

Original Research Article

Clinical Study of Dengue Fever in Jalandhar, North India

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Abstract: Dengue fever, a vector borne viral disease has emerged as a major public health problem of international concern because of its severe manifestations such as dengue haemorrhagic fever and dengue shock syndrome. The objective of this study is to find the clinical profile of Dengue patients treated in a tertiary care hospital in the district Jalandhar of North India. It is a hospital based observational study wherein all the serologically confirmed dengue fever patients during the period of June 2015 to December 2015 were evaluated for demographic data, clinical presentation and laboratory findings and follow up was done to assess outcome in terms of recovery or death. Out of total 376 dengue cases, 206 (54.8%) were male and 170 (45.2%) female. 74.7% patients were urban and 25.3% rural, statistically significant ($p < 0.001$). Predominant age group affected was 16 – 30 years and majority of the patients occurred during monsoon and post-monsoon period. Most common presenting symptom was fever (81.2%), followed by myalgia (59.3%), red eyes (54.2%), headache (48.9%) and retro-orbital pain (46.3%). 71.3% patients tested NS1Ag positive. Mean platelet count was $26.5 \times 10^3/\mu\text{L}$ and in 17% patients, it was below $10 \times 10^3/\mu\text{L}$. 21.8 % patients received platelets transfusion. 1.8% patients died of dengue shock syndrome. Dengue causes mortality and morbidity mainly among productive age group. Early diagnosis and treatment, vector control measures should be strengthened and community awareness should be increased, during pre-monsoon period. The patients of dengue fever should visit physician early to prevent complications.

Keywords: Dengue, Clinical profile, IgM, IgG

INTRODUCTION

Dengue is a major public-health concern throughout tropical and sub-tropical regions of the world. It is the most rapidly spreading mosquito-borne viral disease, with a 30-fold increase in global incidence over the past 50 years. The World Health Organization (WHO) estimates that 50 –100 million dengue infections occur each year and that almost half of the world population lives in countries where dengue is endemic. Outbreaks exert a huge burden on populations, health systems and economies in most tropical countries of the world. While dengue is a global concern, with a steady increase in the number of countries reporting the disease, currently close to 75% of the global population exposed to dengue are in the

Asia-Pacific region [1]. Epidemics of Dengue were documented in the 1780s in Asia, Africa and North America. The first clinical case report of Dengue fever (DF) was by Benjamin Rush in 1780 during an epidemic in Philadelphia. He coined the word “break-bone fever”. The epidemics of dengue fever were common throughout the 20th century in the Asia-Pacific region [2]. The first epidemic of clinical dengue-like illness was recorded in Madras (now Chennai) in 1780 and the first epidemic of virological proven DF in India occurred in Calcutta and Eastern Coast of India in 1963-1964 [3-5]. The first major wide spread epidemics of dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) occurred in India in 1996 involving

areas around Delhi [6] and Lucknow [7] and then it spread to all over the country [8].

Dengue is caused by dengue virus transmitted by mosquitos mainly *Aedes aegypti* and also *Aedes albopictus*. A dengue virus (DV) belongs to the family Flaviviridae, and is a positive-stranded encapsulated RNA virus. There are four serotypes of the virus referred to as DV- 1, DV-2, DV-3, and DV-4. All four serotypes can cause the full spectrum of disease ranging from a subclinical infection to a mild self-limiting disease, DF to severe forms of the disease, DHF and DSS that may be fatal causing significant morbidity and mortality [2]. Dengue is invariably associated with high fatality rates. Therefore early detection and prompt treatment remains the mainstay in lowering mortality. The objectives of this study were to know demographic characteristics and clinical profile of the Dengue patients.

METHODOLOGY

The present study is an observational study done on the patients of dengue treated in Punjab Institute of Medical Sciences, Jalandhar during the period of June to December, 2015. The patients studied were having history of fever and clinical features suggestive of dengue. They were investigated for complete blood count (CBC), haematocrit and dengue serology (Rapid qualitative immune-chromatographic test, Dengue check combo by Zephyr bio-medicals) for NS1 antigen and IgG/IgM antibodies. Diagnosis was

made on the basis of clinical features and positive dengue serology (either NS1 antigen or dengue antibodies). The detailed history was taken and clinical examination was performed. The clinically sick or hemodynamically unstable patients and/or having platelet count < 75 thousand per microliter were admitted while others were treated as outdoor patients and followed-up with serial CBC. Chest x-ray, abdomen ultrasonography, liver and renal function tests were done where necessary. The criteria of DHF included acute febrile illness less than 10 days with bleeding manifestations and thrombocytopenia or raised haematocrit. With the presence of circulatory failure, it was termed as DSS. The variables recorded were demographic characteristics, including area of residence (urban or rural), clinical manifestations, laboratory parameters and outcome of the illness as recovery or death. The data was entered in Microsoft excel sheet and analysed statistically on SPSS software version 21.

RESULTS

There were total 376 patients, 206 (54.8%) male and 170 (45.2%) female; 245 (65.2%) indoor and 131 (34.8%) outdoor and 281 (74.7%) urban and 95 (25.3%) rural. The age range was 1 to 88 years with mean age 31.33 ± 17.17 years. The demographic characteristics of the patients are shown in table 1. The number of the patients increased progressively from June to maximum in the month of October and then declined. The monthly distribution of the dengue patients is shown in Figure 1.

Table-1: Demographic characteristics of the patients

| | Male, n (%) | Female, n (%) | Total, n (%) |
|------------------|-------------|---------------|--------------|
| Age range | | | |
| 1 – 15 | 45 (11.9) | 25 (6.6) | 70 (18.6) |
| 16 – 30 | 82 (21.8) | 58 (14.8) | 140 (35.3) |
| 31 – 45 | 46 (22.3) | 45 (12.3) | 91 (25.6) |
| 46 – 60 | 23 (11.1) | 28 (7.7) | 51 (14.0) |
| 61 – 75 | 7 (3.4) | 11 (2.8) | 18 (4.6) |
| ≥ 76 | 3 (1.4) | 3 (0.3) | 6 (1.1) |
| Urban | 162 (57.6) | 119 (42.4) | 281 (74.7) |
| ural | 51 (53.7) | 44 (46.3) | 95 (25.3) |
| Outdoor | 142 (57.9) | 103 (42.1) | 245(65.2) |
| Indoor | 72 (54.9) | 59 (45.1) | 131(34.8) |
| Total | 206 (54.8) | 170 (45.2) | 376 (100.0) |



Fig 1: Monthly distribution of the patients during study period

The clinical profile of the patients is given in table 2. The common clinical manifestations were fever (81.2%), myalgia (59.3%), red eyes (54.2%), headache (48.9%), retro-orbital pain (46.3%) and abdominal pain (37.7%). Skin rash was present in 4.2% and itching in 10.4% patients. 71.3% patients were positive for NS1 antigen, 27.4% for IgM antibodies, 30.8% for IgG

antibodies and 17.8% for both IgM and IgG antibodies (Table 3). The mean Hb was 10.4 (± 1.8) gm%, mean TLC $4.7 \times 10^3/\mu\text{L}$ and mean platelet count $26.5 \times 10^3/\mu\text{L}$. Most of the patients had 7 to 8 times elevated liver enzymes; SGOT was elevated more than SGPT, while serum creatinine was mildly raised. The laboratory findings are shown in table 4.

Table 2: Clinical features of the patients of dengue fever

| Clinical features | N | Percentage | 95%CI |
|----------------------|-----|------------|-----------|
| Fever | 305 | 81.2 | 75.3-87.8 |
| Myalgia | 223 | 59.3 | 52.3-64.4 |
| Arthralgia | 128 | 34.2 | 27.5-40.6 |
| Headache | 184 | 48.9 | 41.4-54.6 |
| Red Eyes | 204 | 54.2 | 49.2-58.8 |
| Retro-orbital pain | 174 | 46.3 | 39.5-49.4 |
| Skin rash | 16 | 4.2 | 3.1-5.5 |
| Abdominal pain | 142 | 37.7 | 28.5-46.4 |
| Painful hepatomegaly | 52 | 1.4 | 0.9-2.2 |
| Vomiting | 150 | 39.9 | 28.7-48.2 |
| Breathlessness | 14 | 3.7 | 2.2-5.4 |
| Itching | 39 | 10.4 | 8.6-11.8 |

95% CI: 95% confidence interval

Table 3: Distribution of the patients according to dengue serology

| Serological Test | Positive (n) | Percentage |
|------------------|--------------|------------|
| NS1 Ag | 268 | 71.3 |
| IgM | 103 | 27.4 |
| IgG | 116 | 30.8 |
| Both IgM & IgG | 67 | 17.8 |

Table 4: Laboratory parameters of the patients of dengue fever

| Parameter | Mean | SD | (95% CI) |
|---|-------|-------|---------------|
| Hemoglobin (gm %) | 10.4 | 1.8 | 8.6 – 11.8 |
| Total leucocyte count ($\times 10^3/\mu\text{L}$) | 4.7 | 1.4 | 4.5 – 4.8 |
| Platelet count ($\times 10^3/\mu\text{L}$) | 26.5 | 8.4 | 25.6 – 27.3 |
| SGOT (IU/L) | 312.8 | 102.7 | 302.4 – 323.1 |
| SGPT (IU/L) | 298.6 | 94.7 | 289.3 – 308.1 |
| S. Creatinine (mg %) | 1.2 | 0.4 | 0.7-1.8 |

95% CI: 95% confidence interval

The platelet count in majority of the patients (38%) was between 10 – 50 thousands and it was below 10 thousand in 17% patients. The distribution of the

patients as per haemoglobin levels and as per platelet count is shown in figures 2 and 3.

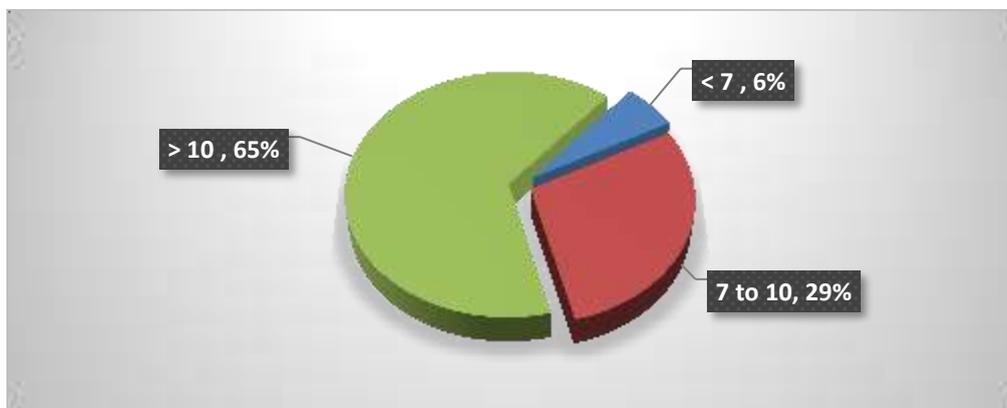


Fig 2: Distribution of the patients as per haemoglobin level (gm %)

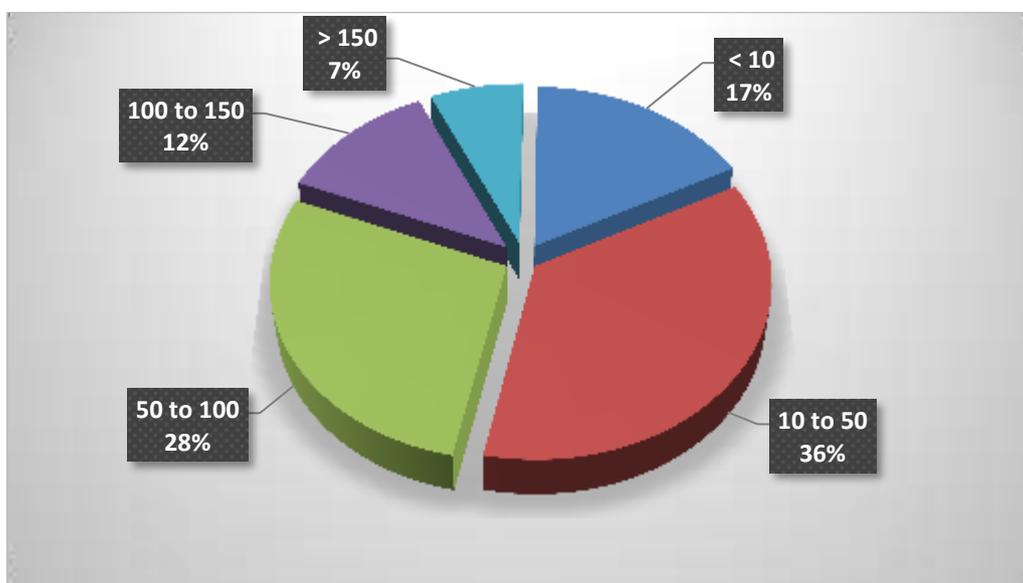


Fig 3: Distribution of the patients as per platelet count (x 10³/µL)

Most of the patients (98.2%) had dengue fever (DF) and recovered with symptomatic supportive treatment; 82 (21.8 %) patients received platelets transfusion in our study. 7 patients (1.8%) presented with dengue shock syndrome (DSS) and all of them had mortality. The profile of the patients died of DSS is

presented in Table 5. The age range of the deceased patients was 18 – 80 years with mean age 41.7 (±22.47) years. Five of them were positive for NS1 antigen. The platelet count of these patients was not very low and ranged between 40 to 87 thousands.

Table 5: Profile of the patients who died of Dengue Shock Syndrome

| S. No. | Age | Sex | Hb (gm %) | TLC (x10 ³ /µL) | Platelet (x10 ³ /µL) | SGOT | SGPT | NS1Ag | IgM | IgG |
|--------|-----|-----|-----------|----------------------------|---------------------------------|------|------|-------|-----|-----|
| 1. | 80 | F | 11.7 | 6.4 | 80 | 247 | 330 | N | P | N |
| 2. | 40 | F | 7.6 | 4.1 | 50 | 7881 | 3516 | P | N | P |
| 3. | 45 | M | 12.6 | 3.2 | 72 | 273 | 179 | P | N | N |
| 4. | 60 | F | 12.6 | 3.6 | 80 | 422 | 152 | P | N | N |
| 5. | 30 | F | 16.6 | 5.7 | 40 | 490 | 257 | P | N | N |
| 6. | 18 | M | 10.7 | 16.8 | 48 | 170 | 98 | P | N | N |
| 7. | 19 | F | 8.6 | 11.1 | 87 | 6984 | 1854 | N | N | P |

DISCUSSION

Dengue is the most common and widespread arboviral infection in the world today. It is an increasingly prevalent tropical arbovirus infection with significant morbidity and mortality. Dengue is emerging as a major public health problem in North India [2]. In the present study, majority of the patients (35.3%) belonged to the age group 16-30 years and male patients outnumbered female patients. The study by Chaturvedi UC *et al.*; [9] also reported high incidence in young population. Gupta *et al.*; [10] and Chakravarti and Kumaria [11] reported maximum cases in the age group 21–30 years with male preponderance. However, Sarkar *et al.*; [12] reported maximum cases in the age group 0–10 years with female preponderance. The increased mobility of adult population, better access to health care facilities and easy access to physicians might be some causative factors for high incidence of dengue infection among adults. Males were slightly more (54.8%) affected than females; statistically insignificant ($p= 0.062$). This finding is consistent with that of Anker & Arima [13]. In contrast to this, higher prevalence of dengue in females is observed by Murugananthan *et al.*; [14] Majority of the patients were urban residents (74.7 %), this might be due to location of our hospital in urban area. Additionally, urbanization also favours vector breeding. The common presenting features of the patients were fever, myalgia, redness and pain in eyes and headache. Fever lasted for mean of 2–7 days and average hospital stay was 4.88 days. 28% patients stayed for more than one week. The longer hospital stay results in significant burden in terms of cost of care which is particularly important in resource limited settings. The management of dengue is essentially supportive. Dengue viral infections are rarely fatal, although fatal infections do occur due to plasma leakage, fluid accumulation, respiratory distress, severe bleeding or multiple organ involvement [15]. Overall mortality in our study was 1.8 % and all death cases were admitted with multi-organ dysfunction and the cause of death was shock. Since patients with mild or classical DF can develop severe infection later, therefore dengue patients should be monitored vigilantly [16]. Majority of the patients were reported during the monsoon and post monsoon seasons, in accordance with the earlier reports of dengue transmission [17, 18]. Heavy rain fall proceeding these months might be a contributing factor. Preventive measures with full swing should be carried out before the monsoon in order to combat this disease.

CONCLUSION

Dengue viral infection is a dangerous and debilitating disease that is a growing threat to the global health. North India is facing worse dengue crisis. Our findings showed that dengue is common in all age groups regardless of gender, race and residency. In current study, dengue presented with several typical and

some atypical manifestations. Our data showed that DF presented as morbid disease with varied clinical features and longer hospital stay. The mortality occurred in all age groups and more in female patients than male patients. Routine use of laboratory tests in diagnosis of dengue along with public awareness and vigilant monitoring by health care professionals could go a long way in combating dengue. Dengue is one of the major public health problems which can be controlled with active participation of the community. Need is to organize health education programmes about dengue disease to increase community knowledge and sensitize the community to participate in integrated vector control programmes. Our findings will help national dengue control authorities to continue efforts for prevention and treatment of dengue infection in this region of North India.

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