

Dengue Fever



**Daffodil**  
*International*  
**University**

**Project On**

A survey on Dengue Fever severity at Mirpur in Bangladesh

**Submitted To**

The Department of Pharmacy,  
Faculty of Allied Health Sciences,  
Daffodil International University

In the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy

**Submitted By**

Student ID: 191-29-1488  
Batch: 21<sup>th</sup>  
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April 2023

## **APPROVAL**

This Project A survey severity on Dengue Fever at Mirpur in Bangladesh, submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

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## DECLARATION

I, at this moment, announce that I am carrying out this project study under the supervision of “Ms. Tahmina Afroz,” Assistant Professor, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, Impartial Compliance with the Bachelor of Pharmacy Degree Requirement (B. Pharm). This project, I declare, is my original work. I also state that neither this project nor any part thereof has been submitted for the Bachelor's award or any degree elsewhere.

**Supervised By:**



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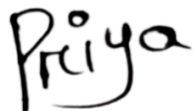
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***DEDICATION***

*I dedicate this work to my parents and my teachers and my friends.*

### **ABSTRACT**

Dengue fever (DF) is one of the most significant rising arboviral illnesses in the world, caused by the container breeding mosquitoes *Aedes aegypti* and *Aedes albopictus*. Human dengue fever infections can cause a variety of symptoms, from mild flu-like illness to dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS). An estimated 50 million individuals get the dengue virus each year, and the geographic coverage of DF transmission has grown due to social and demographic factors such as population growth, urbanization, air travel, and environmental change. My aim of this studies was to see the current scenario and treatment of Dengue Fever. The questionnaire begins with a review and 16 relevant questions. 112 individuals between the ages of 20 and over 40 are interested in participating in this study. This study was carried out in the location of Mirpur, Dhaka, Bangladesh. Nearly 70% of respondents blamed dengue on the rise in aedes species, 20% on a drainage system leak, and 10% on kitchen standing water. 60% of responders took paracetamol four times to treat dengue, 20% had intravenous fluids, 10% had platelet infusions, and 10% had all three. Bangladesh has large DF clusters over the last decade, which can be improved through further research into how social and ecological variables influence DF transmission.

**Keywords:** Dengue, Antibiotic, Drug, Fever, Mosquitoes.

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# Introduction

### 1.1. Dengue fever

Dengue fever is a tropical illness that is transmitted from person to person through the bite of an infected mosquito. The dengue virus is the causative agent of dengue fever. [1] After an infection has taken hold, it may take anywhere from three to fourteen days, on average, for symptoms to begin to reveal themselves. [2] There is a possibility that this ailment will present itself in a variety of ways, including a high temperature, a headache, nausea and vomiting, pain in the muscles and joints, as well as a distinctive rash and itching on the skin. Between two and seven days is the typical amount of time that must pass before one can be considered recovered. Just a very small fraction of people will develop the more severe form of the disease known as dengue hemorrhagic fever, but this is still a possibility. This particular form of the disease can lead to significant bleeding, poor platelet counts, and the loss of blood plasma. Dengue can also cause a disease known as dengue shock syndrome, which is characterised by a blood pressure that is dangerously low. This condition can result in death. The mosquitoes that belong to the genus *Aedes*, and in particular the *Aedes aegypti* mosquito, are the insects that are primarily responsible for the transmission of dengue disease. There are five different serotypes of the virus. In the vast majority of instances, infection with one type confers protection against that sort for one's entire life, but only temporary immunity against the other variants of the virus. In the event of a future infection with a different strain of the virus, the risk of experiencing terrible repercussions is going to be significantly raised. This is due to the fact that the strains cannot be exchanged for one another. A wide variety of different diagnostic procedures, such as the detection of antibodies to the virus or the RNA of the virus, can be utilised in order to provide conclusive evidence that the diagnosis is accurate. A vaccination against dengue fever has been approved for use and is now on sale in a number of countries around the world. Dengue fever is a mosquito-borne illness that can cause severe joint and muscle pain. [5-6] As of the year 2018, the vaccine is only recommended for use in people who have already been exposed to the virus or in groups who have a high prevalence of previous infection by the age of nine. The only exception to this rule is in groups who have a high prevalence of previous infection by the age of nine. [7-9] This is due to the fact that the vaccine is only effective in preventing illness in individuals who have already been vaccinated against the disease.[10-11]



## 1.2. Signs and symptoms

Dengue may be asymptomatic or cause relatively moderate disease [12], but it can also induce symptoms similar to those of the flu, such as the following:

- ✓ fever of 104 degrees Fahrenheit (40 degrees Celsius).
- ✓ acute pain in the head
- ✓ ache in the region of the eyes
- ✓ nausea
- ✓ vomiting
- ✓ swollen glands
- ✓ rash
- ✓ pains in the joints, muscles, or bones that are so severe that dengue is frequently referred to as "breakbone fever." [13]

### Severe dengue

The condition known as severe dengue is characterized by a reduction in the number of platelets (cells that contribute to the formation of clots) as well as blood vessel damage and leakage. The most severe forms of dengue fever may cause a variety of serious complications, including shock, internal bleeding, bleeding gums or nose, organ failure, and even death. [14] A severe case of dengue fever may result in the following:

- ✓ severe abdominal pain
- ✓ persistent vomiting
- ✓ rapid breathing
- ✓ bleeding gums or nose
- ✓ fatigue
- ✓ restlessness
- ✓ liver enlargement
- ✓ blood in vomit or stool
- ✓ potentially fatal [15-16]

### 1.3. Cause

#### Virology

RNA viruses belong to the family Flaviviridae, and the flavivirus genus is one of the families that make up this family. This particular family includes the virus that causes dengue fever, also referred to as DENV. In addition to the Zika virus, other viruses that belong to the same genus include the yellow fever virus, the West Nile virus, the Zika virus, the tick-borne encephalitis virus, the Japanese encephalitis virus, the tick-borne encephalitis virus, the Kyasanur forest disease virus, and the Omsk hemorrhagic fever virus. All of these viruses can cause severe illness and even death in humans. [17] Because arthropods, such ticks and mosquitoes, are responsible for the transmission of the great majority of these viruses, the viruses in question are often referred to as arboviruses (arthropod-borne viruses). The genome of the dengue virus, which is the collection of genetic material carried by the virus, is made up of approximately 11,000 nucleotide bases. These bases serve as the genetic instructions for the three distinct types of protein molecules (C, prM, and E) that make up the virus particle, as well as for the seven additional non-structural protein molecules (NS1, NS2a, NS2b, NS3, and NS4a, and NS5) that are only present in infected host cells and are necessary for the replication of the virus. These non-structural protein molecules are only found in infected host cells. [18-19] The virus can be broken down into five distinct serotypes, sometimes known as strains. These sorts of bacteria are also referred to as serotypes. The first four distinct strains of the DENV virus have been given the labels DENV-1, DENV-2, DENV-3, and DENV-4, correspondingly. The announcement of the fifth sort took occurred in the year 2013, which was also the year it was named. The antigenicity of the distinct serotypes is the standard that is applied in the process of distinguishing one from the next. This antigenicity serves as the criterion. [20]

#### Predisposition

In contrast to the majority of diseases, severe sickness is more likely to occur in infants and young children who, on the whole, are healthy and get enough nutrition. In addition, being female, being overweight, and having a high viral load all enhance the chance of contracting a disease that might potentially be fatal. Even while each serotype has the potential to cause a different sickness spectrum, the virus strain itself is still a risk factor. It is thought that following infection, immunity

to one serotype develops permanently, while protection against the other three serotypes disappears soon. If someone has been exposed to DENV-1 and subsequently gets DENV-2 or DENV-3, or if someone has been exposed to DENV-3 and then catches DENV-2, then secondary infections are more likely to cause significant disease. People who already have a health problem, such as diabetes or asthma, are more likely to pass away as a result of the potentially lethal consequences of dengue. [21] Certain polymorphisms, which are normal changes in DNA, have been linked to an increased risk of developing catastrophic consequences as a result of dengue fever. These include variants of the HLA-B gene that code for specific types of human leukocyte antigen, as well as those that code for tumor necrosis factor alpha, mannan-binding lectin, CTLA4, transforming growth factor beta, [32] DC-SIGN, PLCE1, and TNF. Other variants include those that code for transforming growth factor beta and TNF. [22] Glucose-6-phosphate dehydrogenase insufficiency is a common genetic abnormality, particularly widespread among Africans, and it has been linked to an increased risk of developing diabetes. Polymorphisms in the genes that code for the vitamin D receptor and FcR seem to be responsible for conferring protection against severe disease in future dengue infections. [23]

### **1.4. Diagnosis**

The diagnosis of dengue is usually often made clinically, on the basis of the patient's reported symptoms as well as a physical examination. This is especially true in areas where the disease is prevalent, as it is the most common method of diagnosis. On the other hand, it could be difficult to tell the difference between the early stages of this illness and those of other viral infections. The presence of fever in conjunction with two additional symptoms, such as nausea and vomiting, a rash, widespread aches, a low white blood cell count, a positive tourniquet test, or any warning sign in an individual who resides in an endemic region establishes a high level of probability for the diagnosis. [24] In most cases, warning symptoms will present themselves before the start of severe dengue. The tourniquet test, which is particularly helpful in settings where no laboratory investigations are readily available, involves the application of a blood pressure cuff at between the diastolic and systolic pressure for five minutes, followed by the counting of any petechial hemorrhages; a higher number makes a diagnosis of dengue more likely, with the cut off being more than 10 to 20 petechial hemorrhages per 1 inch<sup>2</sup>; the tourniquet test is particularly useful (6.25 cm<sup>2</sup>). [25] Anyone who gets a fever within two weeks after having been in a tropical or

subtropical environment should be evaluated for the possibility of having dengue fever. Dengue fever and chikungunya, another viral virus that is very similar to dengue fever and has many of the same symptoms and occurs in the same regions of the globe, may be very difficult to differentiate from one another. Investigations are frequently carried out in order to rule out other conditions that cause symptoms that are similar to those of the illness being investigated. Some examples of these conditions include malaria, leptospirosis, viral hemorrhagic fever, typhoid fever, meningococcal disease, measles, and influenza. [26] Zika fever also includes symptoms that are comparable to dengue fever. [27] The first change that can be detected via laboratory examinations is a low white blood cell count, which may be followed by low platelet counts and metabolic acidosis. The earliest change that can be detected through laboratory examinations is a low white blood cell count. Platelet and white blood cell counts that are low are often found to be related with a somewhat higher level of aminotransferases (AST and ALT) produced by the liver. Plasma leakage causes hemoconcentration (which is shown by an increasing hematocrit), as well as hypoalbuminemia, in severe cases of illness. The presence of significant pleural effusions or ascites may be seen during a physical examination; however, the presentation of fluid during an ultrasound might be of assistance in the early diagnosis of dengue shock syndrome. Because it is not readily available in a lot of different places, the usage of ultrasonography is restricted. If your pulse pressure decreases to less than 20 mm Hg and you also have peripheral vascular collapse, you may be suffering with dengue shock syndrome. In children, the presence of peripheral vascular collapse may be identified by delayed capillary refill, fast heart rate, or chilly extremities. Although warning indicators are an essential component in the early diagnosis of potentially life-threatening diseases, there is insufficient evidence to support the use of any one clinical or laboratory marker. [28]

### **1.5. Prevention**

Controlling the mosquitoes that spread the disease and protecting oneself from their bites are essential for preventing the disease. The World Health Organization suggests implementing a program of integrated vector control that includes the following five components: [29]

I. Advocacy, social mobilization, and legislation aimed at ensuring the strengthening of public health agencies and communities;

- II. Collaborative efforts between the health industry and other fields (both public and commercial);
- III. A comprehensive strategy for illness prevention that makes the most efficient use of available resources;
- IV. Decision-making that is based on evidence in order to ensure that any interventions are targeted correctly; and
- V. Strengthening of capabilities to provide an appropriate reaction to the circumstances at hand in the local area

Eliminating *Aedes aegypti*'s natural environments is the most effective technique for managing this pest. This may be accomplished by removing any open sources of water from the region, or if that is not feasible, by applying insecticides or biological control agents to the area in question. Even though it is done sometimes, spraying a whole area with pesticides including organophosphates or pyrethroids is not regarded to be very effective. [30] Given the potential for insecticides to have adverse effects on human health as well as the increased logistical challenges associated with using control agents, the most effective way of control is the reduction of open water collections brought about through environmental alteration. The use of clothes that completely covers the skin, the use of mosquito netting when resting, and/or the use of insect repellent are all ways that people may protect themselves from being bitten by mosquitoes (DEET being the most effective). [31] The frequency of outbreaks seems to be rising in certain regions, most likely as a result of urbanization expanding the habitat of *Aedes aegypti*. These approaches, although they may be an effective way of lowering an individual's risk of exposure, do nothing to mitigate the frequency of outbreaks. It indicates that the disease's geographic distribution is also growing, which may be a result of changes in the climate. [32]

### **Vaccine**

In 2016, the Philippines and Indonesia were two of the countries that began offering a vaccination against dengue fever that was only half effective. It has been given permission for use in the United States of America, Mexico, Brazil, El Salvador, Costa Rica, Singapore, and Paraguay, as well as in a large portion of Europe. [33] The vaccination is only indicated for persons who have already been sickened by dengue or for communities in which the majority of people (more than 80 percent) had already been infected by the age of 9. [34] There is some indication that it may make

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future infections more severe in those who have never had an illness before. Even in geographical locations where the illness is prevalent, Prescire does not consider it to be an option for vaccination on a large scale due to this reason. Dengvaxia is the brand name for the vaccine that is made by Sanofi and sold under that name. It is composed of a weakened mix of the dengue virus and each of the four different dengue serotypes, as well as the yellow fever virus. According to the findings of the studies, the vaccine had a success rate of 66% and averted more than 80% to 90% of severe cases. Some people's expectations were higher than what they found here. [35]

# Literature Review

**2.1. Banu, S., Hu, W., Hurst, C., Guo, Y., Islam, M. Z., & Tong, S. (2012). Space-time clusters of dengue fever in Bangladesh. *Tropical Medicine & International Health*, 17(9), 1086-1091.**

Using a geographic information system and spatial scan statistics, analyze the space-time clustering of dengue fever (DF) transmission in Bangladesh (SaTScan).

The Directorate General of Health Services provided us with information on monthly suspected DF cases and fatalities by district in Bangladesh between 2000 and 2009. From the national census conducted by the Bangladesh Bureau of Statistics, information on the population and district boundaries of each district was gathered. SaTScan software was used to run a discrete Poisson model to find the space-time clusters of DF transmission.

There were three clusters in the space-time distribution of DF transmission: 2000–2002, 2003–2005, and 2006–2009. In all three times, Dhaka was the cluster where DF was most likely to occur. Significant secondary clusters were found in a number of additional areas. However, during the last ten years, it seems that the Bangladeshi DF transmission's geographic range has shrunk.

Over the last ten years, there have been sizable space-time clusters of DF in Bangladesh. Our findings would encourage more research into the potential effects of social and ecological variables on DF transmission, and they would also help Bangladesh's DF control and preventive measures.

**2.2. Rahman, M., Rahman, K., Siddque, A. K., Shoma, S., Kamal, A. H. M., Ali, K. S., ... & Breiman, R. F. (2002). First outbreak of dengue hemorrhagic fever, Bangladesh. *Emerging infectious diseases*, 8(7), 738.**

Four antigenically different but related dengue virus (official name: Dengue virus [DENV]) serotypes that are largely spread by *Aedes aegypti* cause dengue fever (DF) and dengue hemorrhagic fever (DHF) (yellow fever mosquito). In Southeast Asia, DHF, the disease's severe form, is prevalent and often worsens into epidemics, leading to frequent hospitalizations and fatalities. With a rising frequency in new nations and tropical regions, dengue has recently become a significant worldwide health hazard. From the middle of the 1960s until the middle of the 1990s, DF was seen in Bangladesh, but a DHF epidemic has never been recorded. A 28-year-old patient was hospitalized in Dhaka, Bangladesh, in late June 2000 with hemorrhagic fever, ascites, pleural effusion, and thrombocytopenia. The case was identified as DHF by an ELISA, or enzyme-linked immunosorbent test, for anti-dengue antibodies. In Dhaka and other significant Bangladeshi cities



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that summer, an epidemic of DF (>5,000 hospitalized cases recorded) and DHF took place. We carried out dengue surveillance at a hospital in Dhaka during the first dengue hemorrhagic fever epidemic that affected the whole nation of Bangladesh. Sixty-two percent of the 176 patients, mostly adults, who tested positive for dengue had fever, 39.2 percent had hemorrhagic fever, and 0.6% had shock syndrome. In eight individuals, the Dengue virus 3 serotype was found.

## **Goal of my studies**

## Dengue Fever

Tropical dengue fever is brought on by a virus that mosquitoes spread. The infection may result in physical discomfort, rashes, headaches, and fever. The majority of dengue fever cases are minor and resolve on their own in about a week.

My aim of this studies was,

- to see Bangladesh's current Dengue fever treatment options.
- to continue discussing the present Dengue Fever situation.
- to learn what attitudes individuals have around dengue illness.
- to create a new field for higher education.

# Methodology

### **4.1. Target Population:**

The survey opens with an overview and 16 pertinent questions. This research is looking for 112 participants between the ages of 20 and over 40. This research was conducted in the Bangladeshi city of Mirpur.

### **4.2. Research Design:**

The purpose of this survey was to learn what people's perceptions of the severity of dengue fever and how it impacts their health and happiness were. The target demographic was invited to participate in the field survey, which required them to physically answer all of the questions.

### **4.3. Method of Data Analysis:**

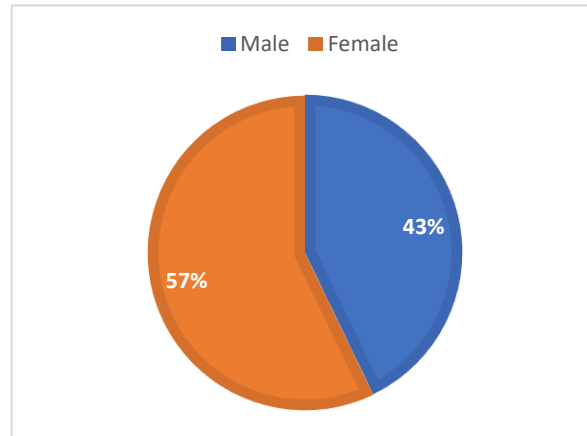
After an assortment of information, all information was checked for precision and internal consistency to deny missing or clashing data, and those were discarded. Information investigation was done through Microsoft's dominant refreshed rendition.

### **4.4. Ethical Considerations:**

Before beginning the information assortment, educated verbal permission was taken from the investigation members. The obscurity of the respondents was kept private, and study subjects were educated that they could have the option to leave the program at any.

# Result and Discussion

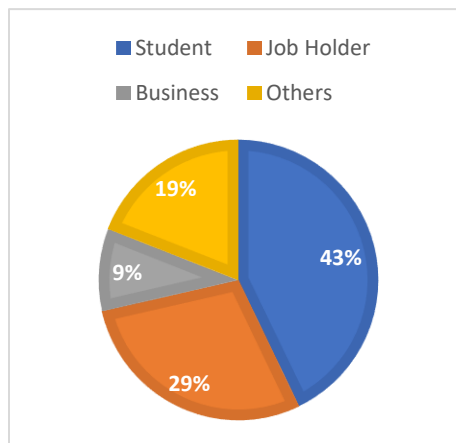
### 5.1. Gender of respondents



**Fig 01: Gender**

In this study, 43% of respondents are men and 57% of respondents are women. More women than men reply to surveys.

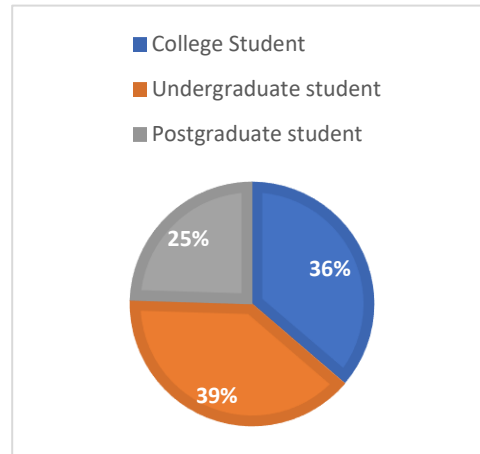
### 5.2. Occupation of respondents



**Fig 02: Occupation**

In this study, around 43% of respondents identify as students, 29% as job holders, 9% as people involved in business, and 19% as people involved in other professions.

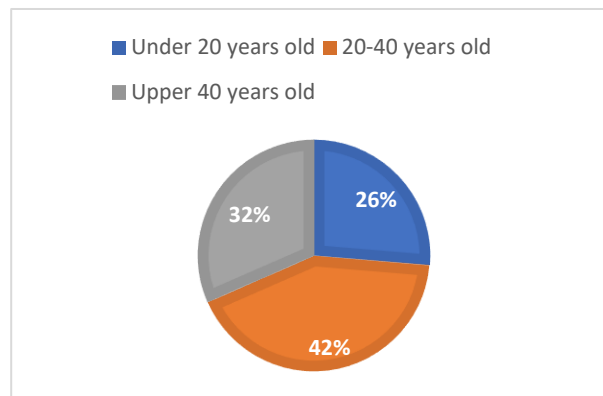
### 5.3. Education Level of respondents



**Fig 03: Education Level of respondents**

In this survey around 39% respondents are undergraduate student, 36% respondents are college student and 25% respondents are postgraduate student.

### 5.4. Age of respondents

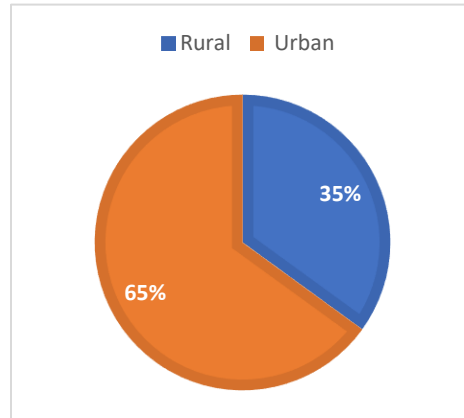


**Fig 04: Age**

In this study, around 42% of respondents are between the ages of 20 and 40, 32% are between the ages of 40 and up, and 26% are under the age of 20.



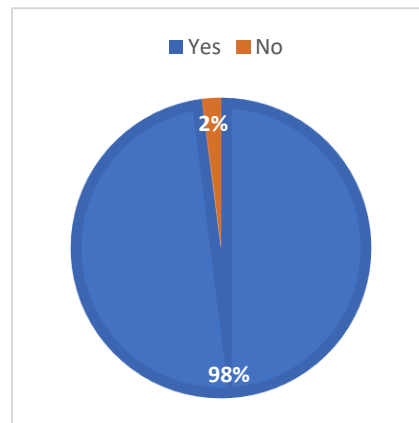
### 5.5. Respondents Location



**Fig 05: Location**

In this study, 35% of respondents come from rural areas, while 65% of respondents reside in urban areas.

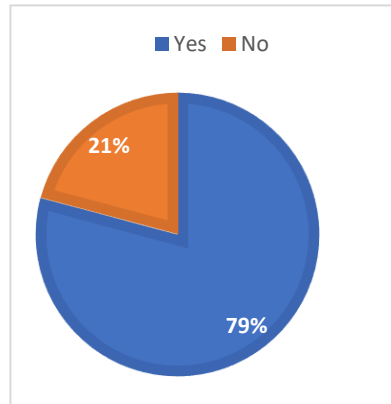
### 5.6. Knowledge about dengue



**Fig 06: Knowledge about dengue**

Around 98% of the responders to this study had awareness of dengue, which is a high rate, while just 2% do not.

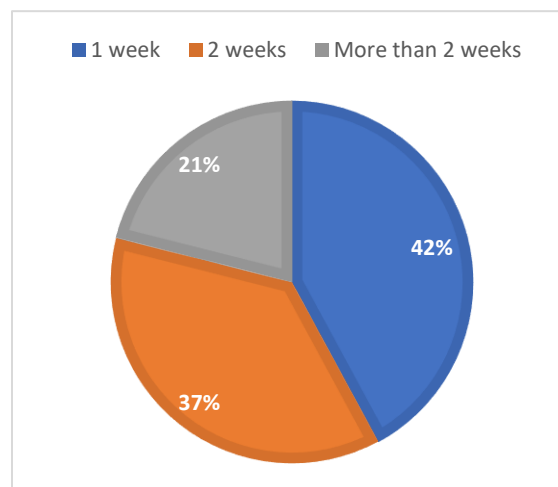
### 5.7. Suffering from dengue



**Fig 07: Suffering from dengue**

Approximately 79% of responders to this study reported having dengue fever, whereas 21% did not. The rate of suffering is greater.

### 5.8. Duration of suffering from dengue

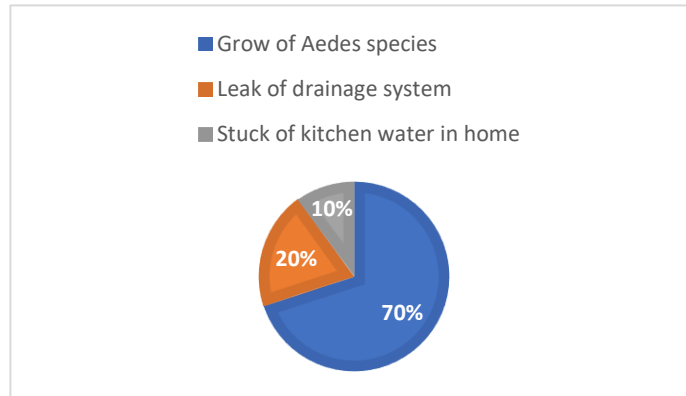


**Fig 08: Duration of suffering from dengue**

In this survey, around 42% of respondents experienced dengue symptoms for one week, 37% had dengue symptoms for two weeks, and 21% had dengue symptoms for more than two weeks.

# Dengue Fever

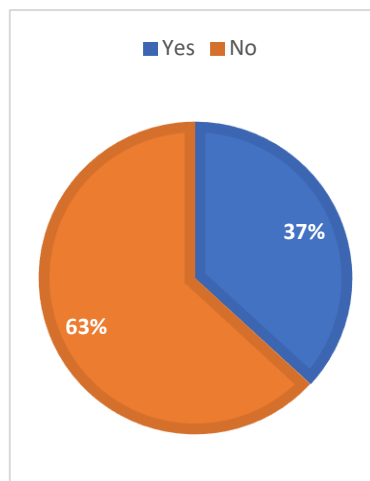
## 5.9. Cause of Dengue



**Fig 09: Cause of Dengue**

In this survey, almost 70% of respondents claimed that the increase in aedes species was the cause of dengue, 20% claimed that a drainage system leak was to blame, and 10% claimed that standing water in the kitchen was to blame.

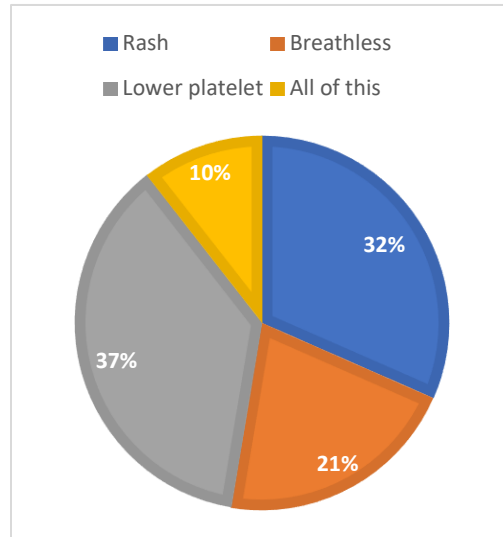
## 5.10. Suffering from the severe dengue



**Fig 10: Suffering from the severe dengue**

In this survey, about 37% of participants reported having experienced severe dengue, while another 63% said they had not experienced any severe dengue.

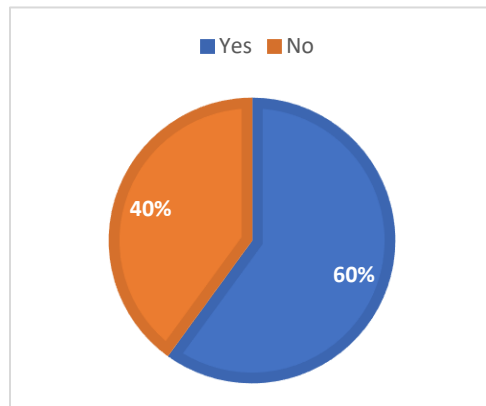
**5.11. Symptoms of dengue suffered by respondents beside fever**



**Fig 11: Symptoms of dengue suffered by respondents beside fever**

Around 32% of survey participants stated they had had rash in addition to fever, 21% said they had experienced breathlessness in addition to fever, 37% said they had experienced low platelet counts, and 10% said they had experienced all of these symptoms in addition to fever.

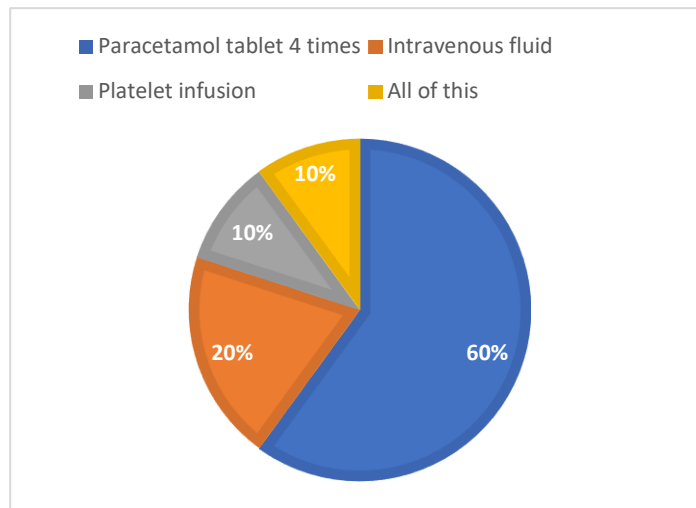
**5.12. Knowledge about hemorrhagic dengue fever**



**Fig 12: Knowledge about hemorrhagic dengue fever**

In this survey around 60% respondents has knowledge about hemorrhagic dengue fever and another 40% have no knowledge about hemorrhagic dengue fever.

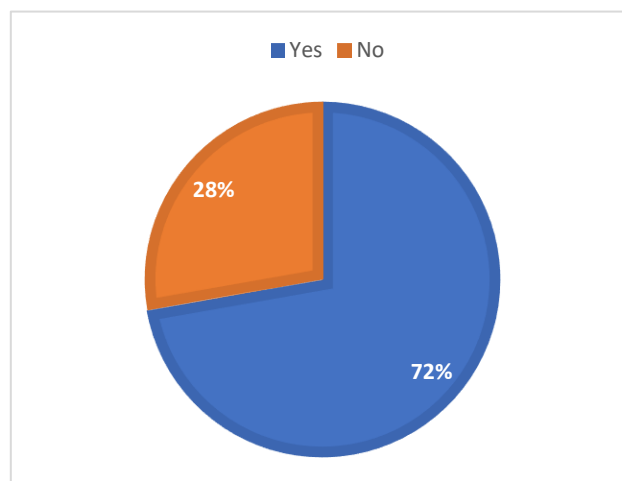
### 5.13. Medications for treating dengue fever



**Fig 13: Medications for treating dengue fever**

In this poll, about 60% of respondents stated they had taken paracetamol tablets four times to treat dengue, while 20% indicated they had also had intravenous fluids, 10% had received platelet infusions, and another 10% had received all of these treatments.

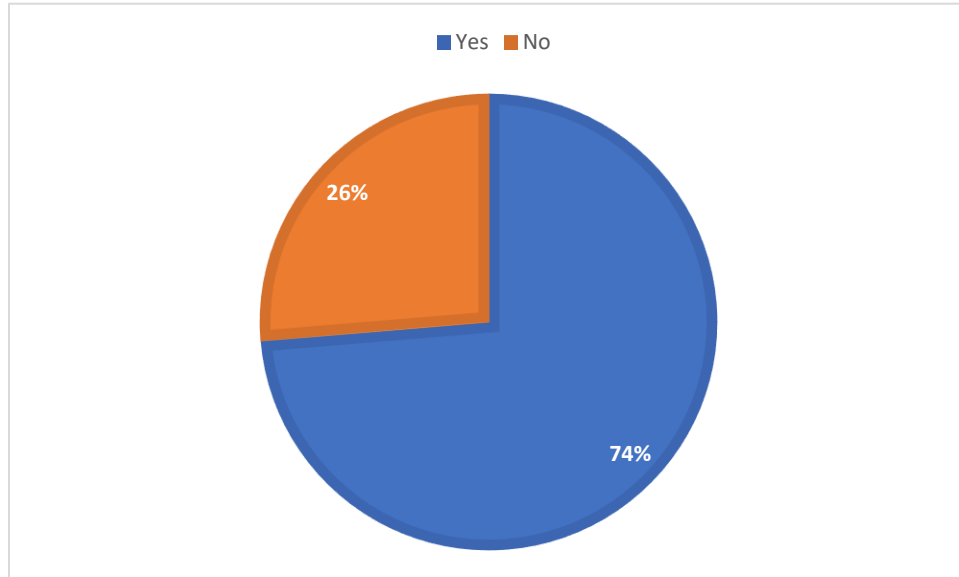
### 5.14. Knowledge about prevention of dengue



**Fig 14: Knowledge about prevention of dengue**

In this survey around 72% respondents has knowledge about prevention of dengue fever and 28% respondents has no knowledge about prevention of dengue.

**5.15. Respondents thought about control of dengue by prevention**



**Fig 15: Respondents thought about control of dengue by prevention**

Around 74% of respondents agreed in this survey that dengue can be controlled by preventative measures, and 26% of respondents had no opinion on the subject.

# Conclusion

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In conclusion, our analysis shows that DF transmission in Bangladesh was concentrated in a variety of spatial and temporal contexts, and that its geographic spread has recently shrunk. It is yet unknown how sociodemographic shifts and environmental variables may affect DF transmission in densely populated places. The Bangladesh health authority may utilize our results to enhance its DF control and preventive programs.



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## Dengue Fever

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