A Study on Clinical Profile of Dengue Cases in Tertiary Care Hospital of Central Part of India

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Abstract

Background: Dengue is an Aedes mosquito-borne viral disease brought about by an arbovirus. There are an estimated 2.5 billion people who are at risk for contracting dengue, of whom about 100 million do so each year. Dengue fever is an acute febrile illness with frontal headache, retro-ocular pain, muscle pain, joint pain, and rash, even though other signs and symptoms could also be present. Aim to study clinical profile of dengue cases in tertiary care hospital of central part of India.

Methodology: Prospective observational study was carried over a period of 1 year month from July 2021 to June 2022, patient were admitted in R D Gardi medical college Ujjain, Madhya Pradesh, India. About 130 cases were included in study. The information regarding demographic details, clinical symptoms and complications, and epidemiological details were collected from the records using a questionnaire.

Result: Maximum cases of dengue was seen in 19-44 year of age group (60%) and in male (62.31%). Only 16.15% had more than 7 days of hospital stay. It was found that 66.92% of dengue cases were DENGUE NS1 positive. Only 10.77% were IgM positive. It was observed that in study about 71 cases were having severe thrombocytopenia. It was observed that 27 cases had platelet transfusion.

Conclusion: Dengue is a difficult infectious disease that poses a serious public health risk. The reduction of mortality and morbidity requires more vigilance on the part of healthcare professionals while dealing with a case. To meet this issue, hospitals must be prepared with the proper public health measures.

Keywords: Dengue Fever, Clinical Manifestation, Laboratory Test, DHS, DSS, Serological Marker, Thrombocytopenia.

Introduction

Dengue is an Aedes mosquito-borne viral disease brought about by an arbovirus [1]. The dengue virus (DENV) is classified into four serotypes named (dengue virus-1) DENV-1, (dengue virus-2) DENV-2,

(dengue virus-3) DENV-3, and (dengue virus-4) DENV-4.[2]

According to World Health Organization (WHO), the disease can be classified into group A, group B, and group C, where group C is the most severe form of the disease.[3] The number of dengue cases reported to WHO increased over eight folds over the last two decades, from 505,430 cases in 2000 to over 2.4 million in 2010, and to about 4.2 million in 2019.[4] For more than 200 years, the Western Hemisphere has seen periodic epidemics. There are an estimated 2.5 billion people who are at risk for contracting dengue, of whom about 100 million do so each year. Of them, over 250 000 get dengue haemorrhage shock (DHF) or dengue shock syndrome (DSS).[5]

Dengue fever is an acute febrile illness with frontal headache, retro-ocular pain, muscle pain, joint pain, and rash, even though other signs and symptoms could also be present (such as lymphadenopathy, petechiae, nausea, hepatomegaly, and different types of haemorrhagic manifestations). [6]

There is no specific treatment for dengue/severe dengue. Early detection of disease progression associated with severe dengue, and access to proper medical care lowers fatality rates of severe dengue to below 1%.[7]

Materials and Methods

Prospective observational study was carried over a period of 1 year month from July 2021 to June 2022, patients were admitted in R D Gardi medical college Ujjain, Madhya Pradesh, India.

Inclusion criteria

* Patients above 13 year of age admitted with symptoms suggestive of Dengue Fever and found positive for NS1 antigen and Dengue IgM antibody by ELISA test.

Exclusion criteria

* Patients with chronic kidney disease.
* Patients with chronic liver disease.
* Patients with co-infections - malaria, leptospirosis, Scrub typhus.
* Incomplete case sheet.

Sample size: sample size was calculated using the formula $4PQ/d^2$ where P is the proportion of dengue fever cases showing abdominal pain as a symptom. The value of P is taken to be 62.4% which was obtained from a previous study done at Kollam, Kerala.[8] The calculated minimum sample size was 60. We included 130 samples in the study.

Case selection: A suspected case of dengue was defined by any person living or traveling in the dengue-endemic zone with fever (≥99°F) along with any two of the following symptoms: nausea or vomiting, rash, aches and pains, a positive tourniquet test, leukopenia (<4,000/mm3), and any warning signs. In addition, a confirmed dengue case was defined by a positive non-structural protein 1 antigen (NS1Ag) in the blood of a suspected dengue patient.

The diagnosis of dengue fever was based on clinical features, (fever, headache or body ache, altered sensorium, haemorrhagic manifestation, jaundice, and shock) and positive serum NS1/IgM / IgG antibodies. The dengue sero-markers used in this study were NS1 antigen, IgM and IgG antibodies. The method which was employed in the study was a Rapid immunochromatographic test (card test). All patients with confirmed serology (IgM positive alone or both IgM and IgG) or NS1 antigen positive dengue fever patients were enrolled. The other requisite tests were done for each of the dengue patients. In addition to these specific markers, age, gender, fever duration, clinical manifestations and laboratorial parameters were recorded for each patient.

Details of data collection:

An adequate history, clinical examination, and investigations ruled out dengue co-

infection with other viral, protozoal, or bacterial diseases. For data collection, a complete case record form was created and utilized throughout the data collection. The questionnaire included demographic information, clinical data, pertinent investigations, and the patient's admission outcome. Age, gender, first symptoms, underlying co-morbidities, clinical findings, laboratory investigations, and results were documented. Standard of care investigations, including total blood count, haematocrit, anti-dengue antibody IgM and IgG, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and other laboratory assays, were conducted for all patients. Every patient underwent an immediate clinical examination focused on fever, vital signs, urine output, rash, and further necessary systemic examinations. Every patient was followed up every day till they were discharged. According to the WHO classifications of dengue (2009), disease severity was defined as group A, group B, and group C for all patients. Haematological profiles and biochemical investigations were done at the time of admission and were followed by daily (or bi-daily) investigations as required until discharge. Signs of plasma leakage were assessed by chest radiograph and abdominal ultrasonography. The patient's outcome was measured in terms of mortality during hospital admission. Data collection was performed by the lead researcher and was recorded in a Microsoft Excel sheet separately.

Patients were classified as dengue fever, dengue haemorrhagic fever or dengue shock syndrome according to WHO guidelines [11] and laboratory diagnosis of dengue was established by demonstration of specific IgM antibodies to dengue in serum.

Statistical analysis

Statistical studies were carried out utilizing SPSS version 20.0 for Windows (IBM Corp.). We used both descriptive and inferential statistics. Categorical variables were expressed as frequencies and percentages, whereas continuous variables were expressed as the mean and standard deviation. In addition, the chi-square test was used for the categorical variables. The result was calculated using a 95% confidence interval, and $p<0.05$ was deemed statistically significant.

Ethical considerations

The study was approved by the Institutional Ethics Committee and written informed consent was obtained from all the patients. Ethical measures were maintained throughout the study period, and a high standard of confidentiality and anonymity of the participants were preserved. All of the study procedures complied with the latest Declaration of Helsinki.

Result

A total of 130 patients were included in study with objective to study the clinical profile of dengue fever patients.

Demographic Profile: In this study it was observed that maximum cases of dengue was seen in 19-44 year of age group (60%) and in male (62.31%). Similarly, 59.18% having dengue fever belongs to 19-44 year of age group and also for 66.67% of dengue haemorrhagic fever belongs to same age group.

It was observed that about 83.85% of dengue cases had less than 7 days of hospital stay. Most of them had dengue fever (81.63%). Only 16.15% had more than 7 days of hospital stay as seen in table 1.

Table 1: Demographic Profile

Variable	Total	Dengue Fever	Dengue Haemorrhagic Fever	Dengue Shock syndrome
	n(%)	98(75.38)	30(23.08)	2(1.54)
Gender				
Male	81(62.31)	62(63.27)	18(60.00)	1(50.00)
Female	49(37.69)	36(36.73)	12(40.00)	1(50.00)
Age				
<=18	18(13.85)	15(15.31)	2(6.67)	1(50)
19-44	78(60.00)	58(59.18)	20(66.67)	0(0)
>=45	34(26.15)	25(25.51)	8(26.67)	1(50)
Duration of hospital stays				
<7 days	109(83.85)	80(81.63)	28(93.33)	1(50.00)
>= 7 days	21(16.15)	18(18.37)	2(6.67)	1(50.00)
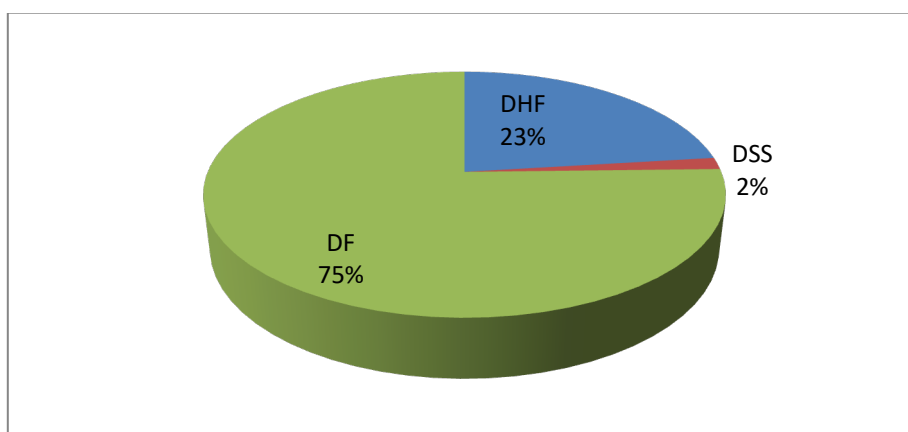
Figure 1: pie chart representing distribution of dengue cases

Seropositivity Pattern in dengue fever.
All the cases were investigated for Seropositivity Pattern in dengue fever and was found that 66.92% of dengue cases were DENGUE NS1 positive. Only 10.77% were IgM positive. In the study 81.63% of dengue fever cases were DENGUE NS1 positive while only 21.88 % cases of DHF/DSS were DENGUE NS1 positive as seen in table 2

Table 2: Distribution according to Seropositivity Pattern in dengue fever.

	Total n(%)	DF n(%)	DHF/DSS n(%)
Dengue NS1	87(66.92)	80(81.63)	7(21.88)
IgG	4(3.08)	2(2.04)	2(6.25)
IgM	14(10.77)	11(11.22)	3(9.38)
IgG/IgM	0	0	0

Clinical features distribution: It was observed that all the cases had complaints of fever with chills. Only 34(26.15%) of cases had complaints of nausea and vomiting. Out of those 28 cases of dengue fever and 6 cases of DH/DSS had complaints of nausea and vomiting. Complaint of generalised body ache was seen in 47 (36.15%) cases. Only 15 cases had complaint of headache while 70 cases were having complaint of abdominal pain as seen in table 3.

Others included Weakness, cough, shortness of breath, skin rash, yellowish discolouration of eyes, Amenorrhea,

Altered Sensorium, Loose stool, bleeding   per-rectum   and   so   on.

Table 3: Distribution according to clinical features

Clinical features	Total	DF	DHF/DSS
	n (%)	n (%)	n (%)
Fever with chills	130 (100)	98 (100)	32 (100)
Nausea/vomiting	34(26.15)	28(28.57)	6(18.75)
Generalized Body-ache	47(36.15)	38(38.78)	9(28.13)
Headache	15(11.54)	12(12.24)	3(9.38)
Abdominal pain	70(53.85)	51(52.04)	19(59.38)
Others	26(20)	20(20.41)	6(18.75)
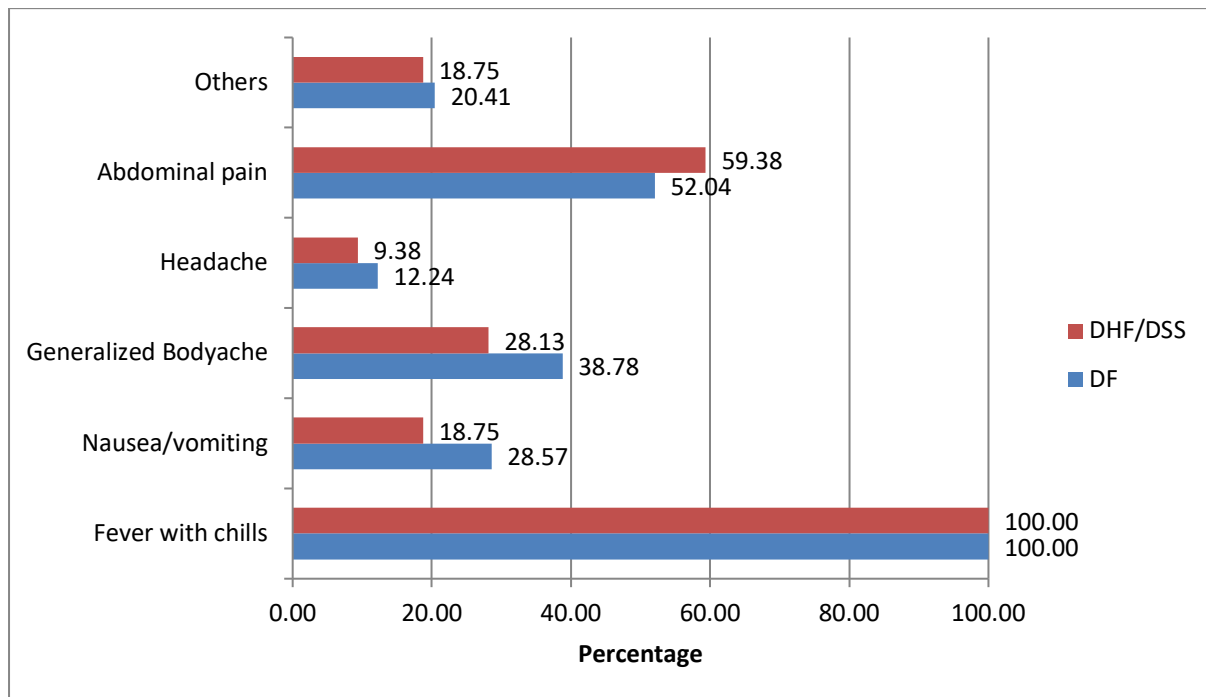
Figure 2: Bar diagram representing clinical features

Laboratory parameter: In the study it was observed that mean haemoglobin in total cases was 13 ±2.66 while 13.02 ±2.7 and 13.02 ±2.7 in dengue fever and DHF/DSS respectively. There was no significant difference observe. Mean TLC observed was 6943.71 ±5783.72 in total cases while 6903.55 ±5127.05 and 7068.07 ±7565.31 in dengue fever and DHF/DSS respectively as seen table 4. Mean platelet count observed was 76.63 ±83.62 in total cases. While 79.07 ±86.77 and 69.16 ±73.91 in dengue fever and DHF/DSS respectively.

Table 4: Distribution according to Laboratory parameters.

Laboratory parameters	Total	DF	DHF/DSS	P-value
	Mean ± SD	Mean ± SD	Mean ± SD	
Hb	13 ±2.66	13.02 ±2.7	13.02 ±2.7	0.9062
TLC	6943.71 ±5783.72	6903.55 ±5127.05	7068.07 ±7565.31	0.8911
Hematocrit	40.05 ±10.57	40.59 ±11.68	38.41 ±5.75	0.3201
Platelet	76.63 ±83.62	79.07 ±86.77	69.16 ±73.91	0.5686
Urea	43.34 ±56.34	45.87 ±60.78	36.07 ±40.97	0.3988
CREAT	1.03 ±1.17	1.06 ±1.33	0.93 ±0.5	0.593
Serumbil.	0.84 ±0.73	0.84 ±0.7	0.84 ±0.85	0.9877

Serum Protein	5.09 ±1.69	4.95 ±1.72	5.49 ±1.59	0.1208
SGOT	162.69 ±197.94	157.9 ±177.76	176.79 ±250.84	0.6429
SGPT	87.77 ±100.9	85.74 ±76.71	93.73 ±152.8	0.7006
ALP	138.72 ±181.07	126.11 ±101.65	175.32 ±314.05	0.1931
Na	136.21 ±9.8	136.08 ±11.28	136.58 ±2.68	0.8041
K	4.56 ±4.28	4.69 ±4.96	4.18 ±0.63	0.5688

Radiology parameters: In the study it was observed that 42 dengue cases were reported having hepatomegaly, 27 cases were reported having ascites , 18 were reported having splenomegaly and only 9 cases were reported having pleural effusion.

Table 5: Distribution according to radiological parameters.

Radiological parameters	Total n(%)	DF n(%)	DHF/DSS n(%)
Chest X-RAY	5(3.85)	3(3.06)	2(6.25)
USG Abdomen			
Hepatomegaly	42(32.31)	36(36.73)	6(18.75)
Edematous Gb	102(78.46)	81(82.65)	21(65.63)
Ascites	27(20.77)	27(27.55)	0(0)
Splenomegaly	18(13.85)	12(12.24)	6(18.75)
Pleural Effusion	9(6.92)	0(0)	9(28.13)
Cholethiasis	6(4.62)	3(3.06)	3(9.38)

It was observed that in study about 71 cases were having severe thrombocytopenia, out of those 54 cases of dengue fever were having severe thrombocytopenia while 17 cases of DHS/DSS were reported having severe thrombocytopenia. While 23 total cases were reported having platelet count between Moderate (50,000-1,00,000) and 12 cases were reported having platelet count between (1,00,000-1,50,000) as seen in table 6.

Table 6: Thrombocytopenia in dengue patients

Platelet count	Total n(%)	DF n(%)	DHF/DSS n(%)	P-value
Normal (>=1,50,000)	24(18.46)	20(20.41)	4(12.5)	0.433
Mild (1,00,000-1,50,000)	12(9.23)	7(7.14)	5(15.63)	
Moderate (50,000-1,00,000)	23(17.69)	17(17.35)	6(18.75)	
Severe (<50,000)	71(54.62)	54(55.1)	17(53.13)	

Platelet transfusion: It was observed that 27 cases had platelet transfusion. Out of those 27 cases, 25 were having dengue fever.

Table 7: Distribution according to treatment outcome of patients

Platelet transfusion	Total n(%)	DF n(%)	DHF/DSS n(%)	P-value
Given	27(20.77)	25(25.51)	2(6.25)	0.02
Not given	103(79.23)	73(74.49)	30(93.75)	

Discussion

This study describes the clinical and epidemiological profile of patients admitted with dengue fever in a tertiary care hospital of central part of India. Total number of 130 sero positive (Ns1Ag test or IgM and IgG antibody tests) Dengue fever cases were analysed during our study period. In our study, male patients were more common than female. Other similar studies by Deshwal et al. [9] and Karoli et al. [10] also support our finding. About 60% of dengue cases belong to 19-44 year of age group which is similar to Mishra et

al [11] while contradict to , our study result contradicts the earlier evidence of increasing incidence of dengue among older age groups. in Guha-Sapir D et al. [12] The common symptom was fever, headache, and myalgia, other symptoms and signs were less common. Jassirali et al. [13] reported the similar observations in their study. Microbiological diagnostic tests along with haematological and biochemical Parameters help the clinician in the proper management of patients with confirm diagnosis as there are many causes for these sign and symptoms.

Abdominal ultrasound scan has an important role in DF for diagnosis of organomegaly, ascites, gall bladder edema and pleural effusion. Out of 130 cases, 27 cases had ascites while 9 cases had pleural effusion. On the contrary, in the study conducted at Kollam, 17.6% had hepatomegaly, ascites were detected either clinically or by ultrasound in 30 patients (12%) and thirty three patients(13.2%) had pleural effusion.[14] In another study conducted at Delhi, hepatomegaly was seen in 20.4% of patients and Pleural effusion in 08.2% of patients.[15]

To increase the dengue diagnostic sensitivity both NS1 Ag and IgM detection in samples during first few days is recommended. IgG is the dominant immunoglobulin in secondary dengue infection and IgM levels may not be detectable during secondary dengue infection as the levels will significantly decrease later. In our study we found that 66.92% of dengue cases were DENGUE NS1 positive and only 10.77% were IgM positive. In a study done by Dhadke J et al found that Only IgM was observed in153 i.e. 60.8%, only NS 1 was seen in 98 i.e. 39.1% both IgM and NS 1 in 44 i.e.17.3%.[16]

Mishra et al reported thrombocytopenia in 19.2% cases.[17] In our study severe thrombocytopenia was reported in 54.62% of cases , moderate thrombocytopenia was reported in 17.69%. Tewari K et al

reported that in their study Platelet transfusion was needed in 9.2%.[18] In out study only 20.77% cases had platelet transfusion.

The present study has few limitations: we were unable to analyse seasonal variation, rural and urban area and quantitative analysis of levels of IgM and IgG antibodies against dengue. The strengths of our study was conducted at a single centre and a single laboratory to confirm dengue. In addition, this study followed current WHO guidelines for severe dengue.

Conclusion

Dengue is a difficult infectious disease that poses a serious public health risk. It can manifest with no symptoms or with severe, perhaps fatal symptoms. The present study conclude that 19-44 year of age group is most commonly exposed age group, incidence was most common in male and fever with chills, abdominal pain and generalised body ache was commonly reported symptoms. The reduction of mortality and morbidity requires more vigilance on the part of healthcare professionals while dealing with a case. To meet this issue, hospitals must be prepared with the proper public health measures.

Ethical Approval: The study was approved by the Institutional Ethics Review Committee.

References

1. Sharmin S, Glass K, Viennet E, Harley D: Geostatistical mapping of the seasonal spread of under-reported dengue cases in Bangladesh. PLoS Negl Trop Dis. 2018, 12: 10.1371/journal.pntd.0006947

2. Yung CF, Lee KS, Thein TL, Dengue serotype-specific differences in clinical manifestation, laboratory parameters and risk of severe disease in adults, Singapore. Am J Trop Med Hyg. 2015, 92:999-1005.

3. Dengue guidelines, for diagnosis, treatment, prevention and control. 2009; https://www.who.int/publications/i/item/9789241547871.

4. George T, Valsan SM. Clinical and epidemiological profile of patients admitted with dengue fever in a tertiary care hospital, Thrissur, Kerala, India. Int J Community Med Public Health. 2020; 7:3654-8.

5. Turbadkar D, Ramachandran A, Mathur M, Gaikwad S. Laboratory and clinical profile of dengue: A study from Mumbai. Ann Trop Med Public Health. 2012; 5:20-3.

6. WHO fact sheet on dengue and severe dengue. Available at: https://www.who.int/en/news-room/fact-sheets/detail/dengue-and-severe-dengue..

7. Low SL, Lam S, Wong WY, Teo D, Ng LC, Tan LK. Dengue seroprevalence of healthy adults in Singapore: Serosurvey among blood donors, 2009 Am J Trop Med Hyg. 2015; 93:40–5

8. Daniel R, Philip AZ. A study of clinical profile of dengue fever in Kollam, Kerala, India. Dengue bulletin. 2005; 40:25.

9. Deshwal R, Qureshi MI, Singh R. Clinical and laboratory profile of dengue fever. J Assoc Physicians India 2015; 63:30-2

10. Karoli R, Fatima J, Siddiqi Z, Kazmi KI, Sultania AR. Clinical profile of dengue infection at a teaching hospital in north India. J Infect Dev Ctries. 2012; 6:551-4.

11. Mishra AK, Kumar S, Kumar P, Ahmad A, Kumar S, Saha KK, Choudhary MK, Kumar N. Study on Clinical Profile of Dengue Fever in a Tertiary Care Centre of Bihar. Int J Sci Stud. 2018;6(5):43-46.

12. Guha-Sapir D, Schimmer B. Dengue fever: new paradigms for a changing epidemiology. Emerg Themes Epidemiol. 2005; 2:1.

13. Jassirali CA, Sathikali AS, Sirajuddin S. Clinical and haematological parameter in adult dengue patients. MedPulse Int Med J. 2017; 4:306-9.

14. Daniel R, Philip AZ. A study of clinical profile of dengue fever in Kollam, Kerala, India. Dengue bulletin. 2005; 40:25.

15. Sharma S, Sharma SK, Mohan A, Wadhwa J, Dar L, Thulkar S, Clinical Profile of Dengue Haemorrhagic Fever in Adults during 1996 –Outbreak in Delhi, India. Dengue Bulletin. 1998; 22:20.

16. Dhadke J, Banshiwala L, Savaskar S. To Study Clinical Profile and Outcome of Dengue Fever with Reference to Serological Test (IgM & NS1) in a Tertiary Care Hospital. Int Arch BioMed Clin Res. 2020;6(3): PD1–PD5.

17. Mishra S, Ramanathan R, Agarwalla SK. Clinical Profile of Dengue Fever in Children: A Study from Southern Odisha, India Scientifica (Cairo). 2016; 2016:6391594.

18. Tewari K, Tewari VV, Mehta R. Clinical and haematological profile of patients with dengue fever at a tertiary care hospital-an observational study. Med. J Hematol Infect Dis. 2018;10(1).