

**Institute of Pharmaceutical Sciences
RKDF University, Ranchi**

SUSHRUT

A MAGAZINE OF PHARMACEUTICAL SCIENCES

Theme: What is Dengue and why it's becoming more common



THIRD EDITION: DECEMBER 2024

Our Mentors...



DR. SUNIL KAPOOR
Chairman
RKDF University, Ranchi

DR. SADHNA KAPOOR
Chancellor
RKDF University, Ranchi



MR. SIDDHARTH KAPOOR
Managing Director
RKDF University, Ranchi

Advisory Committee



SHRI DHARMENDRA SINGH

Member of Executive Committee, PCI
Member, JSPC

PROF. (DR.) S. CHATTERJEE

Vice Chancellor

RKDF University, Ranchi



DR. AMIT KUMAR PANDEY

Registrar

RKDF University, Ranchi

DR. SHEETAL TOPNO

Dean Academics

RKDF University, Ranchi



MR. KANCHAN DEY

Assistant Manager

Cipla, Sikkim

DR. SANTANU BISWAS
Director Research
RKDF University, Ranchi



Editorial Committee

Editor in Chief



DR. FEDELIC ASHISH TOPPO
Principal
Institute of Pharmaceutical Sciences
RKDF University, Ranchi

Associate Editors

MR. MANAB DEY
Assistant Professor
Institute of Pharmaceutical Sciences
RKDF University, Ranchi



MR. MILAN NANDI
Assistant Professor
Institute of Pharmaceutical Sciences
RKDF University, Ranchi

Editorial Members



Mr. Souradeep Dev
Assistant Professor



Mrs. Manju Mehra
Assistant Professor



Ms. Ghazala Aafreen
Assistant Professor



Mr. Saibal Das
Assistant Professor



Ms. Saba Anjum
Assistant Professor

Index

| Sr. No. | Title | Page No. |
|---------|---|----------|
| 01 | Article 1: An Overview Study of Dengue | 5-7 |
| 02 | Article 2: Dengue: An International Health Issue | 7-8 |
| 03 | Article 3: Dengue in Co-morbidity Patients | 9-11 |
| 04 | Article 4: Dengue Virus: A Worldwide Human Peril | 11-13 |
| 05 | Article 5: A Comparison of Dengue in Urban and Rural Settings | 13-14 |

Article: 1

An Overview Study of Dengue

Arpita Dutta

BDS, Consultant Dental surgeon in WB

arpita0802@gmail.com

Abstract

Dengue fever, a mosquito-borne viral disease caused by the dengue virus (DENV), has become a significant global health issue, especially in tropical and subtropical regions. The disease, transmitted by *Aedes* mosquitoes, is responsible for millions of infections annually. Although traditionally considered a disease of urban areas, recent trends show an alarming rise in dengue cases worldwide. This review discusses the nature of dengue, its clinical manifestations, the factors contributing to its increasing prevalence, and measures for its prevention and control. We highlight key drivers of the rise in dengue, including urbanization, climate change, and global travel, and discuss ongoing efforts to control its spread, including the challenges of vector control, vaccine development, and public health infrastructure.

Keywords: Mosquitoes, Vector control, Viral disease, Dengue virus, Dengue

Introduction

Dengue fever is an acute febrile illness caused by one of the four dengue virus serotypes (DEN-1, DEN-2, DEN-3, and DEN-4). It is primarily transmitted through the bite of an infected *Aedes aegypti* mosquito, which thrives in urban and peri-urban environments. The disease is endemic in over 100 countries, with the World Health Organization (WHO) estimating that 390 million people are infected annually, and 96 million cases manifest clinically (WHO, 2022). Dengue has become a major global health challenge, with increasing incidence, especially in tropical and subtropical regions. This review examines the factors contributing to the rising incidence of dengue and discusses the global implications of the disease.^{1,2}

What is dengue?

Dengue is a debilitating viral disease of the tropics, transmitted by mosquitoes, and causing sudden fever and acute pains in the joints. Dengue fever typically presents with a sudden onset of high fever, severe headache, retro-orbital pain, muscle and joint pain, rash, and gastrointestinal symptoms. In severe cases, it can progress to dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS), which are life-threatening. The disease is often misdiagnosed in endemic areas because its symptoms overlap with other febrile illnesses like chikungunya and Zika virus infections.

The virus is transmitted to humans via the bite of an infected *Aedes* mosquito. The mosquito becomes infected when it feeds on the blood of a person who is already infected with dengue. After an incubation period, the mosquito can then transmit the virus to others, often during the peak biting periods (dawn and dusk).³

Symptoms of dengue:

Sudden high fever (up to 104°F or 40°C), severe headache, pain behind the eyes, muscle and joint pain ("breakbone fever"), nausea and vomiting, skin rash, mild bleeding (e.g., nosebleeds, gum bleeding)

While most cases are self-limiting and resolve within 2-7 days, severe dengue (DHF/DSS) can result in shock, organ failure, and death, particularly among children and those with a previous dengue infection.²

Why is dengue becoming more common?

Several interrelated factors have contributed to the increasing global burden of dengue in recent decades. These factors span environmental, social, and biological domains, and understanding them is crucial for designing effective prevention and control strategies.⁶

Urbanization and population growth: Urbanization, especially in tropical regions, has created ideal conditions for *Aedes* mosquitoes. Urban areas often have poor waste management and drainage systems, leading to the accumulation of stagnant water where mosquitoes can breed. The rapid expansion of urban populations also increases human exposure to infected mosquitoes. As urban areas become more densely populated, the potential for dengue outbreaks increases.

Climate change: Climate change has altered the distribution and abundance of *Aedes aegypti*, expanding its range into previously unaffected regions. Warmer temperatures shorten the mosquito's life cycle, allowing it to reproduce more quickly, while higher rainfall creates more breeding sites. The spread of dengue to regions previously unsuitable for *Aedes* mosquitoes has been directly linked to climate shifts.

Increased global travel and trade: Global travel and trade have facilitated the spread of dengue virus across international borders. Infected travelers can introduce the virus to non-endemic areas, leading to localized outbreaks. Additionally, mosquitoes can hitch rides on cargo shipments, contributing to the geographic spread of the disease.

Inadequate vector control: Vector control programs in many endemic regions are underfunded, inconsistent, or ineffective. The *Aedes aegypti* mosquito, which is the primary vector of dengue, has adapted well to urban environments and breeds in small, artificial containers such as water storage tanks, tires, and discarded plastic items. Conventional control methods, such as insecticide spraying, have also been hampered by the development of resistance in mosquito populations.

Lack of a universal vaccine: Although a dengue vaccine (*Dengvaxia*) has been developed, it is not universally applicable. The vaccine is only recommended for people who have had a previous dengue infection, as it can cause severe adverse effects in individuals who have not been exposed to the virus before. The absence of a universally effective vaccine leaves much of the population vulnerable to infection.

Improved surveillance and reporting

The apparent rise in dengue cases may partly reflect better detection and reporting. As awareness of the disease increases and diagnostic capabilities improve, more cases are identified, leading to an apparent increase in incidence. Early detection and better reporting systems enable health authorities to respond more effectively to outbreaks, potentially preventing larger-scale epidemics.

Global impact and burden

Dengue fever has become one of the most important mosquito-borne diseases in terms of both morbidity and mortality. The World Health Organization (WHO) reports that over 100 countries are currently affected by dengue, with the highest incidence in Southeast Asia, the Pacific Islands, Latin America, and parts of Africa. The WHO estimates that dengue causes approximately 500,000 cases of severe dengue annually, resulting in 20,000 deaths each year (WHO, 2022).

Dengue not only imposes a significant health burden but also causes substantial economic losses due to healthcare costs, loss of productivity, and the disruption of local economies during outbreaks. In regions with limited healthcare infrastructure, the impact of severe dengue can be devastating.^{4,5}

Prevention and control

The most effective approach to controlling dengue is through vector control, which includes eliminating mosquito breeding sites, using insecticides, and promoting personal protective measures such as mosquito nets and repellents. Public health campaigns aimed at reducing the number of standing water sources in and around homes are crucial.

Community engagement is essential in eliminating breeding sites, as *Aedes* mosquitoes breed in water containers commonly found in households.

Vaccine development is also a key area of focus. While current vaccines like *Dengvaxia* offer some protection, their limited applicability underscores the need for safer, universally effective vaccines that can be used in all populations.³

Conclusion

Dengue is a significant and growing public health problem, with its rising incidence driven by urbanization, climate change, and global mobility. The increasing prevalence of the disease highlights the need for coordinated global efforts to strengthen mosquito control programs, improve surveillance, and develop effective vaccines. Although much progress has been made, the complex factors contributing to dengue's rise require a multifaceted approach that involves governments, public health organizations, and communities working together to combat this global health threat.

References

1. Anyamba, A., et al. (2014). Climate change and the global spread of dengue fever: Implications for the United States. *Environmental Health Perspectives*, 122(7), 710-715.
2. Bhatt, S., et al. (2013). The global distribution and burden of dengue. *Nature*, 496(7446), 504-507.
3. Guzman, M. G., et al. (2016). Dengue: A continuing global threat. *Nature Reviews Microbiology*, 14(2), 66-78.
4. Halasa, Y. A., et al. (2014). The burden of dengue in the Americas: Estimating the number of cases and deaths. *PLOS Neglected Tropical Diseases*, 8(5), e2807.
5. Ritchie, S. A., et al. (2013). Mosquitoes and their control: A comprehensive approach. *Annual Review of Entomology*, 58(1), 213-231.
6. Thomas, S. J., et al. (2016). Dengue vaccine development: Progress and challenges. *The Lancet Infectious Diseases*, 16(10), e306-e316.

Article: 2

Dengue: An International Health Issue

Tridib Mal

Department of Pharmacy, Ranchi Collage of Pharmacy, Jharkhand 834003, India
tridibmal13@gmail.com

Abstract

Dengue is a virus that is spread by mosquitoes, mostly *Aedes aegypti* mosquitoes. It is caused by the dengue virus (DENV). The disease, which affects millions of people every year, presents serious public health issues, especially in tropical and subtropical areas. An extensive review of dengue's epidemiology, symptoms, management, and prevention is given in this study. Along with an assessment of the shortcomings and potential for the future in the fight against dengue, a comprehensive analysis of existing vector control and vaccine strategies is presented. The results emphasize the potential contribution of upcoming technologies as well as the significance of integrated approaches to prevention and treatment.

Keywords: Tropical diseases, Dengue, Aedes aegypti, Vector control, Dengue vaccine

Introduction

Over 390 million cases of dengue fever are reported each year, making it one of the most serious viral diseases spread by mosquitoes worldwide. Affecting about half of the world's population, it is endemic in more than 100 nations. Its spread has been accelerated by globalization, urbanization, and climate change, making it a critical public health concern. Examining current knowledge about dengue, assessing current preventive interventions, and investigating potential future approaches to disease management are the objectives of this research.^{2,3}

Approach

Using a mixed-method approach, this study combines data from international health agencies, such as the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), with a systematic assessment of published literature. Transmission patterns, the efficacy of current therapies, and developments in vaccine research are among the key parameters examined.¹

Findings

Epidemiology: Dengue is most common in tropical and subtropical areas, with the largest burdens reported in Southeast Asia, the Americas, and parts of Africa. Infection rates have increased as a result of urbanization's facilitation of mosquito breeding.

Symptoms and treatment: The symptoms might vary from a low-grade fever to serious bleeding. The main goals of management are supportive care, hydration, and symptom alleviation.^{4,5}

Prevention: The best approach is still vector control, which includes removing breeding grounds and taking precautions for oneself. Although promising, the Dengvaxia vaccine has drawbacks because it only works on people who have already been afflicted.

Challenges: Limited vaccination coverage, poor public awareness, and inefficient vector control program implementation are major obstacles.^{1,2}

Prospects for the future

The use of integrated techniques is key to the future of dengue management:

Advanced vaccines: The creation of more potent vaccines that simultaneously target all four serotypes.

Genetic interventions: Utilizing mosquitoes that have undergone genetic modification to lower vector populations or transmission capacity.

Technology implementation: Using AI and GIS technologies to forecast outbreaks and improve intervention tactics is known as digital surveillance.

Community engagement: Increasing the effectiveness of community-driven vector control projects and public education programs.⁴

Conclusion

Dengue is becoming a more serious hazard to world health, especially in areas with inadequate medical facilities. Despite their impact, current measures are not enough to completely stop its spread. It is essential to employ a multimodal strategy that incorporates effective vector control, immunization, public awareness campaigns, and cutting-edge technologies. Governments, researchers, and communities working together will be crucial to lowering dengue's worldwide burden.

References

1. WHO (2024). Severe dengue and dengue. Taken from the WHO website. Disease Control and Prevention Centers (2024). Transmission of the dengue virus. Taken from the CDC's website.
2. Harris, E., and Guzman, M. G. (2015). The Lancet, 385(9966), 453-465.
3. D. S. Shepard and associates (2016). A thorough analysis of dengue's economic impact worldwide. Infectious Diseases, The Lancet, 16(8), 935-941.
4. S. Bhatt and associates (2013). dengue's prevalence and dispersion around the world. 504-507 in Nature, 496(7446).

Article: 3

Dengue in Co-morbidity Patients

Shubhasis Das

Senior Executive, Zydus health care, Sikkim-737132, India

dshubhasis1@gmail.com

Abstract

Dengue fever (DF) is a vector-borne viral infection caused by the dengue virus (DENV), primarily transmitted through the bite of Aedes mosquitoes. While DF is typically a self-limiting illness, it can cause severe manifestations, especially in patients with underlying co morbidities. This review discusses the impact of co morbid conditions such as diabetes, hypertension, cardiovascular disease, chronic kidney disease, and immune compromised states on the clinical course, complications, and management of dengue fever. The interplay between these co morbidities and the patho physiology of dengue infection is explored, with an emphasis on prevention, early recognition, and appropriate management strategies in these high-risk populations.

Keywords: Dengue fever, Dengue, Vector-borne viral infection, Dengue virus

Introduction

Dengue fever remains a major public health concern, particularly in tropical and subtropical regions. The global incidence of dengue has risen dramatically in recent decades, and the burden of the disease is compounded in populations with pre-existing co morbidities. While dengue fever is typically a mild illness, patients with underlying chronic conditions are at a higher risk of severe disease, including hemorrhagic manifestations, organ dysfunction, and shock. The interaction between these comorbidities and the dengue virus can exacerbate disease severity, complicate treatment regimens, and increase morbidity and mortality rates.^{1,2}

Overview of dengue fever

Etiology and Transmission: The dengue virus (DENV) is a single-stranded RNA virus of the Flaviviridae family, transmitted by Aedes mosquitoes, particularly *Aedes aegypti* and *Aedes albopictus*.

Clinical Features: The disease manifests as a febrile illness with symptoms such as high fever, severe headache, retro-orbital pain, rash, and muscle and joint pain. Severe cases can progress to dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS).

Comorbidities and their impact on dengue fever

Diabetes mellitus (DM)

Prevalence in dengue patients: The prevalence of DM in dengue-endemic areas has increased, and its association with more severe dengue outcomes is well-documented.

Pathophysiology: Hyperglycemia is thought to impair immune function and increase endothelial permeability, which may enhance viral replication and contribute to increased vascular leakage.

Clinical implications: Patients with diabetes are more prone to developing complications such as acute kidney injury (AKI), shock, and poor wound healing. Managing blood sugar levels during dengue infection is critical to prevent these complications.

Hypertension and cardiovascular disease (CVD)

Impact on disease progression: Hypertension can exacerbate the vascular instability seen in severe dengue. The elevated blood pressure in hypertensive patients can lead to more pronounced capillary leakage and fluid shifts, which increases the risk of shock and organ failure.

Management considerations: Tight control of blood pressure and careful fluid management are essential in preventing cardiovascular collapse in these patients.

Chronic kidney disease (CKD)

Increased risk of acute kidney injury: Dengue fever can cause kidney dysfunction, particularly in patients with pre-existing CKD. The combination of hemo concentration,

hypovolemia, and acute tubular necrosis in severe dengue can lead to irreversible renal damage.

Management: Close monitoring of renal function and early dialysis intervention when needed are crucial for improving outcomes in dengue patients with CKD.

Immune compromised states (HIV, Cancer, and Organ transplantation)

Viral dynamics: Immuno compromised patients have altered immune responses, which may result in prolonged viral shedding and a higher risk of severe manifestations. Additionally, secondary infections can complicate the clinical picture.

Clinical outcomes: These patients are more prone to dengue hemorrhagic fever (DHF) and disseminated infections due to a reduced ability to mount an appropriate immune response.

Other comorbidities

Obesity: Obesity has been linked to a higher incidence of severe dengue due to metabolic and immune dysregulation. Obese individuals may have a higher inflammatory response, which worsens the disease.

Chronic respiratory diseases: Conditions such as asthma and chronic obstructive pulmonary disease (COPD) may increase the risk of respiratory complications during severe dengue episodes.

Clinical management and challenges in comorbid patients

Management of dengue fever in patients with comorbid conditions requires a multidisciplinary approach and vigilant monitoring. The primary goals are to:

Control and monitor comorbid conditions: Proper management of blood pressure, glucose levels, and renal function is essential during the acute phase of dengue.

Fluid and electrolyte balance: Patients with comorbidities, particularly those with cardiovascular and kidney issues, are at higher risk for fluid overload or dehydration. Intravenous fluid therapy should be tailored to individual needs.

Early detection of complications: It is critical to monitor for complications like shock, organ failure, and hemorrhagic manifestations, which may present more aggressively in comorbid patients.

Supportive care: As there is no specific antiviral treatment for dengue, management is largely supportive, focusing on fluid resuscitation, pain relief, and monitoring for secondary infections.

Prevention Strategies

Preventing dengue infection in high-risk populations with comorbidities should be a priority. Measures include:

Mosquito control: Vector control measures such as eliminating breeding sites and using insect repellents can reduce the incidence of dengue.

Public health initiatives: Increasing awareness and vaccination programs (such as the Dengvaxia vaccine in endemic areas) can reduce the overall disease burden.

Management of comorbid conditions: Ensuring optimal control of chronic diseases, such as diabetes and hypertension, can improve resilience to infectious diseases like dengue.

Conclusion

Dengue fever poses significant challenges in patients with comorbidities, as these conditions can worsen the clinical course and increase the risk of complications. Early recognition, tailored management, and preventive strategies are crucial in improving outcomes for these high-risk groups. Further research is needed to better understand the mechanisms underlying the interaction between comorbid conditions and dengue, as well as to develop targeted therapeutic approaches.

References

1. World Health Organization (WHO). Dengue and severe dengue. [WHO Fact Sheet]. Updated 2023.
2. Martina, B.E.E., et al. (2009). Dengue virus infections in humans. *Nature Reviews Microbiology*, 7(12), 899-909. DOI: 10.1038/nrmicro2223
3. Srikiatkachorn, A., et al. (2017). Dengue: Pathogenesis and clinical management. *The Lancet Infectious Diseases*, 17(3), e52–e63. DOI: 10.1016/S1473-3099(16)30565-6

- Rathore, A., et al. (2019). Diabetes and dengue: Implications for management. *Journal of the Association of Physicians of India*, 67(1), 21-24.
- Khan, E., et al. (2020). Impact of hypertension on the severity of dengue fever. *Journal of Clinical Hypertension*, 22(5), 797-804. DOI: 10.1111/jch.13873
- Borges, M., et al. (2017). Clinical presentation and outcomes of dengue in patients with chronic kidney disease: A systematic review. *Clinical Infectious Diseases*, 64(12), 1809-1817. DOI: 10.1093/cid/cix265

Article: 4

Dengue Virus: A Worldwide Human Peril

Rumman Aliya

Florence College of Pharmacy, Irba, Ranchi, Jharkhand-835217, India

rummanaliya8@gmail.com

Abstract:

The dengue virus (DENV), which infects millions of people each year worldwide, poses a serious danger to public health. The virus, which is mostly spread by *Aedes aegypti* and *Aedes albopictus* mosquitoes, has four different serotypes (DENV-1 to DENV-4), which makes developing a vaccine difficult. Mild feverish illness to severe symptoms like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) are all possible outcomes of a dengue infection. The molecular biology, pathophysiology, and epidemiology of DENV are examined in this article, with a focus on the phenomena of antibody-dependent enhancement (ADE) and the part immune responses play in the development of the disease. There includes discussion of the most recent developments in vaccine development, preventative tactics, and diagnostic methods. The review also emphasizes the growing necessity of public health initiatives and coordinated vector management to reduce the rising incidence of dengue disease worldwide.

Keywords: Dengue virus, *Aedes* mosquito, DENV, Arthropode borne viruses, Flavivirus

Introduction

A virus called dengue, sometimes known as break-bone fever, is transmitted from mosquitoes to humans. In tropical and subtropical regions, it is more prevalent. The majority of dengue patients won't show any symptoms but for those who do, the most frequent symptoms include high temperature, headache, body aches, nausea, and a rash. Most will recover in one or two weeks. Some people get severe dengue and require hospital treatment. Dengue can be lethal in extreme circumstances. Avoiding mosquito bites, particularly during the day, can reduce your risk of contracting dengue. Since there is currently no specific treatment for dengue, pain medication is used to treat it.

The four distinct serotypes of the dengue virus (DEN-1, DEN-2, DEN-3, and DEN-4) are arthropode-borne viruses that belong to the genus *Flavivirus* of the family *Flaviviridae*. Dengue is regarded by the World Health Organization (WHO) as a serious worldwide public health concern in tropical and subtropical countries. Due to factors like unplanned urbanization, global warming, frequent air travel, ineffective mosquito control, and a lack of health care facilities, dengue has increased 30 times globally between 1960 and 2010. Dengue endemic regions are home to 2.5 billion people, with an annual incidence of about 400 million infections and a fatality rate that can exceed 5-20% in some places. More than 100 nations, including the USA and Europe, are afflicted by dengue.

Symptoms

The commonly found symptoms of dengue are seen to be fever with the following signs: Nausea, aches and pain, vomiting, high temperature, blood in stool, fatigue and tiredness, nose bleeding, blood containing vomit, difficulty in breathing, skin rashes etc.

Diagnosis and treatment

Dengue has no particular treatment. The goal is to treat the symptoms of pain. Pain medication can be used to treat the majority of dengue fever cases at home. Acetaminophen,

often known as paracetamol, is frequently used to manage pain. Because they raise the risk of bleeding, non-steroidal anti-inflammatory medications such as aspirin and ibuprofen should be avoided. Hospitalization is frequently required for patients with severe dengue.

Epidemiology

In recent decades, dengue has become much more common worldwide; according to WHO data, the number of cases recorded increased from 505,430 in 2000 to 5.2 million in 2019. The true number of dengue cases is underreported because the great majority of infections are mild or asymptomatic and self-managed. Additionally, a lot of cases are misinterpreted as other feverish conditions¹. Over 80 nations across all WHO regions experienced the greatest number of dengue cases in 2023. Over 6.5 million infections and over 7300 dengue-related deaths have been documented since the start of 2023 due to continuous transmission and an unanticipated increase in dengue incidence. There are a number of factors linked to the rising risk of dengue transmission.

In recent decades, dengue has become much more common worldwide; according to WHO data, the number of cases recorded increased from 505,430 in 2000 to 5.2 million in 2019. The true number of dengue cases is underreported because the great majority of infections are mild or asymptomatic and self-managed. Additionally, a lot of cases are misinterpreted as other feverish conditions¹. Over 80 nations across all WHO regions experienced the greatest number of dengue cases in 2023. Over 6.5 million infections and over 7300 dengue-related deaths have been documented since the start of 2023 due to continuous transmission and an unanticipated increase in dengue incidence. There are a number of factors linked to the rising risk of dengue transmission.

The increasing risk of the dengue epidemic spreading is linked to a number of factors, including the shifting distribution of the vectors (primarily *Aedes aegypti* and *Aedes albopictus* mosquitoes), particularly in countries that were previously dengue naïve; the effects of El Niño in 2023 and climate change, which resulted in higher temperatures, high rainfall, and high humidity; fragile health systems during the COVID-19 pandemic; and political and economic instability in nations dealing with complex humanitarian crises and large population movements. According to one modeling estimate, there are 390 million dengue virus infections annually, of which 96 million lead to clinical manifestations². 3.9 billion people are thought to be at risk of contracting dengue viruses, according to another study on the disease's prevalence³. Currently, the illness is widespread in over.

In the WHO Regions of Africa, the Americas, the Eastern Mediterranean, South-East Asia, and the Western Pacific, the illness is currently endemic in over 100 countries. With Asia accounting for almost 70% of the world's disease burden, the Americas, South-East Asia, and Western Pacific are the area's most severely impacted. New dengue outbreaks are occurring in South America, the Eastern Mediterranean, and Europe. In 2023, the most dengue cases were recorded. According to the WHO Region of the Americas, there were 2300 fatalities and 4.5 million cases. In Asia, Bangladesh (321 000), Malaysia (111 400), Thailand (150 000), and Vietnam (369 000) reported the highest number of cases.

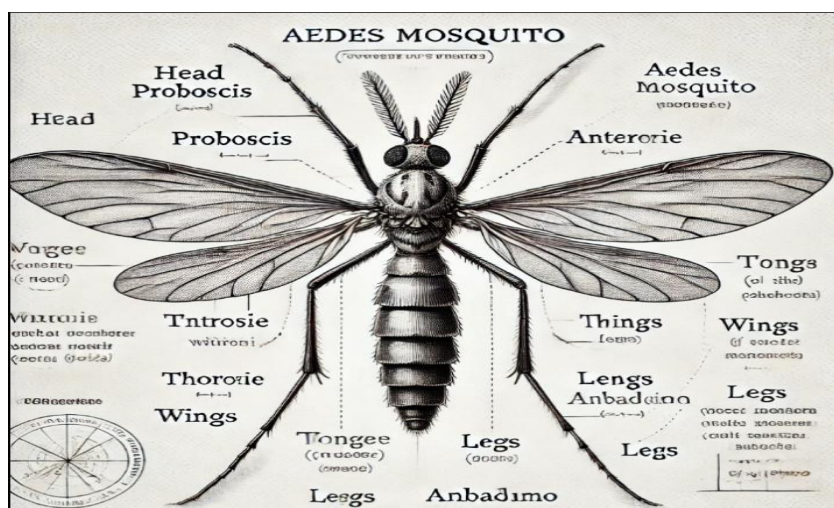


Figure 1: Aedes mosquito

Transmission and reason of rising dengue

Aedes aegypti mosquito bite are the main way that the dengue virus is spread from person to person. The main host and viral source host for female mosquito to contract dengue virus is human body as they feed on blood of infected humans.

In addition to the global increase in new infections, outbreaks are growing more frequent and unpredictable. For instance, 2019 witnessed nearly twice as many instances of dengue fever as the year before, making it the year with the highest number ever recorded. Additionally, the disease claimed a record number of lives in Bangladesh in July 2023. The majority of dengue patients experience flu-like symptoms, which can range from mild to quite unpleasant and include fever, headache, and joint discomfort.^{4,5}

Prevention: Empty clean and remove stale waters or stagnant water, make sure the buckets, containers and water tanks are securely covered, use insect repellent, wear protective clothing, use mosquito repellent and take steps to control mosquito in the surrounding.⁶

Conclusion

Dengue has developed into a potentially fatal public health issue that affects over 2.5 billion people in more than 100 nations. The doctor should guarantee an early and appropriate treatment plan and be knowledgeable about the condition of many clinical presentations. Future efforts to combat this terrible disease will focus on developing vaccines, antiviral medications regimens, and mosquito control techniques.

References

1. World health organization comprehensive guidelines for prevention and control of dengue and dengue hemorrhagic fever. Revised and expanded edition new Delhi: WHO; 2011
2. Zeyauallah M, Muzammil K, AlShahrani AM, Khan N, Ahmad I, Alam MS, et al. Preparedness for the dengue epidemic: vaccine as a viable approach. *Vaccines* 2022; 10(11):1940.
3. Halstead SB. Pathogenesis of dengue: Challenges to molecular biology. *Science* 1988; 239:476-81.
4. Kurane I. Dengue hemorrhagic fever with special emphasis on immune pathogenesis. *Comp Immunol Microbiol Infect Dis* 2007; 30:329-40.
5. Gubler DJ. Dengue and dengue Hemorrhagic fever. *Clin Microbiol Rev* 1998; 11:480-96.
6. World Health Organization (WHO). Dengue- Guidelines for Diagnosis, Treatment, Prevention and Control. New ed. Geneva, Switzerland: World Health Organization; 2009.

Article: 5

A Comparison of Dengue in Urban and Rural Settings

Tamal Kanti Das

Institute of Pharmaceutical Sciences, RKDF University, Ranchi, Jharkhand- 834004, India
dastamal15@gmail.com

Abstract

The transmission dynamics of dengue fever, a virus spread by mosquitoes, have been found to differ between urban and rural regions. Because of their high population density and ideal breeding grounds for *Aedes aegypti* mosquitoes, urban areas frequently see more frequent and severe epidemics. On the other hand, underreporting and restricted access to healthcare are two particular issues that rural communities face. The epidemiological distinctions between dengue transmission in urban and rural areas are examined in this article, along with underlying causes and obstacles to putting effective control measures in place. To better adapt management and preventative tactics to a variety of situations, a deeper comprehension of these distinctions is essential.

Keywords: Public health, Vector control, Mosquito, *Aedes aegypti*, Dengue

Introduction

Dengue fever, which affects millions of people annually, is one of the most serious vector-borne illnesses in the world. Due to their large population densities, dengue study and intervention have historically concentrated on urban areas; however, the disease's burden is also growing in rural places. These two environments have very different risk factors, transmission patterns, and healthcare availability. To effectively combat dengue, location-specific tactics must be designed with an understanding of these differences.¹

Approaches

Literature review: To determine how dengue epidemiology differs in urban and rural areas, peer-reviewed WHO and CDC papers and articles were examined.

Data analysis: In order to evaluate case numbers and outcomes between urban and rural areas, surveillance data from endemic countries; these countries include Brazil, India, and the Philippines.

Selected case studies that showcased effective interventions in both urban and rural contexts were used to offer practical insights.²

Dynamics in urban and rural areas

Transmission in city environments population density

Because *Aedes aegypti* mosquitoes prefer to live near people, urban settings offer the perfect environment for them.

Infrastructure: Breeding grounds are produced by stagnant water from inadequate drainage and water storage techniques.

Mobility: Dengue spreads quickly throughout neighborhoods in cities due to high human mobility.

Rural area transmission environmental factors

Ponds and ditches are common natural mosquito breeding grounds in rural regions.

Healthcare Access: Underreporting and delayed case management result from limited access to diagnostic resources and treatment.

Underestimation: Other vector-borne illnesses, such as malaria, frequently take precedence over dengue epidemics in rural regions.

Difficulties in urban areas

Overcrowding: Controlling vectors is challenging in dense populations.

Trash management: Solid trash buildup expands mosquito breeding grounds.

Vector resistance: *Aedes aegypti* have developed resistance as a result of excessive pesticide use in urban areas.

Difficulties in rural areas

Low awareness: It's possible that residents of remote areas are unaware of dengue symptoms and ways to avoid contracting the disease.

Limitations on resources: Effective administration is hampered by a shortage of healthcare facilities and qualified staff.

Surveillance Gaps: Inadequate surveillance systems cause outbreaks to go undetected for longer.³

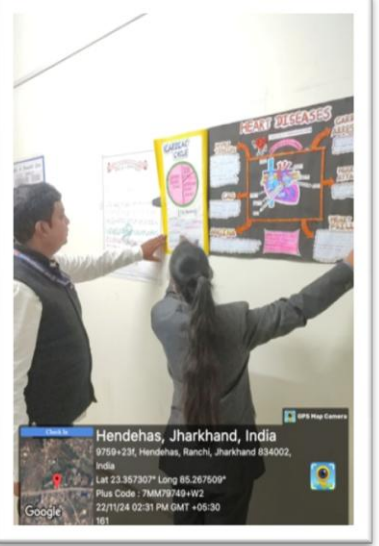
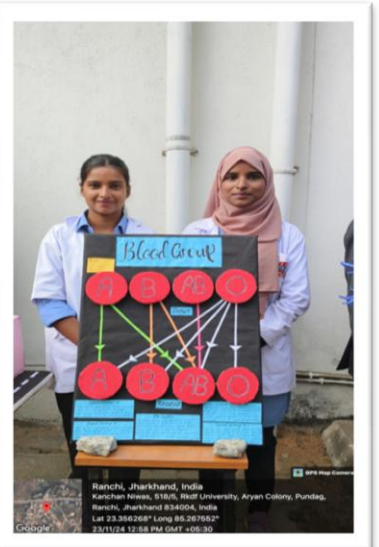
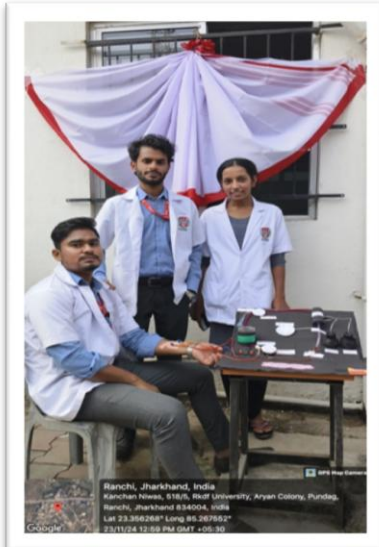
Conclusion

Although it presents unique epidemiological and infrastructure issues, dengue poses serious risks in both urban and rural regions. Overcrowding and waste management are problems in urban areas, whereas underreporting and a lack of healthcare facilities are problems in rural places. Specialized tactics are needed to address these discrepancies, such as increasing surveillance in rural areas and boosting waste management in metropolitan settings. To stop the spread of dengue in these contexts, cooperation between communities, governments, and healthcare practitioners is crucial.

References

1. S. Bhatt and associates (2013). Dengue's prevalence and dispersion around the world. 504-507 in *Nature*, 496(7446).
2. D. S. Shepard and associates (2016). Dengue's economic effects: contrasting urban and rural environments. *Infectious Diseases, the Lancet*, 16(8), 935-941.
3. Harris, E., and Guzman, M. G. (2015). Epidemiology of dengue in various geographical locations. 453-465, *The Lancet*, 385(9966).

National Pharmacy Week Celebration 2024



About RKDF University Ranchi

It was in the year 2018, **Dr. Sunil Kapoor**, the founder decided to fulfil his dream of establishing an institute for quality education to the people and the region & beyond initiated “**Ayushmati Education and Social Society**” trust in an attempt to make the holy city of Ranchi, a recognized destination for knowledge seekers from different spheres of life and strive to become one of the best Universities in Jharkhand. This is what led to the foundation of a milestone at the karmabhoomi of the versatile and sagacious **Bhagwan Birsa Munda**.



RKDF group has been actively involved with social causes since its very inception and has drawn appreciation from one and all for its works in various facets of societal paradigms. The Group started its journey in 1994 by establishing 1st private engineering college at Bhopal, Madhya Pradesh. Now the group has 162 institutions & 6 universities (Five in Madhya Pradesh and one in Jharkhand). The six universities and social society established by Ayushmati Education are **RKDF University, Bhopal** (2011), **Sri Satya Sai University of Technology & Medical Science, Sehore** (2014), **Sarvepalli Radhakrishna University, Bhopal** (2015), **Dr. A.P.J. Abdul Kalam University, Indore** (2016), **Bhabha University, Bhopal** (2018), **RKDF University, Ranchi** (2018). RKDF Ranchi is a highly prestigious government recognized university established under the Jharkhand Govt. Act & registered under UGC 2f 1956. RKDF University, Ranchi is a recognized member of AIU (Association of Indian Universities) and has publication house, named IJHESM (International Journal of Humanities, Engineering, and Science & Management) with an impact factor of SJIF-5.81.

Next theme for fourth edition

“Is there any link between heart attacks and covid 19”

Deadline for article submissions:

31st January, 2025

Send your article on (only micro soft doc file)

pharmacy@rkdfuniversity.org

For any queries feel free contact to us: +91 8001343454

+91 7872379092

