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Research Article

PREVALENCE OF LEPTOSPIROSISIN CASES OF UNDIFFERENTIATED FEBRILE ILLNESS IN A TERTIARY CARE HOSPITAL IN NORTH INDIA

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ABSTRACT:

Cross sectional study of leptospirosisin cases of undifferentiated febrile illness.INTRODUCTION: Leptospirosis is a zoonosis that is globally being recorded as an epidemic threat in developing countries. The spectrum of disease ranges from subclinical infection to a severe syndrome of multiorgan dysfunction. AIM: To evaluate the prevalence of Leptospirosisin cases of undifferentiated febrile illness. MATERIAL ANDMETHODS: All patients presenting with undifferentiated fever of >38^{o} C of less than 2 weeks duration and who lacked localizable or organ-specific clinical features were included in the study. IgM antibodies against leptospiraantigen were detected by Elisa.RESULTS: Age of patients ranged from 6-65 years. The male: female ratio was 1.6:1. Presenting complaints were headache (77.3%), fatigue (32.84%), vomiting (31.97%), arthralgia (29.06%), severe myalgia (26.16%), cough (15.11%), nausea (14.53%), hypertension (4.65%), diarrhea (4.36%),skin necrosis (3.19%), renal failure (2.9%), hemorrhage (2.61%), pneumonia (2%), hepatitis (1.74%), respiratory failure(0.58%) Out of a total of three hundred and forty-four samples, twenty-two (6.4%) tested positive. The highest prevalence of leptospirosis amongst the study population was found in the age group of 20-39 years (9.4%) followed by age group 40-59 years (4.5%), age group >60 years (4.3%) and age group 0-19 years (2.7%). Higher prevalence of leptospirosis was found in the female gender (7.5%) as compared to the male gender (5.6%). A higher prevalence of leptospirosis was found in patients belonging to the rural areas (6.4%) as compared to patients belonging to urban areas (6.0%).
Key Words: Leptospirosis, Undifferentiated febrile illness, Zoonosis ,

INTRODUCTION

Acute undifferentiated febrile illness (AUFI) is a standout amongst the most overwhelming difficulties a doctor encounters. It is defined as a fever that ordinarily does not stretch out past a fortnight and lacks localizable or organ-specific clinical features. It is a diagnostic and therapeutic challenge to health workers especially in constrained asset settings.[1]The previous five years have seen coordinated endeavors to comprehend the etiology of undifferentiated febrile illnesses.[2]These diseases can be undefined clinically. Also, the decision of empiric antibiotics relies upon the etiologic profile which is variable and is area dependent. Leptospirosis, a zoonotic infection is predominant in regions with

substantial rural and agrarian lifestyle is one of the emerging causes of AUFI.[3]Leptospirosis has been perceived as an imperative rising global public health issue as a result of its epidemic capabilities and expanding occurrence in both developing and developed nations.[4] Therange of illness varies from subclinical disease to a serious disorder of multiorgan dysfunction portrayed by headache, fever, myalgia, jaundice, hepatomegaly and seizures.[5]Limited studies have been done regarding the prevalence Leptospirosis in India and as far as state of Jammu and Kashmir is concerned only few case reports are available. The present study, was therefore, planned to determine prevalence of Leptospirosis infections in patients presenting with AUFI. Such surveillance data would promote awareness of Leptospirosis among local physicians and increase the probability that individual patients with Leptospirosis would be identified promptly and receive appropriate therapy early in the course of their illness. This data will also serve as base line to detect changing prevalence of the etiological agent in future. Knowing the magnitude of such preventable disease, generating awareness and institution of preventive measures will decrease the disease burden in our country.

AIMS: To determine the prevalence of leptospirosis among patients of AUFI

MATERIALS AND METHODS:

This cross-sectional study was conducted in the Department of Microbiology at Sher-i-Kashmir-Institute of Medical Sciences, over a period of 18 months from 2016 to 2018. All patients in the age group of 5-65 years presenting with undifferentiated fever of >38^{o} C of less than 2 weeks duration and who lacked localizable or organ-specific clinical features were included in the study.Patients who were unable to cooperate, unable to give consent, at extremes of ageand had severe comorbidities were excluded from the study.Three ml of blood was collected in a plain vial. Serum was pipetted out after blood was centrifuged at 2000 RPM for 10 minutes, separated and kept at - 80ºC until further use.IgM antibodies against Leptospira antigen were detected by ELISA, the kit forwhich was procured from NovaTech Immunodiagnostics, Germany. 100 µl of standard/controls and diluted samples were poured into their respective wells. Well A1 was left for substrate blank. The wells were covered with foil supplied in the kit and incubated for 1 hour at 37 ℃. After the incubation the wells were aspirated and were washed 3 times with 300 µl of washing solution. At the end the remaining fluid was removed by tapping strips on tissue paper.100 µl of Leptospira anti-IgM conjugate into all wells except substrate blank and cover with foil. Incubated for 30 min at room temperature without exposing to sunlight. It was again washed with 300 µl of substrate solution and dried. 100 µl of TMB substrate was added and incubated at 15 minutes in the dark.100 µl of stop solution was added to each well and absorbance was read at 450 nm.

CALCULATION OF RESULTS:

Results in units

$$\text{NovaTech Units (ntu)} = \frac{10}{\text{Cut off}} \times \text{Patient absorbance value}$$

POSITIVE $\geq$ 11 NTU
EQUIVOCAL = 8-11 NTU

NEGATIVE < 8 NTU

RESULTS AND DISCUSSIONS:

A total of 344 patients were included in the study. Patient age ranged from 6-65 years. Most of the patients were adults in the age group of 20-39 years (46.2%) followed by the age group of 40-59 years (25.6%), 0-19 years age group (21.5%) and >60 year age group (6.7%). The average age of the patients was 32.5 years with a standard deviation of 0.774 years**.** The study population comprised of two hundred and twelve males (61.6%) and one hundred and thirty-two females (38.4%)**.** Distribution of the study population according to their residence showed that Two hundred and seventy-eight patients (80.8%) were from rural areas whereas sixty-six patients (19.2%) were from urban areas.The most prominent clinical feature among the studied population was found out to be headache (77.3%), fatigue (32.84%), vomiting (31.97%), arthralgia (29.06%), severe myalgia (26.16%), cough (15.11%), nausea (14.53%), hypertension (4.65%), diarrhea (4.36%),skin necrosis (3.19%), renal failure (2.9%), hemorrhage (2.61%), pneumonia (2%), hepatitis (1.74%), respiratory failure(0.58%)Out of a total of three hundred and forty-four samples, twenty-two (6.4%) tested positive. **[Table 1]**. The highest prevalence of leptospirosis amongst the study population was found in the age group of 20-39 years (9.4%) followed by age group 40-59 years (4.5%), age group >60 years (4.3%) and age group 0-19 years (2.7%). The p-value was found to be statistically insignificant at 0.186. **[Table 2]**. Higher prevalence of leptospirosis was found in the female gender (7.5%) as compared to the male gender (5.6%). The p-value (0.099) was found to be statistically insignificant **[Table 3]**. A higher prevalence of leptospirosis was found in patients belonging to the rural areas (6.4%) as compared to patients belonging to urban areas (6.0%). The p-value (0.336) was found to be statistically insignificant. **[Table 4].**

Table 1: Prevalence of Leptospira in the studied population. (n=344)

Leptospirosis	**Frequency**	**Percentage**
Positive	22	6.4
Negative	322	93.6
Total	344	100

Table 2: Age wise distribution of leptospirosis positive patients among the study population

Age (years)	**Leptospirosis Present**	**Leptospirosis Absent**	**Prevalence**	**P-value**
0-19	2	72	2.7	0.186
20-39	15	144	9.4	
40-59	4	84	4.5	
≥ 60	1	22	4.3	

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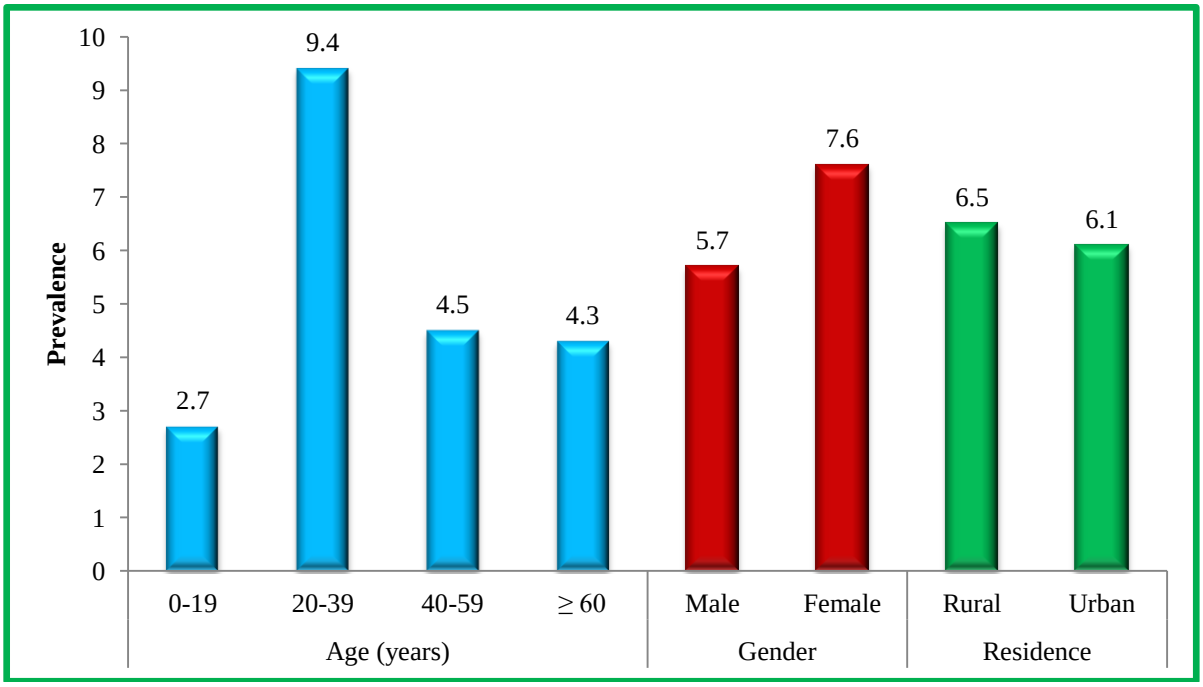
Table 3: Gender wise distribution of leptospirosis positive patients in studied population

Residence	Leptospirosis Present	Leptospirosis Absent	Prevalence	P-value
Rural	18	260	6.4	0.336
Urban	4	62	6.0	

Table 4: Showing prevalence of leptospirosis as per residence in studied population

Gender	Leptospirosis Present	Leptospirosis Absent	Prevalence	P-value
Male	12	200	5.6	0.099
Female	10	122	7.5	

Figure 1: Prevalence of leptospirosis as per age, gender and residence in studied population.



The present study was thus undertaken to determine the prevalence of Leptospirosis in patients of undifferentiated febrile illness (UFI) in our hospital (Sher-i-Kashmir Institute of Medical Sciences). Patients were recruited from OPD, Medicine and Pediatrics ward. Our study population comprised of 80.8% (278) rural dwellers whereas 19.2% (66) patients were urban dwellers. The rural predominance of our study population maybe due to the agrarian lifestyle, poor hygiene practices, greater exposure to contaminated water of people living in villages.IgM ELISA was carried out to determine the prevalence of leptospirosis in our study population which revealed that out of a total of three hundred and forty-four patients, 6.4 % (22) were positive 93.6% (322) tested negative.In a study conducted by Salim *et al*.(2017), in Columbia, it was found that out of a total of 69 patients of undifferentiated febrile illness, 39% (27) were found to have leptospirosis.[6] Another study by H. Sahira*et al*. (2014), in Kerala revealed that, out of a total of 1924 patients presenting with undifferentiated febrile illness, 11.2% (220) tested positive for leptospirosis by IgM- ELISA.[7] Manock (2009)in his study done in Ecuador (2009) found that, Leptospirosis comprised 13.2% of patients of undifferentiated febrile illness.[8]In contrast to this a study by GowriVeligandla*et al* (2016) found that out of a total of 116 patients of AUFI there were no detected cases of leptospirosis.[9]The highest prevalence of leptospirosis amongst our study population was found in the age group of 20-39 years (21.4) followed by age group 40-59 years (12.1), age group >60 years (7.7) and lastly age group 0-19 years (6.5). The p-value was found to be statistically insignificant at 0.186,The prevalence of leptospirosis as per gender in the study population demonstrated that higher prevalence of leptospirosis was found in the female gender 7.5% as compared to the female gender 5.6%. The p-value was found to be statistically insignificant at 0.099. The female predominance of leptospirosis in our study may be attributed to women here working in paddy fields during the rice harvesting season.In a study by Antony J. *et al.* (2007) 1,523 confirmed cases of leptospirosis in a tertiary hospital in Kerela, comprised of 993 (65.20%) males and 530 (33.02%) females. The case fatality of leptospirosis was 4.13%, and it was high in the age group 40-60 years in both sexes.[10]In our hospital, RubeenaShaheen*et al.* (2006) carried out a study in which a total of 72 cases of PUO were included. Serum samples were sent to RMRC, Port Blair, for microscopic agglutination test (MAT) while the remaining portion of the samples were subjected to Lepto-Dipstick assay. Of the 72 studied cases, 43 were males and 29 females, predominantly in the age group of 21-40yrs. Laboratory tests showed 23.35% (10/43) males and 10.34% (3/29) females to be positive for leptospirosis. Results showed that 1 of the 15 urban (6.66%) and 14 of the 57 rural (24.56%) patients were positive for Leptospira antibodies respectively.[11]

CONCLUSION

Acute undifferentiated febrile illness (AUFI) though an entity relatively new as compared to pyrexia of unknown origin (PUO) is a clinical and microbiological predicament. So, it was not surprising that the majority of the cases in our study remained undiagnosed and would thus classify and true AUFI.Not only is our study is the first of its kind in the valley providing an insight in the etiology of AUFI,it will also raise awareness to diseasewhich is not usually considered as differential diagnosis of AUFI.Leptospirosis has for long been overlooked in Kashmir valley and the results of this study provide

substantial information to overturn this trend and commands clinicians to work hand in hand with microbiologists to unravel this diagnostic mystery.

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