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Scenario of Filariasis in Murshidabad: A Survey During 2019-2023

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Abstract: ***A comprehensive study on Filariasis in Murshidabad district, West Bengal, India reported 3,301 registered cases during 2019 to 2023, with a significant concentration of cases in Jangipur, the northern-most subdivision of the district. Jangipur alone accounted for 74.92% of the total cases, while the remaining 25.08% were distributed across the other four subdivisions: Lalbagh, Berhampore, Domkal and Kandi. This disparity in disease distribution is largely attributed to the environmental and socio-economic conditions prevalent in Jangipur. The survey also highlighted that the local population's limited or no use of mosquito nets significantly increases their vulnerability to infection. Due to this ignorance, individuals, especially in rural areas like Jangipur, are more exposed to mosquito bites, facilitating the spread of the disease. The survey data also revealed that Filariasis predominantly affects the legs, with 57.22% of patients reporting infections in this area. The legs' susceptibility is linked to their anatomical structure and the distribution of the lymphatic system. The legs have a higher concentration of lymphatic vessels, making them more prone to lymphatic obstruction and fluid accumulation, which are hallmarks of Filariasis. In Jangipur, Berhampore, and Lalbagh, 56% of infections involved the legs, while in Kandi and Domkal, 49.21% of cases were associated with hydrocele, a condition where fluid accumulates in the male gonads. Hydrocele was the second most common manifestation, affecting 39.24% of the patients. The scrotum's rich lymphatic network, closely associated with the testicles and inguinal lymph nodes, makes this area particularly vulnerable to Filariasis. In contrast, only 3.54% of infections affected the hands, which have a different lymphatic distribution and less soft tissue, making them less susceptible to the disease. Overall, the study underscores the need for targeted public health interventions in Jangipur, including improving housing conditions, enhancing drainage systems, and promoting the use of mosquito nets. Addressing these factors is crucial for reducing the prevalence of Filariasis in this high-risk area and preventing further spread of the disease across Murshidabad district.***

Keywords: Lymphatic, filariasis, elephantiasis, Murshidabad, *Wuchereria*, *Culex*

1. Introduction

Lymphatic filariasis, commonly known as elephantiasis, is a neglected tropical disease. Infection occurs when filarial parasites are transmitted to human through mosquitoes. Infection is usually acquired in childhood and remains hidden in lymphatic system. The painful and profoundly disfiguring visible manifestations of this disease include lymphoedema, elephantiasis and scrotal swelling - occur later in life and lead to permanent disability. These patients are not only physically disabled but also suffer mental, social and financial losses contributing to stigma and poverty. In 2021, 882.5 million people in 44 countries were living in areas that require preventive chemotherapy to stop the spread of infection (WHO reports, June 2023). Lymphatic filariasis is caused by infection with parasite classified as nematodes (round worms) of the family Filariodidae. There are 3 profound species of these thread-like filarial worms found in the tropical and subtropical regions – *Wuchereria bancrofti* (most prevalent), *Brugia malayi* and *Brugia timori* (less occurrence reported). Lymphatic filariasis is transmitted by different types of mosquitoes. *Mansonia annulifera* is the principal vector while *M uniformis* is the secondary vector in most parts of Bengal. The *Culex* mosquito is also widespread across urban and semi urban areas of India. *Anopheles* is mainly found in rural areas and *Aedes* is predominant in endemic islands of the Pacific. It usually takes repeated mosquito bites over several months (or even year) for a person to get affected by this parasite. Elephantiasis can affect various part of the body including Arms, Legs, Breasts, Scrotum, Penis, Vulva, Face etc. About 2 in every 3 people who have lymphatic filariasis do not have severe symptoms. But filariasis usually leads to weakened immune system. Some people may experience Inflammation (due to an over activated immune system), Lymphedema (fluid build-up in the lymphatic system), Hydrocele (swelling and fluid buildup in scrotum), and Edema (swelling and fluid buildup in tissue throughout the body).

Nine states of India (Andhra Pradesh, Bihar, Gujarat, Kerala, Maharastra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal) contributed to about 95% of total burden of filariasis. The health department of West Bengal, India, had identified pockets in Bankura, Purulia, Paschim Bardhaman, Birbhum, Murshidabad, Bishnupur health district and Rampurhat health district as Vulnerable for Lymphatic filariasis. As of 2022, the state had reported total of 35,631 lymphoedema and 13,846 hydrocele cases, while 8,571 hydrocele surgeries were conducted.

2. Objective of Present Study

The aim of this research work is to scrutinize the pervasiveness and demographic dissemination of elephantiasis in a particular district, focusing on age, gender, and seasonal variations in disease proneness, if any. This survey aims to identify high-risk groups and periods of peak transmission, correlating these findings with environmental and socio-economic aspects. The definitive goal is to provide insights for targeted intervention strategies and improve community cognizance and preemptive practices.

3. Materials and Method

This study was designed as retrospective surveys, which were conducted at different hospitals of the district. Data of a period of five years (2019-2023) has been taken into consideration. To conduct the survey, at first the district was alienated into five blocks. After conducting survey in all the blocks, it had been found that the disease (Filariasis) was reported in different hospitals of the blocks, such as Jiaganj Rural Hospital, Lalbagh Hospitals, Murshidabad Medical College, Sagardighi Superspeciality Hospital, Lalgola Hospital, Jangipur Superspeciality Hospital as well as Beldanga Hospital etc. Detailed information regarding age, sex, address, and occupation had been collected.

All the available data had been analyzed using suitable statistical method, and graphical representations have been prepared to evaluate the findings.

4. Results

A total of 3301 registered cases of Filariasis was reported during the present study. A statistically significant heterogeneity in the distribution of Filariasis among different zones of Murshidabad was evident. Figure 1 shows the distribution of Filariasis in Murshidabad district in the year 2022.

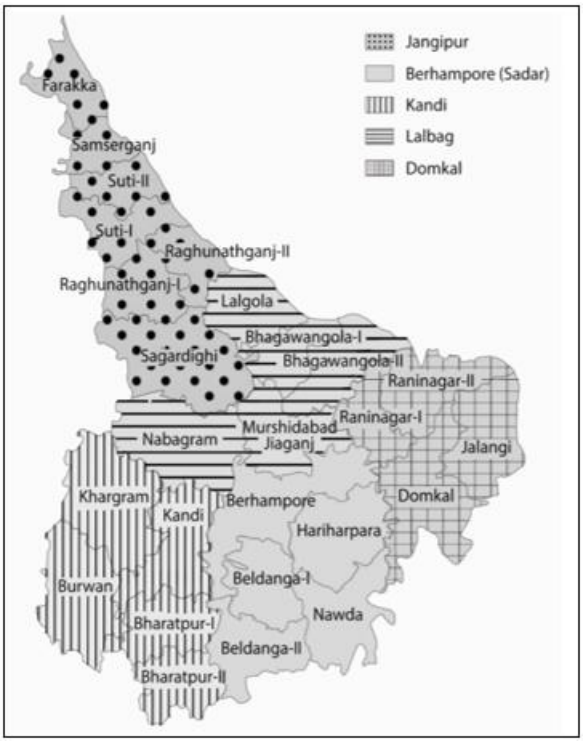
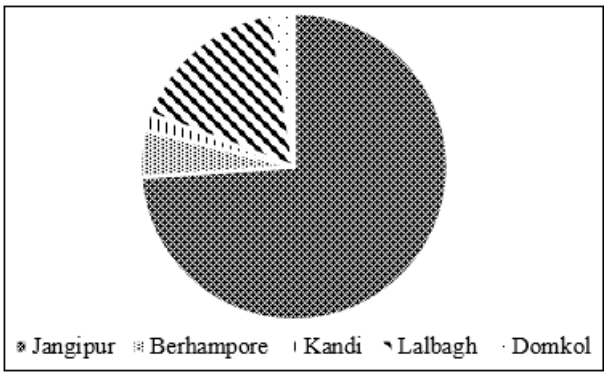


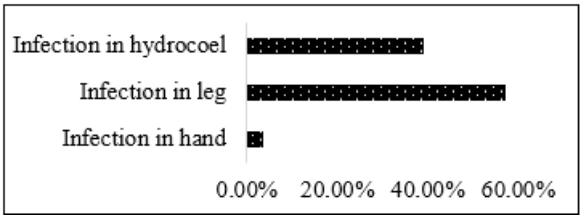
Figure 1: Distribution of Filariasis in Murshidabad

Of these 3301 registered cases of Filariasis, shown in Graph 1, 74.92% were reported from Jangipur subdivision, the northern-most subdivision of Murshidabad, whereas 25.08% were from other four subdivisions: Lalbagh (17.33%), Berhampore (4.97%), Domkal (2.33%), and Kandi (1.82%).



Graph 1: Subdivision wise distribution of Filariasis

From graph-2, it is evident that most of the Filariasis patients from Murshidabad (57.22%) were affected by infection in their legs, and moderate number of patients (39.24%) were affected by infection in the male gonad while smallest fraction of patients (3.54%) was found to be affected by infection in their hands. No data was available for infection in breasts of female patients.



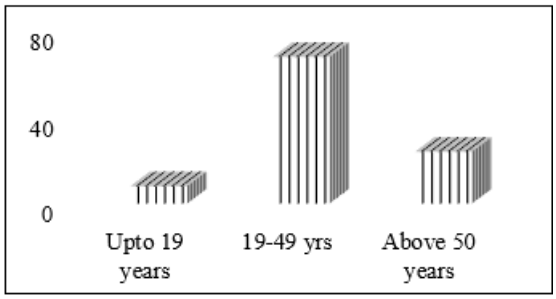
Graph 2: Organ infection scenario of Filariasis in Murshidabad

Table 1 shows the percentage of affected individuals by their infection in each subdivision. In Jangipur, Berhampore and Lalbagh subdivision 56% of individuals were affected by their infection in legs. A different pattern was also reported in Kandi and Domkal subdivisions, where 49.21% of individuals were affected by infection in their hydocoel. Only 5.4% of individuals was reported by the infection in their hands from the five subdivisions.

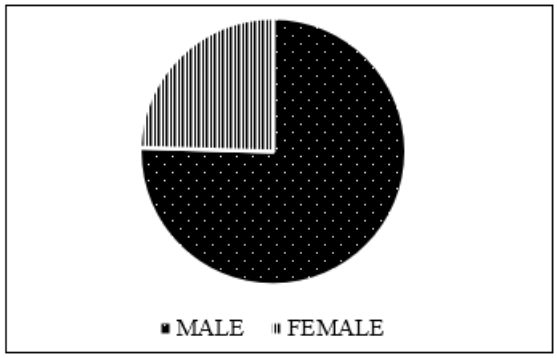
Table 1: Subdivision wise percentage of affected individuals by infections in body parts

Subdivision	Percentage of affected individuals by their infection		
	Hand	Leg	Hydrocoel
Jangipur	3.56%	58.47%	37.97%
Berhampore	2.44%	52.44%	45.12%
Kandi	3.33%	45%	51.67%
Lalbagh	2.09%	56.93%	40.97%
Domkol	15.58%	38.96%	46.75%

For lymphatic filariasis, it was found more pronounced among those in the 19–49-year age group (graph – 3) as compared to juveniles and above 50 age group. It was also conclusive that the males had a higher burden in this vector borne disease than females (graph – 4).



Graph 3: Age and filariasis (%) correlation



Graph 4: Gender and filariasis (%) correlation

5. Discussion

From the available data of the year 2019 to 2023, it is observed that Jangipur subdivision reported to have maximum number of patients affected by filariasis compared to other subdivisions of Murshidabad district. Among the total number of patients, 74.92% patients have been reported from Jangipur. While 17.33% patients reported from Lalbagh, 4.97% patients were from Berhampore, 2.33% patients were from Domkol and 1.82% patients were from Kandi. This difference maybe the effect of occurance of more rural areas in Jangipur. Proximities to stagnant water bodies such as ponds, marshes etc. provide ideal environment to *Culex* mosquitoes to lay their eggs, thus increasing mosquito population in maximum areas. Poor housing conditions such as inadequate drainage can lead to higher exposure to mosquito bites. It has been reported that people of that region are not too much habituated of using protections against mosquito bite, especially in terms of mosquito nets. Without the protection of mosquito nets, individuals are more exposed to mosquito bites, especially during the night when *Culex* mosquitoes are most active. This increased exposure raises the likelihood of being bitten by infected mosquitoes, thereby increasing the transmission of disease. Infected individuals who are not using mosquito nets can serve as a source of infection for mosquitoes. When mosquitoes bite these individuals, they can become carriers of the disease and spread it to others. Jangipur's landscape, characterized by numerous stagnant water bodies such as ponds and marshes, provides ideal breeding grounds for *Culex* mosquitoes, the primary vector for Filariasis. Poor housing infrastructure and inadequate drainage systems further exacerbate the situation, leading to increased exposure to mosquito bites, particularly during the night when these mosquitoes are most active. The data obtained from the survey indicates that filariasis is more likely to manifest in legs compared to hands and hydrocoel. This observation aligns with previously reported patterns in lymphatic filariasis distribution. The legs being further from the heart and major lymph nodes, are more susceptible to fluid accumulation. The anatomical structure of the lymphatic system in the legs may play a significant role. The lymphatic vessels in lower extremities are larger and more extensive, offering more opportunities for the filarial worms to cause blockage. This anatomical predisposition has been documented in earlier researches (Smith et al., 2018). The data from the survey also suggests that hydrocoel is more likely to occur than infection in the hands among individuals affected by filariasis. This pattern can be attributed to several physiological and pathological factors. The anatomical and physiological properties of the lymphatic system in scrotal region play a crucial role. The scrotum has a rich lymphatic network that is closely associated with testicle and inguinal lymph nodes. This extensive lymphatic presence makes it more sustainable to blockage and fluid accumulation caused by filariasis worms.

The difference in the prevalence of filariasis infections in various body parts in Jangipur, Murshidabad, can be attributed to a combination of factors. Mosquitoes, which transmit filariasis, may preferentially bite certain areas of the body. Since the legs are often exposed during daily activities and are more accessible to mosquitoes, they might be more frequently affected compared to other body parts. Filariasis primarily affects the lymphatic system. The legs are a common site for lymphatic filariasis due to the distribution and functioning of the lymphatic system. The legs have a higher concentration of lymphatic vessels, making them more prone to lymphatic obstruction and swelling. Hydrocele, which is a condition where fluid accumulates around the testicles, is less common compared to lymphatic filariasis in the legs. The lower prevalence might be due to anatomical differences and the fact that hydrocele specifically affects the genital region, which might not be as exposed to mosquito bites as the legs. The skin and tissue structure in different body parts can influence how filariasis manifests. The legs have a significant amount of soft tissue that can accumulate fluid more readily compared to the hands, which have less soft tissue and a different lymphatic distribution.

Mid-age individuals were found far more prone to lymphatic filariasis while compare to other groups. This can be attributed to the fact that the 19-49 years age group individuals in this district go out for works in field and construction sites, and thus are much more vulnerable to mosquito bites. People of 18 years and below, as well as 50 and above, are not exposed to the vector of this disease to that extent. Gender and filariasis also has a correlation, as found during the study. This is mostly due to the fact that females of this district are very little exposed to *Culex* mosquito bites as compared to males working outside and limbs remain open to mosquito bites.

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