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Original Research Article

Prevalance of Leptospirosis among the Patients Attending a Hospital in Kanyakumari District in South India

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ABSTRACT

Background
Leptospira causes zoonotic disease named leptospirosis. the disease is transmitted to humans by direct or indirect contact with water contaminated by the urine of carrier animals. Only few studies are available on the prevalence of leptospirosis in the Kanya Kumari district of Tamil Nadu. Our study mainly highlights the prevalence of leptospirosis in the Kanya Kumari district.
Aim
To determine the prevalence of Leptospirosis in Kanya kumari district of Tamil Nadu
Methods
A cross-sectional study stretched over 2 years involving 150 cases of clinically suspected leptospirosis were included, The serological test used in this study is IgM ELISA,
Results
Out of the 150 cases investigated for leptospirosis 35 patients were positive for IgM ELISA were as 115 cases were negative for IgM ELISA.
Conclusion
A significant rise in the prevalence (23%) of leptospirosis cases were reported in the Kanyakumari district of Tamil Nadu.
Key Words: Leptospirosis, Prevalence, IgM ELISA.

INTRODUCTION

Leptospirosis caused by a bacteria called Leptospira, is noted as the most widespread and dreadly zoonotic infection because of its presence in all continents except in Antartica. Leptospirosis is very endemic in developing countries namely India, Sri Lanka Malaysia.[1,2] The average mortality rates of severe leptospirosis ranges between 5% to 40 %.. Most of the deaths due to leptospirosis occur due to either renal failure or any severe acute respiratory distress syndrome (ARDS).

Leptospirosis or Weil's disease in humans is caused by bacteria Leptospira interrogans which can cause liver and kidney damage respiratory distress and even death. They are very

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delicate flexible and helical rods about 6-20 micrometres long and they also posses tightly coiled spirals with hooked ends.[1].They are mainly transmitted by rats and other rodents which are important reservoirs for the Leptospira, but human to human transmission does not occur.[1] This bacteria survives for very long duration in the convoluted tubules of the kidney of the rodents. In the kidneys they may multiply and can be shed in the urine of the reservoir animals to contaminate the water bodies.[2] Leptospirosis is more common the rainy or monsoon season.[1,2]

Leptospirosis may be mild with undifferentiated pyrexia or it could manifest as fatal illness. The incubation period is around 10 days. Initially there will be mild anicteric febrile illness followed by fatal disease. There can be hepatorenal damage in the fatal disease known as Weil's disease.[3,4] The incubation period may also range from 1-30 days. In less severe cases mild anicteric febrile illness, which manifests with rigor, vomiting, headache and the fever, usually may subsides in about 9 days. It present as flu like symptoms with fever, chills, rigor headache, conjunctival suffusion, vomiting, abdominal pain. Jaundice can occur in an average of 10-20 % of the cases on the third or fourth day of infection followed by small purpuric haemorrhages which may occur on the skin and mucosa of the patient. Leptospirosis is a multisystem disorder which may manifest even as aseptic meningitis too.[5]

After entering the body, Leptospira disseminates to the bloodstream and seeds various organs like lungs, heart, brain, kidney. The organism can also be found in the capillaries of vessels, which causes vascular damage. These organisms are highly motile and secrete hyaluronidase which may account for its pathogenesis.[5] Chemoprophylaxis with Doxycycline is recommended for anticipated short term exposures.

In India Leptospirosis occurs mostly during the monsoon season and commonly seen during floods mainly in south as well as west India. Because Leptospirosis is an under-reported infection in India and also there is not much reliable clue on incidence figures, we decided to study the prevalence of Leptospirosis disease in the coastal region of Kanyakumari district in southern part of India. IgM antibodies appear within a week of illness and can peak in the third or fourth week of illness. IgG antibodies appears later than IgM, reaches a peak level after few weeks of illness and then may persists for low levels for few years. There are different serological methods for detection of leptospirosis like Enzyme Linked Immunosorbent Assay (ELISA), Macroscopic slide agglutination test(MSAT), Microscopic agglutination test (MAT) which is a serovar specific test, Cross agglutination and absorption test (CAAT), Lepto dipstick assay, Immunochromatographic test (ICT). PCR has also been found to be useful in severe disease, even before seroconversion occurs.[5] In the present study we have utilized IgM ELISA test to study the prevalence of Leptospirosis in the fever of unknown causes in the Kanyakumari district of South India.[6]

MATERIALS AND METHODS

The study has been conducted for a period of only two years from September 2017 to August 2019. This is a cross-sectional study performed in a tertiary care hospital in Kanyakumari district of southern part of India.

Sample size Calculation

Based on Hypothesis Testing Population Proportion using nMaster 2.0 Sample Size Calculator Software

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Formula

$$H_o : P = P_o \; ; \qquad H_a : P \neq P_o$$

$$n = \frac{\left\{Z_{1-\alpha/2}\sqrt{P_o(1-P_o)} + Z_{1-\beta}\sqrt{P_a(1-P_a)}\right\}^2}{(P_a - P_o)^2}$$

Where,

P_0 : Population proportion

P_a : Sample proportion

α : Significance level

$1-\beta$: Power

$P_0 = 0.1$
$P_a = 0.01$
$\alpha = 5\%$
$1 - \beta = 99\%$
Sample Size = 150

Proposed Statistical Analysis

- Study data obtained had been entered into Microsoft Excel Software, which then will be exported to Statistical Package for Social Sciences (SPSS) Version 21, IBM Statistics, USA.
- Descriptive Statistics (Frequency and Percentages) will be obtained.

Details from history of the patient regarding the age of the patient, sex of the patient and also symptoms like fever, bodyache or myalgia, headache vomiting, any purpuric rashes on the body were also very well documented. A total of 150 patients with clinically suspected febrile cases of Leptospirosis, attending both inpatient department and outpatient departments of this hospital were included in the above study.

Inclusion Criteria Included

1) Patients with headache, myalgia, jaundice and oliguria.
2) Patients with pururic rashes.

Exclusion Criteria Included

1) Fever due to other causes like malignancy and autoimmune diseases.
2) All the 150 serum samples of the patients are subjected to Panbio IgM ELISA test.

RESULTS

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A total of 150 serum samples from the patients were collected and subjected to IgM ELISA test. Out of 150 serum samples, only 35 (23%) were positive for IgM ELISA and the rest about 115 (76%) were negative for Ig M ELISA.

Out of the positive cases detected, 29 (82%) were males patients and rest 6 (17%) were female patients

Age Group	Male	Female	Total
0-10 Years	1	Not present	1
11-20 Years	5	1	6
21-30 Years	8	3	11
31-40 Years	7	2	9
41-50 Years	3	Not present	3
Above 50 Years	5	Not present	5

Table 1: Age and Sex wise distribution of the Leptospirosis in IgM positive cases

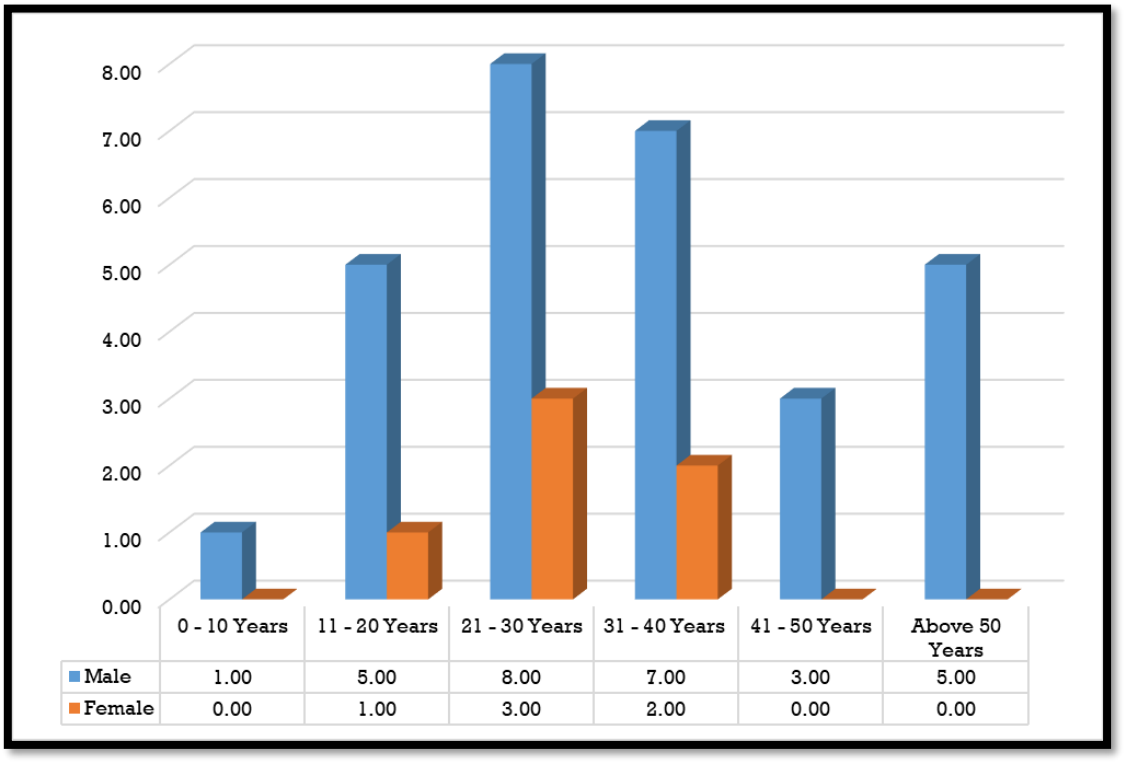

Fig 1: Age wise and sex wise distribution of the patients positive for leptospirosis infection

DISCUSSION

Leptospirosis is an occupational disease and seen mainly in people engaged in agriculture (example; rice field workers), sewer workers, people involved animal slaughtering industry.[7] Leptospirosis has also been reported more in the coastal districts of Andaman and Nicobar Islands, hence Leptospirosis is also called as Andaman haemorrhagic disease.[8] In the present study out of 150 patient samples screened for leptospirosis Ig M ELISA test only, 35 cases that is 23% were positive for Leptospirosis IgM ELISA test. Since Leptospirosis is a very rare zoonotic infection the study was conducted was conducted for a period of two years. Among the positive cases detected by IgM ELISA test, 29 were males patients and 6 were females patients. These findings are very well in concordance with the study which was conducted by

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MA Muthusethupathi et al., which stated that out 50 (88%) out of 57 positive cases were males.[1] This higher incidence among males may due to increased outside work by males compared to females in the rodent infested environments.[1,2] The three important epidemiological determinants for the leptospiral disease are frequent exposure to rodents, high rainfall and more commonly associated with rice fields.

According to the study conducted by MA Muthusethupathi et al., Leptospirosis infection did not show any particular age preference and the median age was about 40 years.[1] But in the study which we conducted maximum number of cases are reported in the age group of 21 years-30 years and 31 years-40 years. The higher incidence in this above age group can be due to participation of the people in the above age group of 21-40 in work like agriculture, fishing, animal husbandry, sewage works. This finding is in concordance with the study conducted by Sharma. S et al which stated that Leptospirosis is an occupational disease of persons engrosed in agriculture work, sewage works, forestry and animal slaughtering industry. Leptospirosis was initially named as rate fever because it is transmitted through the urine of the rodents and rat and is also may be transmitted through the urine of other domestic animals like, cattle, sheep, pig.[8]

The patients in whom IgM ELISA was conducted mostly had history of fever, headache and myalgia only, which are the symptoms of mild Leptospirosis.[9] In the study no cases of hepato-renal-haemorrhagic syndrome was noted. According to S. Shivakumar all though severe Leptospirosis has declined, mild Leptospirosis is on the greater side. This may be due to expanded knowledge about the disease among the endemic population, increased diagnosis rate, and also due to increased usage of antibiotics.[10]

CONCLUSION

A significant rise in the incidence of leptospirosis (23%) was documented in the coastal area of Kanya Kumari district of Tamil Nadu. The IgM ELISA test is a sensitive test for the diagnosis of current Leptospiral infection. In our study majority number of patients were males patients and were in the age group 30-50 years.

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