

## Research Article

# A serological study of leptospirosis in Chennai

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### ABSTRACT

**Background:** Leptospirosis is a zoonotic disease of mammals caused by serovars belonging to the spirocheate *Leptospira interrogans*. Commonly occurs in tropical and sub tropical regions.

**Methods:** A total number of 2180 suspected cases were included in the study during the period April 2014 to June 2014. All the samples were subjected to macroscopic slide agglutination test (MSAT). Suspected leptospirosis cases (n=2180) in the Chennai city and its suburbs were clinically evaluated.

**Results:** The most common presentation involved was specific signs and symptoms including fever, myalgia and headache (99%). Fever followed by jaundice and renal failure were observed in 3.74% cases. Fever followed by chills, skin rashes, cough, vomiting were observed in 2.43% cases. About 30% of the infected people were found in the age group of above 60 years. Female (57 %) were found predominantly infected when compared to male (43 %). Out of 2180 suspected cases 534 (32%) were found infected due to leptospirosis during the summer by MSAT method. (April '14-June'14).

**Conclusions:** This study shows leptospirosis found more common among female than male, probably due to occupational status of leptospirosis. Based on our study we suggest that senior age group people (age more than 60 years) are highly proven to this disease probably due to the less immunity factor.

**Keywords:** Leptospirosis, Macroscopic slide agglutination test

### INTRODUCTION

Leptospirosis is a zoonotic disease caused by spirochetes of the genus *Leptospira*.<sup>1,2</sup> Leptospirosis affects human beings and many other species of vertebrates, it can present in a wide spectrum of clinical manifestations in human being.<sup>3</sup> Many wild and domestic animals are reservoirs for leptospira organisms and they shed these organisms in their urine thereby contaminating fresh water, mud and soil. Leptospirosis has a worldwide distribution; however it is more common in tropical climates where conditions for transmission are favourable.<sup>4</sup> The climatic conditions in tropical and subtropical regions help provide and optimal environment to support the survivability of leptospirosis.<sup>5</sup>

Leptospirosis is considered as the most widespread zoonosis in the world.<sup>6</sup> As leptospirosis have the ability to survive in the environment and infect human being and it is a potential health hazard to community. The International leptospirosis society (ILS) made an attempt to compile data on occurrence of leptospirosis in various countries<sup>7</sup> and the data showed that tens of thousands of severe cases occur annually worldwide. Many places in South India are known to be endemic for leptospirosis these include Chennai and Madurai in the state of Tamil nadu. As leptospirosis has the ability to survive in the environment and infect human beings leptospirosis is the potential human health hazard to community.<sup>8</sup>

Chennai has a tropical climate throughout the year with temperature 35-38°C during summer. Leptospirosis cannot be classified as a seasonal disease. This disease can occur throughout the year without any seasonal factors. Direct transmission from animals to human beings is common in occupations that involve handling animals or animal tissue such as butchers, veterinarians, cattle and pig farmers, rodent control workers, etc. Accidental infection to veterinarians has also been recorded.<sup>9</sup> Leptospiral transmission can be broadly categorized as urban setting; rats infesting sewage networks, overflowing sewage during rains, flooding of roads and exposure of people to flooded roads create an ideal environment for the transmission of leptospirosis. Leptospirosis is currently identified as worldwide public health problem<sup>10</sup> in endemic areas. Leptospirosis is a major cause of various clinical syndromes such as jaundice, renal failure.<sup>11</sup> Recommended by the WHO and international leptospirosis society prescribes that any person presenting with acute onset of fever, headache and body aches associated with severe muscle tenderness particular in calf muscles, haemorrhages including sub conjunctival haemorrhage, jaundice, cough, breathlessness and haemoptysis be suspected as a cause of leptospirosis and investigated.

**METHODS**

Two thousand one hundred and eighty samples obtained from patients with clinical features suggestive of leptospirosis received at the Institute of Microbiology, Madras Medical College during April 2014 – June 2014. All the suspected samples examined by macroscopic slide agglutination test (MSAT).

A total number of 2180 suspected cases in the different age group were selected and 3-5 ml of vein blood was collected, allowed to clot and then it was centrifuged for the separation of serum which was used for performing MSAT.

The MSAT was performed using 13 serovars formalized and has killed pooled antigen from leptospire belonging to different serovars commonly prevalent in and around Chennai. The serovars that were included were Australis (Ballico), Autumnalis (Akiyami), Bataviae (Swart), Canicola (HondUtrechtIV), Grippytyphosa (Moskva), Hebdomadis (Hebdomadis), Icterhaemorrhagiae (RGA), Javanica (Poi), Pomona (Pomona), Pyrogenes (Salinem), Sejroe (Hardjoprajitno), Semarang (Patco I), Manhao (L60). Macroscopic slide agglutination test was done using a dense suspension of killed leptospire was mixed with a drop of serum on a slide and rotated on a rotator (120rpm) for 4 minutes.<sup>12,13</sup> It was then examined by presence of agglutination. A 4+ agglutination titre was considered significant.<sup>14,15</sup>

**RESULTS**

Out of 2180 suspected 534 cases (32%) were found positive for leptospirosis by MSAT method. Leptospirosis was found more common among female than male (Table 1). All the cases had fever followed by myalgia and headache (99%). Fever followed by renal involvement (3.74%). Fever followed by conjunctival suffusion (2.80%). Fever followed by chills, cough, vomiting (2.43%) (Table 2).

**Table 1: Gender wise distribution of positive cases for leptospirosis.**

S. no.	Gender	No. of positive cases			Total	Suspected percentage (%)
		April	May	June		
1	Male	69	71	90	230	43
2	Female	98	74	132	304	57

**Table 2: Common signs / symptoms observed in cases affected with leptospirosis.**

S.no.	Signs / symptoms	No. of cases	Percentage (%)
1	Fever, Myalgia, Headache	530	99%
2	Jaundice, Renal involvement	20	3.74%
3	Conjunctiva Suffusion	15	2.80%
4	Chills, Cough, Vomiting	13	2.43%

Patients in the age group of above 60 years (30%) were found predominantly infected due to leptospirosis followed by the age group 0-20 (25%), 20-40 years (24%) and finally 40-60 years (21.1%) (Table 3).

**Table 3: Age wise distribution of patients positive for leptospirosis.**

S.no.	Age group (years)	No. of positive cases (n=534)	Positive percentage
1	0-20	134	25
2	20-40	127	24
3	40-60	108	21
4	Above 60	165	30

In the month of June 2014, we noticed number of positives as compared to April and May months but the suspected numbers of cases were higher during the month of May 2014.

**DISCUSSION**

The study shows that leptospirosis occur frequently in Chennai surroundings during the summer. Considering the environmental conditions and occupational habits of the population this is expected. The Clinical criteria used for screening patients had a strong productive value.

However there is a possibility that its sensitivity is low. This can only be tested by screening samples of fewer cases of leptospirosis and following them up for the development of symptoms / signs suggestive of leptospirosis.

Its high prevalence in Chennai makes it necessary to devise an early sensitive diagnostic method. Early sensitive and specific macroscopic slide agglutination test (MSAT) is important as it provides unequivocal evidence and helps in preventing the spread of active leptospirosis infection.

MSAT is a simple, satisfactory and quick screening test for the laboratories which do not have other facilities. This study was done among 2180 suspected cases out of which 534 patients serum sample was suggestive of leptospirosis. In our study higher incidence of positive percentage of leptospirosis was found in the age group of above 60- years (i.e. 30%) and seen 25% in 0-20 years, 24% in 20-40 years and 21% in 40-60 years. From these findings, we suggest that leptospirosis is seen more in age of above 60 years because of their poor immunity and it was more common among female than male cases.

The predominant symptom among the patients in our study was found fever. The commonest symptoms of those who were confirmed as having leptospirosis were fever, headache, myalgia and vomiting. These finding are agreeable with the findings of the study by Davol (2006).<sup>16</sup>

It has been our policy to do the macroscopic slide agglutination test (MSAT) as a screening test for all the samples received. Sumathi et al<sup>17</sup> found that MSAT is positive in 39.8% of 1461 samples where as in our study the overall positive percentage during the study period April 2014 – May 2014 was 32%.

Samples were received throughout the year and the data reveal that leptospirosis occurs throughout the year although the number of positives increases during the summer season (April 2014-June 2014). This emphasizes the importance of a polluted environment which is an important epidemiological risk factor.

## CONCLUSION

We conclude that there has been a dramatic increase in the number of leptospirosis cases reported in our laboratory irrespective of the seasons (summer and Monsoon). Occurrence of Leptospirosis throughout the whole year is not only due to polluted environment and also due to important epidemiological risk factors.

This study shows leptospirosis was found more common among female than male, probably due to occupational status of leptospirosis.

Based on our study we suggest that senior age group people (age more than 60 years) are highly prove to this disease probably due to poor immunity.

We strongly suggest suspicion of leptospirosis by the physicians is possible even during summer season as this disease occurs throughout the year.

Finally to conclude MSAT is a valuable and simple screening test. The sensitivity of this test was enhanced by adding the locally prevalent serovars. This was an important modification done by us over the PSAT. As this test does not require sophisticated equipments, conjugates and substrates, it would be a ideal test for screening current leptospiral infection. The WHO and international leptospirosis society prescribes that any person presenting acute onset of fever, headache and body aches associated with severe muscle tenderness particularly in calf muscles, haemorrhages including subconjunctival haemorrhage, jaundice, cough, breathlessness and haemoptysis, oliguria and signs of meningeal irritation should be suspected as a case of leptospirosis and investigated.

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