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Perception And Preparedness Towards Dengue in Rampur Bushahr (H.P.): A KAP Study Among College Youth

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Abstract
Dengue is one of the most dangerous mosquito-borne diseases in the world today. Dengue fever, a mosquito-borne viral disease, is becoming an increasing public health concern in India, including regions previously considered low-risk such as Rampur Bushahr in Himachal Pradesh. This study was conducted to assess the level of knowledge, attitude, and preventive practices (KAP) regarding dengue among students of Government College Rampur Bushahr, following the region's first significant outbreak in 2024. A cross-sectional survey was carried out using a structured online questionnaire, which was completed by 120 randomly selected students from various disciplines.
The findings revealed a generally high level of awareness about dengue transmission, symptoms, and prevention. Most respondents recognized mosquito bites, specifically from *Aedes* mosquitoes, as the primary mode of transmission and identified common symptoms such as fever, joint pain and body aches. Preventive measures like using mosquito repellents, covering water containers, and proper waste disposal were commonly practiced. However, gaps in knowledge and behavior were also observed. Some participants held misconceptions, such as believing dengue to be contagious or linked to dirty water. Moreover, while most students acknowledged the seriousness of dengue, only a small portion regularly eliminated standing water or participated in mosquito control activities.
The study highlights the need to bridge the gap between knowledge and action through targeted awareness programs, especially those that correct misconceptions and encourage consistent preventive behaviors. Given their strong willingness to participate in awareness campaigns, students can be valuable agents of change within their communities. Strengthening health education and community involvement is essential for effective dengue control, particularly in newly affected regions like Rampur Bushahr.

Key words: 1. Dengue 2. KAP 3. Rampur Bushahr

Introduction

Dengue accounts for 17% of all infectious diseases globally. The word dengue originally came from a Swahili term that describe painful cramps. In 1789, Benjamin Rush called it "Break bone fever" due to intense joint pain it causes. The term "dengue fever" officially came into use after 1828. The first record of a case of probable dengue fever is in a Chinese medical encyclopedia from Jin Dynasty (265-420AD)

which referred to a "water poison" associated with flying insects. By 1906, scientists confirmed that *Aedes* mosquitoes were responsible for spreading dengue fever. In 1907, it was proven that dengue, like yellow fever, was caused by a virus. Later dengue hemorrhagic fever was reported in the Philippines in 1953 and then in South America in 1981. Environmental factors such as urbanization, climate change and globalization have significantly contributed to the increased transmission and spread of dengue worldwide. Dengue fever is a viral infection caused by dengue virus belonging to Flaviviridae family. Dengue virus has four serotypes, DENV-1, DENV-2, DENV-3, DENV-4. It is mainly spread by the *Aedes* mosquito bite. When an infected mosquito bites a person, it injects the virus into their blood which then causes fever and other symptoms. Secondary transmission can also occur through blood transfusion, organ donation, or from mother to child during pregnancy. A big challenge with dengue is that it is often hard to detect early and because of this delay, the infection progresses to more severe forms like D**engue Hemorrhagic Fever (DHF)** or **Dengue Shock Syndrome (DSS)**, which can lead to serious complications and death if not treated properly.

Dengue virus does not spread directly from person to person. It only spread through mosquito bites. Therefore, preventing mosquito bite is the only way to stay safe. Prevention and treatment strategies mainly focus on mosquito control, reducing human-mosquito contact, and supportive clinical management, as there is currently no specific antiviral treatment for dengue. Dengue vaccines however have been developed but their use is limited by various factors, including pre-existing immunity in populations. Dengue affects people of all ages, but poorer communities are more vulnerable. According to World Health Organization (WHO) about 390 million people get infected each year, 40% of the world's population is at risk. Sadly around 22,000 people, mostly children, die from dengue each year (according to a 2015 WHO report). Before the 1970s, dengue was reported in only 9 countries. But now, dengue is found in over 110 countries around the world. India accounts for a significant proportion of the global dengue burden, with outbreaks reported almost every year, especially during and after the monsoon season (July- October).

In India, Delhi is considered the capital of dengue fever outbreaks. People with weaker immune systems and those getting dengue for the second time are at higher risk of developing severe dengue. Rapid urbanization, inadequate vector control, poor waste management and climatic conditions conducive to mosquito breeding have worsened the situation. States such as Kerala, Maharashtra, Delhi, Punjab and Uttar Pradesh frequently report high numbers of dengue cases. According to the National Vector Borne Disease Control Programme (NVBDCP), ten thousand cases are recorded annually.

Himachal Pradesh, a northern state with a temperate climate, witnessed alarming dengue outbreaks in recent years. Previously considered low-risk due to its cooler, high-altitude geography, the state reported over 1200 cases in 2021, especially in Kangra, Mandi, and Shimla districts. In 2023, the number of cases increased further, with Kullu and Solan emerging as new hotspots (HP Health Department, 2023). In 2024, Rampur Bushahr in Shimla district, HP, experienced its first significant dengue outbreak. Over 500 cases were reported, with the outbreak beginning around August 21 and peaking 700 in the last week of September. According to the National Vector Borne Disease Control Programme (NVBDCP), Himachal Pradesh reported 3,359 dengue cases in 2024, with no associated deaths. The reasons of increasing dengue outbreaks in Himachal Pradesh are perhaps due to Climate change, Urbanization and Tourism.

Many studies have used KAP surveys in countries with lots of dengue, especially in Southeast Asia, like Malaysia and the Philippines. To understand how well people know and deal with dengue, researchers often use KAP survey. KAP stands for:

- Knowledge: what people know about dengue?
- Attitude: what they believe about it.
- Practices: what they do to prevent it.

These surveys help measure how aware and prepared people are. KAP surveys have been used since the 1950s and are now common in public health research.

Literature Review

Dengue is a vector-borne disease caused by infection with an arbovirus. It is currently the most common and widespread arboviral infection globally, occurring in at least 128 countries, with an estimated 4 billion people at risk (WHO, 2015). Over the years, dengue has grown from being a seasonal disease to a major global concern. According to Singh *et al.,* (2018), dengue outbreaks now happen regularly, especially during and after the rainy season. This is when mosquitoes breed more due to stagnant water. The dengue virus has four different types: DENV-1, DENV-2, DENV-3, and DENV-4. A person can get infected up to four times in their life, once by each type. Getting infected by one type gives lifelong protection only against that type. But if someone gets infected a second time by another type their chances of getting severe dengue (like bleeding or shock) increase. This is because of a phenomenon called antibody-dependent enhancement (ADE), where the body's immune system reacts too strongly (Zafar *et al.,* 2022; Singh *et al.,* 2018). Most people who get dengue have high fever, severe headache, pain behind the eyes, joint and muscle pain, nausea, vomiting, skin rash and fatigue but in some cases, the disease becomes severe and leads to Dengue Hemorrhagic Fever (DHF) or Dengue Shock Syndrome (DSS) which can lead to death. According to Bhatt *et al.,* (2013) quick diagnosis and supportive care can save lives, especially in children and elderly patients.

According to the World Health Organization (WHO) nearly 500,000 people worldwide develop severe forms of dengue annually, requiring hospitalization and about 2.5% of them succumb to the disease. Overall, it is estimated that around 390 million dengue infections occur globally each year, of which approximately 92 million manifests clinically (symptomatic cases). In India, the trend of dengue infections has risen sharply since 2001 dengue was earlier considered an urban or semi-urban disease, but recent studies suggest that it has spread extensively to rural regions as well (Krishnamoorthy *et al.,* 2018). According to the data provided by the National Vector Borne Disease Control Programme (NVBDCP) till October 2022, India recorded approximately 110,473 dengue cases with 86 deaths (Bhadake *et al.,* 2023) suggesting that in India, dengue is now endemic and has become a significant public health problem. As per the reports of Tribune (20 September, 2024), Rampur Bushahr (Shimla district, H.P.) witnessed its first major dengue outbreak. Over 500 cases were reported from August to September, peaking with nearly 700 cases. Surprisingly, Rampur Bushahr, a traditionally cold region, experienced this surge, mainly attributed to climate change, urban expansion, and increased tourist influx.

There are many reasons of frequent dengue outbreaks. Rapid urbanization leads to crowded cities with poor drainage and more mosquito breeding sites. Climate change (warmer temperatures and more rain) helps mosquitoes multiply. Travel and migration spread the virus from one region to another. Poor sanitation and stagnant water in homes, streets, and containers give mosquitoes a place to breed (Sharma *et al.,* 2022). Singh *et al.,* (2018) points out that dengue outbreaks happen in cycles, usually every 3–5 years, and are worse during rainy seasons.

There is no specific medicine to cure dengue. So, prevention and mosquito control are the best ways to reduce the disease. All studies agree that controlling mosquitoes is the most effective method. Khetan *et*

al., (2018) and Sharma *et al.,* (2022) explain several control methods like cleaning and emptying containers that hold water. Using mosquito nets, repellents and screens. Spraying insecticides during outbreaks and educating the public about how to reduce mosquito breeding. Some new methods are also being tested, like using Wolbachia-infected mosquitoes, which can block the virus inside the mosquito, and genetically modified mosquitoes (Montenegro-López, D. *et al.,* 2024). But these are still under research and not used everywhere. Making a vaccine for dengue is hard because of the four types of viruses. The only available vaccine, Dengvaxia, works well for people who have already had dengue once, but can cause severe illness in people who have never had it (Singh *et al.,* 2018; Zafar *et al.,* 2022). That's why many countries are careful in using it. Scientists are still working on better vaccines that can protect everyone, but these are still being tested and are not available yet (Bhatt *et al.,* 2013).

Dengue not only causes sickness and death but also creates a heavy economic burden. Hospitals get overcrowded, and families spend a lot on treatment. Sharma *et al.,* (2022) explain that during outbreaks, people miss work, students miss school, and governments spend a lot on mosquito control. In low-income areas, this makes life even harder. Bhatt *et al* (2013) and Singh *et al.,* (2018) stress that dengue is not just a local issue—it's a global one. Everyone must work together to prevent and control it. Keeping in view the rapid emergence of dengue in new regions, it is critical to assess public awareness, attitudes, and practices related to dengue prevention. Understanding the gaps between knowledge and actual preventive behavior is essential to design effective intervention programs, particularly in areas like Rampur Bushahr, where dengue outbreaks are a new phenomenon.

Understanding community Knowledge, Attitude, and Practices (KAP) related to dengue is essential for designing effective public health interventions (Shuaib *et al.,* 2010). Studies have shown that while awareness about dengue is generally high in endemic regions, misconceptions about its transmission and prevention persist (Al-Zurfi *et al.,* 2015). For example, a study conducted in Philippines found that although 93% of participants had heard of dengue, only 30% were aware of its specific symptoms and warning signs, highlighting the gap between general knowledge and accurate understanding (Yboa & Labrague, 2013). This lack of detailed knowledge can hinder early diagnosis and timely medical intervention (Dhimal *et al.,* 2014). Attitude plays a crucial role in shaping behavior toward disease prevention. Research in India indicated that many people consider dengue a serious disease, but they still don't take steps to protect themselves such as using mosquito repellents or covering water containers (Balami & Said, 2020). Similarly, despite favorable attitudes, many communities rely solely on government action for vector control rather than taking personal responsibility (Naing *et al.,* 2011). Practice, the final component of KAP, often lags behind knowledge and attitude. For example, in a study conducted in Nepal., even among people who were knowledgeable about mosquito breeding sites, only a minority practiced regular elimination of stagnant water (Dhimal *et al.,* 2014). This indicates a critical gap between awareness and behavior. That's why researchers suggest doing regular KAP surveys. These helps identify what people don't know, where they have wrong beliefs, and how to encourage better habits (Itrat *et al.,* 2008). With this information, health departments can make better awareness campaigns that truly work for local people.

In India, KAP studies have revealed significant regional variation. A study conducted in Delhi found that urban residents had higher levels of knowledge but poorer preventive practices compared to rural populations, possibly due to differences in lifestyle and environmental exposure (Acharya *et al.,* 2005). KAP studies among students are especially important, as youth can act as agents of change in their communities. Research shows that students often have good theoretical knowledge but lack practical

engagement in dengue prevention, pointing to the need for action-based education (Kalaivani *et al.,* 2020). KAP studies help the government create better health programs that fit the local situation and improve people's actions (Rosenbaum *et al.,* 1995).

Methodology

With this background, the present study was conducted to assess the Knowledge, Attitude, and Practices (KAP) related to dengue fever among the students of Government College Rampur Bushahr and to find out where improvements are needed to guide further health education programs.

Study design and study area

It was a cross-sectional observational study, conducted to evaluate the knowledge, attitude and practices (KAP) regarding dengue fever among students at Govt. College Rampur Bushahr, located in the Shimla district of Himachal Pradesh, India, with an elevation approximately 1,021 meters above sea level with temperature range of about 15°C to 30°C with little rainfall during summers, 10°C to 25°C with heavy rainfall during monsoons and from 2°C to 15°C with minimal rainfall during winters. A total of 120 student participants were selected through random sampling to ensure a representative mix in terms of age, gender, year of study and background (rural/urban).

Inclusion criteria: Students enrolled at G.B. Pant Memorial Govt. College, Rampur Bushahr, those who gave consent to participate and had access to a Smartphone or computer to complete the online questionnaire

Exclusion criteria: Students who were absent during the data collection period and who gave incomplete responses.

Data collection: Data was collected using a structured questionnaire developed through Google forms (https://forms.gle/mQibN7JJcE7P547S8). The questionnaire was divided into four sections viz. Demographic information, Knowledge of dengue, Attitude towards dengue and Preventive measures

Ethical consideration: Participant's privacy and confidentiality were maintained throughout the study and participation was voluntary and no personal identifies were collected.

Data Analysis: Data from close-ended questions i.e. multiple-choice questions were analyzed using descriptive statistics (e.g. percentages) to summarize the prevalence of disease and the use of preventive measures.

Limitations of the study: The study was limited to a single college and may not reflect KAP levels to other regions.The use of an online form may have excluded students with limited internet access.

Results and Discussion

The present KAP study related to dengue fever among students at G.B. Pant Memorial Government College, Rampur Bushahr demonstrates generally a high level of awareness but also reveals several knowledge gaps and inconsistencies in preventive behaviors that warrant attention. In this survey, most participants (91.67%) stated that they had heard about dengue but 7.5% had no idea, indicating widespread awareness of the disease. A similar study conducted by Sharma et al., (2024) in tribal hostels in Bilaspur, Chhattisgarh, found that 95% of people had heard about dengue. The results are very similar, suggesting that people in both areas have a good level of awareness. This indicates that health information about dengue is reaching many people. However, a small number of people in both surveys had not heard of

dengue, highlighting the need for continued efforts to ensure that everyone, especially in remote or hard-to-reach areas, knows about it.

Social media was the main source of dengue knowledge (52.7%), showing the significant impact of digital platforms. This finding is supported by a study conducted in Sudan, (Ahmed et al., 2024), where social media (52.7%) was also the most common source of dengue knowledge. Both studies highlight the growing dependence on digital platforms, while showing that traditional sources such as newspapers and schools play a lesser role. This trend emphasizes the importance of utilizing electronic and social media in public health communication.

In our study 40% of participants correctly believed that dengue is not contagious, while the study conducted in Sudan, (Ahmed et al., 2024) found that 62.4% of people had the correct understanding. These studies reveal that many people still misunderstand how dengue spreads, indicating a need for better awareness.

Regarding specific knowledge, 85% of respondents in the present study correctly identified mosquito bites as the mode of dengue transmission, reflecting a fairly good level of awareness. However, some participants still held incorrect beliefs or were unsure, indicating room for improvement in health education. This finding aligns with a similar study conducted in the western region of Saudi Arabia (Hamed et al., 2024), where 89.3% of participants correctly recognized mosquito bites as the cause of dengue. These findings confirm that public awareness about mosquito bites being the main route of dengue transmission is high, although some misconceptions still persist.

Most participants in our study (62.5%) correctly identified *Aedes* mosquitoes responsible for spreading dengue, showing strong and specific knowledge. This finding is supported by a similar study conducted in Jamaica (Shuaib et al., 2010), where 62.6% of participants also acknowledged *Aedes* mosquitoes as dengue vectors. However, in another study by Sharma et al., (2024), many participants (77.1%) wrongly believed that dengue was spread through dirty water. This misbelief can lead to ineffective prevention efforts. These differences in understanding reflect a knowledge gap likely influenced by varying levels of education, awareness programs, and access to information in tribal regions.

73.3% of respondents identified evening as the peak biting time, followed by 33.3% who selected night. A similar study in Pakistan, (Mohamed et al., 2025) found that 58.1% of respondents correctly selected morning and evening, while 26.2% chose evening and night. Although the evening period was most frequently selected in both studies, some confusion may exist due to a lack of precise time clarity.

In this survey, 45.83% of participants correctly stated that *Aedes* mosquitoes breed in clean stagnant water. This is supported by another study in Pakistan (Mohamed et al., 2025), where 52.7% of participants provided the same answer. In both studies, nearly 50% of students still lacked clarity regarding mosquito breeding sites.

In our data, fever was identified by 84.1% of respondents as a key symptom of dengue. This aligns with a study conducted in Rawalpindi, Pakistan, (Khan et al., 2022), where 70.9% of participants responded similarly. This indicates that awareness regarding key symptoms of dengue is consistent across different regions.

In our survey, 79.17% of respondents identified the rainy season as the most common period for dengue outbreaks. In contrast, the study by Khan et al., (2022) found that only 40.9% of participants believed dengue primarily occurs during the rainy season. This reflects regional differences in perception and possible experience of outbreaks.

Most respondents (48.33%) believed that dengue affects all age groups equally, which is incorrect. However, 31.6% believed that children under 5 years are more likely to be infected. A study by Sharma et al. (2024) reported that participants perceived individuals of extreme age are more vulnerable. According to epidemiological data, children under 5 years are indeed among the most affected due to their weaker immune systems. This contrast highlights the gap between perception and scientific evidence, emphasizing the need for targeted awareness campaigns to correct misconceptions and enhance community preparedness.

In the present study, 75% of respondents believed that a vaccine is available for dengue, indicating a fair level of awareness. However, 25% either believed no vaccine exists or were uncertain. This shows a need for better public education regarding the availability and importance of the dengue vaccine and other preventive strategies.

Regarding dengue re-infection, 67.5% of respondents believed that a person can get dengue more than once. This closely matches the study conducted at Sudan (Ahmed et al., (2024). This consistency suggests a moderate global level of awareness, but improved public education may lead to more effective prevention.

A significant majority (91.67%) believed that dengue is a serious public health issue. This finding closely aligns with a study conducted in Nepal (Bhandari et al., 2024), where 90% of participants agreed that dengue is a serious disease, reflecting a high level of awareness among participants about the severity of the disease.

The majority of respondents in our study (71.67%) believed that dengue control is a shared responsibility of the government, individuals, and healthcare professionals. In contrast, the study by Sharma et al., (2024), found that 61.4% of participants believed individuals alone are responsible, while 32.9% believed both individuals and the government share the role. This difference suggests that awareness levels and understanding of disease control vary among population.

In our study, 72.5% respondents believed that dengue can be prevented, and 50.8% believed they were at risk of getting dengue. The study conducted in Chhattisgarh, Sharma (et al.,) 2024 found that 92.9% believed dengue can be prevented and 85% felt they were at risk. This shows that although awareness about prevention is fairly high in both regions, perception of personal risk remains lower in our study area.

In terms of prevention, 81.6% of people reported using some form of preventive measure to avoid mosquitoes. As per the study conducted in Chhattisgarh (Sharma et al., 2024), 97.1% responded similarly, indicating high level of awareness in both regions.

53.3% of respondents used mosquito coils or vaporizers, while in Sri Lanka (Gayathri et al., 2021), 69.6% of participants used mosquito nets. This suggests that people's choices may depend on accessibility and comfort with specific preventive tools.

In this survey, 43.3% of participants said they would prefer both using home remedies and visiting a doctor during the early phase of fever. In the Sri Lankan study (Gayathri et al., 2021), most participants preferred to visit a doctor. This indicates a balanced attitude in our respondents, where home remedies are used for relief but the importance of medical consultation is also recognized, which is crucial for proper dengue management.

In our survey, 62.5% of respondents reported occasionally eliminating standing water around their homes, while about 12% never checked at all. This highlights a gap in daily preventive practices and stresses the need for regular action to stop mosquito breeding.

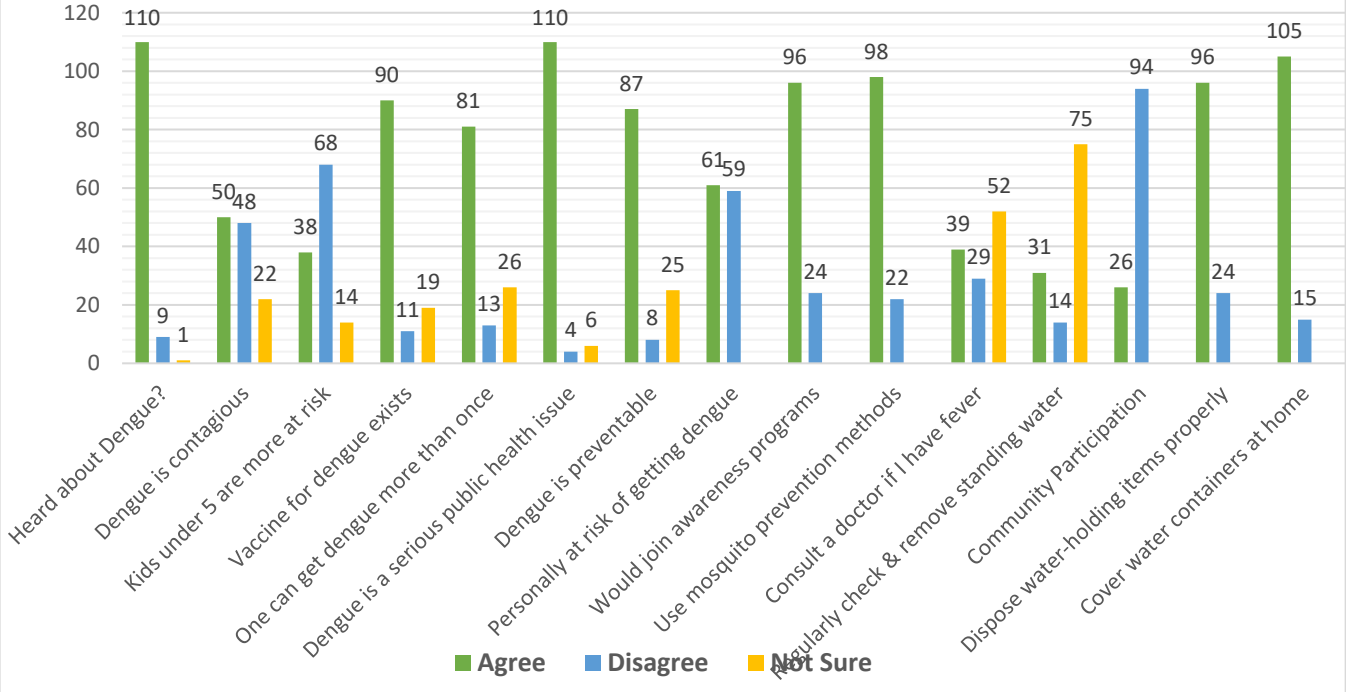
Only 21.6% of respondents in our study had participated in mosquito control activities, whereas the study in Maharashtra (Bhadake et al., 2023) found that 99% of people had done so. This significant gap, indicates to the need for more locally organized and accessible mosquito control programs.

In our study, 80% of respondents reported properly disposing of water-holding items, while the same study conducted in Maharashtra (Bhadake et al., 2023) found that majority (97%) of respondents properly dispose such items, reflecting a generally high but improvable level of awareness and practice regarding mosquito breeding prevention.

Our findings also showed that 87.5% of respondents regularly covered water containers. These practices are consistent with findings from Southern Thailand (Suwanbamrung et al., 2021), which reflects good dengue prevention habits.

To increase awareness in groups with lower risk perception, health education programs, social media campaigns, and community meetings can be useful. In our study, a large number of respondents (80%) expressed willingness to participate in dengue awareness initiatives, showing a positive attitude and eagerness towards building a healthier society.

Overall, the students showed a good level of general knowledge and a positive attitude toward dengue prevention, but their actual practices do not always match their understanding. This gap between knowledge and action needs to be addressed through better health education. More awareness campaigns are needed, especially those that explain the facts in simple language and involve students directly through activities like clean-up drives, street plays, or workshops. Since most students use digital media, messages shared through social media, YouTube, or mobile apps can also be effective. If colleges support and guide students to take real actions, they can become responsible and active participants in controlling the spread of dengue in their own communities. This study makes it clear that while awareness exists, efforts must now focus on turning that awareness into daily habits and community participation. Only then can we effectively protect areas like Rampur Bushahr from future dengue outbreaks.



Distribution of study participants according to their responses in questions related to knowledge, attitude and practice towards dengue.

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