

Review Article

A review of Hummā Danj (dengue fever) in Unani and conventional medicine

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ABSTRACT

The global burden of Hummā Danj dengue fever (DF) and its severe manifestations, such as dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS), has escalated significantly in recent decades. Dengue viruses, transmitted primarily by *Aedes* mosquitoes, pose a substantial public health challenge, with an estimated 50-100 million infections annually and significant mortality. While traditionally viewed as a childhood illness, there's emerging evidence of a shift towards older age groups experiencing more severe forms of the disease. Additionally, race, gender, rural settings and climate variability influence disease dynamics. Socioeconomic factors play a crucial role, with poorer countries facing greater challenges in disease prevention and control. The economic impact of dengue, akin to malaria, underscores the need for effective public health interventions. Improving case management, early detection and accurate monitoring are essential strategies. Diagnosis remains challenging due to variable test sensitivities and specificities. In Unani medicine, dengue fever is conceptualized within the framework of humoral pathology, with management focusing on symptomatic relief and supportive care. Overall, addressing the multifaceted challenges of dengue requires a comprehensive approach integrating medical, social and economic strategies.

Keywords: Conventional medicine, Dengue fever, Epidemiology, Hummā Danj, Unani medicine

INTRODUCTION

The incidence of dengue fever has significantly increased worldwide in recent decades. Each year, there are approximately 50-100 million dengue infections, 500,000 cases of dengue haemorrhagic fever (DHF) and at least 12,000 deaths globally.^{1,2} In 1970, dengue haemorrhagic fever epidemics were reported in only nine countries. By 1995, this number had increased more than fourfold and currently, approximately 2.5 billion people are at risk of dengue fever.³ Dengue viruses (DENVs), which belong to the Flaviviridae family, consist of four closely related serotypes: DENV-1, DENV-2, DENV-3 and DENV-4.⁴

All dengue virus serotypes are transmitted to humans by mosquitoes of the genus *Aedes*, primarily *Aedes aegypti*. During the rainy season, there is a notable increase in mosquito larval populations, which may explain why dengue epidemics often coincide with this time of year.⁵ A person infected with one dengue virus serotype will never be infected by the same serotype again but loses immunity to the other three serotypes after 12 weeks. The residual antibodies from the initial infection cannot neutralize a subsequent infection with a different serotype. Instead, these antibodies enhance the second infection, leading to a more severe illness. This phenomenon is known as "antibody-dependent enhancement."⁶

PRESENTATION OF A CLINICAL CASE

Dengue infection can result in a range of illnesses, from mild, undifferentiated fever to a disease lasting up to 7 days with high fever, severe headache, retro-orbital pain, joint pain and rash, though it rarely causes death. Dengue haemorrhagic fever (DHF), a severe complication, involves bleeding tendencies, thrombocytopenia and plasma leakage. Dengue Shock Syndrome (DSS) includes all DHF symptoms plus circulatory failure, hypotension for age and low pulse pressure. While DHF and DSS can be fatal, early diagnosis and proper treatment can lead to full recovery without lasting effects. Management of Dengue Fever (DF) is primarily symptomatic and supportive. Urine output and vital sign monitoring must be done continuously for DHF patients. DSS is a medical emergency necessitating intensive care unit hospitalization.^{7,8}

MODIFICATIONS IN EPIDEMIOLOGY

Demographic, economic, behavioural and social factors

These factors are crucial for effective communicable disease control and form the foundation of successful public health programs. Despite promising findings in the literature, these factors are not well understood in the context of dengue. Additionally, recent field evidence has raised questions about some widely accepted characteristics of dengue, indicating the need for further review and confirmation.

Modal age shift

While dengue fever (DF) is traditionally recognized as a childhood illness and a significant reason for pediatric hospitalizations in Southeast Asia, there is emerging evidence of a rising incidence of dengue haemorrhagic fever (DHF) among older age groups. Since the early 1980s, multiple studies conducted in both Latin America and Southeast Asia have indicated a greater association of DHF with older age brackets. Among the pioneering investigations were those conducted by Guzman (1981) in Cuba and Rigau-Pérez in Puerto Rico.⁹

Predisposition based on race

Several studies have noted race-related susceptibility to dengue, highlighting the need for deeper investigation. In a retrospective Sero epidemiologic study by Guzmán, it was reported that both black and white individuals were equally infected with DEN-1 and DEN-2 viruses during the Cuban epidemics of 1977 and 1981. However, severe dengue disease appeared to occur less frequently in dengue-infected black individuals compared to whites.^{9,10}

Gender disparities

Recognizing gender disparities in infection rates and disease severity is crucial for public health control efforts.

Several hospital-based studies and surveillance data indicate differences between males and females in both infection rates and disease severity. Three separate studies conducted during epidemics in India and Singapore revealed a significantly higher number of male patients compared to females. In Lucknow and Singapore, the male-to-female ratios were both reported as 1.9:1, while in Delhi, it was 1:0.57, suggesting a consistent trend across different regions.¹¹

Rural dispersal

Traditionally, dengue fever (DF) and dengue hemorrhagic fever (DHF) have been primarily associated with urban populations, where high-density housing and the short flight range of the vector facilitate transmission. However, literature indicates that dengue transmission and occasionally outbreaks, also occur in rural settings across Asia and Latin America. In the Western Pacific region, the World Health Organization (WHO) has verified the spread of the disease into rural areas where it was not previously reported.¹²

Climate variability and seasonality

The occurrence, especially epidemics, of dengue fever has often been linked to the rainy season. Additionally, the El Niño phenomenon has been implicated in the rise of specific vector-borne diseases, including dengue.¹³

PROBLEMS WITH HEALTH SYSTEMS

The socioeconomic environment

Social and economic factors significantly influence the incidence and prevalence of dengue fever (DF) and dengue haemorrhagic fever (DHF). In wealthier countries, amenities such as air conditioning, screens and safe water supplies aid in prevention, while better healthcare services help reduce or eliminate mortality from DHF. Conversely, factors such as unplanned urbanization and insufficient resources for vector control are more prevalent in poorer countries, promoting disease transmission. Reiter et al, (2003) conducted a study on dengue transmission along the Mexico-USA border and found higher transmission rates in the Mexican city compared to the American one.¹⁴

Prices

From a macroeconomic perspective, the impact of dengue is likely to resemble that of malaria more closely over time. Both diseases are prevalent in communities characterized by subsistence or daily wage labor, where even a week-long illness can have devastating effects on poor families. Historically, since dengue has been primarily a pediatric disease, the active labor force or family wage earners were less affected. However, as the modal age of illness and incidence increases, losses in productivity and earning capacity may become more pronounced. The economic lessons learned from malaria were realized late and by the

time efforts to address its resurgence were implemented, it was already in full swing. Dengue fever risks facing a similar fate. Regarding the costs of care, there is a scarcity of economic studies, with most estimating economic losses to be in the millions. Von Allmen et al, conducted a cost analysis of the epidemic of DF/DHF in Puerto Rico in 1977, using upper and lower limits of incidence as their basis.¹⁵

Knowledge, attitude and practice

There is a pressing need to develop effective strategies for behavior change, especially concerning childhood diseases, as mothers often serve as the primary caregivers. Knowledge, Attitude and Practice (KAP) studies related to dengue are scarce, resulting in limited understanding of the exposed population's knowledge and attitude towards the disease. However, the existing data is promising.

In a controlled experiment conducted in Mexico, community education aimed at reducing mosquito breeding sites proved to be more effective than chemical spraying in controlling mosquito populations.¹⁶

Patterns in the death rate for cases

Two significant aspects warrant meaningful discussion in this field. Firstly, there are considerable variations in Case Fatality Rates (CFRs) observed among countries, sub-national regions and even hospitals, despite similar virological conditions. Secondly, there are differing risks of severe illness and mortality between children and adults. Government statistics indicate a declining trend in the global case fatality rate (CFR) for dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) in most endemic countries. Presently, the overall CFR in the Southeast Asia region stands at less than 1%.¹²

Case management and early detection

In addition to vector control, which is widely acknowledged as a primary preventive strategy, the health sector's key response to reducing mortality and morbidity primarily focuses on two areas: early detection (including promoting changes in care-seeking behaviour and enhancing surveillance) and enhancing case management for patients. Mortality rates exceeding 1% may be attributed to inadequate care, delayed diagnosis and late hospitalization. A study conducted at hospitals during the dengue outbreak in Delhi demonstrated that mortality rates could be remarkably low among patients who sought medical attention early.¹⁷

Monitoring and documenting

Unreliable statistics pose a significant and multifaceted challenge. Estimates of case fatality rates (CFRs) for Dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) derived from surveillance data consistently appear lower than those obtained from single-

sample studies, suggesting potential under-reporting or misclassification of deaths. The incomplete understanding of case definitions among district health personnel further hampers accurate reporting within the public health service system. Additionally, inappropriate denominators contribute to confusion when estimating prevalence and incidences.

Such reporting discrepancies can result in significantly misleading CFRs, particularly in countries where reliable estimates are urgently needed for effective resource allocation. For instance, in Laos, the World Health Organization (WHO) registered 8197 DHF cases and 24 deaths in 1996, while the Institute of Malariology, Parasitology and Entomology (IMPE) reported 2563 cases and 23 deaths during the same period, leading to a CFR three times higher than the WHO statistics.¹⁸

Diagnosis of dengue

The diagnosis of dengue relies on a variety of methods, including serological assays, molecular diagnostics and antigen detection. Serology, which utilizes techniques such as hemagglutination-inhibition, immunofluorescence antibody assays and enzyme-linked immunosorbent assay (ELISA) tests, is commonly employed for diagnosis. However, its effectiveness is compromised by variable sensitivity and specificity attributed to cross-reactivity with other flavivirus infections and flavivirus vaccines. During acute dengue infection, serum IgM typically becomes detectable within 4 to 5 days, followed by the development of IgG after day 7 of illness. However, the sensitivity of commercially available ELISAs for diagnosing acute dengue ranges from 60% to 90%, with specificity ranging from 80% to 99%.¹⁹⁻²¹

Concept of dengue fever in Unani

In Unani texts, there is no direct mention of dengue fever, although various types of fever are extensively discussed. According to Unani concepts, dengue fever may be classified as "Humma Damwi Ufooni," where ufoonat (putrid matter) is believed to be present in the blood (khilt-e-dam), leading to skin rashes. The renowned Unani scholar Ibn Sina proposed that infectious material (madah afna'h) causes abnormal alterations in fluids and humours, disrupting their qualities and normal functions. Occasionally, humours (Akhlāt) are infected both intravascularly (dakhil-e-urooq) and extravascularly (kharij-e-urooq). However, in the case of dengue fever, intravascular infection is established due to the *Aedes aegypti* vector, which transmits the disease through blood contact. It's also noteworthy that dengue fever tends to affect individuals with weakened immunity.²²⁻²⁴

Management in Unani medicine

Various measures are implemented to manage symptoms, mitigate complications and increase platelet count. These

include addressing the root cause (Izala sabab karaein), ensuring bed.^{22,25-27}

CONCLUSION

The rising global incidence of dengue fever, driven by various epidemiological and socioeconomic factors, demands a comprehensive approach involving public health strategies, healthcare improvements and community engagement. Effective management is crucial to mitigate its significant health and economic impacts.

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