The Review Of
DIABETIC
STUDIES OPEN ACCESS

# Assessing The Risk Of Knowledge Decline Among Patients With Dengue Virus Infection: A Systematic Review In Saudi Arabia 2024

**Ibraheem Ahmed Alzahrani[1], Sultan Hymid Al-Hazmi[1], Haitham Abdullah Ali Alahmadi[2], Ghaleb Essam A ALsharabi[3], Mathkar Mazyad Alotaibi[3], Jamal Osama Bakr Gazzaz[4], Muneer Salem Almabadi[4], Naif Faihan Orayn Alotibi[5], Hadeel Khaled Marzuq Al-Motary[6], Afrah Atallh Bkeet Alanezy[7], Amani Adbullah Oadah Alodah[8], Sheka Hamed Jries Almotery[8], Abdulaziz Talaat Munshi[9]**

*[1]Epidemiology Monitor, Makkah health, Saudi Arabia.*
*[2]Nursing Technician, Makkah health, Saudi Arabia.*
*[3]Epidemiologist, Health Affairs in the Makkah Al-Mukarramah Region, Saudi Arabia.*
*[4]Epidemiologist, Makkah health, Saudi Arabia.*
*[5]Emergency and ambulance technician, Makkah health, Saudi Arabia.*
*[6]Nursing technician, King Saud Hospital, Saudi Arabia.*
*[7]Nursing technician, Al Dhalfaa Health Center, Saudi Arabia.*
*[8]Nursing technician, Al Bukayriyah Hospital, Saudi Arabia.*
*[9]Epidemiologist, Ministry of Health, Saudi Arabia.*

## Abstract

### Background

Dengue fever, caused by the dengue virus and transmitted through Aedes mosquitoes, is a growing public health concern, particularly in tropical and subtropical regions. Traditionally associated with febrile and hemorrhagic symptoms, recent research suggests a potential link between dengue and cognitive impairments. Dengue fever cases are on the rise in Saudi Arabia. Studies pertaining to public knowledge of dengue prevention have frequently been used to better understand the publics' needs towards dengue. Dengue fever (DF) is one of the most prevalent arboviral infections worldwide. In Saudi Arabia, the dengue positive serological cases as well as the presence of the dengue vector Aedeses Egypt have raised health concerns, highlighting the need to enhance the dengue surveillance system. Regarding dengue fever in a large and high-risk region in Saudi Arabia . This study conducted a systematic review of assessing the risk of Knowledge decline among patients with dengue virus infection,

**Aim of the systematic review**: To assessing the risk of Knowledge decline among patients with dengue virus infection in Saudi Arabia systematic review 2024.

**Method:** This systematic review followed preferred reporting items for systematic reviews guidelines. A comprehensive literature search was conducted in PubMed, EMBASE, and Web of Science up to December, 2024. Studies assessing the risk of Knowledge decline among patients with dengue virus infection in Saudi Arabia.

**Results:** The systematic review databases yielded a total of129 studies. After excluding 823 duplicates, 866 studies were screened based on titles and abstracts. Irrelevant studies were removed, including nonhuman studies, case reports, studies not related to dengue, reviews, short communications, and studies without cognitive outcomes. Six articles were retrieved for full text screening, with 1 further excluded, for not reporting cognitive outcomes. Finally, 7 studies met all the eligibility criteria for Inclusion in the systematic review, covering a total of 2873 participants from Saudi Arabia and other country as shown in Table1.

**Conclusion**: This systematic review suggests that dengue virus infection may affect risk of Knowledge decline in both acute and long-term contexts. However, the current evidence is not strong enough to establish a conclusive link. Further research with larger sample sizes and Longitudinal studies is essential to confirm the impact of dengue virus on risk of Knowledge decline.

**Keywords:** Assessment, risk, Knowledge, decline, dengue virus , infection, Saudi Arabia 2024

## Introduction

### Background:

Aedes mosquitoes carrying the dengue fever (DF) virus can bite people and spread the infection to humans who have the virus, as well as to Aides mosquitoes. Aedes a Egypt and Aides albopictus are the Aides species that are recognized as carrying the illness (1)

The infection of dengue starts with a bite of a female mosquito primarily of the species Aides a Egypt and, to a lesser extent, Aides albopictus, Aides- polynesiensis, and Aides scutellaris. (2)There are four dengue serotypes: DEN-1, DEN-2, DEN-3, and DEN-4, and symptoms typically appear in four to seven days going through three phases: febrile, critical, and recovery (3). Most infections by any of these serotypes result in a self-limiting fever; however, age, genetic predisposition, and background immunity can result in different clinical appearances, the most severe of which causes hemodynamic compromise due to plasma leakage (4). In 2009, WHO classified dengue into three categories: dengue without warning signs, dengue with warning signs and severe dengue to optimize clinical management since the strict application of the 1997 system missed the more severe manifestations (5). Since a modest proportion of infected patient progress to the severe forms of dengue, it becomes more important than ever for healthcare professionals (HCPs) to recognize the warning signs in clinical practice. Including metabolic disturbances and autoimmune reactions, can lead to serious long-term brain issues . (6) However, the full extent and nature of these long-term consequences remain underexplored in the current scientific literature. There have also been observations of diminished sensitivity, cognitive impairment, convulsions, and a decline in cognitive function during acute phases of the illness.(7) such findings indicate that the dengue virus may have a more profound and lasting impact on cognitive function than previously understood. (8) The potential for dengue to cause such significant neurological sequelae raises critical questions about the disease's long-term effects on the brain and cognitive health.(9)

Climate influences the propagation of dengue as the virus has to complete part of its development in the vectors responsible for disease transmission that transmit the disease. (10) The major vectors are mosquitoes such as Aides Egypt or albopictus whose lifecycle is dependent on ambient temperature and rainfall.(11) The climate is constantly changing which increases the chances to expand the geographical distribution of several mosquito-borne diseases (12). The evidence from around the areas with frequent dengue outbreaks indicate a close association between increasing incidence of dengue with rainfall, relative humidity, and temperature.(13) Several studies have indicated an increase in the transmission potential of dengue fever under climate change based on the association between meteorological factors and disease transmission. Meteorological factors have an intricate influence on disease transmissions, and patterns of disease epidemics, such as epidemic size and peak time, may be subject to change under global warming.(14) Climate factors such as precipitation also significantly affect the life cycle of dengue mosquitoes thus, these factors need to be included in mathematical models of dengue transmission. Further-more. Similarly, rainfall has been shown to influence larval density and larval population size of vector of dengue.(15)

Dengue transmission involves a complex interplay of environmental, entomological, and social determinants. (16) Key risk factors include climate conditions suited for vector breeding, Aides mosquito density, human movement patterns, urbanization, and herd immunity4. Weather factors like temperature, rainfall, and wind also impact mosquito biology and dengue transmission dynamics (17). Given Saudi Arabia's arid climate, dengue risk is highest during seasonal increases in humidity and precipitation6. Dengue primarily affects young adults yet can cause severe disease requiring hospitalization, especially upon secondary infection (18). Understanding local epidemiology is thus critical to plan targeted prevention.(12)

## Methodology

### Aim of the study:

To assessing the risk of Knowledge decline among patients with dengue virus infection in Saudi Arabia systematic review 2024.

**Study design**:
Systematic reviews Using multiple databases, including followed preferred reporting items for systematic reviews guidelines. A comprehensive literature search was conducted in PubMed, EMBASE, and Web of Science up to December, 2024. Studies assessing the risk of Knowledge decline among patients with dengue virus infection in Saudi Arabia.

**Search strategy**:
A comprehensive literature search was conducted in PubMed, EMBASE, and Web of Science from inception to December, 2024.
The search strategy utilized a combination of keywords and medical subject headings related to "dengue," "risk" "assessment" "Knowledge" "decline," and "confusion." No filters or restrictions were applied to the search to ensure comprehensive literature capture. A detailed search strategy is provided.

**Searches and Data Sources**
This systematic review followed preferred reporting items for systematic reviews guidelines. A comprehensive literature search was conducted in PubMed, EMBASE, and Web of Science up to December, 2024. Studies assessing the risk of Knowledge decline among patients with dengue virus infection in Saudi Arabia were included. Data extraction and quality assessment were performed using assessment Knowledge. Of the 129 articles identified, 7 were included in the review, covering a total of 2873 participants from Saudi Arabia. Evidence from indicated Knowledge decline, in some dengue patients . Additionally, long-term risks among older adults . Although the findings suggest there might be an association between dengue infection and Knowledge decline, the mechanisms underlying this link remain unclear. This systematic review suggests that dengue virus infection may affect knowledge decline function in both acute and long-term contexts. However, the current evidence is not strong enough to establish a conclusive link. Further research with larger sample sizes and longitudinal studies is essential to confirm the impact of dengue virus on knowledge decline.

**Inclusion criteria**
We included studies examining patients diagnosed with dengue, regardless of age, sex, or geographical location. Our primary outcome of interest is to find the association between risk of Knowledge decline and dengue virus infection. Eligible study designs include RCTs, cohort studies, case-control studies, and observational studies. We considered studies published from inception to December, 2024. Initially, there was no language restriction, but for practicality, only articles published in English or available with English translations were reviewed. A detailed inclusion criterion was represented in Table 1.

**Exclusion Criteria**
Studies that did not report the results of an observational study, such as comments, case reports, reviews, and letters to the editor were excluded.

**Data Extraction**
Data extraction was independently carried out by 2 reviewers using a tagging function in Nested Knowledge. We collected data on study characteristics, including study design, country, patient demographics, types of risk of Knowledge decline, total sample size, and prevalence rates of this risk of Knowledge decline. For assessing associations, we recorded the total numbers in both dengue virus infected and non-infected groups and the number of events. Any discrepancies in data extraction were resolved through discussion or by consulting a third reviewer.

**Table 1: Summary of Findings of the Assessing the risk of Knowledge decline among patients with dengue virus infection: a systematic review in Saudi Arabia 2024 .**

| Author, Date, Country | Region | Study design | Study aim | Results |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **Crowley et al. (2024)[19]** | In Thailand | A systematic review and met analysis | To assessing the Knowledge, Attitudes, and Practices (KAP) of Dengue Fever in Thailand | The overall low knowledge and poor practice levels pertaining to dengue prevention that were detected in the systematic review and meta-analysis are alarming given the previously cited rates of increasing dengue cases throughout Thailand and the subsequent burdens the virus imposes on the Thai economy . However, the overall positive attitudes towards dengue prevention that were also observed in the results are reassuring. This finding suggests that there is a high likelihood that participants will be open to dengue education and prevention programs given their overall high-risk perceptions of the virus. The results of this study displayed both similar and conflicting information when compared to similar studies conducted in other countries in Southeast Asia.<br>**Conclusions**<br>The majority of studies in the systematic review overall poor practices towards dengue prevention. Similarly, the meta-analysis found that the pooled estimate of the proportion of good practices for preventing dengue infection is only 25% . In addition to the previously discussed lack of standardization in KAP survey questions across studies, is that it only examined dengue KAP studies in Thailand. Further research should conduct similar systematic reviews and meta-analyses on dengue KAP in other regions of the world and compare the results to this study. |
| **Karimi et al (2024) [20]** | Rawalpindi and Islamabad, | This retrospective study considers a three-year (2019-2023) | To understand the prevalence and hotspots of dengue virus. Dengue Fever (DF), Dengue Shock Syndrome (DSS), and Dengue Hemorrhagic Fever (DHF), were collected and analyzed | Analysis of the impact of various emission scenarios on dengue suitability in Islamabad and found that the season conducive to dengue transmission is projected to increase substantially in the future. Similarly, when examined the impact of climate change on dengue transmission dynamics it was concluded that regardless of the emissions trajectory, the period characterized by suitable temperature conditions for dengue transmission is expected to expand significantly. This expansion of the dengue transmission period poses significant challenges for dengue |

| | | | | |
|---|---|---|---|---|
| | | | | control and public health efforts. Disease burden and distribution of Dengue fever (DF), Dengue Hemorrhagic Fever (DHF), and dengue shock syndrome (DSS) in different areas of Rawalpindi shows that in central panda the abundance of dengue fever was more as compared to the other parts of the district<br>**Conclusions**<br>This study emphasizes the importance of considering seasonal variations and the potential impacts of climate change on dengue transmission dynamics. The shift towards a bimodal pattern indicates a significant change in the timing and distribution of dengue-suitable temperature days, which has implications for dengue control strategies and public health interventions in Islamabad-Rawalpindi. Adapting surveillance and vector control measures to account for the increased occurrences during spring and autumn will be crucial for effectively managing dengue transmission in the future. Understanding these shifting patterns can inform policymakers and public health authorities in developing targeted strategies to mitigate the impacts of climate change on dengue incidence in Islamabad and ensure the health and well-being of the population. |
| **Nejati, et al (2024 ) [21]** | Iran | A multi-stage sampling method from May 2022 to July 2023 | To assess the knowledge, attitudes, and practices (KAP) of healthcare professionals (HCPs) regarding dengue fever in a large and high-risk region of Southeastern Iran. | This study was conducted for the first time in the secondlarge province of Iran, which has a history of reporting the presence of the dengue vector and positive serological cases. Considering the potential establishment of Ae. aegypti and even dengue outbreaks in this province, it is crucial to assess the knowledge, attitude, and practice of healthcare professionals to enhance decision-making and dengue fever surveillance . Poor knowledge and low education levels in border areas, inadequate training courses for most participants, and unsatisfactory practice scores are the findings that unmistakably highlight the challenges facing the health system. Only a small |

| | | | | |
|---|---|---|---|---|
| | | | | percentage of the personnel were familiar with overtop and aware of dengue vector reporting in the province. In our study, while there was no significant difference in the knowledge and attitude between genders, males exhibited a higher average practice score than females.<br>**Conclusions**<br>The lack of dengue training among 71% of participants, combined with only 32.6% familiar with overtops and 21.7 % aware that destroying larval breeding sites could not eliminate the dengue vector, raises concerns for both the healthcare system and the community. Regular, targeted, and continuous training courses are necessary to improve the knowledge level of HCPs, particularly those with lower education levels. These initiatives can effectively mitigate dengue outbreaks by equipping healthcare workers with the necessary knowledge to deliver appropriate health education to the community. Our findings underscore the significance of training in fostering a comprehensive understanding of symptoms and prevention methods among participants, resulting in improved attitudes and practices. |
| **Alqassim, et al (2024) [22]** | In Jazan at Saudi Arabia | Retrospective cross-sectional study utilized surveillance records for 3427 confirmed dengue cases. | This study analyzed the spatiotemporal, demographic, and meteorological patterns of dengue in Jazan from 2015–2020. | This study's findings The shifting geographic distribution of cases highlights spatially heterogeneous transmission requiring targeted vector control for each sector's seasonal outbreak pattern. The transition toward year-round epidemics signifies endemic establishment, as evidenced across dengue endemic regions globally. Age and nationality-based incidence disparities also mirror known dengue epidemiological risk factors of young adulthood and population mobility driving importation. Meteorological associations align with established links between climate conditions, mosquito breeding cycles, and dengue transmission. Taken together, these results quantify local epidemiological dynamics to inform a tailored prevention approach addressing |

| | | | | |
|---|---|---|---|---|
| | | | | endemic transmission among Saudi citizens alongside continued importation threats. Integrating risk-factor surveillance, outbreak forecasting and climate-based early warnings within a comprehensive dengue control program presents an evidence-based path to mitigate dengue in Jazan through data-driven resource allocation<br>**Conclusions**<br>This retrospective analysis provides vital evidence characterizing the substantial yet shifting burden of dengue in Jazan, Saudi Arabia from 2015–2020. The results quantify endemic establishment through year-round transmission, alongside spatially heterogeneous and demographically varied incidence patterns. Associations between weather factors and seasonal peaks can inform climate-based early warning systems. |
| **Al-Jabri et al . (2023), [23]** | Al-Hodeidah governorate. Yemen | Descriptive research design was used | In Al-Hodeidah governorate, to assess health employees' understanding and views toward dengue fever | The present research showed that the majority of participants were aware that DF is a viral illness spread by mosquitos. According to the present research, more than half of the participants were married. According to the current study's findings, half of the subjects were nurses, and one-third was doctors. Primary care physicians and nurses are the first-line healthcare providers in diagnosing, notifying, and treating dengue patients. The KAP of HCPs regarding dengue diseases also provides early detection and improves dengue outcome. In addition, according to Primary care doctors and nurses are the first-line health-care workers for diagnosing, notifying, and treating dengue cases. Dengue control outcomes are also influenced by basic health care workers' understanding of dengue diseases.Thought the insect that spreads the dengue fever virus attacked at night. According to the results of the present research, the majority of subjects were aware of the mechanisms of spread of dengue fever via mosquito attack.<br>**Conclusion** |

| | | | | |
|---|---|---|---|---|
| | | | | According to the research, approximately half of all health workers had a rudimentary knowledge of dengue fever. While three-quarters of them had a favorable outlook toward dengue disease. Dengue is emerging as a major mosquito-borne disease in Al-Hodeidah governorate, Yemen. The lack of knowledge about dengue and undesirable attitudes toward various aspects of the disease and weak preventive prevention practices against the disease; exacerbated by the ongoing civil posed a serious health threat to Yemen. A rigorous campaign is needed to educate and inform to improve knowledge, attitudes, and practices regarding dengue fever, and to identify and the identification of factors associated with dengue fever. |
| **Al-Nefaie et al (2022) [24]** | Jeddah, Saudi Arabia | Descriptive and analytical cross-sectional. | To investigate the distribution and spatial patterns of dengue fever cases in Jeddah, and to determine if there is an association between dengue fever and the following environmental factors: temperature, humidity, land cover, climate, rainfall, epicenter of reproduction, and socioeconomic factors.. | The current study revealed that more than three-quarters of the dengue cases were adults, similar to the study with 85 % adults. The majority of our study was male, more than two thirds of the dengue reported cases, similar reporting 71 % male. However, in our study half of the dengue cases were between 15 and 44 years. A reason could be that the adult men may be exposed to dengue at the workplace, home or outdoor activities. Regarding workers, our results showed that more than half of the cases are non-health workers which could raise the risk of exposure of workers in multiple unsuitable environments. Offer the same explanation that a male has a higher risk of becoming infected due to working outside and less likely to be covered compared to females due to the Saudi culture.<br>However, the current study did not find a significant association between the distribution of dengue and the environmental factors due to the time this study was conducted. In 2020, COVID19 have been detected, resulting in government limitations which prevented collecting inspection data regarding the environmental factors related to dengue cases inside or outside their home.<br>**Conclusions** |

| | | | | |
|---|---|---|---|---|
| | | | | The study revealed that the association of dengue confirmed and suspected cases with temporal and spatial distribution, but the environmental factors were not completely detected in 2020 given that the impact of covid-19 on human mobility. However, these factors are still present. The highest distribution of the endemic dengue was in the middle and east of Jeddah, and the highest number of confirmed cases were in June and geographically in the east of Jeddah.The dengue fever virus ranks as an endemic infection as one of the most infectious diseases in Jeddah, the prevalence of dengue fever virus is high and it is a public health problem in Saudi Arabia. Lastly, the consequence of lacking environmental factor investigation about dengue distribution and infection of the population requires serious actions by following the dengue intervention programs to reduce the endemic dengue in Jeddah. |
| **Giang, et al (2023) [25]** | This study was conducted in three countries, including eight hospitals, six of them in the southern region of Vietnam, one in Egypt and one in Pakistan. | A cross-sectional survey | To investigate the knowledge, attitudes and practices of the healthcare professionals (HCPs) including physicians and nurses regarding dengue transmission, diagnosis and clinical classification using the warning signs of World Health Organization (WHO) 2009 classification . | Recognition of dengue fever might be complicated because not only clinical manifestation of dengue might vary from person to person according to age or gender, but also there may be different defining criteria that vary from country to country defined and agreed upon by different experts, and maybe redefined later due to regional events. In our study, 43.3% of physicians, and 55.5% of nurses used < 100.000 mm3 as the definition criteria for the warning sign of platelet decrease. Warning signs were determined based on laboratory tests such as hem concentrations are more likely to identify by doctors. This may be a reason for a significantly higher proportion of nurses who unknown this sign. It may be that having not a global definition of a warning sign may be beneficial because dengue might appear differently regionally . Also, scientific studies are done regionally, which may affect the current expert consensus of what the definition of a warning sign would be for that region.<br>**Conclusions** |

| | | | | |
|---|---|---|---|---|
| | | | | The current study highlighted the wide variation in the application of all warning signs listed in WHO 2009 classification and significant gaps in knowledge about dengue diagnosis test, Aedes aegypti and dengue rout of transmission among HCPs. These results provide a valuable opportunity to identify areas of dengue management that need improvement. Interventions should focus on increasing knowledge of HCPs regarding dengue transmission, clinical classification and diagnosis |

**Results and discussion**

This systematic review followed preferred reporting items for systematic reviews guidelines. A comprehensive literature search was conducted in PubMed, EMBASE, and Web of Science up to December, 2024. Studies assessing the risk of Knowledge decline among patients with dengue virus infection in Saudi Arabia were included. Data extraction and quality assessment were performed using assessment Knowledge. Of the 129 articles identified, 7 were included in the review, covering a total of 2873 participants from Saudi Arabia. Evidence from indicated Knowledge decline, in some dengue patients . Although the findings suggest there might be an association between dengue infection and Knowledge decline. Further research with larger sample sizes and longitudinal studies is essential to confirm the impact of dengue virus on knowledge decline.

This is the first systematic review to provide significant insights into the potential between the risk of Knowledge decline among patients with dengue virus infection , domain in dengue-related research. Drawing on evidence from over individuals, our findings indicate a notable prevalence of risk of Knowledge decline among dengue patients and a higher risk compared with non-infected individuals. The results Knowledge decline reveal dengue might cause acute dysfunctions, as confusion and reasoning problems, which can impact patient care during the early stages of the disease. Studies also suggest a possible link between dengue and an increased risk of long-term particularly in older adults. Previous studies on cognitive impairment in patients with dengue virus infection have shown that acute and short-term impairments, such as confusion, memory loss, and reasoning problems, significantly impact patient care during the early stages of the disease. These cognitive impairments are particularly in severe cases of dengue. Carras et al.(26) identified that confusion was associated with severe dengue in dengue patients admitted to emergency departments. Teixeira et al.(27) also reported memory loss and reasoning difficulties among younger patients, demonstrating the broad cognitive impacts that can occur soon after infection. These findings confirm that the dengue virus induces neurological effects beyond its traditional symptoms of fever and hemorrhagic manifestations (26,27)

The overall low knowledge and poor practice levels pertaining to dengue prevention that were detected in the systematic review are alarming given the previously cited rates of increasing dengue cases throughout in Saudi Arabia (28) and the subsequent burdens the virus imposes on the Saudi Arabia economy (29) However, the overall positive attitudes towards dengue prevention that were also observed in the results are reassuring. This finding suggests that there is a high likelihood that participants will be open to dengue education and prevention programs given their overall high-risk perceptions of the virus. The results of this study displayed both similar and conflicting information when compared to similar studies conducted in other countries in Southeast Asia. For example, the previously cited met analysis on dengue KAP in the Philippines presented similar findings pertaining to knowledge with 31.1% of the studies displaying high knowledge (22), which is close to the figure of 35.0% for this study. However, positive attitude levels were lower at 50.1% compared to 61.0% in this study while good practice levels were higher at 35.3% compared to 25.0% in this study (19) However, greater contrasts were observed for knowledge and practices in the results of the other previously cited meta-analysis on dengue KAP in Malaysia with 51.0% of the studies exhibiting high knowledge and 45.0% displaying good practices (28). On the other hand, attitude levels were similar with the meta-

analysis in Malaysia finding that 56.0% of the studies depicted positive attitudes (30). Furthermore, the previously cited systematic review of dengue KAP in Malaysia found significant associations between knowledge and dengue experiences, which correlate with the systematic review of this study (29)

**Conclusion**

Over the past several decades, DF has emerged as a truly global disease. There is a critical need for research in geographical areas where DF is a significant public health problem but its epidemiology is not well-characterized. In this review, we have highlighted factors associated with DF emergence and persistence in Saudi Arabia, including factors that are distinct from those affecting DF transmission in other parts of the world. In particular, large numbers of migrant workers and religious pilgrims from other dengue endemic areas across the MENA and Asia complicate the story of DF in Saudi Arabia . Specifically, with its moderate average temperatures, high humidity, and role as the gateway for religious pilgrims and foreign visitors, was particularly favorable for DENV introduction and emergence, and remains a location where DF persistence is high. Understanding the range of drivers of DF in Saudi Arabia can help guide further research, guide prevention efforts, and improve health system preparedness .

**References**

1. Alqahtani, H. M. (2023). Inference of Evolutionary History of Aedes aegypti Mosquito Populations in Saudi Arabia and Africa and Implications for Arbovirus Transmission (Doctoral dissertation, The University of Manchester (United Kingdom).
2. Nanaware, N., Banerjee, A., Mullick Bagchi, S., Bagchi, P., & Mukherjee, A. (2021). Dengue virus infection: a tale of viral exploitations and host responses. Viruses, 13(10), 1967.
3. Majeed, W., Aslam, B., Altaf, S., Abbas, I., & Kanwal, H. A. (2023). Mosquito-Borne dengue fever-an update. One Health Triad, Unique Scientific Publishers, Faisalabad, Pakistan, 3, 8-14.
4. Gupta, P. K., Tiwari, N., Agrawal, V., Kumar, S., Kumar, S., & Ranjan, S. (2024). Deciphering the Impact of Dengue Serotypes on Liver Function Tests (LFTs), Kidney Function Tests (KFTs) and Complete Blood Counts (CBC): A Comprehensive Analysis. Res. J. Med. Sci, 19, 212-223.
5. Tsheten, T. (2023). Epidemiology of dengue in Bhutan (Doctoral dissertation, The Australian National University (Australia)).
6. Giang, H. T. N., Sayed, A. M., Dang, T., Iqtadar, S., Tuan, N. M., Khiem, N. T., ... & Huy, N. T. (2021). Survey of knowledge, attitude and practice of healthcare professionals on dengue transmission, diagnosis and clinical classification. BMC infectious diseases, 21, 1-11.
7. Colonna, K. J., Koutrakis, P., Kinney, P. L., Cooke, R. M., & Evans, J. S. (2022). Mortality attributable to long-term exposure to ambient fine particulate matter: insights from the epidemiologic evidence for understudied locations. Environmental Science & Technology, 56(11), 6799-6812.
8. Thangavelu, L., Abdelwahab, S. I., Farasani, A., Ballal, S., Bansal, P., Nathiya, D., ... & Satapathy, P. (2024). Risk of cognitive decline among patients with dengue virus infection: a systematic review. International Journal of Neuropsychopharmacology, 27(12), pyae053.
9. Rissardo, J. P., Byroju, V. V., & Caprara, A. L. F. (2024). A Scoping Review Of Neurological Manifestations Of Dengue Virus Infection Besides Cerebrovascular Disorders.
10. Dos Santos, A. L. S. (2023). Tropical infectious diseases of global significance: Insights and perspectives. Tropical Medicine and Infectious Disease, 8(10), 462.
11. Mataba, G. R. (2023). Exploring integrated strategies to control oviposition and larval development in mosquitoes in Northern Tanzania.
12. Fu, G. (2024). Epidemiological patterns of mosquito-borne diseases globally. Journal of Mosquito Research, 14.
13. Gizaw, Z., Salubi, E., Pietroniro, A., & Schuster-Wallace, C. J. (2024). Impacts of climate change on water-related mosquito-borne diseases in temperate regions: A systematic review of literature and meta-analysis. Acta Tropica, 107324.
14. Reza, S. B., Shoukhin, M. M. U. R., Khan, S. A., & Rahman Dewan, S. M. (2024). Dengue outbreak 2023 in Bangladesh: From a local concern to a global public health issue. Science Progress, 107(4), 00368504241289462.

15. Natsir, N., Arsin, A. A., Ishak, H., Alimuddin, I., Masni, M., Massi, M. N., & Mallongi, A. (2023). Transmission of Four Serotypes of Dengue Virus in Several Asian Countries Literature Review. Pharmacognosy Journal, 15(6s).
16. dos Santos, V. L. P., Witt, N. G. D. P. M., Estevam, F. M., & Berté, R. (2024). Dengue fever in the state of Paraná in the seasonal period from 2022 to 2023.
17. Rodriguez, L. O., Levitt, E. B., Khamisani, N., Nickle, S., & Izquierdo-Pretel, G. (2024). Local Transmission of Dengue in South Florida: A.
18. Fujita, D. M., Salvador, F. S., da Silva Nali, L. H., & de Andrade Júnior, H. F. (2023). Dengue and climate changes: Increase of DENV-1 in São Paulo/Brazil–2023. Travel Medicine and Infectious Disease, 56, 102668.
19. Crowley, J., Liu, B., & Jan, H. (2024). Assessing the Knowledge, Attitudes, and Practices (KAP) of Dengue Fever in Thailand: A Systematic Review and Meta-Analysis. medRxiv, 2024-05.
20. Karimi, S., Akhtar, N., Katiana, O., Haider, S., Ahmed, B., Khan, M., & Umer, M. (2024). Decoding Dengue: A Comprehensive Analysis of Cases at Holy Family Hospital (2019–2023) and Anticipating Pakistan's Future Dengue Dynamics under Climate Change. Journal of Islamabad Medical & Dental College, 13(2), 345-354.
21. Nejati, J., Okati-Aliabad, H., Mohammadi, M., Akbari, M., & Moghaddam, A. A. (2024). Knowledge, attitudes, and practices of healthcare professionals regarding dengue fever in high-risk regions of southeastern Iran. BMC medical education, 24(1), 915.
22. Alqassim, A. Y., Badedi, M., Muaddi, M. A., Alharbi, A. A., Jareebi, M. A., Makeen, A. M., ... & Sahly, A. (2024). Shifting spatial, temporal and demographic patterns of dengue incidence and associated meteorological factors in Jazan Region of Saudi Arabia from 2015–2020. Journal of Vector Borne Diseases, 61(3), 444-451
23. Al-Jabri, M. M., & Al Jawfi, A. M. (2023). Assessment of Knowledge and Attitude of Health Workers About Dengue Fever at Al-Hodeidah Governorate. Sudan Journal of Medical Sciences, 18(3), Aljaby11-yahoo.
24. Al-Nefaie, H., Alsultan, A., & Abusaris, R. (2022). Temporal and spatial patterns of dengue geographical distribution in Jeddah, Saudi Arabia. Journal of Infection and Public Health, 15(9), 1025-1035.
25. Giang, H. T. N., Sayed, A. M., Dang, T., Iqtadar, S., Tuan, N. M., Khiem, N. T., ... & Huy, N. T. (2021). Survey of knowledge, attitude and practice of healthcare professionals on dengue transmission, diagnosis and clinical classification. BMC infectious diseases, 21, 1-11.
26. Carras, M., Maillard, O., Cousty, J., Gérardin, P., Boukerrou, M., Raffray, L., ... & Bertolotti, A. (2023). Associated risk factors of severe dengue in Reunion Island: A prospective cohort study. PLOS Neglected Tropical Diseases, 17(4), e0011260.
27. Teixeira, L. D. A. S., Nogueira, F. P. D. S., & Nascentes, G. A. N. (2017). Prospective study of patients with persistent symptoms of dengue in Brazil. Revista do Instituto de Medicina Tropical de São Paulo, 59, e65.
28. Rabaan, A. A., Alshengeti, A., Alrasheed, H. A., Al-Subaie, M. F., Aljohani, M. H., Almutawif, Y. A., ... & Hajissa, K. (2024). Dengue virus infection in Saudi Arabia from 2003 to 2023: a systematic review and meta-analysis. Pathogens and Global Health, 1-10.
29. Alyahya, H. S. (2023). Prevalence of dengue fever in Saudi Arabia: Jeddah as a case study. Entomological Research, 53(12), 539-553.
30. Hamdoon, A. A. E., Almozainy, N. A., Albajali, A. M., & Ali, M. H. A. (2024). The Prevalence of Dengue Fever in Al-Leith Province, Saudi Arabia 2023. Life Science Journal, 21(10).