

Original article

## Cross sectional study on clinico-investigative profile of dengue fever with context to thrombocytopenia

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### Abstract:

**Background:** India is one of the seven identified Southeast Asian countries reporting frequent outbreaks of the dengue with case fatality rates as high as 3-5%. Dengue has an extensive clinical presentation ranging from fever to fatal bleeding and shock, often with an unexpected mortality.

**Objective:** To study clinico-investigative of dengue fever with context to thrombocytopenia.

**Material and Method:** This was descriptive cross sectional study conducted at tertiary care medical teaching hospital of western Maharashtra. Total 200 patients were included in present study as per inclusion and exclusion criteria. Purposive sampling method was used in this study. Structured and pilot tested questionnaire used for data collection.

**Results.** Prevalence of dengue in present study was found to be 4%. Out of 200 patients maximum (53.5%) were in the age group of 15 to 30 years of age and male predominance was seen. In present study out of all patients 97.5% (195) survived where as 2.5% (05) succumbed to dengue. Statistical significant difference was observed in mean hematocrit value of mild and severe thrombocytopenic patients. Most common symptoms observed in current study were headache (77%) and myalgia (76.5%). Mean hospital stay of mild thrombocytopenic patients was 5.92±2.09 days while moderate and severe thrombocytopenic patients mean hospital stay was 6.2±2.74 days and 7.03±3.3 days respectively.

**Conclusion:** The distribution patterns of clinical and laboratory criteria observed did not differ substantially from those described in the literature. Hematocrit and level of thrombocytopenia indicate the prognosis in terms of hospital stay of patients suffering from dengue.

**Key words:** Dengue, Thrombocytopenia, Fever, Hematocrit, Dengue hemorrhagic fever

### Introductions

Dengue, which has four serotypes, is the vector-borne illness that spreads the quickest (DEN-1 to DEN-4). In the world, there are thought to be between 50 and 100 million cases of dengue fever (DF) and between 250,000 and 500,000 cases of dengue hemorrhagic fever (DHF) annually<sup>1</sup>. DHF cases in Southeast Asia have climbed from 10,000 in the 1950s to over 200,000 in the 1990s, on average. As a result, the dengue virus is now a significant contributor to disease and death in tropical regions<sup>2</sup>. India is a tropical nation and is the home of many infectious illnesses. One of the seven Southeast Asian nations with dengue epidemics regularly reporting case fatality rates of up to 5% is India. <sup>3</sup> *Aedes aegypti*<sup>4</sup>, a female mosquito, is what transmits dengue. Vellore reported the first case of dengue fever in India in

1956, while Calcutta reported the first case of dengue hemorrhagic fever in 1963<sup>5</sup>. Dengue cases in India are thought to range from 7.5 to 32.5 million annually<sup>6</sup>. Leucopenia and thrombocytopenia are two symptoms of dengue. Evidence from several sources point to the possibility that plasma leakage may be mediated by endothelial cell activation. The consequences of plasma leakage on endothelial cells are assumed to be constructive rather than negative. Endothelial cell dysfunction may also be brought on by the activation of infected monocytes and T-cells, the complement system, and the generation of mediators, monokines, cytokines, and soluble receptors. Thrombocytopenia, along with related platelet dysfunction or disseminated intravascular coagulation, may result in haemorrhage. <sup>7</sup>All four serotypes of dengue are responsible for severe form

such dengue hemorrhagic fever (DHF) and dengue shock syndrome DSS). Dengue presents a wide range of clinical symptoms, from fever to shock and catastrophic haemorrhage, frequently with an unexpected death. Given this backdrop, the goal of the current study was to ascertain the clinico-investigative profile of dengue fever in relation to thrombocytopenia.

#### **Material and Method:**

Before starting the study, the Institutional Ethical Committee (IEC) was consulted. This descriptive cross-sectional study was carried out in western Maharashtra's tertiary care teaching hospital. The participants gave their informed consent after being guaranteed of the confidentiality of the data. The current investigation was conducted for a total of two years.

Dengue cases were classified and reported in accordance with WHO guidelines<sup>8</sup>. According to criteria, patients were categorised as having suspected, probable, or confirmed dengue. A case that meets the clinical criteria for suspected dengue is one in which the patient has lived in or travelled to an area where the disease is endemic, has a history of fever, and at least one of the following symptoms: nausea, vomiting, rash, aches and pains, leucopenia, or any other warning sign. A case that meets the clinical description and any of the criteria, such as a positive IgM antibody test in late acute convalescent phase blood samples or a positive Ns1 antigen, is considered to be likely to have dengue.

A case of confirmed dengue is one that meets certain laboratory requirements, such as showing a fourfold or greater change in dengue IgG or IgM antibody titers in paired serum samples, demonstrating viral genomic sequences or the antigen of the dengue virus in patient samples, or isolating the dengue virus from serum, plasma, leucocytes, or samples. The research covered all patients who were 15 years of age or older, were willing to participate, and met the prerequisites. Individuals with malaria, typhoid, leptospirosis, or any other disease producing thrombocytopenia were eliminated, as were those with any previous chronic illness that would impede the evaluation of a dengue consequence.

In all, 200 patients met the inclusion and exclusion criteria for the current study. In this investigation, a method of deliberate sampling was employed. A

structured, pilot-tested questionnaire was utilised to gather the data. The questionnaire has three sections. Together with sociodemographic data, a complete case history of weakness, nausea, headaches, fever, blurred vision, sleep patterns, the length of the fever, abdominal discomfort, etc. was documented in Part I. Information on both general and clinical examinations was documented in section II. A thorough physical examination was performed. A local examination was important in determining the patients' current health, any signs and symptoms of illness, and any other underlying medical conditions. The patients were given a daily score<sup>8</sup> based on the place of bleeding.

Data from the investigation were documented in Part III. Each patient had their CBC, PCV, SGOT, SGPT, serum albumin, Dengue IgM and IgG levels, NS-1, and a chest X-ray performed. A severity score<sup>9</sup> was given to the patients based on successive haematocrit levels and the presence of features suggestive of capillary leak or shock. SPSS v.16 was used to evaluate the data that was input into Microsoft Excel. Calculated descriptive statistics included mean, standard deviation, frequency, and percentage. To examine associations, inferential statistics such as the unpaired t test and chi square test were utilised. P values under 0.05 were considered statistically significant.

#### **Results.**

In present study total 5000 patients were hospitalized in the tertiary care teaching hospital. Out of 1000 patients 200 tested positive for dengue. All the samples selected for the present study were aged above 15 years of age. Prevalence of dengue in present study was found to be 4%. Out of 200 patients maximum (53.5%) were in the age group of 15 to 30 years of age, 34% (68) and 12.5% (25) were in the age group of 31 to 50 years and above 51 years respectively. The mean age of all participants was  $33.77 \pm 15$  years. Out of 200 patients 118 (59%) were males and 82 (41%) were females. (Graph no 01). Distribution of patients based on severity of dengue shown in table no 01. Out of 200 patients suffering from dengue 68% (137) patient's hematocrit was less than 40 (Table no 02A). In this study mild thrombocytopenia was seen in 46% (92) cases. (Table no 02B)

Most common symptoms observed in current study were headache (77%), myalgia (76.5%), arthralgia (71.5%) and body ache (71%). Nausea/vomiting and retro-orbital pain was less commonly observed. (Table no 03). Out of 200 patients most common complication was ascites (28%) and gall bladder wall thickening (33%) (Graph no 02). Mean SGPT (u/l), mean hemoglobin (g/dl) and mean WBC (cells/mm<sup>3</sup>) of patients were 32.1±12.68, 13.48±0.5, 3882.52±323.7 respectively. In present study out of all patients 97.5% (195) survived where as 2.5% (05) succumbed to dengue.

Mean hematocrit value of patients having mild thrombocytopenia was 37.33±8.1, while moderate and severe thrombocytopenic patients mean hematocrit value were 38.59±8.25 and 40.98±8.35 respectively. Statistical significant difference was observed in mean hematocrit value of mild and severe thrombocytopenic patients on Mann Whitney test. (P=0.03). On comparing the number of patients according to level of thrombocytopenia and severity of dengue, there was no statistically significant difference observed (P= 0.16, table no 04). Average hospital stay of patients was 6.2±2.58 days. Mean hospital stay of mild thrombocytopenic patients was 5.92±2.09 days while moderate and severe thrombocytopenic patients mean hospital stay was 6.2±2.74 days and 7.03±3.3 days respectively. On unpaired 't' test statistical significant difference was seen in between mean hospital stay of mild and severe thrombocytopenic patients only (P: 0.03)

#### **Discussion:**

Dengue fever is a common communicable disease and major threat worldwide. Its complex nature is a major concern for the clinicians. In present study out all patients 53.5% were between 15 to 30 years of age, 34% and 12.5% were in the age group of 30 to 50 years and above 50 years of age respectively. Mean age of male and females were 35.21±16.29 and 33.90±12.85 years respectively. In this study majority of patients suffering from dengue were males. In Francisca RF et.al.<sup>10</sup> study 66 patients were of 15 years old and 88 were of above 15 years age. Vulavala et al<sup>11</sup> in their study reported that majority of the patients were in 18-40 age groups (60.32%) and predominantly were male patients (70.97%). Study conducted by Ahemd S et al<sup>12</sup>, Milltal H et al<sup>13</sup>,

Lee MS et.al<sup>14</sup> etc. also reported male predominance in their study.

Most common symptoms reported by dengue patients were head ache, body ache and myalgia. In Deshwal R et. al<sup>15</sup> study the common symptoms were fever (100%), headache (94.7%), myalgia (90.67%) etc. Lee MS et al<sup>14</sup> in their study found that the most common symptoms of dengue patients were fever (96.1%), myalgia (68.5%), headache (55.4%), and skin rash (53.7%). Ascites, gall bladder thickening and hepatomegaly were common complication seen in present study.

Deshwal R et al<sup>15</sup> reported similar finding in his study. Hematocrit value found severely derange in present study and statistical significant difference was observed in hematocrit value of mild and severe thrombocytopenia group. Kittigul L et. al.<sup>16</sup> in their study reported hemoconcentration, thrombocytopenia, increased alanine aminotransferase, and longer prothrombin time. Mild thrombocytopenia was seen in 104 patients (52%), moderate in 76 cases (38%) whereas severe thrombocytopenia was seen in 20 cases (10%).

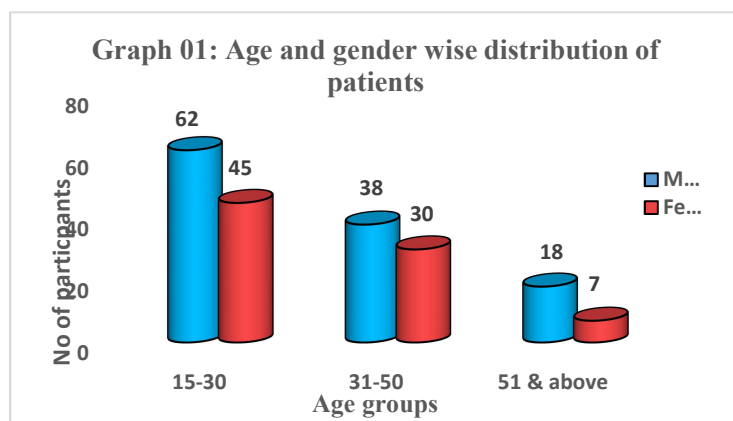
In present study severity of dengue was assessed. Of the 200 patients classic dengue fever was seen in 78.5% cases severe dengue 12% cases and dengue hemorrhagic fever was seen in 9.5% cases. With regards to the platelet count mild thrombocytopenia was seen in 52% patients, moderate in 38% patients whereas severe thrombocytopenia was seen in 10% patients. On comparing the number of patients according to level of thrombocytopenia and severity of dengue, there was no statistically significant difference observed. Anish Laul et al<sup>17</sup> reported DF in 73%, DHF in 16.5%, DSS in 1.7%, and EDS in 4.3%. In our study the average stay of patients in the hospital was 6.2± 2.58 days. There was a trend of increase in the number of days of hospital stay with regard to the level of thrombocytopenia. In this study 2.5% mortality seen among admitted patients. . Abdul M et. al<sup>18</sup> in their study reported that mean hospital stay was 10.63 ± 8.434 days in those who died and 1.5% mortality was observed in his study.

#### **Conclusion:**

Within the limits of our study we found that males are affected more than females. The distribution patterns of clinical and laboratory criteria observed

did not differ substantially from those described in the literature, despite the differences in sample selection criteria between studies. The clinical profile of the patients in our study can be characterized by the presence of fever, headache, bodyache, myalgia, arthralgia, nausea and vomiting. There was an

association between the level of thrombocytopenia and the length of hospital stay. The haematocrit levels also corresponded with the level of thrombocytopenia. Thus, haematocrit and level of thrombocytopenia indicate the prognosis in terms of hospital stay of patients suffering from dengue.

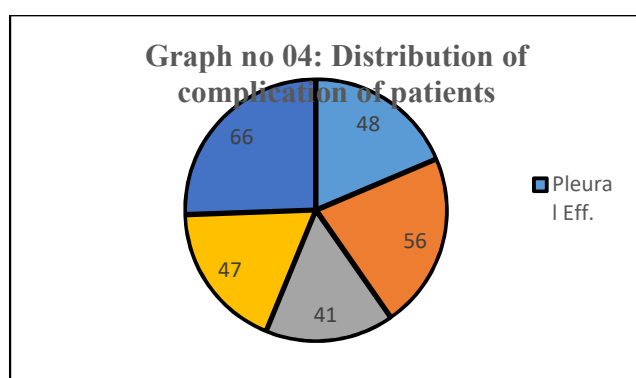


Sr. No	Severity type	Frequency (%)
1.	Classic dengue fever	157 (78.5%)
2.	Severe dengue	24 (12.0%)
3.	Dengue hemorrhagic fever	19 (09.5%)
	<b>Total</b>	<b>200 (100%)</b>

Sr. No	Hematocrit levels	Frequency (%)
1.	< 40	137 (68.5%)
2.	40 to 45	16 (08%)
3.	> 45	47 (23.5%)
	<b>Total</b>	<b>200 (100%)</b>

Sr. No	Thrombocytopenia level	Frequency (%)
1.	Mild	92 (46%)
2.	Moderate	77 (38.5%)
3.	Severe	62 (31%)
	<b>Total</b>	<b>200 (100%)</b>

Sr. No.	Symptoms	Frequency (%)
1.	Headache	154 (77%)
2.	Body ache	142 (71%)
3.	Myalgia	153 (76.5%)
4.	Arthralgia	143 (71.5%)
5.	Vomiting /Nausea	124 (62%)
6.	Abdominal pain	85 (42.5%)
7.	Rash	82 (41%)
8.	Bleeding	19 (09.5%)
9.	Retro orbital pain	115 (57.5%)
	Total	200 (100%)



Severity of dengue	Level of thrombocytopenia			
	Mild	Moderate	Severe	Total
Classical	75	62	20	157
Severe	11	06	07	24
Dengue shock syndrome	06	09	04	19
<b>Total</b>	<b>92</b>	<b>77</b>	<b>31</b>	<b>200</b>

Chi-square ( $\chi^2$ ):6.57, d.f:04 P:0.16 Non significant

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