

# Prevalence of Ocular Manifestation in Patients Hospitalized with Dengue Fever during its Outbreak in Bangladesh

DOI: dx.doi.org



Mostak Ahmed Al Zafri<sup>1\*</sup>, Zahidul Ahsan Menon<sup>2</sup>, Tanjila Hossain<sup>3</sup>, Bimol Kumar Agarwala<sup>4</sup>, Shirin Ara Alam<sup>5</sup>, Robiul Islam<sup>6</sup>

Received: 28 Jan 2024  
Accepted: 4 Feb 2024  
Published: 14 Nov 2024

Published by:  
Sher-E-Bangla Medical College,  
Barishal, Bangladesh

\*Corresponding Author



This article is licensed under a  
[Creative Commons Attribution 4.0  
International License](https://creativecommons.org/licenses/by/4.0/).



## ABSTRACT

**Introduction:** Since its initial outbreak in 2000, the clinical presentation of dengue fever in Bangladesh has undergone significant changes. This report highlights the clinical characteristics of the 2019 outbreak and compares them to those recorded in previous outbreaks in the region. The aim of the study is to investigate the range of ocular symptoms in patients hospitalized for dengue fever during an outbreak. **Materials & Methods:** This prospective observational study sought to examine ocular manifestations linked to dengue fever among 500 hospitalized patients at Sir Salimullah Medical College & Mitford Hospital from August 2023 to October 2023. The study group comprised both men and women, with an average age of (mean age) years, spanning from 15 to 45 years. **Result:** The study reveals that most participants are between 31 and 40 years old, with a mean age of 33.12±12.65 years. A majority, 75.4%, are male, while females constitute 24.6% of the participants. Sub-conjunctival hemorrhage, occurring in 55.2% of cases, is the most common ocular manifestation. Other manifestations include peripheral retinal hemorrhage (14.2%), conjunctival chemosis (9.4%), hard exudates (9.2%), anterior uveitis (6.2%), cotton wool spots (2.2%), optic neuritis (1.2%), and retinal vasculitis (2.4%). All ocular changes had resolved in patients who returned for follow-up within 8 to 10 weeks. **Conclusion:** Hospitalized dengue fever patients commonly exhibited ocular pain and subconjunctival hemorrhage, with intra-retinal hemorrhages, maculopathy, and cotton wool spots also observed, often linked to low platelet counts. Fundus

examination can help predict patient prognosis.

**Keywords:** Prevalence, ocular manifestation, dengue fever, outbreak

(The Planet 2023; 7(2): 246-249)

1. Curator, Department of Anatomy, Dhaka National Medical College, Dhaka, Bangladesh
2. Professor, Department of Ophthalmology, Sir Salimullah Medical College, Dhaka, Bangladesh
3. Assistant Professor, Department of Ophthalmology, Sir Salimullah Medical College, Dhaka, Bangladesh
4. Associate Professor (CC), Department of Diabetology, Dhaka National Medical College, Dhaka, Bangladesh
5. Registrar, Department of Ophthalmology, Sir Salimullah Medical College, Dhaka, Bangladesh
6. Assistant Professor, Department of Ophthalmology, Sir Salimullah Medical College, Dhaka, Bangladesh

## INTRODUCTION

Dengue fever, the most common mosquito-borne viral illness in people, is a multi-systemic malady with different complications [1-4]. It is transmitted through the nibble of a tainted female *Aedes aegypti/albopictus* mosquito [5]. The dengue infection has a place to the class *Flavivirus* of the family *Flaviviridae* [1-3,6]. Classic dengue fever is most commonly watched in youths and youthful adults [1-5]. Its clinical highlights are categorized into five introductions: non-specific febrile ailment, classical dengue fever, dengue hemorrhagic fever, dengue hemorrhagic fever with stun disorder, and atypical side effects such as encephalopathy and hepatitis [1]. It is characterized by indications that show up 3-14 days after the nibble of a vector like sudden onset of fever related with discomfort, cerebral pain, joint torment, retro-orbital torment, maculopapular hasty, related

thrombocytopenia, with or without dying signs, etc.<sup>7</sup> Visual appearances are something else exceptional. It has 4 serotypes (DEN-1, DEN-2, DEN-3, DEN-4) [1,7]. The pathogenesis of systemic dengue contamination is accepted to be multifactorial, complex, and as however not completely understood [1,8]. Ocular signs are generally uncommon, but those reported in the writing incorporate subconjunctival, vitreous, and retinal hemorrhages. In a few cases, they may show as back uveitis, optic neuritis, or maculopathies like foveolitis and macular edema. The primary side effects detailed are obscured vision, scotoma, metamorphopsia, and floaters [1,7]. Demonstrative and checking strategies include optical coherence tomography, fundus fluorescein angiography, and visual field testing [1,7]. The essential objective of this consider was to assess the visual signs related with dengue fever.

**METHODS & MATERIALS**

A prospective observational study was conducted with 500 patients across multiple institutions in Bangladesh, including Chittagong Medical College, Sir Salimullah Medical College, and Dhaka. Diagnosis was based on the presence of fever along with other characteristic symptoms and signs, confirmed through serological testing using IgM and IgG antibody assays and by monitoring platelet count reductions. The study took place over a three-month period, from August 2023 to October 2023. Each patient underwent a thorough examination, including a detailed medical history with a focus on visual symptoms. Systemic examinations and laboratory results were carefully recorded. Best-corrected visual acuity for both distance and near vision was measured using a Snellen chart. Patients also underwent a detailed slit-lamp examination with +90 D and +78 D lenses. Dilated fundus examination was performed using an indirect ophthalmoscope with a +20 D lens, and fundus images were taken using a fundus camera. Patients with positive ophthalmic findings were advised to return for weekly follow-up visits.



**Figure - 1: Subconjunctival hemorrhage**

**RESULTS**

Table I presents the age distribution of the study participants, with a total sample size of 500. The majority fall within the 31-40 years age range, accounting for 38.2% of the total, followed by those aged 41-50 years (26.8%), 20-30 years (21.6%), and 51-60 years (13.4%). Although the mean age is not provided, the distribution offers a clear overview of the represented age groups. Table II outlines the sex distribution, where 75.4% of the 500 participants are male, and 24.6% are female, giving insight into the gender breakdown of the study population. Table III categorizes the platelet count distribution among the dengue patients, also with a sample size of 500. The most frequent platelet count range is 21-30 (35.6%), followed by 31-40 (21.6%), 11-20 (18.8%), ≤10 (6.2%), 41-50 (9.2%), 51-

60 (6.2%), and >60 (2.4%). This distribution highlights the platelet levels in dengue patients in the study. Table IV presents the ocular manifestations observed in the 500 dengue patients. The most common manifestation is subconjunctival hemorrhage, seen in 55.2% of cases. Other findings include peripheral retinal hemorrhage (14.2%), conjunctival chemosis (9.4%), hard exudates (9.2%), anterior uveitis (6.2%), cotton wool spots (2.2%), optic neuritis (1.2%), and retinal vasculitis (2.4%), providing important data on the prevalence of ocular symptoms among the patients.

**Table - I: Age distribution of the study subject (n=500)**

Age in years	Frequency	Percentage (%)	Mean±SD
20-30	108	21.6	
31-40	191	38.2	33.12±12.65
41-50	134	26.8	
51-60	67	13.4	

**Table - II: Sex distribution of the study subject (n=500)**

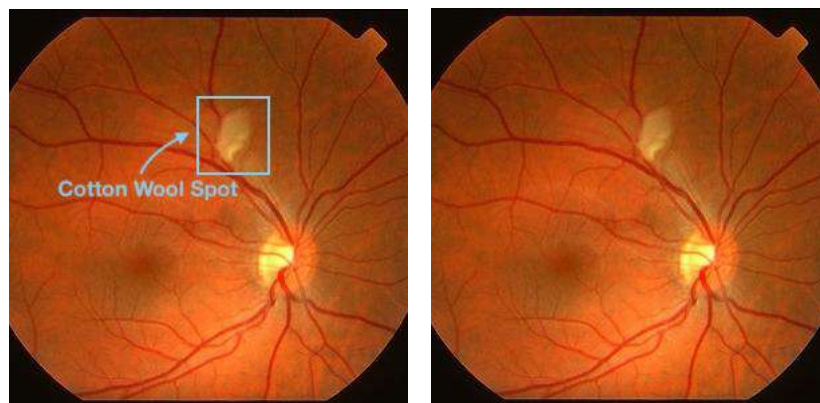
Sex	Frequency	Percentage (%)
Male	377	75.4
Female	123	24.6

**Table - III: Platelet count of the dengue patient (n=500)**

Platelet count (X10 <sup>3</sup> )	Frequency	Percentage (%)
≤10	31	6.2
11-20	94	18.8
21-30	178	35.6
31-40	108	21.6
41-50	46	9.2
51-60	31	6.2
>60	12	2.4

**Table - IV: Ocular manifestations of the Dengue patients (n=500)**

Manifestations	Frequency	Percentage (%)
Sub-conjunctival hemorrhage	276	55.2
Conjunctival chemosis	47	9.4
Anterior uveitis	31	6.2
Peripheral retinal hemorrhage	71	14.2
Hard exudates	46	9.2
Cotton wool spots	11	2.2
Optic neuritis	6	1.2
Retinal vasculitis	12	2.4



**Figure – 2: Cotton wool spot**

## DISCUSSION

Dengue is recognized as a prominent emerging viral illness and a growing public health concern, especially in Southeast Asian countries [6,9]. It is a communicable disease transmitted through the bite of *Aedes* mosquitoes infected with any of the four dengue virus serotypes (DEN-1, DEN-2, DEN-3, and DEN-4). Whereas people who recoup from a dengue disease obtain long lasting insusceptibility to that specific serotype, consequent contaminations with other serotypes increment the chance of creating extreme dengue, already known as dengue hemorrhagic fever [6,10]. The correct component mindful for the wide run of visual signs in dengue fever, from subconjunctival hemorrhage to optic neuritis, is not however completely caught on. However, these symptoms point to an immune-mediated response and possibly an infectious origin [11]. Hemorrhages are believed to result from factors like thrombocytopenia, coagulation disorders, capillary fragility, consumptive coagulopathy, and platelet dysfunction [12]. Generally, the ocular changes linked to dengue fever tend to resolve completely over time. Visual appearances related with dengue contamination are basically watched in the back portion, counting conditions such as macular edema, vascular impediment, vitreous hemorrhage, optic neuropathy, chorioretinitis, vasculitis with retinal hemorrhages, and cotton fleece spots [13,14]. In the anterior segment, the most commonly reported issues are subconjunctival hemorrhages and anterior uveitis [6,15,16]. Extremely rare manifestations include ptosis, periorbital ecchymosis, and globe rupture [17,18]. Our findings are consistent with those of Kapoor et al. and Hussain et al., particularly in observing a predominance of male participants [3,15]. The average age of 32 years in our study aligns with similar observations reported in other studies [6,15]. In our study, 91.4% of patients had a platelet count below 50,000/ $\mu\text{l}$ , and those with ocular complications had platelet counts under 35,000/ $\mu\text{l}$ . This differs slightly from the findings of Kapoor et al., where 90.7% of patients showed a similar association [15]. The onset of ocular manifestations in our study occurred at the lowest point of thrombocytopenia, a pattern that aligns with observations in other studies [6,9,13,18]. In our study, the most common ocular manifestation was subconjunctival hemorrhage, followed by retinal hemorrhages, similar to the findings reported by Kapoor et al. and Hussain et al [15,19]. However, our study also noted an

exception to this pattern, as one patient displayed optic neuropathy. Less common findings in our study included anterior uveitis and conjunctival chemosis, as well as hard exudates, cotton wool spots, and retinal vasculitis. Unlike the study by Lim et al. which reported ocular features primarily restricted to the macula, our study observed a broader range of ocular manifestations affecting both the anterior and posterior segments [8]. In our study, none of the patients displayed bilateral periorbital ecchymosis, unilateral ptosis, proptosis due to anterior orbital or retrobulbar hemorrhage, or globe rupture, which differs from findings reported in previous studies [6,15,19]. Additionally, our patient group included individuals with diabetes and hypertension, suggesting that the retinal manifestations observed could not be solely attributed to dengue fever but may be associated with these underlying conditions, representing a limitation of our study. As dengue fever prevalence is expected to rise, leading to more cases of ophthalmic manifestations, it is essential for physicians to be vigilant and refer such cases to ophthalmologists promptly. Our study identified less common manifestations, including anterior uveitis, conjunctival chemosis, hard exudates, cotton wool spots, and retinal vasculitis. Unlike the study by Lim et al., which focused mainly on macular features, our research revealed a broader range of ocular findings affecting both the anterior and posterior segments [8]. In this study did not observe bilateral periorbital ecchymosis, unilateral ptosis, proptosis from anterior orbital or retrobulbar hemorrhage, or globe rupture, which contrasts with findings from previous research [6,15,19]. It is important to note that our patient group included individuals with diabetes and hypertension, indicating that the retinal manifestations observed may not be solely due to dengue fever but could be associated with these other conditions, which is a limitation of our study. Given the expected increase in dengue fever prevalence and the potential rise in ophthalmic manifestations, it is essential for physicians to be vigilant and refer patients to ophthalmologists as soon as possible.

## CONCLUSION

Dengue fever can lead to various ocular symptoms, including subconjunctival hemorrhage, retinal hemorrhages, and optic neuropathy. While subconjunctival hemorrhage is the most frequent manifestation, retinal involvement is also observed.

Prompt management of thrombocytopenia is crucial to minimizing the risk of these ocular complications.

**Funding:** No funding sources

**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee

## REFERENCE

1. Shrivastava V, Sarkar S. Study of Ocular Manifestations in Patients Hospitalized with Dengue Fever. *Int J Ophthalmol Eye Res.* 2018 Oct 31;6(6):387-92.
2. Bacsal KE, Chee SP, Cheng CL, Flores JV. Dengue-associated maculopathy. *Archives of Ophthalmology.* 2007 Apr 1;125(4):501-10.
3. Itha S, Kashyap R, Krishnani N, Saraswat VA, Choudhuri G, Aggarwal R. Profile of liver involvement in dengue virus infection. *National Medical Journal of India.* 2005 May 1;18(3):127.
4. Subramanian V, Shenoy S, Joseph AJ. Dengue hemorrhagic fever and fulminant hepatic failure. *Digestive diseases and sciences.* 2005 Jun 1;50(6):1146-7.
5. Lim WK, Mathur R, Koh A, Yeoh R, Chee SP. Ocular manifestations of dengue fever. *Ophthalmology.* 2004 Nov 1;111(11):2057-64.
6. Noman SM, Ahmed MS, Asif S, Hassan S, Parvez M, Mazumder CS, Akbar US. Ocular manifestations of dengue fever in Bangladesh during its out break. *Bangabandhu Sheikh Mujib Medical University Journal.* 2022 Jul 12;15(1):16-9.
7. Ng AW, Teoh SC. Dengue eye disease. *Survey of ophthalmology.* 2015 Mar 1;60(2):106-14.
8. Yacoub S, Mongkolsapaya J, Sreaton G. The pathogenesis of dengue. *Current opinion in infectious diseases.* 2013 Jun 1;26(3):284-9.
9. National Vector Borne Disease Control Programme. *Dengue Cases and Deaths in the Country Since 2008.* Available at: <http://nvbdcp.gov.in/den-cd.html> (last accessed on November 4, 2012).
10. World Health Organization. *Dengue and Severe Dengue.* Available at: <http://www.who.int/mediacentre/factsheets/fs117/en/> (last accessed on November 4, 2012).
11. Teoh SC, Chan DP, Nah GK, Rajagopalan R, Laude A, Ang B. Eye institute dengue-related ophthalmic complications workgroup. A re-look at ocular complications in dengue fever and dengue haemorrhagic fever. *Dengue Bull.* 2006;30:184-93.
12. Chhina DK, Goyal O, Goyal P, Kumar R, Puri S, Chhina RS. Haemorrhagic manifestations of dengue fever & their management in a tertiary care hospital in north India. *Indian Journal of Medical Research.* 2009 Jun 1;129(6):718-20.
13. Chan DP, Teoh SC, Tan CS, Nah GK, Rajagopalan R, Prabhakaragupta MK, Chee CK, Lim TH, Goh KY, Eye Institute Dengue-Related Ophthalmic Complications Workgroup. Ophthalmic complications of dengue. *Emerging infectious diseases.* 2006 Feb;12(2):285.
14. Sanjay S, Wagle AM, Au Eong KG. Optic neuropathy associated with dengue fever. *Eye.* 2008 May;22(5):722-4.
15. Kapoor HK, Bhai S, John M, Xavier J. Ocular manifestations of dengue fever in an East Indian epidemic. *Canadian journal of ophthalmology.* 2006 Dec 1;41(6):741-6.
16. Gupta A, Srinivasan R, Setia S, Soundravally R, Pandian DG. Uveitis following dengue fever. *Eye.* 2009 Apr;23(4):873-6.
17. Kumar V, Ghosh B, Raina UK, Goel N. Bilateral periorbital ecchymosis in a case with dengue fever. *Indian Journal of Ophthalmology.* 2009 May 1;57(3):242-3.
18. Nagaraj KB, Jayadev C, Yajmaan S, Prakash S. An unusual ocular emergency in severe dengue. *Middle East African Journal of Ophthalmology.* 2014 Oct 1;21(4):347-9.
19. Intizar Hussain FC, Afzal F, DOMS AS. Ophthalmic manifestation of dengue fever. *An official journal of peshawar medical college.* 2012 Jan;10(1):93.