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Hematological and hepatic profile of dengue patients presenting to a tertiary care hospital in Mumbai

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Abstract---Objective: To assess the pattern of hematological and hepatic involvement in patients of dengue fever. Methods: This study was performed in a tertiary care center in Mumbai, India. 142 patients diagnosed with dengue who were admitted between January 2016 to December 2017 enrolled for the study. Patients Demographic data, clinical history, examination findings, and investigations including complete blood count and liver profile were done. Results: Highest incidence of dengue was seen in the age group of 21-30. More males were affected than females. Highest incidence was seen in monsoon months in Mumbai (August-September). Commonest symptom was fever followed by rigor, chills, bodyache and headache. Altered sensorium was the rarest. In investigations thrombocytopenia was the commonest followed by raised AST and ALT. Conclusion: As Dengue causes significant mortality and morbidity, there is excess burden on healthcare infrastructure of metro cities in India, knowing about the disease behavior is of paramount importance. Doing simple and easily available investigations can be vital in predicting disease severity and need of inpatient and intensive care in Dengue patients.

Keywords---Hematological, hepatic profile, dengue patients.

Introduction

Dengue is an acute febrile disease of viral etiology. It is a mosquito-borne infection in the tropical and sub-tropical regions and currently, it is the most common cause of arboviral disease globally[1]. About 1.8 million (more than 70%) of the population at risk for dengue(2.5 million) worldwide live in member states of the WHO South-East Asia Region and Western Pacific Region, which bear nearly 75% of the current global disease burden due to dengue[2] Number of Dengue cases reported in India 2021 – 51,373 Number of Dengue deaths in India 2021 - 37 [3] as per National Center For Vector Borne Diseases Control. It is caused by one of the four serotypes of the dengue virus which are DEN-1, DEN-2, DEN-3, DEN-4 that belong to the Flaviviridae family and to the Flavivirus genus[4]. This disease is transmitted by mosquito bites in a human-Aedes aegypti-human cycle. [5]

The degree of liver dysfunction varies from mild injury with elevation of transaminases, albumin and bilirubin to even fulminant hepatic failure.[6]. Thrombocytopenia is caused by the suppression of bone marrow by the virus and destruction of platelets and megakaryocytes[7]. The tendency of hemorrhagic manifestations are parallel to platelet counts[8]. Leukopenia is seen in 56.92% of subjects[9]. Raised haematocrit levels may also be observed[10].

As per WHO Criteria, Severe Dengue is due to severe plasma leaking, fluid accumulation, respiratory distress, severe bleeding or organ impairment. Warning signs that doctors should look for include: severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums or nose, blood in vomit or stool[11]. It can be predicted by thrombocytopenia and increase in hematocrit. Hence, this study is being carried out to comprehend the management of the disease.

Material and Methods

This is a prospective observational study carried out in the department of Medicine, at a tertiary care hospital, Mumbai. Clinically suspected patients above 12 years, admitted in medicine wards from January 2016 to December 2017 are confirmed for dengue via NS1 antigen test/PCR. They were subjected to haematological and liver function on alternate days and changes in blood reports were noted. Patients with past history of hepatic, haematological disease and concomitant malaria, leptospirosis, typhoid were excluded from the study. Laboratory investigations done were haemoglobin, hematocrit, total and differential leucocyte count, platelet count, serum albumin, serum bilirubin and serum transaminases. Written and Informed consent was taken from all the patient.

Results

142 patients were taken in our study who fulfilled the inclusion and exclusion criteria. Table 1 shows the age distribution of the study subjects.

Table 1: Age Distribution

Age	13-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Number	48	54	28	7	4	0	0	1

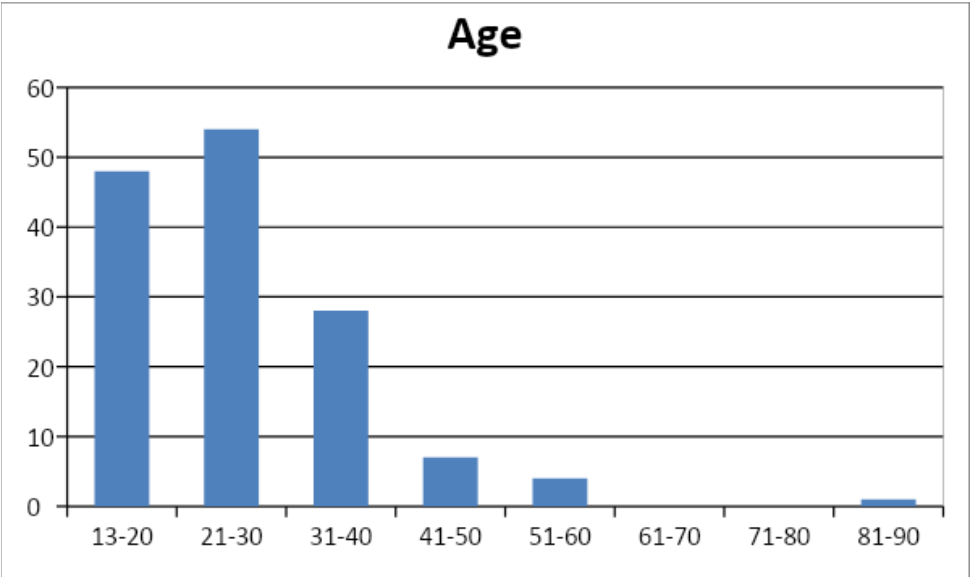


Figure 1: Age Distribution

Table 2
Sex Distribution of the study subject

Sex	Number
Male	101
Female	41

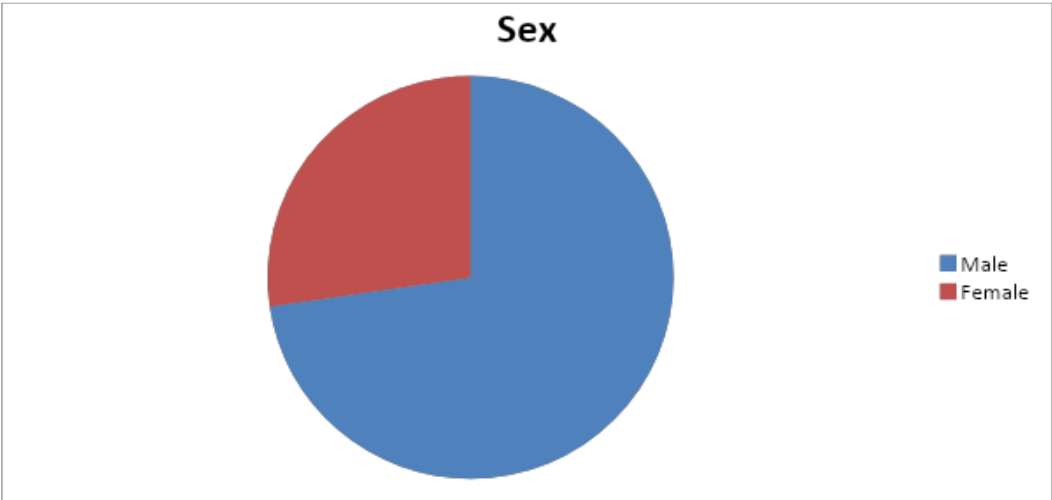


Figure 2: Sex Distribution of the study subject

Table 3
Case distribution according to month

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Patients	2	0	0	0	0	4	6	34	67	20	0	9

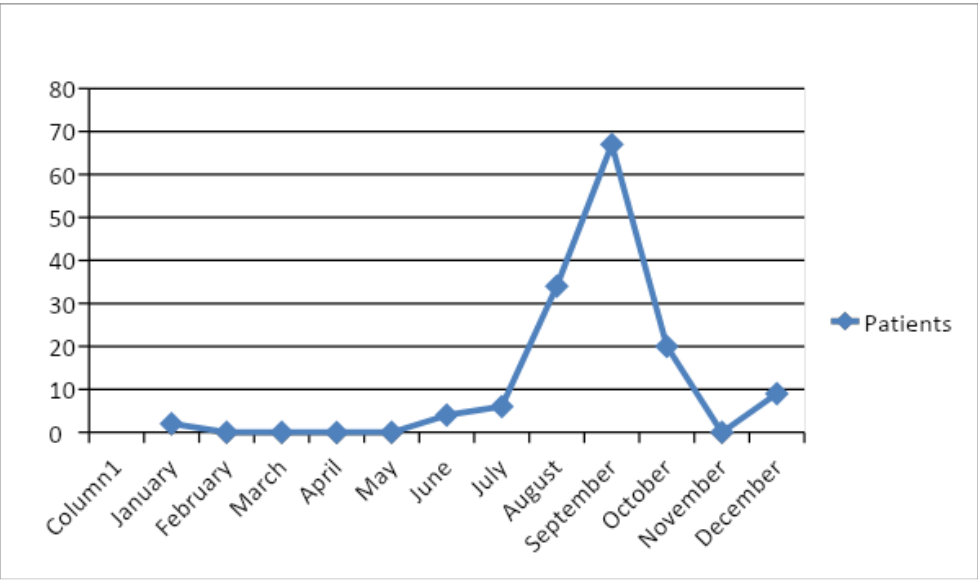


Figure 3: Case distribution according to month

Table 4
No of Dengue patients presenting with fever

fever	Number
present	139
absent	3

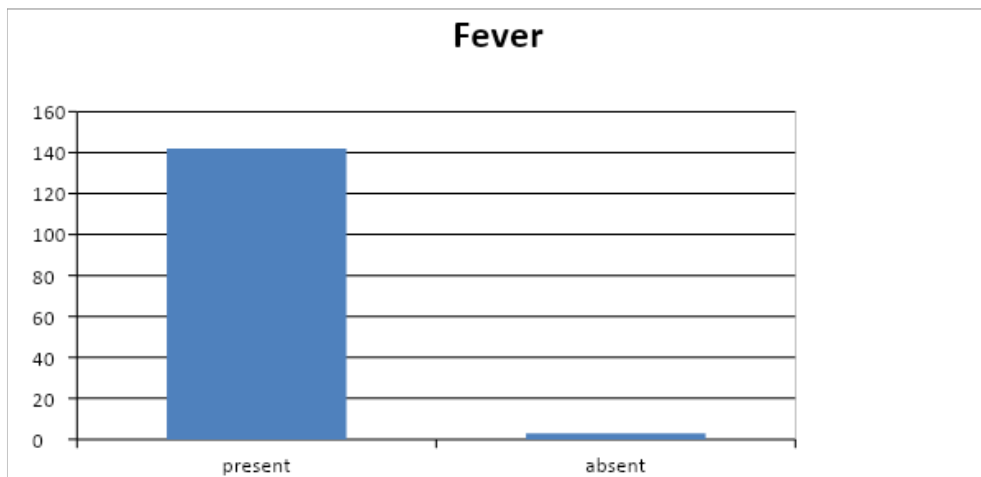


Figure 4: No of Dengue patients presenting with fever

Table 5
No of Dengue patients presenting with Chills

Chills	Number
Present	136
Absent	6

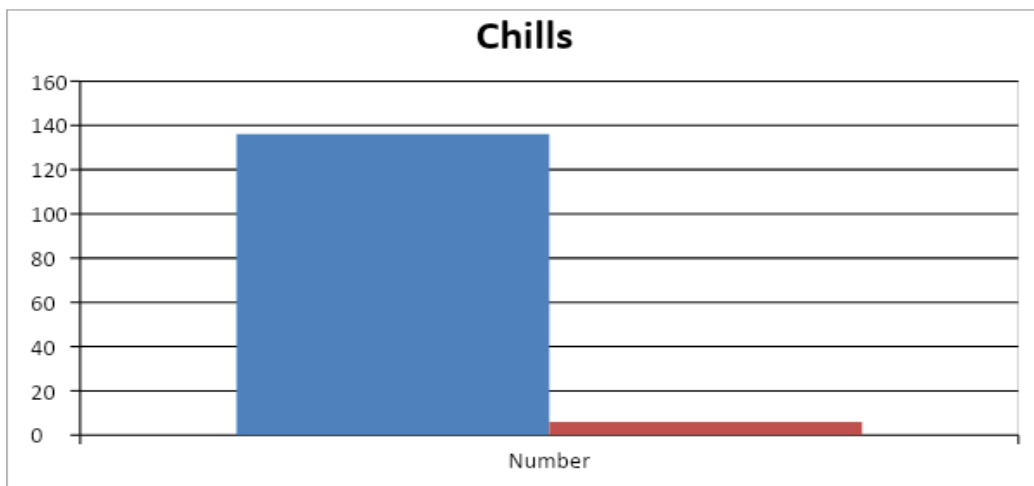


Table 5: No of Dengue patients presenting with Rash

Table 6
No of Dengue patients presenting with Rigor

Rigors	Number
Present	4
Absent	138

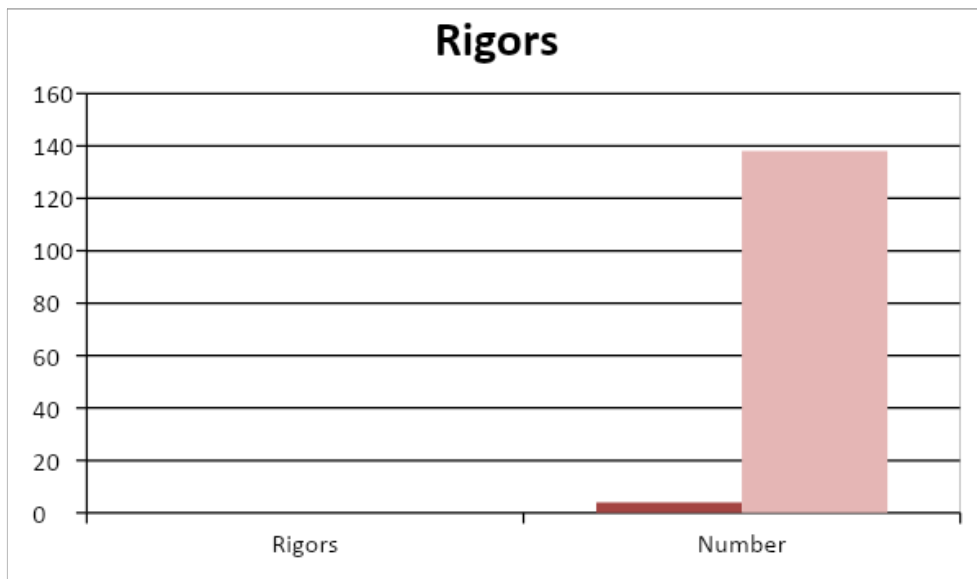


Figure 6: No of Dengue patients presenting with Rigor

Table 7
No of Dengue patients presenting with Bodyache

body ache	number
present	137
absent	5

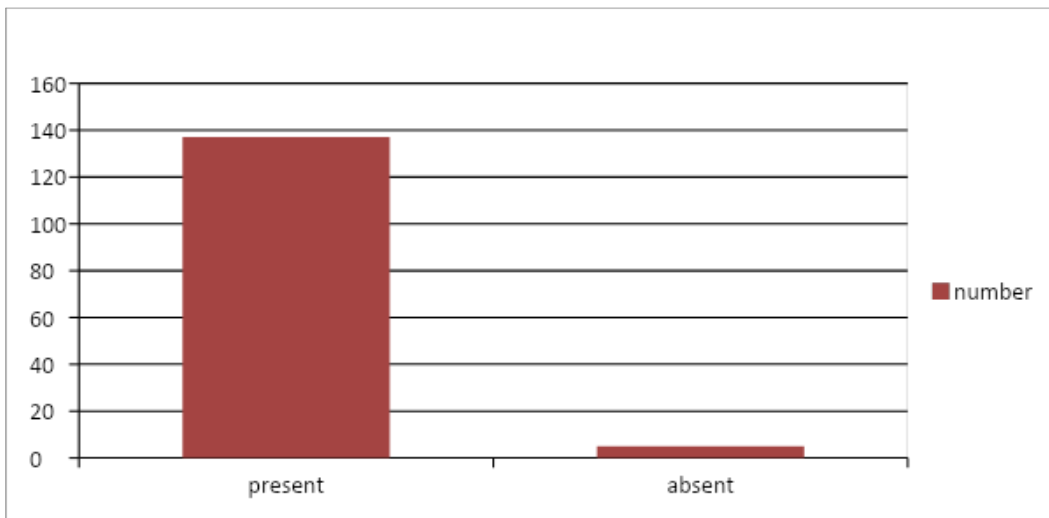


Figure 7: No of Dengue patients presenting with Bodyache

Table 8
No of Dengue patients presenting with Headache

Headache	Number
Present	132
Absent	10

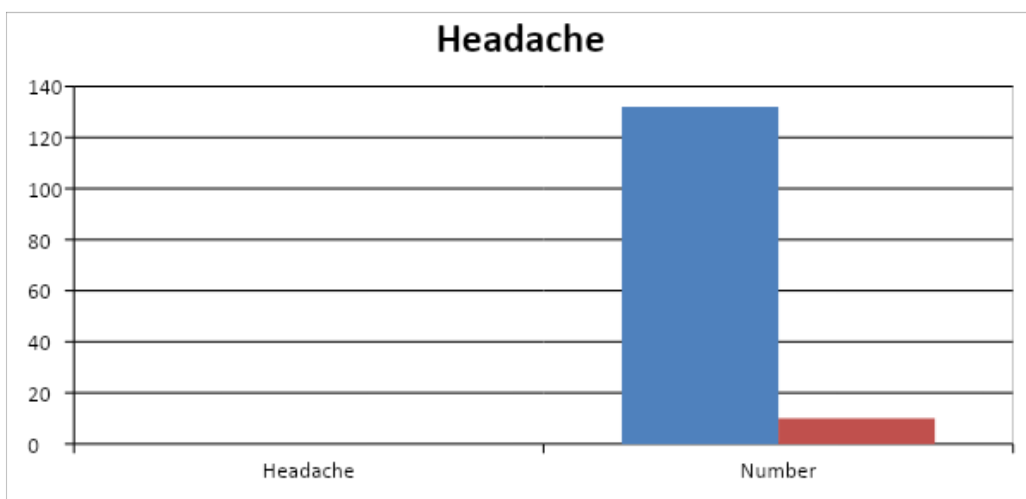


Figure 8: No of Dengue patients presenting with Headache

Table 9
No of Dengue patients presenting with Joint Pain

JointPain	Number
Present	17
Absent	125

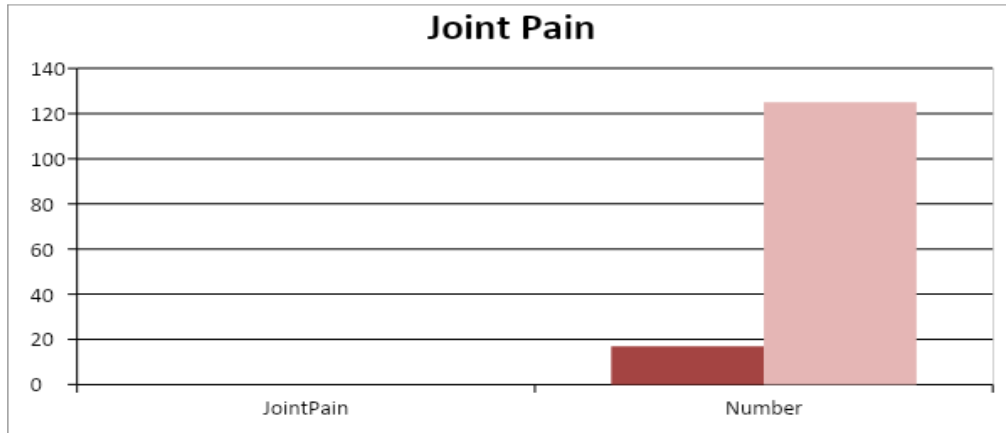


Figure 9: No of Dengue patients presenting with Joint Pain

Table 10
No of Dengue patients presenting with Vomiting

Vomiting	Number
Present	86
Absent	56

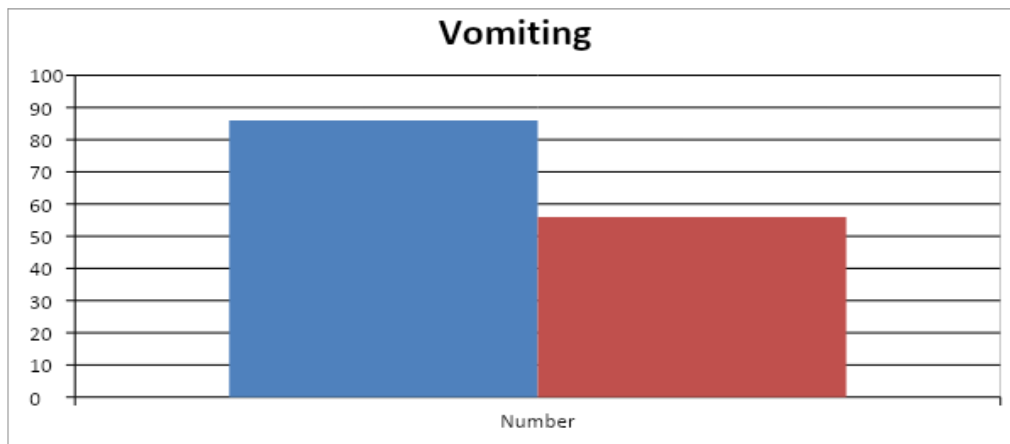


Figure 10: No of Dengue patients presenting with Vomiting

Table 11
No of Dengue patients presenting with Diarrhoea

Diarrhoea	Number
Present	37
Absent	105

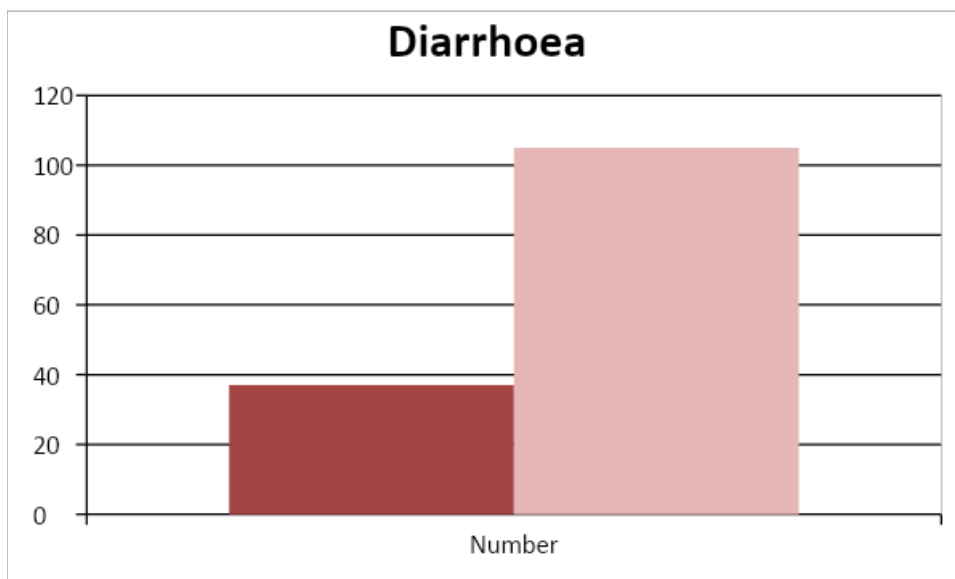


Figure 11: No of Dengue patients presenting with Diarrhoea

Table 12
No of Dengue patients presenting with Rash

Rash	Number
Present	82
Absent	60

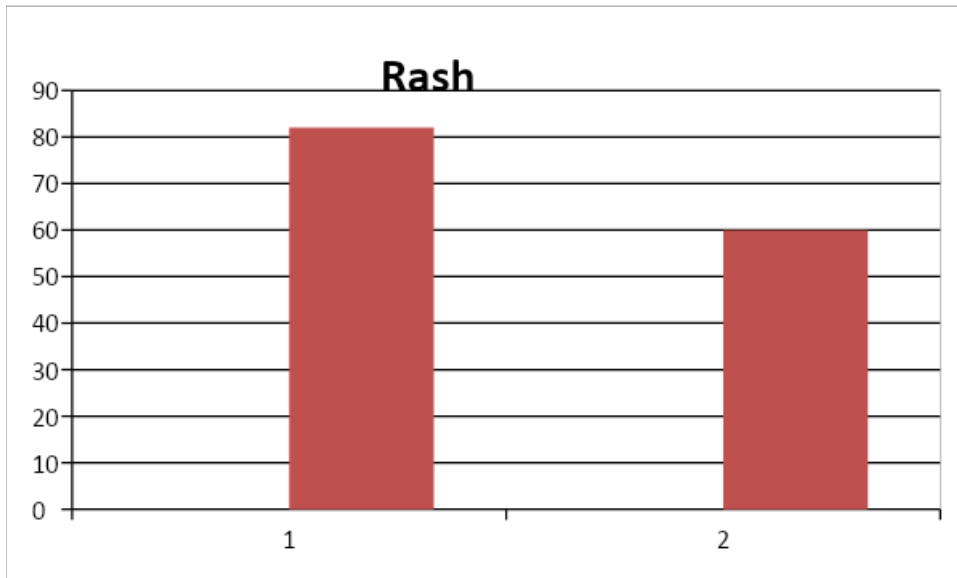


Figure 12: No of Dengue patients presenting with Rash

Table 13
No of Dengue patients presenting with Petechniae

Petechniae	Number
Present	3
Absent	139

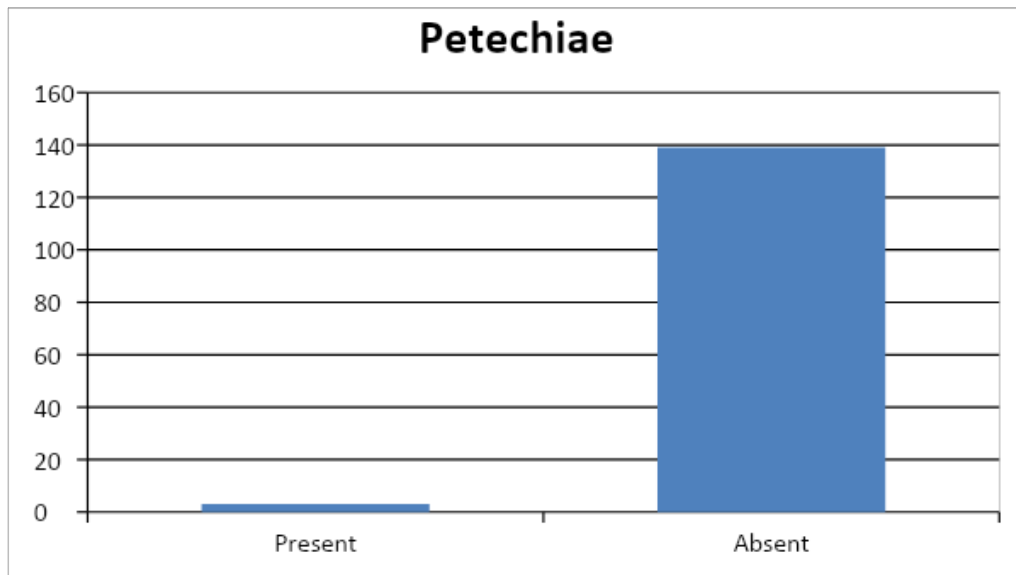


Figure 13: No of Dengue patients presenting with Petechniae

Table 14
No of Dengue patients presenting with Bleeding

Bleeding	Number
Present	16
Absent	126

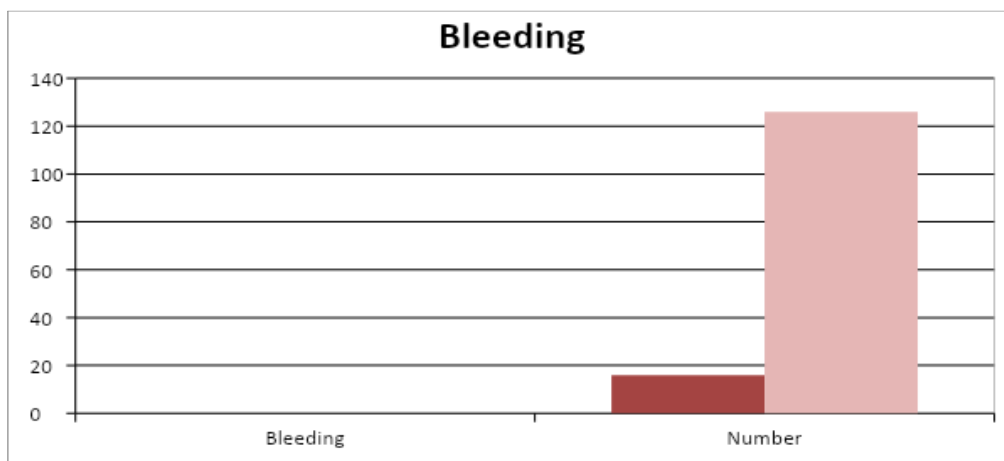


Figure 14: No of Dengue patients presenting with Bleeding

Table 15
No of Dengue patients presenting with Breathlessness

Breathlessness	Number
Present	5
Absent	136

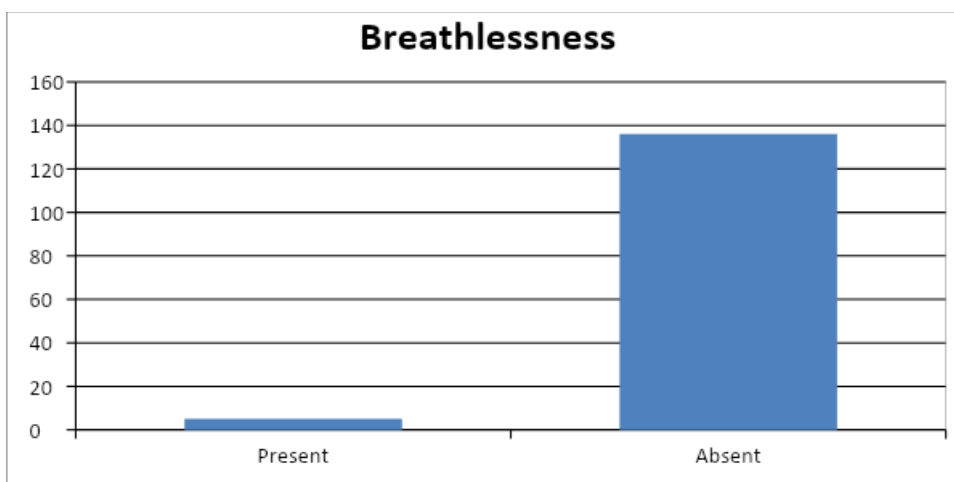


Figure 15: No of Dengue patients presenting with Breathlessness

Table 16
No of Dengue patients presenting with Altered Sensorium

Altered Sensorium	Number
Present	1
Absent	141

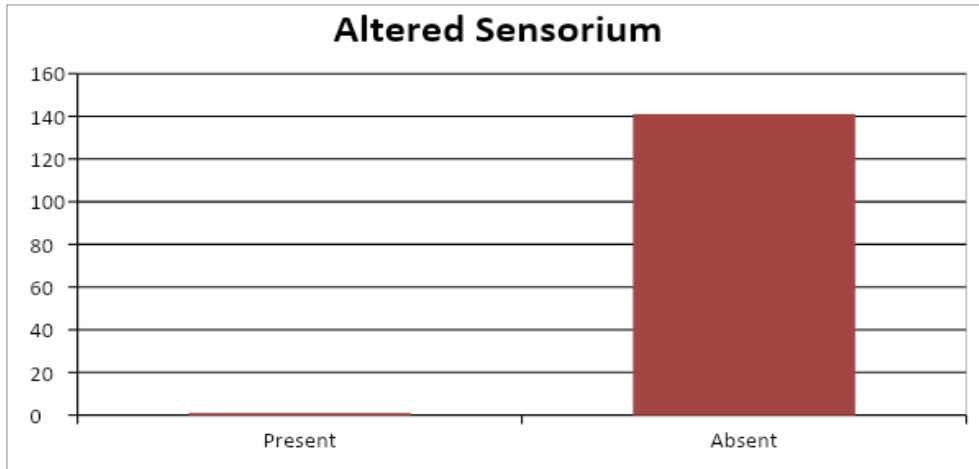


Figure 16: No of Dengue patients presenting with Altered Sensorium

Table 17
Pulse Rate of Dengue Patients

Pulse	Number
<60	0
60-100	138
>100	4

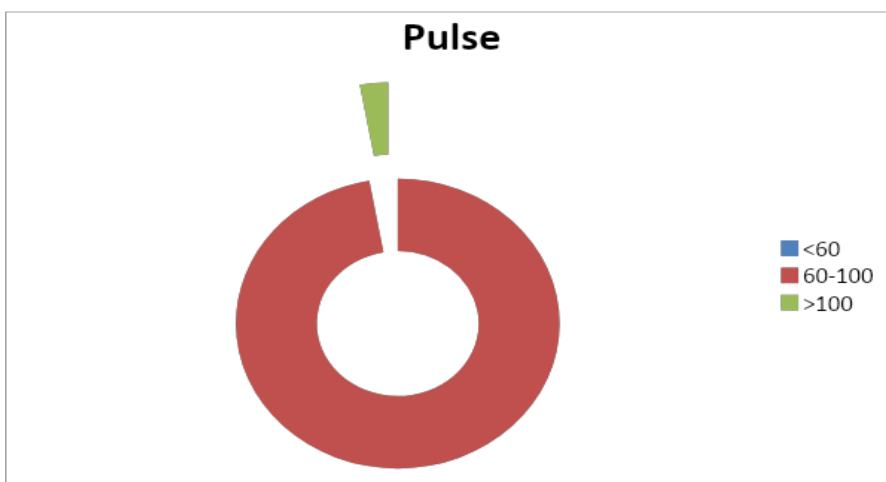


Figure 17: Pulse Rate of Dengue Patients

Table 18
Systolic Blood Pressure Of Dengue Patients

Blood Pressure	Systolic	Patients
	<120	118
	120-139	20
	140-159	4
	>160	0

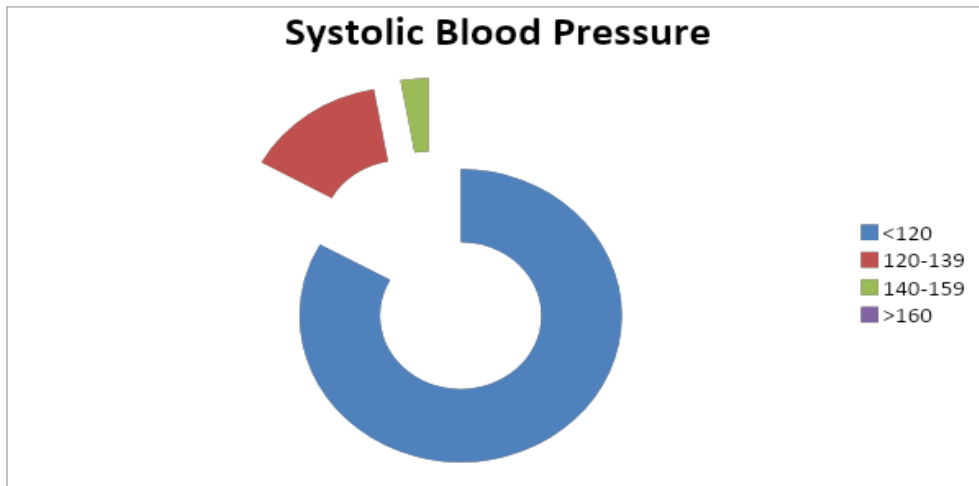


Figure 18: Systolic Blood Pressure of Dengue Patients

Table 19
Diastolic Blood Pressure of Dengue Patients

Diastolic	Patients
<80	110
80-89	28
90-99	4
>100	0

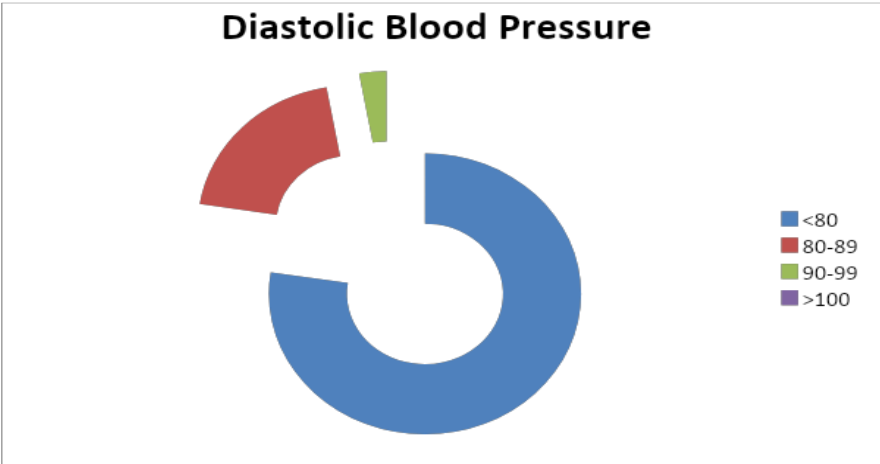


Figure 19: Diastolic Blood Pressure of Dengue Patients

Table 20
Temperature of Dengue Patients

Temperatur	Patients
<36.11	0
36.1-37.2	51
>37.2	91

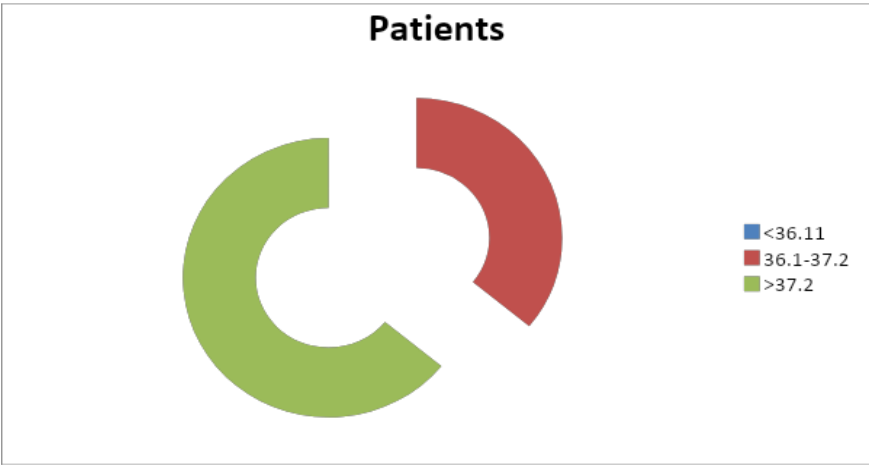


Figure 20: Temperature of Dengue Patients

Table 21
Respiratory Rate of Dengue Patients

Respiratory Rate	Patients
<16	24
16-20	92
>20	26

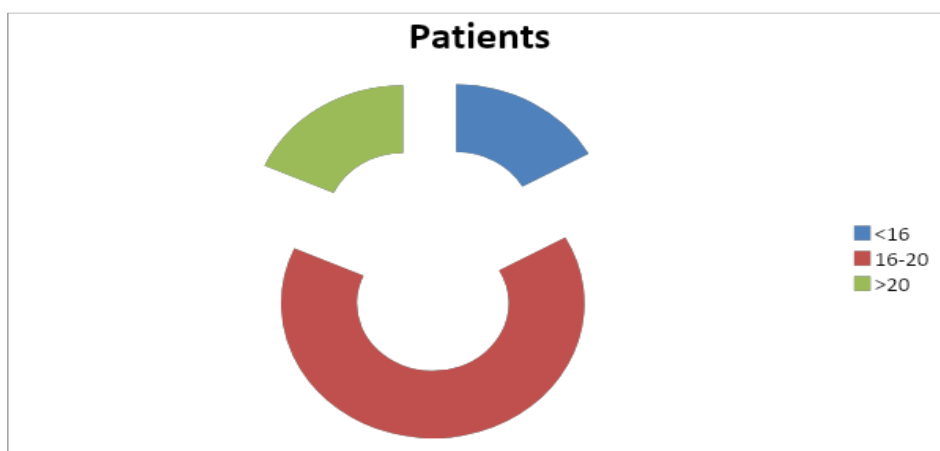


Figure 21: Temperature of Dengue Patients

Table 22
Hematological and Hepatic Profile Of Dengue Patients

Investigations	Normal	High	Low
Hemoglobin	114	5	23
Hematocrit	114	5	23
White Blood Count	55	6	81
Platelets	7	-	135
AST	17	125	-
ALT	34	1081	-

Discussion

In our study out of 142 patients, 109 (72.66%) patients were males, females were 41(27.33%) which was similar to a study done by Padmaprakash K V in coastal area of Southern India, 2018 in which 73.9% were males and 26.1% were females. Another study was done by Rizwan Ishtiaq in Pakistan which also had similar results, out of 63 patients 87.3% were males and 12.7% were females. As males are involved more in outdoor activities than females they are more prone for mosquito bite hence more cases are seen in males than females.

In our study group majority of population (36%) were between 21 to 30 age group which was similar to study done by Patil.N.S,Mumbai which had majority of population 36.63% between 20 to 29years.Similar study was done in Karachi,

Pakistan by Muhammad Mehmood Riaz which had mean age of 31 ± 12.9 years. Reason seems to be the same as before, ie increase in outdoor activities in the said age group.

Most common manifestation of dengue fever is thrombocytopenia, which can be asymptomatic or can present with rash, petechiae or bleeding. In our study platelets were measured on day 3,5 and 7. Average of platelet on days 3,5,7 is 79586, 77723 and 80183 which shows that platelet counts start rising from 6-7 days of illness.

Study done by Ferede G, Tiruneh M on A study of clinical, hematological, and biochemical profiles of patients with dengue viral infections in Northwest Ethiopia showed thrombocytopenia (platelet count $< 150,000/\text{cumm}$) in 59.8%. Another study done by Prabhavati J Patil on clinical and hematological profile in dengue showed Platelet count ranged from 2000 cells/cumm to 456,000 cells/cumm with the mean of 98,718 cells/cumm. In our study average hemoglobin on days 3,5,7 was 13.1, 12.3, 12.4 and average hematocrit on day 3,4,7 was 38, 35.7, 36.3. A study done on Hematocrit Spectrum in Dengue by Anagha A Joshi at Kempegowda Institute of Medical Sciences, Research Centre, Bengaluru had a hematocrit range of 20.8–59.6% and the average being 40.2%. In our study average white cell count on day 3,5,7 was 4426, 4584, 4964

Study done by Shiyana Ibrahim in sri lanka showed white cell count (WCC) was below $4 \times 10^9/\text{L}$ in 47% of patients. The lowest recorded WCC at admission was $1.5 \times 10^9/\text{L}$ while the mean WCC on admission for all patients was 4.78 (range, $1.5- 17.7) \times 10^9/\text{L}$.

In our study average ALT on day 3,5,7 was 90.10, 95.5, 112.79 and average AST on day 3,5,7 was 152.34, 154.02, 179.86. Which shows in dengue fever AST is more elevated than ALT. A similar study was done by Patil N S in Mumbai which had 77% elevation in AST and 59.7% elevation in ALT.

Trung and colleagues also observed consistently higher levels of AST in dengue patients, including those in the convalescent period. Conclusion: Dengue is major cause of morbidity and mortality in India and more so, in densely populated urban areas. It is very important to pick up severe dengue by doing the investigations which co-relate with disease severity and mortality and decide early in course of disease, the need for admission and intensive care.

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