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## Research Article

# EPIDEMIOLOGICAL FACTORS & CLINICAL SPECTRUM INVOLVED IN LEPTOSPIROSIS IN TERTIARY CARE HOSPITAL, SURAT

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Leptospirosis, Epidemiological factors, clinical spectrum, Rain-fall.

### ABSTRACT

**Background:** Leptospirosis is a zoonotic spirochetal disease. The spectrum of human disease is ranging from subclinical infection to a severe syndrome of multiorgan infection with high mortality. **Aim:** To evaluate the epidemiological factors & the clinical presentation. **Method:** Patients with fever admitted in a GMC, Surat, Gujarat who were tested positive for Leptospirosis were evaluated for epidemiological risk factors in addition to the clinical profile. **Result:** Total 326 patients are evaluated. The peak time was rainy season and harvesting, farmers are most affected. Males were more than females. In the clinical spectrum, fever is present in all, followed by jaundice, myalgia, oligouria and haemorrhage. **Conclusion:** Rain-fall is the main epidemiological factor followed by harvesting of crops & Poor knowledge regarding mode of transmission by farmer is the main reason behind the occurrence of disease.

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### INTRODUCTION

Leptospirosis is a zoonotic spirochetal disease known to affect humans since many years and was identified and isolated for the first time in Japan in 1915. The spectrum of human disease caused by leptospira is extremely wide, ranging from subclinical infection to a severe syndrome of multiorgan infection with high mortality (Faine *et al* 1999<sup>(1)</sup>).

Leptospirosis has worldwide distribution and it is most common in temperate regions in the late summer and early rain fall and in tropical regions during rainy seasons (Levett.Paul *et al*, 2001<sup>(2)</sup>). The emergence of zoonotic disease in the human population is a complex phenomenon with multifaceted causes. Leptospirosis is considered one of the most important emerging zoonotic disease with worldwide distribution. The disease is one of the seriously neglected tropical diseases, despite its obvious burden on human health and livestock productivity (Bashiru Garbaa *et al* 2018<sup>(3)</sup>).

If we look at the world scenario Weil's disease, is one of the severe forms of this disease, occurs in many countries, including India and other South-East Asian Countries, China, continental Europe and England. Leptospirosis exists in all the five inhabited continents and in a large number of countries (Rao R *et al*, 2003<sup>(4)</sup>). The global burden of disease is unknown

because the paucity of data, but incidence estimates range from 0.1 to 1/100,000/year in temperate areas, to over 100/100,000/year during epidemics in the tropics. An estimated 300,000 to 500,000 severe cases occur each year, with case fatality reports of up to 30% (Z. Tilahun, 2013<sup>(5)</sup>).

In India most outbreaks of leptospirosis are reported from the coastal regions of the states of Gujarat, Maharashtra, West Bengal, Orissa, Kerala, Tamil Nadu, Karnataka and the Andaman Islands. Highest rates occur during October to November which coincides with the monsoon season in these parts (Dr. Mavatkar M V *et al*<sup>(6)</sup>).

The disease is endemic in south Gujarat since 1994. The endemic districts are Valsad, Navsari and Surat. Cases are seen during the monsoon months. Based on extensive studies conducted in Gujarat, it was highlighted that agro-climatic conditions for south Gujarat favor endemicity for leptospirosis. These include heavy rainfall, clay soil and high water table (S. Shivakumar 2008<sup>(7)</sup>).

The present hospital-based study focused on the trend of the leptospirosis case over a three-year period to study its age and sex distribution, the peak month of occurrence, its distribution through out south-gujarat, occupation involved. The present study will help to know the trend and make proper measures for future reference.

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**MATERIAL & METHOD**

We have conducted a prospective study from August 2011 to December 2013, at New civil hospital, Government Medical college, surat. The study protocol was approved by the Human Research Ethics Committee of the college. All suspected cases of Leptospirosis regardless of there age/sex were included in the study, following informed and written consent.

A detailed history and the physical examination findings were recorded on a clinical record form. All suspected cases of leptospira admitted in New Civil Hospital, Surat, having one of the following sign / symptoms : fever, chills, conjunctival suffusion, headache, myalgia particularly calf muscles, oliguria, jaundice. Later on the diagnosis were confirmed by PCR, ELISA & MAT. The data were processed and statistically analyzed by using Microsoft excel.

**RESULT**

In present study, patients admitted to New Civil Hospital, Surat with fever, chills conjunctival suffusion, headache, myalgia particularly calf muscles, oliguria, jaundice were included. Total 326 patients included in study during the period of September 2011 to October 2013. If we look at the gender wise distribution male (237) are more than females(89) as shown in table no 1. Maximum number of cases were in the age group of 31-40yr accounting for 26.3 %

**Table No 1** Age-Wise & Gender-Wise Distribution

Age	Male	Female	Total(%)
0-10	3	1	4(1.2)
11-20	21	7	28(8.5)
21-30	65	20	85(26)
31-40	60	26	86(26.3)
41-50	55	20	75(23)
51-60	25	12	37(11.3)
61-70	8	3	11(3.3)
TOTAL	237 (72.6%)	89 (27.3%)	326(100%)

No of cases of Leptospirosis during 2011-2013

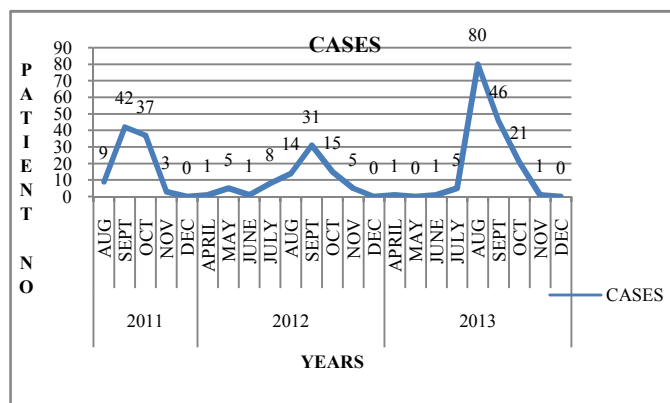
**Table No 2** Year-Wise Distribution of Cases of Leptospirosis

2011	91
2012	80
2013	155

**Table No 3** Month-Wise Distribution of Cases of Leptospirosis

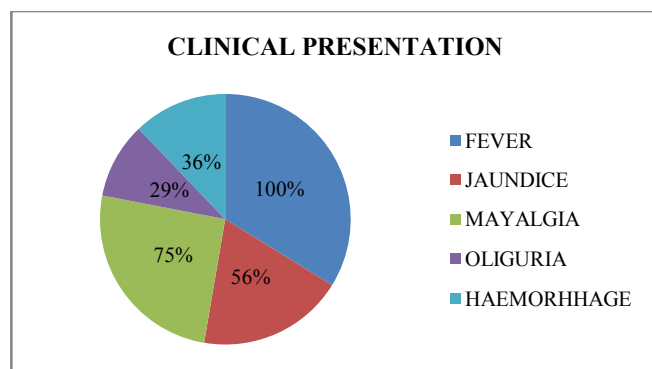
YEAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
2011	0	0	0	0	9	42	37	3	0
2012	1	5	1	8	14	31	15	5	0
2013	1	0	1	5	80	46	21	1	0

If we look at the month-wise distribution the maximum peak of patients are in month of august, September & October as shown in Chart no 1.



**Chart no 1** Month-Wise Distribution of Leptospirosis

If we look at the clinical presentation of patients fever was present in all patients. As many times seen that patients present with payrexia only and later diagnosed to have leptospirosis. So fever is an important feature. Well in decreasing order of seavarity the other clinical presentation were mayalgia in 75% of patients, Jaundice in 56% of patients, haemorrhage in 36 % of patients and oligouria in 29% of patients.



**Chart No 2** Distribution of Clinical Presentation

If we look at the occupation- wise distribution in table no 4, farmers are most affected 234(71.7%) (Dr.Mavatkar M V *et al* 2017) followed by labourer 57(17.4%) unemployed 17(5.2%), dairy worker 15(4.6%) and student 3 (0.9%).

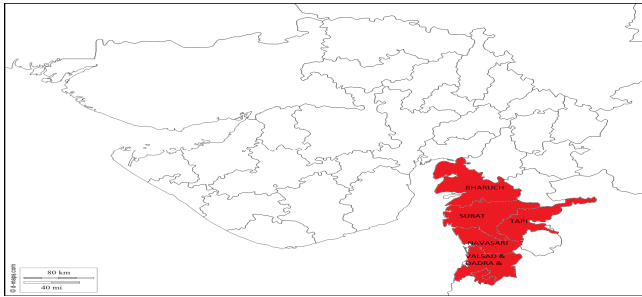
**Table No 4** Occupation-Wise Distribution

Occupation	CASES(%)
Dairy worker	15(4.6)
Farmer	234(71.7)
Labourer	57(17.4)
Student	3(0.9)
Unemployed	17(5.2)
Total	326 (100)

The district-wise distribution of affected areas in south-gujrat are as follows:

**Table No 5** District-Wise Distribution

	Total Cases
Surat	195
Tapi	74
Navasari	34
Valsad	12
Bharuch	1
Dadra & Nagar Haveli	3
Sillvassa	4
Maharashtra	1
Thane	2



**Table No 5** District-Wise Distribution

The red cloured area showing the affected area of south Gujarat and as shown in table no 5, area of silvassa, maharastra and thane were also affected.

## DISCUSSION

Leptospirosis is one of the most recognized zoonotic diseases around the world that has been reported from every continent inhabited by man. Leptospirosis is known to be endemic in India since the early 20<sup>th</sup> century with most outbreaks reported from the coastal regions of the Indian peninsula and the Andaman Islands (Dr. Rajdeep Saha 2016<sup>(8)</sup>).

In present study the increase in cases as increase in age is observed, a high percentage of cases was seen in the age group of 31-40 years. The present study showed the preponderance of males in the cases Similar observation has been reported in studies with Dr. Mavatkar M V *et al* 2017<sup>(6)</sup>, Dr. Rajdeep Saha *et al* 2016<sup>(8)</sup>. Also the study done by Manisha DebMandal 2011<sup>(9)</sup> in and around the Kolkata shows higher preponderance of male getting infected. Similar age-wise distribution is seen in the study done by Lalmani Regmi *et al* 2017, Sero-epidemiology study of leptospirosis in febrile patients from Terai region of Nepal (Lalmani Regmi *et al* 2017<sup>(10)</sup>).

In present study seasonal variation of Leptospirosis were seen, peak months of infection were july, august & September. This were the similar observation in study by Sunil Sethi *et al* 2010<sup>(11)</sup>, Dr. Mavatkar M V *et al* 2017<sup>(6)</sup> and also by Manisha Deb Mandal *et al* 2011<sup>(9)</sup> that maximum patients were observed post-monsoon season.

If we look at the clinical presentation of patients fever followed by myalgia, Jaundice, haemorrhage and oligouria. The data co-relates with other studies also Dr. Rajdeep Saha *et al* 2016. If we look at commonest clinical profile in study done by Manisha Deb Mandal *et al* 2011<sup>(9)</sup> fever & headache is seen in 100% of patient followed by jaundice, while study by Lalmani Regmi *et al* 2017<sup>(10)</sup> in terai region of Nepal shows fever, headache, Myalgia, vomiting, diarrhea, abdominal pain and Jaundice. Even the study done by Sunil Sethi *et al* 2010<sup>(11)</sup> shows fever in all patients followed by Icterus, abdominal pain, hepatomegaly, muscle pain and tenderness, headache etc. So over-all fever, headache, myalgia and jaundice are the commonest features seen in all Leptospirosis patient.

In our study Occupation wise distribution shows highest no of farmers are affected followed by labourer, unemployed, dairy worker and students. Study by Lalmani Regmi *et al* 2017<sup>(10)</sup> highest occurrence in farmers followed students. While study done by Manisha Deb Mandal *et al* 2011<sup>(9)</sup> showing highest occurrence in laborers followed by students and farmers. While study by Sunil Sethi *et al* 2010<sup>(11)</sup> most of the patients by

occupation were farmers followed by housewives, students, labourers, indoor non-manual workers, para-military personal, sweeper.

If we look at the district-wise distribution from bharuch till dadra & nagar haveli almost all district are affected by Leptospirosis. The chapter on Leptospirosis scenario in india shows similar observation that endemic districts are Valsad, Navsari and Surat (S. Shivakumar 2008<sup>(7)</sup>, S. Shivakumar 2013<sup>(12)</sup>). The agro-climatic conditions for south Gujarat favour endemicity for leptospirosis. These include heavy rainfall, clay soil and high water table (S. Shivakumar, 2008<sup>(7)</sup>).

## CONCLUSION

Leptospirosis is a endemic disease in India. Socioeconomic conditions, population density of animals, climatic conditions, environmental hygiene and occupational habits of humans are determinants of the incidence and prevalence of the disease in our country. Present study shows increased incidence among males (72%) and among the age group 31-40 yr which is the working population. Large time lag between onset of symptom and admission to hospital was associated with poor prognosis and high mortality. Maximum number of cases were in monsoon season, thus proper policy should be formulated to maintain environmental cleanliness. Several control measures, environmental control programs and animal vaccination, along with a strong surveillance system may significantly reduce the outbreak of disease.

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## Conflict of interest statement

We declare that we have no conflict of interest.

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