

# Study of clinical and haematological profile of dengue fever in a tertiary care hospital

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## Abstract

**Background:** Dengue fever (DF) is an acute febrile infectious disease in subtropical and tropical areas which is one of the world's major emerging infectious disease. Over half of the world's population lives in areas at risk of infection. The etiologic agents include all four serotypes which belong to the genus flavivirus in the family flaviviridae. The principal vector is the mosquito, aedesegypti, which breeds largely indoors in Artificial waters containers, and feeds on humans in daytimes. The clinical manifestations of dengue vary and can be classified into five presentations. **Objectives:** To study the clinical manifestations and some laboratory parameters and various complications and outcome in the patients of dengue fever. **Methodology:** In this prospective study, 100 cases with dengue infection who were admitted from June 2015 to June 2017 at a tertiary care hospital were studied. The patients were labelled as belonging to either of the following categories: Classical Dengue Fever (DF) or Dengue Haemorrhagic fever (DHF) or Dengue shock syndrome (DSS) **Results:** Highest number of cases were from 12-20 years (33%).The majority of cases (81%) had DF, 19% had DHF, while no patient of DSS. Fever was the most common symptom followed by Headache. Haemoconcentration was found in only 4 patients with DHF. Liver enzymes were elevated in 10 patients of DF and in 8 patients with DHF while deranged RFT were found in 21% patients with DHF and 2.46% patients of DF. Coagulation profile was deranged in 5 patients (26.31%) in DHF and in none in DF. Pleural effusion was found in 10 patients (52.6%) and ascites was found in 11 patients (58%) of DHF. Hepatomegaly was present in 18 patients (22%) of DF and 8 patients (42%) of DHF. **Conclusions:** Typical biphasic pattern of fever was seen in only a small number of patients. The most common haemorrhagic manifestations were haematemesis and malaena. A positive tourniquet test was found only in a small number of patients. Thrombocytopenia is an important haematological finding, both in DF and DHF patients. Leukopenia is found in majority of the patients with DF and DHF.

**Key Words:** dengue fever.

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## INTRODUCTION

Dengue fever (DF) is an acute febrile infectious disease in subtropical and tropical areas which progressively

making its way from being “one of the great neglected disease of mankind”<sup>1</sup> toward being acknowledged as one of the world's major emerging infectious disease”<sup>2</sup>. In 1998, a total of 5,58,000 infections and 15,000 deaths due to DF were reported by member States of the world health organization (W.H.O.) which corresponds to the case –fatality rate of 2.7% annually, there are estimated 50-100 million cases of DF and 250,000 to 500,000 cases of dengue haemorrhagic fever (DHF) in the world. Over half of the world's population lives in areas at risk of infection<sup>3, 4</sup>. The etiologic agents include all four serotypes which belong to the genus flavivirus in the family flaviviridae. The principal vector is the mosquito, aedesegypti, which breeds largely indoors in Artificial waters containers, and feeds on humans in daytimes<sup>5</sup>. The

clinical manifestations of dengue vary with the age of the patient and in addition to clinically inapparent infection, can be classified into five presentation:

1. Non-Specific Febrile Illness,
2. Classic Dengue Fever [DF],
3. Dengue Haemorrhagic Fever (DHF),
4. Dengue Shock Syndrome (DSS) and
5. Other unusual syndromes such encephalopathy and fulminant liver failure.<sup>(8,9)</sup>

The present study was carried out in a tertiary care hospital in a district, to study the clinical manifestation, complications and outcome of patients with dengue infection. All cases of dengue fever admitted in General Medical Ward and Medical intensive care unit (MICU) were included in the study.

### MATERIAL AND METHODS

In this prospective study, 102 cases with dengue infection who were admitted in General Medical Ward (G.M.W.) and Medical Intensive care unit (M.I.C.U.) at a tertiary care hospital were studied.

The duration of the study was from June 2015 to June 2017.

#### Inclusion Criteria

1. Patients presenting with acute onset febrile illness with 2 or more of the manifestations like Headache, Retro-Orbital pain, Myalgia, Arthralgia, Rash, Haemorrhagic manifestation, Leukopenia and
2. Supportive serology i.e a positive IgM antibody test by ELISA on a late acute or convalescent phase serum.

#### Exclusion Criteria

1. All patients aged less than 12 years.
2. Cases with malarial parasite seen in peripheral smear were excluded.
3. Cases with evidence of salmonella infection on blood culture or evidence of leptospirosis by tridot test.
4. Patients having fever of more than 2 weeks duration.

The patients were labelled as belonging to either of the following categories:

Classical Dengue Fever (DF) or Dengue Haemorrhagic fever (DHF) or Dengue shock syndrome (DSS)

### OBSERVATIONS AND RESULTS

During the Present Study carried out at a tertiary care hospital in a rural area of a district, from Jan 2016 to Nov 2017. 100 patients with Dengue Fever admitted in G.M.W. and M.I.C.U. were studied and the following observations were made.

**Table 1: Age wise distribution of cases**

Age Wise (Years)	Number (No.) of cases	Percentage
12-20	33	33
21-30	28	28
31-40	24	24
41-50	09	9
51-60	04	4
>60	02	2
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 2: Gender wise distribution of cases**

Gender	No. of cases	Percentage
Male	71	71
Female	29	29

**Table 3: Distribution of cases with dengue infection**

	DF	DHF	DSS	Total
N	81	19	Nil	100
%	81	19	0.00	100

**Table 4: Age wise distribution of DF and DHF cases**

Age group (Years)	DF	DHF	Total (n)	Percentage (%)
12-20	23	10	33	33
21-30	24	04	28	28
31-40	21	03	24	24
41-50	08	01	09	9
51-60	04	00	04	4
61-70	01	01	02	2
<b>Total</b>	<b>81</b>	<b>19</b>	<b>100</b>	<b>100</b>

**Table 5: The gender – Wise distribution of cases With DF and DHF table**

	DF		DHF		Total	
	N	%	n	%	n	%
Male	56	69.13	15	78.94	71	71
Female	25	30.86	4	21.05	29	29
<b>Total</b>	<b>81</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 6: Symptom- wise distribution of cases**

Clinical manifestations	No of DF+ DHF cases n = 100	Percentage (%)
Fever	100	100
Headache	62	62
Retro-orbital pain	20	20
Arthralgia/myalgia	40	40
Body ache	66	66
Anorexia	25	25
Nausea or Vomiting	41	41
Diarrhea	15	15
Abdominal pain	30	30
Respiratory symptoms	15	15
Haemorrhagic Manifestation	25	25
Rash	20	20
Sore throat	5	5
Conjunctival congestion	15	15
Hepatomegaly	25	25
Splenomegaly	23	23
Lymphadenopathy	0	0

**Table 7:** Various haemorrhagic manifestations seen in the present study

Haemorrhagic	No	Percentage
Petechiae	14	14
Purpuric spots	2	2
Ecchymoses	2	2
Epistaxis	6	6
Gingival bleeding	2	2
Hematemesis and/or melena	19	19
Haematuria	2	2
Haemoptysis	2	2
Menorrhagia/bleeding per vagina	4	4
Positive tourniquet test	7	7

**Table 8:** Temperature in the study subjects

Median duration of fever (range)		6 days (3-10days)
Median maximum body temperature(range)		39 c (38.2-40.2c)
Type of fever	Biphasic n (%)	18(18%)
	Continuous n (%)	82(82%)

**Table 9:** Mean haemoglobin level and platelet count

	DF(n=81)	Dhf (n=19)
Mean hb level	11gm%	10.4gm%
Mean platelet	47,000/cm <sup>3</sup>	38,000/mm <sup>3</sup>
Mean platelet	150,000/mm <sup>3</sup>	1,10,000mm <sup>3</sup>

**Table 10:** Haematological and biochemical parameters

Haematological and biochemical parameters	DF (n=81)	%	DHF (n=19)	%
Leukopenia(<4.3x10 <sup>9</sup> /l)	60	74.07	9	47.36
Haemoconcentration (<52%M, <sup>&gt;</sup> 48%F)	Nil	Nil	4	21.05
Serum albumin <3.5 gm%)	Nil	Nil	10	52.63
Raised AST (>5U/L)	10	12.34	8	42.10
Raised ALT (>35U/L)	10	12.34	8	42.10
Raised BUN (>20mg/dl)	2	2.46	8	42.10
Raised serum creatine (>1.5mg/dl)	2	2.46	4	21.05
PT (Control+1sec)	Nil	Nil	5	26.31
APTT (Comparable to control)	Nil	Nil	5	26.31
Urine routine for rbcs	Nil	Nil	Nil	Nil

**Table 11:** Ultrasonographic findings in the study subjects

	DF (n=81)	%	DHF (n=19)	%
Pleural effusion	5	6.17	10	52.63
Ascites	15	18.51	11	57.89
Hepatomegaly	18	22.22	08	42.10
Splenomegaly	20	24.69	12	63.15

In the present study the highest cases were from the age group between 12-20 years summing upto 33%, while the least were in the age group of >60 years (2%). The majority of cases (71) which were about two-thirds were males and rest were females. Out total 100 patients studied, 81(81%) had DF, 19 (19%) had DHF, while no patient of DSS. It was seen that out of the total 81 patients with DF, 56(69%) were male and 25 (30%) were female, while out of total 19 patients with DHF, 15(78.9%) were male and rest were female. Fever was the most common symptom followed by Headache, while a significant number of patient reported retro- orbital pain, arthralgia, myalgia body ache, anorexia, nausea, vomiting. The median duration of fever was 6days (range 3-10days) with Median maximum body temperature of 39.0c (range 38.5-40.6c). Only 18 patients (18%) had a biphasic course with a nadir between 2 temperature peaks. The remaining 82 patients had a continuous temperature. It was observed that leucopenia was present in a significant number of patients with DF and DHF. Haemo concentration was found in only 4 patients (21.05%) with DHF. Liver enzymes were elevated in 10 patients (12.34%) with DF and in 8 Patients (42.10%) with DHF while deranged renal function tests were found in 4 patients (21.05%) with DHF and two patient (2.46%) with DF. Coagulation profile was deranged in 5 patients (26.31%) with DHF and in none of the patients with DF. Microscopic examination of urine samples did not show any evidence of haematuria in any of the patients in the study. Pleural effusion was found in 10 patients (52.6%) and ascites was found in 11 patients (58%) of DHF. Hepatomegaly was present in 18 patients (22%) of DF and 8 patients (42%) of DHF.

## DISCUSSION

Gopal K *et al.*<sup>6</sup> (2017) in their cross-sectional observational study undertaken among adult patients admitted in a teaching hospital, reported that most of the patients i.e. 42.86% were between 21-30 years of age. According to Stephan c *et al.*<sup>9</sup> (2002)<sup>102</sup>, the maximum incidence of dengue fever among adult population was in the age group of 21-30 years. From the studies by Gopal K *et al.*<sup>6</sup> (2017), Khan YM. *et al.*<sup>11</sup>(2016), Meena R *et al.*<sup>14</sup> (2016) including the present study, it appears that among population >12 years of age, dengue infection is most common between 12-30 years, with a maximum incidence in the age group of 12-20 years. The male to

female ratio in the present study is 2.44 : 1 which correlates well with the findings of Deshwal R. *et al*<sup>10</sup> (2015). Although DHF, is said be primarily a disease of children under the age of 15 years, the relatively high incidence of DHF Patients in the present study may be due to more severe patients being referred to this hospital for tertiary care. Also, most of the patients with DHF in the present study were in the age- group of 12-20 years. Kale AV *et al*<sup>7</sup> (2007) in his study of Clinical Profile and Outcome of Dengue Fever from a Tertiary Care Centre at Aurangabad Maharashtra India: An Observational Study showed that 128 (85.33%) cases were Dengue fever with warning signs, 15 (10%) were Severe dengue and 7 (4.67%) were Dengue fever without warning signs which was quite close to the present study. Also Madhavi K *et al* (2016) did a study of clinical and haematological profile of dengue fever in a tertiary care hospital at Kakinada in which showed resonating results to the present study as 72% patients had Dengue fever, 23% patients had DHF and 5% had DSS. Thus fever is the most common presentation in dengue infection as shown by the studies of Gopal K *et al*.<sup>6</sup> and Khan YM. *et. Al*<sup>11</sup>, Deshwal R. *et al*<sup>10</sup> as in the present study. The second most common symptom in the present study was headache (62%) which correlates well with the findings of Khan YM. *et. Al*<sup>11</sup>. The other major clinical manifestation in the present study were retro – orbital pain (20%), arthralgia and/or myalgia (40%) and bodyache (66%), which is also confirmed by study of Khan YM. *et. Al*<sup>11</sup> (2016). About 25% patients in the present study complained of anorexia, and 15 percent of patients had diarrhea. Abdominal pain, which was mainly in the epigastric region, was seen in 30% patients, which is also seen in the studies of Gopal K *et al*.<sup>6</sup> (2017), Khan YM. *et.al*<sup>11</sup> (2016). A total of 25 patients (i.e. 25%) had haemorrhagic manifestation in the present study. Rash was observed in 2% cases in the study of Gopal K *et al*.<sup>6</sup> (2017), and in 29.33% cases in the study of Khan YM. *et. Al*<sup>11</sup> (2016). In the present study, rash was seen in 26.78% cases. In the present study hepatomegaly was observed in 25 patients (25%) a comparable incidence of (14.2%) has been reported by Deshwal R. *et al*<sup>10</sup> (2015). Kale AV *et al*<sup>7</sup> (2007) in his study of Clinical Profile and Outcome of Dengue Fever from a Tertiary Care Centre at Aurangabad Maharashtra India: An Observational Study showed similar results to the present study as fever (100%), myalgia (65.3%), headache (38.6%), vomiting (64%), retro-orbital pain (43.3%), abdominal pain (54.6%), rash (41.9%), positive tourniquet test (34.6%). Another study which was similar to present study was Kashinkunti MD *et al*<sup>8</sup> (2013) a Study of Clinical Profile of Dengue Fever in a Tertiary Care Teaching Hospital showed fever was present in all cases and is the most common symptom

followed by headache (90%), myalgia (81%), vomiting (56%), abdominal pain (48%), breathlessness (25%), skin rash (21%), and altered sensorium (13%). Hemorrhagic manifestations (21%) included petechiae, ecchymosis, gum bleeding, hematuria, malena, hematemesis and epistaxis. The occurrence of petechiae was found in the current study (i.e. 14%) when compared similar to the study of Khan YM. *et. Al*<sup>11</sup> (2016). Haematuria was found in 10.34% in Khan YM. *et. Al*<sup>11</sup> (2016) whereas it was 2% in our study. Differences between our study and Khan YM. *et. Al*<sup>11</sup> (2016) was seen in higher percentage of PV bleeding, positive tourniquet test, epistaxis and Gingival bleeding in the latter as compared to the former. Thus, the most common haemorrhagic manifestation in the present study were hematemesis as seen in 16.07% patients, which correlates well with the findings of Wittesjo B *et al*<sup>12</sup> (1993) and Cobra c *et al*<sup>13</sup> (1995). The second most common haemorrhagic manifestation in the present study was GI bleeding in the form of haematemesis and/or malena, which was seen in 10.71% patients this is comparable with finding of Wittesjo B *et al*<sup>12</sup> (1993) who have reported an incidence of 13.04% of GI bleeding. Although some authors have mentioned that a positive tourniquet test may be found in over 1/3rd of patients Cobra c *et al*<sup>13</sup> (1995) in their study on 267 patients with DF have reported a positive tourniquet test only in 2.20% patients. The median duration of fever in the present study was 6 days (range 3- 10 days), While the median maximum body temperature was 39.0c (range 38.2-40.2c). Both these findings correlate with the study of Stephen c *et al*<sup>9</sup> (2002). However, only 18% patients had a typical biphasic course of fever in the present study as against 38% reported by Stephen c *et al*<sup>9</sup> (2002) most of the patients in the present study had continuous fever (82%). In laboratory parameters it was observed that a low white cell count was present in a significant number of patients with DF and DHF. Haemoconcentration was found in only 4 patients (21.05%) with DHF. Liver enzymes were elevated in 10 patients (12.34%) with DF and in 8 Patients (42.10%) with DHF while deranged renal function tests were found in 4 patients (21.05%) with DHF and two patient (2.46%) with DF. Coagulation profile was deranged in 5 patients (26.30%) with DHF and in none of the patients with DF. Microscopic examination of urine samples did not show any evidence of haematuria in any of the patients in the study. Khan YM. *et. Al*<sup>11</sup> (2016) in his Study in Nizamabad, Telangana State of India Among haematological parameters, raised haematocrit (>45%) was found in 35 (23.33%) and leukopenia (<4000/cmm) was found in 58 (38.66%) patients which was slightly lower than the present study findings. A similar finding to the current

study of thrombocytopenia was observed in all the patients with varying severity, severe (<20000/cmm) was observed in 23 (15.33%) patients while moderate (20000-50000/cmm) in 62 (41.33) patients. Platelet count at presentation was <50000 in about 56.66% of the patients. Minimum platelet count noted was 9000/cmm. Among biochemical parameters, raised serum bilirubin (>2mg%) was observed in 17 (11.33%) while raised SGOT (>45 IU/L), raised SGPT (>45 IU/L) were observed in 61 (40.66%) and 42 (28%) respectively, approximately 1/3<sup>rd</sup> to the present study i.e. 4.66% patients had raised serum creatinine (>1.5mg/dl). Another study resonated with the results found in the present study was of Gopal K *et al.*<sup>6</sup> done in central India shows mean platelet count is 51286 /cumm platelet count, 40000-100000 noted in 63.81 % cases, < 20000 in 16.19% cases and > 100000 /cumm platelets count found in 3.80%. mean haemoglobin among study population was 11.61 gm% in our study population. 43.81% cases required blood products transfusion during their hospital course. Frequency of blood transfusion does not seem to be affected by low platelets count as bleeding manifested in subjects having count >50000 – 100000 also. Hepatic involvement was present in majority of cases in our study, we found serum ALT >45 in 22.85% cases and AST >45 seen in 19.04% cases. Deranged INR (>1.5 ) noted in 11.42 % cases. Rise in serum transaminases and coagulopathy was more in group of severe dengue as compared to dengue fever with warning signs and dengue fever without warning signs. There was 84.4% and 93.75% ALT and AST elevation respectively in dengue with warning signs and 94.5% and 95.9% ALT and AST elevation respectively in severe dengue and fulminant hepatic failure was observed in severe dengue.

## CONCLUSIONS

The most common presenting symptom was fever. The 2<sup>nd</sup> most common symptom was bodyache. A large number of patients with dengue infection had headache, myalgia and/or arthralgia, and retro- orbital pain.

1. The median duration of fever was 6 days (range 3-10 days).
2. Typical biphasic pattern of fever was seen in only a small number of patients.
3. The most common haemorrhagic manifestations were haematemesis and malaena.
4. A positive tourniquet test was found only in a small number of patients.

5. Thrombocytopenia is an important haematological finding, both in DF and DHF patients.
6. Leukopenia is found in majority of the patients with DF and DHF.
7. DHF patients usually show one or more signs of plasma leak eg. Hypoalbuminmia, haemoconcentration, ascites and pleural effusion.

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