

# A Scientific Innovative Approach to Recovery from Dengue Fever

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**Abstract Background:** Dengue is a worldwide mosquito-borne serious disease. Yet medical experts are tackling the unexpected cause of dengue as a highly globalized eradication problem. **Objectives:** The aim of the study is to outline a scientific innovative approach to recover dengue through extensive follow-up and services. **Methods:** Qualitative and quantitative health data related to dengue were obtained from preliminary survey and ISNAH (Impact of Sensor Networks towards Animals and Human beings) examined patients in 4 districts of Sylhet division of Bangladesh, while secondary data were recorded from indexed journals, annual reports and theses. **Results:** The study shows that a total of 24 patients were infected with dengue and lived in a suitable environment using top-ten sensor systems (1) tightly closed eyes, (2) in silent mood, (3) limit wireless sensor devices, (4) ban active mobile phones, (5) rest in interchangeable places, (6) disconnect wireless network and satellite cloud net, (7) setting up private area network control unit, (8) digital treatment, (9) eating sensitive foods and regular drinks, (10) Take the medicine with a little warm lemon juice. Survey shows that all patients recover from dengue through timely and effective these services. Exploring scientific methods of study is essential for everyone, but such knowledge is endangered. **Conclusion:** The importance of this research should be made known to everyone today or the day after tomorrow, otherwise no one will be saved from dengue. The study suggests future research pathways with alternative treatment modalities to recover dengue by encouraging global health management and therapeutic strategies related to the Sustainable Development Goals 2030.

**Keywords** Dengue, ISNAH, Sensor system, Innovative Model, Policy

## 1. Introduction

Humans are facing multiple health challenges, including dengue fever, which is one of the top ten health threats in the world [1]. People are afraid of dengue like coronavirus [2]. The World Health Organization (WHO) considers dengue to be a major global public health challenge in the world [3]. Dengue worldwide has increased 50-fold between 1960 and 2020 due to high population density growth rates, unpredictable global climate crisis, political instability, unplanned urbanization, inefficient mosquito control, frequent air travel, misuse of unsafe wireless sensor technology and inadequate health care policies [4,5].

Advanced wireless sensor technology has speeded up our work systems, but its misuse has increased sensor diseases [6]. Every year after September-October the dengue outbreak starts to decrease. But in this month of November 2022, many people have been infected with dengue fever. Hospitalization with dengue fever is an added risk during the corona epidemic. Aedes mosquito is the carrier of this disease. During the Corona period, we should be more aware of dengue prevention. Various awareness programs are going on to prevent dengue, but dengue cannot be prevented in any way. The awareness slogans are, (1) clean the water under the tub, vases and dishes at home or office twice a week, (2) do not collect water in buckets, containers, drums, tires etc., (3) cover drains, manholes around the house. and apply mosquito repellent regularly, (4) spray mosquito repellent daily on the windows and doors of the house, (5)

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Received: Dec. 4, 2022; Accepted: Dec. 29, 2022; Published: Jan. 13, 2023

Published online at <http://journal.sapub.org/phr>

wear long sleeves and light-colored clothing, (6) pull mosquito nets when children sleep during the day, and (7) skin Apply mosquito repellent. Once again, the rainy season is over and autumn is over and autumn has arrived. A hint of the coming winter is in the air. However, dengue has not subsided, rather it is becoming more aggressive, the number of dengue patients is increasing day by day and the death toll is also increasing. Fear of dengue with complications, but why this complication? A real mosquito-borne disease? No, digital killing is happening through misuse of wireless sensor technology, it will be known from this research.

Dengue is a virus of the genus *Flavivirus*, which is transmitted by the *Aedes* mosquito. There are a total of four types or four serotypes of dengue virus. Infection with one of these may develop long-term immunity against it, but there is a risk of re-infection with other serotypes. Among the four serotypes, serotypes 2 and 3 have been shown to be more responsible for brain inflammation. Dengue virus infection has several stages. In some, it resolves with a mild fever, while in others, it can lead to life-threatening conditions such as severe bleeding or other organ complications. A form of severe dengue infection is dengue encephalitis. Dengue virus can cause complications such as brain inflammation or encephalitis, meningitis, stroke. Any part of the human brain can be infected by dengue virus. General inflammation of the brain is common in dengue but the incidence of dengue encephalitis is not high. This is considered a very serious dengue symptom. In dengue encephalitis, the patient may have severe headache, sometimes incoherent behavior, fainting or unconsciousness, convulsions, in addition to the usual symptoms of dengue. Some testing is needed to be sure. In addition to testing for dengue antigens or antibodies in the blood, collecting cerebrospinal fluid to look for the virus, PCR, EEG, CTscan or MRI may be necessary. Since such symptoms are also present in cerebral malaria, Japanese encephalitis, etc., it is very important to diagnose the presence of dengue virus. However, there is no specific treatment for dengue encephalitis, even though it can be confirmed by testing. Some supportive treatment may be given, such as plenty of fluids, medicines like paracetamol to reduce fever, some medicines to prevent convulsions and other treatments according to symptoms. Although dengue encephalitis is relatively rare, it can cause serious complications. Therefore, in case of dengue infection or a few days of fever, incoherence of behavior, fainting, it is necessary to consult a doctor immediately. If necessary, you should be admitted to the hospital and receive treatment. Many patients can be saved from this fatal condition if treated in time with advanced sensor technology. Today's world is a mixture of science with innovative technology. Everyone uses this innovative technology, but none can know its impact in daily life.

The aim of the study is to find out the recovery approach of severe dengue fever with innovative research evidence and inference to solve the core tropical challenges in global public health security.

## 2. Materials and Methods

The research work initiated at the laboratory of UNIMAS Malaysia from October 2014 to May 2018. The study follows materials and methods of the requirements related to discovery coronavirus from the published papers at international indexed journals:

- a. <http://article.sapub.org/10.5923.j.bioinformatics.20211101.01.html>,
- b. <http://article.sapub.org/10.5923.j.fs.20211101.01.html>,
- c. <http://article.sapub.org/10.5923.j.ajbe.20201001.03.html>,
- d. <https://www.un-pub.eu/ojs/index.php/wjer/article/view/5855>.

Tracking techniques include in longitude, latitude and ellipsoid height towards cat and dog at light and dark environments.

All general information regarding the patient's history, diagnosis, case management, cognitive assessment, mental assessment and relevant status with affected conditions were checked for accuracy from the different sources and sources of information were also verified. The compiled and processed data were involved in the preparation of the data master sheet and assimilated into suitable systems used in the results and other segments consecutively.

All collected data compiled for analysis and interpretation using update software like MS Excel 2019, SPSS version 27 and R version 3.6.

## 3. Results

### 3.1. Sign and Symptoms of Sensor Dengue Fever

The study identified the following signs and symptoms from cat and dog through wireless sensor tracking at a specific GPS location, such as:

- (i) Sudden high fever
- (ii) Severe headache
- (iii) Sudden pain behind the eyes, joint and bones.
- (iv) Rash over most of the whole body.
- (v) Nausea
- (vi) Frequent vomiting
- (vii) Severe abdominal pain
- (viii) Difficulty breathing
- (ix) Dehydration
- (x) Mild bleeding from the nose
- (xi) Feel anorexia

The study shows that the dengue fever is a sensor disease, which occurred by cybercriminals through wireless sensor tracking at a specific GPS location due to active open eyes, uttering self-voice and nearby switch-on mobile phone.

Cybercriminals are misusing wireless sensor technology to instantly infect any person or animal with dengue. On the other hand, they are spreading lies in print and social media that the person got dengue fever due to mosquito bite.

Cybercriminals are suddenly infecting people and animals by tracking sensors from different GPS locations through cloud networks, which are not easily understood by common people. Cybercriminals are then coding diseased humans and animals after confirming their current GPS location and tracking them multiple times for sensor poisoning and digital killing.

### 3.2. Tracking for Transmission of Dengue

The study shows that the dengue is a target-oriented sensor disease to develop at a specific GPS location due to misuse of advanced wireless sensor technology. Due to tracking with wireless sensor technology, the sensor cell is transmitted to humans at a specific GPS location including longitude, latitude and ellipsoid height. The sensor cells are also transmitted to individuals' connective tissues due to active open eyes and uttering self-words and nearby switch-on mobile phone. This wireless sensor tracking system includes location recognizer, individual's identifier, sensor blocking, transmitting, fluctuating, shrinkage, swelling, poisoning and digital killing.

Baby sleeping in bed (specific GPS location) → Targeted Object → Tracking → Transmitting → blocking → Sick (Dengue) or (Severe Dengue) depending on wireless tracking with the ranges of radiofrequencies.

The study also showed that cyber killers target the child or family member of senior executives, researchers, scientists, professors, politicians or businessmen etc. situated adjacent places of the cybercriminal's regions.

### 3.3. Deaths from Dengue

The study showed that deaths from dengue is 241 in the year 2022 (November 30) and only 7 deaths from dengue in 2020, which as shown in Figure 1. The study also represents that deaths from dengue increase in the successive year, which is alarming to the present and upcoming generations.

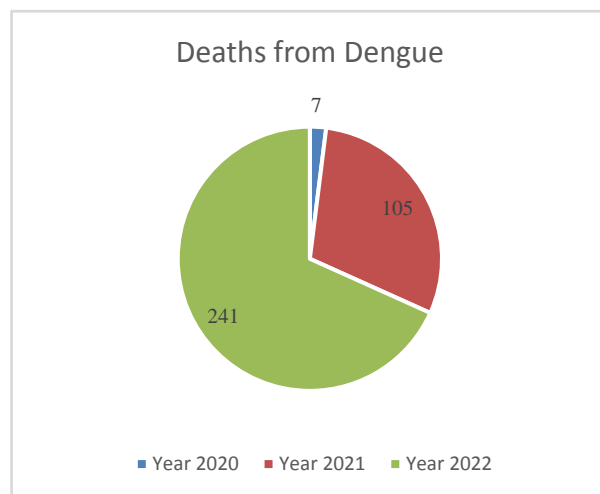


Figure 1. Deaths from Dengue yearly

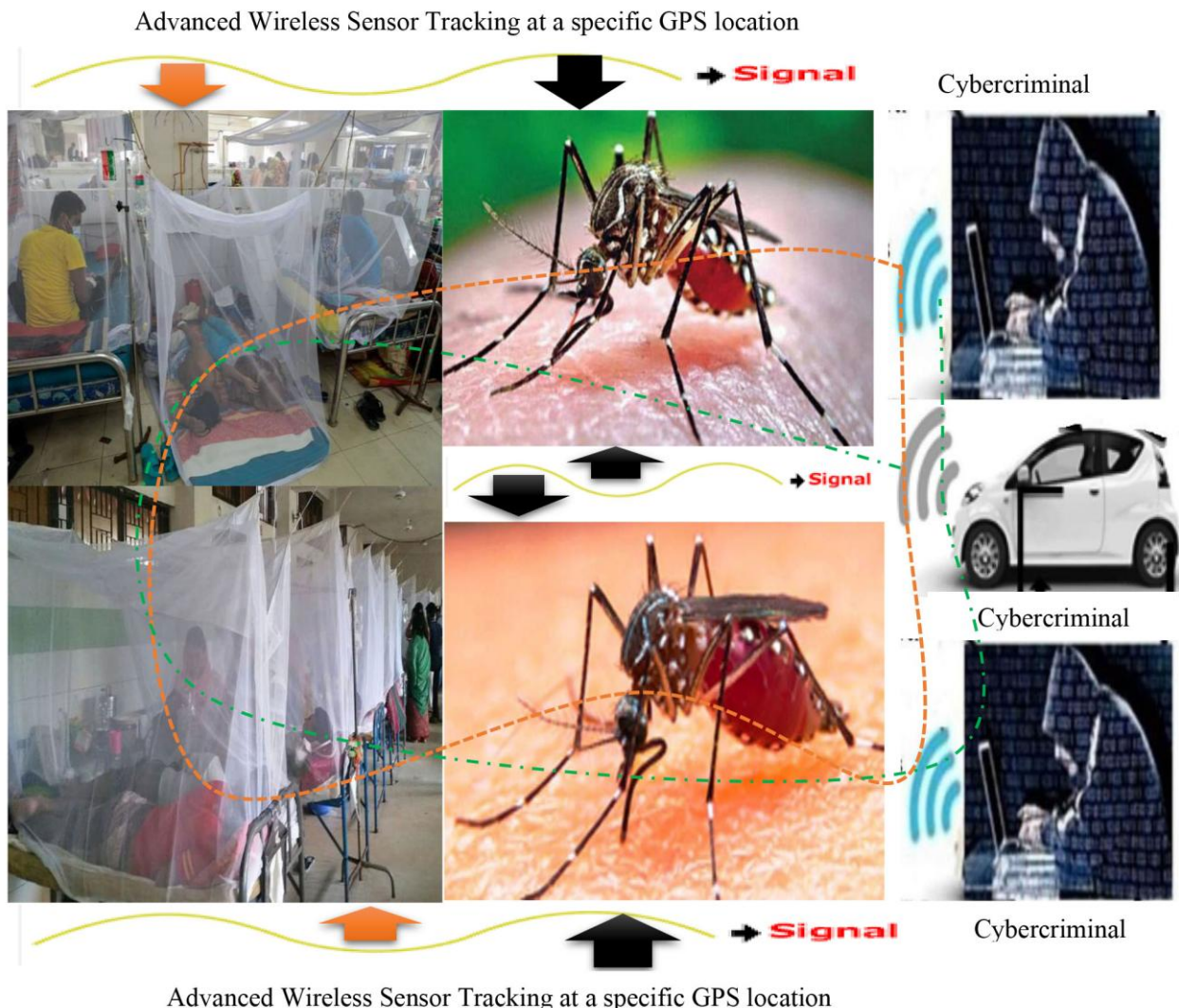
### 3.4. How do People Get Infected with Dengue?

Cybercriminals infect any man, woman and child with dengue fever through wireless sensor tracking to a specific GPS location. When a person sleeps in his bed, his precise GPS location is known through wireless sensor tracking, as his eyes open, talking as needed, nearby mobile phone, nearby switch-on other sensor devices are tracked by the sensor camera at that location. The person's current GPS location is known. Cybercriminals re-track a person's GPS location causing frequent sneezing, yawning, hiccups, flatus, runny nose, teeth grinding and coughing. During this creation, if the person is fixed at a specific GPS location, the sensor cells in his body due to trucking by cybercriminals block the movement of electrons, causing him to suddenly fall ill. This illness depends on the trucked radio frequency interval (this frequency interval can be widely abused, so is not mentioned). The signs and symptoms observed during sensor trucking are similar to dengue fever. So, the researchers named this disease sensor dengue fever.

### 3.5. Case Study on Dengue Fever

It was the post of Farseem Mannan Mohammadi, a teacher of Bangladesh University of Engineering and Science and a science writer. Farwah Mannan Mohammadi (Madhu) is his youngest daughter. Just a few hours ago, he posted for blood for Madhu. Madhu could not be saved despite his best efforts. Five-year-old Madhu died of dengue. As we see in the media, many more children like Madhu are dying from mosquito-borne diseases. Babies as young as a few months old were not spared. This year, 213 people died of dengue till last Tuesday. As always, most deaths are in different hospitals of Dhaka city. This is the first time since the dengue outbreak in the country in 2000 that the death toll from dengue has crossed 200. Worryingly, young people aged 20 to 29 years are dying more from dengue this time. The matter has come up from the review of the information of the Department of Health.

Flower-like child Madhu's death has rocked social media. Condolences to Farseem Mannan and his wife Farhana Mannan, may Madhu become everyone's beloved child. We watched the couple touching the girl for the last time in the hospital bed, kissing the girl's hand. They expressed their emotions by sharing pictures of them from behind the dead car, carrying the girl's body on their shoulders on Facebook. I understood that they will never see their beloved child again, they will not get a chance to caress him. So, this couple is frantically holding on to the memory of the sweet farewell. Many people talk about this on Facebook. But how can we forget the grief of a mother or father who has lost a child? The study illustrated that this child died from tracking with advanced wireless sensor technology. The study showed that the spreading of dengue through tracking with advanced wireless sensor technology, which as shown in Figure 2.



**Figure 2.** Severe Dengue Fever are spreading due to tracking with advanced wireless sensor technology

By hypnotizing the wireless sensor, cybercriminals bring arthropod mosquitoes around the child and the mosquitoes occasionally bite him. At this point, the mosquito-bitten child stays at a specific GPS location, the cybercriminals transmit sensor fever through wireless tracking, then the child develops a fever, and the cybercriminals reveal to the media that the child has dengue fever. The cybercriminals track the child's body temperature by repeatedly increasing the radio frequency range through the cloud network to raise the body temperature and the cybercriminals reveal to the media that the child is suffering from severe dengue fever and the Aedes mosquito is responsible for the disease. As the child is in the specific bed i.e., GPS location, the cybercriminals again move the wireless sensor to the lungs. As a result, the patient becomes suffocated and joins the death march. Thus, cybercriminals are digitally killing thousands of children, women and men by tracking wireless sensors and they are exposing in the media the causes of various diseases like Dengue, Corona, Cardiac Arrest, ARDS, Tracheal Disorder, Liver Cirrhosis, stroke and

stomach cancer etc. Meanwhile, doctors blame the Aedes mosquito and are silent spectators. Research shows that if children had a network isolator or personal area network control unit, banning wireless networks in that zone, the disease would not have spread and certainly no one would have died. Current and future generations are expected to learn from the results of this research.

## 4. Discussion

The study illustrated on the innovative approach to recover from dengue in tropical region. Recovery with innovative system from dengue depends on the severity of the illness and any treatment prescribed during the fever and critical stages. But studies show that the severity of frequent illness depends on wireless radio frequency tracking, sensor poisoning and digital killing. Earlier, dengue became a major threat in 2019. Officially, 179 people died that year. Several doctors also died. Our first encounter with the horrors of dengue was in the service. Newspapers, TV channels,

social media, etc. have attracted the attention of people everywhere, this mosquito-borne disease. People lambasted the government, health ministry and city corporations for their failure to deal with dengue. A minister's extermination of FDC heroes in the name of dengue control also created a lot of humor amid panic. However, in March of that year, the Dhaka City Corporations were warned by a survey from a project of the Ministry of Health. They did not care, even the concerned authorities of the government, including the Ministry of Health, did not give importance to the matter.

From ISNAH Formula, we recognize the sensor technological effects towards animals and human being as below:

“Due to the active Sensor Technology, every human, animal or object affects with the fluctuated frequencies of its movement through electromagnetic transmission within the boundaries of the body in the GPS positions, and this effect is proportional to its weight and disproportionate to its GPS positions. As a result, the changing waves damage the person, animal or object and for recovery systems, each of them should change its fixed GPS locations instantly with tightly closed eyes” [6].

#### 4.1. Treatment

The treatment includes with ten postulates with DRAST to recover severe dengue fever. The DRAST implies as Dengue Recovery through Advanced Sensor Technology. These are included with top-ten sensor systems, such as: (i) tightly closed eyes, (ii) in silent mood, (iii) limit wireless sensor devices, (iv) ban active mobile phones, (v) rest in interchangeable places, (vi) disconnect wireless network and satellite cloud net, (vii) setting up private area network control unit, (viii) digital treatment with biomarkers, (ix) eating sensitive foods and regular drinks, and (x) taking medicine with a little hot lemon juice.

Some individuals think that still no specific treatment is available for dengue fever [7]. But the study illustrated that the dengue fever recovers from the scientific innovative approach with the effective application digital biomarkers. Earlier a lot of people thought negatively to recover from dengue. In East Pakistan there was a health minister named Habibullah Bahar. At that time many areas of Dhaka were filled with dense forests. At that time, he was praised for killing mosquitoes in Dhaka city. At that time, there were not so many advanced technologies, rules and remedies as now. If a Habibullah Bahar could do it so many years ago, why can't the mayor and health ministers of today. Why are they pushing the people or citizens to death again and again? In the midst of the corona epidemic, it has shown us how terrible the fear of death can be. As a result, we have forgotten those terrible days of dengue. In view of the rise in dengue deaths that year, the Department of Health constituted a committee to review dengue deaths. But no report of that committee was ever made public. That year, in the presence of the health minister about the dengue situation in the Ministry of Health and Family Welfare, a mayor of Dhaka said that there is no shortage of his integrity. But

experience is lacking. He is still learning. Another mayor of Dhaka was next to him. Our question is, three years have passed. How many years will they gain experience in dealing with dengue? Still, the mayors of Dhaka are talking various things about mosquito repellent. Other mayors outside Dhaka have also joined. Looking at the attitude of all of them, it would seem that they are very 'serious' in dealing with dengue. However, they could not remove the question about the effectiveness of the medicine that the city corporations sprinkle to kill mosquitoes. There are various irregularities and mismanagement in the entire process including buying mosquito killers and spraying them. This year, since the beginning of the dengue season, public health experts and experts have been giving repeated warnings. Entomologist and researcher and professor of Zoology Department of Jahangirnagar University. When talking to Kabirul Bashar, he said, "When the dengue season started in May this year, due to not being able to properly manage the Aedes mosquito and dengue, it increased at a geometric rate and created this terrible situation."

Two years later, we had to see a big shock as the plan given to the Bangladesh government to control Aedes mosquito-borne disease by World Health Organization Consultant K Krishnamurthy in 2017 was not taken into consideration. In that plan, apart from the Ministry of Health, the Ministry of Local Government, Ministry of Science and Technology, Ministry of Roads and Transport, Ministry of Railways, Ministry of Agriculture, Ministry of Defense, Ministry of Commerce were said to be added. The roles and responsibilities of which ministries will be performed were also briefly stated. So far, we have not seen any action by the government. Now dengue is no longer limited to big cities. District-upazilla Mofswal has spread to the cities. Deaths have also been recorded.

Public Hygienist and former Director of Health Directorate's Disease Control Branch, Prof. Benazir Ahmed told Prothom Alo, past experience was not utilized, experts' opinions were ignored. No national plan has been put in place to control the dengue-carrying Aedes mosquito. If there are these mosquitoes, there will be patients. The current outbreak was inevitable but there is no effective national plan to control dengue [16]. Addressing the lawyer of Dhaka North City Corporation (DNCC), the High Court said, "They say there is a budget, but mosquitoes have to be killed." So why cannot kill mosquitoes? The reality is, people are dying from dengue. People are being admitted to hospitals. You couldn't win against mosquitoes. The High Court bench consisting of Justice JBM Hasan and Justice Raziq Al Jalil said these things in the hearing regarding the progress of the activities and steps taken to control the mosquito breeding at Dhaka's Hazrat Shahjalal International Airport [14]. According to sources in the accounts branch of Dhaka South City Corporation, about 2.1 million dollars were spent in the last financial year 2021-22 for the purchase of mosquito repellent. In the current financial year 2022-23 about 2.50 million dollars have been allocated [15].

We are getting to know from the health department that



dengue patients have been found in almost all districts this year. Entomologists say that there are dengue-carrying *Aedes* mosquitoes in all cities of the country. But there is no mosquito control program in all cities and upazilas across the country. Many districts lack manpower, equipment and insecticides for mosquito control.

#### 4.2. Dengue Spreading Situation

During the dengue situation in 2019, I still remember a speech by Swapan Bhattacharya, Minister of State for Local Government, Rural Development and Cooperatives. In a seminar in Gopalganj, he said, 'The more developed the country, the more the impact of disease and pestilence is increasing in that country. Dengue is an elite class mosquito. This mosquito is seen in Singapore, Bangkok, Kolkata. Bangladesh is going to be a developed country. That is why dengue has come to this country. (21 August 2019, Prothom Alo).

The country is developing. According to their comments, the country is becoming 'Singapore too'. But none of the government hospitals in the division like Barisal have platelet cell separator machines or platelet separation machines for severe dengue patients. As a result, these patients have to be sent to Dhaka. This time the dengue type is happening, the patient is dying within a few days of being infected. How can such a waste of time be accepted in bringing a serious patient to Dhaka due to the lack of necessary equipment. Despite corruption, irregularities and mismanagement, our doctors and health workers have shown great success in dealing with the corona epidemic. As there is no national action plan to deal with dengue, their experience is also not being utilized.

In 2019, The Telegraph newspaper wrote in a report that the dengue disease had increased due to the accumulation of water due to large-scale infrastructure projects and extensive construction work, such as the metro rail project in Dhaka. Metroraill project is still ongoing. There is also the BRT project of Mahadurbhoga. The duration increases but the project does not end. More mega projects are planned. Dr. Kabirul Bashar says, 'Unplanned urbanization is a major reason for creating breeding grounds for *Aedes* mosquitoes. This includes climate change. Now dengue will be there all year round in Dhaka city. Because suitable temperature and humidity for the breeding of *Aedes* mosquitoes exist throughout the year in Dhaka. As a result, there is no need for rainfall for the breeding of *Aedes* mosquitoes.

That means we should see more dengue outbreaks in the coming years. It has to be said, since the government is not taking into account any experts from home and abroad, nor is it showing goodwill. Farhana Mannan, who lost her daughter, said, "Today my daughter is gone, tomorrow someone else will go." We cannot understand pain unless we lose ourselves. It can't continue like this.' But this is how everything is going, maybe it will continue like this in the years to come. We have nothing to do but mourn the pain of losing our relatives [8].

Because the source of Covid-19 was unknown, we could

not prevent its transmission. No country in the world could stop Bangladesh. This argument does not apply in the case of dengue. Dengue can be easily eradicated if the breeding of the *Aedes* mosquito, the source of dengue, is prevented. In this regard, many initiatives have been planned, recommendations, decisions have been made, but little work has been done. As a result, we could not get out of the pessimism we had before about dengue. There are two ways to prevent dengue. First, destroy the breeding grounds of the *Aedes* mosquito, the source of dengue. Usually, *Aedes* mosquitoes are born if there is water in the house, balcony, roof or around the house. It spreads when water accumulates in flower tubs, plates placed under tubs, buckets, unused pots etc. We can prevent dengue by destroying the breeding grounds of *Aedes*. Second, to cure the dengue patient by providing prompt treatment. If you do the first job well, you don't have to think much about medical care. According to a Prothom Alo report, dengue has spread in two-thirds of the country's districts. This is because we have not been able to destroy the breeding grounds of *Aedes*. According to the monsoon mosquito survey of the Department of Health's Disease Control Branch, *Aedes* mosquito larvae or larvae were found in 13 percent of houses in Dhaka North City Corporation area and 12 percent in Dhaka South City Corporation area. In cities where 10-12 percent of households harbor *Aedes* larvae, dengue outbreaks cannot be reduced. Two city corporations are responsible for mosquito control in Dhaka city. They do routine work of spraying medicine in the house yard. But the *Aedes* mosquito is born inside the house. In 2017, when many people were affected by dengue and chikungunya in the country, World Health Organization Pathologist K Krishnamurthy came to observe the situation on the ground. He also prepared a 22-page plan document to combat dengue and chikungunya, which was to be implemented by 2019. Unfortunately, that plan did not materialize. Public Health Professor Bay-Nazir Ahmed has rightly said that none of the recommendations or suggestions made by local and foreign experts in the past about dengue have been implemented. If the recommendations and suggestions of experts are not implemented, how will dengue be prevented? Dengue has been reported in two-thirds of the districts, but the number of infected people is not known. The number of dengue patients admitted to the hospital is more than 12 thousand. And 45 people died. According to health experts, four times the number of hospitalized patients are infected. There was once an outbreak of dengue in Calcutta City Corporation area as well. They brought it down almost to zero but we couldn't. Dengue has been a major public health problem in Bangladesh for more than two decades, but it is an unforgivable crime not to take effective measures to control it. Without going into the debate whether the health department or the city corporation is responsible, I want to say that effective and sustainable measures should be taken to control dengue. Those who were responsible for implementing these recommendations and decisions should be held accountable. Also, there is no alternative to increase citizen awareness.

Although the situation is gradually deteriorating, there is no visible clean-up program on the part of the common people and public and private institutions. As a result, the incidence of dengue is increasing. The main reason behind death in villages is that affected patients start treatment late. Again, the reason behind the higher death rate among women is that rural women receive less nutrition than men in urban areas. Because of this, their immunity is low. This may lead to higher mortality in women. Although the number of dengue patients and deaths have increased, the medical facilities have not increased accordingly.

According to the information provided by the Health Emergency Operation Center and Control Room of the Department of Health today, the number of dengue patients admitted to public and private hospitals in the country this year has so far reached 52 thousand 161. Among them, the number is 33 thousand 751 in Dhaka and 18 thousand 410 outside Dhaka. Most of the people who die from dengue are children [9]. 226 people died of dengue this year. Last October saw the highest death toll of 86 people. However, this number will be exceeded in November. Because the number of dead patients in November is 85 so far. Most of the people who died from dengue this year were children. In 2000, there was an outbreak of dengue in the country. 93 people died of dengue that year. Then the biggest outbreak of dengue occurred in 2019. 179 people died that year. 7 people died in 2020, the year of the beginning of the corona epidemic, 105 people died in the following year. Division wise as usual this year also the highest number of deaths occurred in Dhaka Division. The control room has given the information of 137 deaths in this department. Among them, 135 people died in different hospitals of Dhaka city. After Dhaka, the highest number of deaths occurred in Chittagong division. So far 56 people have died in this department. Among them 24 died in Cox's Bazar alone. Most of them are Rohingya who have taken refuge in Bangladesh. When asked about the initiatives taken by the Rajshahi City Corporation to control Aedes mosquitoes and create awareness, Chief Clean Officer of the City Corporation Sheikh Md. Mamun said awareness activities are being conducted by the City Corporation. They preached in the mosque. Mikeing done. Various awareness posts are also being given on the Facebook page of the City Corporation.

Dengue patients are being treated at the hospital. Dengue outbreaks in the country have been going on for more than two decades [10]. However, the number of deaths this year has not happened before. This outbreak has been going on for a long time, which has not been seen before. Dengue has already spread in 62 districts of the country. Public health experts and researchers say that the spread of dengue has increased this year for at least five reasons. Three of these are natural, the remaining two are social or institutional. No one had a hand in the three natural causes. However, they say that dengue prevention would have been possible if there were proper social or institutional initiatives in both cases. What the researchers say This year's dengue appeared with a different dimension. Now is the time to rethink dengue. Now

it is not only a seasonal disease, but also not Dhaka-centric. Therefore, to prevent this, the traditional method must be changed and a new trend has to be created.

Government Pathology, Disease Control and Research Institute (IEDCR) advisor Dr. Mushtaq Hossain said so. In 2000, there was an outbreak of dengue in the country. 93 people died of dengue that year. Then the biggest outbreak of dengue occurred in 2019. 179 people died that year. 7 people died in 2020, the first year of the corona epidemic, 105 people died in the following year. So far this year (November 16, 2022) 216 people have died of dengue. The experience of dengue in the last 22 years is that if it rains early, dengue starts a little earlier. ends quickly. Again, if it rains late, the spread of dengue increases. But the more or less experience is that the outbreak increases during the rainy season i.e., from June. And it decreases towards September. But this year, mid-November passed, the death is not decreasing. Detections were slightly lower for the week but higher than any previous year. So far, the year in which the most dengue outbreak has occurred i.e., 1 lakh 1 thousand 354 people were infected with dengue in 2019. A maximum of 52 thousand 636 people were infected in August of that year. After that, the outbreak began to decrease from September. It decreases a lot in October and November. But this time, the situation is different. In October this year, the number of dengue patients was 21 thousand 932. This is the highest number of patients in any month this year. Again, 86 people died in October. This is the highest number of deaths in a single month this year.

### 4.3. Three Natural Causes

The first of the three natural factors that are being talked about in the spread of dengue this year is that there was no rain in the monsoon season this year. June and July were rainless months. During these months, drought conditions have been observed in the northern districts of the country. Rains are more in September and October. And this rain has stopped. Public health officer Mushtaq Hossain said, "The intermittent rains have made the dengue situation fragile. The situation could have improved a bit. But after heavy rains caused by low pressure in the Bay of Bengal and cyclone Sitrang last October, the spread of dengue has been prolonged. Experts said that the spread of Aedes mosquitoes is more due to intermittent rains. That's what happened this time. Former Chief Scientific Officer of IEDCR ASM Alamgir told Prothom Alo that if it rains intermittently, mosquitoes cannot be washed away. Mosquitoes remain. When an Aedes mosquito bites a patient, the mosquito carries the virus. The virus remains in the mosquito's body. When she lays eggs, not all eggs hatch into mosquitoes. Rain and favorable temperatures are a factor there. Then as many eggs hatch, that mosquito will carry this virus. So, whoever they bite will get dengue. There are 4 types of dengue virus. Doctors say that there are four types of dengue virus. They are Den-1, Den-2, Den-3 and Den-4. Once infected with a type, the human body develops immunity to that type, people are not infected with that type again. A person affected by

Den-1 will never be affected by Den-1 again. But there is a risk of getting infected from the remaining three types. However, if a person is infected with one type for the first time, then the complications of that person increase. For example, if a person with Den-1 recovers, then becomes infected with Den-2 or Den-3 or Den-4, complications increase. Mushtaq Hossain thinks that besides the reason for the increase of rain and mosquitoes, another natural reason is the new type or Den-4 type of infection. He told Prothom Alo, "This time more patients are affected in Den-4. This is one of the reasons for the increase in the number of detections.

#### 4.4. Lack of Concerted Initiative

Public health experts believe that the lack of effective and coordinated measures to kill mosquitoes is also a reason for the spread of dengue. Dengue infection is more in the capital Dhaka. The two city corporations have also conducted occasional raids at various places to spray mosquito repellants and destroy mosquito breeding grounds. Virologist and former Vice-Chancellor of Bangabandhu Sheikh Mujib Medical University Nazrul Islam says that despite taking these initiatives, they "could not pass". He said, 'Mosquito extermination is a coordinated initiative. Public involvement is needed here. But the two cities have failed to involve the people. In addition to this failure, Professor Nazrul Islam also raised questions about how effective the medicine being given from the two cities is to kill mosquitoes. He thinks that the drugs used should be tested. Doctor Alamgir also thinks that the issue of public involvement in mosquito killing is very significant. He feels that the responsible authorities are not taking responsibility and the social institutions are not coming forward on their own. Highlighting the experience during dengue outbreak in 2000, ASM Alamgir said that then different organizations were joined in the neighbourhood. Where did these initiatives go? Doctor Alamgir also said, 'We are not able to send people to the field to prevent dengue. We know what dengue is, what it causes. But do not agree. Dengue prevention is going out of control day by day due to lack of coordination between local government institutions and common people. Therefore, the concerned people think that the combination of these two is necessary.

#### 4.5. More Reasons

There are several reasons to comment on the spreading of dengue and causes of deaths. For the comment of Mushtaq Hossain said lack of neighborhood-based public health services in the capital is the cause of dengue spread and many deaths. He cited the examples of Calcutta, West Bengal of India, Thailand and Nicaragua and said that there are examples of visiting dengue patients in urban areas and providing them with the necessary health care. Health services of two city corporations in Dhaka are very fragile. Several doctors who are treating dengue are of the opinion that many patients have died because they came to the hospital late. If Dhaka's health care structure was

community-based, these patients could have been identified earlier and provided early care. Mushtaq Hossain thinks that many deaths would have been prevented. Doctors and public health experts say that dengue is not only a problem in the capital but also a problem in the whole country. It's not just a problem at certain times of the year anymore. So, year-round and countrywide initiative should be taken from now. Dengue has been a public health problem for two decades [11]. No effective control initiatives are noticed. WHO experts K Krishnamurthy in 2017 and BN Nagpal in 2019 recommended dengue prevention. But the health department did not implement any recommendation. Dengue has been a major public health problem in Bangladesh for more than two decades. Every year since 2000 many people are getting infected with dengue and people are dying. In 2020, the year the corona epidemic started, the incidence of dengue was slightly lower. But last year, 28 thousand 429 people were admitted to the hospital due to dengue. 105 of them died. In 2019, before the start of the corona epidemic, more than one lakh people were infected with dengue and sought treatment in the hospital. This year also many people are infected and admitted to the hospital. Professor Bay-Nazir Ahmed, former director of public health and disease control branch of the government, told Prothom Alo, "The incidence of dengue is increasing or decreasing without control. From this it is proved that there is no effective nationwide initiative of the health department or any other department to control dengue. In this regard, none of the recommendations or suggestions made by local and foreign experts in the past have been implemented.

#### 4.6. Ignored the Recommendations of Experts

In 2017, the World Health Organization sent pathologist K Krishnamurthy to Dhaka to advise the Ministry of Health in view of the increase in dengue cases in Dhaka city. Talking to government officials, scientists and researchers, K Krishnamurthy prepared a 22-page plan document titled 'Mid-Term Plan for Controlling and Preventing AIDS-Born Dengue and Chikungunya in Bangladesh'. The document called for the formation of a 'rapid response team' comprising epidemiologists, entomologists, microbiologists, information-education-communication experts and media personnel, besides evaluating dengue and chikungunya disease prevention and control programmes. 12 Ministries are asked to join the work of Ministry of Health. Nothing of that plan was implemented. The plan was to be implemented by 2019. In that year, most people were affected by dengue in Bangladesh. The World Health Organization then sent its senior entomologist BN Nagpal to Dhaka to advise the government on mosquitoes. BN Nagpal advised on mosquito control and awareness among people. When asked about the control of dengue, the director of the disease control branch of the government, Professor Nazmul Islam, told Prothom Alo, "In addition to the two city corporations of Dhaka, we have conducted a mosquito survey in Rohingya camps in Chittagong, Khulna, Barisal and Cox's Bazar districts. Apart



from this, dengue treatment guidelines have been prepared and distributed among health institutions and doctors. He said, dengue cannot be prevented if mosquitoes cannot be killed. However, he said he was not aware of reports by K Krishnamurthy and BN Nagpal.

#### 4.7. The High Number of Infections

The exact statistics of how many people have been affected by dengue this year or how many people are affected every year are not available from the health department of the government. The Department of Health only publishes the number of dengue patients admitted to hospitals and deaths. In reality, many more people are infected with dengue than hospitalized patients. According to the information provided by the Directorate of Health on Monday, since January 1, 11,569 people have been infected with dengue and have been admitted to hospitals in different districts of the country. Among them, 45 people died. The list shows that dengue patients have been admitted to hospitals in 50 districts of the country this year. Out of this, Dhaka district has the highest number of patients. After Dhaka, more patients have been admitted to Cox's Bazar district hospital. According to a source of the Department of Health, 4 thousand 292 patients have been diagnosed with dengue in the last three and a half months in a total of 12 public and private laboratories, including the International Udamaya Research Center Bangladesh (ICDDR) laboratory in Teknaf Upazila of Cox's Bazar. According to the government, more than four times the number of dengue patients admitted to hospitals for treatment in the entire Cox's Bazar district were detected in Teknaf upazila. Mahbubur Rahman, civil surgeon of Cox's Bazar district told Prothom Alo that 13 thousand 865 people have been diagnosed with dengue in the district this year. Most of them are residents of Rohingya camps. Several teams of the government's Institute of Epidemiology, Disease Control and Research (IEDCR) have visited the district to understand the situation in Cox's Bazar. Director of IEDCR Professor Tahmina Shireen told Prothom Alo, "Dengue prevalence is high in Chittagong division, especially in Cox's Bazar district. There was a high density of Aedes mosquitoes. On the other hand, more people are getting tested and more people are being detected due to more testing facilities in this district. If all the districts of the country had such an opportunity, the number of patients would have been more. Covid and dengue are raging hand in hand. So, if you get high fever and headache during Corona, don't forget Dengue. During the monsoon, dengue is spreading wildly in the floodwaters of big cities including Dhaka. Because frozen water is the best breeding ground for Aedes mosquitoes. Let's know the similarities and differences between the symptoms of corona and dengue. \* Corona and dengue — both are basically viral fevers. Corona period has been going on for a year and a half. And the outbreak of dengue increases during the rainy season. And in this monsoon, it is as if the competition to be affected by dengue and coronavirus is going on. Every day, hundreds of people are

admitted to the hospital due to corona and dengue. If you have symptoms like fever, headache and body aches, you may have either Corona or Dengue or both. Both covid and dengue infections will have fever. The degree of fever may vary. Both have initial symptoms like fever along with headache, body ache, body massaging, loss of appetite. Corona is constantly changing, so the symptoms are also changing. Sometimes intense distaste and tastelessness are evident. Sometimes the symptoms are only diarrhea and fever. Sometimes just a headache. Many people do not smell the corona. Dengue fever will have odor.

However, in Corona, there is no body rash with fever and bleeding from teeth and nose or other places. The level of platelets in the blood may decrease; This also occurs only in dengue. Rapid decrease in oxygen level and shortness of breath are one of the prominent symptoms of Corona. These symptoms are rare in dengue. It goes without saying. Although there is a vaccine for corona, there is no vaccine for dengue. Since there are four types of dengue virus, a vaccine that works against all four viruses at the same time has yet to be discovered. If there are general symptoms, first of all, both corona and dengue should be tested. The four types of dengue virus mainly cause two types of fever. Clinical dengue fever and hemorrhagic fever. Dengue fever, like other viral fevers, resolves on its own within seven days. However, hemorrhagic dengue fever can be severe. Body temperature may suddenly rise to 104 to 106 degrees. Extreme depression may occur. Nausea, vomiting and skin flushing may occur. This fever lasts for 3 to 7 days. Bleeding may occur under the skin of the body. In most cases, bleeding symptoms are seen on the skin. While there is no specific treatment for dengue, it is important to drink plenty of water, rest, and eat plenty of fluids. No medicine other than paracetamol should be taken to reduce fever. If symptoms of bleeding occur along with fever, you should be admitted to the hospital immediately. To reduce fever, the body should be wiped repeatedly with wet cloth.

#### 4.8. Avoid Dengue in Many Ways

There is an idiom that says poisoned milk is perfectly fine to explain at times like this. This is the period of epidemic, restrictions; Almost every day, an average of one and a half hundred people are admitted to different hospitals due to dengue. Dengue outbreak is increasing with rain especially towards the city. Now, along with dealing with the coronavirus, we have to fight to get rid of dengue. Let's know some simple ways to avoid dengue. According to the Centers for Disease Control and Prevention (CDC), the dengue virus is spread to humans by the bite of an infected *Aedes aegypti* or *Aedes albopictus* species of mosquito, which is also responsible for the Zika and chikungunya viruses. About 4 billion people around the world live at risk of dengue, the leading cause of illness. An estimated 400 million people are infected with dengue and 40,000 die from its severity [12].

#### 4.9. Dengue Vaccine

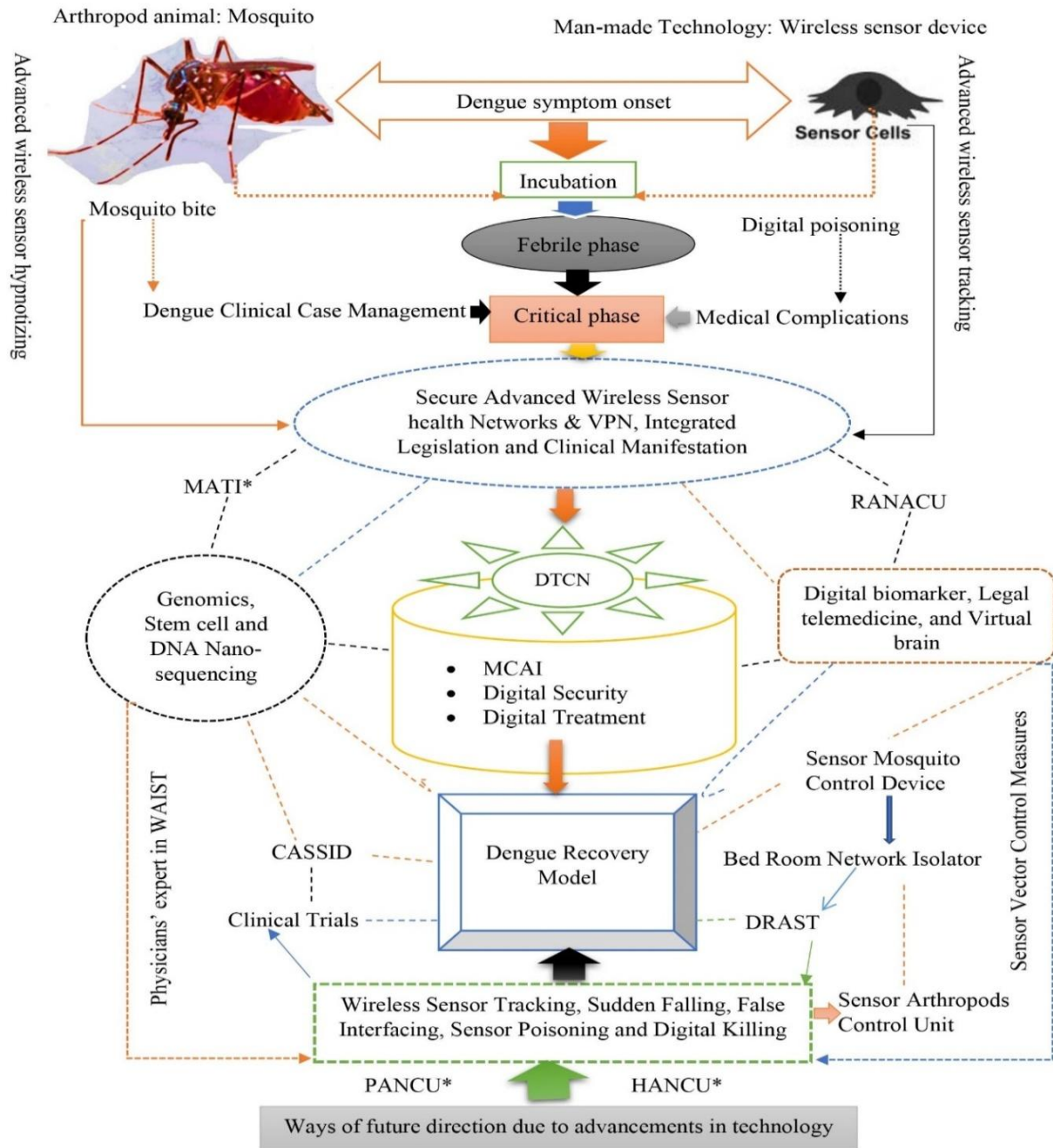
A new dengue vaccine is approved for use in children aged

9–16 years with laboratory-confirmed previous dengue virus infection and living in areas where dengue is endemic (occurs frequently or continuously). Endemic areas include some U.S. territories and freely associated states. The vaccine is not approved for use in U.S. travelers who are visiting but not living in an area where dengue is common. A dengue vaccine is now recommended for U.S. territories of American Samoa, Puerto Rico, and the U.S. Virgin Islands, and freely associated states, including the Federated States of Micronesia, the Republic of Marshall Islands, and the

Republic of Palau [12].

#### 4.10. Control Mosquitoes

Professionals from local health departments or mosquito control districts develop mosquito control plans, perform tasks to control larvae and adult mosquitoes, and evaluate the effectiveness of actions taken. You, your neighbors, and the community can also take steps to reduce mosquitoes in and around your home and in your neighborhood.



\* MATI => Motivation Awareness Training and Innovation, \*DTCN => Digital Treatment at Cloud Networks  
 \* RANACU => Residential Area Network Arthropods Control Unit, \* MCAI => Medical Coding Artificial Intelligence, \*CASSID => Common Acute Sensor Sudden Infection and Disorder, \* DRAST=> Dengue Recovery through Advanced Sensor Technology, \* WAIST => Wireless Artificial Intelligent Sensor Technology, \* PANCU => Personal Area Network Control Unit, \* HANCU => Hospital Area Network Control Unit

Figure 3. Dengue Recovery Scientific Model

#### 4.11. Areas with Risk of Dengue

Dengue outbreaks are occurring in many countries of the world in the Americas, Africa, the Middle East, Asia, and the Pacific Islands. Anyone who lives in or travels to an area with risk of dengue is at risk for infection. Before you travel, find country-specific travel information to help you plan and pack. Almost half of the world's population, about 4 billion people, live in areas with a risk of dengue. Dengue is often a leading cause of illness in areas with risk. Dengue has emerged as a worldwide problem since the 1960s. The disease is common in many popular tourist destinations in the Caribbean (including Puerto Rico), Central and South America, Southeast Asia, and the Pacific Islands. In the United States, local cases and limited spread of dengue does occur periodically in some states with hot, humid climates and *Aedes* mosquitoes.

#### 4.12. Testing

Healthcare provider testifies individual's blood if he has symptoms of dengue and he lives in or has recently traveled to an area with risk of dengue. If individual has recently traveled to an area with risk of dengue to share with his healthcare provider. A blood test is the only way to confirm the diagnosis. Individual's healthcare provider may order blood tests to look for dengue or other similar viruses like Zika or chikungunya [1].

#### 4.13. Transmission

Dengue viruses are spread to people through the bites of infected *Aedes* species mosquitoes (*Ae. aegypti* or *Ae. albopictus*). These are the same types of mosquitoes that spread Zika and chikungunya viruses. The study revealed that dengue, Zika, Ebola, Numbness, Cardiac Arrest, ARDS and Chikungunya diseases are made of sensor cell with advanced wireless sensor technology [17,18,19,20,21,22]. According to biological research, these mosquitoes typically lay eggs near standing water in containers that hold water, like buckets, bowls, animal dishes, flower pots, and vases. These mosquitoes prefer to bite people, and live both indoors and outdoors near people. Mosquitoes that spread dengue, chikungunya, and Zika bite during the day and night. Mosquitoes become infected when they bite a person infected with the virus. Infected mosquitoes can then spread the virus to other people through bites. A pregnant woman already infected with dengue can pass the virus to her fetus during pregnancy or around the time of birth. To date, there has been one documented report of dengue spread through breast milk. Because of the benefits of breastfeeding, mothers are encouraged to breastfeed even in areas with risk of dengue. Dengue in pregnancy occurs through infected blood, laboratory, or healthcare setting exposures. Rarely, dengue can be spread through blood transfusion, organ transplant, or through a needle stick injury.

#### 4.14. Control Model

The study illustrated the recovery from dengue fever with

recovery model, which as shown in Figure 3.

#### 4.15. Precautions on Dengue Fever

The study illustrated some precautions for free from dengue fever as follows:

- i. There is no substitute for cleanliness to prevent dengue. Keep your home, workplace clean. Due to the restrictions of the pandemic, many people have gardened on their balconies at home. The stagnant water in those tubs or bottles is dengue's favorite habitat. So, throw away all the accumulated water after two days.
- ii. Make sure that water does not accumulate in buckets, pots, and mugs of the bathroom. If you leave the house closed and go somewhere else, make sure that buckets, pots, jugs, mugs, tubs, can shells, discarded tires, any abandoned tires do not collect water. You can leave them upside down. Other dirt will not enter it. Care should also be taken that water does not accumulate in aquariums, refrigerators, air conditioners, open water tanks.
- iii. Regular cleaning operations should be done by committee in own apartment, area or neighbourhood. Mosquitoes and larvicides should be sprayed.
- iv. The half hour after sunrise and the half hour before sunset in the evening are the two times when *Aedes* mosquitoes are most active foraging. So, you have to be more careful during these two times.
- v. Consult a doctor if you have dengue fever. It is better to keep the patient under a mosquito net at all times. Because, if this patient is bitten by a common mosquito, he will also become a dengue carrier. As a result, whoever is bitten by that mosquito again will be infected with dengue disease.
- vi. The first target of mosquitoes is hands and feet. So, wear clothes that cover your arms and legs. Children should wear long clothes as much as possible. Full sleeve shirt, genji or dress, full pants, pajamas should be worn. Mosquito repellent cream can be applied to exposed body parts.
- vii. Clean the litter box daily. That is another favorite place of *Aedes* mosquito in civil life. The mouth of the garbage container should be covered after use. Apart from this, keep the corners of the house, shady places, slightly damp places, kitchen basin or bathroom clean regularly.
- viii. Doors and windows should be kept closed during rainy season. And even if you keep the window open, don't forget to keep it with net. Apart from this, you can use effective mosquito coils or sprays to prevent dengue at all times day and night to avoid dengue-carrying mosquitoes.
- ix. Should set up personal area network control unit zone around the residential areas, which as shown in Figure 4.





**Figure 4.** Free zone of Mosquito and Dengue Fever

Public Health Expert Dr Abu Jamil Foisal told the Business Standard that the dengue situation is aggravating current year and people are dying every day. He suggested for dengue test and hospitalization if anyone catches a fever and develops dangerous symptoms [13].

#### 4.16. Innovative Pathways of Mosquito Control

Innovative pathway is important to control mosquito due to severe dengue. According to CDC [26], dengue is transmitted to women, men and children by the bite of

infected mosquitoes. A pregnant woman with sudden dengue fever transmits the virus to her fetus during pregnancy or birth [27]. Sometimes dengue transforms into fatal dengue due to certain GPS location (Miah *et al.*, 2022). This deadly dengue has deleterious effects of dengue fever, including fetal death, infant paralysis, low birth weight and premature delivery. Health authorities should collectively encourage the public to use Environmental Protection Agency (EPA) registered insect repellents to prevent dengue fever and promote awareness programs on radio, TV, social and

other media. Being cost effective and user friendly, the high percentage of active ingredients in the insect repellent provides long protection. When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and lactating women. Some notable mosquito repellents are (i) DEET, (ii) Picaridin, (iii) IR3535, (iv) Oil of Lemon Eucalyptus (OLE), (iv) para-menthane-diol (PMD), and (v) 2-undecanone.

A clever way to create an unpleasant environment for these painful bloodsuckers is to grow mosquito repelling plants [23,24,25]. Aromatic plants and herbs are the best mosquito repellents, as their scent is hot for insects. For an added layer of protection, surround the person and their habitat with the following plants to repel bugs and mosquitoes, such as: (i) Citronella, (ii) Lavender, (iii) Marigolds, (iv) Nasturtiums, (v) Rosemary, (vi) Basil, (vii) Catmint, (viii) Scented Geranium, (ix) Bee Balm, (x) Mint, (xi) Ageratum, (xii) Sage, (xiii) Allium.

On the other hand, four wireless sensor isolators set up around the residence to ensure anti-radiation zone for free from dengue, malaria, yellow fever, encephalitis, Ebola virus, the west Nile and Zika viruses [2,23].

## 5. Conclusions

Dengue has evolved into a serious life-threatening global public health concern, affecting nearly 5 billion individuals in more than 150 countries. Health administration and physicians are aware of the disclosure of various treatment methods for this condition, which increases the awareness of the population at the national and international level. And for this the higher authority should ensure in formulating an integrated and technically adequate treatment plan. Future directions to combat this dreaded disease include ensuring the use of safe wireless sensor technology, developing mosquito control methods, developing novel vaccines, developing innovative antiviral drug regimens, and improving digital biomarkers for therapeutic interventions.

## 6. Declarations

### Funding

This research work is a part of PhD Thesis, which was funded by the Zamalah Postgraduate Scholarship of UNIMAS, Malaysia and also sponsored by the Information and Communication Technology Division, Ministry of Posts, Telecommunication and Information Technology, Government of People's Republic of Bangladesh. The funders had no role in the design of the research, in data collection, analyses or final interpretation of data, in the writings of the manuscript, or in the decision to publish the findings.

### Data Availability

Data being used to support the findings of this research work are available from the corresponding author upon

request.

### Competing Interests

The authors declare no potential conflict of interests in this research work.

## ACKNOWLEDGEMENTS

The authors acknowledged the authority of Universiti of Malaysia Sarawak (UNIMAS), Malaysia for providing the Zamalah Postgraduate Scholarship for the completion of PhD degree. The authors are also grateful to the authority of the Information and Communication Technology Division, Ministry of Posts, Telecommunication and Information Technology, Government of People's Republic of Bangladesh, for PhD Fellowship during the higher study in Malaysia. The authors acknowledged the authority of Northeast Medical College & Hospital (NEMCH) Pvt. Limited, Sylhet, Bangladesh for kind supports.

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