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Leptospirosis in Ernakulam District of Kerala in India: Post Flood Surveillance

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Abstract

Background: Outbreaks of leptospirosis usually occur after flooding. In 2018, Kerala suffered great flooding including Ernakulam district. **Objective:** Present study was an assessment of the post flood leptospirosis surveillance in the flood affected areas of Ernakulam district of Kerala in India. **Material & Method:** Data was collected for the period 15th August to 30th September 2018 from households, PHC and District level officers by using a standard questionnaire. A total of 2100 adults from 525 households were studied, various registers and records available at PHC and DSU were reviewed. Compliance to chemoprophylaxis, chlorination of wells, availability of chlorine tablets and orthotoludene test was studied. **Results:** A total of 277 leptospirosis cases were reported, 49 (17.7%) cases were laboratory confirmed, most of the cases were from the catchment areas of the Periyar River. Mean age was 27.2 years with Standard Deviation of 3.2 and 192 (69.1%) were males. All the households were visited by the Health Worker and Chlorine tablets were given. More than 95% of the householders received chemoprophylaxis. **Conclusions and Recommendations:** Increased awareness of the community, enhanced surveillance and timely administration of chemoprophylaxis were key strategies to prevent the outbreak of Leptospirosis. In leadership of Central Surveillance Team, periodic sensitization training of Medical Officers and other Health Care Workers on flood related illnesses could be a good initiative to fill the knowledge gap.

Key words: *Leptospirosis, Surveillance, Flood Related Illnesses, Ernakulam, Periyar River Flood*

Introduction

Leptospirosis is a worldwide zoonotic disease that affects humans and animals, caused by pathogenic Leptospira spp. It is most common in tropical countries such as India[1,2,3]. In India, Leptospirosis is a major endemic disease with zoonotic significant[4,5]. The disease is seasonal, with peak incidences occurring in the rainy season[3,4,5]. Large number of animals acts as carriers or vectors[5]. Human infections result from accidental contact with carrier animals or environment contaminated with leptospires[6]. The usual portal of entry is through abrasion or via the conjunctiva or intact skin after prolonged immersion in water and outbreaks of Leptospirosis usually occur after flooding[5,6,7].

In the early stages of the disease, symptoms include high fever, severe headache, muscle pain, chills, redness of the eyes, abdominal pain, jaundice, haemorrhages in the skin and mucous membranes, vomiting, diarrhoea, and rash[6,7] . Case-fatality rates have been reported to range from 5 – 15 percent[7,8]. The outbreaks of Leptospirosis have been reported from coastal districts of Gujarat, Maharashtra, Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Andamans & Nicobar, Dadar & Nagar Havelli, Daman & Diu & Puducherry from time to time[5,7,9].

Beginning on 15 August 2018, severe floods affected Kerala due to unusually high rainfall during the monsoon season. Flood affected one – sixth of the total population in all 14 districts of Kerala and at least

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a million people were evacuated[10].

A team consisting of Public Health Specialist, Microbiologist and Entomologist deputed by Government of India worked in closed liaison with District Surveillance Officer and District Epidemiologist of Ernakulam district in Kerala for hand holding surveillance. Present study was conducted to assess the post flood situation of leptospirosis surveillance in the flood affected areas of Ernakulam district of Kerala in India.

Objectives

Present study was conducted with following objectives,

- To analyse the post flood situation of Leptospirosis Surveillance in Ernakulam district
- To study the epidemiological profile of cases of Leptospirosis reported from Ernakulam District
- To study the extent of awareness and involvement of community in respect of Leptospirosis reporting.

Materials & Method

Present study was conducted in Ernakulam district of Kerala in India. Data collection was done for the period 15th August to 30th September 2018. Primary unit of data collection was households of the flood affected area of the Ernakulam district. PHC level data was collected by interviewing the Medical Officer, Public Health Nurse and Field Workers. District level data was collected by interviewing Chief Medical Officer, District Surveillance Officer and District Epidemiologist.

Data was collected by using a standard questionnaire. Various registers and records available at PHC and district surveillance unit were reviewed. IDSP data for the year 2016, 2017 and 2018 was reviewed. Data was collected from 2100 adults from 525 households. Out of total households available at PHC level, 525 households were selected by using simple random sampling and data was collected on compliance to chemoprophylaxis.

All the cases of leptospirosis were identified, classified and treated as per the IDSP guideline. A probable case of Leptospirosis was defined as "a person with acute febrile illness with history of exposure to infected animals or an environment contaminated with animal urine with positive Rapid Diagnostic test for IgM and IgG". Microscopic agglutination test (MAT) and ELISA Test were used as confirmatory test for diagnosis of leptospirosis[9].

Operationally a case of leptospirosis was defined as "a person with acute febrile illness with history of exposure to infected animals or an environment contaminated with animal urine with positive Rapid Diagnostic test for IgM and IgG or confirmed laboratory diagnosis by using MAT or ELISA test.

Data analysis was done in line with study objectives by using Microsoft Excel software. Study findings were presented by using tables and graphs and data was summarized by using mean, standard deviation and proportions.

Results

During the study period a total of 277 cases of leptospirosis were reported in Ernakulam district. Out of total 277 reported cases of leptospirosis, 49 cases were confirmed by laboratory test. Out of 277 reported cases of leptospirosis, 192 (69.1%) were male and 85 (30.9%) were females (Table 1). Maximum number of cases were in the age group of 25 to 45 years (85.5%) followed by 15 to 25 years (06.9%), 45 to 68 years (5.1%) and <15 years (02.5%). Mean age was 27.2 years with Standard Deviation of 3.2, minimum age was 9 years and maximum age was 68 years (**Table 1**).

Table 1: Age and Sex wise distribution of cases of Leptospirosis (n=277)

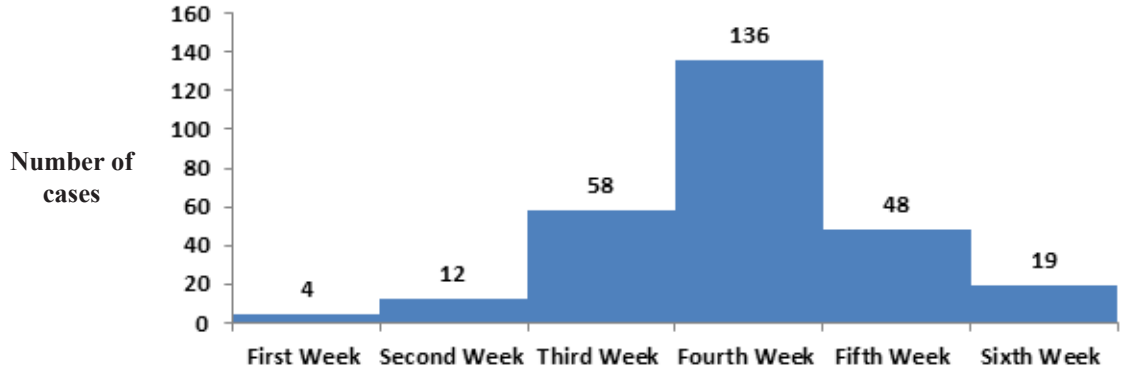
		Number	Percentage
Sex	Male	192	69.3
	Female	85	30.7
Age in completed years	<15	7	02.5
	15 – 25	19	06.9
	25 – 45	237	85.5
	>45	14	05.1

Minimum age = 9 years, Maximum age = 68 years, Mean ± SD = 27.2 ± 3.2

Out of total 277 reported cases of Leptospirosis, 04 (1.4%) were reported in 1st week, 12 (4.3%) were

reported in 2nd week, 58 (20.9%) were reported in 3rd week, 136 (49.1%) were reported in the 4th week, 48 (17.3%) were reported in 5th week and 19 (6.1%) were reported in 6th week after the flood. Maximum number of cases were reported in 4th week after the flood and reporting of cases was declining after 4th week (**Figure 1**).

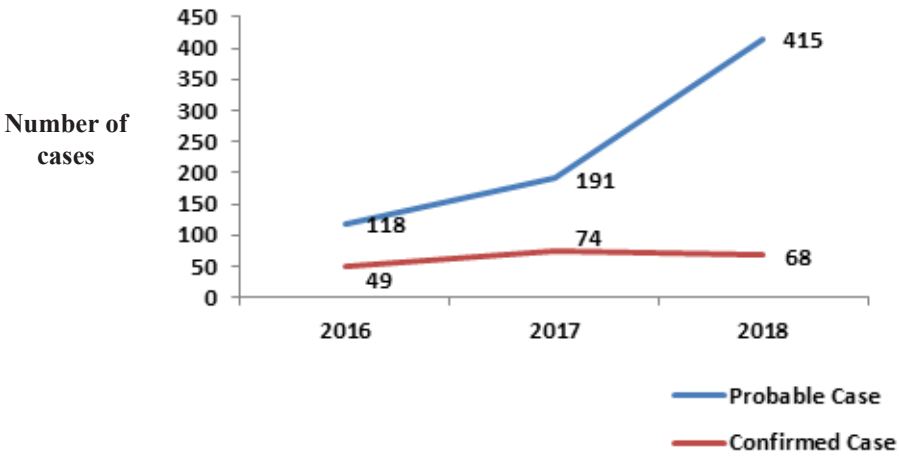
Figure 1: Epicurve of reported cases of Leptospirosis (n=277)



Out of 277 probable as well as laboratory confirmed cases of Leptospirosis, most of the cases were reported from the catchment areas of the Periyar River[11]. The areas reporting maximum number of cases were Kochi Corporation, Thrikkakara, Eloor, Kadungallur, Kalamassery, Choornikkara, Kothamangalam, Paravur, Sreemoolanagaram and Edathala.

As per the IDSP reports of Ernakulam District, during the reporting year 2016, 2017 and 2018 (January to September) a total of 118, 191 and 415 probable cases of Leptospirosiswere reported. However, during the same reporting period the number of laboratory confirmed cases were 49, 74 and 68 respectively (**Figure 2**). In year 2018 there were 3 deaths reported[11].

Figure 2: Reported Cases of Leptospirosis reported



During house to house survey a total of 525 households and 2100 householders were surveyed. Out of total 525 surveyed households 262 (49.9%) had water supply from well and all these wells were affected during the flood. Out of 525 households all houses were visited by the health workers. Out of 2100 householders more than 95% had received one dose of Chemoprophylaxis. However, none of the householders completed full six weeks course of Chemoprophylaxis (**Table 2**).

Table 2: Water supply and Chemoprophylaxis in flood affected households

Sr No.	Parameters	Number (percentage)
1	Households having water supply through well (n= 525)	262 (49.9)
2	Households using water from the flood affected well (n=525)	262 (49.9)
3	Households visited by Health Worker (n= 525)	525 (100)
4	Householders received Chemoprophylaxis (n=2100)	1997 (95.1)

Discussion

In Ernakulam during the flood most of the cases of leptospirosis were reported from flood affected catchment areas of Periyar River. Majority of the probable and confirmed cases were reported from the area of Kochi Corporation followed by Thrikkakara and Kadungallur. The urban areas of Ernakulam reported more cases than in other areas. Cases of Leptospirosis was reported in all age groups and both the sexes, however more number of cases were in the age group of 25 – 45 years and number of males were more than that of females. This is the pattern reported in flood affected other areas of Kerala and also in other studies, as the age group of 25 – 45 years and males are involved in outdoor activities[5,6]. Maximum number of cases of leptospirosis were reported in 4th week after the flood. After 4th week the number of cases declined progressively. Number of cases of leptospirosis reported in year 2018 was 1.5 to 2 times more than the number of cases reported in year 2016 and 2017. However there was no increase in the number of laboratory confirmed cases. The increase in reporting of number of probable cases was due to increased awareness of community, better reporting and enhanced surveillance during the post flood period.

The Primary Health Centres visited has the facility of Lepto card tests (IgG& IgM) for screening the affected community. District Public Health Laboratory had the capacity to confirm Leptospirosis cases by IgM ELISA method.

During the household survey it was found that all the houses in the flood affected areas were visited by health workers. All the householders were given chemoprophylaxis against Leptospirosis. More than 95% of the householders had received one or two doses of chemoprophylaxis however, none of them completed the full 6 weeks course of chemoprophylaxis. The compliance towards completion of full course of chemoprophylaxis could have been improved with involvement of Public Health Department. Sensitization training of Medical Officer and monitoring could have been done to improve the compliance.

Conclusion

Increased awareness of the community, enhanced surveillance system and timely administration of chemoprophylaxis were key strategies to prevent the outbreak of Leptospirosis in Ernakulam district of Kerala in spite of facing major flood.

Recommendations

Periodic Sensitization training of Medical Officers and other Health Care Workers on flood reacted illnesses can be a good initiative to fill the knowledge gap. Central Surveillance Team can do the handholding for enhanced surveillance, monitoring, training and developing strategy for improving the compliance towards chemoprophylaxis.

Conflict of Interest: Nil

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Ethical Clearance: Study was conducted after taking permission from the appropriate authorities of the state government and Institutional Ethics Committee.

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