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Proportion and Trend of Human Leptospirosis in the Tertiary Care Settings of Kerala, India

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Abstract

Objective: To determine proportion of human leptospirosis in the sera of suspected clinical cases acute febrile illness sent by 5 tertiary care hospitals in Kerala. **Methods:** From the Out patient Department serum samples of suspected individuals were sent for confirmation using the immunoglobulin M (IgM) enzyme-linked immunosorbent assay (ELISA) for leptospirosis. Also the number of deaths in this patients were recorded and proportion of confirmed causes of death due to Leptospirosis is recorded. **Results & conclusions:** We found 45.29 % (95 % CI 43.82, 46.76) of sero prevalence across the 5 MCH in Kerala. Also proportional death due to *Leptospira* was 22.62% (95% CI 19.05, 26.19) i.e out of 137 suspected deaths due to *Leptospira* 31 deaths had serological evidence. Sero prevalence will be much more in community than this study report. This warrants for better diagnostic facilities for better care. Proper reporting from all sectors of health to monitor trend of disease and

Key words: Leptospirosis; laboratory techniques and procedures; enzyme-linked immunosorbent assay; Prevention of Infectious & Epidemic Diseases Centre (PIED) Kerala. Medical college Hospital (MCH)

Introduction

Leptospirosis is a zoonosis of global importance and has been described as a re-emerging disease (1). a zoonosis associated with potentially fatal consequences, has long been a grossly underreported disease in India. Human leptospirosis has been responsible for morbidity and mortality in both developed and developing countries (2-4). Infections

in humans are known to occur primarily when individuals come in contact, directly or indirectly, with urine containing viable leptospires from rodents, or by ingestion of contaminated food or water (5). Several factors, such as age, sex, season, geographical location, and occupation have been associated with human leptospirosis (6).

Leptospirosis can be confused with diseases such as dengue fever (in areas where both coexist) because of some similar clinical manifestations (7). Therefore, the possibility of over- or under-diagnosis of either or both conditions exists, particularly when based on clinical diagnosis only. Several serological diagnostic methods (8-10) have been described for human leptospirosis, but the two commonly-used serological tests are the microscopic agglutination test (MAT) (8) and the enzyme-linked immunosorbent assay (ELISA) (9). The MAT is the "gold standard" for the detection of leptospiral infection, and is the most widely used method for detecting both immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies to *Leptospira* (11). The test can be used qualitatively and quantitatively to detect the infecting serovars (8) and is highly specific; however, MAT requires the propagation of live leptospiral strains, is time-consuming, and has been shown to have a low sensitivity (12). On the other hand, the ELISA involves the use of whole-leptospiral antigen preparations to screen for infection, has the ability to detect IgM and IgG antibodies separately, and is highly sensitive. Also, the fact that this assay uses killed leptospires reduces the risk of infection among laboratory personnel.

Above factors describe the difficulty of diagnosing Leptospirosis at all levels. In Indian context these facilities are available only in Tertiary care center and Most of these centers are nothing but Medical Colleges In India. Similarly in Kerala Most of these cases are found in medical colleges.

These factors made us to conduct this study with the objective to find Proportion of Human Leptospirosis in the Tertiary care settings of Kerala and proportional mortality due to the same.

Methods

Hospital based cross sectional study in the Tertiary care setting of Kerala.

Cases with acute febrile illness will be reported to PIED cell in Kerala. All these cases will be sent for diagnosis using IgM ELISA for Leptospirosis. Data from all the Government Medical colleges on Infectious Diseases will be sent to PIED cell these data was used for the following study. Data collected Includes Total number of suspected cases of Leptospirosis i.e total acute febrile illness reported , Confirmed cases of Leptospirosis ,Total number of deaths among the suspected cases of Leptospirosis, and number of death confirmed due to Leptospirosis. Data from the time of Jan 2011 to Nov 2011 comprising 5 Government Medical colleges was obtained from the registers of PIED cell. All the qualitative data are expressed as proportions .

Results

Out of the 5 Govt.tertiary care centers Kottayam Medical college has reported 376 Probable cases and 35 (9.3%) confirmed cases followed by Calicut with 370 Probable cases and 187 (50.5%) confirmed cases. MCH Trivandrum has highest confirmed death reported due to leptospirosis 7.2% (10) out of the 138 probable cases reported.(Table 1.)

The trend of probable leptospirosis cases was showing an increasing trend from June to August and then declining in MCH Calicut. In Kottayam MCH also probable cases was seen to be rising during May - June and then declining .In the other three MCH the number of cases almost remains stable. (Figure 1.Trend of probable cases).The number of confirmed cases has been decreasing till the month of May ,especially in MCH Calicut and then showing an increase in all the five hospitals especially in Alleppey and Calicut. (Figure 2.Trend of confirmed cases).The probable deaths due to leptospirosis in MCH Calicut has shown an increase from the month of June and remaining stable from August onwards. An increasing trend was also noted in MCH Trivandrum. The number of probable deaths has decreased in Alleppey. (Figure 3.Trend of probable

deaths).There has been no confirmed cases of death in MCH Kottayam and Thrissur .The number of confirmed deaths in Calicut has decreased . (Figure 4.Trend of confirmed deaths)

Discussion

Leptospirosis has two distinct clinical syndromes- a mild anicteric febrile illness seen in 90% of patients, and a severe variety (10%) with jaundice and other manifestations (Weil disease)¹³. The presentation of disease as asymptomatic febrile illness makes detection of disease very difficult and most of these cases end up in tertiary care setting .

The seroprevalence of leptospirosis in patients with an acute febrile illness has been steadily increasing in southern India. The highest positivity rate of 25.6% has been reported from southern India. The reported positivity rates are

8.3%, 3.5%, 3.1% and 3.3% in northern, western, eastern and central India, respectively.¹⁴ But in the current study we found 45.29 % of sero prevalence across the 5 MCH in Kerala. Also proportional death due to *Leptospira* was 22.62% i.e out of 137 suspected deaths due to *Leptospira* 31 deaths had serological evidence .

Although traditionally considered to be a disease of sewage workers, miners and farmers, leptospirosis is now recognized as one of the common causes of acute febrile illness in the general population.¹⁵

We found that 515 of 1137 (45.29%) patients had serological evidence of leptospirosis. A seroprevalence of 8.8% and 21.7% has been reported from Chandigarh and Varanasi, respectively, by Sethi et al.¹⁵ Comparing this the sero prevalence is double that of what is reported. This is 20% more than what is reported for southern India at 25.6%.¹⁴ Even than the sero prevalence in community will be much more because utility of curative care in Kerala is more through private sector which is not accounted in the present study.

Leptospirosis has a peak during the monsoon and post-monsoon months, and occurs more commonly in people living in urban slums with poor sanitation and low hygienic conditions. However, in the past decade, it has been reported from all parts of urban and rural India.¹⁶ Similar to this clustering of cases can be seen in months of June, July and August in all the 5 MCH of Kerala . The factors must be the same as exposure to rat urine due to rain water will increase during this seasons. For rest of the months the case load remains flat.

Other Vector borne diseases which peaks post monsoon season with increasing list of acute febrile illness Leptospira detection becomes further complicated.

The reported proportion of death of 22.62% (95% CI 19.05, 26.19) due to Leptospirosis is alarming for better diagnostic and preventive approach to tackle this disease. These numbers are deflated due to the following background reasons. poor infrastructure in Government setting for confirmation of death and poor recording and reporting . What ever is reported is tip of Ice burg .

All these warrants for better diagnostic facilities for better care . Proper reporting from all sectors of health to monitor trend of disease and to bring in better control and preventive measures.

Limitations

The majority of infections with Leptospira are subclinical or of mild intensity. Such patients would not report to a hospital and the diagnosis would be missed in them. Our study would underestimate the community prevalence of Leptospirosis because of a referral bias in patients attending a tertiary level centre.

Table 1: Proportion of Suspected & Confirmed Cases , Deaths due to Leptospirosis Across the 6 tertiary care centres of Kerala.

Medical college	Probable cases	Confirmed cases	Probable Death	Confirmed Death
Trivandrum	138	110 (79.7%)	38 (27.5%)	10 (7.2%)
Alleppey	159	110 (69.2 %)	20 (12.6 %)	6 (3.8 %)
Kottayam	376	35 (9.3 %)	28 (7.4 %)	0
Thrissur	94	73 (77.6 %)	9 (9.5 %)	5 (5.3 %)
Calicut	370	187 (50.5 %)	37 (10 %)	10 (2.7 %)

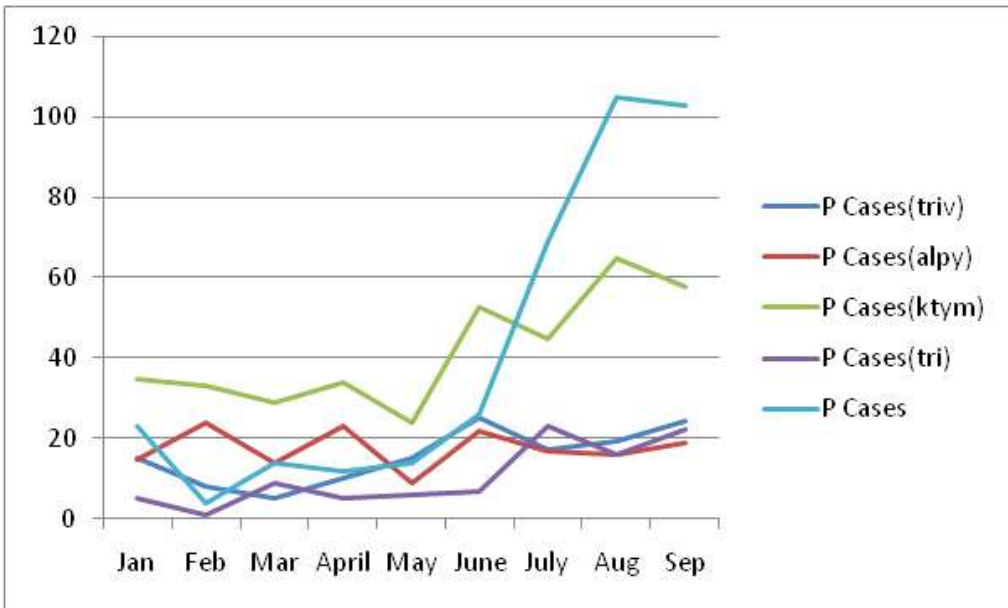


Fig.1: Trend of probable cases.

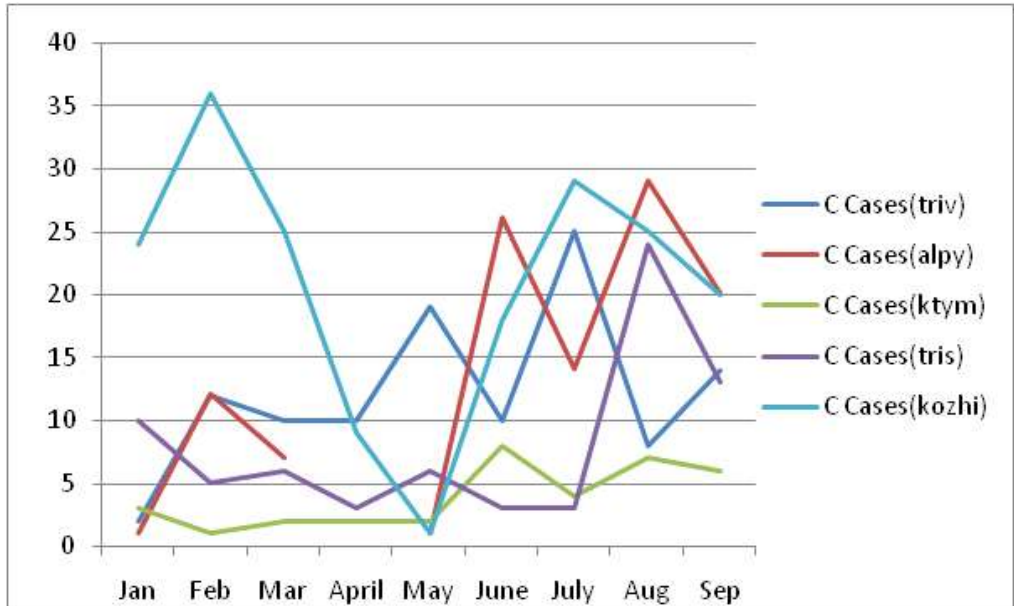


Fig. 2: Trend of confirmed cases of Leptospirosis.

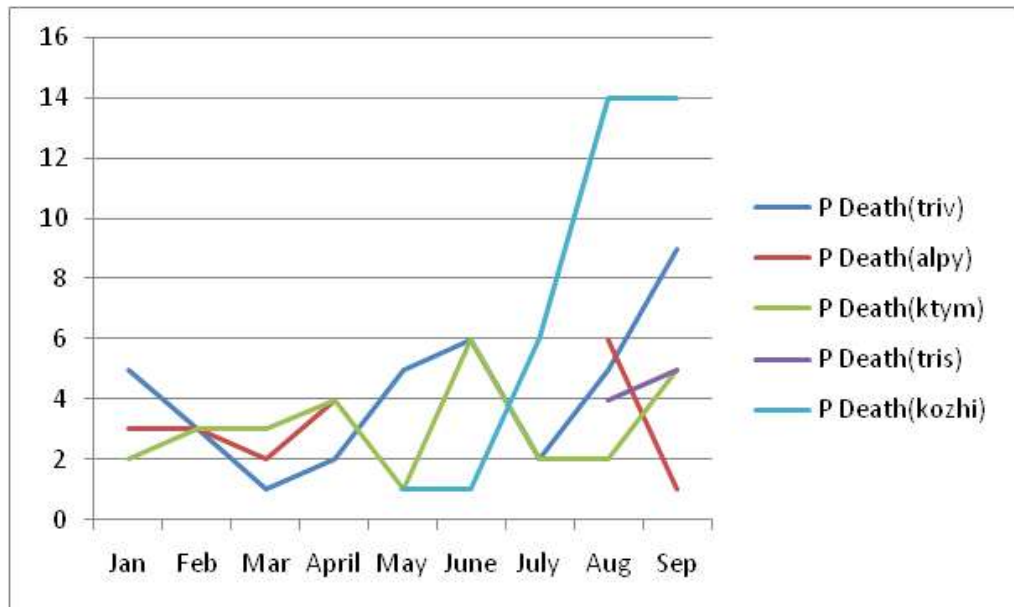


Fig. 3: Trend of probable deaths due to Leptospirosis.

Reporting from private sector is incomplete which deflates the revalence.

Conclusion

The presentation may range from a subclinical infection to a severe syndrome of multi organ dysfunction. Sero diagnosis by a micro agglutination test (MAT) is the gold standard but is not universally

available Leptospirosis can be easily diagnosed using a latex agglutination test and IgM ELISA. If this is made available at primary care setting quality of care in will improve. We recommend that all persons with fever for >7 days should be screened for Leptospirosis. More importantly, policy makers and public health officials should be convinced that addressing the principal conditions of poverty such as poor sanitation could lead to reduced disease burden of Leptospira in tertiary care ; In conclusion, prevention is largely dependent on sanitation

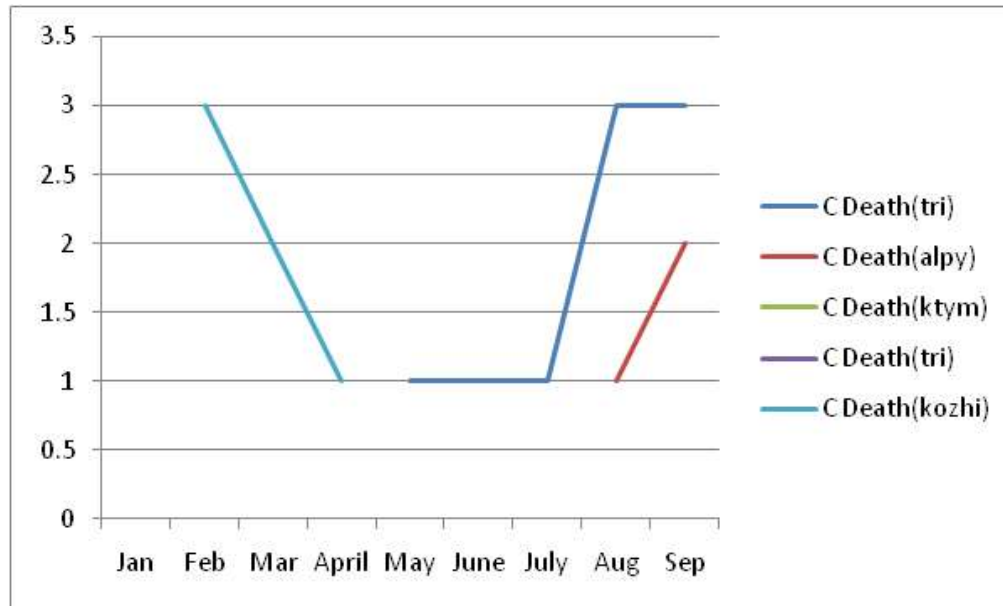


Fig.4:Trend of confirmed deaths due to Leptospirosis

measures that are difficult to implement, especially in developing countries.

Extra effort for environmental Hygiene during Monsoon and post Monsoon will reduce the burden of Leptospirosis disease.

References

1. Meites E, Jay MT, Deresinski S, Shieh WJ, Zaki SR, Tompkins L, et al. Re-emerging diseases, California. *Emerg Infect Dis.* 2004;10(3):406–12. [Links]
2. Bharti AR, Nally JE, Ricardi JN, Matthias MA, Diaz MM, Levett PN, et al. Peru-United States Leptospirosis Consortium. Leptospirosis: A zoonotic disease of global importance. *Lancet Infect Dis.* 2003;3(12):757–71. [Links]
3. Levett PN. Leptospirosis. *Clin Microbiol Rev.* 2001;14(2):296–326. [Links]
4. Kupek E, de Sousa Santos Faversoni MC, de Souza Philippi JM. The relationship between rainfall and human leptospirosis in Florianópolis, Brazil, 1991–1996. *Braz J Infect Dis.* 2000; 4(3):131–4. [Links]
5. World Health Organization. Human leptospirosis: guidance for diagnosis, surveillance and control. Geneva: WHO; 2003 [Links]
6. Vanasco NB, Schmeling MF, Lottersberger J, Costa F, Ko AI, Tarabla HD. Clinical characteristics and risk factors of human leptospirosis in Argentina (1999–2005). *Acta Trop.* 2008; 107(3):255–8. [Links]
7. Ellis T, Imrie A, Katz AR, Effler PV. Underrecognition of leptospirosis during a dengue fever outbreak in Hawaii, 2001–2001. *Vector Borne Zoonotic Dis.* 2008;8(4):541–7. [Links]
8. KIT Biomedical Research. International course on laboratory methods for the diagnosis of leptospirosis. Amsterdam, Netherlands: Royal Tropical Institute; 2006. Pp. 62–74. [Links]
9. Levett PN, Branch SL. Evaluation of two enzyme-linked immunosorbent assay methods for detection of immunoglobulin M antibodies in acute leptospirosis. *Am J Trop Med Hyg.* 2002;66(6):745–8. [Links]
10. Ooteman MC, Vago AR, Koury MC. Evaluation of MAT, IgM ELISA and PCR methods for the diagnosis of human leptospirosis. *J Microbiol Methods.* 2006;65(2):247–57. [Links]
11. Faine S. *Leptospira and leptospirosis.* Clayton, Victoria, Australia: CRC Press; 1994. [Links]
12. Smythe LD, Wuthiekanun V, Chierakul W, Suputtamongkol Y, Tiengrim S, Dohnt MF, et al. The microscopic agglutination test (MAT) is an unreliable predictor of infecting *Leptospira* serovar in Thailand. *Am J Trop Med Hyg.* 2009;81(4):695–7. [Links]

13. D. DEODHAR, M. JOHN. Leptospirosis: Experience at a tertiary care hospital in northern India NMJI VOL. 24, NO. 2, 2011
14. Kamath S. Leptospirosis. In: Das S (ed). API Medicine update. Vol. 13. Mumbai: Association of Physicians of India; 2003:1008-11.
15. Sethi S, Sood A, Pooja, Sharma S, Sengupta C, Sharma M. Leptospirosis in northern India: A clinical and serological study. Southeast Asian J Trop Med Public Health 2003;34:822-5.
16. Natarajaseenivasan K, Boopalan M, Selvanayagi K, Suresh SR, Ratnam S. Leptospirosis among rice mill workers of Salem, South India. Jpn J Infect Dis 2002;55:170-3.

