

A STUDY ON CLINICAL, HEMATOLOGICAL AND SEROLOGICAL PROFILE OF DENGUE FEVER IN A TERTIARY CARE HOSPITAL

Dr. Priyanka C.

India.

***Corresponding Author: Dr. Priyanka C.**

India.

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ABSTRACT

Introduction: Dengue is the most important arthropod borne viral infection of humans. As there is an alarming rise in Dengue Fever and its complications (i.e, Dengue Hemorrhagic Fever/Dengue Shock Syndrome), rapid and accurate diagnosis is of paramount importance. **Aims/Objectives:** The aim of the study is to determine the clinical, haematological and serological profile in patients with Dengue fever. **Methods:** A prospective study from Sep 2021 to Feb 2022 was done among 55 serologically confirmed cases of dengue by rapid immunologic tests. **Results:** A total of 55 serologically positive cases were studied. There were 35(63.63) male and 20(36.36%) female patients. Out of 55 patients, (61.82%) were in age group of 21 to 30 years. Most of the cases were found in post monsoon period in September and October. In our study out of 55 cases of dengue fever, raised hematocrit (>46%) was noted in 17(30.91%) of patients at presentation and 35(63.64 %) cases had thrombocytopenia, in which 6(10.91%) cases had Platelet count < 20,000/cumm with bleeding manifestations.

KEYWORDS: Dengue fever, Platelet count, Leucopenia, Dengue serology.**INTRODUCTION**

The word dengue is believed to have originated from Swahili language “ki denga pepo”, which describes sudden cramp like seizure. The clinical symptoms suggestive of dengue virus infection were described as early as 265-420 AD in China. At that time the disease was associated with water and insects.^[1]

Dengue is one of the most important viral diseases especially in the tropical regions. According to the WHO almost 50 million people get dengue infection annually and WHO estimates almost half of the world's population lives in countries having endemicity for dengue infection.^[2]

There are four serotypes of the dengue virus (DEN-1, DEN-2, DEN-3, DEN-4) that can cause the disease. It is a type of arbovirus (arthropod-borne viruses) that belongs to the genus flavivirus of the family flaviviridae.^[2,3]

It is a well-known fact that this disease is transmitted by mosquitoes of the genus *Aedes aegypti*. Dengue has a variety of clinical presentations, where the patients can be completely asymptomatic to mild clinical features to high grade fever with viral syndrome or in the severest forms as dengue hemorrhagic fever (DHF) which can even be fatal.^[4] Dengue virus infection has existed in India since a long time.^[5]

Most common clinical presentation of Dengue fever (DF)

is of an acute febrile viral disease with headaches, bone, joint and muscular pains, rash and leucopenia. It is also known as break bone fever due to the severe bone pains.^[6]

Dengue hemorrhagic fever (DHF) is characterized by four major clinical manifestations: high grade fever, hemorrhagic phenomena, often with hepatomegaly and, in severe cases, signs of circulatory failure. Severe plasma leakage in these patients can lead to hypovolemic shock and circulatory failure. This is called dengue shock syndrome (DSS) and can lead to death.^[7]

The period of transmission from humans to mosquitoes begins one day before the start of fever up to the sixth day of illness corresponding to the viremia phase. After a female *Aedes* mosquito bites an individual in the viremia phase, viral replication (extrinsic incubation) begins in the vector from eighth to twelve days. In humans, the incubation period ranges from 3 to 15 days (intrinsic incubation) with an average of 5 days.^[8,9]

AIM OF THE STUDY

The aim of the study was to determine the clinical and hematological and serological profile in patients suffering from Dengue fever.

MATERIALS AND METHODS

This was a Prospective study with analysis of patients who were admitted for Dengue fever in the department

of General Medicine at Navodaya Medical College and Hospital Research Centre, Raichur District Karnataka for duration of 6 months. This study was conducted on 55 indoor patients admitted from beginning of September 2021 to end of Feb 2022.

Inclusion criteria

- Patients with serologically confirmed positive dengue fever admitted to Medicineward.
- Both genders

Exclusion criteria

- Pre-existing chronic diseases
- Pediatric age group was excluded
- Patients who were having mixed infections like Dengue fever and Malaria and where diagnosis was not confirmed were excluded from the study.

METHODOLOGY

Patient’s clinical data was collected from case sheets and patients themselves wherever possible.

- Evaluation of hematological parameters was done by collecting 2 ml of venous blood sample in EDTA pre-filled tubes/bulbs and transported to the laboratory immediately. The analysis was done by the automated Hematology analyzer ABX Pentra 60: 5 part Analyzer.
- For serology a venous blood sample was collected from patients and transported to the laboratory immediately. SD Bioline Dengue NS1+ Antibody Combo Card Test Kits were used to detect NS1 antigen, IgM and IgG antibodies and the test results were expressed as positives/negatives for antigen and both antibodies.

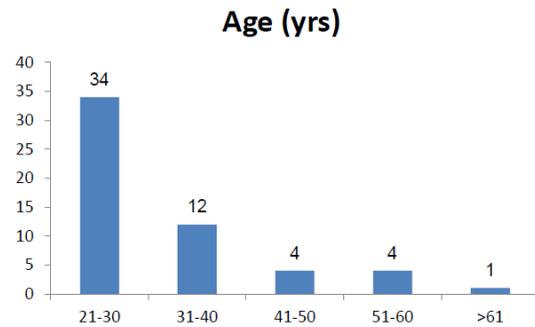
RESULTS

Most of the cases (61.82%) were seen in the 21 to 30 years agegroup.

Table 1: Age distribution.

Age(yrs)	Frequency	Percentage (%)
21-30	34	61.82
31-40	12	21.82
41-50	4	7.27
51-60	4	7.27
>61	1	1.82
Total	55	100.0

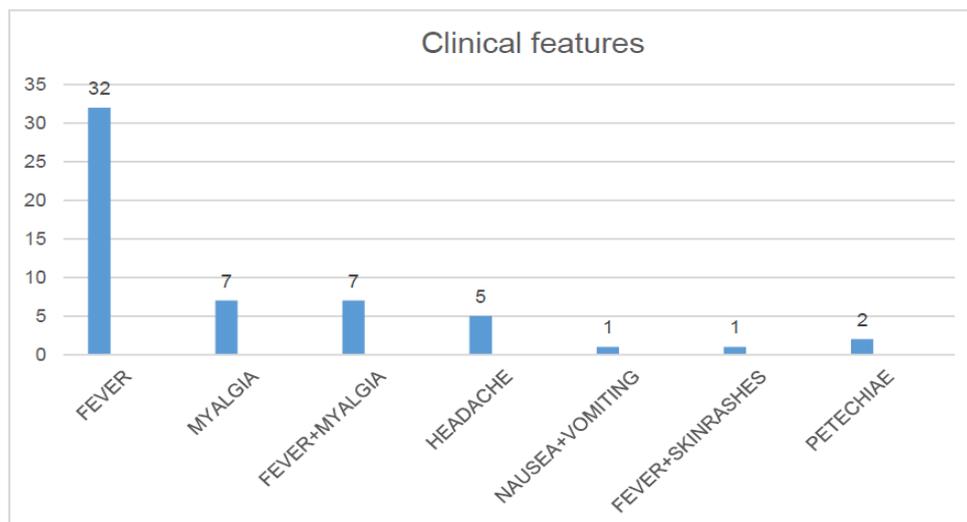
Mean ±SD=32.95±9.74



GRAPH NO 1: AGE DISTRIBUTION

Table 2: Distribution of clinical features.

Clinical Features	Frequency	Percentage(%)
Fever	32	58.18
Myalgia	7	12.73
Fever + Myalgia	7	12.73
Headache	5	9.09
Nausea & Vomiting	1	1.82
Fever + Skin rashes	1	1.82
Petechiae	2	3.64
Total	55	100



GRAPHNO2: CLINICALFEATURES.

Fever was the most common presentation and was seen in 32 cases (58.18%) cases.

compared to females are 20 (36.3%) and the male to female ratio was 1.75 : 1.

Gender Distribution

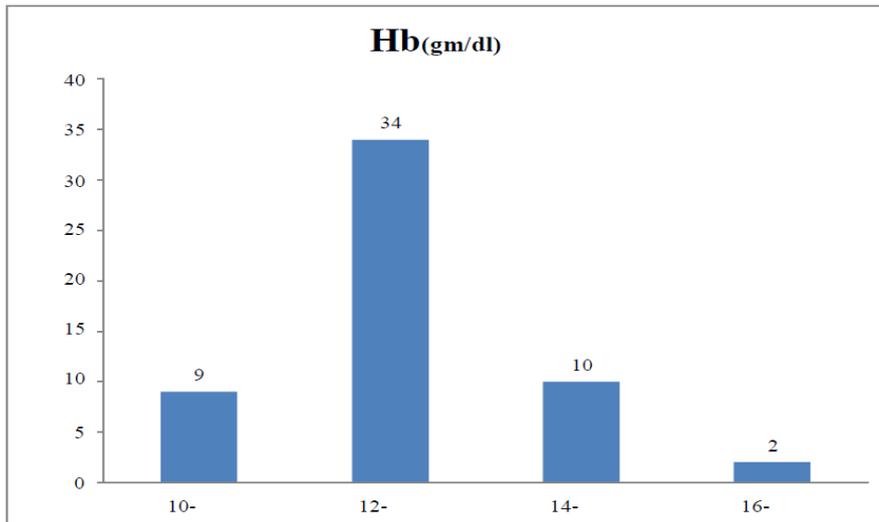
Majority of the patients were males are 35 (63.63%)

Table 3: Distribution Of Study Population By Haemoglobin Level.

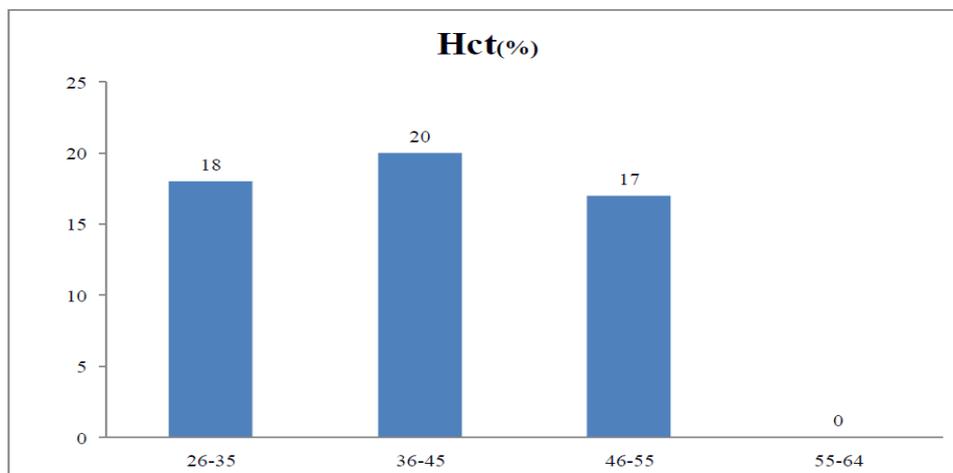
Hb(gm/dl)	frequency	Percentage(%)
10-11.9	9	16.36
12-13.9	34	61.82
14-15.9	10	18.18
16-17.9	2	3.64
Total	55	100.0

Table 4: Distribution Of Study Population By Haematocrit Level.

Hct(%)	frequency	Percentage (%)
26 -35	18	32.73
36-45	20	36.36
46-55	17	30.91
55-64	-	-
Total	55	100.00



GRAPH 3: HAEMOGLOBIN LEVEL.

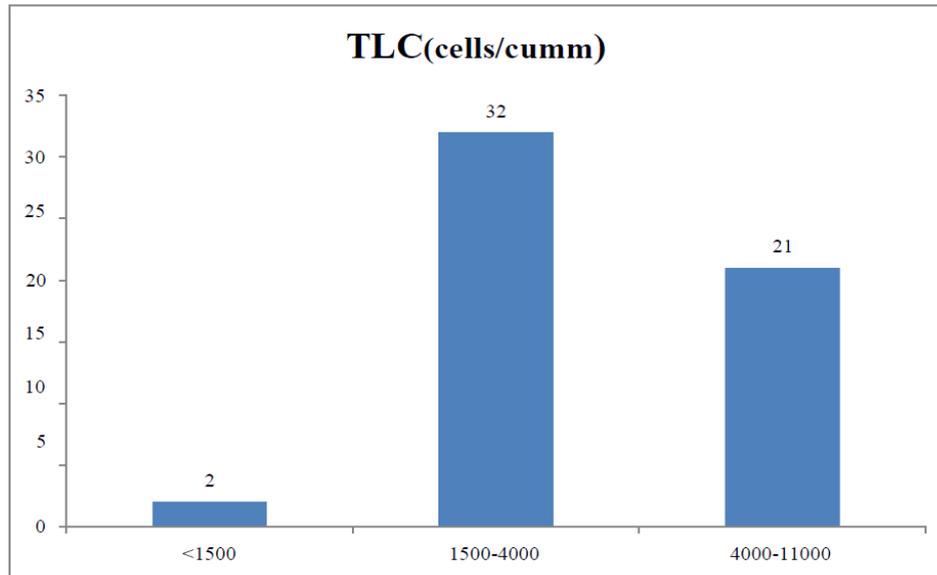


GRAPH NO 4: HAEMATOCRIT LEVEL.

Table 5: Distribution Of Cases According To Total Leucocyte.

TLC(cells/cumm)	Frequency	Percentage(%)
<1500	2	3.64
1500-4000	32	58.18
4000-11000	21	38.18
>11000	0	0
Total	55	100.0

Mean±SD=4301.352±1802.101

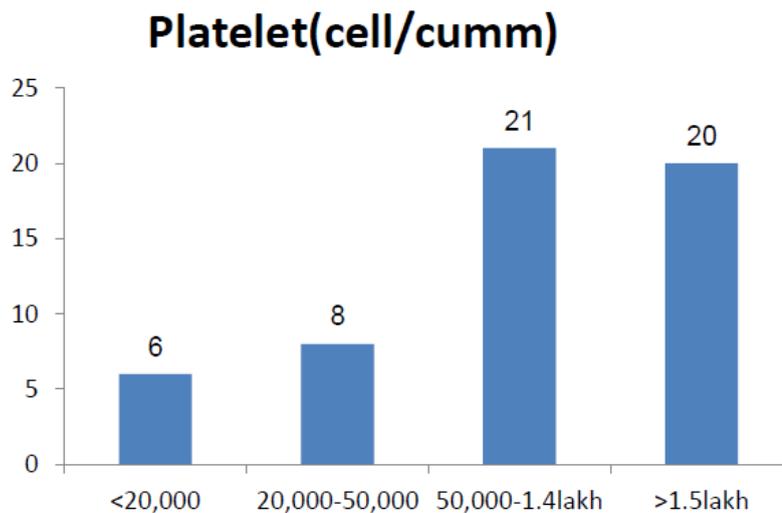


Graph 5: Distribution Of Cases According To Total Leucocyte Count.

Table 6: Distribution Of Cases According To Platelet Count.

Platelet(cell/cumm)	Frequency	Percentage (%)
<20,000	6	10.91
20,000-50,000	8	14.55
50,000-1.4lakh	21	38.18
>1.5lakh	20	36.36
Total	55	100.0

Mean ±SD=6.29±1.11



Graph 6: Distribution Of Cases According To Platelet Count.

Hematological parameters

Present study showed hemoglobin range of 10 gm% to 17 gm% (Table 3).

Raised hematocrit more than (46%) was noted in (30%) of patients at presentation and the hematocrit ranged from 26 % to 55%.

The total leukocyte count ranged from 1500 cells/cumm to 11000 cells/cumm. Leucopenia with less than 4000 cells/cumm was present in 34 cases(61.82%) cases (Table 4).

In the present study out of 55 cases of dengue fever, 35cases (63.33 %) cases had thrombocytopenia and 6cases (10.91%) cases had severe thrombocytopenia (<20,000/cumm)with bleeding manifestations.

DISCUSSION

Age and gender wise distribution

In the present study out of 55 patients, 34(61.82%) were in age group of 21 to 30 years followed by 12(21.82%) cases in the age group of 31 to 40 years, 4(7.27%) cases in the age group of 41 to 50 years and 4 (7.27 %) cases with age 51 to 60 years, 1(1.82%) cases were in the age group of more than 61 years (Table 1).

Deshwal, et al.^[10] studied a total of 515 patients of Dengue. In their study too maximum patients were in 21-40 year age group (62.91%). Vibha, et al.^[11] studied 100 patients, and observed 49 (49%) to be in the 15 to 25 year age group followed by 33 (33%) cases in the 26 to 35 years age group. Meena, et al.^[12] (12 did a randomized study of 100 patients with Dengue fever. According to age, maximum cases (29%) were in 21-30 years and rest (27%) were in 15-20years, (21%) were in 31-40 years, (16%) were in 41-50 years and (7%) in 51-60 years.

In our study majority of the patients were males 35(63.63%) compared to females 20 (36.36%) and the male to female ratio was 1.75:1. Deshwal, et al.^[11] and Vibha, et al.^[11] too observed a male predominance in their studies with 72.8% and 70% male patients respectively. The male to female ratio was 1.7:1 in Vibha, et al.^[11] study. In the study by Ahmed, et al.^[13] the number of males was 193 (94.15%), while females were 12 (5.85%) with male to female ratio of 9:1approximately. The male predominance can be explained by the fact that usually it's the male population that has excess outdoor activity and the likelihood of being exposed to the vector mosquito bites.

Clinical presentation

In the present study, fever was the most common presentation and was seen in 32 cases (58.18%) followed by fever and myalgia in 7 (12.73%) (Table 2). In the study by Deshwal, et al.^[10] fever was universal followed by headache (94.75%), myalgia (90.67%), conjunctival injection (39.41%), morbilliform skin rash (37.86%),

abdominal pain(24.46%), retro-orbital pain (18.25%), itching predominantly localized to palmar and plantar aspects of hands and feet (13.39%). In the study by Vibha, et al.^[11] 95 (95%) of the patients had fever as presenting symptom. Other symptoms were myalgia in 70 (70%) cases, arthralgia in 60(60%) cases and headache in 50 (50%) cases.

Hematological parameters

Present study showed hemoglobin (Hb) ranging from 10 gm% to 17 gm%, 34 (61.82%) cases showed Hb of 12-13.9 gm %, followed by 10(16%) cases showed Hb of 14-15.9 gm %, 02 (3.64%) had Hb of 16-17.9 gm % and 9 cases(16.36%) had Hb of 10-11.9 gm % (Table 3).

In the study by Meena, et al.^[12] hemoglobin ranged from 7.5-17.5 g/dl, mean hemoglobin value was 12.6 g/dl. Hemoglobin level more than 15gm% was seen in 6% cases. Dongre, et al.^[14] observed hemoglobin level from 3.6 gm/dl to 16.7gm/dl with a mean of 11.9 gm/dl. In the present study, 18(32.73%) cases showed hematocrit of 26-35% and 20 (36.36 %) showed hematocrit of 36-45%. Raised hematocrit (>47%) was noted in 17(30.91%) of patients at presentation. Deshwal, et al.^[10] observed raised hematocrit of >47% in 20.7% of patients at presentation. Vibha, et al.^[10] observed > 40% hematocrit in 28 (28%) cases. In present study, hematocrit ranged from 20% to 51%. The mean hematocrit value of dengue positive cases in our study was 30.91%. Increased hematocrit levels was noted and was above 45%. Dongre, et al.^[14] observed an increased hematocrit of > 40% in only 16patients.

In the present study, total leukocyte count ranged from 1500 to 11000 cells/mm³. A total leukocyte count of less than 4,000 cell/mm³ was present in 32(58.18 %) cases, count of 4000-11000 cells/cu mm seen in 34(61.82%) cases as per (Table 4). In Deshwal, et al.^[10] study leucopenia was noticed in around 20.19% of cases. In Meena, et al.^[12] study total leukocyte count ranged from 1310 to 16700 cell/mm³, with mean total leukocyte count of 4701 cells/cumm. A total leukocyte count of less than 4,000 cell/cumm was present in 51 (51%) patients whereas, a total leukocyte count of more than 11,000 cell/cumm was present in 4 (4%) patients. Almost 45% patients had total leukocyte counts between the normal range. Dongre, et al.^[14] observed leucopenia (total leukocyte counts <4000/cumm) in 81cases and normal count(count between 4000 to 11000/cumm) in 111. In the present study out of 55 cases of dengue fever, 35 (63.33 %) cases had thrombocytopenia, in which 8(14.55%) patients had platelet count between 20,000-50,000/cumm, 21cases (38.18%) had platelet count of 50000- 1.4 lakhs cumm and 6 (10.91%) cases had < 20,000/cumm with bleeding manifestations. Deshwal, et al.^[10] observed a platelet count of 50,000/cumm at presentation in 69.5% of cases, though it kept on falling further during hospitalization under observation. In their study minimum platelet count noted was 8,000/cumm. Dongre, et al.^[14] Observed thrombocytopenia, platelet count<1,00,000 in 112 patients. Six cases had counts less

than 20000/cumm, 32 cases had counts between 20,000-50,000/cumm, 42 cases had counts between 50,000-75000/cumm and 129cases had counts more than 75000/cumm.

CONCLUSION

In our study serological positive Dengue fever cases showed most common clinical presentation is of fever with or without myalgia. It is more common in immediate post- monsoon months and affects young adult males more commonly. Most commonly it affects 21 – 30 years of age group. The most common laboratory abnormalities are of an increase in hematocrit, low total leucocyte count and low platelet count.

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