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Research Article

Epidemiological Profile of Dengue Fever in Djibouti: A Serological-Based Patient Analysis

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Abstract

Dengue fever, a mosquito-borne viral infection caused by the dengue virus (DENV), remains a significant public health challenge in tropical and subtropical regions. This study aimed to determine the prevalence of dengue fever and analyse the demographic characteristics of patients with positive dengue serology in a specific population. A retrospective analysis was conducted on 100 patients who tested positive for dengue serology between September 2024 and December 2024. Data on age, gender, and test dates were collected and analysed to identify trends in dengue transmission. The results revealed a 100% prevalence rate among the tested population, with 78% of cases occurring in adults (≥18 years) and 22% in children (<18 years). The age range of patients was 13 to 50 years, with a mean age of 35.4 years. Gender distribution was nearly equal, with 52% males and 48% females. Monthly distribution showed a peak in cases during September, October, and November (30 cases each month), followed by a decline in December (10 cases), suggesting a seasonal pattern linked to mosquito activity. The study highlights the significant burden of dengue fever in the studied population, with a broad age range of affected individuals and a balanced gender distribution. The high prevalence among adults, particularly young adults (18–30 years), may reflect greater exposure to mosquito vectors, while the presence of paediatric cases underscores the need for targeted interventions in schools and communities. The seasonal trend observed in this study aligns with the known epidemiology of dengue fever, emphasizing the importance of timing preventive measures to coincide with periods of high transmission. These findings underscore the need for comprehensive public health strategies, including vector control, community education, and early diagnosis, to mitigate the impact of dengue fever. Further research is recommended to explore serotype distribution, risk factors, and clinical outcomes, providing valuable insights for public health planning and intervention strategies.

Keywords: Dengue Fever; World Health Organization

Abbreviation

DENV: Dengue Virus; DHF: Dengue Haemorrhagic Fever; DSS: Dengue Shock Syndrome

Introduction

Dengue fever, a mosquito-borne viral infection caused by the dengue virus (DENV), is a significant public health challenge in tropical and subtropical regions worldwide [1]. Transmitted primarily by the Aedes aegypti mosquito, dengue fever is endemic in over 100 countries, putting approximately half of the global population at risk [2]. The World Health Organization (WHO) estimates that there are 390 million dengue infections annually, with 96 million manifesting clinically [3]. The disease presents a wide spectrum of symptoms, ranging from mild febrile illness to severe and potentially life-threatening conditions such as dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) [4]. The global burden of dengue has increased dramatically in recent decades, driven by factors such as urbanization, climate change,

and inadequate vector control measures [5]. This study aims to contribute to the understanding of dengue fever by analysing the prevalence and demographic characteristics of patients with positive dengue serology in a specific population [6]. The dengue virus belongs to the Flaviviridae family and has four distinct serotypes (DENV-1, DENV-2, DENV-3, and DENV-4). Infection with one serotype provides lifelong immunity to that specific serotype but only temporary and partial immunity to the others. Subsequent infections with different serotypes increase the risk of severe dengue due to antibody-dependent enhancement (ADE), a phenomenon where pre-existing antibodies enhance viral entry and replication [7]. This complexity underscores the importance of understanding the epidemiology of dengue fever to inform effective prevention and control strategies [8]. Dengue fever is characterized by a sudden onset of high fever, severe headache, pain behind the eyes, joint and muscle pain, rash, and mild bleeding manifestations such as nosebleeds or gum bleeding [9]. While most cases are mild and self-limiting, severe dengue can lead to plasma leakage, fluid accumulation, respiratory distress, severe bleeding, and organ impairment. Early diagnosis and prompt medical management are critical to reducing morbidity and mortality associated with severe dengue. However, the lack of specific antiviral treatments and the limited availability of vaccines in many endemic regions highlight the importance of preventive measures, such as vector control and community education [10].

The transmission dynamics of dengue fever are influenced by a combination of environmental, biological, and social factors. The Aedes aegypti mosquito, the primary vector, thrives in urban and semi-urban environments, breeding in stagnant water sources such as discarded containers, tires, and flowerpots. Climate change, characterized by rising temperatures and changing rainfall patterns, has expanded the geographic range of Aedes mosquitoes, increasing the risk of dengue transmission in previously unaffected areas. Urbanization, with its associated population density and inadequate waste management, further exacerbates the problem by creating ideal breeding conditions for mosquitoes [11]. In many endemic regions, dengue fever exhibits distinct seasonal patterns, with peaks in transmission occurring during the rainy season when mosquito breeding sites are abundant [12]. However, the disease can also occur year-round in areas with consistent rainfall or inadequate vector control measures. Understanding these temporal trends is essential for designing targeted interventions that maximize their impact during periods of high transmission [13]. The burden of dengue fever is not evenly distributed across populations. Certain demographic groups, such as children and the elderly, are at higher risk of severe dengue due to differences in immune response and underlying health conditions. Socioeconomic factors, such as poverty and limited access to healthcare, also play a significant role in shaping the epidemiology of dengue fever. Communities with inadequate housing, poor sanitation, and limited access to clean water are particularly vulnerable to dengue outbreaks. Despite the significant progress made in understanding dengue fever, several challenges remain. The lack of reliable surveillance systems in many endemic regions hampers efforts to accurately estimate the burden of the disease and monitor its spread [14]. The development of effective vaccines has been complicated by the need to provide protection against all four serotypes and the risk of ADE. Furthermore, the emergence of insecticide resistance in Aedes mosquitoes poses a significant threat to vector control efforts. This study seeks to address some of these challenges by analysing the prevalence of dengue fever and the demographic characteristics of patients with positive dengue serology in a specific population. By examining the age and gender distribution of cases, as well as the temporal trends in dengue transmission, this study aims to provide valuable insights for public health planning and intervention strategies [15]. The findings of this study will contribute to the growing body of knowledge on dengue fever and inform efforts to reduce its burden in endemic regions. dengue fever remains a major public health challenge in tropical and subtropical regions, with significant implications for morbidity, mortality, and healthcare systems [16]. The complex interplay of environmental, biological, and social factors that drive dengue transmission underscores the need for a multifaceted approach to prevention and control [17]. This study aims to enhance our understanding of dengue fever by analysing the prevalence and demographic characteristics of cases in a specific population, providing valuable insights for public health action. By addressing the gaps in knowledge and informing targeted interventions, this study contributes to the global effort to reduce the burden of dengue fever and improve health outcomes for affected populations [18].

Methods

Study design and population

A retrospective analysis was conducted on 100 patients who tested positive for dengue serology between September 2024 and December 2024. Data included patient demographics (age, gender) and test results.

Data collection

Data were extracted from laboratory records, including patient names, ages, genders, dengue serology results, and test dates. Ethical approval was obtained, and patient confidentiality was maintained.

Statistical analysis

Descriptive statistics were used to analyze the data. Prevalence rates were calculated, and demographic characteristics were stratified by age and gender.

Results

The analysis of 100 patients with positive dengue serology revealed significant insights into the prevalence and demographic distribution of dengue fever. All 100 patients tested positive for dengue serology, indicating a 100% prevalence rate among the tested population during the study period from September 2024 to December 2024. The age distribution of the patients showed that adults (≥18 years) constituted the majority of cases, with 78 patients (78%), while children (<18 years) accounted for 22 patients (22%). The age range of the patients was 13 to 50 years, with a mean age of 35.4 years. Among the adults, the 18–30 years age group had the highest number of cases (33 patients, 33%), followed by the 31–40 years age group (27 patients, 27%), and the 41–50 years age group (18 patients, 18%). In the paediatric population (<18 years), 22 cases were reported, with 12 males and 10 females. Gender distribution was nearly equal, with 52 males (52%) and 48 females (48%) testing positive for dengue serology. Among adults, males slightly outnumbered females, with 40 male cases compared to 38 female cases. In the paediatric group, the gender distribution was balanced, with 12 males and 10 females. The monthly distribution of cases showed a consistent number of infections during the first three months of the study, with 30 cases each in September, October, and November (30% each month). However, a decline was observed in December, with only 10 cases (10%) reported. This pattern suggests a seasonal peak in dengue infections during the earlier months, likely corresponding to higher mosquito activity [Table 1].

The age and gender stratification further highlighted specific trends. In the 13–17 years age group, 12 males and 10 females were affected, while in the 18–30 years age group, 18 males and 15 females tested positive. The 31–40 years age group had 14 males and 13 females, and the 41–50 years age group included 8 males and 10 females. These findings indicate that dengue fever affects a broad age range, with a slightly higher prevalence among younger adults (18–30 years) and a balanced gender distribution across all age groups. The monthly distribution of cases also provided valuable insights into the temporal spread of dengue fever [Table 3]. The high number of cases in September, October, and November (30 cases each month) suggests a seasonal surge, potentially linked to environmental factors such as rainfall and temperature, which influence mosquito breeding and activity. The decline in cases in December (10 cases) may reflect reduced mosquito activity or the effectiveness of public health interventions implemented during the peak months. the results demonstrate a high prevalence of dengue fever among the tested population, with a significant burden on adults and a notable proportion of paediatric cases. The nearly equal gender distribution and the seasonal pattern of infections underscore the need for targeted public health strategies to address dengue fever. These findings align with global trends, where dengue fever is endemic in tropical and subtropical regions, and highlight the importance of continuous surveillance and intervention to mitigate its impact [Table 2].

Age and gender stratification

Table 1: Shows the distribution of dengue cases by age group and gender.

Age Group	Male Cases	Female Cases	Total
13-17 Years	12	10	22
18-30 Years	18	15	33
31-40 Years	14	13	27
41-50 Years	8	10	18
Total	52	48	100

Monthly distribution of cases

Table 2: Illustrates the monthly distribution of dengue cases.

Month	Number of cases	Percentage
September	30	30%
October	30	30%
November	30	30%
December	10	10%
Total	100	100%

Age distribution

Age Group	Number of Cases	Percentage
13-17 Years	22	22%
18-30 Years	33	33%
31-40 Years	27	27%
41-50 Years	18	18%
Total	100	100%

Table 3: Shows the age distribution of dengue cases.

Discussion

The findings of this study reveal a high prevalence of dengue fever among the tested population, with all 100 patients showing positive dengue serology results [19]. This underscores the significant burden of dengue fever in the studied region, particularly during the months of September, October, and November, which accounted for 90% of the cases [20]. The nearly equal gender distribution (52% males and 48% females) suggests that both genders are equally susceptible to dengue infection in this population. This contrasts with some studies that report a higher prevalence among males, often attributed to occupational exposure or outdoor activities that increase contact with mosquito vectors. The balanced gender distribution in this study may reflect similar exposure risks for both males and females in the community [21]. The age distribution of dengue cases highlights the vulnerability of both adults and children to the disease. Adults (≥18 years) constituted the majority of cases (78%), with the 18–30 years age group being the most affected (33% of total cases). This is consistent with global trends, where adults are often more exposed to mosquito vectors due to work or daily activities [23]. However, the significant proportion of paediatric cases (22%) is concerning, as children are particularly susceptible to severe forms of dengue, such as dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). The presence of cases in the 13–17 years age group (22 cases) emphasizes the need for targeted interventions in schools and communities to protect this vulnerable population.

The seasonal pattern observed in this study aligns with the known epidemiology of dengue fever, which is influenced by environmental factors such as rainfall, temperature, and humidity [24]. The high number of cases in September, October, and November (30 cases each month) likely corresponds to the peak mosquito breeding season, driven by favorable climatic conditions. The decline in cases in December (10 cases) may reflect reduced mosquito activity due to cooler temperatures or the impact of public health interventions implemented during the peak months. This seasonal trend highlights the importance of timing preventive measures, such as vector control campaigns and public awareness programs, to coincide with periods of high mosquito activity. The nearly equal distribution of cases across genders and the broad age range of affected individuals suggest that dengue fever is a community-wide issue that requires comprehensive public health strategies. The high prevalence among adults, particularly young adults (18–30 years), may be linked to their greater mobility and outdoor activities, which increase their exposure to mosquito bites. On the other hand, the significant number of paediatric cases underscores the need for targeted interventions in schools and households to protect children from infection. Public health campaigns should focus on educating communities about the importance of eliminating mosquito breeding sites, using insect repellents, and seeking early medical care for dengue-like symptoms.

The findings of this study are consistent with global trends, where dengue fever is endemic in tropical and subtropical regions. However, the equal gender distribution contrasts with some studies that report a higher prevalence among males. This discrepancy may be due to differences in local exposure risks or cultural factors that influence mosquito contact. For example, in some regions, males may have greater outdoor exposure due to work or

recreational activities, while in others, females may be equally exposed due to household or community roles. The balanced gender distribution in this study suggests that both males and females in the studied population face similar risks of dengue infection. The presence of paediatric cases in this study highlights the need for targeted interventions to protect children from dengue fever. Children are particularly vulnerable to severe dengue, which can lead to life-threatening complications such as DHF and DSS. Public health strategies should include school-based education programs, community outreach, and household-level interventions to reduce mosquito breeding sites and promote protective behaviors. Additionally, healthcare providers should be trained to recognize and manage dengue fever in children, ensuring timely diagnosis and treatment to prevent severe outcomes [25].

The seasonal pattern of dengue cases observed in this study underscores the importance of timing public health interventions to coincide with periods of high mosquito activity. Vector control measures, such as laicising and fogging, should be intensified during the peak transmission season to reduce mosquito populations and interrupt disease transmission. Public awareness campaigns should also be conducted during this period to encourage communities to take preventive measures, such as using insect repellents, wearing protective clothing, and eliminating standing water around homes. this study highlights the high prevalence of dengue fever in the studied population, with significant cases among both adults and children. The nearly equal gender distribution and the seasonal pattern of infections underscore the need for targeted public health strategies to address dengue fever. These findings align with global trends and emphasize the importance of continuous surveillance, vector control, and community engagement to mitigate the impact of dengue fever. Further research is needed to explore the serotype distribution, risk factors, and clinical outcomes of dengue fever in this population, providing valuable insights for public health planning and intervention strategies [26].

Limitations

This study has several limitations. First, it was restricted to a single cohort of 100 patients, which may not be representative of the broader population, thereby limiting the generalizability of the findings. Additionally, data on clinical severity, serotypes, and patient outcomes were not available, preventing a comprehensive analysis of disease progression and its impact. The absence of these variables reduces the study's ability to assess potential correlations between specific factors and patient prognosis. Furthermore, the short study period limited the ability to evaluate long-term trends, making it difficult to determine whether the findings are consistent over time or influenced by temporal variations. These constraints highlight the need for future research with larger, more diverse patient cohorts, extended study periods, and more comprehensive data collection. Expanding these aspects would improve the reliability and applicability of the findings, providing a more robust understanding of the studied condition.

Recommendation

To effectively combat dengue, several key measures should be implemented. Strengthening vector control programs is essential to reduce mosquito breeding sites through environmental management, proper waste disposal, and targeted insecticide use. Increasing public awareness is equally important, as educating communities about dengue prevention strategies, early symptom recognition, and the need for timely medical intervention can help reduce disease transmission and severity. Additionally, conducting larger, longitudinal studies is crucial for assessing trends, identifying risk factors, and understanding the long-term epidemiology of dengue, which will enhance public health preparedness and response strategies. Improving diagnostic capacity is another critical step, ensuring that healthcare facilities have access to rapid and accurate testing methods. This includes investing in laboratory infrastructure, expanding training programs for healthcare professionals, and integrating advanced diagnostic technologies. By adopting these measures, health authorities can enhance dengue prevention, improve early detection, and mitigate the overall impact of the disease.

Conclusion

This study highlights the high prevalence of dengue fever in the studied population, with significant cases among both adults and

children. Public health measures, including vector control, community education, and early diagnosis, are essential to mitigate the impact of dengue fever. Further research is needed to explore serotype distribution and risk factors.

Conflict of Interest

Author has no conflicts of interest to declare.

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Ethical Approval

The decision was taken by the Clinical Research Ethics Committee of the Peltier General Hospital, University Hospital Center, Djibouti, on the date of 15.08.2024.

Author Contribution

SMH: conceived of the presented idea, wrote the manuscript verified the analytical methods. SMH, CMI, proofread the manuscript. All authors read and approve the Last Version of this Research Article.

Bibliography

1. Hidig SM., *et al*. "Advancements in Disease Surveillance and Data Coverage in Djibouti: A Commentary and Brief Overview". *International Journal of Advance Research and Innovative Ideas in Education* 10.2 (2024).

2. Cen S., *et al*. "Prevalencia de dengue y leptospirosis en pacientes febriles en un hospital general de especialidades, México [Prevalence of dengue and leptospira in febrile patients of the general hospital of specialities in Mexico]". *Revista chilena de infectologia : organo oficial de la Sociedad Chilena de Infectologia* 35.3 (2018): 332-333.

3. Kamal R., *et al*. "Culture-positive unilateral panophthalmitis in a serology-positive case of dengue hemorrhagic fever". *Indian Journal of Ophthalmology* 66.7 (2018): 1017-1019.

4. Santos TMIL., *et al*. "Dengue and SARS-CoV-2 co-circulation and overlapping infections in hospitalized patients". *Frontiers in Cellular and Infection Microbiology* 14 (2024): 1429309.

5. Oderinde BS., *et al*. "Prevalence of locally undetected acute infections of Flaviviruses in North-Eastern Nigeria". *Virus Research* 286 (2020): 198060.

6. Mota M L., *et al*. "Serological and molecular epidemiology of the Dengue, Zika and Chikungunya viruses in a risk area in Brazil". *BMC Infectious Diseases* 21.1 (2021): 704.

7. Souza Gonçalves M., *et al*. "Prevalence of arboviruses in sickle cell disease patients from two different regions of Brazil, the North and Northeast". *The Brazilian Journal of Infectious Diseases* 28.2 (2024): 103741.

8. Hidig SM. "Advancing Healthcare in East Africa: Challenges, Advancements, and Potential Solutions". *GAS Journal of Clinical Medicine and Medical Research (GASJCMMR)* 1.1 (2024): 6-8.

9. Huang XY., *et al*. "Outbreak of dengue Fever in central China, 2013". *Biomedical and Environmental Sciences : BES* 27.11 (2024): 894-897.

10. Arai K E., *et al*. "Performance evaluation of an indirect immunofluorescence kit for the serological diagnosis of dengue". *Einstein (Sao Paulo, Brazil)* 18 (2019): eAO5078.

11. Ngwe Tun M M., *et al*. "Characterization of the 2013 dengue epidemic in Myanmar with dengue virus 1 as the dominant serotype". *Infection, Genetics and Evolution* 43 (2019): 31-37.

12. Hidig SM. "Dengue Fever Crisis in Somaliland: Overview of Reported Cases and Impacts". *Journal Homepage* (2018).

13. Chakravarti A and Kumaria R. "Circulating levels of tumour necrosis factor-alpha and interferon-gamma in patients with dengue & dengue haemorrhagic fever during an outbreak". *The Indian Journal of Medical Research* 123.1 (2006): 25-30.

14. Sánchez-Lerma L., *et al*. "Unexpected arboviruses found in an epidemiological surveillance of acute tropical febrile syndrome in the department of Meta, Eastern Colombia". *Journal of Infection and Public Health* 17.9 (2024): 102510.

15. Liew SM., *et al*. "Dengue in Malaysia: Factors Associated with Dengue Mortality from a National Registry". *PloS One* 11.6 (2016): e0157631.

16. Wee L E., *et al*. "Experience of a Tertiary Hospital in Singapore with Management of a Dual Outbreak of COVID-19 and Dengue". *The American Journal of Tropical Medicine and Hygiene* 103.5 (2020): 2005-2011.

17. Dos Santos Carmo AM., *et al*. "Maintenance of demographic and hematological profiles in a long-lasting dengue fever outbreak: implications for management". *Infectious Diseases of Poverty* 5.1 (2016): 84.

18. de Teive E Argolo AF., *et al*. "High frequency of pre-existing neutralizing antibody responses in patients with dengue during an outbreak in Central Brazil". *BMC Infectious Diseases* 16.1 (2016): 546.

19. Baba M., *et al*. "Evidence of arbovirus co-infection in suspected febrile malaria and typhoid patients in Nigeria". *Journal of Infection in Developing Countries* 7.1 (2013): 51-59.

20. Aoussi EB., *et al*. "Seven native cases of dengue in Abidjan, Ivory Coast". *Medecine et Maladies Infectieuses* 44.9 (2014): 433-436.

21. Hidig SM., *et al*. "Advancements in Disease Surveillance and Data Coverage in Djibouti: A Commentary and Brief Overview". *International Journal of Advance Research and Innovative Ideas in Education* 10.2 (2024).

22. Humphrey J M., *et al*. "Dengue in the Middle East and North Africa: A Systematic Review". *PLoS Neglected Tropical Diseases* 10.12 (2016): e0005194.

23. Gebremariam TT., *et al*. "Increasing prevalence of malaria and acute dengue virus coinfection in Africa: a meta-analysis and meta-regression of cross-sectional studies". *Malaria Journal* 22.1 (2023): 300.

24. Altassan K K., *et al*. "Dengue fever in Saudi Arabia: A review of environmental and population factors impacting emergence and spread". *Travel Medicine and Infectious Disease* 30 (2019): 46-53.

25. Shimelis T., *et al*. "Detection of dengue virus infection in children presenting with fever in Hawassa, southern Ethiopia". *Scientific Reports* 13.1 (2023): 7997.

26. Alsedig K., *et al*. "Prevalence of malaria and dengue co-infections among febrile patients during dengue transmission season in Kassala, eastern Sudan". *PLoS Neglected Tropical Diseases* 17.10 (2023): e0011660.