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David B Taylor, PhD  
Editor-in-Chief, Journal of Medical Entomology

**Dr. Taylor,**

Please find attached our manuscript “Two Decades of Endemic Dengue in Bangladesh (2000-2022): Trends, Seasonality, and Impact of Temperature and Rainfall Patterns on Transmission Dynamics” for your consideration as a “Research article” in JME.

The first official dengue outbreak in Bangladesh was reported in 2000, and since then, dengue has become endemic in the country, posing a significant health challenge. We have compared the monthly dengue virus (DENV) infection, deaths, case-fatality ratio, and meteorological parameters between the first and the recent decade (2000-2010 vs. 2011-2022) and to understand the trends, seasonality, and impact of change of temperature and rainfall pattern on transmission dynamics of dengue in Bangladesh.

The mean annual number of dengue cases increased eight-fold during the second decade, with 2216 cases during 2000-2010 vs. 18,321 cases during 2011-2022. The mean annual deaths have doubled (21 vs. 46). The annual temperature increased by 0.49 °C in the recent decade, which adds approximately 4292-degree-hours equivalent heat per year in the country. For dengue virus transmission, approximately 305-degree-hours equivalent heat is needed to accomplish the extrinsic incubation period in *Aedes* mosquitoes at 26° C. Thus, the additional 0.49°C temperature will add to the burden of more than 14 generations of infectious mosquitoes in the environment of Bangladesh. In the regression model, monthly mean temperature (Incidence risk ratio [IRR]: 1.26) was significantly associated with monthly dengue incidence.

Between two decades, rainfall has decreased by 314 mm, however, unusual precipitation during pre-and-post monsoon season increased which allowed an extended vector season in the country. Two of our previous articles published in JME discussed the effect of [early rainfall](#) and [late rainfall](#) on the unusual number of dengue cases and deaths in Bangladesh during 2019 and 2022, respectively. In the regression model, first-lagged rainfall (IRR: 1.08), and second-lagged rainfall (IRR: 1.17) were significantly associated with monthly dengue incidence.

Despite increasing the DENV infection, and deaths, the case-fatality ratio has decreased (0.69 vs 0.23). This improvement is probably associated with improved access to the health care system, a better understanding of the treatment protocol including the availability of clinical management guidelines and training for the health care providers, better availability of Information, Education, and Communication (IEC) materials, community engagement and expansion of surveillance system to more hospitals in the surveillance system across the country in the recent years, and overall improvement of the economic condition of the country. The time series ARIMA model forecast an increasing trend of DENV in Bangladesh.

This is one of the articles, that generates empirical evidence of climate changes (temperature and rainfall pattern) on dengue virus incidence in Bangladesh. We believe the readers of vector biology, entomology, epidemiology, and climate change will be interested to understand the overall picture of dengue outbreaks in Bangladesh in the last two decades.

We have discussed the public health challenges for controlling future outbreaks of the dengue virus in Bangladesh. All authors reviewed the article and provided their consent for journal submission. We do not have any conflict of interest. The article is not submitted elsewhere except in Medrxiv to publish the preliminary analysis as a preprint.

**Kind regards,**

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