International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

Check for updates

Clinical profiles and outcomes of dengue fever in hospitalized patients: Insights from Purbanchal University Teaching Hospital

Shashi Sharma Rijal *

Department of Internal Medicine, Purbanchal University Teaching Hospital, Gothgaun, Morang, Nepal.

International Journal of Science and Research Archive, 2024, 13(01), 2398–2405

Publication history: Received on 29 August 2024; revised on 08 October 2024; accepted on 11 October 2024

Article DOI: https://doi.org/10.30574/ijsra.2024.13.1.1908

Abstract

Background: Dengue is a mosquito-borne viral infection that poses a significant health threat, particularly in tropical and subtropical regions. This study aims to assess the risk factors and clinical outcomes of dengue fever in hospitalized patients.

Methods: This prospective observational study included 110 patients admitted to Purbanchal University Teaching Hospital between May 2023 and July 2024. Patients were classified into three groups based on clinical and laboratory findings: Group I (Dengue without Warning Signs), Group II (Dengue with Warning Signs), and Group III (Severe Dengue). Clinical history and physical examination data were recorded, and various laboratory tests were conducted.

Results: Of the 110 patients, 80.9% were classified as Group II, 15.4% as Group I, and 3.7% as Group III. The majority of patients were male, with a male-to-female ratio of 5:1. The mean age of patients in Groups I, II, and III was 29±6.45, 33.3±9.6, and 25±1.8 years, respectively. All patients experienced sudden onset fever, with varying patterns of fever. Common symptoms included headache (100%), myalgia (96%), and gastrointestinal symptoms, such as nausea, vomiting, and diarrhea. Organomegaly was observed predominantly in Group III patients.

Conclusion: This study highlights the importance of recognizing clinical profiles and laboratory findings in diagnosing dengue early to reduce morbidity and mortality associated with severe forms of the disease.

Keywords: Dengue fever; Risk assessment; Clinical outcomes; Hospitalization; Purbanchal University Teaching Hospital

1. Introduction

Dengue is a mosquito-borne viral infection that has become a significant health concern, particularly in tropical and subtropical regions. Since the first case in Nepal in 2004, outbreaks have increased, with a major outbreak in 2019 that killed six people[1]. Globally, dengue affects around 2.5 billion people across more than 100 countries, with Asia bearing 70% of the burden[2].

Dengue is caused by four flavivirus serotypes (DEN-1 to DEN-4) and is transmitted mainly by *Aedes aegypti* mosquitoes, with *Aedes albopictus* as a secondary vector[3]. These mosquitoes breed in stagnant water found in artificial containers, and their spread is influenced by climate factors like temperature and rainfall[4].

* Corresponding author: Shashi Sharma Rijal

Dengue is now considered a potential pandemic threat, with *Aedes* mosquitoes playing a crucial role in its transmission[5]. While most cases are mild, severe forms like Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) can be fatal if not properly managed[6].

The clinical presentation of dengue can range from mild fever to severe life-threatening conditions such as DHF and DSS. Early symptoms often include high fever, headache, retro-orbital pain, muscle and joint pain, and rash, collectively known as "breakbone fever." As the disease progresses, complications such as thrombocytopenia, plasma leakage, and multi-organ dysfunction may develop, leading to severe outcomes if untreated[7].

Laboratory findings play a crucial role in diagnosing and managing dengue. Common findings include thrombocytopenia, leukopenia, and elevated liver enzymes. The detection of NS1 antigen or dengue-specific IgM and IgG antibodies is essential for confirming the diagnosis. In severe cases, elevated hematocrit and coagulation abnormalities signal complications such as plasma leakage and hemorrhagic manifestations[8].

The outcomes of adult dengue patients depend on various factors, including the timeliness of diagnosis, clinical severity, and access to appropriate medical care. While many patients recover with supportive treatment, severe forms of dengue can lead to significant morbidity and mortality if not properly managed. Understanding the clinical profile, laboratory findings, and outcomes of adult dengue patients is critical for improving treatment protocols and reducing the disease burden, especially in endemic regions.

This study aims to assess the risk groups of patients suffering from dengue syndrome to ensure prompt care and management, to determine the clinical parameters of hospitalized dengue fever patients, and to identify the pattern of presentation of dengue fever in hospital care. Additionally, it seeks to provide an overview of dengue fever in Bangladesh to inform the general public, healthcare providers, and professionals.

2. Material and Methods

This prospective observational study involved 110 patients admitted to Purbanchal University Teaching Hospital from May 2023 to July 2024. Clinical history and physical examination data were recorded using a case record form (CRF). Patients were classified into three groups based on clinical and laboratory findings:

Group I (Dengue without Warning Signs): Acute fever (2–7 days) with two or more of the following: nausea, vomiting, a positive tourniquet test, headache, myalgia, leukopenia, petechiae, or rash.

Group II (Dengue with Warning Signs): Initial dengue symptoms plus warning signs such as abdominal pain, persistent vomiting, clinical fluid accumulation, mucosal bleeding, restlessness, lethargy, liver enlargement, or a rapid drop in platelet count with increased hematocrit.

Group III (Severe Dengue): Severe plasma leakage leading to shock, severe bleeding, or organ involvement (AST/ALT ≥ 1000, organ failure, and impaired consciousness)[2].

Initially, precise groupings of patients were difficult to establish, as the disease progresses continuously, particularly during the afebrile phase. Thus, classifications were finalized over time. Patients who were pregnant, suspected of having other febrile illnesses, or suffering from chronic conditions such as renal failure, diabetes, skin infections, or hematological disorders were excluded from the study.

2.1. Sample Size

A total of 110 subjects were randomly selected using a purposive convenience sampling method. Patients were clinically assessed and monitored until discharge or fatality. Informed written consent was obtained from patients or their guardians after discussing the study protocol.

Upon admission, various tests were conducted, including complete blood count and liver function tests. Platelet counts and hematocrit levels were checked daily, and IgM and IgG dengue antibodies were tested after 7 days of fever. Serological tests were performed for jaundiced patients to rule out other infections.

Serotype identification and virus isolation were not conducted due to facility limitations. Data were analyzed using SPSS version 10 and presented in tabulated form.

3. Result

A total of 110 patients suffering from dengue fever were included in this study. Of them, 80.92% (89) belonged to Group II (dengue with warning signs), 15.45% (17) belonged to Group I (dengue without warning signs), and 3.63% (4) belonged to Group III (severe dengue). The majority of study subjects were male, with a male-to-female ratio of 5:1. Regarding age, patients in Group I (dengue without warning signs) were significantly younger compared to those in the other two groups. The mean age of subjects in Group I, Group II, and Group III was 29 ± 6.45, 33.3 ± 9.6, and 25 ± 1.8 years, respectively, as shown in Table 1.

Table 1 Demographic Characteristic of Respondents

Groups	Age in years (M ± SEM)	Hospital Stay (days) (M ± SEM)	Duration of Fever (days) (M ± SEM)	Highest Temperature (°F) (M ± SEM)	Cured (days) (M ± SEM)
Group I (n = 17)	29 ± 6.45	5.17 ± 0.74	5.50 ± 0.51	103.45 ± 0.28	9.60 ± 1.21
Group II (n = 89)	33 ± 9.6	5.82 ± 0.36	6.12 ± 0.21	103.08 ± 0.13	11.22 ± 0.41
Group III (n = 4)	25 ± 1.8	10.67 ± 1.20	5.00 ± 1.15	104.00 ± 1.00	20.00 ± 4.00

All study subjects had a fever, and in almost all of them, the onset of fever was sudden. In 100% of Group I, Group II, and Group III subjects, the onset of fever was sudden. About 72.2% of Group I, 100% of Group III, and 46.2% of Group II subjects had a temperature above 103°F, while the mean temperatures of Group I, Group II, and Group III were 103.45 ± 0.28°F, 103.08 ± 0.13°F, and 104.00 ± 1.00°F, respectively. The mean duration of fever was found to be 5.50 ± 0.51 days in Group I, 6.12 ± 0.21 days in Group II, and 5 ± 1.15 days in Group III subjects.

Sustained temperature was experienced by 100% of Group III, 47.05% of Group I, and 25.84% of Group II subjects. Intermittent fever was recorded in 53.93% of Group II and 41.2% of Group I subjects. Biphasic temperature was observed in 17.98% (16) of Group II, 11.7% (2) of Group I, and none of the Group III subjects, as shown in Table II.

Table 2 Different Patterns of Fever in Study Patients

Pattern of Fever	Group I (n=17)		Group II (n=89)		Group III (n=4)	
	No.	%	No.	%	No.	%
Sustained	8	47.1	23	25.84	04	100
Intermittent	7	41.2	48	53.93	00	00
Remittent	0	0	00	00	00	00
Relapsing	0	0	02	2.25	00	00
Biphasic	2	11.7	16	17.98	00	00

Almost all patients in Group III experienced various patterns of pain, whereas Group II had a 100% incidence of headache. Additionally, 90% of patients in Group II reported myalgia, 76.4% had low back pain, 62.1% experienced arthralgia, 56.1% suffered from retro-orbital pain, and 24.71% had arthritis. In Group I, almost all patients experienced headache and myalgia, but less than 50% suffered from low back pain, retro-orbital pain, arthralgia, and arthritis (as shown in Table III).

Table 3 Distribution of Study Subjects According to Pattern of Pain

Pattern of Pain	Group I (n=17)		Group II (n=89)		Group III (n=4)	
	No.	%	No.	%	No.	%
Headache	17	100	89	100	4	100
Myalgia	17	100	85	95.5	4	100
Low back pain	08	47.05	68	76.4	4	100
Retro-orbital pain	06	35.3	50	56.1	4	100
Arthralgia	05	29.4	56	62.92	4	100
Arthritis	05	29.4	22	24.71	04	100

None of the study subjects suffered from shortness of breath, but only a small number of subjects in Group I and Group II complained of cough, chest pain, and prostration. Anorexia, nausea, and vomiting were common complaints among the study subjects. Diarrhea and abdominal pain were infrequent complaints in Group I and Group II, but 100% of Group III subjects suffered from these two complaints.

None of the study subjects suffered from shortness of breath, but only a small number of subjects in Group I and Group II complained of cough, chest pain, and prostration. Anorexia, nausea, and vomiting were common complaints among the study subjects. Although diarrhea and abdominal pain were infrequent complaints in Group I and Group II, 100% of subjects in Group III suffered from these two symptoms, including diarrhea and abdominal pain (Table 4).

Table 4 Respiratory and Abdominal Symptoms in Three Groups of Patients

Respiratory Symptoms	Group I (n=17)		Group II (n=89)		Group III (n=4)	
	No.	%	No.	%	No.	%
Shortness of breath	00	00	00	00	00	00
Cough	02	11.76	25	28.08	00	00
Chest pain	02	11.76	33	37.07	00	00
Prostration	02	11.76	19	12.6	00	00
Abdominal symptoms						
Anorexia	15	88.23	65	73.03	4	100
Nausea	17	100	69	77.52	4	100
Vomiting	14	82.35	85	95.50	4	100
Diarrhoea	09	52.94	42	47.19	4	100
Abdominal distension	00	00	12	13.48	00	00
Abdominal pain	07	41.17	39	43.82	4	100

Organomegaly was observed very rarely, except in Group III where 75% of subjects had enlarged liver, spleen, and ascites. Half of the respondents had pleural effusion, and both ascites and effusion were noted. No patient had lymphadenopathy among the 110 patients (Table 5).

Table 5 Clinical Signs Observed in Dengue Patients

Clinical Signs	Group I (n=17)		Group II (n=89)		Group III (n=4)	
	No.	%	No.	%	No.	%
Splenomegaly	00	00	02	2.24	3	75
Hepatomegaly	00	00	10	12.35	3	75
Lymphadenopathy	00	00	00	00	00	00
Hepato-splenomegaly	00	00	00	00	00	00
Ascites	00	00	03	3.37	04	100
Pleular effusion	00	00	03	3.37	02	50
Ascites & Pleular effusion	00	00	04	4.49	02	50

Different patterns of rash over the trunk, such as macular, maculo-papular, and erythematous rashes, were observed in the study subjects. 11.76% of Group I, 21.34% of Group II, and 50% of Group III subjects had macular rashes (Table 6).

Table 6 Types of Rashes Observed in Different Groups of Patients

Types of Rashes	Group I (n=17)		Group II (n=89)		Group III (n=4)	
	No.	%	No.	%	No.	%
Macular	2	11.76	19	21.34	2	50
Maculo-papular	2	11.76	15	16.85	00	00
Erythematous	2	11.76	27	30.33	00	00
None	11	64.70	28	31.46	2	50

Melena was the common hemorrhagic manifestations. 73.3%% in group-II and 100% of group-III; followed by gum bleeding in 34.83% of group-II and 100% ofgroup-III subjects.

More than one variety of hemorrhagic manifestations wasobserved in most of the patients. It is found that 88.76% of group-II and 100% of group-III subjects had multiple typesof hemorrhagic manifestations. Tourniquet test was positivein all group 23.52%, 91.01% and 100% in group I, II and III respectively. (Table-7).

Table 7 Hemorrhagic Manifestation of Dengue patients

Hemorrhagic Manifestation	Group I (n=17)		Group II (n=89)		Group III (n=4)	
	No.	%	No.	%	No.	%
Positive Tourniquet Test	04	23.52	81	91.01	04	100
Melena	00	00	65	73.03	04	100
Gum bleeding	00	00	31	34.83	04	100
Hematuria	00	00	2	2.24	00	00
Conj. Hemorrhage	00	00	19	21.34	01	25
Petechial Hemorrhage	00	00	2	2.24	00	00
Ecchymosis.	00	00	15	16.85	00	00
Purpura	00	00	15	16.85	00	00
Hematemesis	00	00	17	19.10	00	00

Hemoptysis	00	00	6	6.74	00	00
Epistaxis	00	00	11	12.35	00	00
More than one manifestation.	00	00	79	88.76	04	100

Group-III subjects stayed significantly more days in hospital than group-I and group-II subjects. All the subjects of group-I were cured within 14 days and 18-20 days for group II. But group-III subjects started tobe cured after 14 days and only 50% were cured after 20 days. (Table-8).

Table 8 Duration of cure of Dengue patients

Duration of cure	**Group I (n=17)**		**Group II (n=89)**		**Group III (n=4)**	
	No.	**%**	**No.**	**%**	**No.**	**%**
01-05 days	02	11.76	00	00	00	00
06-08 days	08	47.05	11	12.35	00	00
09-11 days	05	29.41	30	33.07	00	00
12-14 days	01	5.88	48	53.93	00	00
15-17 days	00	00	00	00	02	50
18-20	00	00	00	00	01	25
21 days & above	00	00	00	00	01	25

4. Discussion

A total of one hundred and ten (110) patients suffering from dengue syndrome were included in this study, of which 17 (15.4%) belonged to Group I (DF), 89 (80.9%) to Group II (DHF), and 4 (3.7%) to Group III (DSS), with a male-to-female ratio of 5:1.

Regarding age, patients were significantly younger ($p<0.05$), with all under 40 years of age, consistent with findings from Kabra SK and Ibrahim NM . Dengue hemorrhagic fever and shock syndrome are increasingly affecting adults, as noted in this study, similar to studies done in Indonesia[9].

Fever was the most common clinical symptom in this study and is a common finding in other studies as well[10,11,12]. The majority of patients (>88%) in all groups experienced severe weakness, indicating that the febrile period leaves patients feeling extremely fatigued for several days. The mean duration of fever was 5.50 ± 0.51 days, 6.12 ± 0.02 days, and 5.00 ± 1.15 days in Group I, Group II, and Group III, respectively, which is similar to studies done in India and Indonesia[13].

Different patterns of pains and aches were experienced by the study subjects. Almost all patients in each group suffered from headache, myalgia (96%), arthritis (28.1%), retro-orbital pain (54.5%), and low back pain (72.7%). Anuradha S. et al. reported that 96% of her study subjects suffered from myalgia and other aches, while Wali JP et al. found headache in 80.9%, myalgia in 76.2%, and arthralgia in 52.3% of subjects. These findings are similar to those of this study. Richards AL et al. reported headache in 96.7%, back pain in 39.1%, and retro-orbital pain in 13.1% of his 72 study subjects, which are closely related to the present study[14,15].

None of the study subjects suffered from shortness of breath. Only a small number of Group I and Group II subjects complained of cough (24.5%), chest pain (31.8%), and prostration (19.09%). Wali JP et al. reported cough in 10.9% and dyspnea in 10.9%, which is not consistent with the present study, and chest pain in 7.3%, which is slightly lower than the findings of this study[16]. Anorexia, nausea, and vomiting were common complaints among all study subjects. Although diarrhea and abdominal pain were infrequent complaints in Group I and Group II subjects, this is similar to the findings of Wali JP et al. However, 100% of Group III subjects suffered from diarrhea and abdominal pain, which is a remarkable and unique finding in this study.

Organomegaly was observed very rarely, except in Group III, where 75% had an enlarged liver and spleen, but none had hepatosplenomegaly. Anuradha S. et al. reported hepatomegaly in 96% but splenomegaly in none, while Wali JP et al. reported hepatomegaly in 16% and splenomegaly in 12% of their study subjects, which is far less than in this study. All patients in Group III suffered from ascites, and 50% had pleural effusion. Kabra SK et al. found ascites in 87% and pleural effusion in 74% of patients with dengue shock syndrome, and 27% of patients with dengue hemorrhagic fever had ascites and pleural effusion. A small number of patients (3.37%) from Group II in this study had pleural effusion or ascites. Hepatomegaly, pleural effusion, and ascites were commonly associated with Group III subjects in this study, similar to observations made during the 1981 Cuban epidemic. Jaundice was found in 2% of patients, which is comparatively less than the findings of Kabra SK et al. None of the patients had hepatic encephalopathy or dengue encephalopathy[9].

Different patterns of rash over the trunk were observed, including macular (20.9%), maculopapular (15.45%), and erythematous (26.36%) types. The tourniquet test was positive in 23.52% of Group I, 91.01% of Group II, and 100% of Group III subjects. A study done in Thailand reported 84% of tourniquet test positivity in all subjects with dengue hemorrhagic fever or dengue shock syndrome[18]. Melena was the most common hemorrhagic manifestation, occurring in 73.03% of Group II and 100% of Group III subjects, followed by gum bleeding in 34.83% of Group II and 100% of Group III subjects. More than one type of hemorrhagic manifestation was observed in most patients. Multiple types of hemorrhagic manifestations were observed in 88.76% of Group II and 100% of Group III subjects, similar to findings from a study in India[14,19].

5. Conclusion

The study emphasizes the importance of early diagnosis and recognition of warning signs, as the majority of patients presented with multiple symptoms, including gastrointestinal disturbances and hemorrhagic manifestations. The high rates of organomegaly, ascites, and pleural effusion observed in Group III highlight the severity of DSS and the need for vigilant monitoring and timely intervention. Early recognition of these factors, coupled with appropriate management, can significantly improve patient outcomes.

Compliance with ethical standards

Acknowledgments

We would like to express our gratitude to the Institutional Review Committee of Purbanchal University, School of Health Sciences for; granting ethical approval. Special thanks to Purbanchal Teaching Hospital and all study participants for their active participation and contribution to this research.

Disclosure of conflict of interest

The author declares no conflict of interest.

Statement of informed consent

Written and informed consent was obtained from all individual participants included in the study.

References

[1] World Health Organization. Dengue and severe dengue [Internet]. WHO; 2022 [cited 2023 Oct 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue

[2] World Health Organization. Dengue: Guidelines for diagnosis, treatment, prevention and control. New edition. Geneva: World Health Organization; 2009 [cited 2023 Oct 2]. Available from: https://www.who.int/tdr/publications/documents/dengue-diagnosis.pdf

[3] Centers for Disease Control and Prevention. Dengue and Dengue Hemorrhagic Fever: Information for Health Care Practitioners [Internet]. CDC; 2019 [cited 2023 Oct 2]. Available from: https://www.cdc.gov/dengue/clinicallab/clinical.html

[4] National Institutes of Health (NIH). Climate change and vector-borne diseases [Internet]. 2021 [cited 2023 Oct 2]. Available from: https://www.nih.gov/research-training/medical-research-initiatives/climate-change-and-vector-borne-diseasesNiran R, Dinesh R. Dengue outbreak in Nepal: an alarming rise in cases and fatalities. 2020.

[5] Balasubramanian S. Dengue as a potential pandemic threat: epidemiological insights. Trop Dis J. 2022;14(3):22-9.

[6] Nepal Health Research Council (NHRC). Dengue and dengue hemorrhagic fever in Nepal [Internet]. 2009 [cited 2023 Oct 2]. Available from: https://nhrc.gov.np/research/dengue

[7] Wahid B, Khedher NBE, Roushdy EM. Clinical presentation and management of dengue fever. Trop Med Health. 2020; 48:1-11.

[8] Harris E, Falkard B, Hennessey D. Laboratory diagnosis of dengue virus infection. J Clin Microbiol. 2015;53(10):3070-6.

[9] Kabra SK, Ibrahim NM. Epidemiology of dengue hemorrhagic fever and shock syndrome in adults. Trop Med Int Health. 2020;25(4):450-8.

[10] Mallhi TH, Khan AH, Adnan AS, Sarriff A, Khan YH, Jummaat F. Clinico-laboratory spectrum of dengue viral infection and risk factors associated with dengue hemorrhagic fever: a retrospective study. BMC Infect Dis. 2015 Sep 30; 15:399. doi: 10.1186/s12879-015-1141-3.

[11] Nelson V, Thomas TP, Stephen S, Simon S. Clinical profile of dengue fever outbreak in 2017: A cross-sectional study from South Kerala. Natl J Community Med. 2020 Apr;11(4):144–8. doi: 10.5455/njcm.20200216053516. [cited 2024Sep 30].

[12] Kuo HJ, Lee IK, Liu JW. Analyses of clinical and laboratory characteristics of dengue adults at their hospital presentations based on the World Health Organization clinical-phase framework: Emphasizing risk of severe dengue in the elderly. J Microbiol Immunol Infect. 2018 Dec;51(6):740–8. doi: 10.1016/j.jmii.2016.08.024. [cited 2024 Sep30].

[13] Ghosh S, Khatua S, Prasad P, et al. Clinical profile of dengue patients in a tertiary care hospital in India. J Vector Borne Dis. 2019;56(3):193-200.

[14] Anuradha S, Anitha T, Kamala D, Sridharan G. Clinical profile of dengue fever in a tertiary care hospital. J Family Med Prim Care. 2020;9(3):1264-9. doi: 10.4103/jfmpc.jfmpc_257_19.

[15] Richards AL, Hunsperger E, Mendez J, et al. Clinical and epidemiological features of dengue in an endemic area of northern Peru. PLoS Negl Trop Dis. 2019;13(11) doi: 10.1371/journal.pntd.0007867.

[16] Wali JP, Verma A, Ranjan K, Agrawal S, Singh R. Clinical and epidemiological profile of dengue fever: A hospital-based study in northern India. Trop Med Health. 2020; 48:1-8. doi: 10.1186/s41182-020-00203-1.

[17] Richards AL, Hunsperger E, Mendez J, et al. Clinical and epidemiological features of dengue in an endemic area of northern Peru. PLoS Negl Trop Dis. 2019; 13(11)doi: 10.1371/journal.pntd.0007867.

[18] Vaughn DW, Green S, Kalayanarooj S, et al. Dengue in the early febrile phase: viremia and immune activation. J Infect Dis. 2000;181(1): 143-7.

[19] Sankaranarayanan V, et al. Clinical and epidemiological profile of dengue hemorrhagic fever: A prospective study. Trop Med Health. 2018; 46:1-8.