Dengue Outbreak in Bangladesh: A Threat to Public

Ahsan MA[1], Rashid MH[2], Nahar N[3], Munir UR[4], Chowdhury IAQ[5], Chowdhury IB[6], Patwary MHM[7]

DOI: https://doi.org/10.3329/bafmj.v58i1.84963

ABSTRACT

Background: Dengue fever is a viral infection transmitted through the bite of an infected Aedes mosquito, prevalent in urban and semi-urban areas within tropical and subtropical regions.

Methods: This cross-sectional study was conducted by utilizing secondary data sourced from the governmental dashboard from January 2020 to December 2024 which consolidates and displays pre-analyzed information on reported dengue cases and fatalities throughout Bangladesh.

Results: During 2020, minimal dengue-related data was recorded due to the COVID-19 pandemic, with 3 deaths among 1,405 reported cases. The subsequent years showed a rise in cases, with 28,429 and 62,382 reported in 2021 and 2022 respectively. There was fivefold (321,179 cases) increase in dengue cases in 2023, and setting a new record. In 2024, a total of 101,214 dengue cases were documented. Deaths attributed to dengue were 105 in 2021 and increased to 281 in 2022 which was followed by 1,705 deaths in 2023, making it the deadliest year thus far. However, fatalities declined to 575 in 2024. Males accounted for 63.1% of patients with predominant female fatalities (over 51%). The age group most affected in both 2023 and 2024 was 21-25 years. The highest number of deaths occurred in the 36-40 age group in 2023 (165 fatalities) while 56 deaths were noted in the 25-30 age group in 2024. In 2024, the Dhaka North City Corporation reported the highest incidence of dengue cases (21,254), while the Dhaka South City Corporation recorded the most fatalities (239).

Conclusion: The risk of dengue becoming a major public health issue in Bangladesh is alarming due to the country's dense population and favorable conditions for mosquito proliferation.

Keywords: Dengue, Viral Disease, Outbreak, Mosquito Control.

1. Colonel Mohammad Ahmed Ahsan, D Aero Med, D Avn Med, MPH, Classified Specialist in Aerospace Medicine, Instructor Medicine, AFMI, 2. Professor Dr Md Halimur Rashid. MBBS, FCPS, Professor of Medicine & Line Director CDC, DGHS, 3. Asst Professor Dr. Nurun Nahar, DCH, Dhaka Shishu Hospital and Institute, 4. Brigadier General Umar Rashed Munir, PBGMS, MPH (Epid), MPH (HM), MBA (HRM), M Phil PSM (Health Economics), HADC, Brisbane, Director, Sylhet MAG Osmani Medical College and Hospital, 5. Brig Gen Imru-Al-Quais Chowdhury, SPP, MPhil, MPH. Chief Health Officer, Dhaka North City Corporation, 6. Colonel Iqbal Bahar Chowdhury, SPP, MPH, MPhil, OIC Trg, AFMI, 7. CGO Md Helal Morshed Patwary, BSc (Hons), MS (Statistics), Statistician, AFMI.

Correspondence: Colonel Mohammad Ahmed Ahsan, D Aero Med(USA), D Av Med (PAK), MPH, Classified Specialist in Aerospace Medicine, Instructor Medicine, AFMI. Mobile: 01714167057, Email: ahsanahmed153@yahoo.com

Received: 08 May 2025 **Accepted**: 11 August 2025

INTRODUCTION

Dengue fever is a significant infectious disease transmitted through the bite of an infected Aedes mosquito, caused by one of four antigenically distinct serotypes of the dengue virus (DENV 1-4).[1] It is prevalent in both urban and semi-urban areas across tropical and subtropical regions, placing over half of the global population at risk of contracting dengue fever. Annually, there are more than 400 million documented cases and approximately 22,000 fatalities due to dengue infection worldwide.[2,3] Over the past 25 years, Bangladesh, a South Asian nation, has maintained a status of dengue endemicity with heterogeneous prevalence. Recently, dengue fever has emerged as a severe public health issue in Bangladesh, where the country's proximity to the equator and subtropical climate creates an ideal environment for Aedes mosquito proliferation, resulting in heightened dengue transmission rates.[4] Since 2000, the country has been grappling with recurring dengue outbreaks, with 2023 marking one of the most severe episodes, reporting more than 321,179 cases and 1,705 deaths.[5]

Dengue can range from mild fever to life-threatening conditions, such as dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS), characterized by reduced platelet and white blood cell counts, as well as increased vascular permeability.[6] The management of dengue outbreaks in tropical regions is complicated due to the warm climate, which facilitates mosquito breeding and the transmission of the virus. Furthermore, large-scale control of dengue outbreaks requires substantial resources, including the deployment of insecticide sprays to reduce mosquito populations and a significant medical workforce to care for those affected.[7]

This article aims to provide insights into the dengue situation in Bangladesh from January 2020 to December 2024, by synthesizing existing government-analyzed data. As a descriptive epidemiological study, it seeks to offer a comprehensive interpretation of dengue trends, contributing valuable information to enhance understanding and response strategies. The study identifies key areas for public health intervention and further research to improve the management and control of dengue endemicity and outbreaks in Bangladesh.

MATERIALS AND METHODS

This cross-sectional study was conducted by utilizing the secondary data from the dashboard of Directorate General of Health Services (DGHS) database (open source). We compile and analyzed information on dengue cases and fatalities reported among Bangladeshi inhabitants from 2020 to 2024 with an objective to interpret and assess overall dengue situation in the country. The methodology for this research included several crucial steps. Data were sourced from the Dengue Dynamic Dashboard for Bangladesh, which is regularly updated with information from hospitals and health centers nationwide. This dashboard provides extensive data, including demographic details and geographic locations of reported dengue cases and fatalities. The study then focused on data interpretation, analyzing the dashboard information to discern trends and patterns in the dengue landscape. This involved examining the distribution of cases and fatalities by sex and age, as well as comparing records from various types of residential areas. Subsequently, the gathered data were discussed to identify potential reasons behind observed trends and discrepancies. Factors such as exposure risks, healthcare access, and socio-cultural influences were considered to provide a comprehensive understanding of the

dengue situation. The collected data were charted using Microsoft Excel 2016.

RESULTS

The data collection on dengue fever was hindered in 2020 due to the COVID-19 pandemic; however, dengue cases were reported every month throughout the year. In 2021 and 2022, there were 28,429 and 62,382 documented cases of dengue fever, respectively. The months of August and September witnessed the highest fatalities in 2021, whereas October and November experienced the peak rates in 2022. A dramatic surge in dengue cases was observed in 2023, reaching 321,179, which was five times the number reported in the previous year. September 2023 emerged as the most critical month, affecting nearly 80,000 individuals whereas 101,214 dengue cases were noted 2024, with peak in the month of October (30,879 cases). Over the five-year span, the months of August, September, October, and November each year consistently recorded the highest number of dengue cases. (Table-1)

TABLE-I: Monthly distribution of Dengue cases from 2020–2024

Month	2020	2021	2022	2023	2024	Total Cases	% Cases
January	199	32	126	566	1055	1978	0.38
February	45	9	20	166	339	579	0.11
March	27	13	20	111	311	482	0.09
April	25	3	23	143	504	698	0.14
May	10	43	163	1036	644	1896	0.37
June	20	272	737	5956	798	7783	1.51
July	23	2286	1571	43854	2669	50433	9.8
August	68	7698	3521	71976	6521	89784	17.45
September	47	7841	9911	79598	18097	115494	22.44
October	164	5458	21932	67769	30879	126202	24.52
November	546	3567	19334	40716	29652	93815	18.23
December	231	1207	5024	9288	9745	24202	4.7
Total	1405	28429	62382	321179	101214	514609	99.75

In regards to the year wise epidemiological analysis, it was revealed that 2023 experienced the highest surge (321,179 cases) which was followed by 101214 in the year 2024. Highest (1705) death were noted in 2023 and 575 deaths in 2024 (Table II).

TABLE-II: Year wise epidemiological analysis of Dengue cases (2020-2024)

Year	Cases	Death	Yearly mortality rate based on the confirmed cases	% of yearly death based on total death (last 5 years)
2020	1405	03	0.21	0.112
2021	28429	105	0.37	3.934
2022	62382	281	0.44	10.530
2023	321179	1705	0.54	63.881
2024	101214	575	0.57	21.543

It revealed that 2023 was the deadliest year for the dengue cases with 321179 cases and 1705 deaths (63.88%). July to November experienced the highest peak with September was the most prevalent month for dengue cases (79598 cases and 396 deaths) (Figure-I)

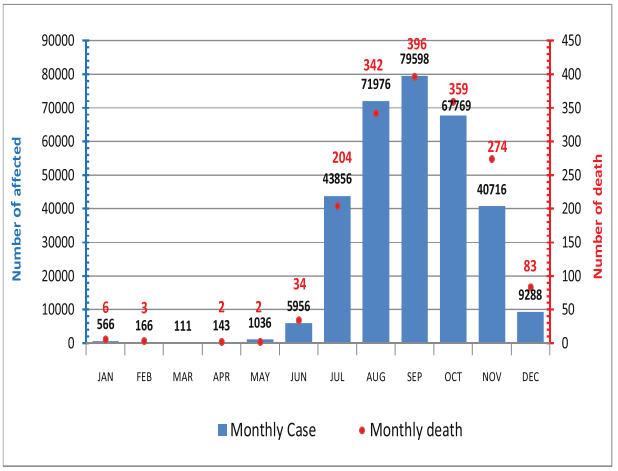

Figure-1: Monthly distribution of Dengue cases with mortality in the year 2023

Table III shows the age group and sex wise comparison of dengue cases in 2023 and 2024 which revealed that age group 21-25 years were the most affected group with male predominance in both the year (Table III).

TABLE-III: Age group and sex distribution of Dengue cases in 2023

Age group	2023		2024	
	Female	Male	Female	Male
0-5	6854	9165	2459	3156
06-10	6990	9219	2115	2746
11-15	7630	14299	2123	3983
16-20	12930	25865	4252	8883
21-25	15625	29718	4826	10284
26-30	15985	25299	4850	9213
31-35	13015	18045	3712	6247
36-40	12465	15419	3481	5205
41-45	9375	11142	2586	3732
46-50	8623	9309	2199	2909
51-55	6183	7676	1521	2440
56-60	5602	6463	1357	1920
61-65	3334	4827	804	1457
66-70	2155	3161	555	848
71-75	802	1481	216	438
76-80	588	878	192	220
80+	413	644	80	205

In regards to the mortality, it was revealed that highest mortality took place in the year 2023 (165 deaths) and age group 36-40 was the most affected group. Whereas, 56 deaths took place in the year 2024 with 26-30 years group was the predominant sufferers (Table IV).

TABLE-IV: Age group and sex wise comparison of mortality statistics in 2023 and 2024

Age Group	2023		2024	
	Female	Male	Female	Male
0-5	35	31	14	12
06-10	37	21	14	8
11-15	23	21	6	10
16-20	44	56	15	16
21-25	82	43	25	27
26-30	90	58	34	22
31-35	116	39	28	19
36-40	107	58	30	15
41-45	79	54	24	20
46-50	84	55	22	18
51-55	67	55	25	23
56-60	78	56	17	25
61-65	51	67	12	26
66-70	38	49	13	11
71-75	21	28	11	11
76-80	8	18	4	9
80+	10	26	0	9

In regards to the distribution of dengue cases as per division and city corporation area, it was revealed that Dhaka North City Corporation (DNCC) was the most affected area (21254 cases) in 2024 where Dhaka South City Corporation (DSCC) experience highest deaths (239) (Figure-II)

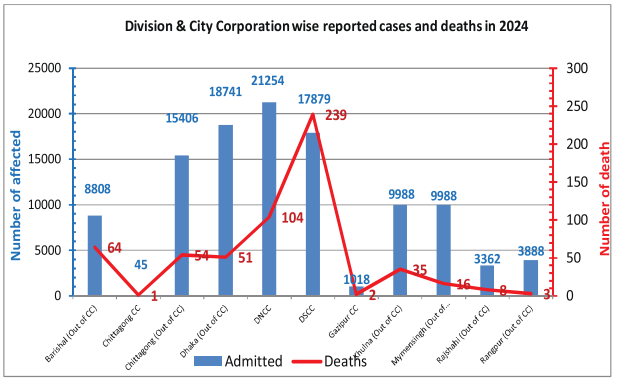

Figure-2: Division and City Corporation wise reported cases in 2024.

As per the cases and mortality statistics of various hospitals in Dhaka city, it was revealed that Sir Salimullah Medical College and Mitford Hospital received the highest number of patient admissions (19,670), followed by Dhaka Medical College and Hospital (DMC&H) with 15,665 admissions. Bangladesh Shishu Hospital and Institute reported the highest number of child admissions (5,138). During this timeframe, DMC&H also accounted for the most fatalities, totaling 381 (Table-V).

TABLE-V: Dangue admitted and death cases of major hospitals of Dhaka in the year 2021-2024

Sl No	Hospital Name	2021		2022		2023		2024	
		Cases	Death	Cases	Death	Cases	Death	Cases	Death
1.	DMCH	472	1	3121	33	8631	253	3396	94
2.	SSMC & Mitford Hospital	3780	24	3253	28	8906	83	3727	44
3.	BangladeshShishu Hospital	1140	17	1195	16	2027	23	776	10
4.	Shaheed Suhrawardi Medical College & Hospital	538	0	1719	0	4364	10	1765	6
5.	BSMMU	177	0	132	0	1342	6	392	4
6.	Police Hospital, Rajarbag	1	0	612	0	2035	3	100	0
7.	Mugda Medical College Hospita	334	2	4252	11	13505	170	3819	49
8.	BGB Hospital, Pilkhana, Dhaka	58	0	296	0	529	0	110	0
9.	CMH Dhaka	1214	0	1954	11	3665	12	1952	0
10.	Kurmitola General Hospital	417	0	2403	7	7778	70	2699	23
11.	Kuwait BD Friendship Hospita	0	0	1229	0	3619	13	1433	5
	Total	8131	44	20166	106	56401	643	20169	235

DISCUSSION

Currently, more than 50% of the world's population resides in dengue-endemic regions across over 100 countries, with the occurrence of the disease having increased thirtyfold over the last 50 years.[8]

From 2020 to 2023, dengue fever became the predominant cause of mortality in Bangladesh, surpassing COVID-19. By December 31, 2024, there were 514,609 reported cases of dengue fever over the past five years, of which 2,669 resulted in fatalities, underscoring the illness's severity. The number of deaths recorded in 2023 was 1,705, while in 2024, it was 575, collectively accounting for over 85% (2,280) of all dengue-related deaths (Table-2). This statistic highlights the seriousness of the disease. Furthermore, Dhaka city has emerged as the epicenter of the outbreak, with over 35% of all cases originating there. The situation in Dhaka has stabilized recently; reported cases have surged in other regions of the country. Besides Dhaka, areas such as Chattogram, Barishal, Khulna, and Mymensing have also faced severe dengue outbreaks in 2024 (Figure 4). The increased population density, unplanned infra structural development at Dhaka and other districts are likely the primary factors contributing to this issue.

In the recent dengue fever outbreak in Bangladesh, there was a marked gender disparity, with males constituting 63.1% of reported cases, indicating nearly double the incidence compared to females. This male-to-female ratio aligns with findings from previous outbreaks in Bangladesh.[9] Comparatively, studies in India have shown similar trends.[10] In contrast, surveys conducted in South America indicated that the ratio of female patients was equal to or exceeded that of male cases.[11] One potential explanation for this disparity is that men may have increased exposure to dengue transmission vectors, such as Aedes aegypti and Aedes albopictus, owing to occupational or outdoor activities where these mosquitoes thrive. Additionally, societal and cultural norms may influence behaviors regarding protective measures, such as the use of long sleeves or mosquito repellents. Another factor could be that men are more likely to seek medical care promptly, resulting in higher incidence rates among males.[12] Nonetheless, data from 2023 and 2024 indicated a slightly higher mortality rate among females (>51%) compared to males, suggesting that female patients may have accessed medical assistance too late, potentially overlooking the severity of their condition.

Historically, dengue fever in Bangladesh has predominantly affected young adults. During the first pandemic in 2000, over 80% of infections occurred in adults (age 18 and older), primarily among individuals aged 18 to 33.[13] In both 2023 and 2024, the most affected demographic was those aged 21-30, accounting for 27.0% of cases. Similar trends have been reported in India,[14] Sri Lanka,[15] Brazil,[16] and Ethiopia.[17] It is plausible that some dengue cases were mistakenly diagnosed as COVID-19. The reported incidence of dengue cases saw a significant decline in 2020, with only 1,405 cases registered (Table-2). This decrease may be attributed to the overlapping symptoms of COVID-19 and dengue, leading to a greater likelihood of testing for COVID-19 rather than dengue or other diseases.[18] Consequently, some dengue cases may have been misdiagnosed as COVID-19. Additionally, the COVID-19 pandemic likely discouraged individuals from seeking treatment for dengue due to fears of visiting healthcare facilities, thereby impacting local mosquito control efforts, public health campaigns, and natural variations in disease prevalence.[19] In 2021, there was a dramatic rise in documented dengue cases, totaling 28,429; this trend continued in 2022, with 62,382 cases

reported. Statistics for 2023 and 2024 indicate an ongoing increase in recorded dengue cases, amounting to a total of 422,393 (321,179 in 2023 and 101,214 in 2024), with 2,280 fatalities (1,705 in 2023 and 575 in 2024) (Table-2).

CONCLUSION

The escalating potential for dengue to emerge as a significant public health concern in Bangladesh warrants serious attention, given the nation's high population density and favorable climatic conditions for mosquito proliferation. Implementing effective strategies is crucial, including enhancing public awareness regarding prevention, establishing robust mosquito control initiatives, and strengthening healthcare infrastructure to adequately manage and treat affected individuals. Prompt and sustained actions are essential to alleviate the repercussions of this escalating health threat. Increasing community awareness is critical in decreasing the likelihood of this lethal disease. Furthermore, it is incumbent upon the government of Bangladesh to undertake public education initiatives, conduct awareness campaigns, and implement appropriate measures to mitigate the disease's impact.

REFERENCES

1. Guzman MG, Harris E. Dengue. The Lancet. 2015;385(9966): 453-465. doi:10.1016/S0140-6736(14)60572-9.

2. Bhatt S, Gething PW, Brady OJ, et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504-507. doi:10.1038/nature12060.

3. Shepard DS, Undurraga EA, Halasa YA, Stanaway JD. The global economic burden of dengue: a systematic analysis. Lancet Infect Dis. 2016;16(8):935-941. doi:10.1016/s1473-3099(16)00146-8.

4. Bhowmik KK, Ferdous J, Baral PK, Islam MS. Recent outbreak of dengue in Bangladesh: A threat to public health. Health Science Reports [Internet]. 2023 Apr 1; 6(4). Available from: https://doi.org/10.1002/hsr2.1210.

5. Mahmood R, Benzadid MdS, Weston S, Hossain A, Ahmed T, Mitra DK, et al. Dengue outbreak 2019: clinical and laboratory profiles of dengue virus infection in Dhaka city. Heliyon [Internet]. 2021 Jun 1; 7(6):e07183. Available from: https://doi.org/10.1016/j.heliyon.2021.e07183.

6. Roy SK, Bhattacharjee S. Dengue virus: epidemiology, biology, and disease aetiology. Can J Microbiol. 2021;67(10):687-702. doi: 10.1139/ cjm-2020-0572.

7. Haider N, Chang Y-M, Rahman M, Zumla A, Kock RA. Dengue outbreaks in Bangladesh: historic epidemic patterns suggest earlier mosquito control intervention in the transmission season could reduce the monthly growth factor and extent of epidemics. Curr Res Parasitol Vector-Borne Dis. 2021;1:100063.

8. Harapan H, Michie A, Sasmono RT, Imrie A. Dengue: a minireview. Viruses. 2020;12(8):829.

9. Hossain MS, Noman AA, Mamun S, Mosabbir AA. Twenty-two years of dengue outbreaks in Bangladesh: Epidemiology, clinical spectrum, serotypes, and future disease risks. Trop Med Health 2023; 51(1): 1-14.

10. Chakravarti A, Arora R, Luxemburger C. Fifty years of dengue in India. Trans R Soc Trop Med Hyg 2012; 106(5): 273-282.

11. Anker M, Arima Y. Male-female differences in the number of reported incident dengue fever cases in six Asian countries. Western Pac surveill Response J 2011; 2(2): 17-23.

12. SA Maksudul, Toufiqul MS, Chowdhury S. Dengue situation in Bangladesh: January to

early August 2024, World Journal of Biology Pharmacy and Health Sciences, 2024, 19(03), 327–332.

13. Rahman M, Rahman K, Siddque AK, Shoma S, Kamal AH, Ali KS, et al. First outbreak of dengue hemorrhagic fever, Bangladesh. Emerging Infect Dis 2002; 8(7): 738-740.

14. Chakravarti A, Arora R, Luxemburger C. Fifty years of dengue in India. Trans R Soc Trop Med Hyg 2012; 106(5): 273-282.

15. Jayadas T, Kumanan T, Arasaratnam V, Gajapathy K, Surendran SN. The clinical profile, hematological parameters and liver transaminases of dengue NS1 Ag positive patients admitted to Jaffna Teaching Hospital, Sri Lanka. BMC Res Notes 2019; 12(1): 604.

16. Teixeira MG, Siqueira Jr JB, Ferreira GL, Bricks L, Joint G. Epidemiological trends of dengue disease in Brazil (2000–2010): a systematic literature search and analysis. PLoS Negl Trop Dis 2013; 7(12): e2520.

17. Ferede G, Tiruneh M, Abate E, Wondimeneh Y, Gadisa E, Howe R, et al. A study of clinical, hematological, and biochemical profiles of patients with dengue viral infections in Northwest Ethiopia: implications for patient management. BMC Infect Dis 2018; 18(1): 616.

18. Nasim R, Tisha JF and Dewan SMR. Only COVID-19 and not all infectious diseases are of concern: a timely observation. Health Sci Rep 2023; 6: e1589.

19. Dengue. Health Emergency Operation Center and Control Room. 2023. Accessed August 10,2023. https://dashboard.dghs.gov.bd/pages/heoc_dengue_v1.php-Google Search. Accessed August 7, 2024.