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Prevalence of Leptospirosis among the Patients with Fever Attending a Tertiary Care Hospital in Kanyakumari District, India

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A B S T R A C T

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 kanyaKumari district of Tamil Nadu. Our study mainly highlights the prevalence of leptospirosis in the Kanya Kumari district. To determine the prevalence of Leptospirosis in Kanya kumari district of Tamil Nadu. 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. Out of the 150 cases investigated for leptospirosis 35 patients were positive for IgM ELISA were as 115 cases were negative for IgM ELISA. A significant rise in the prevalence (23%) of leptospirosis cases were reported in the Kanyakumari district of Tamil Nadu, India.

Introduction

Leptospirosis is considered as the most widespread zoonotic infection on account of its presence in all continents except Antartica. The infection is endemic in developing countries like India, Sri Lanka Malaysia (Muthusethupathy *et al.*, 1995; Sumathi *et al.*, 1995). The mortality rates of severe leptospirosis averages from 5% to 40 %.. Most deaths occur due to renal failure or acute respiratory distress syndrome (ARDS). Leptospirosis in humans is caused by bacteria Leptospira interrogans which belong to the family of spirochaetes. They are delicate flexible and helical rods about 6-20 micrometres long and 0.1 micrometrs thick. They are transmitted by rats and other rodents which are important reservoirs for the bacteria (Muthusethupathy *et al.*, 1995). The Leptospira survives for a long periods in the convoluted tubules of the kidney in the natural host where they multiply and shed in the urine to contaminate the water bodies (Sumathi *et al.*, 1995). Leptospirosis may be mild with undifferentiated pyrexia or it could manifest as fatal illness. There may be hepatorenal

damage in fatal disease known as Weil's disease (Sharma *et al.,* 2006; Kalaivani *et al.,* 2017).The incubation period ranges from 2-26 days. In severe cases onset is acute with rigor, vomiting, headache and the fever usually subsides in about 10 days. Jaundice may occur in 10-20 % of cases on the third or fourth day followed by purpuric haemorrhages occuring on the skin and mucosa. It is a multisystem disorder which may manifest as aseptic meningitis also (Shivakumar and Shareek, 2004).

In India Leptospirosis occurs following the monsoons and floods in south and west India. Since it is an under-reported infection and there is no reliable incidence figures, we needed to study the prevalence of this disease in the coastal area of Kanyakumari district in southern India. There are different serological methods for detection of leptospirosis like Enzyme Linked Immunosorbent Assay (ELISA), Macroscopic slide agglutination test (MSAT), Microscopic agglutination test (MAT). In our study we have used IgM ELISA test to study the prevalence of Leptospirosis in the pyrexia of unknown cases in the Kanyakumari district of South India (Arumugam *et al.*, 2011).

Materials and Methods

The study has been conducted for a period of two years from September 2017to August 2019. This is a cross-sectional study performed in Sree Mookambika Institute of Medical Science

Sample Size Calculation

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

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
α = 5%
$1 - \beta$ = 99%
Sample Size = 150

Proposed Statistical Analysis

Study data obtained with be entered to 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 regarding age, sex of the patient and symptoms like fever, bodyache, headache vomiting, purpuric rashes were also documented. A total of 150 clinically suspected febrile cases of Leptospirosis attending both inpatient and outpatient departments of this hospital were included in the study.

Inclusion criteria

Patients with headache, myalgia jaundice and oliguria.
Patients with pururic rashes.

Exclusion criteria

Fever due to other causes like malignancy and autoimmune diseases.

All the serum samples were subjected to Panbio IgM ELISA.

Results and Discussion

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

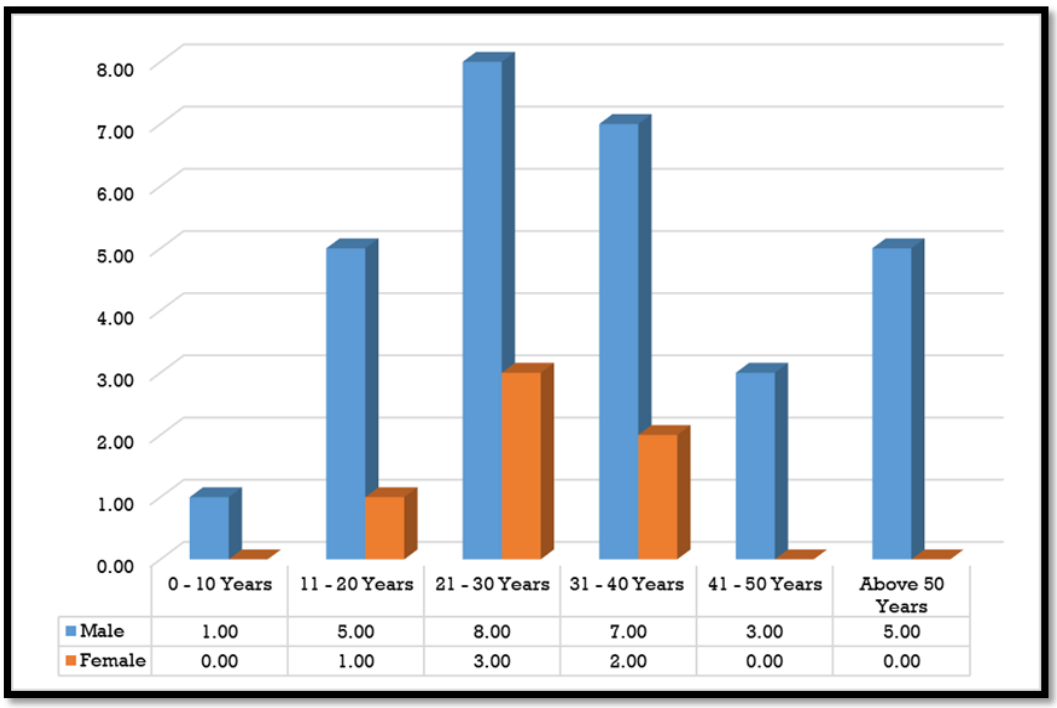
Out of the positive cases, 29 (82%) were males and rest 6 (17%) were female.

Leptospirosis is an occupational disease and seen mainly in people engaged in agriculture, sewage works, animal slaughtering (ICMR, 2006). In this study out of 150 samples screened for leptospirosis Ig M ELISA 35 cases that is 23% were positive for Leptospirosis IgM ELISA. Since Leptospirosis is a rare zoonotic disease we conducted this study for three years. Among the positive cases 29 were males and 6 were females. This finding is in concordance with the study conducted by Muthusethupathi *et al.*, (1995) which states that out 50 (88%) out of 57 positive cases were males. This higher incidence among males may due to increased outside work by males compared to females. According to Muthusethupathi *et al.*, (1995) Leptospirosis did not show any age preference and the median age was 39 years. But in our study maximum cases were reported in the age group 21-30 and 31-40 years.

Table.1 Age and Sex wise distribution of Leptospirosis IgM positive cases

Age Group	Male	Female	Total
0-10 Years	1	-	1
11-20 Years	5	1	6
21-30 Years	8	3	11
31-40 Years	7	2	9
41-50 Years	3	-	3
Above 50 Years	5		5

Fig.1 Age wise and sex wise distribution of patients positive for leptospirosis.



This higher incidence in the above age group may be due to involvement of the people in the age group of 21-40 in work like agriculture, animal husbandry, sewage works. This results in concordance with Sharma *et al.*, (2006). Leptospirosis is an occupational disease of persons engaged in agriculture, sewage works, forestry and animal slaughtering. Leptospirosis was originally named as rate fever because it is transmitted through the urine of the rats and is also transmitted through the urine of the domestic animals like, cattle, sheep, pig (Shivakumar, 2006).

The patients in whom IgM ELISA was conducted mostly had fever, headache and myalgia only which are symptoms of mild Leptospirosis (Terpstra *et al.*, 1985). According to Shivakumar (2006) all though severe Leptospirosis has declined, mild Leptospirosis is on increase. This may be due to increased knowledge about the disease among the population, increased diagnosis, and increased usage of antibiotics (Chinari Pradeep *et al.*, 1999).

A significant rise in the incidence of leptospirosis (23%) was documented in the Kanya Kumari district of Tamil Nadu. The IgM ELISA test is a sensitive test for the diagnosis of current infection. In our study more number of patients were males and were in the age group 31-50 years.

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