

**A Survey on Knowledge and Awareness of Dengue Fever among The Residents at
Mirpur, Bangladesh**



[A dissertation submitted to the Department of Pharmacy, Faculty of Allied Health and Sciences, Daffodil International University, Dhaka. This report presented in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.]

Submitted To

The Department of Pharmacy
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Submitted By

Shamsun Nahar Sorna

ID: 191-29-1433

Batch: 21th C

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

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APPROVAL

This Project paper, “**A Survey on Knowledge and Awareness of Dengue Fever among The Residents at Mirpur, 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.

BOARD OF EXAMINERS



.....

Dr. Muniruddin Ahmed
Professor and Head
Department of Pharmacy
Faculty of Allied Health Sciences
Daffodil International University

.....

Internal Examiner 1

.....

Internal Examiner 2

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External Examiner

Declaration

I, Shamsun Nahar Sorna, hereby declare that, this project is done by me under the guidance of Ms. Farjana Islam Aovi, Assistant Professor, Department of Pharmacy, Daffodil International University, in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy. The results embodied in this project have not been submitted to any other university or institute for the award of any degree.

Submitted by:



Shamsun Nahar Sorna

ID: 191-29-1433

Batch: 21th C

Department of Pharmacy

Daffodil International University

Certificate

This is to certify that the results of the investigation that are embodied in this thesis works are original and have not been submitted before in substance for any degree or diploma of this university. The entire present work submitted as a thesis work for the partial fulfillment of the degree of Bachelor of Pharmacy.



Ms Farjana Islam Aovi

Assistant Professor

Department of Pharmacy

Daffodil International University

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Shamsun Nahar Shorna



My Parents & My Teachers,

The persons who always encourage me in every sphere of my life

Abstract

Dengue fever is a tropical disease carried by mosquitoes and caused by the dengue virus. The aim of the current study was to assess the knowledge, prevalence, treatment and preventative strategies among the people of Mirpur, Bangladesh. From December 2022 to February 2023, 112 residents of Mirpur, Bangladesh, participated in a community-based cross-sectional survey. Using a distinct portion of the questionnaire, data regarding sociodemographic details and knowledge, awareness, treatment, prevention, and practice toward dengue was gathered.

In this study, majority of the patients were female. 43% of respondents identify as students and 39% of respondents are undergraduate students. 42% of respondents are between the ages of 20 and 40. The majority 65% of responders have come from urban areas. This study revealed 98% of the responders had an awareness of dengue and 60% of respondents had knowledge about hemorrhagic dengue fever. Approximately 79% of responders to this study reported having dengue fever. 42% of respondents experienced dengue symptoms for one week. 70% of respondents claimed that the increase in *Aedes* species was the cause of dengue, and about 37% of participants reported having experienced severe dengue. 37% said they had experienced low platelet counts. 60% of respondents stated they had taken paracetamol tablets four times to treat dengue. 72% of respondents have knowledge about the prevention of dengue fever. 74% of respondents agreed in this survey that dengue can be controlled by preventative measures. This particular study has an extensive analysis of dengue fever which can help to decide the healthcare provider to conduct an awareness programme ensure to the control of dengue fever in this area.

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Chapter One

Introduction

1. Introduction

Dengue, a mosquito-borne illness spread by the bites of *Aedes* mosquitoes, primarily *Aedes aegyptian* and *Aedes albopictus*, is estimated to be the most common human arbovirus infection in the world [1]. An important public health issue, dengue is the most common mosquito-borne disease that affects people. The four ribonucleic acid (RNA) viruses (DENV serotypes 1-4), which are genetically similar but not identical, are the cause of the disease [2]. It is estimated that 3.8 billion individuals living in 128 countries are at risk of contracting dengue. The WHO estimates that dengue causes roughly 20,000 deaths worldwide each year [3]. In South-East Asia, where the first dengue virus infection was discovered, 52% of the world's dengue-at-risk population resides. The dengue vector and its transmission have found a suitable environment in Bangladesh, which is located in South Asia [7].

The first dengue infection was discovered in Bangladesh in 1964. Bangladesh has a lower prevalence of dengue than the majority of Southeast Asian countries [8], but dengue outbreaks have recently increased, going from 2769 cases in 2017 to 10148 cases in 2018. The Directorate General of Health Services (DGHS) [9] reported 87953 cases with 81 fatalities in 2019. This is a 9-fold increase in dengue incidence from the prior year [10]. Dengue cases peaked between 2012 and 2019 in Dhaka, the capital and largest metropolis of Bangladesh, with a population of over 16 million [15]. Due to the possibility of more severe disease symptoms among seronegative people and children younger than 9 years old, Bangladesh, like many other nations, has not used the first dengue vaccine, CYD-TDV [17]. The cornerstone of dengue prevention efforts continues to be insecticide-based vector control, despite being unsustainable and occasionally ineffective. University students have access to real knowledge, making them an important group of learners in any community. They can readily be contacted by the authority through universities or various social media and digital media sites [13]. The widely disseminated mosquito *Aedes aegypti* is responsible for transmitting dengue, the most serious arboviral disease affecting humans. At this time, controlling the dengue virus's mosquito vector is crucial for its management and prevention [3]. Immunological stresses and pathogen transmission bottlenecks both influence the evolution of the dengue virus globally. Globalization and human mobility are factors that may contribute to the spread of newly developing dengue virus strains [10].

A first infection's febrile phase may have a sensitivity of more than 90% for the detection of NS1, but in subsequent infections, this percentage reduces to between 60% and 80%. All of the tests were negative in the early stages of the sickness. PCR and viral antigen detection are most precise in the first week following an infection. Despite the fact that specific antiviral drugs cannot cure dengue, maintaining a healthy fluid balance is crucial. The symptoms will dictate the course of treatment. The majority of people who contract dengue fever recover completely without experiencing any long-term consequences. The risk of mortality in patients with severe dengue varies from 0.8% to 2.5%; however, this risk is decreased to less than 1% with effective treatment [8].

1.1 History

The Jin Dynasty (266–420) Chinese medical encyclopedia makes mention of a "water poison" linked to flying insects and may have been the first source of information about suspected dengue disease. Between 266 and 420 AD, this book was written. [12]

The principal vector, *Aedes aegypti*, left Africa between the 15th and 19th centuries as a result of rising globalization that was caused by the slave trade. Dengue fever epidemics were first reported in 1779 and 1780, despite the fact that outbreaks of the disease were originally mentioned as far back as the 17th century. [13] Between that time and 1940, there were just a few outbreaks. Dengue fever became the second infectious disease, after yellow fever, to be connected to a particular virus. In 1906, it was determined that the *Aedes* mosquito was the carrier of dengue fever, and the cause of the sickness was traced back to a virus the following year. Further investigation on the transmission of dengue, carried out by John Burton Cleland and Joseph Franklin Siler, fleshed out our foundational understanding of the disease. It is widely held that the ecological upheaval that occurred both during and after World War II had a key role in the development of dengue disease. These same elements also had a role in the development of dengue hemorrhagic fever and the dissemination of different serotypes of the disease to new places. In 1953, the Philippines became the first country in the world to report this severe form of the sickness. By the 1970s, it had spread across the Pacific and the Americas, where it had developed into a prominent cause of mortality among infants. In 1981, DENV-2 was discovered for the first time in Central and South America; it was found that mosquitoes that had been infected with DENV-1 were the carriers of the virus to people. Because of this, the first instances of dengue hemorrhagic fever and dengue shock syndrome were observed [14].

1.2 Epidemiology

A map of the world showing the locations of countries where the *Aedes* mosquito is found (the southern United States, eastern Brazil, and the majority of sub-Saharan Africa), as well as the locations of countries where both the *Aedes* mosquito and dengue have been reported (most of Central and tropical South America, South Asia and Southeast Asia, and many parts of tropical Africa). As of 2019, dengue was a common disease in more than 120 countries. In 2013, it caused around 60 million symptomatic infections all over the globe, with 18% of those infected being admitted to the hospital and over 13,600 people losing their lives as a result [64].

The global cost of dengue case is estimated to be \$9 billion. In the decade of the 2000s, it was projected that 12 nations in Southeast Asia had a total yearly incidence of around 3 million cases of infection and 6,000 fatalities. The number of fatal dengue cases in the Philippines reached 622 in 2019, prompting the government to declare a nationwide dengue epidemic. At least 22 nations in

Africa have received reports of it, but it is very likely to be widespread over the whole continent, putting 20% of the population at danger. As a result, it is one of the most widespread vector-borne illnesses in the whole globe. Infections are more often acquired in the context of an urban environment. In recent decades, there has been a rise in the number of outbreaks and circulating viruses as a result of the increasing movement of people as well as the growth of villages, towns, and cities in regions where it is prevalent. In the past, dengue fever was only found in Southeast Asia; however, it has since migrated to southern China in East Asia, nations in the Pacific Ocean, and the Americas, and it even has the potential to spread to Europe. [64-65] In November 2022, the first locally transmitted case of dengue was recorded in Maricopa County, Arizona, as well as in the state of Arizona as a whole [64-65].

The incidence of dengue fever grew by a factor of thirty between the years 1960 and 2010. It is thought that a mix of factors, including urbanization, population expansion, greater international travel, and global warming, are responsible for this surge. Around the equator is where you'll find the geographical dispersion. 70% of the world's 2.5 billion people who live in regions where it is prevalent are residents of the WHO's Southeast Asia Region and Western Pacific Region. After malaria, an infection with dengue virus is the second most common cause of fever among tourists who have returned from impoverished countries. Malaria is the most common cause. It is the virus that causes the most widespread illness that is spread by arthropods, and it is responsible for a disease burden that is estimated to be 1,600 disability-adjusted life years per million people. Dengue fever is one of seventeen tropical illnesses that are considered to be neglected by the World Health Organization. The dengue virus, like the majority of other arboviruses, is maintained in the natural world via cycles that include favored blood-sucking vectors and vertebrate hosts. Transmission of the viruses from female *Aedes* mosquitoes of species

other than *A. aegypti* is what keeps the viruses alive in the woods of Southeast Asia and Africa. *A. aegypti*—to their progeny as well as to more primitive monkeys. The highly domesticated *A. aegypti* is the species most likely to spread the virus in urban and suburban areas. *A. albopictus* is the agent that spreads the virus from animal to human in rural areas. *A. albopictus*, in addition to other species of the genus *Aedes*, including *A. albopictus*. In the latter part of the 20th century, both of these species were able to extend their geographic ranges. A process known as amplification takes place anywhere there are infected lower primates or humans, which results in a significant rise in the amount of dengue viruses that are circulating. According to one set of projections, the number of individuals who may be at risk of dengue illness due to climate change, urbanization, and other factors might reach over 6 billion by the year 2080 [66].

1.3. Etymology

Early in the 19th century, the name was acquired from West Indian Spanish, which had gotten it from the Kiswahili word *dinga*. This name eventually made its way into English (in full *kidingapopo*, "disease caused by an evil spirit"). Due to the fact that the word "dengue" already existed in Spanish with the meaning "fastidiousness," the borrowed term was converted to *dengue* in Spanish. This folk etymology refers to the fact that afflicted patients detest moving about. [15] In the West Indies, those who had dengue fever were supposed to have the posture and stride of a dandy, and the sickness itself was referred to as "dandy fever." [16] Benjamin Rush, a physician and founding father of the United States, first used the phrase "break-bone fever" in a report that he wrote in 1789 on an outbreak that occurred in 1780 in Philadelphia. He chooses the more academic phrase "bilious remitting fever" to serve as the title of the report. After the year 1828, the phrase "dengue fever" began to be used in common parlance. Historically, this illness was also referred to as "breakheart fever" and "la dengue." The terms "infectious thrombocytopenic purpura" and "Philippine," "Thai," or "Singapore hemorrhagic fever" are used to refer to diseases that are very severe. [17].

1.4 Dengue fever

Dengue fever is a tropical illness that is transmitted by mosquitoes and is caused by the dengue virus. [1] The average onset of symptoms is somewhere between three and fourteen days following infection. [2] These symptoms may include a high temperature, headache, nausea and vomiting, discomfort in the muscles and joints, as well as a distinctive rash and itching of the skin. In most cases, recovery takes between two and seven days. In a very small number of people, the disease progresses into a more severe form known as dengue hemorrhagic fever, which can lead to excessive bleeding, low platelet counts, and the leakage of blood plasma. Dengue can also develop into dengue shock syndrome, which is characterized by dangerously low blood pressure. The *Aedes* genus of insects, and particularly the *Aedes aegypti* mosquito, are responsible for the transmission of dengue fever. There are five different serotypes of the virus; in most cases, infection with one type confers protection against that type for one's whole life, but only temporary immunity against the other kinds. The chance of developing serious consequences is significantly raised in the event that a subsequent infection with a different strain occurs. The diagnosis may be verified by the use of a variety of different assays, such as the detection of antibodies to the virus or the virus's RNA. A vaccination against dengue fever has been licensed for use, and it is now available for purchase in a number of different nations [5-6]. As of the year 2018, the vaccine is only indicated for use in those who have already been exposed to the virus or in groups who have a high prevalence of past infection by the age of nine [7]. Eliminating breeding grounds for mosquitoes and minimizing the amount of time spent outside are two other preventative measures. This may be accomplished by removing standing water or covering it up, as well as wearing clothes that covers a significant portion of the body. The treatment of acute dengue fever consists on supportive care, which may involve the administration of fluids intravenously or

orally for patients with mild to severe illness. In more severe situations, it may be necessary to get a blood transfusion. Because of the increased risk of bleeding associated with the use of nonsteroidal anti-inflammatory medicines (NSAIDs), paracetamol (also known as acetaminophen) is suggested for reducing fever and relieving pain in dengue patients rather than NSAIDs. 1779 is the year in which we have the first descriptions of an epidemic. At the beginning of the 20th century, its viral source and propagation were already well recognized. Since the end of the Second World War, dengue fever has spread around the world to the point that it is now endemic in more than 120 countries, mostly in Southeast Asia, South Asia, and South America. Every year, there are around 390 million new cases of infection, of which roughly 500,000 need hospitalization and 40,000 result in fatalities [7-8]. In 2019, there was a noticeable spike in the total number of instances that were observed [9]. In addition to getting rid of the mosquitoes that spread the disease, researchers are working on drugs that will specifically target the virus [10]. The World Health Organization has categorized it as a neglected tropical illness [11].

1.5. Signs and symptoms

Dengue may be asymptomatic or cause relatively moderate disease [18], 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." [19].

1.5.1 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 [20]. 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 [21-22]

1.6. Cause

1.6.1 Virology

The dengue fever virus, also known as DENV, is a member of the RNA viral family Flaviviridae and the flavivirus genus. The yellow fever virus, the West Nile virus, the Zika virus, the St. Louis encephalitis virus, the Japanese encephalitis virus, the tick-borne encephalitis virus, the Kyasanur forest disease virus, and the Omsk hemorrhagic fever virus are all other viruses that belong to the same genus as the Zika virus [23]. The majority are arthropod-borne, such as those carried by mosquitoes and ticks, and as a result, they are also known as arboviruses (arthropod-borne viruses). The genome, or genetic material, of the dengue virus contains 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 the seven other non-structural protein molecules (NS1, NS2a, NS2b, NS3, NS4a, NS4b, and NS5) that are only present in infected host cells and are necessary for the replication of [24-25] There are five different strains of the virus, which are referred to as serotypes. The first four strains are known as DENV-1, DENV-2, DENV3, and DENV-4, respectively. The announcement of the fifth kind took place in 2013. The antigenicity of the different serotypes is the factor that is used to differentiate between them [26].

1.6.2 Transmission

The Aedes mosquitoes, and particularly the Aedes aegypti species, are the most common carriers of the dengue virus and are responsible for its widespread distribution. These mosquitoes may be found in places with latitudes between 35 degrees north and south if the elevation is less than 1,000 meters (3,300 ft). Even though they are most active in the morning and evening, infections may spread at any time of the day. However, the morning and evening are when they are most likely to succeed [27]. Other species of Aedes that are known to be responsible for the transmission of the disease include Aedes albopictus, Aedes polynesiensis, and Aedes scutellaris. Although the virus is most often seen

infecting humans, it has also been discovered infecting other species of primates. [28] Even one bite might potentially transmit an infection. After feeding on the blood of an infected person for the first two to ten days of the feverish phase, the dengue fever virus multiplies in the cells that line the stomach of a female mosquito that has contracted the illness from that human.

After 8–10 days, the virus has spread to other areas of the mosquito and is now present in its salivary glands. It has also found its way to other parts of the host. The virus does not seem to have any effect on the health of infected mosquitoes over their whole lifetimes. The *Aedes aegypti* mosquito plays a crucial part in the spread of the disease because it prefers human surroundings, deposits its eggs in artificial water containers, and virtually exclusively feeds on people. On the other hand, blood transfusions and organ transplants both have the potential to propagate the dengue virus. The risk is estimated to be between 1.6 and 6 out of every 10,000 blood transfusions in countries and regions where dengue fever is common, such as Singapore [29]. There has been documented evidence of instances of vertical transmission (from mother to child) of the disease either during the process of conception or delivery. Reports of sexual transfer and other kinds of transmission from person to person are very uncommon. However, the virus's genetic diversity is site specific, which suggests that growth into new area is a rare event. Dengue has developed in new locations during the last several decades; however, this is a relatively recent trend [30].

1.6.3 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. [31].

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. [32] 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 [33].

1.7. Diagnosis

The diagnosis of dengue is almost always done clinically, on the basis of the patient's reported symptoms as well as a physical examination; this is particularly true in locations where the disease is prevalent. On the other hand, early stages of the illness might be difficult to distinguish from other viral diseases. The presence of fever in addition to two other 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 someone who lives in an endemic region, establishes a high level of probability for the diagnosis [34].

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 inch²; the tourniquet test is particularly useful (6.25 cm²) [35]. 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. [36] Zika fever also includes symptoms that are comparable to dengue fever [37]. 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 [38].

1.7.1 Examining in the laboratory

The diagnosis of dengue fever may be verified by the use of microbiological tests in the laboratory [39]. Virus isolation in cell cultures, nucleic acid detection using PCR, viral antigen identification (for example, for NS1), or detection using particular antibodies are all viable options for doing this (serology). Antigen detection is less reliable than virus isolation and detection using nucleic acid, yet antigen detection is nevertheless commonly used since virus isolation and nucleic acid detection are more accurate. The detection of NS1 during the febrile phase of a primary infection may have a sensitivity of higher than 90 percent; however, in subsequent infections, this number drops to between 60 and 80 percent. In the early stages of the illness, none of the tests could come back positive. The first week after an infection is when PCR and viral antigen detection are at their most accurate. It was announced in 2012 that a PCR test could be done on equipment that was already being used to detect influenza; this is anticipated to enhance access to PCR-based diagnosis [40]. With the exception of serology, these laboratory tests are only useful for diagnostic purposes during the acute phase of the patient's disease. In the latter stages of the illness, it may be helpful to confirm a diagnosis using tests that look for antibodies specific to the dengue virus, of the kinds IgG and

IgM. After five to seven days, the production of IgG and IgM begins. Following a first infection, the levels (titres) of IgM are at their greatest, however IgM may also be generated following a subsequent infection. IgM is undetectable between 30 and 90 days after the first infection, although it happens much sooner after subsequent infections. IgG, on the other hand, may be detected even when more than sixty years have passed since the infection, making it a helpful sign of previous illness even in the absence of symptoms. IgG levels in the blood reach their highest point somewhere between 14 and 21 days following an initial infection. The levels reach their peak more quickly and the titres are often greater in successive re-infections. IgG and IgM antibodies, when combined, provide a protective immune response against the infecting serotype of the virus [41]. When testing for IgG and IgM antibodies, there is a possibility of cross-reactivity with other flaviviruses, which may result in a false positive after recent infections or vaccinations with yellow fever virus or Japanese encephalitis. This possibility exists because flaviviruses are closely related to each other [42]. If blood samples are taken 14 days apart and a larger than fourfold rise in levels of particular IgG is identified, then the discovery of IgG alone may be deemed diagnostic. The presence of symptoms in a person is required for a diagnosis to be made using IgM testing [43].

1.8. Pathophysiology

The bite of a mosquito that is infected with dengue virus may spread the disease from one person to another. It does this by invading white blood cells, where it then proceeds to multiply as the cells move about the body. The reaction of the white blood cells to the infection is to produce a variety of signaling proteins, such as cytokines and interferons. This is the root cause of many of the symptoms, including fever, symptoms similar to the flu, and severe pain. Severe infections lead to an increase in the generation of viruses inside the body and may cause the infection to spread to further organs, such as the liver and the bone marrow. Because of the permeability of the capillary walls, blood fluid may leak out of the blood arteries and into various places throughout the body. Because of the decreased amount of blood that can flow through the arterial system, low blood pressure causes the heart and other vital organs to receive an insufficient amount of blood. The second significant repercussion of dengue fever is bleeding, which may take place as a direct result of the disease's effect on the stromal cells that are found in the bone marrow [44].

1.8.1 The Reproduction of Viruses

The dengue virus, after it has broken through the epidermis, seeks for and infects the Langerhans cells (a population of dendritic cells in the skin that identifies pathogens). The attachment of viral proteins to membrane proteins on the Langerhans cell, namely the C-type lectins DC-SIGN, mannose receptor, and CLEC5A, paves the way for viral entry into the cell. It indicates that dendritic cells are the predominant entry point, and the DC-SIGN receptor, which is a non-specific receptor for foreign material on dendritic cells, seems to be the key point of entry. This dendritic cell is making its way to the lymph node that is the most nearby for storage purposes. In the meanwhile, the machinery responsible for the synthesis of proteins within the cell is producing new viral proteins, which duplicate the viral RNA and start the process of the production of viral particles. On the endoplasmic reticulum, these proteins are translated from the DNA of the virus into vesicles that are surrounded by a membrane. Because some proteins get their sugar chains in the Golgi apparatus, immature virus particles have to be carried there (glycoproteins). The process of exocytosis is what sets off the discharge of the freshly formed viruses. Once they are inside, they have the potential to infect other kinds of white blood cells, such as monocytes and macrophages [45].

Infected cells produce interferon in response to a viral infection. Interferon is a cytokine that stimulates the manufacture of a diverse collection of proteins through the JAK-STAT pathway, therefore enhancing a variety of innate immune responses. It would seem that some serotypes of the dengue virus have built-in mechanisms to slow down the progression of this process. Additionally, interferon activates the adaptive immune system, which results in the production of antiviral antibodies and T cells that specifically target and destroy infected cells. Various antibodies are produced, some of which bind tightly to viral proteins and direct them toward phagocytosis (the

ingestion of specialized cells and subsequent destruction), while others appear to deliver the virus into a region of the phagocytes where it is not destroyed but can replicate further. phagocytosis is the process by which specialized cells consume other cells and destroy them [46].

1.8.2 Severe disease

In the process that is known as antibody-dependent enhancement, the increased likelihood of contracting a viral infection is due to the fact that antibodies bind to viral particles and Fc gamma receptors that are formed on immune cells (ADE). Although the reasons for this are not completely known, subsequent infections with a different strain of the dengue virus might potentially result in dengue hemorrhagic fever and dengue shock syndrome. The notion of immune-dependent improvement has received the most support and is now the leading contender (ADE). It has not been determined what exactly causes ADE at this time. There are a number of potential explanations, one of which is that antibodies that do not neutralize the virus do not effectively bind to it, and as a result, they are sent to the wrong part of the white blood cell where the virus may be killed [47]. In the pathogenesis of severe dengue-related sequelae, T cells and soluble factors including cytokines and the complement system have been demonstrated to play a role. This adds to the accumulating body of data that suggests ADE is not the only mechanism at play. Disorders in capillary permeability, which refers to the speed at which fluid and proteins in the blood may pass through the capillaries, as well as blood coagulation issues, are indicators of a severe disease. These changes seem to be connected to a situation of disorganization within the endothelium glycocalyx, which is a molecular filter of blood components. It is believed that a response from the immune system causes leaky capillaries, which in turn leads to the critical phase. In addition to their significance, necrotic infection cells are influential in the processes of coagulation and fibrinolysis, which are respectively responsible for blood clotting and the breakdown of clots [48].

1.9. Prognosis

The majority of persons who have dengue fever make a full recovery without any long-term complications. In patients with severe dengue, the risk of mortality ranges from 0.8% to 2.5%; however, this risk is reduced to less than 1% with appropriate treatment. Those who acquire extremely low blood pressure, on the other hand, have been shown to have a mortality rate that may reach up to 26%. Children under the age of five have a mortality rate that is four times higher than older children and adolescents (those aged 10 and above). People who are elderly are also at a larger risk of having a negative result [63].

1.10. Management

Dengue is a disease that cannot be treated with particular antiviral medications; nonetheless, it is essential to have a healthy fluid balance. The treatment will be determined by the symptoms. Those individuals who are able to drink, are able to pass pee, do not have any "warning symptoms," and are otherwise healthy may be maintained at home with oral rehydration treatment and daily followup visits. Patients who have other health issues, have "warning symptoms," or are unable to handle frequent follow-up should be cared for in a hospital [59]. Care for those who have severe dengue should be offered in an area where there is access to an intensive care unit. In the event that it is necessary, intravenous hydration is normally only required for one or two days. The rate of fluid delivery is then titrated to a urinary output of 0.5–1 mL/kg/h, stable vital signs, and

normalization of hematocrit in children who are in shock as a result of dengue. [60] In children who are in shock as a result of dengue, a fast dosage of 20 mL/kg is appropriate. It is advisable to use the minimum quantity of liquid necessary to accomplish this goal. In light of the potential for bleeding, invasive medical procedures such as nasogastric intubation, intramuscular injections, and artery punctures are avoided. Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided since they may increase the risk of bleeding. Paracetamol, often known as acetaminophen, is used to treat fever and pain. People who present with unstable vital signs in the face of a decreasing hematocrit are given blood transfusions as soon as possible, rather than waiting for the hemoglobin concentration to decrease to some predetermined "transfusion trigger" level [61]. Packed red blood cells or whole blood are recommended, whereas platelets and fresh frozen plasma are typically not given. [Citation needed] There is not enough information to evaluate whether or not corticosteroids have a beneficial or detrimental impact on dengue fever at this time. In order to avoid reaching a condition of fluid overload during the recovery phase, intravenous fluids are stopped being administered. If there is a risk of fluid overload and the vital signs are not changing, discontinuing the administration of any more fluids may be all that is required. If a person is outside of the critical phase, a loop diuretic like furosemide may be used to clear excess fluid from the circulation. Furosemide is one example of this kind of medication [62].

1.11. 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: [49]

- 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 [50]. 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) [51]. 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 [52].

1.11.1 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 [53]. 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 [54]. There is some indication that it may make future infections more severe in those who have never had an illness before. Even in geographical locations where the illness is prevalent, Prescrire 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 [55]. The three dosages that are advised will set you back around 207 dollars when purchased in Indonesia. [59] Study on vaccinations is ongoing despite the limitations of the currently available vaccine; the fifth serotype may be considered as part of this research. One of the main concerns is that a vaccination might, via antibody-dependent augmentation, increase the likelihood of a serious illness occurring (ADE). The ideal vaccination is one that does not cause adverse effects, is effective after one or two doses, protects against all possible serotypes, does not contribute to adverse drug reactions, is simple to carry and store, and is inexpensive while still being cost-effective [56].

1.11.2 Anti-dengue day

On June 15 of each year, people throughout the world commemorate International Anti-Dengue Day. In 2010, those involved came to an initial consensus on the concept, and the following year, in 2011, the first gathering was held in Jakarta, Indonesia. Additional activities were placed in Yangon, Myanmar, in 2012, and in Vietnam, in 2013, respectively. [57] The public's knowledge of dengue fever will be increased, resources will be gathered for the illness's prevention and management, and Southeast Asia will show that it is serious about combating the disease. These are the goals [58]

Chapter Two

Literature review

- 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 [67]

- In tropical and subtropical areas, dengue viruses (DENV), which are flaviviruses carried by arachnids, induce severe systemic illness. 1-3 Although the majority of dengue virus infections are asymptomatic, An official national guideline for the clinical treatment of dengue syndrome has been created in Bangladesh and is being used to handle dengue cases at all levels of medical institutions. Therefore, training on dengue guidelines for medical professionals throughout the year, especially before dengue season, may help in better managing dengue patients [68].

- 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. 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 [69].

Chapter Three

Purpose of the Study

3. Purpose of the study

- i. To see the current treatment of Dengue fever in Bangladesh.
- ii. To follow up the current scenario of Dengue Fever.
- iii. To know, what people think about Dengue fever.
- iv. To open a new area of higher studies.

Chapter Four

Methodology

4.1. Study Population and period

The survey opens with an overview and 16 pertinent questions. This study is looking for 112 participants between the ages of 20 and over 40. This research was conducted in the Bangladeshi city of Mirpur during the month of January 2023 to April 2023.

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 gathering a variety of data, each piece was examined for accuracy and internal coherence to rule out any missing or inconsistent pieces, and those were then deleted. Information research was conducted using Microsoft's popular updated version.

4.4. Ethical Considerations:

The members of the investigation were spoken to and given the go-ahead verbally for the information gathering process. The respondents' identities were kept secret, and participants in the study were informed that they might opt out of the program at any time.

4.5. Survey Question:

1. Patient Name
2. Gender
 - i. Male
 - ii. Female
3. Occupation
 - i Student
 - ii Job Holder
 - iii Business
 - iv. Others

4. Education Level

- i. College Student
- ii. Undergraduate student
- iii. Postgraduate student

5. Your Age

- i. Under 20 years old
- ii. 20-40 years old
- iii. Upper 40 years old

6. Location

- i. Rural
- ii. Urban

7. Do you know about Dengue?

- i. Yes
- ii. No

8. Did you suffer from Dengue?

- i. Yes
- ii. No

9. How long have you suffered from Dengue?

- i. 1 week
- ii. 2 weeks
- iii. More than 2 weeks

10. What do you think about the cause of Dengue fever?

- i. Aedes species
- ii. Leak of drainage system

iii. Stuck of kitchen water in home

11. Do you ever suffer the severity of dengue?

i. Yes

ii. No

12. Which symptoms you have suffered most for dengue beside fever?

i. Rash

ii. Breathless

iii. Lower platelet

iv. All of this

13. Do you know about hemorrhagic dengue fever?

i. Yes

ii. No

14. Which type of medical therapy do you take for dengue?

i. Paracetamol tablet 4 times

ii. Intravenous fluid

iii. Platelet infusion

iv. All of this

15. Do you know the preventative management of dengue?

i. Yes

ii. No

16. Do you think dengue can control by prevention?

i. Yes

ii. No

Chapter Five

Result and Discussion

5.1 Result

In total of 116 people have participated in this survey who were lived in Mirpur, Bangladesh.

5.1.1 Gender

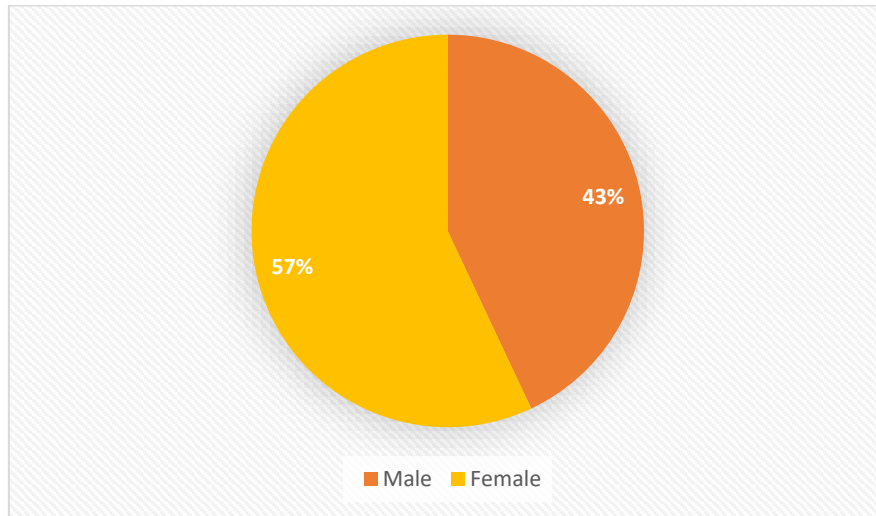


Figure 5.1.1: Gender

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

5.1.2 Occupation of the responders

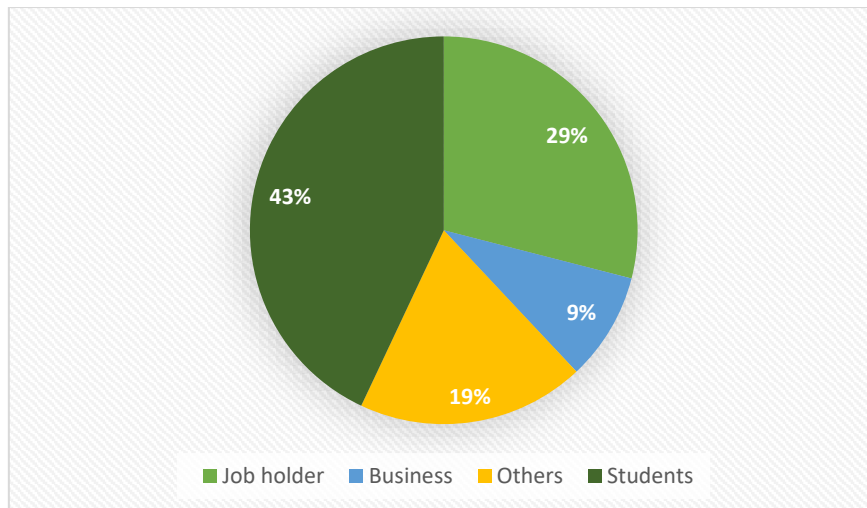


Figure 5.1.2: Occupation

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.

5.1.3 Education level

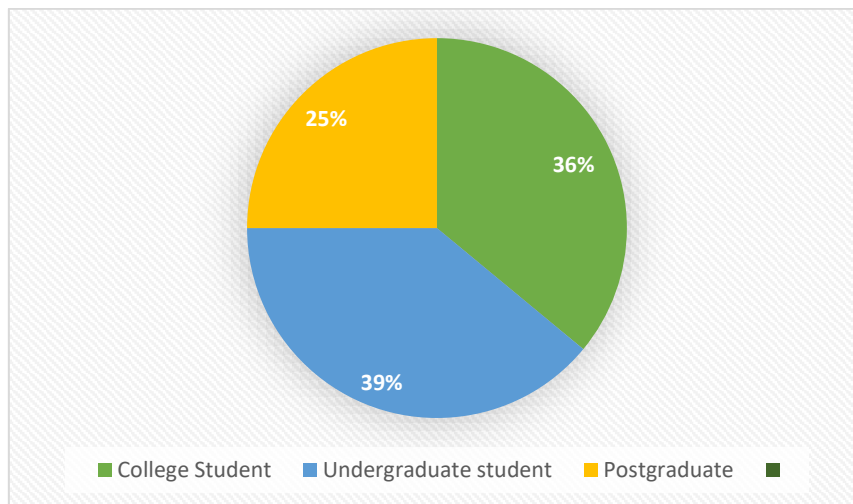


Figure 5.1.3: Education level

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

5.1.4 Age

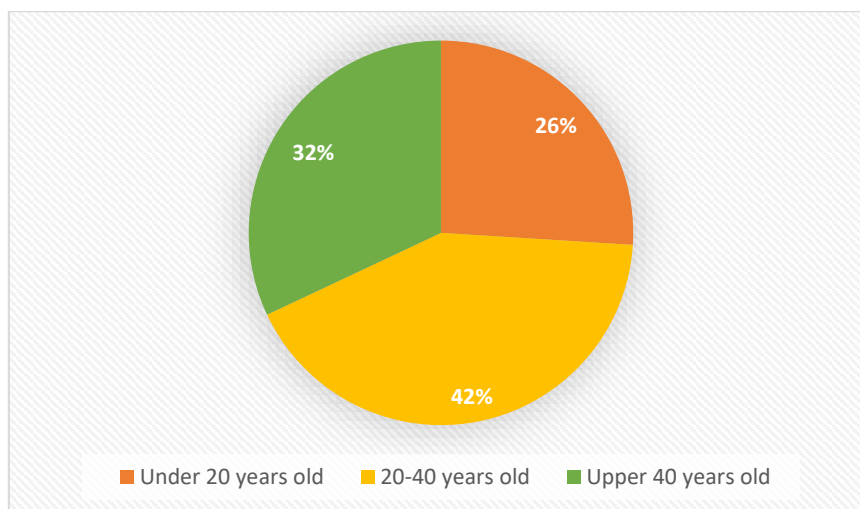


Figure 5.1.4: Age

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.

5.1.5 Location

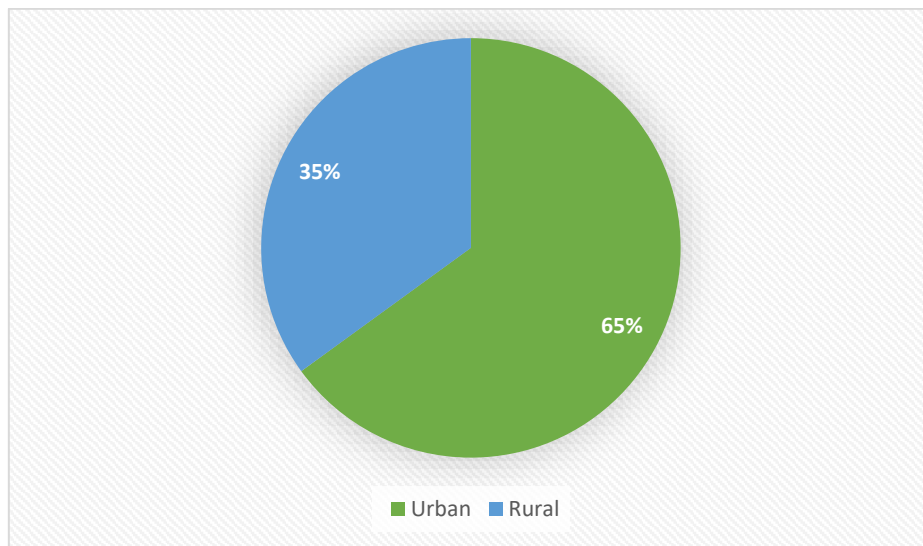


Figure 5.1.5: Location

Around 65% of the responders of this study belongs to urban area and 35% from rural.

5.1.6 Knowledge about the dengue

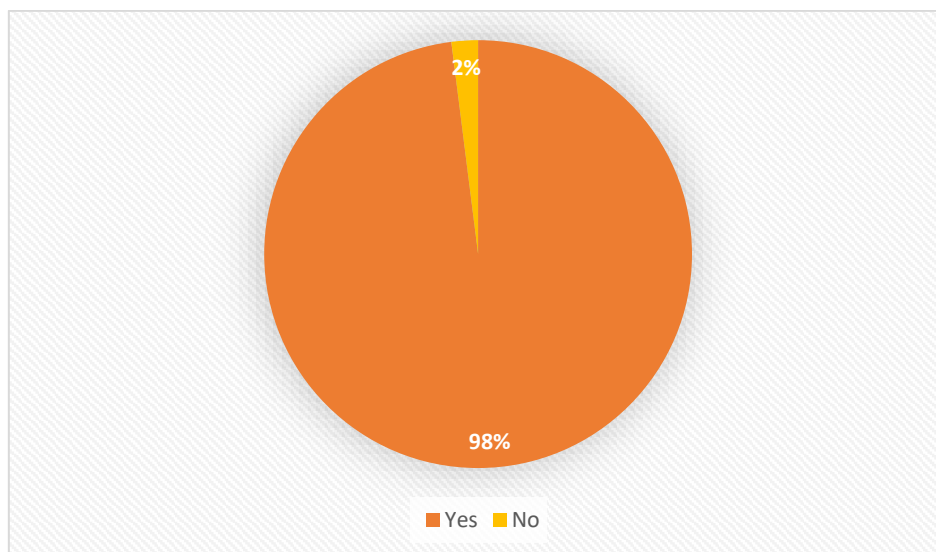


Figure 5.1.6: Knowledge about the dengue

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

5.1.7 Suffering from dengue

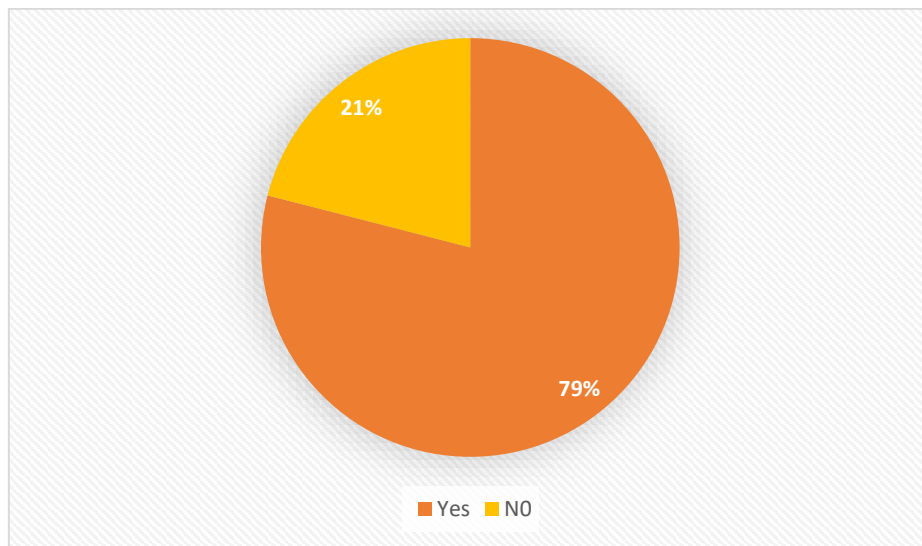


Figure 5.1.7: Suffering from dengue

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

5.1.8 Duration of suffering from dengue

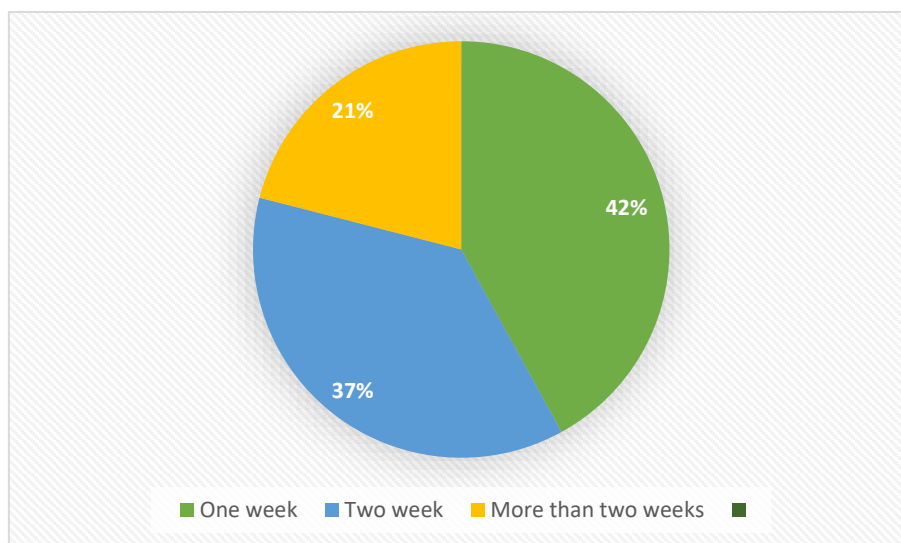


Figure 5.1.8: Duration of suffering from dengue

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.

5.1.9 Cause of dengue

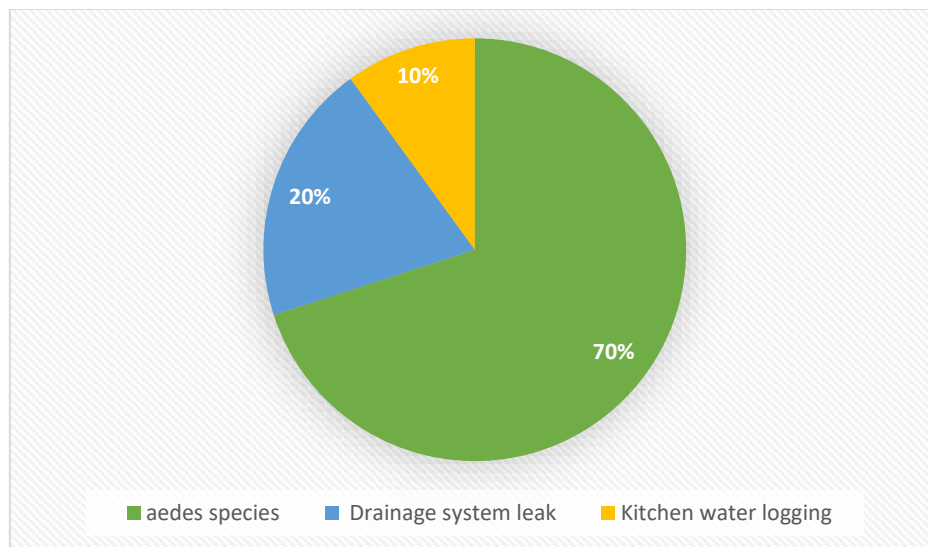


Figure 5.1.9: Cause of dengue

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.

5.1.10 Suffering from severe dengue

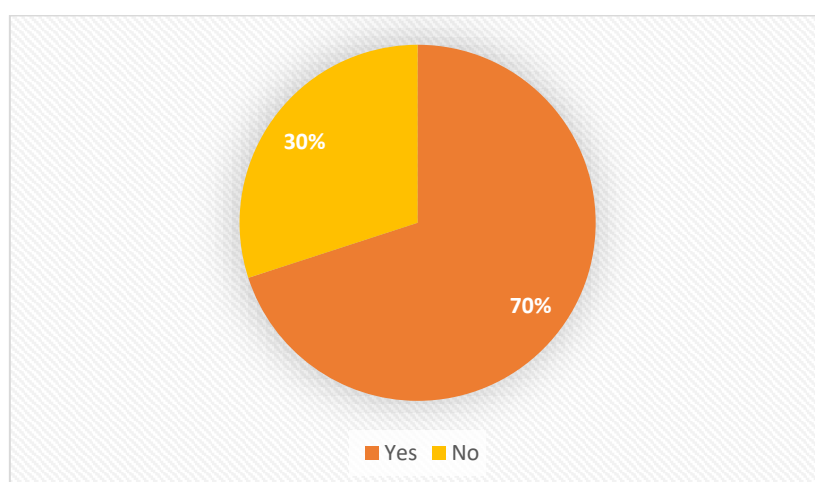


Figure 5.1.10: Suffering from severe dengue

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

5.1.11 Symptoms of dengue suffered by respondents beside fever

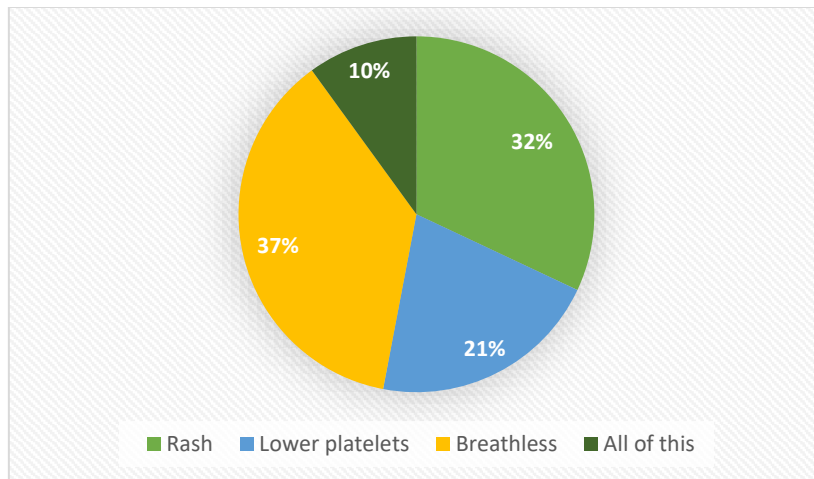


Figure 5.1.11: Symptoms of dengue suffered by respondents beside fever

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.

5.1.12 Knowledge of hemorrhagic dengue fever

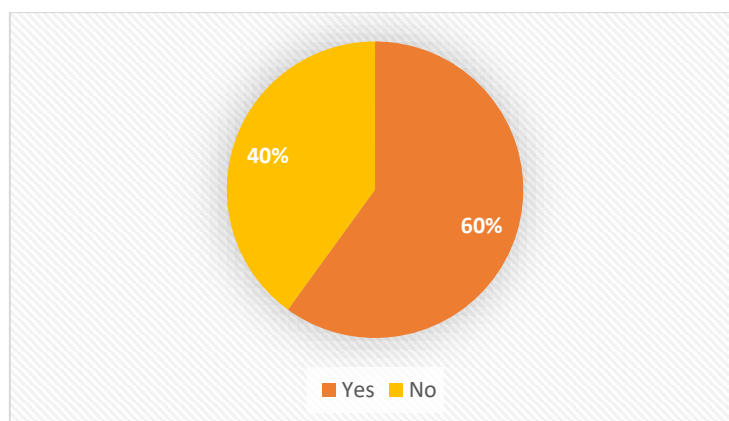


Figure 5.1.12. Knowledge of hemorrhagic dengue fever

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

5.1.13. Medications for treating dengue fever

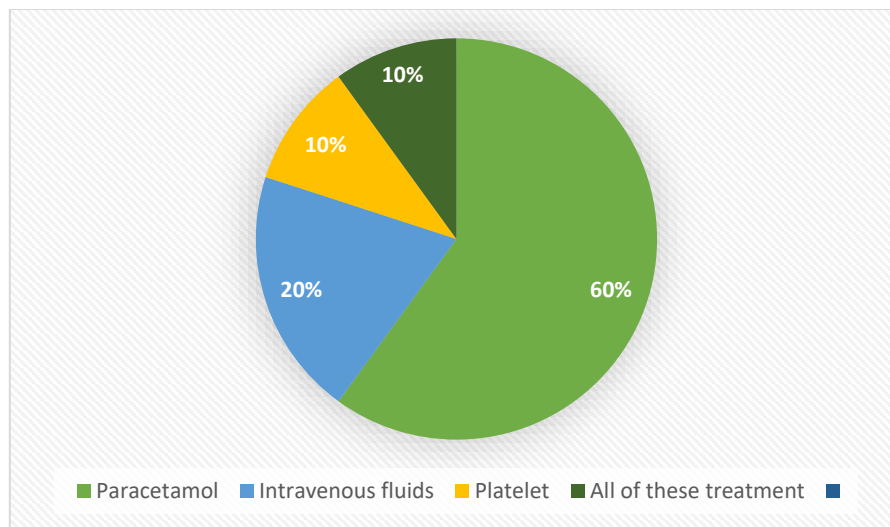


Figure 5.1.13: Medications for treating dengue fever

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.

5.1.14 Knowledge about prevention of dengue

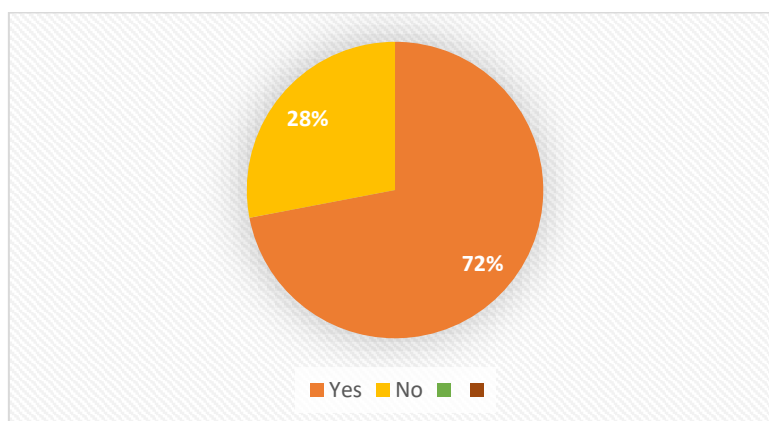


Figure 5.1.14 Knowledge about prevention of dengue

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

5.1.15 Respondents thought about control of dengue by prevention

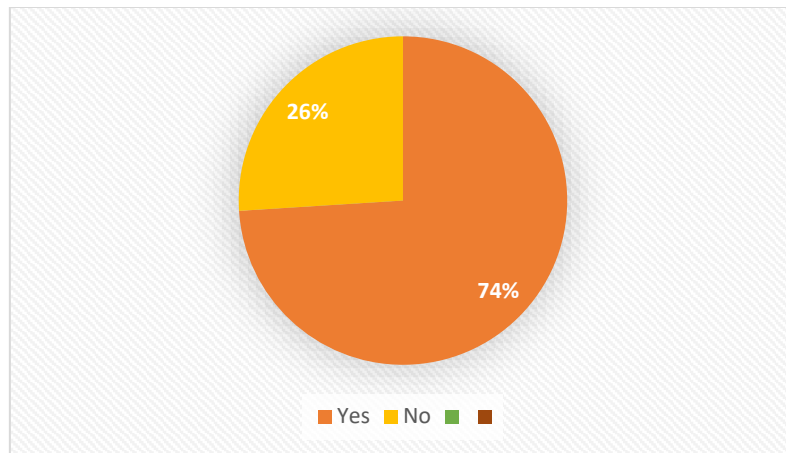


Figure 5.1.15: Respondents thought about control of dengue by prevention

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.

5.2 Discussion

In this study in total of 112 people participated from Mirpur, Bangladesh. Where 43% of respondents were men and 57% of respondents were women. More women than men reply to the surveys. The majority of these responders were undergraduate students. Most them had age between 20 years to 40 years and they belong to the urban area. Similar research has been done in nine different Bangladeshi regions where the majority of participants (93.8%) have heard of dengue. Incorrectly, 45.7% of the study's participants thought that Aedes could breed in tainted water. Fever symptoms were the most prevalent sign of dengue, and they were seen in 36.6% of patients []. In this study, In this study, nearly all of the respondents knew about dengue and 60% respondents has knowledge about hemorrhagic dengue fever. Almost 70% of respondents claimed that the increase in aedes species was the cause of dengue and 79% of participant had affected by dengue fever and about 37% of participants reported having experienced severe dengue, while another 63% said they had not experienced any severe dengue. In order to cure dengue, roughly 60% of respondents said they had taken paracetamol tablets four times. Another 20% said they had also gotten intravenous fluids, 10% had platelet infusions, and a final 10% had received all of these treatments. A research found that more than half of the population had some knowledge of dengue (mean percentage scores were 52%), had a favorable attitude toward the illness (69.2%), and 71.4% of the people took preventative measures []. In this study also around 72% respondents has knowledge about prevention of dengue fever and 28% respondents has no knowledge about prevention of dengue. 74% of respondents agreed in this survey that dengue can be controlled by preventative measures.

Chapter Six

Conclusion

6. Conclusion

In conclusion, This study revealed that dengue transmission is higher in the urban area than in rural and people in urban areas are at high risk to get affected by dengue fever. But the satisfying thing is the majority of people in this study has known about dengue fever. But the still one-third of this population have no idea about the preventative measures. The Bangladesh health authority may utilize our results to enhance its DF control and preventive programs.

Chapter Seven

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