Section: Microbiology

Original Research Article

EPIDEMIOLOGY OF VISCERAL LEISHMANIASIS IN A TERTIARY CARE HOSPITAL IN NORTH BENGAL FOR LAST NINE YEARS (2014-2022): A RETROSPECTIVE CROSS-SECTIONAL HOSPITAL-BASED STUDY

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Abstract

Background: Kala azar or Visceral Leishmaniasis is a life threatening, neglected tropical disease, caused by protozoan parasite *Leishmania donovani* complex and transmitted by the female sandfly *Phlebotomus argentipes*. Despite of effective implementation of National Kala-azar Elimination Programme in India, 54 districts of four states are still endemic including 11 districts in West Bengal. The most affected parts of West Bengal are predominantly various districts of North Bengal. The aim of the present cross sectional, retrospective study was to evaluate all epidemiological data from all diagnosed cases of Visceral Leishmaniasis in a tertiary care hospital in North Bengal for last nine years (2014-2022) to understand the pattern of the disease. **Materials and Methods:** After Ethical approval, all epidemiological data including Age, Sex, Address, Occupation and Socio-economic status from all diagnosed case of Visceral Leishmaniasis in the Department of Microbiology of North Bengal Medical College & Hospital for last nine years (2014-2022) were collected and analysed. **Result:** Out of total 103 cases over last nine years, male (59.22%) outnumbered female (40.78%) with Male: Female ratio 1.45:1. The maximum affected age group was 21-40 years of age. Death was reported in three cases only. Darjeeling was the maximum affected among all districts in North Bengal. Within Darjeeling, Naxalbari and Phansidewa were major blocks affected most. Most of the cases were belonging to lower socio-economic status (44.66%). Majority of cases were belonged to rural area and were labour or farmers. **Conclusion:** The study indicates that the number of cases has declined substantially. Although four districts are still endemic in eastern India including West Bengal, integrated and successful application of the strategies implemented by National Kala-azar elimination programme will reach the target very soon.

INTRODUCTION

Visceral Leishmaniasis or Kala-azar is one of the most neglected, life-threatening vector-borne diseases in tropical and sub-tropical countries. It is caused by the protozoan parasite *Leishmania donovani* complex and transmitted by the female sandfly *Phlebotomus argentipes*.[1] In India, the disease is endemic across four states including 54 districts of Bihar, Jharkhand, West Bengal and Uttar Pradesh. India accounted for 20% of the global burden of Leishmaniasis, out of which Bihar alone contributes >70% of total cases.[2] It was targeted for elimination by 2020 as a public health problem in India in the WHO Neglected Tropical Disease (NTD) roadmap (2012–2020) annual incidence of less than one case per 10000 populations at the sub-district level in India.[3] Due to resurging cases of Leishmaniasis in India, a centrally sponsored National Kala-azar Control Programme was initiated in the endemic states in 1990-91.[4] Since 2003, All programmatic activities under the programme have been subsumed under the umbrella programme of National Health Mission (NHM), known National Vector Borne Disease Control Programme

(NVBDCP) to facilitate effective strategy implementation by states.[2,4] In West Bengal, Malda, Murshidabad, Darjeeling, 24- Parganas(N), 24-Parganas(S), Nadia, Hooghly, Burdwan, Dinajpur (N), Dinajpur (S) and Birbhum are endemic for Kala-azar, although case has been declined substantially.[4] The disease manifests mainly in three forms; cutaneous leishmaniasis (CL), visceral leishmaniasis (VL), (also known as kala-azar), and mucocutaneous leishmaniasis (MCL). The most common form is CL, VL being the most severe form and MCL the most disabling form of the disease.[5]

The present work was aimed to evaluate and analyze epidemiological data from all diagnosed cases of visceral Leishmaniasis cases in a tertiary care hospital in North Bengal for last eight years.

MATERIALS AND METHODS

This cross sectional and observational study was designed as a retrospective, hospital based for a period of eight years (2014-2022). After Institutional Ethical clearance, epidemiological data was collected from all cases of visceral leishmaniasis diagnosed in the Department of Microbiology, North Bengal Medical College & Hospital. All cases were diagnosed serologically by rK 39 immunographic rapid test method, followed by bone marrow examination. Detailed history regarding age, sex, address, occupation and socio-economic status was collected to detect the Kala-azar prone area in North Bengal. All data were analysed in Microsoft Excel 2021.

Case definition and detection VL (Visceral Leishmaniasis): A person from an endemic area with fever of more than two weeks duration and with splenomegaly, who is confirmed by an RDT (rK 39) or a bone marrow or spleen biopsy.[2]

RESULTS

A total 103 cases of Leishmaniasis were analysed retrospectively. According to sex wise distribution, male [61 (59.22%)] outnumbered female [42 (40.78%)] with Male: Female ratio 1.45:1. [Figure 1]. The maximum affected age group was 21-40 years of age with mean age 21 years followed by 0-20 years of age group. [Table 1].

It was evident that number of positive cases were declining year-wise. [Figure 2]. Maximum cases were found in 2014, whereas only two positive cases were found in 2022. Death was reported in three cases only. Darjeeling was the maximum affected district among all other districts in North Bengal. [Table 2]. Within Darjeeling, Naxalbari and Phansidewa were the major blocks affected most. [Table 3].

Most of the cases were belonging to lower socio-economic status (44.66%) followed by lower middle (31.07%), as per Modified B. G. Prasad Socio-economic scale 2022 [Figure 3] and mostly from rural areas (57.28%) [Table 4]. Majority of cases were labours (36.89%) or from agricultural family [Table 5].

Table 1: Age wise distribution of cases (n=103)

Age group (in years)	Total	%
0-20	29	28.16
21-40	50	48.54
41-60	17	16.50
>60	7	6.80
Total	103	100

Table 2: District wise distribution of cases (n=103)

Districts	Number of cases	%
Alipurduar	3	2.91
Uttar Dinajpur	6	5.83
Dakkhin Dinajpur	4	3.88
Coochbihar	1	0.97
Darjeeling	77	74.76
Sikkim	2	1.94
Jalpaiguri	4	3.88
Kalimpong	1	0.97
Outside Bengal (Bihar)	5	4.86
Total	103	100

Table 3: Block wise distribution of cases (n=103)

Districts	Block(s)	No of cases	%
Darjeeling (n=77)	Naxalbari	37	35.92
	Phansidewa	23	22.33
	Kharibari	11	10.68
	Mirik	1	0.97
	Matigara	4	3.88
	Sukhiapokhri	1	0.97
North Dinajpur(n=6)	Chopra	6	5.83
South Dinajpur(n=4)	Tapan	2	1.94

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	Harirampur	1	0.97
	Banshihari	1	0.97
Coochbihar (n=1)	Kaljani	1	0.97
Alipurduar (n=3)	Samuktala	1	0.97
	Falakata	1	0.97
	kalchini	1	0.97
Jalpaiguri (n=4)	Malbazar	2	1.94
	Maynaguri	1	0.97
	Nagrakata	1	0.97
Kalimpong (n=1)	Panbu	1	0.97
Sikkim (n=2)	Singtam	1	0.97
	Gangtok	1	0.97

Table 4: Habitat wise distribution of cases (n=103)

Habitat	Number	%
Urban	44	42.72
Rural	59	57.28

Table 5: Occupation wise distribution of cases (n=103)

Occupation	Number	%
Serviceman	4	3.88
Housewife	20	19.42
Farmer	24	23.30
Student	17	16.51
Labour	38	36.89

Image 1: showing that Darjeeling was the most affected district in North Bengal

Image 2 showing Naxalbari followed by Phansidewa were the most affected blocks in the district of Darjeeling.

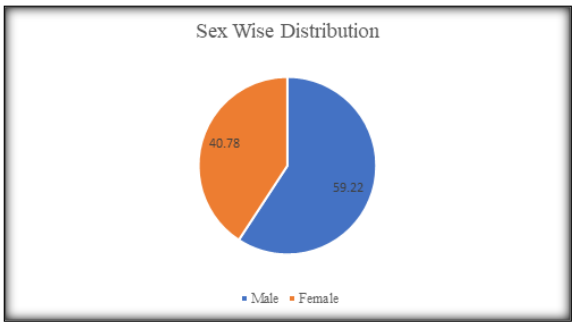

Figure 1: Sex wise distribution of cases (n=103)

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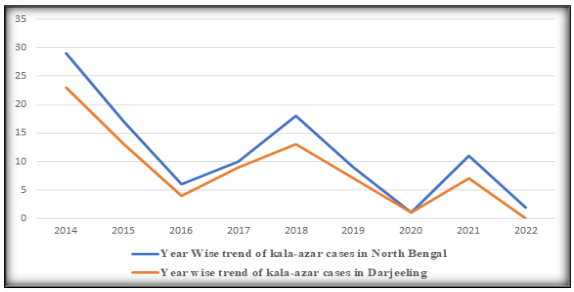

Figure 2: Year wise trend of Leishmaniasis cases (n=103)

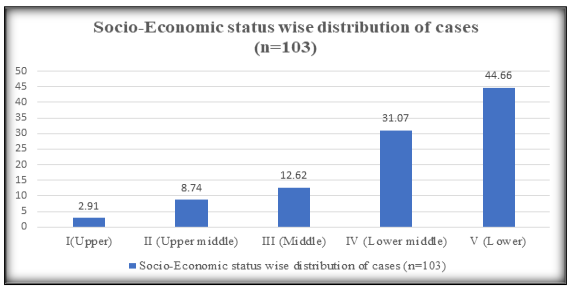

Figure 3: showing Socio-Economic status wise distribution of cases (n=103)

DISCUSSION

In the subcontinent, being humans as only known reservoir for the Leishmania parasites; implementing effective strategies under National Vector Borne Disease Control Programme (NVBDCP) such as early diagnosis and treatment of active cases, and integrated vector management is the utmost important. [6,7] India has taken various initiatives including signing a Memorandum of Understanding (MoU) with Nepal and Bangladesh to eliminate Kala-azar from the South-East Asia Region (SEAR). Elimination is defined as to decrease the annual incidence of Kala-azar to less than 1 case per 10,000 population at the sub-district (block PHCs) level.[4]

Along with all three countries, India too has progressed significantly towards the targets of Elimination. More than two thirds of endemic blocks have already achieved the goal.[5] In this hospital based retrospective study too, it was found that active cases were declining year wise. This considerable decline may be due to facilitate effective and stringent policies under the programme including regular insecticide sprays. Improvement in housekeeping and sanitation practices probably making sandflies to change its habitat. Gradually adopting healthy life styles including not sleeping outdoors and decreasing tendency to maintain cattles in house and being more prone to build pukka houses, even in rural areas, making the breeding grounds of sandflies destroyed. [8-11]

In our study, Male (59.22%) were maximally affected than female (40.78%) with Male: Female ratio 1.45:1. The maximum affected age group was 21-40 years of age with mean age 21 years. Similar finding was noted in the study of Chakraborty et al,[7] showing Male: Female ratio of 1.6:1 and more than 80% of the cases were aged less than 30 years with mean age 20.1 years. Himanshu Kaushal et al,[12] also showed that majority of the affected Leishmaniasis cases belonged to the age group 19–44 years. Handbook published by the Directorate of National Vector Borne Disease Control Programme, Government of India, Ministry of Health & Family Welfare on Operational definitions in kala-azar elimination programme in 2021 showing that Darjeeling is the major Kala-azar endemic district in West Bengal followed by North Dinajpur. Naxalbari and Phansidewa are two most affected blocks in Darjeeling.[13] These findings are consistent with the findings in the study.

In our study, most of the cases belonged to lower socio-economic status followed by lower middle, as per modified B. G. Prasad Scale.[14] It is also stated in the official website of National center of vector borne disease control, Directorate general of Health services, Government of India, Ministry of Health & Family Welfare.[4] This finding was also consistent with the study of Guha SK et al.[15] Rajni E et al also found similar findings.[8] Most of the cases found in the present study were labour or farmer. Similar findings were also noted in the study of Guha SK et al,[15] and Rajni E et al.[8] Similar finding was also noted in in the guidelines "Accelerated plan for Kala-azar elimination 2017", published by Directorate National Vector Borne Disease Control Programme.[2]

CONCLUSION

A careful review of the results indicates that the number of cases has declined substantially. It is important to use molecular techniques for diagnosis, especially for species identification and to understand its evolving epidemiology.[16] Although four districts are still endemic in eastern India including West Bengal, but integrated and successful application of the strategies implemented by National Kala-azar elimination programme will reach the target very soon.

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