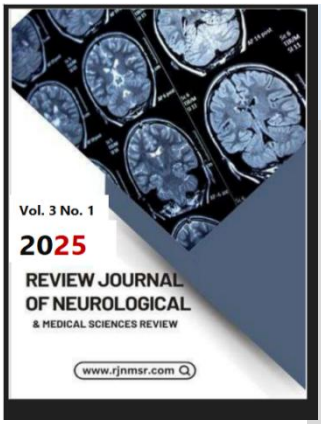

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Prevalence and Epidemiological Investigation of Dengue Fever Cases in Abbottabad

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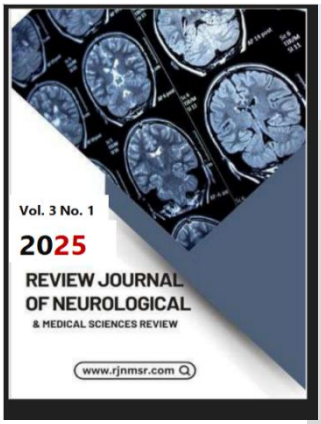

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Abstract

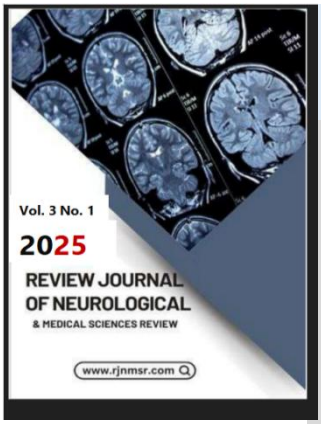
Dengue is a mosquito borne viral disease that spread through mosquito bite into human which is now endemic in more than 100 countries and is regarded as the threat to public health results in heavy socio-economic burden on a large number of tropical, subtropical and temperature region of the World. According to research, 50% of people on Earth reside in dengue-prone areas. The World Health Organization estimates that 20 million individuals contract dengue each year, and that 2.5 billion individual's roughly half of the world's population—are at risk of contracting the disease. The purposes of this investigation are to determine the incidence, prevalence, and contributing factors of dengue fever as well as the community's level of awareness of the disease. This epidemiological investigation was carried out using information gathered from 315 dengue fever patients in the Abbottabad district's CMH (Combined Military Hospital) and AMC (Ayub Medical Complex). According to the questionnaire's design, the participants were questioned on a variety of subjects including their residence, risk factors, symptoms, and basic information. The participants were primarily split into five age groups and two groups, one for each gender. Males (75%) are more likely than females (25%) to contract dengue because they engage in more outdoor endeavors, according to the current study. Dengue fever was more common among individuals in the 16–30 age range (34%). Additionally, it was noted that more instances have been reported since the beginning of the monsoon. In October, 91% of instances had been documented. This study also demonstrates that elderly individuals (33%) and those with low platelet counts suffered more than the others. In the same year, there were 20 recorded deaths from dengue fever. In Pakistan, DENV continues to pose a serious threat to public health and appears to be endemic for some time. In order to prevent and manage dengue outbreaks in the future, the Department of Public Health may take the appropriate actions. The people should be made aware of the need of maintaining a clean environment and urged to take part in the fight against illnesses and infections that are spread by vectors.

Key words: Dengue fever, Outbreak

Introduction

Dengue is an acute viral infection with potential fatal complications. Dengue fever was initially introduced as "water poison" associated with flying insect (Delghandi *et al.,* 2020). Acute viral infections like dengue can have fatal consequences. At first, dengue illness was referred to as "water poison" linked to flying insects (Mutheneni *et al.,* 2017). Originally in Africa, Aedes aegypti expanded throughout its many locations. As daytime biters, Aedes mosquitoes attack before the sun sets and before morning. When a mosquito consumes dengue from an infected person, the virus multiplies in its salivary gland for eight to ten days (the incubation period) before spreading to another person during a subsequent blood meal (Brown *et al.,* 2014).

Dengue belongs to Flaviviridae family in the genus flavivirus whose genome is positive sense single-stranded RNA (Durrani *et al.,* 2017). The genome of the dengue virus (DENV) is around 11 kb in size. There are four distinct serotypes of the dengue



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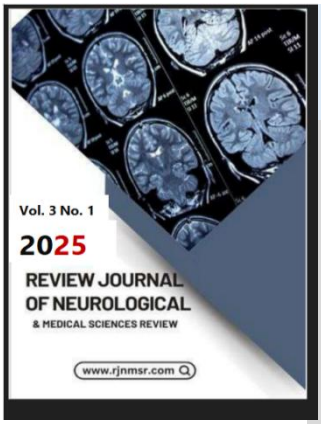
virus that differ from one another antigenically: DEN-1, DEN-2, DENV-3, and DENV-4 (Harapan *et al.,* 2020). Mild dengue fever, severe dengue-hemorrhagic fever, and deadly dengue shock syndrome are the three primary stages of the dengue virus. Dengue fever frequently causes flu-like symptoms like rash, muscular aches, and excruciating headaches (Haroon *et al.,* 2019). After three to seven days, some patients may enter a critical phase, which might lead to multi-organ failure and plasma leakage. Blood platelet counts might drop below 20,000 (Wiemer *et al.,* 2017). Around 3.6 billion people are at risk of contracting dengue sickness each year, with the virus infecting people in more than 100 nations. Each year, dengue virus outbreaks happen in many parts of the world, such as the Americas, Africa, and Australia. They also impact people who are traveling from areas where the virus is prevalent (Pierson and Diamond, 2020).

The first dengue virus outbreaks were documented in Egypt, Cairo, Indonesia, and Jakarta in 1779. Four dengue serotypes are present throughout the year in Pakistan, with the largest outbreaks occurring in the months of September through November, which follow the monsoon season. In Lahore, a dengue outbreak started in 2011. In Hubb (Baluchistan), all three dengue virus serotypes cause a severe epidemic (Wu *et al.,* 2011). The first two serotypes of the dengue virus were identified in Swat (Khyber Pakhtunkhwa) in 2013. Three serotypes of dengue (serotypes 1, 2, and 3) were present during the 2013–14 outbreak in Mansehra and Swat. In Pakistan, the mosquito that spreads dengue fever most frequently is Aedes aegypti (Rasheed *et al.,* 2013).

Specific and sensitive tools for diagnosis that are suitable for specific illness stages When there is a DENV infection, virus isolation is crucial. New ELISA and rapid immunochromographic (IC) techniques were utilized to identify primary and secondary DENV infection up to nine days after the illness started (Guzman *et al.,* 2016). Serological tests to detect IgM and IgG, such as the hemagglutination inhibition (HI) assay and ELISA, are the most commonly employed are the most commonly employed to diagnose dengue fever in developing countries because they are the specimens required are stable at room temperature (Wilder-Smith *et al.,* 2019).

There are presently no specific therapies or treatments for dengue fever. One of the most crucial dengue fever treatments is fluid therapy. Oral fluid replacement is enough for DF, while intravenous fluid replacement is advised for severe dengue in order to prevent shock. Vector control is the primary method of avoiding dengue infections (Messina *et al.,* 2019). This is accomplished by chemical control with larvicides and insecticides. Both manmade and natural vectors must be reduced or eliminated as part of environmental improvements. Unmaintained garbage facilities and containers are two instances of man-made vector breeding sites (Halstead, 2019).



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Materials and Method

Study Area and Data Analysis

This epidemiological investigation was carried out using data gathered from the Ayub Medical Complex (AMC) and Combined Military Hospital (CMH) in the Abbottabad district between July and October of 2022. Prior to the trial, all participants and their guardians submitted their informed permission. Various cases that were admitted to both hospitals in July and August were appropriately assigned to a designated and restricted dengue patient unit. According to the questionnaire's design, the participants were questioned on a variety of topics, including their place of residence, risk factors, symptoms, and basic information.

Questionnaire

A total of 315 clinical samples and patient data across a range of age groups of both males and females were evaluated.

Name---------- Gender----------

What is your age?

1-15, 16-30, 31-45, 46-60, above 60

What is your occupation?

Full time /Part time / Housewife / unemployed / Student

Can you identify Aedes mosquito?

Yes / No

Do you know where Aedes mosquitoes come from?

Yes / No

Do you know the symptoms of dengue?

Yes / No

Have you experienced dengue before?

Yes / No

Have any of your family members suffered from dengue before?

Yes / No

Is your residence area was ever sprayed for remains of mosquitoes' eggs?

Yes / No

Have you ever attended awareness about dengue before?

Yes / No

Were you infected before?

Yes / No

How long have you been getting treatment?

Less than a month / More than a month

Does your house have mosquito prevention elements?

Yes / no

Do you know the time when Aedes mosquito is active?

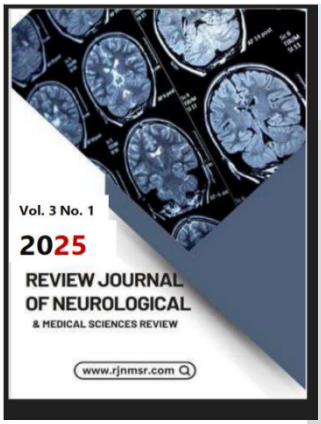
Yes / No

Do you spend more time out of home after evening?

Yes / No

Are you living in poor drainage area?

Yes / No



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Which symptom do you think is more dangerous for you?
Bleeding / Fever / Shock
Do you agree that visiting the Doctor or hospital for proper diagnosis is important?
Yes, Strongly Agree, No, Disagree
Is dengue fever so dangerous that will take life?
Yes / No/Don't Know
Is there any treatment or vaccine?
Yes / No/Don't Know
Do you accept prevention is better than treatment in case of dengue virus transmission?
Yes, Strongly Agree, No, Disagree

Results

Data from 315 dengue fever patients at CMH and AMC Abbottabad were gathered for this study between July and October of 2022. Male and female participants were primarily split into two groups, and their ages (years) were assigned at random to the following groups: 1–15, 16–30, 31–45, 46–60, and over 60.

Table 1: Age wise Distribution of Participants

Groups	Age in years
First group	1-15
Second group	16-30
Third group	31-45
Forth group	46-60
Fifth group	above 60

Males accounted for 236 (75%) of the high number of instances, while females made for 79 (25%) of the total.

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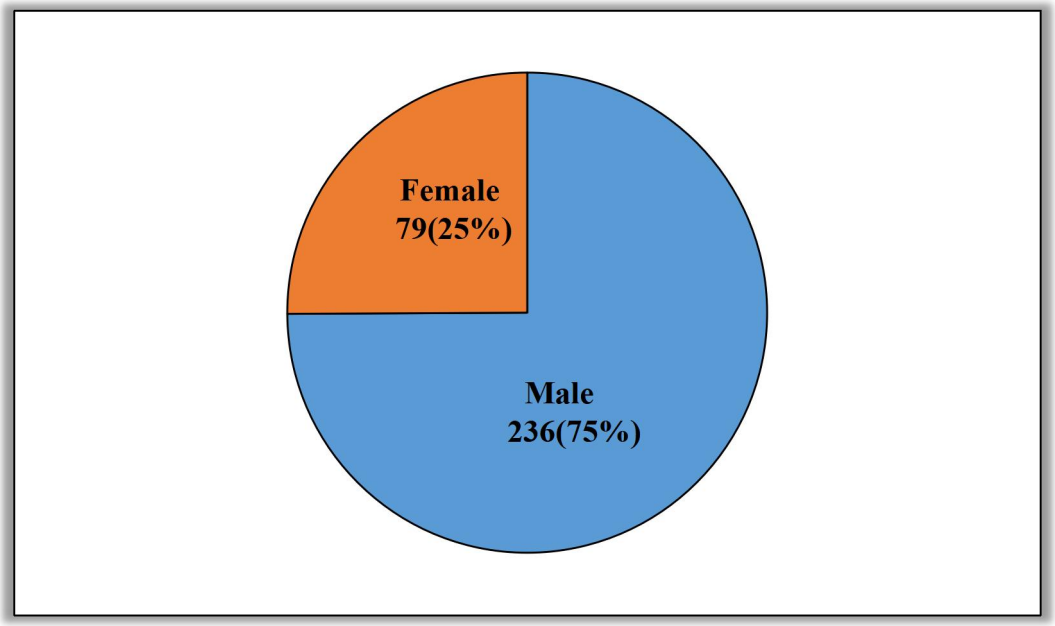


Figure 1: Representation of Number of Cases among Males and Females

16–30 years old had the highest number of cases (107, 34%), followed by 46–60 years old (92, 29%), 31–45 years old (85, 26%), 1–15 years old (24, 7%), and those above 60 years old (7, 2%).

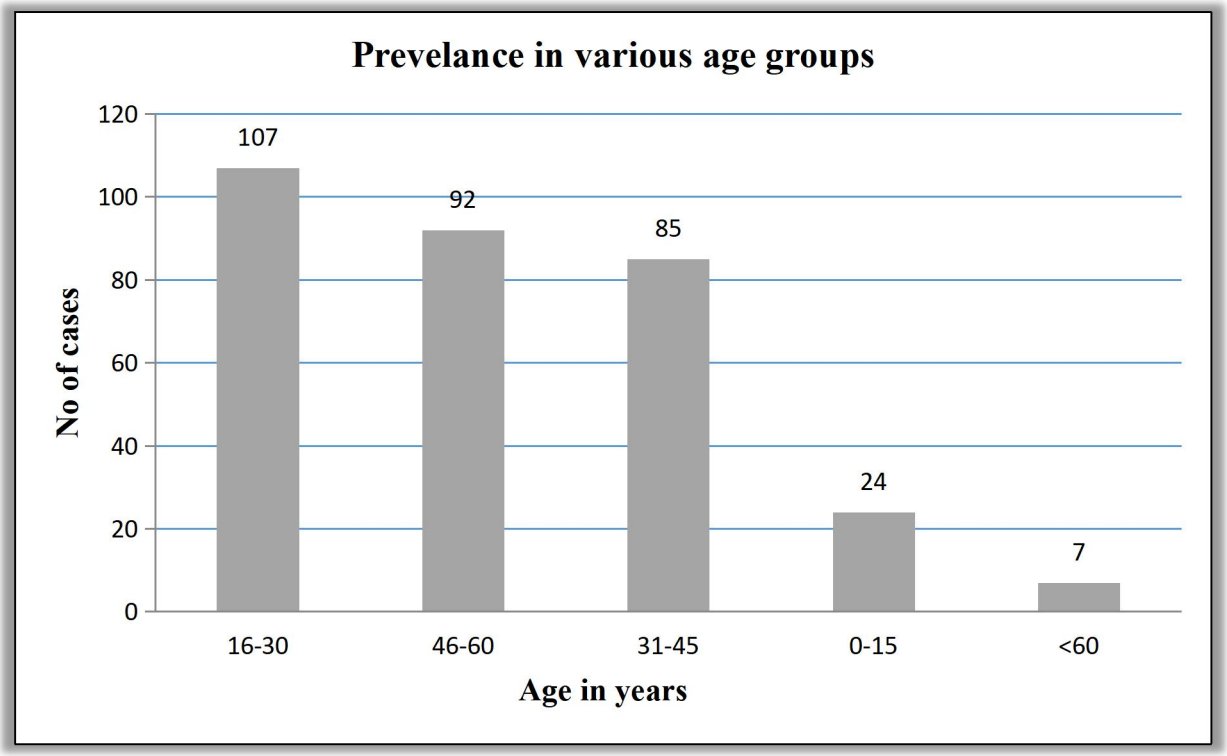
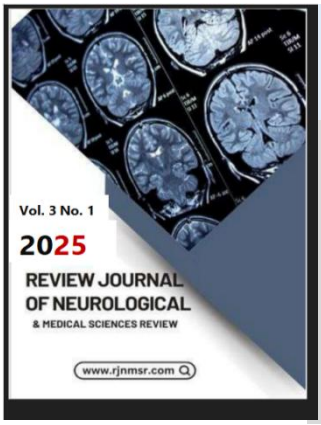


Figure 2: Representation of Number of Cases in Different Age Group



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Although men were more likely to engage in outdoor activities, the current study observed that the proportion of males (75%) was greater than the percentage of girls (25%). In addition, the cases were divided according to the months of July, August, September, and October. Only three (01%) confirmed cases were recorded in July and August. Additionally, it was noted that more instances have been reported since the beginning of the monsoon. The likelihood of standing water has increased as a result of Abbottabad's growing population and extensive building without an adequate drainage infrastructure. This issue led to an increase in cases in September (08%) and October (91%).

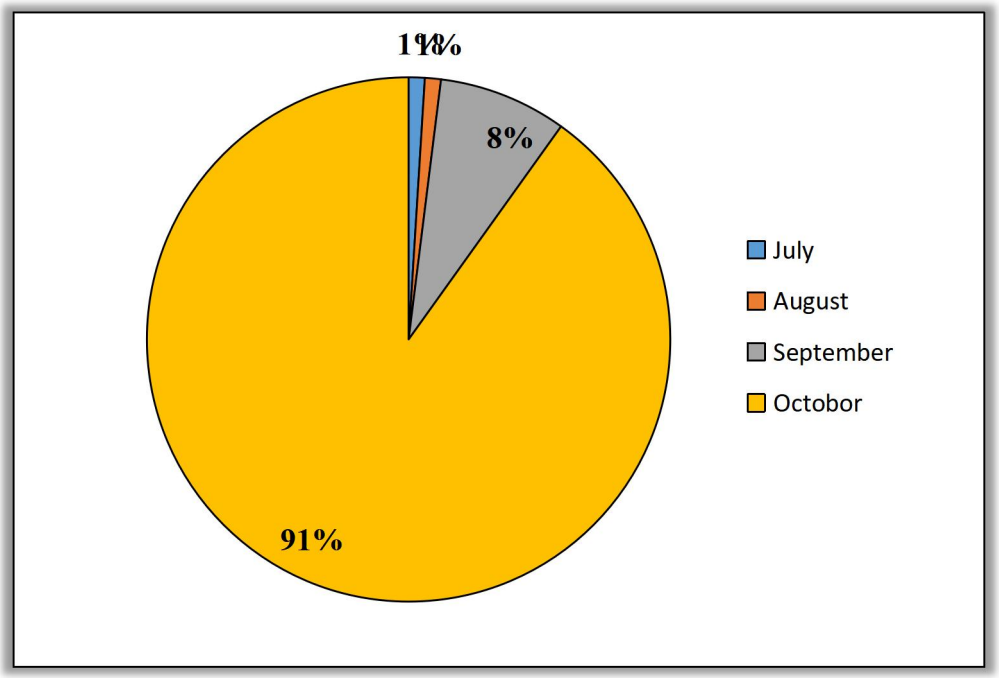
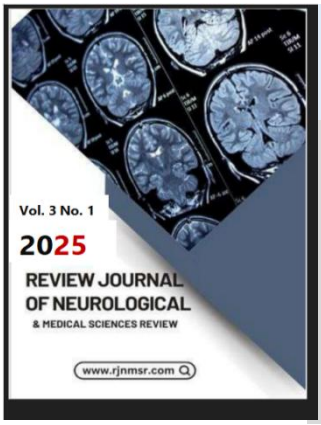


Figure 3: Representation of Number of Cases on the Basis of Time (Month)

This study also demonstrates that elderly individuals (33%) and those with low platelet counts suffered more than the others. In the same year, there were 20 recorded deaths from dengue fever.

Discussion

Dengue is a single-stranded RNA virus that has four distinct serotypes (DEN-I–IV) and causes dengue sickness. The primary way that the Dengue Virus (DENV) is spread to people is by mosquito bites, particularly from Aegypti mosquitoes, which are prevalent in Pakistan in the late summer. In the past 50 years, the prevalence of dengue fever has increased thirtyfold, making it one of the illnesses that spreads the fastest in the globe (Ali *et al.,* 2019). Dengue is considered a public health problem that causes significant socio-economic burden in many tropical, subtropical, and temperate regions of the world. It is now endemic in over 100 countries in Africa, America, Asia, and the Western Pacific. According to estimates, 50% of people on Earth reside in dengue-prone areas. The World Health Organization estimates that



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20 million individuals contract dengue each year, and that 2.5 billion people, or over half of the world's population, are at risk of contracting the disease (Amjad Ali *et al.,* 2019).

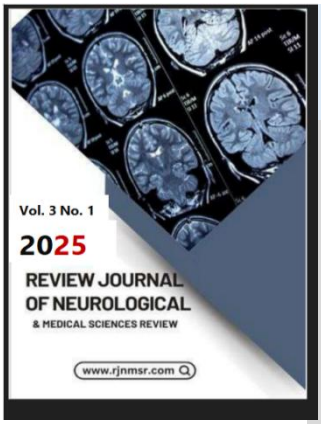
The climate in Abbottabad, which is in Pakistan's northern region, is nearly ideal for mosquito breeding. Dengue is more common in tropical, warm, humid, and rural regions of the world than it is elsewhere. Although dengue does not exist in freezing climates like the Arctic, 50% of the world is at danger of contracting the disease. The virus adheres to human cells and kills them, and mosquitoes are primarily responsible for the transmission of DENV in humans. The virus replicates in white blood cells (Roy and Bhattacharjee, 2021).

The current study was carried out using data gathered from the Abbottabad district's CMH (Combined Military Hospital) and AMC (Ayub Medical Complex). A total of 315 clinical samples and patient data from a range of age groups of both males and females were observed. Similar study was conducted by Khan *et al.,* 2015 it displays 400 patients in total. Data were gathered to determine the dengue virus ratio in the population of men and females. Our research indicates that a greater proportion of instances were seen in males than in females. This finding is consistent with findings of another study by Mehmood *et al.*, 2021 which shows prevalence of dengue is higher in males as compared to female in Punjab. This may be explained by the fact that, in Pakistani society, men are more likely to engage in outdoor activities and are hence more susceptible to infection. The study's findings indicated that the 16–30 age range was most impacted. Our results are consistent with those of earlier research by (Khan *et al.*, 2018).

Additionally, it was noted that more instances have been reported since the beginning of the monsoon. As a result, there were more instances in September and October, which is according to research by Ali *et al.,* (2017) that indicates that numerous dengue virus infections were observed in humid environments between July and September. Water stagnation can be the primary cause of this. According to Rowe *et al.,* (2014), dengue was more severe in older patients with low platelet counts, which is consistent with our findings.

Conclusion

Dengue is spreading quickly and is a hazard to public health everywhere, especially in Pakistan. In this epidemiological survey, we gathered information from 315 dengue fever patients in Abbottabad's CMH and AMC districts. According to the study's findings, dengue is more common in men than in women, and it also affects individuals who are elderly and have low platelet counts. People in the 15–30 age range were most impacted. The majority of dengue cases were documented in October. In the same year, there were 20 recorded deaths from dengue fever. DENV has been a serious public health concern in Pakistan for a very long time. If preventative measures against the dengue epidemic are not taken, there is a risk that the infections will worsen in the future. Therefore, in order to prevent and control dengue in the future, the KPK Department of Public Health may take the necessary steps. It is crucial that teams of young male and female volunteers obtain the proper training at the union council level in addition to increasing awareness since the KPK



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local governments might have a big influence on the battle against dengue fever. Water storage in open containers must be prohibited, and district administrations must give priority to replenishing stagnant water reservoirs. Teachers, community elders, and other powerful people should be made aware of the seriousness of the problem in order to get their cooperation.

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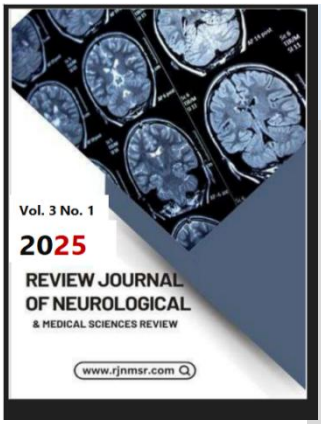

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