

Dengue: An Epidemic Is Largely a Failure in Public Health Administration! The Role of Dhaka City Corporation, DCC of Bangladesh

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Abstract

It was reported that a dwindling supply of blood was exacerbating the dengue outbreak in Bangladesh. A total number of dengue-affected patients, according to official accounts, stood at 3,474. Three hundred died as of 2002. Bangladesh's population is at risk of dengue infection due to the poor management of Dhaka City Corporation. This article explores how this problem occurred, assesses what factors impede progress in eliminating this problem and recommends governmental measures for the prevention of dengue.

Perspectives

Dengue and dengue hemorrhagic fever (DHF) are caused by one of four closely related, but antigenically distinct, virus serotypes of the genus *Flavivirus*. Infection with one of these serotypes does not provide crossprotective immunity. It is possible that persons living in a dengue-endemic area can have four dengue infections during their lifetimes (CDC 2000).

History of Dengue

The first reported epidemics of dengue fever occurred in 1779-1780 in Asia, Africa and North America. The near parallel incidence of outbreaks on three continents indicates that these viruses and their mosquito vector have had a worldwide distribution in the tropics for more than 200 years. During most of this time, dengue fever was considered a benign, nonfatal disease of visitors to the tropics. Generally, there were long intervals (10 to 40 years) between major epidemics, mainly because the viruses and their mosquito vector could only be transported between population centers by sailing vessels (CDC 2000).

A global pandemic of dengue began in Southeast Asia after World War II and has intensified during the last 15 years. Epidemics caused by multiple serotypes (hyperendemicity) are more frequent, the geographic distribution of dengue viruses and their mosquito vectors has expanded, and DHF has emerged in the Pacific region and the Americas. In Southeast Asia, epidemic DHF first appeared in the 1950s, but by 1975 it had become a leading cause of hospitalization and death among children in many countries in that region (CDC 2000).

Most cases occur in urban areas, and usually at altitudes less than 4,500 feet. *Aedes* mosquitoes like to breed in standing water such as may be found in empty tires, flower pots, artificial ponds, etc., especially after rains. These are quite common in tropical urban areas, even around hotels. The local authorities may try to eradicate the mosquito population with spraying, but these pesky aviators just keep coming back for more (*Health Travels* n.d.)

1. What Is Dengue?

Dengue (pronounced den' gee) is a disease caused by any one of four closely related viruses (DEN-1, DEN-2, DEN-3, or DEN-4). The viruses are transmitted to humans by an infected mosquito. In the Western Hemisphere, the *Aedes aegypti* mosquito is the most important transmitter or vector of dengue viruses, although a 2001 outbreak in Hawaii was transmitted by *Aedes albopictus*. It is estimated that there are over 100 million cases of dengue worldwide each year (CDC 2002).

2. Where Can Outbreaks of Dengue Occur?

Outbreaks of dengue occur primarily in areas where *Aedes aegypti* (sometimes also *Aedes albopictus*) mosquitoes live. This includes most tropical urban areas of the world. Dengue viruses may be introduced into areas by travelers who become infected while visiting other areas of the tropics where dengue commonly exists.

In the Americas, all dengue virus serotypes are now present. DEN-3 was reintroduced into Central America in 1994 and is now found in several countries in the region. Since this serotype had been absent from the Americas for almost 20 years, the population has a low level of immunity and the virus is expected to spread rapidly (CDC 2002).

History of Dengue in Bangladesh

Dengue is not new in the country. In 1965, dengue was detected as "Dhaka Fever," and in 1999, 13.7% children were found infected with dengue virus in a serological survey at Chittagong Medical College. Since then, it has appeared to be a seasonal disease (*Bangladesh Observer* 2002).

1. Vitamin B1 with Thiamin

A journal from Denmark has announced that we can prevent mosquito bite, all species, including *Aedes* mosquito, by taking a tablet called Apovit 300 mg once daily during the season. (Source: Jane, 2001)

Each tablet contains 300 mg thiamin hydrochloride (B1-vitamin) manufactured by Nycomed Danmark A/S, DK-4000 Roskilde. This medicine is **not recommended for age below two years**. (Source: Jane, 2001)

In Dhaka and all city pharmacies in Bangladesh, vitamin B1 with Thiamin produced locally is available but in different names and only in 100 mg strength, which means intake of three tablets daily (Source: Jane, 2001)

2. Dengue Death Toll in Dhaka Reaches 40

It was reported in 2002 that a dwindling supply of blood was exacerbating the dengue outbreak in Bangladesh. With the new figure, the total number of dengue-affected patients, according to the official accounts, stood at 3,474. Of them, 191 (official) and 300 (unofficial) died as of September 6, 2002.

The director general of the health department informed BSS that a total of 500 people were affected by dengue fever as of August 2002. According to the official statistics, 5,551 persons were affected with dengue and 93 died in the year 2000, while in 2001, 1,430 persons were infected with the virus and 44 died (*Bangladesh Observer* 2002).

Dengue Control Room sources said 509 persons affected with dengue virus were undergoing treatment at different hospitals across the country.

According to the health experts, the country's actual dengue situation, particularly in the city, was worse than the official accounts. Asked whether dengue turned into epidemic form in the county, epidemiologists refused to make any direct comment, but said if any disease breaks out unusually and unexpectedly, it can be termed "epidemic."

3. Breeding Period

The breeding period of *Aedes* mosquito, the carrier of dengue virus, is between July to October 2002.

4. Aedes Breeding Sites in Dhaka

The Dhaka City Corporation larval survey revealed that *Aedes* egg concentration in Dhaka is highest in (1) rooftop uncovered water tanks, followed by (2) open cemented water tanks in under-construction buildings, and (3) tires found in open space (see Appendix A). All city dwellers are urged to pay highest attention to these top-breeding sites, side-by-side the other identified common sites already known (*Daily Star* 2002).

5. Dengue Outbreak Other Than Dhaka City

A Khulna (*a district, compare as a state*) staff correspondent reported that one person died from DHF in Magura district, while four others were hospitalized in Jessore (*a district, compare as a state*) General Hospital within 24 hours. The Khulna City Corporation, in the meantime, launched an antimosquito drive in the city.

At least one person died in Chapai-nawabganj district, and 15 others were hospitalized for DHF. All of them were admitted to the Rajshahi Medical College Hospital (RMCH) within 10 days. The RMCH authorities opened a "dengue corner" to facilitate treatment of dengue patients. Of the 15 affected, only five underwent treatment at the "dengue corner" of the RMCH, while the rest were shifted to Dhaka. In addition, 10 more persons were treated at different clinics in Rajshahi (*a district, compare as a state*) City (*South Asia* 2002).

Government Has Failed to Curb Dengue

Governments' Poor Planning

The government failed to address the dengue situation as the viral disease turned worse and spread quickly across the country. Competent sources said Dhaka City Corporation failed to collect larvicide and adulticide to kill the *Aedes* mosquito, the carrier of dengue virus. As a result, the breeding of *Aedes* caused the spread of dengue in an "epidemic" proportion. All the medicine being sprayed in the city and elsewhere in the country is not actually for killing normal mosquitoes, or maybe the drives are simple the eyewash, the sources said on condition of anonymity.

It was asked why the DCC failed to collect the medicine in the year 2002. The source informed that since the DCC did not pay the previous dues of Rhone-Poulanc India for the same medicine

procured earlier. The source further said that Rhone-Poulanc refused DCC to supply the medicine without payment of its previous dues (*Bangladesh Observer* 2002).

Dengue's Spread and DCC's Role

The Dhaka City Corporation was not able to control dengue which became an epidemic. It was also mentioned that the Dhaka City Corporation is least prepared against the *Aedes*-borne disease. It has yet to spray larvacide or launch awareness programs to make the citizens cognizant of their roles in preventing the cause.

Entomologists and epidemiologists fear that if the *Aedes* control drive fails, dengue will take an epidemic form, as has occurred in other countries in the past.

Some leading entomologists have suggested that the Dhaka City Corporation **ignored** recommendations they submitted in 2000 for *Aedes* mosquito control. The dengue prevalence could have been prevented if the DCC had acted on their suggestions, they mentioned at a roundtable on Dengue Vector Control at the Jatiya Press Club in Dhaka City. "We have had no response from the DCC despite repeated requests and those were virtually shelved," said one of the entomologists (*Daily Star* 2002).

1. What Other Countries Did to Control Dengue

The entomologists suggested that to ensure broad-based public participation in "container (breeding place for *Aedes* mosquito) disposal and management," the DCC should initiate a new strategy in line with the existing laws in other countries with dengue problems. *Aedes* breeding potential of different containers should be widely publicized to increase public awareness.

The current *Culex* mosquito control program of the DCC should be reorganized to include the strategy for *Aedes* mosquito control, they said. The DCC should form a technical committee having members with expertise in vector control to advise on dengue control and prevention and launch a vector surveillance program immediately (*Daily Star* 2002).

2. What Mayor Said Regarding Dengue Outbreak

The mayor of Dhaka City Corporation, Sadek Hossain Khoka, said that they had received permission to import 15,000 litres of that they would use once the consignment arrives. Commenting on his plan to combat dengue transmission, the mayor said, "I have already summoned all commissioners of Dhaka City and instructed them to take special measures to destroy eggs of the mosquito. In addition I am now planning to form a separate mosquito control cell within the DCC to combat transmission of the disease" (*Daily Star* 2002).

3. DCC Did Not Have a Plan at Hand to Face Dengue Attack

The Daily Star, a popular newspaper, revealed that the DCC itself had not yet approved purchase of larvacide to kill the *Aedis* mosquito larvae. Neither had it sent any sample of the larvacide to the plant protection wing for approval. The worst thing was, the DCC did not have a plan at hand to face dengue attack despite warnings previous year that the fatal infection would come in a wave (*Daily Star* 2002).

4. How Could This Happen? Who is Responsible?

Why isn't there any mechanism to punish people guilty of criminal negligence pertaining to a serious public health hazard?

The DCC neither dispatched any sample of to the plant protection department for approval, nor did the mayor of Dhaka City okay a purchase of 8,000 litres of it. In addition, the corporation did not have any approved adulticide in stock to be able to kill adult mosquitoes.

There is no alternative view between the experts and the city planners that large-scale spraying of larvacide and adulticide could bail the city out of the critical situation that arose through absolute lack of planning and timely action. It was urged that the health and local government ministries and

the DCC mayor should make a public declaration about the status on the *Aedes* mosquito control plan (*Daily Star* 2002).

5. Comment From a Father of a Dengue Patient, Vented in Grievance

"Although DCC claims that it has taken proper steps against dengue, the increasing number of dengue patients and death toll proves the DCC claim untrue."

Father of a dengue patient, vented in grievance (Bangladesh Observer 2002)

Meanwhile, the Dhaka City Corporation almost run out of insecticide to kill the adult *Aedes* mosquito, the cause of the disease. According to sources at the DCC, the city authorities have asked all its 10 zones to purchase Malathion, an effective mosquito killer that has also been recommended by the World Health Organization (WHO). "This insecticide is cheap. One liter costs about 35 takas against 355 takas a litre [USD 0.62 vs. 6.34] for quick-flying fogging fluid. And it is locally available" (*South Asia* 2002).

Conclusion

Even though the World Health Organization has referred to dengue as a major international public health concern, Bangladesh has done precious little in the way of preventive public health works to stave off the disease. Since there are no known cures for the disease, public works including good solid waste disposal, improving water storage practices, regular insecticide deployment and effective public health education are crucial.

Under the circumstances, the health ministry should engage itself more and seek to import on an emergency basis the needed and adulticides within days if a full-blown epidemic is to be avoided. Not only their import, the relevant ministry needs to intervene, perhaps, to ensure that the same are effectively sprayed throughout Dhaka City and other parts of the country from where notable outbreak of Dengue has been reported (*The New Nation* 2002).

Recommendations for Good Planning for Dhaka City

First, the city needs to destroy all the spots where *Aedes* mosquitoes breed, primarily artificial containers that hold water.

Second, items that collect rainwater or that are used to store water (plastic containers, gallon drums, buckets, or used automobile tires) should be covered or properly discarded.

Third, pet and animal watering containers and vases with fresh flowers should be emptied and scoured at least once a week. This will eliminate the mosquito eggs and larvae and reduce the number of mosquitoes present in these areas.

Fourth, for travelers to areas with dengue, as well as people living in areas with dengue, the risk of being bitten by mosquitoes indoors is reduced by utilization of air conditioning or windows and doors that are screened. The risk of dengue infection for international travelers appears to be small unless an epidemic is in progress.

Fifth, if needed, the hospital authorities should immediately arrange additional beds for increased number of patients.

Sixth, no dengue patient should leave hospitals without receiving the highest possible care. Dengue patients should receive optimal care and doctors should take all precautionary steps for treatment of dengue hemorrhage fever.

Seventh, preventing epidemic disease requires a coordinated community effort to increase awareness about dengue, how to recognize it, and how to control the mosquito that transmits it. A campaign for creating awareness, no doubt, is helpful to eradicate *Aedes* mosquitoes from the capital city and elsewhere in the country. For example a public awareness raising campaign should start over radio and television (also through the electronic, print and other media). Residents are responsible for keeping their yards and patios free of sites where mosquitoes can be produced.

Eight, children are the most vulnerable to dengue. The school dress code of the schools should be changed for a few days during potential outbreaks. The students should wear full-sleeved shirts. Mosquito nets should be used during sleep. Containers which may be conducive for breeding of the mosquitoes should be covered with white nets.

Last, but not the least, we all need to be united to wrestle against this deadly disease. The best way to make a metropolitan solution regarding dengue is to disengaging the “institutional jujitsu.”

It becomes clear that dengue is gradually turning into an “all-weather” health hazard to the people of this country. In our disaster-prone country, this menace has already created much trouble, along with losses of life, and will create more damage if not prevented soon. The negligence of DCC to control the breeding and spreading of *Aedes* mosquitoes is one of the major causes of the spreading of dengue in the country.

Dengue poses as much of an epidemiological challenge as it does a challenge **to good governance and public administration. An epidemic is largely a failure in public health administration.** No country has been able to eliminate this dangerous disease. However it is possible to keep it under control.

Comments from City Planners

(a) A World Health Organization (WHO) expert said, “What we are witnessing is a re-emergence of this epidemic disease” (*Daily Star* 2002).

(b) José Esparza, coordinator of viral vaccines at the WHO, said, “At WHO, we are concerned that we have to react to this epidemic now, because it is expanding and there are now 100 countries in the world that have the ecological conditions for outbreaks” (*Daily Star* 2002).

(c) The World Health Organization recommended that every dengue-positive household be sprayed with insecticide with urgency. The WHO rule states that at least 100 square metres radius of the household where a dengue patient has been identified should be sprayed with insecticide to kill the carrier mosquito (*Daily Star* 2002).

(d) “The situation is quite alarming and in the coming days, we may face a serious epidemic of dengue in the city unless it is put under control right now,” said Touhid Uddin Ahmed, a leading entomologist and also a consultant entomologist at the DCC (*The Independent* 2002).

(e) Dr. Khandker Mosharraf Hossain said it was a time to create awareness the city dwellers. (*The Independent* 2002).

(f) Amanullah Aman, Member of Parliament, urged the mayor to intensify City Corporation’s campaign about cleanliness and awareness among the townspeople (*The Independent* 2002).

(g) Advocate Khandker Mahbubuddin Ahmed, Member of Parliament, suggested that laws be enacted providing for fine for violating environmental cleanliness rules (*The Independent* 2002).

(h) Dr. David Sack, Executive Director of ICDDR,B emphasized the need for more research on dengue. He said dengue problem could not be solved and added that big cities like Singapore and Thailand could not yet solve the dengue problem (*The Independent* 2002).

(i) Eminent entomologist Manzur A. Chowdhury said, “Out of such campaigns, no significant achievement can be attained. Moreover, the frustrating aspect is that the nonentomologists who are giving suggestions and recommendations to the innocent people are making the situation worse” (*The Independent* 2002).

He also mentioned, “Dengue would not have taken an epidemic turn had the DCC adopted the 14-point recommendations of a consultant report titled ‘Aedes Larval Survey in Dhaka’ provided and prepared by a panel of entomologists in 2000. The recommendations included many of the steps and remedies which would have helped get rid of the present status” (*The Independent* 2002)

(j) Showing a photograph published in a national daily, Manzur Chowdhury said, “Spraying of larvicide in the hospitals in presence of patients is totally an erroneous step by the DCC. The patients may die owing to the toxic effect of the chemical” (*The Independent* 2002).

(k) Citing statistics, Touhiduddin Ahmed said, “The temperature of the world will rise six percent in the coming years as a result of global warming. The rise in the mercury will make room for easy

breeding of mosquitoes and other insects in the future. But there is nothing to get panicky about if we take necessary steps to prevent the rise in temperature” (*The Independent* 2002).

(l) DCC Chief Health Officer Dr. Mohammad Ashraf Uddin said that indiscriminate fogging would not be effective, nor is it scientific. He cited examples of dengue outbreak in Latin America and Southeast Asia, where only case-positive houses have been focused in the *aedes* mosquito control programme (*Daily Star* 2002).

Morbidity Rate of Dengue by Year

Morbidity (DALY)		
Year	Population (000)	DALY (000)
1998	5,884,576	558
1999	5,961,628	465
2000	6,045,172	433

http://www.geocities.com//prevent_dengue2/seminar/sh4/page9.html

Mortality Rate of Dengue by Region

Dengue in a region			
Region	Mortality (000)		
	1998	1999	2000
South East Asia	13	12	11
Africa	0	0	0
American countries	0	0	0
Region	DALY (000)		
	1998	1999	2000
South East Asia	471	440	371
Africa	16	24	6
American countries	1	0	10

http://www.geocities.com//prevent_dengue2/seminar/sh4/page9.html

45 Dengue-affected Wards in Dhaka City in 2000

Sensitive Wards	Area Name	BI Value
01		20 – 94
02, 05, 06, 08	Pallabi	20 – 94
09, 10	Mirpur	20 – 94
18, 19, 20	Gulshan	20 – 94
31, 32, 34, 36	Motijheel	20 – 94
37, 39, 40	Tejgaon	20 – 94
41, 44, 45	Mohammadpur	20 – 94
48, 49, 50, 51, 52	Dhanmondi	20 – 94
53, 54, 56, 57	Ramna	20 – 94
62, 63, 64, 66	Lalbagh	20 – 94
69, 70, 71, 72, 73	Kotwali	20 – 94
74, 75, 76, 77, 81, 82, 83	Sutrapur	20 – 94

http://www.geocities.com/prevent_dengue/45wards.html

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Appendix A



