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Clinical Profile and Outcome of Leptospirosis- Hospital Based Study.

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ABSTRACT
BACKGROUND*::Leptospirosis is a zoonotic disease caused by pathogenic Leptospira species and is characterized by a broad spectrum of clinical manifestations. Leptospira are coiled, thin, highly motile organisms that have hooked ends and two periplasmic flagella that are responsible for motility. Leptospirosis presents as both an endemic and epidemic disease and its clinical spectrum can range from an asymptomatic, subclinical infection to a fulminant, fatal disease..Leptospirosis is highly underreported in India, most likely due to lack of diagnostic modalities and lack of awareness among clinicians. The disease is presently endemic and deeply entrenched in Gujarat, Maharashtra, Karnataka, Kerala, Tamil Nadu, and Andaman and Nicobar Islands. High risk areas include Goa, Andhra Pradesh, Orissa and West Bengal. There is less information on the prevalence of leptospirosis in northeastern part of India as compared to other parts of the country. This study has been undertaken to study the clinical profile and to assess the in hospital outcome of leptospirosis patients in our hospital which caters to population in upper Assam where agriculture-related activities form a major occupation of the population and are at risk of acquiring leptospirosis.* ***METHODS:****It was a Hospital based observational study and was conducted at teritary care hospital in Assam for a duration of two years* ***RESULTS****:A total of 87 cases were taken up in the study, out of which 70(80 %) were males and 17(20%) females. The age group which was affected most was between 31-40 years in males and 21-30 years in females. September had the highest number of cases with a percentage of 26.4 %. most of the patients were farmers which contributed to 43.67 % of the total cases. Out of 87 patients, fever(96.55%), myalgia (51.72%), headache(39.08%) jaundice (35.63%), pain abdomen (32.18%), Oligura (25.29%), vomiting (24.13%) and conjunctival suffusion (22.99%), were the most common presentation followed by cough(17.24%), diarrhoea(17.24%), hypotension (17.24%), altered sensorium (10.34%), hepatomegaly (9.19%), meningism (8.04%), joint pain(5.74%), splenomegaly (4.59%), seizure (3.44%), UGI bleed (2.29%) and hematuria (2.29%). Heamatological profile showed 29.89% of patients were anaemic.Leucocytosis was seen is 58.62% patients and 2.3% patients had leucopenia.Thrombocytopenia was observed in 26.44% patients. Serum creatinine level above 1.5mg/dL was noted in 63.21% patients. Hyperbilirubinemia was seen in 47.12% patients. AST and ALT were deranged in 51.72% and 42.52% cases and their levels were higher than two times in 22.99% and 12.64 % of the patients respectively.Most common complication was Hepatic dysfunction which was seen in 70.11% patients followed by renal (63.21), hematological (31.03%), pulmonary (13.79%),gastrointestinal (10.34%), neurological (8.04%) and cardiovascular(3.44%). 10 (18.86%) had all three clinical features of Weil's disease. 1 patient succumbed to meningoencephalitis giving the mortality rate of 1.15%.* ***CONCLUSION****:Leptospirosis is a an important emerging public health problem in India. Many cases of leptospirosis remain undiagnosed due to the lack of specificity in signs and symptoms also confirmation of the diagnosis is difficult due to problems associated with isolating the organism and with serologic testing. It is not reported from other areas due to lack of diagnostic facilities. As per our knowledge not many studies were conducted in our state regarding the heterogeneity of clinical presentation. In our study most common presentation were fever, headache and myalgia while hepatic dysfunction followed by renal impairment were the two most common complications. This study showed that Leptospira is not a very uncommon disease in this area and early recognition can lead to significant improved outcome and reduction in mortality. Cases occurred throughout the year with a surge in the rainy seasons with farmers being the most affected ones followed by housewives. Assam being a flood prone state since time immemorial, it is important for clinicians to be aware of, particularly during the monsoon and post monsoon, the various ways in which leptospirosis can present as lesser common manifestations may predominate. Programs for control of leptospirosis targetting the high-risk populations with focus on disease education and importance of protective clothing, is strongly recommended. Thus, our study concludes that leptospirosis should be a part of the differential diagnosis for a patient*

consulting with nonspecific symptoms and with multiorgan involvement specially with a history of exposure to floodwaters.

***KEY WORDS**: Leptospira, Faine's criteria, jaundice, AKI(Acute Kidney Injury).*

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I. INTRODUCTION:

Leptospirosiswas first described by Adolf Weil as disease enitity in 1886.(WHO, 2003). Leptospirosis is caused by spirochete, which is primarily a zoo-notic disease with an accidental human infection. The disease usually appears when humans come in contact with urine of infected animals as walking in urine polluted environment. Thereby, whole communities living in tropical regions with a wet environment could be at risk.(Chan et al., 1987).Globally the estimated incidence of leptospirosis ranges from 0.1-1.0 person per 100000 population in temperate climates and tropical countries.(WHO 2003).

In India, first confirmed report of leptospirosis came in Andaman and Nicobar islands in 1929, subsequently, few reports on Leptospirosis originated from India till 1980s(Sehgal, et al, 1994; Sehgal 1998) case fatality ratios in these outbreaks were in range of 10-50 percent. After that , Leptospirosis became endemic disease in the Andaman and Nicobar Islands, which usually occurs in postmonsoon outbreak(Sehgal et al., 1995), median age is in decreasing trend and pulmonary hemorrhage is the common clinical manifestation. During 1980s, outbreak of leptospirosis were reported from Mysore(Karnataka), Nagpur(Maharashtra), and Surat (Gujarat). In July and August 2000, cases of Leptospirosis were also reported frpm Gujarat, Maharastra, Kerala, and Andaman and Nicobar Islands(Sehgal, 2000).

BACKGROUND:Leptospirosis is a zoonotic disease caused by pathogenic Leptospira species and is characterized by a broad spectrum of clinical manifestations. Leptospira are coiled, thin, highly motile organisms that have hooked ends and two periplasmic flagella that are responsible for motility.Leptospirosis presents as both an endemic and epidemic disease and its clinical spectrum can range from an asymptomatic, subclinical infection to a fulminant, fatal disease.Humans are accidental hosts and usually become infected through, walking bare foot with lacerated wound or abrasion over feet or anywhere over the body through contact with water in lake or ponds or soil contaminated by the urine of infected animals such as rats , dogs, cattle pigs usually in urban & rural area.High risk groups are agricultural workers such as rice field planters, sugar cane and pineapple field harvesters, labourers engaged in canal cleaning operations, livestock handlers, fishermen and sewer workers.Leptospirosis is highly underreported in India, most likely due to lack of diagnostic modalities and lack of awareness among clinicians.The disease is presently endemic and deeply entrenched in Gujarat, Maharashtra, Karnataka, Kerala, Tamil Nadu, and Andaman and Nicobar Islands. High risk areas include Goa, Andhra Pradesh, Orissa and West Bengal.There is less information on the prevalence of leptospirosis in northeastern part of India as compared to other parts of the country.This study has been undertaken to study the clinical profile and to assess the in hospital outcome of leptospirosis patients in our hospital which caters to population in upper Assam where agriculture-related activities form a major occupation of the population and are at risk of acquiring leptospirosis.

AIM AND OBJECTIVES:

To study the clinical profile of Leptospirosis patients admitted in various units in the department of medicine, tertiary care hospital in Assam.

To assess the outcome of the disease of the admitted patients during their stay.

II. METHODS

It was a Hospital based observational study and was conducted intertiary care hospital in Assam for a duration of two years.

INCLUSION CRITERIA:

- All patients who were 13 years and above of age with positive IgM anti-Leptospira antibody by ELISA technique admitted in different units in the department of Medicine, Tertiary care hospital Assam, were taken up for study.
- **EXCLUSION CRITERIA:**
- Patients below 13 years of age
- All patients positive by IgM antibody testing for Leptospira in whom a concomitant infection like malaria, enteric fever, dengue fever, those with HBsAg positive and those with equivocal results were excluded from the study

- Persons not giving informed consent.

DIAGNOSTIC CRITERIA

All patients fulfilling the inclusion criteria who tested IgM positive for Leptospira antibody were taken into the study and analyzed based on modified Faine's criteria.

Part A or part A & part B score: 26 or more

Part A, B, C (Total): 25 or more

In the laboratory tests, only one test should be scored.A score between 20 and 25 suggests leptospirosis as possible but unconfirmed diagnosis.

Faine criteria		Modified Faine criteria	
Part A:Clinical features	Score	Part A: Clinical features	Score
Fever	2	Fever	2
Headache	2	Headache	2
Temperature > 39 deg.C	2	Temperature > 39 deg.C	2
Conjunctival suffusion	4	Conjunctival suffusion	4
Myalgia	4	Myalgia	4
Meningism	4	Meningism	4
Jaundice	1	Jaundice	1
Albuminuria / elevated BUN	2	Albuminuria / elevated BUN	2
Part B:Epidemiological factors		Part B:Epidemiological factors	
Contact with animals or contact with known contaminated water	10	Rainfall Contaminated environment Animal contact	5 4 1
Part C:Laboratory criteria		Part C:Laboratory criteria	
Culture – diagnosis certain		Culture – diagnosis certain	
Serological tests		Serological tests	
MAT			
Leptospirosis-endemic			
Single positive-low titre	2	ELISA IgM Positive	15
Single positive-high titre	10	SAT	15
Leptospirosis-non endemic		MAT-Single +vetitre	15
Single positive-low titre	5	MAT –rising titre(paired sera)	25
Single positive-high titre	15		
Rising titre(paired sera)	25		
Total		Total	

Diagnostic criteria for organ dysfunction

1. Acute renal failure was defined by the presence of the serum creatinine level of >1.5 mg/dL
2. Oliguria was defined by the presence of a first 24-h urine volume of <400 ml
3. Pulmonary hemorrhage was defined as frank blood from endotracheal tube with ≤2 of the following characteristics: decrease in the hematocrit of >3% without another explainable source of bleeding, no clinical signs of volume overload (jugular venous pulsation of >5 cm above the sternal angle or central venous pressure of >12 cm), and a chest radiograph revealing unilateral or bilateral alveolar infiltration with normal cardiothoracic ratio.
4. Acute respiratory distress syndrome was defined by the presence of all of the following criteria: no clinical signs of congestive heart failure, as defined above; arterial gas exchange index of partial pressure of oxygen/fraction of inspired oxygen of >200; a chest radiograph revealing diffuse alveolar process with normal cardiothoracic ratio; and pulmonary capillary wedge pressure of >18 mm Hg (if possible).
5. Significant jaundice was defined as frank icteric sclera or a total serum bilirubin level of >100 μmol/L
6. Hypotension was defined as a mean arterial blood pressure of >70 mm Hg and the need for vasopressors to maintain blood pressure

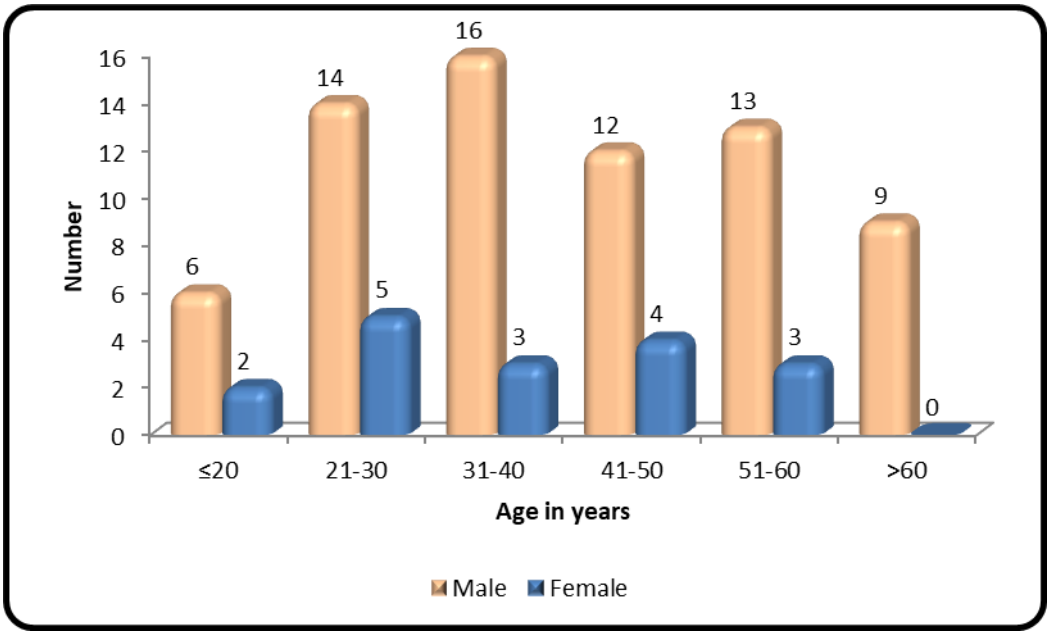
III. Results:

The present hospital based observation study was conducted among 87 patients with IgM anti Leptospira antibody positive status by ELISA. All subjects were aged 13 years and above, and were admitted in various units in the Department of Medicine, at our tertiary care hospital in Assam, during the period of 2 years. The details of each case was studied and consolidated into the below mentioned results.

TOTAL NUMBER OF CASES

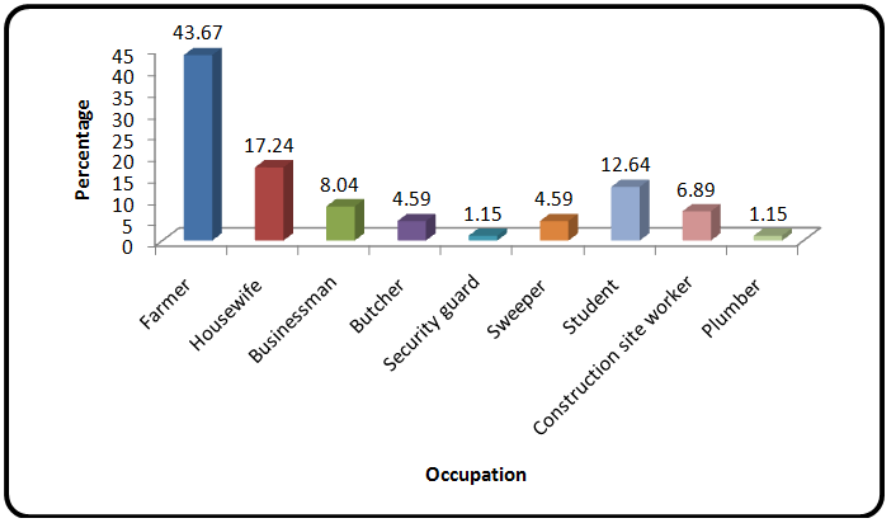
GENDER	NO OF CASES	PERCENTAGE
MALE	70	80
FEMALE	17	20
TOTAL	87	100

AGE&SEX DISTRIBUTION OF CASES



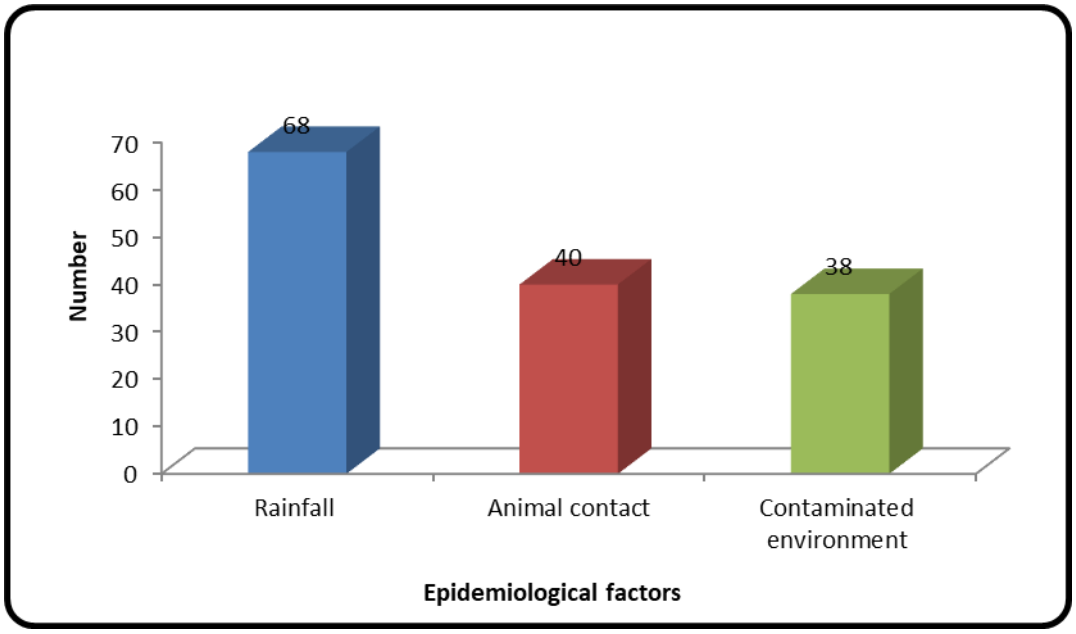
A total of 87 patients diagnosed of leptospirosis were analyzed. There were 70(80%)males and 17(20%) females. Mean age was 40.3±15.21 years.The most common age group was found to be between 31-40 in males and 21-30 in females.

OCCUPATION PROFILE OF THE CASES



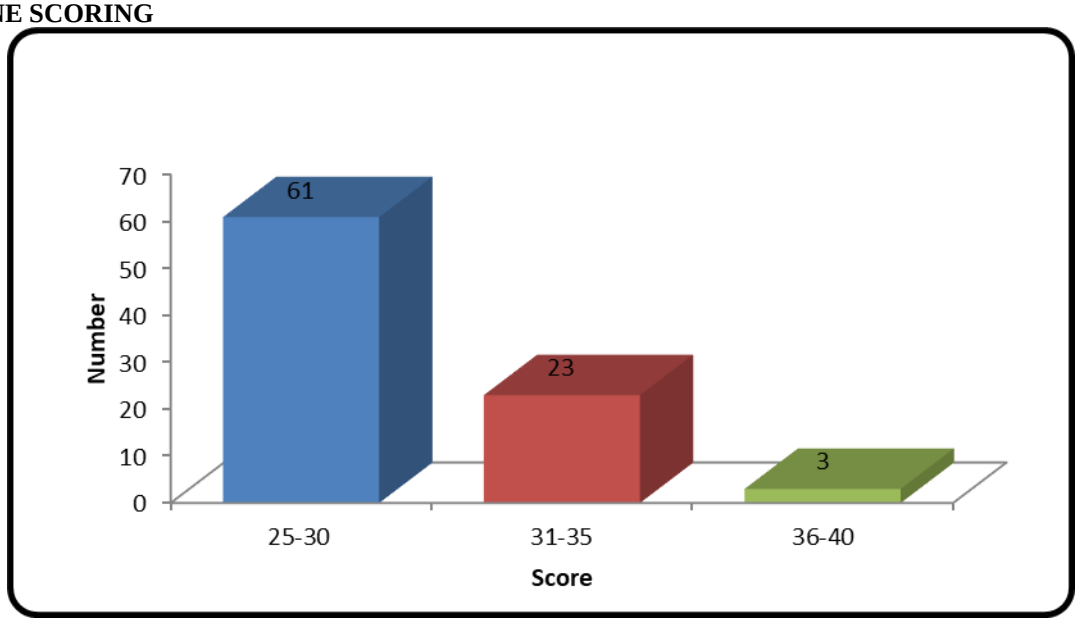
Among all patients, 43.67% were farmers followed by 17.24% were housewives. 12.64% were students, 8.04% businessmen, 6.89% construction site worker, 4.59% each for butchers and sweepers and 1.15% each for plumber and security guard.

EPIDEMIOLOGICAL FACTORS(AS PER MODIFIED FAINE'S CRITERIA)



Among all, 40(45.98%) patients had history of animal contact and 38(43.68%) had contact with contaminated environment.68(78.16%)cases occurred during the rainfall period.

FAINE SCORING

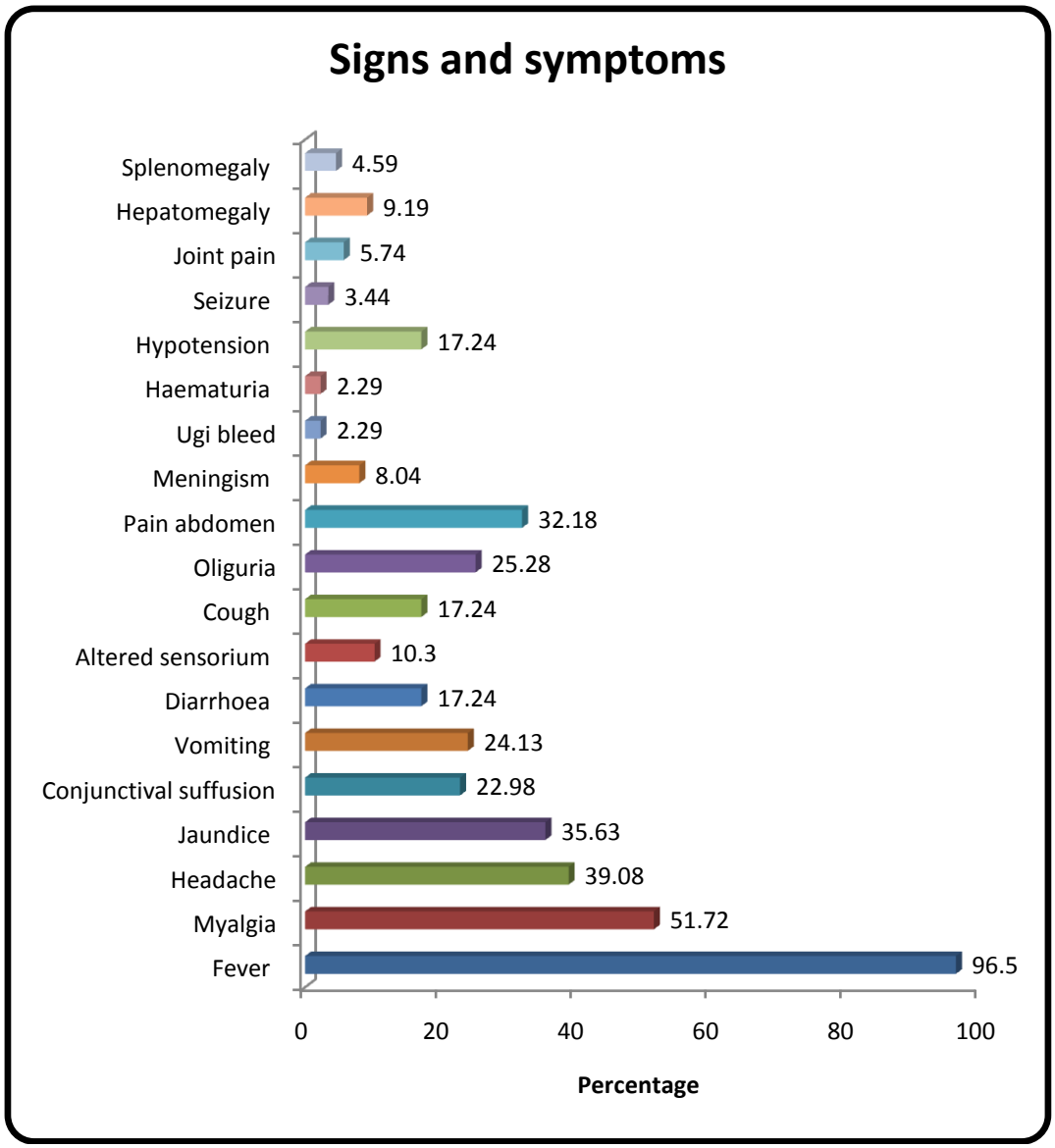


61(70.11%) patients had a faine score of 25- 30. 23(26.44%) had a score between 31-35 and only 3(3.45%) patients had a score of 36-40.

CLINICAL FEATURES

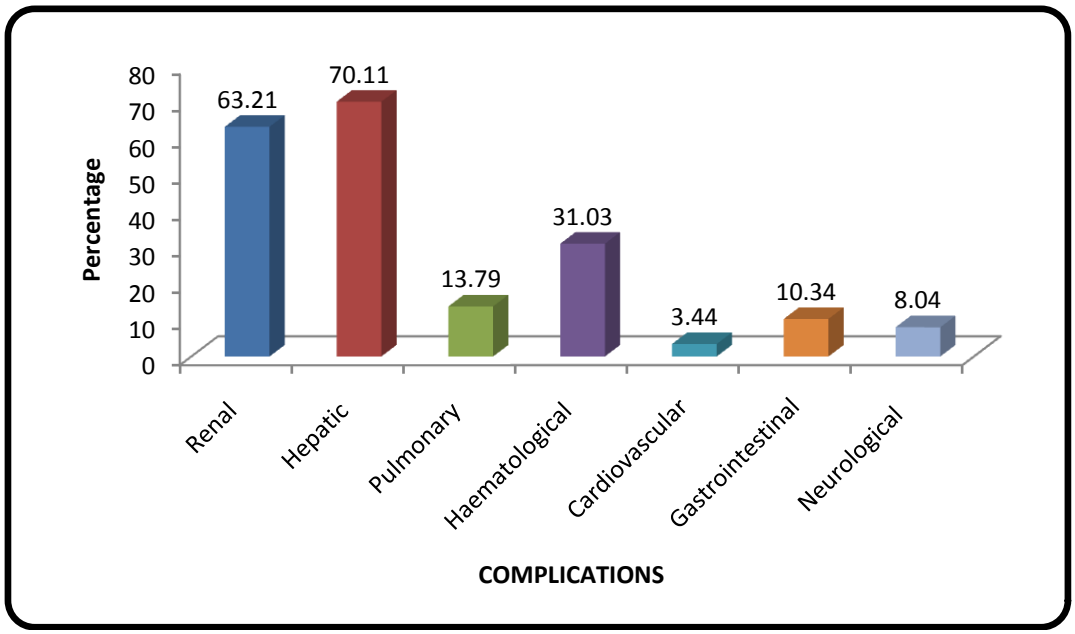
Out of 87 patients, fever(96.55%), myalgia(51.72%) and headache (39.08%) were the most common presentation followed by jaundice (35.63%), pain abdomen(32.18%), oliguria(25.29%), vomiting (24.13%), conjunctival suffusion (22.99%), cough (17.24%), diarrhea (17.24%), hypotension(17.24%), altered sensorium

(10.34 %) , hepatomegaly(9.19%), meningism(8.04%), joint pain(5.74%), splenomegaly(4.59%), seizure(3.44%), UGI bleed (2.29%) and hematuria(2.29%).



COMPLICATIONS OF THE CASES DURING HOSPITAL STAY

In our study, according to the organs involved the most common complication was hepatic (70.11%) followed by renal (63.21) , then hematological (31.03%), pulmonary(13.79%), gastrointestinal(10.34%), neurological(8.04%) and cardiovascular(3.44%).



HAEMATOLOGICAL FINDINGS

Total count(/ cu mm)	**No. of cases**	**Percentage**
< 4000	**2**	**2.30**
4000 – 11000	**34**	**39.08**
>11000	**51**	**58.62**
Platelet		
< 150000	**23**	**26.44**
1.5 lacs – 4 lacs	**64**	**73.56**
>4 lacs	**0**	**0.00**
Haemoglobin		
<10 gm/dl	**26**	**29.89**
>10 gm/dl	**61**	**70.11**

Leucocytosis was seen is 58.62% patients. While only 2.3% patients had leucopenia. Thrombocytopenia was observed in 26.44% patients. 29.89% of patients had a haemoglobin of less than 10 gm/dl.

SERUM CREATININE OF THE CASES

S.creatinine(mg/dl)	**No. of Cases**	**Percentage**
<1.5	**32**	**36.78**
1.5 – 2.9	**24**	**27.58**
3 – 4.9	**20**	**22.98**
>5	**11**	**12.64**

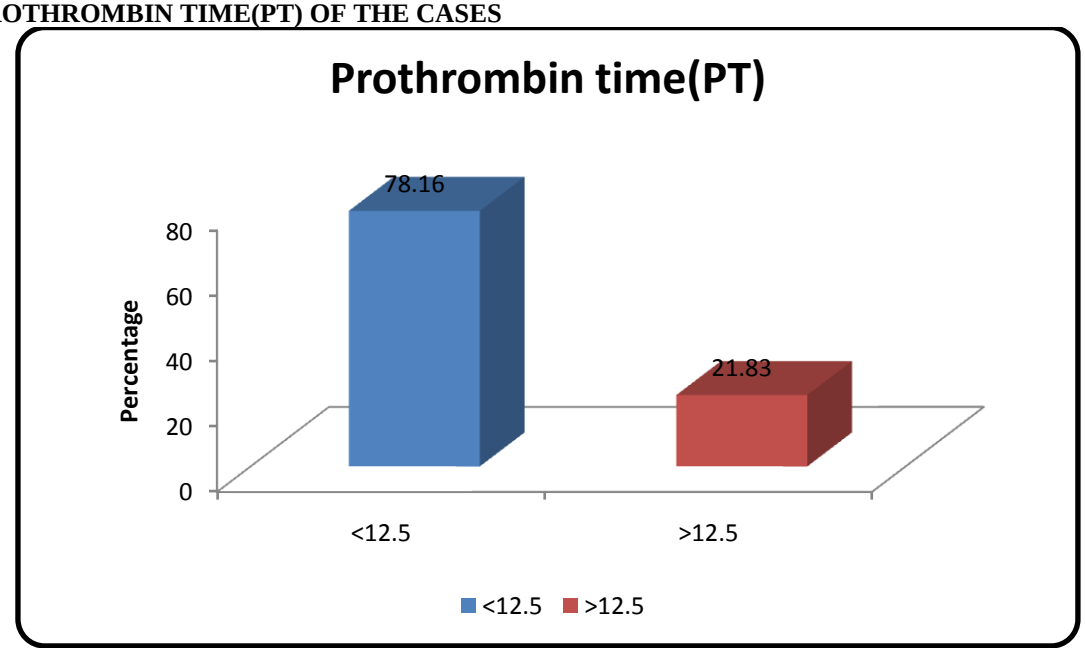
Among all patients serum creatinine level above 1.5mg/dL was noted in 55 patients (63.21%). Out of them 24 patients had values between 1.5 to 2.9, 20 patients with a creatinine of 3 to 4.9 and 11 patients had a creatinine value more than 5mg/dl.

LIVER FUNCTION TESTS

Bilirubin(mg/dl)	No. of Cases	Percentage(%)
<1.5	46	52.87
1.5 – 2.9	9	10.34
3 – 4.9	3	3.45
>5	29	33.33
SGOT(U/L)		
0 – 60	42	48.28
60 – 120	25	28.74
>120	20	22.99
SGPT(U/L)		
0 – 50	50	57.47
50 – 100	26	29.89
>100	11	12.64

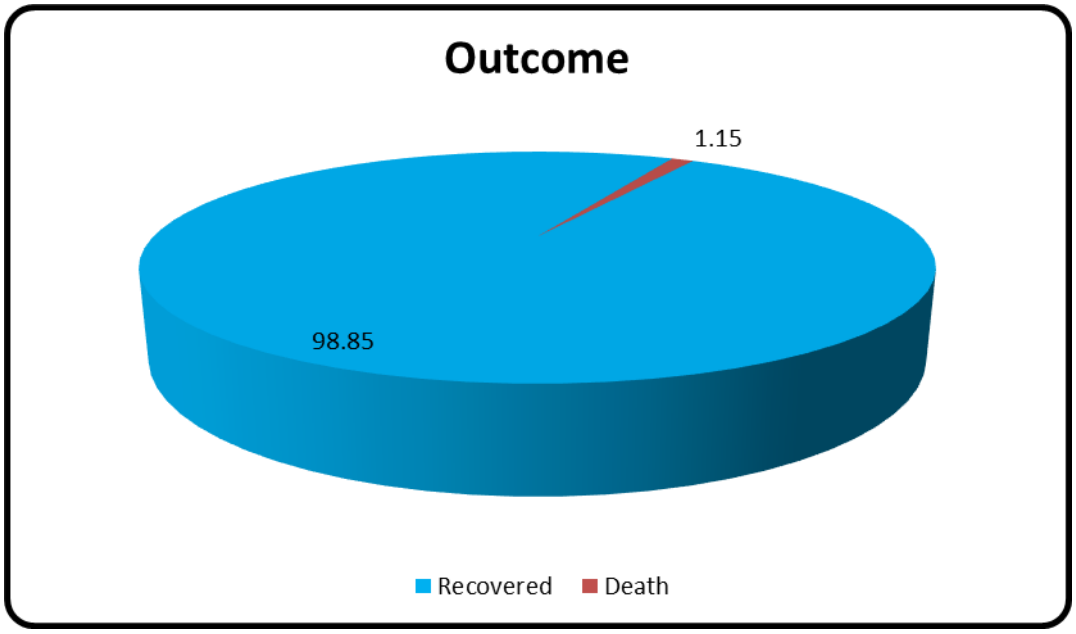
Hyperbilirubinemia was seen in 41(47.12%) patients. AST and ALT levels were within normal limits in 42(48.27%) and 50(57.47%) cases, deranged in 45(51.72%) and 37(42.52%) cases and their levels were higher than two times in 22.99% and 12.64 % of the patients respectively.

PROTHROMBIN TIME(PT) OF THE CASES



Prothrombin time was prolonged in 19(21.83%) patients.

OUTCOME OF THE CASES DURING HOSPITAL STAY



Out of 87 patients, 86 (98.85%)recovered and1 patient dieddue to meningoencephalitis giving the mortality rate of 1.15%.

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