started after obtaining consent from the Institutional Ethics Committee and National Vector Borne Disease Control Programme (NVBDCP) unit, Thiruvananthapuram. The local authorities were also informed about the survey and blood collection.

### Blood Collection

The blood collection time was from 8.30 pm to 12 midnight. Blood examination kit consisted of

slides, lancet, slide box, cotton, gloves for blood collection. The survey team collected 2 drops (20 cu mm) of blood from each participant by a deep finger prick with lancet under aseptic technique, and a thick blood smear was prepared on a previously numbered slide and arranged the slides in the slide box. The details of the participants and the slide number are recorded in the survey format. If any persons are missed during the survey, were again visited on the very next day for data collection.

### Blood Smear Examination

On the next day the slides were dehaemoglobinised, stained, dried and examined in National Vector Borne Disease Control Programme (NVBDCP) unit, Thiruvananthapuram. The staining and microscopic examination were done in the same unit. The result of the blood examination result were informed to the participants within two days and the Microfilaria positive cases were referred to the NVBDCP unit, Thiruvananthapuram for treatment.

### Findings

In data analysis all the baseline variables collected from the participants were described in terms of descriptive statistics, such as Percentage, Mean, Median, and Standard Deviation and Inter quartile range. Qualitative variables were described using Percentage and Quantitative variable by using Mean, Median and Standard deviation.

### Socio demographic data

**Table 1: Distribution of participants according to Sex**

Sex	Frequency(Percentage)		Total Number
	Resident	Migrant	
Male	418(39.8)	196(18.7)	614
Female	436(41.5)	-	436

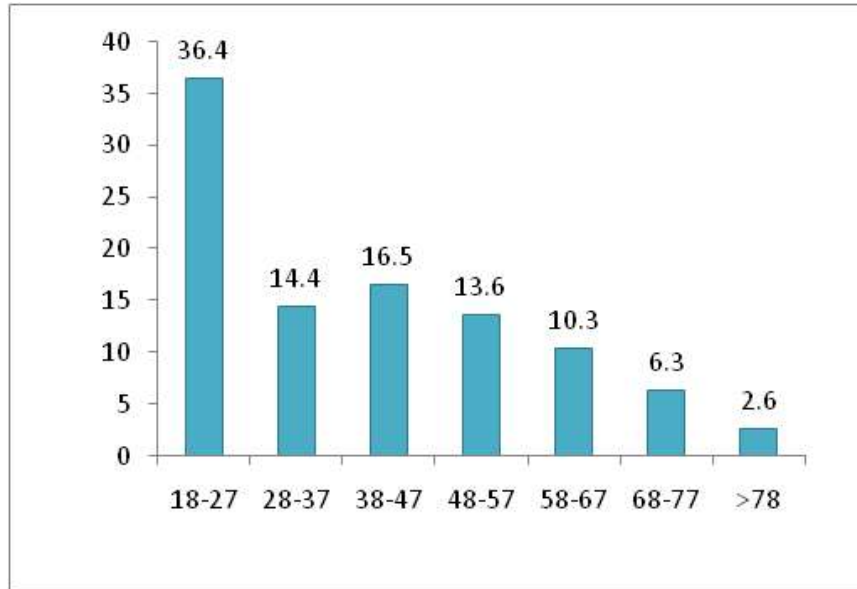


Fig. 1: Distribution of participants according to Age

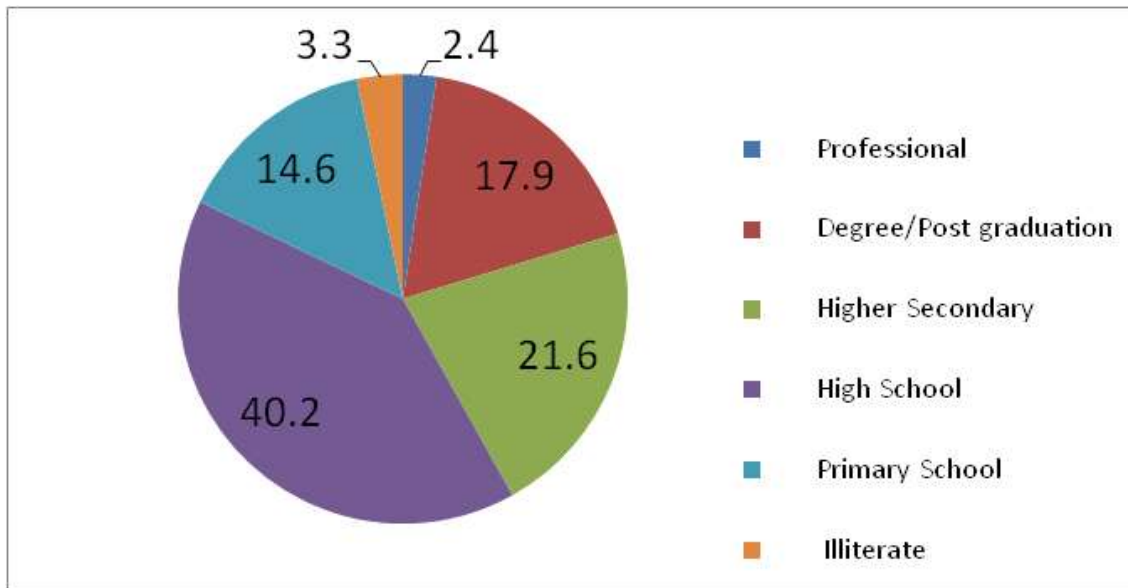


Fig. 2: Distribution of participants according to Education

Table 2: Distribution of participants according to residential status

Residential Status	Frequency	Percentage
Resident	854	81.3
Migrant	196	18.7
<b>Total</b>	<b>1050</b>	<b>100</b>

Estimation of prevalence of filariasis among resident and migrant population

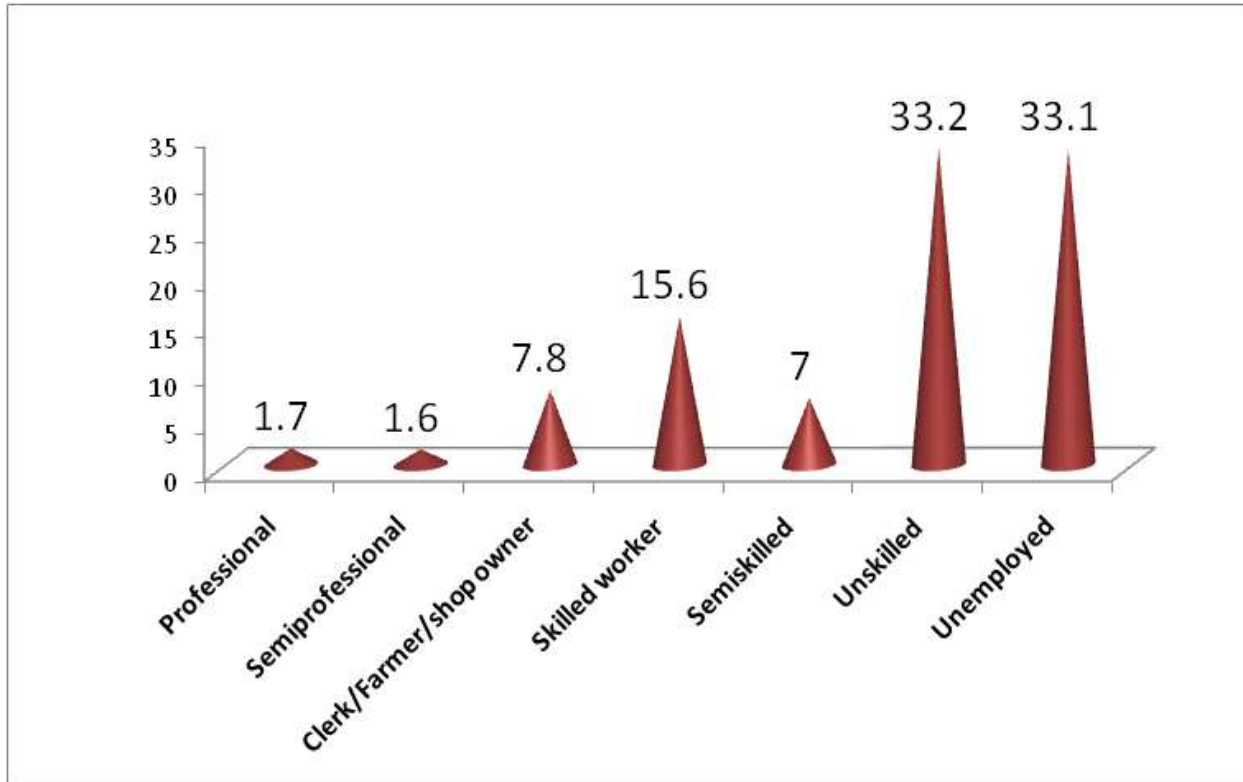


Fig. 3: Distribution of participants according to Occupation

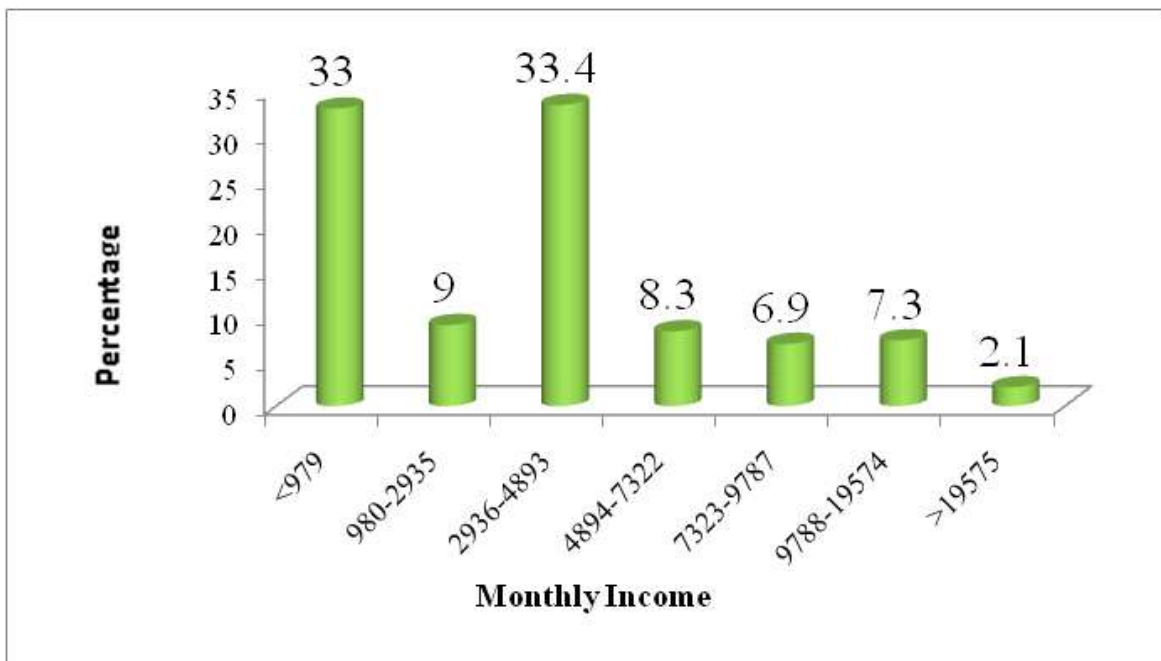


Fig. 4: Distribution of participants according to Monthly Income

**Table 3: New Microfilaria Positive Cases**

Blood examination result	ResidentsFrequency(%)	MigrantFrequency(%)
Microfilaria (Mf)Positive	2(0.23)	8(4.08)
Microfilaria Negative	852(99.77)	188(95.92)

**Table 4: Old cases of Filariasis**

Old cases of Filariasis	Frequency	Percentage
Yes	15	1.4
No	1035	98.6
Total	1050	100

The above Table 4 shows that among the 1050 participants studied, 15 (1.4%) were old cases of Filariasis. In migrants there was no old case of Filariasis

**1. Overall prevalence of Filariasis**

$$\text{Overall Prevalence} = \frac{\text{Old cases of Filariasis} + \text{New cases of Filariasis}}{\text{Total population examined}} \times 100$$

Old cases of Filariasis (both resident and migrant)	Migrant	=	8
Resident	=	15	Total = 10
Migrant	=	0	Total population examined = 1050
Total	=	15	Overall prevalence of Filariasis =
New Microfilaria positive cases (Both resident and migrant)	$\frac{15+10}{1050} = \frac{25}{1050} = 2.38\%$		
Resident	=	2	The estimated overall prevalence is 2.38% with 95% Confidence Interval (CI) of 1.09 to 5.06 %.

**2. Prevalence of Filariasis among residents**

$$\text{Prevalence} = \frac{\text{Old case of Filariasis} + \text{New cases of Filariasis}}{\text{Total residents examined}} \times 100$$

Old cases	=	15	Prevalence of Filariasis among residents
New Microfilaria Positive Cases	=	2	$= \frac{15+2}{854} = \frac{17}{854} = 1.99\%$
Total residents examined	=	854	The estimated prevalence of Filariasis among residents was 1.99% with 95% Confidence Interval of 0.77 to 4.93%.

**3. Prevalence of Filariasis among migrants**

$$\text{Prevalence} = \frac{\text{Old cases of Filariasis} + \text{New cases of Filariasis}}{\text{Total migrants examined}} \times 100$$

Old cases	=	0	Total migrants examined = 196
New Microfilaria Positive cases	=	8	

Prevalence among migrant = The estimated prevalence of Filariasis in migrants is 4.08% with 95% Confidence Interval of 1.03 to 13.97%.

$$\frac{0+8}{196} = 4.08\%$$

#### 4. Prevalence among male residents

$$\text{Prevalence} = \frac{\text{Old cases of Filariasis} + \text{New cases of Filariasis}}{\text{Total male residents examined}} \times 100$$

Old cases of Filariasis	=	11	Prevalence	=
New Microfilaria positive cases	=	2	$\frac{13}{418} = 3.11\%$	
Total males residents examined	=	418		

The estimated prevalence of Filariasis in male residents is 3.11% with 95% Confidence Interval of 1.05 to 8.55%.

#### 5. Prevalence of Filariasis among female residents

$$\text{Prevalence} = \frac{\text{Old cases of Filariasis} + \text{New cases of Filariasis}}{\text{Total female residents examined}} \times 100$$

Old cases of Filariasis	=	4	in Thiruvananthapuram Corporation among 2400 participants shown that the prevalence of Filariasis was 3.38%. The above comparison reveals that there was a reduction in prevalence of Filariasis in Thiruvananthapuram from 2004 to 2011; one reason could be implementation of Mass Drug Administration (MDA) programme.
New Microfilaria positive cases	=	0	
Total female residents examined	=	436	

Prevalence =  $\frac{4}{436} = 0.92\%$

The estimated prevalence of Filariasis in female residents is 0.92%

The major focus of the study was the identification of prevalence among the residents of Thiruvananthapuram corporation. Overall prevalence of Filariasis among population was 2.38% with 95% Confidence Interval (CI) of 1.09 to 5.06%. Among the total study population 18.7% were migrant workers, thus the prevalence is estimated for residents and migrants, it was 1.99% with 95% Confidence Interval of 0.77 to 4.93%. and 4.08% with 95% Confidence Interval of 1.03 to 13.97% respectively. Prevalence of Filariasis among male residents was 3.11% with 95% Confidence Interval of 1.05 to 8.55%. Prevalence of Filariasis among female residents was 0.92% with 95% Confidence Interval of 0.13 to 5.15%.

## Discussion

The study showed that the overall prevalence of Filariasis was 2.38% and the prevalence among residents of Thiruvananthapuram Corporation was 1.99%. This finding was supported by the study of Nujum ZT (2004) who conducted a study on Epidemiological Perspective of Lymphatic Filariasis

This study revealed that prevalence of Filariasis in migrant workers was 4.08%. In all 14 districts of Kerala we have migrant population throughout the year, though their number varies depending upon the work availability. The prevalence of Microfilaria among the migrants who were screened in Palakkad was 1.12% and in Idukki it was 1.8% (DHS, Kerala, August 2011). As the findings of the study were highly relevant, control measures need to be taken among the migrant population for preventing the spread of disease.

The study revealed that the prevalence of Filariasis was higher in males (3.11%) than females (0.92%). The present study was supported by Pani et al (2007) who reported that prevalence of Filariasis was significantly higher in males (13.67%) than females (2.26%). The present study findings also showed that the prevalence of Filariasis is higher in males when compared to females.

## Summary

Lymphatic Filariasis is an important public health problem and one of the most debilitating and disfiguring communicable disease. Lymphatic Filariasis is the world's second leading causes of long term disability. Although Filariasis does not kill, it

causes disability and imposes severe social and economic burden to the affected individuals, their families and the endemic communities.

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