Review of Contemporary Philosophy
ISSN: 1841-5261, e-ISSN: 2471-089X
Vol 22 (1), 2023
Pp 6460 - 6465

# Dengue Fever: A Call for Collaboration Between Pharmacy, Nursing, Epidemiology, and Social Work for Improved Patient Outcomes

**[1]* Mohammad Mohia Alian Alotaibi,[2]*Ahmed Humus Muqhim Alruqi,[3]*Fahad Eid Ali alotaibi,[4]* Dalal Naif Abdullah Alotaibi,[5]* Sheikha Naif Abdullah Alotaibi,[6]* Khaled Attallah Aljoaid,[7]* Mohannad Masfer Alosaimi,[8]*Mohamd Ali Majed Alotaibi,[9]* Saud Faleh Ghazi Alotaibi,[10]*Nawal Faleh Hadyan Alosaimi**

[1]* Specialist-Sociology Afif Hospital ,Saudi Arabia

[2]*Epidemiology Supervision Technician Al Nabwan Primary Care Center, Saudi Arabia

[3]* Specialist-Sociology Afif Hospital ,Saudi Arabia

[4]* Nursing Specialist, Aldwadmi Hospital, Saudi Arabia

[5]* Nursing Specialist, Aldwadmi Hospital, Saudi Arabia

[6]* Nursing Specialist Primary Health Care (urgent care clinic) Saudi Arabia

[7]* Nursing Specialist, Aldwadmi Hospital, Saudi Arabia

[8]* Nursing Technician, Afif Hospital, Saudi Arabia

[9]* Nursing Specialist, Afif Hospital, Saudi Arabia

[10]* Nursing Specialist, Afif Hospital, Saudi Arabia

**Abstract**

Dengue virus is a mosquito-borne infectious disease transmitted by Aedes mosquitoes. The widespread proliferation of these mosquitoes has emerged as a significant public health concern, particularly in tropical and subtropical regions. Dengue fever can manifest as asymptomatic, mild-to-moderate, or severe, depending on individual characteristics. Severe dengue can be life-threatening. Dengvaxia is a licensed vaccine for immunization in at-risk children who have previously contracted dengue.

Pharmacists play a crucial role in supporting immunization efforts, providing guidance on safe travel practices, and assisting in the care of patients with dengue.

Furthermore, a multidisciplinary approach involving healthcare professionals such as pharmacists, nurses, paramedics, physiotherapists, respiratory therapists, and **social workers** is essential for optimizing patient outcomes.

**Social workers** can contribute significantly by:

- **Addressing socio-economic factors** that may impact disease transmission and access to healthcare, such as poverty, inadequate housing, and limited access to clean water.
- **Providing psychosocial support** to patients and their families, including emotional support, coping mechanisms, and assistance with navigating the healthcare system.
- **Facilitating community outreach** and education programs to raise awareness about dengue prevention and control measures.

- **Collaborating with other healthcare professionals** to ensure comprehensive and coordinated care for patients with dengue.

Understanding the clinical presentation and appropriate management of dengue is crucial for mitigating disease severity.

**Received:** 10 october 2023 **Revised:** 12 November 2023 **Accepted:** 23 November 2023

**Introduction**

There are four different serotypes of the Dengue virus, which are all members of the Flavivirus genus, which is a member of the Flaviviridae family. The virus is a single-stranded RNA virus. It is the Aedes aegypti mosquito and the Aedes albopictus mosquito that are responsible for the transmission of the arbovirus that is generally known as broken bone fever4. The fever that is characteristic of dengue fever endures for five to seven days and is accompanied by two or more symptoms, including but not limited to the following: headache, retro-orbital pain, myalgia, arthralgia, rash, hemorrhagic signs, or leucopenia.6. Infection with extra dengue serotypes raises the risk of hemorrhagic illness, which can lead to serious bleeding in the mucosa and gastrointestinal tract, hypovolemia, and even death in certain cases.1. There are a number of factors that have been linked to the rise in dengue epidemics, including population expansion, increasing movement of individuals, rapid urbanization, limited financial and human resources, environmental changes, and neglected areas (rural and slums) [1,2]. The infection caused by the dengue virus is present in tropical and subtropical regions all over the world. It is becoming increasingly recognized as one of the new infectious diseases that are occurring all over the world and has become a serious issue for public health on a global scale [3]. According to estimates provided by the World Health Organization, over 2.5 billion individuals are at risk for dengue fever. Furthermore, over the past few decades, the incidence rate of dengue fever has increased all over the world, making it a significant public health concern. It has been misclassified and underreported that the real number of dengue cases has been underestimated. Dengue fever, dengue hemorrhagic fever, and dengue shock syndrome are the three types of dengue fever that correspond to the World Health Organization's illness classification. According to a recent estimate, there are 390million dengue infections that occur year. Of these, 96 million exhibit clinically with any severity of the disease classification [4,5]. Studies estimate that by the 2080s, climate change might put an additional 2 billion people around the world at risk of contracting dengue fever. This is assuming that other factors remain same. The severity of dengue fever (DHF/DSS) is anticipated to necessitate hospitalization for approximately 500,000 people each year, and approximately 2.5% of those who are infected will pass away. In addition, severe dengue fever (DHF/DSS) continues to be the primary cause of hospitalization and death among children in at least eight nations located in Southeast Asia. Mauritania, Senegal, and Ethiopia are the three countries in Africa that have reported and confirmed the presence of dengue fever outbreaks. There is a high probability that dengue fever is not adequately recognized and reported in Africa due to a lack of awareness among health-care professionals, the prevalence of other febrile disorders, the absence of diagnostic tests, and the absence of systematic surveillance [6,7]. The majority of the prior study that was carried out was primarily undertaken in Asia and concentrated on the viewpoints of community members regarding dengue illnesses. However, there have been very few attempts made to date to better understand the perspectives of physicians [8]. Review: A significant threat to public health has been brought about as a result of the widespread spread of dengue fever (DF) in tropical and subtropical regions around the world. According to the World Health Organization (WHO), there are between fifty to one hundred million dengue infections that take place every year, and the Asia-Pacific area is home to nearly seventy-five percent of the population that is exposed to dengue fever [9]. Dengue symptoms can appear in a variety of ways depending on the individual who is infected with the virus; some people are asymptomatic, while others are in a critical condition. The symptoms that some people experience range from mild to moderate and include headaches, high fevers, nausea, emesis, myalgia, arthralgia, and other similar symptoms. However, once a person has been infected with DENV,

that person is at risk for developing severe dengue fever if they are exposed to the virus again. Because of the potential of severe bleeding and hypovolemic shock, severe dengue can be life-threatening and even fatal. Dengue shock syndrome (DSS) is a severe type of dengue. Both of these conditions are associated with severe dengue. Tachypnea, hemorrhaging, weakness, dehydration, and shock are some of the symptoms that are associated with severe dengue. Other symptoms include the ones that have been discussed above.6,7 A decreased capacity to adjust to the hemorrhage that can occur with DENV [10] puts infants at a greater risk for developing diarrheal septic syndrome (DSS). DF is considered to be the most significant viral disease that is transmitted by mosquitoes all over the world. There are four unique serotypes of the genus Flavivirus for the Dengue virus (DV), which is the culprit that causes dengue fever (DF) [11]. Patients who are infected with dental caries have a wide variety of non-specific clinical signs, such as a high fever, pain in five distinct places (severe frontal headache, retro-orbital pain, bone pain, myalgia, and arthralgia), and a maculopapular rash [3].Certain diseases, including influenza, measles, enteric fever, leptospirosis, typhus fever, malaria, and others, can present themselves in a manner that is comparable to one another. It is essential for early diagnosis and treatment that dengue fever (DF)be differentiated from other diseases that are similar to dengue. Furthermore, a number of research have demonstrated that the clinical spectrum of DF differed from one region to another [11]. In order to facilitate the early diagnosis of this disease, it would be beneficial to have an awareness of the patterns that make up the clinical spectrum of DF in Kaohsiung, Taiwan. It has been discovered that early discovery and access to appropriate medical care can reduce fatality rates to below 1% [12], despite the fact that there is no specific treatment for DF. Dengue fever, which can be asymptomatic or symptomatic, is a dangerous disease that threatens the lives of almost 4 billion people worldwide. In spite of the fact that DENV infects roughly 400 million people around the world every year, it is believed that only 100 million people actually become unwell as a result of DENV. About forty thousand of those people pass away every year as a result of a severe manifestation of dengue. The World Health Organization (WHO) says that there have already been nearly 3 million confirmed cases of DENV in the regions of North and South America in the year 2023. This number is higher than the total number of confirmed cases that occurred in 2022, which was 2.8 million confirmed cases [13]. From 2010 to 2020, the Centers for Disease Control and Prevention (CDC) found that individuals who were 19 years old or younger had a higher likelihood of becoming infected with DENV. However, beginning in 2021, the number of cases in adults who were older than 50 years has grown, while the number of cases in children and young adults has decreased. The growing number of people traveling internationally is reflected in the rise in the number of dengue fever cases and other outbreaks that have occurred in the United States. As of October 2023, it is projected that there have been 1,300 cases of dengue fever reported in the United States [14]. When it comes to adults and children who have not yet been exposed to dengue, the most effective strategy for preventing infection is to take precautions against mosquito bites while traveling to areas where the disease is prevalent. Utilizing insect repellents and dressing in long-sleeved shirts and slacks while in these endemic areas are also effective ways to accomplish this goal. There is now no therapy available for dengue illness; however, a live vaccination called Dengvaxia has recently been developed and licensed by the Food and Drug Administration (FDA) to assist in the prevention of dengue in children aged 6 to 16 years old who have a past dengue infection that has been confirmed by a laboratory and who reside in an area that is endemic for dengue. Confirmation in the laboratory can be achieved by the following means: proof of a previous acute dengue infection through a positive dengue reverse transcriptase–polymerase chain reaction (RT-PCR) result or a positive dengue nonstructural protein 1 (NS1) antigen test result.9–10 Confirmation of a previous dengue infection is required prior to the administration of the vaccine. This is due to the fact that individuals who have no previous history of dengue are at a higher risk of developing viremia. After administration, dengvaxia, which is also known as the chimeric yellow fever virus dengue-tetravalent dengue vaccine (CYD-TDV), elicits immune responses that are specific to dengue against the four different DENV serotypes. Multiple randomized clinical trials [15] have demonstrated that Dengvaxia is both safe and effective in treating the condition being studied.

A phase III, randomized, multicenter, observer-masked experiment was carried out in Asia by Cape ding et al., with the purpose of evaluating the clinical efficacy and safety of the dengue vaccination in children between the ages of 2 and 14 years old. The primary objective of the study was to evaluate the effectiveness of the vaccination against symptomatic and virologically proven dengue illness at a time point that was 28 days following the completion of the three-dose vaccine series. With a 95% confidence interval ranging from 43.8 to 66.4, the study was successful in reaching the primary end aim. Ten One major adverse event that was identified to be attributable to the vaccine occurred in a participant who experienced acute disseminated encephalomyelitis on Day 7 after getting the first injection. However, the condition cleared within 15 days and did not reoccur [16]. A follow-up, case-cohort, retrospective investigation was carried out by Sridhar and colleagues, which verified the effect theory of serostatus of the individuals. The conclusion was reached based on blood samples collected thirteen months after vaccination.111 An increased risk of hospitalization and severe dengue was shown to be associated with seronegative patients, according to the findings of the study [17]. Another phase III, multicenter, randomized, double-blind experiment was carried out by Villar et al. in Brazil, Colombia, Honduras, Mexico, and Puerto Rico with the purpose of determining the efficacy of the dengue vaccine in children between the ages of 9and 16 years old. The effectiveness of the dengue vaccination against symptomatic and virologically proven dengue infection was the primary test that was conducted to determine its effectiveness. In the population that followed the protocol, the vaccination was shown to be successful 60.85% of the time (95% confidence interval, 52.0-68.0). In the participants of the intention-to-treat group who received at least one injection, the vaccine was found to be effective 64.7% of the time (95% confidence interval, 58.7-69.8). A total of eighty-three percent of hospitalizations for virologically proven dengue were prevented by the vaccine when at least one dose of the vaccine was administered. The secondary end points focused on the effectiveness of the dengue vaccine in preventing clinical manifestations, the incidence of hospitalization, the antibody response to each dengue serotype, and the occurrence of major adverse events in the patients during the course of the trial. Among the adverse effects that were discovered to be associated with the vaccine, there was an asthma attack that occurred sixteen hours after the initial injection, allergic urticaria that occurred four hours after the second injection, and acute peripheral polyneuropathy that was associated with viral meningitis that occurred three days after the initial injection [17,18]. When it comes to delivering knowledge about safe travel and preventing infections by advocating for appropriate vaccines in persons who reside in dengue-endemic areas, the pharmacist plays a significant role. The pharmacist is one of the healthcare professionals who is the most accessible. Pharmacists are in a position to provide patients with suggestions for medications and to assist in the prevention of ailments that are associated with travel. In addition to being able to administer vaccines and distribute travel prescriptions, pharmacists, nurses, paramedics, physiotherapists, and respiratory therapists are able to provide patients with assistance in selecting over-the-counter pharmaceuticals and other required preventative medications for travel. Patients have become aware of the fact that community pharmacists are able to provide vaccination services, which has the potential to contribute to the promotion of vaccine awareness and possible prevention of the spread of infectious diseases such as dengue. It is for this reason that pharmacists are the ideal healthcare experts with whom to develop collaborative practice agreements. These agreements have the ability to assist in reaching a greater number of patients who require travel medicine and also have the potential to lessen the burden of infectious diseases all over the world [19].

## Conclusion

The endemic nature of dengue fever poses a significant global public health challenge due to its potential for life-threatening complications. With the increasing frequency of international travel, promoting effective preventive strategies worldwide is crucial. Dengvaxia, a recently licensed vaccine by the FDA, offers a promising tool for preventing dengue fever in children and adolescents aged 6-16 years with a prior dengue infection residing in endemic areas. This tetravalent vaccine provides protection against all four DENV serotypes and requires a three-dose regimen administered over a year. However, the use of

protective clothing and insect repellents remains essential for all individuals traveling to or residing in dengue-endemic regions, regardless of vaccination status.

Effective management of dengue fever hinges on a comprehensive approach. Patients should be evaluated for appropriate treatment settings (inpatient or outpatient) based on their clinical presentation and risk factors. Supportive care is the mainstay of treatment for confirmed dengue cases. Pharmacists, nurses, paramedics, physiotherapists, and respiratory therapists can all play a vital role in both dengue prevention and management. This includes advocating for safe travel practices, promoting appropriate immunization where applicable, and collaborating with the medical team to deliver optimal supportive care.

**Reference**


[1] Halstead S. Dengue. Lancet. 2007;370(9599):1644–1652. doi: 10.1016/S0140-6736(07)61687-0

[2] Heinz FX, Collett MS, Purcell RH, et al., editors. Virus Taxonomy: Seventh Report of the International Committee on Taxonomy of Viruses, Part Three Ed. San Diego: Academic Press; 2000:859–878.

[3] WHO. Dengue Haemorrhagic Fever: Diagnosis, Treatment, Prevention and Control. 2nd ed. Geneva: WHO; 1997:48–59.

[4] Qadir MI, Abbas K, Tahir M, et al. Dengue fever: natural management. Pak J Pharm Sci. 2015;28(2):647–655.

[5] Jamaiah I, Rohela M, Nissapatorn V, et al. Retrospective study of dengue fever (DF) and dengue hemorrhagic fever (DHF) patients at university Malaya Medical Center, Kualalumpur, Malaysia. Southeast Asian J Trop Med Public Health. 2005;38(1):224–230.

[6] Gubler DJ. The changing epidemiology of yellow fever and dengue, 1900 to 2003: full circle? Comp Immunol Microbiol Infect Dis. 2004;27(5):319–330.

[7] Gubler DJ. Dengue and dengue hemorrhagic fever. Clin Microbiol Rev. 1998;11(3):480–496.

[8] Malhotra G, Yadav A, Dudeja P. Knowledge, awareness and practices regarding dengue among rural and slum communities in north Indian city, India. Int J Med Sci Public Health. 2014;3(3):295–299. doi: 10.5455/ijmsph.2013.181220132

[9] Mairuhu AT, Wagenaar J, Brandjes DP, van Gorp ECM. Dengue: an arthropod-borne disease of global importance. Eur J Clin Microbiol Infect Dis. 2004;23:425–433. doi: 10.1007/s10096-004-1145-1

[10] World Health Organization. Disease Outbreak News. Dengue in the Region of the Americas. www.who.int/emergencies/disease-outbreak-news/item/2023-DON475. Accessed September 17, 2023.

[11] CDC. Dengue. www.cdc.gov/dengue/index.html. Updated August 15, 2023. Accessed September 17, 2023.

[12] World Health Organization. Vector-borne diseases. www.who.int/neglected_diseases/vector_ecology/mosquito-borne-diseases/en/. March 2, 2020. Accessed September 10, 2023.

[13] Martina BE, Koraka P, Osterhaus AD. Dengue virus pathogenesis: an integrated view. Clin Microbiol Rev. 2009;22(4):564-581.[14]Gubler DJ. Epidemic dengue/dengue hemorrhagic fever as a public health, social and economic problem in the 21st century. Trends Microbiol. 2002;10(2):100-103.

[15] World Health Organization. Dengue and severe dengue. www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue. March 17, 2023. Accessed September 15, 2023.

[16] CenterWatch. Dengvaxia(Dengue Tetravalent Vaccine, Live). www.centerwatch.com/drug-information/fda-approved-drugs/drug/100382/dengvaxia-dengue-etravalent-vaccine-live-. Accessed September 10, 2023.

[17] Capeding MR, Tran NH, Hadinegoro SR, et al. Clinical efficacy and safety of a novel tetravalent dengue vaccine in healthy children in Asia: a phase 3, randomised, observer-masked, placebo-controlled trial. Lancet. 2014;384(9951):1358-1365.

[18] Sridhar S, Luedtke A, Langevin E, et al. Effect of dengue serostatus on dengue vaccine safety and efficacy. N Engl J Med. 2018;379(4):327-340.

[19] Villar L, Dayan GH, Arredondo-García JL, et al. Efficacy of a tetravalent dengue vaccine in children in Latin America. N Engl J Med. 2015;372(2):113-123

.