Research Article

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2025.60.009500

The Importance of Screening for Dengue in Transfusion Safety: An Integrative Synthesis of the Literature

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ARTICLE INFO

Received: February 13, 2025

Published: February 26, 2025

Citation: Tereza Raquel Xavier Viana, Larissa Teodoro Rabi* and Regiane Priscila Ratti. The Importance of Screening for Dengue in Transfusion Safety: An Integrative Synthesis of the Literature. Biomed J Sci & Tech Res 60(4)-2025. BJSTR. MS.ID.009500.

ABSTRACT

Dengue fever, an endemic arbovirus in tropical countries such as Brazil, presents growing challenges for transfusion safety. Although transmission occurs predominantly through the Aedes aegypti vector, recent evidence suggests that transfusion transmission is also significant, especially during periods of high endemicity. This study sought to assess the relevance of screening blood donors for dengue virus (DENV), with a focus on ensuring transfusion safety and preventing risks to recipients. An integrative literature review was carried out in three databases (SciELO, PubMed and BVS), including articles published between 2020 and 2025, peer-reviewed and with free access. After strict inclusion and exclusion criteria, three studies were selected for analysis. The results highlighted documented cases of arbovirus transmission by transfusion, including DENV, and highlighted the need for specific screening for these viruses in blood banks. One of the studies reviewed showed that 17.9% of healthy donors in Jordan were seropositive for anti-DENV IgG, suggesting a potential risk of transmission. Another study reported 74 cases of arbovirus transmission by transfusion, with a prevalence of serious complications among immunosuppressed recipients. In addition, the review addressed the management of severe dengue, which often requires blood products, reinforcing the importance of rigorous screening practices to avoid transfusion transmission. The findings show that improved screening strategies are essential in endemic regions to minimize risks and ensure the safety of blood components.

The inclusion of specific tests for DENV and other arboviruses in transfusion protocols is an indispensable measure to protect the health of recipients and strengthen transfusion safety.

Keywords: Arboviruses; Blood Safety; Transfusion Screening

Introduction

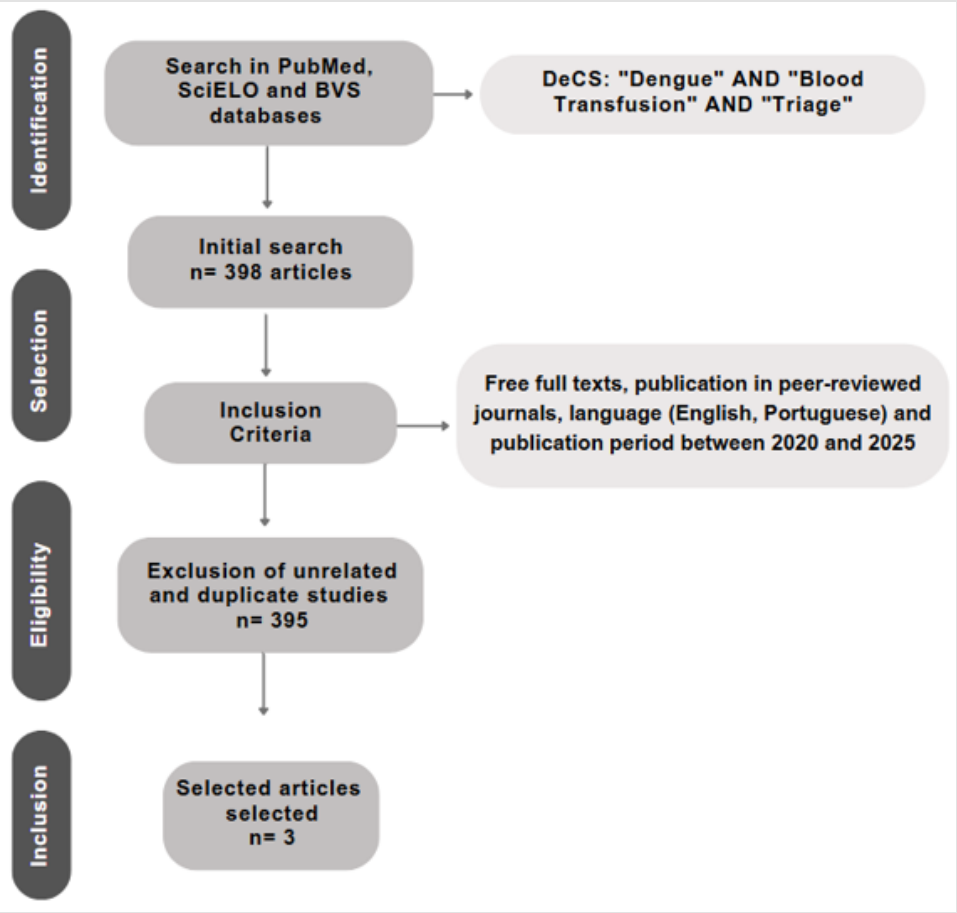
Dengue is an arbovirus of great public health importance, especially in tropical countries like Brazil, where climatic conditions favor the proliferation of the Aedes aegypti mosquito [1]. According to recent data, dengue affects millions of people every year, with significant impacts on quality of life and the burden on health systems [2]. Although the main form of transmission is vector-borne, growing evidence points to the possibility of transfusion transmission, especially during periods of high endemicity [3]. In blood banks, transfusion safety is guaranteed by strict screening criteria, including serological tests for various infectious diseases, such as HIV, hepatitis B and C and syphilis. However, screening for arboviruses, such as dengue, is still not mandatory in Brazil, even with documented cases of transmission by blood transfusion [3]. The rate of dengue transmission by transfusion can reach up to 37.5%, highlighting the need to implement additional preventive actions [4]. The absence of a specific test to detect dengue virus in donors represents a potential risk for recipients, especially those who are immunosuppressed or in critical clinical conditions [4]. In this context, experts recommend implementing testing for arboviruses in blood banks, with the aim of preventing transfusion infections and strengthening the safety of blood components [5]. Given this scenario, the aim of this study is to evaluate the importance of screening blood donors for DENV, with a focus on ensuring transfusion safety and preventing risks to the health of recipients.

The relevance of this analysis lies in the fact that, although arbovirus transmission by transfusion is considered rare, it represents a

potential threat in endemic regions. In this context, understanding the challenges and implementing effective screening strategies are crucial steps to mitigate possible complications, guarantee the quality of hemotherapy services and promote public health more broadly.

Methodology

This research consisted of an integrative literature review, carried out between December 2024 and January 2025. Three databases were consulted: Scientific Electronic Library Online (SciELO), U.S. National Library of Medicine (PubMed) and Virtual Health Library (VHL). The Health Sciences Descriptors (DeCS/MeSH) used in the searches were "dengue", "Blood Transfusion" and "Triage", combined by the Boolean operator "AND". The central research question was: "What is the importance of screening for dengue in transfusion safety?". Initially, 398 articles were found. After applying inclusion and exclusion criteria, this number was reduced to 72. Of these, 69 were discarded because they did not meet the proposed theme. After this filtering, 3 articles remained for analysis. The inclusion and exclusion criteria were carefully defined to ensure the relevance and quality of the studies selected, offering an in-depth and consistent analysis of the topic. We included articles published between 2020 and 2025, in Portuguese or English, which were peer-reviewed and made the full text available free of charge. Meta-analysis articles, clinical trials and systematic reviews were also considered. Articles published before 2020, observational studies, narrative reviews, case reports and opinion articles were excluded. Those that did not directly address dengue screening in the context of blood transfusion, as well as simplified abstracts or texts that required payment for full access were also discarded (Figure 1). These criteria aimed to ensure the selection of relevant, high-quality studies for a robust and comprehensive analysis of the topic.



Note: Source: Literature research process - prepared by the authors.
Figure 1: Flowchart of the scientific article search process.

Results and Discussion

The studies explore various aspects related to the transmission of arboviruses by blood transfusion, including the prevalence of these viruses in different populations and the clinical implications of this transmission. One of the studies reviews cases of transfusion-transmitted infections, highlighting the most common viruses and associated risk factors, such as immunosuppressed recipients. Another study investigates the presence of specific viruses in blood donors, while a third looks at the diagnosis and treatment of arboviruses, focusing on the clinical forms of the disease and the necessary therapeutic approaches. Below is a table summarizing the main findings of these studies. The growing concern about the transmission of arboviruses, especially dengue, through blood transfusion underlines the urgent need to improve donor screening practices in endemic regions. A study carried out in Jordan revealed a 17.9% prevalence of IgG anti-DENV antibodies among healthy blood donors, indicating a potential risk of arbovirus transmission by transfusion. Although the observed prevalence is relatively low, this data highlights the importance of implementing rigorous screening strategies to detect DENV and other arboviruses in areas of high endemicity. In addition, the study reinforces that although dengue transmission by blood transfusion is rare, it represents a growing concern, especially due to the high seropositivity rate observed in some regions, which requires continuous surveillance and improved screening practices [6].

On the other hand, a 2021 study showed that the transmission of arboviruses, including DENV and Zika, by blood transfusion has increased over the last two decades. The research identified 74 cases of transfusion infection, with the majority occurring due to the transfusion of red blood cells, especially in immunosuppressed recipients. The mortality rate of 18.9% among recipients underlines the seriousness of the issue (Table 1). These findings reinforce the need for more rigorous screening strategies to minimize the risk of transmission of these viruses and ensure transfusion safety, especially in endemic regions [4]. The analysis on the management of severe dengue highlights that patients with severe forms of the disease often require blood products, which makes transfusion safety a crucial aspect in the clinical management of these cases. Adequate screening of donors for DENV is essential to avoid transmission of the virus and complications associated with transfusion, such as bleeding. In addition, climate change and global mobility have increased the spread of arboviruses in non-endemic areas, which directly implies transfusion safety and the need for more comprehensive screening [7]. These studies highlight the importance of improved blood screening strategies, especially in dengue-endemic regions, to protect the health of recipients and ensure transfusion safety. Implementing specific screening for arboviruses, including dengue, can minimize risks and ensure that blood transfusions are not a route of transmission for potentially serious diseases. In addition, strengthening screening practices and constantly updating safety protocols are essential to mitigate the risks associated with blood transfusions in areas with a high incidence of arboviruses.

Table 1: Presentation of the articles included in the review.

Author / Year	Objectives	Methods	Results
Giménez-Richarte Á, et al. [1]	To review cases of arbovirus transmission by blood transfusion and analyze their clinical and epidemiological characteristics.	Systematic literature review in MEDLINE, Embase and Scopus. Pairs of authors selected publications on cases of transfusion-transmitted arboviruses. Protocol registered with PROSPERO (CRD42021270355).	A total of 74 cases of infection by 10 arboviruses were identified, with West Nile virus being the most common (n=42). Red blood cells were the most commonly involved blood component (47.3%). 54.1% of cases were in immunosuppressed recipients. 18.9% of cases resulted in death.
Swedan S, Al-Saleh D [6]	To investigate the prevalence of TTV antigen and IgG anti-DENV antibodies among healthy blood donors in Jordan.	Cross-sectional study with 190 blood donors using enzyme-linked immunosorbent assays to detect TTV and anti-DENV IgG, with logistic regression analysis and chi-square test.	TTV detected in 17.9% of samples. Higher positivity in non-residents. Anti-DENV IgG seropositivity was 17.9%, with a higher prevalence among Agwar residents.
Witte P, et al. [7]	Discuss the diagnosis, risk and treatment of dengue, focusing on clinical approaches and preventive measures.	Review with selective search in databases of international publications, WHO guidelines from 2009 and recommendations from the Robert Koch Institute.	Dengue fever has a mild course in over 90% of cases. The severe form is rare, with a mortality rate of 1-5%. Diagnosis is made by RT-PCR or serology. Treatment is symptomatic, with volume replacement and transfusion in cases of hemorrhage. Prevention includes vaccination and bite control.

Note: Source: Studies included in the review - prepared by the authors.

Conclusion

This study highlights the relevance of screening for DENV as an essential strategy for ensuring transfusion safety, especially in endemic regions. The literature review highlighted that although transfusion transmission of dengue is considered rare, its potential impact on recipients, especially immunocompromised ones, is significant. The implementation of strict screening protocols and the adoption of specific tests in endemic areas are indispensable measures to minimize the risks of transmission. Furthermore, the research reinforces the need for ongoing investigations to improve screening and monitoring practices, contributing to a more effective approach to arbovirus prevention in hemotherapy services.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2025.60.009500

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Submission Link: https://biomedres.us/submit-manuscript.php