

Dengue Uproar In Bangladesh: Look Back And Forward To Learn To Live With Dengue

Summary

Dengue is an emerging communicable vector borne infectious diseases of great public health concern. The first outbreak that occurred in 2000 baffled the people, profession and power alike. Dengue was not known and most are not accustomed. In addition, dengue had been found to be a disease of people of upper echelon of the society those who have voice, power and resources. Though at that time the case fatality of dengue was found to be less comparing to other communicable infections, malaria for example. Dengue as such created the uproar that was reverberating around many tenets of care and prevention. On the other hand, during decades there are so many missed opportunities. After two decades plus with dengue endemo-epidemic, the situation and sensitization remain at the square root one with little step ahead fueling more uproars. This narrative reflects on issues that may be picked by concerned people and program to ameliorate uproars. Dengue cannot be eliminated. There is a 'Need to learn to Live with Dengue'.

Prologue

Dengue was an unknown disease to people and profession before the Maiden Outbreak of 2000 at large. Most dengue infections are asymptomatic; however, when symptomatic, the virus can cause mild dengue fever (DF), or more severe forms of the disease, including dengue hemorrhagic fever (DHF), or dengue shock syndrome (DSS)¹. As a medical student we memorized it for exam in the list of hemorrhagic fever prior to final professional exam. Though there are references in the novels of Sarat Chatterjee a cause of desolation villages after villages by deaths. In 60s and 70s and 80s of the last century there were scattered documentations of dengue in some places of Bangladesh. When WHO had been palpating of some of the emerging and reemerging communicable diseases of public health concern, Dengue was picked as an emerging disease. The classical DF (Dengue Fever) has been known more than century in the East Asian and Western Pacific region.

However, DHF (Dengue Hemorrhagic Fever) was reported first time in Thailand in 1958, in India in 1963 and, in Myanmar in 1970. DSS (Dengue Shock Syndrome) is the serious dread complication of DHF. All these countries surround Bangladesh with intense population movement. There are many viral and mosquito and other vector borne diseases are frequent here. Dengue is an Aedes Mosquito borne viral nonspecific febrile illness and all favorable conditions are present here, with endemo-epidemic potential. Standing on the temporal platform of 1995 it was a strong speculation that dengue is very much here that was being ignored.

The beginning of search & find

VBDC (Vector Borne Disease Control) unit was an extended outfit of CDC (Communicable Diseases Control Directorate) established with the prime target of control of malaria per the WHO directive of RMCS (Revised Malaria Control Strategy) adopted in World Health Assembly 1992 abandoning Malaria Eradication Program, and RBM (Roll Back Malaria program) in 1998 at the failure of malaria eradication endeavor^{2,3}. Newly extended VBDC Unit initiated an operational research project called ICOVED (Integrated Control of Vector Borne Diseases) to document the situation of malaria, leishmaniasis, filariasis and dengue to be sponsored by Ministry of Health & Family Welfare and WHO, and to be monitored by an independent peer review board. The project was funded by European Union⁴. Dengue is a mosquito borne viral disease, the vectors are *Aedes aegyptii* and *Aedes albopictus*, the former is urban and the other is rural species. The virus is an arbovirus, single stranded RNA with 4 serotypes, DEN1, DEN2, DEN3 and DEN4. The author was entrusted the Principal Investigator for the Dengue Search and Find. Through an extensive training workshop protocol was developed, peer reviewed and passed followed by funding. The study was hospital based cross-sectional descriptive study and, center of the study was CMCH (Chittagong Medical College Hospital). The span of the study was from September 1996 to June 1997.

The Outcome and output⁵

Based on the gold standard test HI (Hemagglutination Inhibition), done at IEDCR (Institute of Epidemiological Disease Control & Research), Dhaka, and, cross checked at AFRIMS (Armed Forces Research Institute of Medical Sciences) in Bangkok. The result documented evidence of dengue viral infection. Of the total 13.7% subjects of fever without focal signs had evidence of Dengue, Primary 14.3%, Secondary 37.1% and Mixed 48.6%. No D1 was detected. D2 2.9%, D3 47.7%, D4 28.6%, D2+D3 2.9%, D2+D4 11.4%, D3+D4 8.3%. Highest frequency was found in Autumn, and Winter, followed by pre and post monsoon.

The Embedded Alarms

The ICOVD Dengue Study revealed some facts: Dengue is present and transmission had been continuing. Except D1 all serotypes were present. Evidence of both primary and secondary infections signified reinfection. There was presence of many risk factors. Packed population, tropical monsoon, vectors, water logging, waste containers storing rain water, indoor breeding places, travel, endemicity with outbreaks in surrounding and contiguous countries plus ignorance. Though AGI (Area Gravitrap Index) and ADI (Area Density Index) of Aedes were done in a limited manner, but there were reasons to speculate intense increase will occur⁵.

Outbreak 2000⁶

From June 2000 a great outbreak occurred in 3 major cities of Bangladesh in order Dhaka, Khulna and Chattogram. But sporadic cases were reported in 17 townships. Total cases recorded were 5551, DF (Dengue Fever) 4385 (78.9%), DHF (Dengue Hemorrhagic Fever) 1166 (21.1%) with 93 deaths (1.6%). The outbreak lasted through December 2000. During the outbreak the people, profession and power were baffled because of lack of acquaintances with Dengue. Directorate General of Health Services initially arranged the collection of WHO guidelines for case management and test-kits for dengue serology and established reporting portals and a set-up for the documentation of cases. This effort was followed by training of doctors and orientation of specialists on dengue case management, formulation of National Guidelines for Clinical Management of Dengue Syndrome by customization of WHO guidelines and attaining a general consensus, entomological survey, plus initiation of clinical and virological documentations.

Around 300 doctors were trained, 150 specialists were reoriented and a general national consensus on a uniform system of case definition and management was attained. The help of leading experts on dengue for its clinical and other aspects was ensured as well. All these efforts were collaborated by WHO. To be noted to emphasize on the syndromic aspect of the management and initial no differentiable beginning of DF and DHS and to remind that both DF and DHS from the beginning are separate entities DF not converting to DHF, 'Dengue Syndrome' has been coined in the National Guidelines as an Editor by the author and accepted at the approval workshop⁷. There was overwhelming load for HI test, hospitalization and platelet concentrate demands. To ameliorate these pressures a quick Sensitivity, Specificity and Predictive Values of HI test versus Case Definitions were done that revealed case definition was more sensitive and HI test was more specific. National Guidelines provided case definitions, algorithms for management and indications for HI Test and of hospitalization. In addition, added copy-fill-send-ready report form, good practice guideline for IVI and transmission prevention were appended. A great mind resetting about the dengue phobia was done by the National Guidelines about no steroid, NSAID and blanket antibiotic usage plus practice of inclusion of Platelet Counts in the routine CBC (Complete Blood Count). Forgotten three simple clinical exams of immense predictive value were redeemed: Pulse Pressure, Capillary Refilling Time and Tourniquet Test. In 2000 Outbreaks there were many uproars especially blaming and counter blaming from diagnosis to management and transmission containing issues.

Missed Opportunities

Local professionals due to the reluctance of policy makers and authorities missed a great scope of documenting and landscaping the newly emerging communicable diseases through various studies and interventions through nationwide networking. These could have provided many insights and way outs for the future enriching the science and service. Continued viral serotype mapping has been very essential for wellbeing of the people and speculating outbreaks and predicting DHF and DSS cases, that would be very useful for foreseeing and tackling the situation. Moreover, genotyping is important for mutations and others and tracking the source or origin, and, genetic

engineering. Documentation would provide changing patterns and risk factors.

Dengue Follows Mathematics

With each new attack the person becomes immunized to that serotype life long and maintain cross immunity for other serotypes for about a year. If more than one viral serotypes are present there is risk of outbreaks in every alternate years with incidences of DHF. Most of the dengue primary infections are asymptomatic, the infected subjects in due course are in risk of DHF with sequential subsequent infection by another serotype, and the severity risk increases with increasing time in between⁸. But recent studies showed that the period of cross-immunity has been reduced to 2 – 6 months, and that may explain the consecutive and prolong span of outbreaks specially in Bangladesh⁹. And this is another epidemiological point to ponder.

Outbreak 2023 Epidemiology & Management

Washington Post reported on August 6, 2023 Bangladesh battles its deadliest dengue fever outbreak on record¹⁰. As per WHO Bangladesh documentation as of 27 August there were 114511 cumulative cases, recovered 105664, 548 death, 8299 hospitalization. The outbreak has begun in week 17 of this year and cases reported from almost all districts. Case fatality rate for this year is 0.48%¹¹. From personal communication and professional linkage some changing patterns have been noticed, clinical and non-clinical. Overlapping and extended periods with simultaneous different types of viral subtypes, more Dengue Expanded Syndrome cases, rapid deterioration of some cases, craze for confirmation by test than early diagnosis by case definition, non-availability or no ready accessibility or ignorance to national guidelines, platelet and blood transfusion by patient keens pressure, ICU and HDU usages, hospitalization without adherence to indications and platelet stimulator sorties, inappropriate rate of fluid and ignoring other evolving or continuing comorbid conditions plus more morbidity and fatality¹². After two decades of first Outbreak again there are uproars for similar reasons. COVID19 pandemic nakedly exposed the disorganized and too limited healthcare delivery system for service with highly neglecting the science. Dengue Outbreak 2023 emphasized more to the notion that our health care sector needs an overhaul, and, the most that we are missing in the fight against Dengue is data¹³

Outbreak 2023 Transmission Prevention

The contemporary evidence suggest that dengue cannot be prevented altogether because of some characteristic features of the vector and virus. So, the focus is to develop polyvalent vaccine, recently that showed promises with weight in Bangladesh¹⁴. Already a vaccine is in use after FDA approval in USA So far, Denvaxia¹⁵. And more vaccine on the pipe line. Saving that the prime target of the prevention is the vector elimination or and blocking man mosquito contact. This demand both temporal and spatial consistent continued endeavor that is neither visible or appropriate. There is no early warning system in operation other than media posts. After the hue and cry when the outbreak sets strongly the City Corporations begin their actions in a charismatic way like drone usage for breeding ground detection at high cost, penalty and fines there by alienated communities with phobia¹⁶. There is no endeavor for consistent continued collaborative actions that would bring credibility¹⁷. City Corporations should have permanent operative unit for transmission prevention and breeding site elimination. This unit should be equipped for entomological studies of mosquitoes for different indices so that there is early alert for picking proper effective actions.

Infodemic & Syndemic

An infodemic is too much information including false or misleading information in digital and physical environments during a disease outbreak¹⁸. Syndemic is two parallel occurring epidemics that are unfolding in the same real-time together that may or may not have interconnections with one another¹⁹. Both of these terms are fairly new but with wide spectrum. During COVID19 pandemic infodemic were prevalent about diagnosis, management, medicines, facilities, vaccine, tests, PPE usage, social distancing, handwashing and many others. There are also speculations of syndemic during COVID19 period. It is conceivable that during dengue outbreaks both of these phenomena have been present among the people and professionals. Syndemic is welcome for diagnosis and management that may guard the life but infodemic not. Interestingly it has been observed that there is an inverse relationship between COVID19 pandemic and Dengue epidemic specially in India²⁰

Learn To Live With Dengue

With our current KSA (knowledge, skill, attitude) about continuing presence and intensifying of the risk factors it is perceivable that in near future dengue cannot be eliminated. The spell will be increasing year after year

per the dengue mathematics and, severity with case fatality for the pattern of immune responsiveness and number of the cases²¹. The elements of learning to practice to live with dengue may be categorized into personal and house hold, community, institutional plus organizational and academic. The theme and goal are EDPT (Early Diagnosis and Prompt Treatment) with a target of preventing case fatality and morbidity. The EDPT approach for Malaria Control and later to Malaria Elimination have been found to be very effective²². Community and Institutional and Organizational targets should be transmission prevention, vector elimination, early warning and alert system establishment to prevent outbreaks. Academic pursuits should include clinical and epidemiological studies, viral geo mapping, genetic studies utilizing all possible tools including biotechnology. But the core elements are collection and collation of data with archiving and networking plus utilizing untapped resources. Among the untapped resources are Genetic Labs of Dhaka University, Chittagong University and Chittagong Veterinary & Animal Science University are worthy. During COVID19 pandemic these two labs along with BITID (Bangladesh Institute of Tropical & Infectious Diseases) played a pivotal role in Chattogram. Similarly other credible labs like that of IEDCR and ICDDRDB should be utilized.

Epilogue

One score and seven years after the ICOVED study to search and find Dengue, the Principal Investigator of that and the eventual Framer Editor of the National Guidelines, as I am, to me its pitiable that the ad hoc approaches have been continuing without networked endeavor that might foster science and service appropriately. It may be due to our shyness and paucity to collect and play with data. The earliest the liberation from the shyness and reluctance may able to rein the menace of Dengue Syndrome and diffuse the uproar.

Conflict of Interest: None

(J Bangladesh Coll Phys Surg 2023; 41:6-9)

DOI: <https://doi.org/10.3329/jbcps.v41i40.69671>

Emran Bin Yunus

Pioneer Dengue Investigator & Framer Editor of Dengue National Guidelines, ICOVED Project, MOH, GOB; Internist & Nephrologist; Professor of Public Health, Premier University, Chattogram [ebyunus@yahoo.com]

References:

- George R, Lum LC. Clinical spectrum of dengue infection. In: Gubler DJ, Kuno G, editors. Dengue and Dengue Hemorrhagic Fever. London: CAB International; 1997. pp. 89–113.
- Global malaria control strategy. Bull Pan Am Health Organ. 1993;27(3):280-3
- Tarore F N: Rolling Back Malaria: Opportunities and Challenges. 2005. JRSTMH;99:403-406
- www.iedcr.gov.bd
- Yunus EB, Banu Dilrose, Talukder KR, etal: Sero Epidemiological Study of Dengue / Dengue Hemorrhagic Fever in a Metropolitan Hospital of Bangladesh. Dengue Bulletin. 2002;26:1-6
- Yunus EB, Bangali AM, Mahmood MAH: Dengue Outbreak in Bangladesh: From Speculation to Reality and Exercises. Dengue Bulletin. 2001; 21:15-20
- Yunus EB (Editor): National Guidelines for Clinical Management of Dengue Syndrome. 2000; First Edition, DGHS
- Boombooncho P, Nisalak A, Chansitiporn N: Sequential dengue virus infections detected in active and passive surveillance programs in Thailand, 1994-2010. 2015. BMC Public Health; 15:250
- John ALS, Rathore APS: Adaptive immune response to primary and secondary dengue virus infection. Nature Reviews. 2019;19: 218-230.
- Li Lyric: Bangladesh battles its deadliest dengue fever outbreak on record. The Washington Post; 2023; August 6
- WHO Bangladesh: Dengue SitRep. Epiweek 21-27 August 2023
- Kayesh MEH, Khalil I, Kohara M, Kohara KT: Increasing Dengue Burden and Severe Dengue Risk in Bangladesh: An Overview. Trop Med Inf Dis. 2023;8:32
- Tayeb T: Dengue situation shows why our health sector needs overhaul. The Daily Star; August 15, 2023
- Successful trial of dengue vaccine in Bangladesh. The Daily Sun; 7 October 2023.
- Harun N, Vignesh R, Lai NS: Update on Dengue Vaccine and Antiviral: Where are we heading. Molecule. 2021; 26: 6768
- CCC using drone to find mosquito breeding ground. Bangladesh Post; 9 July 2023
- Ngingo BL, Mboera LEG, Chengula A, et al: Aedes aegyptii abundance, larval indices and risk factors for dengue virus transmission in Kinondoni district Tanzania. Trop Med Health 2022;50:1
- Online: Infodemic (who.int)
- Online: Syndemic Meaning and COVID-19 (health.com)
- Sharma H, Chowdhury A, Poddar NK, Chaudhary AA, Shilbayeh SAR, Ibrahim AA, Khan S: Does COVID19 Lockdowns have impacted on global dengue burden? A special focus to India. BMC Pub Health. 2022; 22:1402
- Lessa CLS, Hodel KVS, Goncalves MdS, etal: Dengue as a disease threatening global health: A narrative review focusing on Latin America and Brazil. Trop Med Inf Dis. 2023; 8: 241.
- History of Malaria. In: http://www.malariasite.com/MALARIA/history_control.htm