

## Sero Prevalence of Leptospirosis Among Fever Cases (PUO) Reported from Guntur Government Hospital in And Around Guntur District, Andhra Pradesh, India.

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### Abstract

**Objective:** To determine the seroprevalence of leptospirosis among febrile inpatient cases in Guntur Government Hospital, Guntur.

**Methods:** A hospital-based cross-sectional study was conducted among 100 febrile cases admitted to Guntur Government Hospital in Guntur. A survey using a proforma sheet was used to obtain sociodemographic and occupational information. Serum samples were screened for leptospirosis by IgM and IgG enzyme-linked immunosorbent assay test (IgM & IgG ELISA).

**Results:** Antibodies to leptospire were detected in 48 samples for IgM (48%) and 18 samples for IgG(18%) giving an overall seroprevalence of 66%. The seroprevalence was highest among agriculture workers (53.03%) followed by sewage workers (18.1%), animal handlers (16.6%) butchers (9.09%) and forest workers (3.03%), Seropositivity of *Leptospira* IgM and IgG antibodies was found higher among males than females (41% vs. 25%). The highest *Leptospira* antibodies seropositivity was detected in elderly and in rural area patients.

**Conclusions:** This study revealed a possible high seroprevalence of leptospirosis among febrile cases, indicating the need to review the importance of adding leptospirosis to the case investigation of febrile illness, especially among high-risk occupational groups in and around Guntur. Leptospirosis is a severe spirochetal zoonosis in the world. It is considered an occupational disease of persons engaged in agriculture, sewage works, forestry, and animal slaughtering. A study was conducted with an objective of assessing the seroprevalence of leptospirosis among the high-risk groups in and around Guntur. A total of 100 sera samples from different high-risk populations with fever were collected and tested by ELISA for IgM and IgG antibodies. Antibodies to leptospire were detected in 48 samples for IgM and 18 samples for IgG giving an overall seroprevalence of 66%. The seroprevalence was highest among agriculture workers (53.03%) followed by sewage workers (18.1%), animal handlers (16.6%), forest workers (3.03%), and butchers (9.09%). Seropositivity of *Leptospira* antibodies was found higher among males than females (41% vs. 25%). The highest *Leptospira* antibodies seropositivity was detected in elderly patients and in rural patients.

**Conclusion:** Individuals engaged in risk activities are often exposed to leptospiral infection. Therefore, control and prevention policy toward these people are necessary.

**Keywords:** *Leptospira* antibodies, seroprevalence, high risk groups

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### I. Introduction

Leptospirosis is a zoonotic disease of worldwide distribution. It affects both humans and animals and it is emerging as an important public health problem in India and other developing countries. This disease has been described in several regions of the world, but it is still widely overlooked and underreported in many of developing countries. Leptospirosis has been recognized as an important occupational hazard of agriculture manual laborers, sewage workers, animal handlers, forestry workers and other outdoor workers who work in wet conditions, and butchers. Leptospirosis is caused by different serotypes of *Leptospira*. *L. interrogans* which is recognized to be the most prevalent zoonosis worldwide. This organism can be transmitted to humans either by direct or indirect contact with the urine of infected animals. It usually enters the body via cuts or abrasions in the skin. Pathogenic leptospire invade the bloodstream after penetrating skin or mucous membranes. The immune response to *Leptospira* includes both humoral and cell mediated. The diverse clinical presentations of this disease make it essential for the laboratory to play a role in diagnosis. Microbiological diagnosis of leptospirosis aims at demonstrating the leptospiral antigens or by demonstrating an appreciable antibody response to them.

## II. Materials And Methods

**Study population:** This study was done a period of 1 year from June 2016 to May 2017 at the Dept. of Microbiology, Govt. Medical College. Study includes 100 patients who presented with an acute febrile illness attended to government General Hospital Guntur. High preference was given to occupation at the time of selection of patients.

**Experimental design:** 100 Serum samples were screened for leptospirosis by IgM and IgG enzyme-linked immunosorbent assay test (IgM-IgG ELISA).

A patient proforma sheet was used to collect sociodemographic and occupation data. Clinical history of patients was also collected by using proforma which includes Name, Age, Sex, Occupation, Place of Living, Present History, Previous History, Family History and environmental characters as ownership of companion animals (goats, sheep, dogs, cows, cats, etc.). Of 100 patients, 23 of them were sewage workers, 42 were agricultural workers, 19 were animal handlers, 6 were forest workers, and 10 were butchers.

All of the studied populations were previously informed about the study, and consent forms were accomplished by responders. After enrollment, 4-5 ml of blood sample was taken by venipuncture and serum samples were separated and stored at -20 °C until use. The NovaTec Immunodiagnostica GmbH Leptospira IgM and IgG ELISA kit was used for the qualitative detection of IgM and IgG antibodies to Leptospira.

All samples were analyzed in the Microbiology Laboratory Guntur Medical College, Guntur along with one trained Technician. A score of less than 9 units indicates a negative result or no detectable antibodies, a score of 9-11 units indicates Equivocal result, a score of more than 11 units indicates a positive result, i.e. The presence of Leptospira specific antibodies.

## III. Results

The study includes 100 patients, who were suffering with acute febrile illness (PUO), attended to Guntur Government Hospital Guntur, with preference to high risk group (occupation). Samples were tested for IgM and IgG antibodies by ELISA test method.

The results were tabulated as follows

**Table -1 Total no of samples positive for Leptospira antibodies**

No. of samples	No of positive samples for Leptospira antibodies	%
100	66	66

Out of 100 cases, Leptospira antibodies were positive from 66 cases.

**Table – 2 Total No. of Ig M and IgG antibodies positive samples**

No. of samples	Positive for IgM	Positive for IgG	Both IgM & IgG
100	48 (48%)	18 (18%)	16

Out of 100 samples 48 were positive for IgM antibodies and 18 were positive for IgG antibodies.

**Table -3 Age wise distribution of positive cases**

Age (years)	No. of Positive samples	%
1-15	-	-
16-25	2	2%
26-35	6	6%
36-45	38	38%
46-55	16	16%
56-65	4	4%
total	66	66%

(- = No patient recorded)

The above table shows higher incidence was detected in the age group of 36 -45 years (38%).

**Table – 4 Sex wise distribution of positive cases**

Sex	No. of positive samples	%
Male	41	41%
Female	25	25%

The above table shows higher incidence was observed in males with 41%.

**Table – 5** Occupational wise distribution of positive cases

occupation	No of positive cases	%
Agricultural workers	35	53.03%
Sewage workers	12	18.1%
Animal handlers	11	16.6%
butchers	6	9.09%
Forest workers	2	3.03%
<b>Total</b>	<b>66</b>	<b>66%</b>

The above table shows occupational distribution of positive cases. Highest incidence was observed in Agricultural workers with a percentage 53.03, followed by Sewage workers with 18.1%,16.6% of Animal handlers, butchers with 9.09% and forest workers with 3.03%.

#### IV. Discussion

The Leptospirosis infection is of public health importance due to its morbidity and mortality. Finding out its seroprevalence in and around Guntur District, the zone most affected, and the category of people most affected would help take preventive measures to control the spread of the disease. Leptospirosis mimics many other diseases in its atypical presenting symptoms and clinical features and thus laboratory diagnosis of the disease is of utmost importance. In laboratory diagnosis of Leptospirosis Serological test is the test most commonly used to diagnose leptospirosis due to difficulty in its isolation, lack of sensitivity and specificity in dark field microscopy.

The present study was conducted among 100 patients. The majority of the affected population either belong to the agriculture community or Sewage workers or Animal handlers or butchers or live in the forest. The chances of human beings contracting the infection directly or indirectly are more in these high-risk communities. The current study showed that the seroprevalence of leptospirosis among the high-risk population is high (66%). Similar studies conducted in Madras and Bangalore in mainland India showed seroprevalence of 19.8% and 9.3%, respectively. 12 Studies conducted among high-risk populations of Chile, Trinidad, and Barbados showed seroprevalence of 22%, 49%, and 39%, respectively. It is believed that the agricultural workers are the most exposed population to leptospirosis. Our study also showed that the agriculture workers had the highest seropositivity (53.03%) when compared with other high-risk community. This could be due to their frequent exposure to rice fields that are often waterlogged, which is the major reason for the survival of leptospires, and during harvest season; when the rice is ripe, rodents visit the fields in search of food grain. So the rodents and the favorable environment could play a major role in agriculture-based communities for leptospirosis. In our study more than 40 years age group were more affected than others. Male patients show high prevalence than females in our study with 41%.

#### V. Conclusion

Leptospirosis is emerging as an important public health problem in India. And considered an occupational disease of persons engaged in agriculture, sewage works, forestry, and animal slaughtering. The presentation may range from a subclinical infection to a severe syndrome of multi-organ dysfunction. Serodiagnosis by a microagglutination test (MAT) is the gold standard, but is not universally available. Leptospirosis can be easily diagnosed using a latex agglutination test and IgM-ELISA. Variable degrees of thrombocytopenia have been reported with leptospirosis. The pathogenesis of thrombocytopenia in leptospirosis is not well understood. Acute renal failure is one of the most common complications of severe leptospirosis. Renal leptospirosis is a combination of acute tubular damage and interstitial nephritis. A serious type of lung involvement called severe pulmonary hemorrhagic syndrome is considered to be a major cause of death in patients with Weil's disease in developing countries. In Weil's syndrome mortality rate is 5-10%. Important causes of death include renal failure, hepatic failure, cardiopulmonary failure and widespread hemorrhage.

Antibiotic treatment should be started as soon as possible on clinical suspicion of leptospirosis because, organ damage usually develops by the second half of first week and late antibiotic treatment does not influence. The alarming prevalence of leptospirosis in the society and calls for early necessary steps to prevent further outbreaks. The best measures that can be adopted to limit the effects of leptospirosis on humans and animals they depend on, is by identifying of sources and containing them. The prevalent serovars can likewise suggest animal reservoirs. Education can raise awareness and prevent infection in humans and animals.

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