02-Sep-2023  
  
Dear Dr. Najmul Haider,  
  
Manuscript ID JME-2023-0210 entitled "Two Decades of Endemic Dengue in Bangladesh (2000-2022): Trends, Seasonality, and Impact of Temperature and Rainfall Patterns on Transmission Dynamics" which you submitted to the Journal of Medical Entomology, has been reviewed and will be reconsidered for publication after the completion of the major revisions as noted. The comments of one reviewer is included at the bottom of this letter.   My attempts at obtaining a 2nd review were not successful.  Rather than postpone the review process further,  I have decided to serve as the 2nd reviewer.   Two reviewers responded that they would send me their comments, but have not replied to date.  If these reviews are received, I will forward these to you.  
  
I spent considerable time thinking about your paper and eventually agreed with the reviewer to allow you to revise your paper.

My first problem was that the JME is an entomological journal, but your paper focuses on human cases and does not present any entomological data beyond calculations in the duration of the EIP. In my opinion, your case data is not clearly defined and is possible suspect.  You mistakenly have interchanged the terms 'number of cases', 'monthly incidence' and 'number of infections' --- these clearly are not the same metrics!

Response: Bhai, please clarify it.

In addition, I think the temporal patterns presented may have been confounded by

1) improvements to the health care system which now detects/reports a greater proportion of the clinical cases that it did 20 years ago,

2) the arrival of new serotypes of the virus which cause more severe disease, and

3) increases in the size of the urban population due to growth as well as urbanization.  Some of these factors could have been accommodated into a more complex modeling structure.

Response: Bhai, please clarify it.

In addition, your meteorological data come from a single weather station in Dhaka, but you provide no context for how well these measurements represent patterns throughout the country?  For example, don't rainfall patterns change with elevation?

Response: Thank you, for your valuable time for this comment. We included the below lines in our limitations to explain this issue.

“Another limitation pertains to our exclusive utilization of weather data from the Dhaka station. Given Bangladesh's relatively small size and the moderate climate variation across the country, we focused our data collection solely on the Dhaka station. Furthermore, a substantial proportion of historical dengue data originates from the Dhaka region.” Page 17, Line 382 to 385.

Your paper will require considerable revision to improve the English presentation, formatting and clarity of data description.  To assist I have edited the attached file using tracked changes.

In agreement with the Reviewer, I found your Discussion section excessively long and could be reduced by careful organization.

Response: Bhai, please clarify it.

Finally, your references require careful proof reading:   I found improper capitalization, lack of italics for species names, incomplete references [no volume or pages], etc.

Response: Bhai, please clarify it.   
  
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Once again, thank you for submitting your manuscript to the Journal of Medical Entomology and I look forward to receiving your revision.  
  
  
Sincerely,  
  
wkr  
  
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Reviewer(s)' Comments to Author:  
  
Reviewer: 1  
  
Comments to the Author  
Hasan and colleagues evaluated epidemiological data of dengue cases reported in Bangladesh between 2000 and 2022, and correlated incidence with some weather parameters (temperature and rainfall). The topic is very important and the data presented could be useful in understanding the dynamics of dengue in Bangladesh. The paper is generally well written and the topic should be of interest to the JME readership, although there is little direct emphasis on vectors.

Also, the paper is quite long, especially the discussion (which should be reduced by at least half), considering the limited new data presented.

Response: Bhai, please clarify it.

Additional explanations of the data collection and analyses are needed to evaluate the robustness of the conclusions.

Response: Thank you, for your valuable time for this comment. We included the below lines to additional explanations of the data collection and analyses are needed to evaluate the robustness of the conclusions.

“The Communicable Disease Control (CDC) typically oversees the monitoring of the spread of communicable diseases across the country by gathering data through its central control room. Established in 1983 in collaboration with the International Centre for Diarrheal Disease Research, Bangladesh (icddr,b), under the Epidemic Control Preparedness Program (ECPP) with the Ministry of Health and Family Welfare, Bangladesh, the Control Room of the Directorate General of Health Services operates 24/7. Its main focus is to collect information on dengue, diarrhea, and various other health-related emergencies. This control room cell is now officially recognized as the National Health Crisis Management Centre (NHCMC), DGHS (<https://www.hindawi.com/journals/cjidmm/2019/3516284/)>.” Page 5 to 6. Line 123 to 131.

Probably, several additional variables need to be considered in the analyses or at least discussed as limitations to the very limited information used to explain changes in dengue incidence and severity, including:  
  
1. The authors must define the term "dengue cases" in this study. Did the study consider "suspected dengue cases", "epidemiological dengue cases," or "laboratory-confirmed dengue cases"? Please clarify in the methods section and throughout.

Response: Thank you, for your valuable time for this comment. We mentioned it in our manuscript with reference. “We used the definition of dengue cases used by the Ministry of Health and Family Welfare, Bangladesh, which was discussed in our earlier article (Ahsan et al. 2021).” Page 6, Line 133 to 135.   
  
2. Contextualize the notification system of dengue cases for the Directorate General of Health Services in Bangladesh. For example, are the dengue cases reported for both public and private healthcare services?  
  
Response: Thank you, for your valuable time for this comment. We included the below lines to contextualize the notification system of dengue cases for the Directorate General of Health Services in Bangladesh.

“Dengue monitoring primarily involves proactive efforts, including direct communication with public and private healthcare facilities and passive approaches through a daily 'Hot Line.' Additionally, each facility compiles a comprehensive report summarizing the morbidity and mortality related to dengue at the end of each month, which is then submitted to the CDC.” Page 6. Line 140 to 144.

3. Were all 244,246 dengue cases reported in Dhaka?  
- If not: The correlation between dengue cases and weather variables should be revised and paired with weather variables and the location of dengue cases. Otherwise, assuming climate variation across Bangladesh, the findings presented could not represent this variation.

Response: Thank you, for your valuable time for this comment. We included the below lines in our limitations to explain this issue.

“Another limitation pertains to our exclusive utilization of weather data from the Dhaka station. Given Bangladesh's relatively small size and the moderate climate variation across the country, we focused our data collection solely on the Dhaka station. Furthermore, a substantial proportion of historical dengue data originates from the Dhaka region.” Page 17, Line 382 to 385.

- It all were from Dhaka:  The spatial variation of dengue cases could be investigated across eight administrative divisions using maps throughout time. This could help to understand the most affected locations and periods in Bangladesh in the last two decades.

Response: It’s not possible because of the lack of data on each division.

4. As mentioned above, please clarify the data location used for weather analyses (i.e., rainfall and temperature)? Is this for the entire country or only for Dhaka? Please explain this point.

Response: Thank you, for your valuable time for this comment. We already mentioned our weather data collection station. Again, we clear it by rephrasing the sentence.

“We used three-hourly temperature and daily rainfall data from only Dhaka, as most of the cases reported from Dhaka. We collected those data from Bangladesh Meteorological Department (BMD) over the period 2000–2022 (BMD 2023) for the meteorological station located in Mirpur, Dhaka.” Page 6, Lines 138-141.

5. To normalize the population size variation, the analyses need to be performed using incidence (e.g., cases per 100,000 inhabitants) instead of the absolute number of dengue cases. This applies to Figure 1, Figure 4, Table 1, and Table 2.

Response: Thank you, for your valuable time for this comment. It is not possible because we worked with a total number of dengue cases in Bangladesh, the previous report didn’t present division-wise data. In addition, the collection of yearly population change data is also not possible in Bangladesh.

6. Primary reference sources should replace secondary reports, such as WHO. For example, in the "Introduction section" (Line 82-90) relates to dengue taxonomy, distribution, and burden. Some primary references could be more suitable such as:  
  
Simmonds et al. ICTV Virus Taxonomy Profile: Flaviviridae. J Gen Virol. 2017 Jan;98(1):2-3. doi: 10.1099/jgv.0.000672. PMID: 28218572; PMCID: PMC5370391.  
  
Messina et al. The current and future global distribution and population at risk of dengue. Nat Microbiol. 2019 Sep;4(9):1508-1515. doi: 10.1038/s41564-019-0476-8. Epub 2019 Jun 10. PMID: 31182801; PMCID: PMC6784886.  
  
Bhatt et al. The global distribution and burden of dengue. Nature. 2013 Apr 25;496(7446):504-7. doi: 10.1038/nature12060. Epub 2013 Apr 7. PMID: 23563266; PMCID: PMC3651993.

Response: Bhai, please clarify it.

7. How do the authors address the natural temperature variation across time, regarding findings related to "annual temperature increased by 0.49 °C, and annual rainfall decreased by 314 mm".

Response: Thank you, for your valuable time for this comment. We measured mean annual weather variables in two decades and then, compared them to each other.

8. The rationale for dividing the analysis into two decades (2000-2010 vs 2011-2022) needs to be explained. Instead of this arbitrary separation, the authors might compare the trends across years. This could provide a better picture of the epidemiological dynamics of dengue in Bangladesh across time and, if possible, "space", as suggested above. The same comment above, please consider replacing this type of analysis with incidence instead of absolute number of cases.

Response: Thank you for taking the time to provide this insightful explanation. We outlined the reasoning behind segmenting the analysis into two decades. Over the years, there has been a slight variance in dengue cases. To gain a broader perspective, we chose to examine two significant periods. Furthermore, we have illustrated a year-by-year comparison in Figure 1.

“Then, we compared the number of dengue cases, deaths, and weather parameters in two decades (2000-2010 and 2011-2022) using paired sample t-test, aimed at examining and comparing trends, developments, and changes over specific periods.” Page 7, Line 154 to 156.  
  
9. The authors need to address several other drivers and factors, such as the herd immunity in the population (are data available?), increases in vector populations, the introduction of new serotypes of DENV, etc. If not addressed, a paragraph explaining this limitation should be included in the Discussion section. The same limitation relates to the case-fatality ratio. For example, since reinfection by a different genotype increases the risk of severe dengue through antibody-dependent enhancement, this could help to explain the increase of CFR and should be better explored in the Discussion section.

Response: Bhai, please clarify it.

10. Please contextualize the vector populations in Bangladesh in the Introduction section or Discussion section. Additionally, consider incorporating the P Index in the current analysis. Please see:  
  
Obolski U, Perez PN, Villabona-Arenas CJ, Thézé J, Faria NR, Lourenço J. MVSE: An R-package that estimates a climate-driven mosquito-borne viral suitability index. Methods Ecol Evol. 2019 Aug;10(8):1357-1370. doi: 10.1111/2041-210X.13205. Epub 2019 Jun 19. PMID: 32391139; PMCID: PMC7202302.

Response: Bhai, please clarify it.

11. Discussion section. First, this section should be more focused on the main findings of this study. Second, please include a paragraph on the limitations of this study before the main conclusion. Third, the Conclusion section should be more concise with a key message about the main findings and their implications for public health. Lastly, please include the potential effect of increased temperature, drought, and altered precipitation on the biology of the vector. Some examples of references are below:  
  
Couper et al. How will mosquitoes adapt to climate warming? Elife. 2021 Aug 17;10:e69630. doi: 10.7554/eLife.69630. PMID: 34402424; PMCID: PMC8370766.  
  
Lowe et al. Combined effects of hydrometeorological hazards and urbanization on dengue risk in Brazil: a spatiotemporal modeling study. Lancet Planet Health. 2021 Apr;5(4):e209-e219. doi: 10.1016/S2542-5196(20)30292-8. PMID: 33838736.

Response: Bhai, please clarify it.   
  
Minor comments:  
  
Abstract: The second sentence in the conclusion does not reflect the conclusion of the findings of this study.

Response: Thank you, for your valuable time for this comment. We changed and align that sentence with our findings.

“Effective strategies such as community engagement, vector control, and eliminating mosquito breeding habitats are crucial in addressing and managing the dengue outbreak exacerbated by these environmental changes.” Page 3, Line 76 to 78.

Line 130: The variable section could be renamed a "Procedures section."

Response: Thank you, for your valuable time for this comment. We changed it.

Line 132-134. Please define "lag 1" and "lag 2."

Response: Thank you, for your valuable time for this comment. We defined it.

“A lagged variable refers to a value from a prior time point. When studying the meteorological impact on Dengue cases, it's crucial to focus on lag variables. Two critical stages for lag effects should be considered: mosquito development and parasite incubation within the mosquito. The lag times for these stages can vary based on climate, creating a diverse lag distribution at the population level. In the context of monthly data, lag 1 refers to the data from the preceding month, and lag 2 pertains to the data from two months prior.” Page 6 to 7, Line 151 to 157.

Line 126-128. The meteorological data are from one location or multiple locations?

Response: Thank you, for your valuable time for this comment. We considered only one station and explained it.

“We used three-hourly temperature and daily rainfall data from Dhaka. We collected those data from Bangladesh Meteorological Department (BMD) over the period 2000–2022 (BMD 2023) for the meteorological station located in Mirpur, Dhaka.”

Line 70: The increase in annual temperature is mean? Please clarify.

Response: Thank you, for your valuable time for this comment. We added the word “mean”.

“Concurrently, the annual mean temperature increased by 0.49 °C, and rainfall decreased by 314 mm.” Page 3, Line 76-78.

Line 83: Italicize Flaviviridae  
  
Response: Thank you, for your valuable time for this comment. We changed it.

Line 84: Consider removing "the female Aedes species, including"  
  
Response: Thank you, for your valuable time for this comment. We changed it.

Line 87: replace “are recorded” with “are estimated”  
  
Response: Thank you, for your valuable time for this comment. We changed it.

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Line 91: Consider replacing "infections with different serotypes" with "reinfection with different serotypes."

Response: Thank you, for your valuable time for this comment. We changed it.

Line 92: Consider replacing "may result in severe dengue with a higher case-fatality ratio" with "may result in severe dengue, including increasing the risk of fatal outcomes."

Response: Thank you, for your valuable time for this comment. We changed it.

Line 94-95: This sentence needs to be revised: change “the hotspots” to “hotspots”.

Response: Thank you, for your valuable time for this comment. We changed it.

Line 95: Consider deleting "official".

Response: Thank you, for your valuable time for this comment. We changed it.

Line 98: number of cases is based on clinical presentation or laboratory-confirmed? This needs to be clarified throughout.

Response: Thank you, for your valuable time for this comment. We mentioned it in our manuscript with reference. “We used the definition of dengue cases used by the Ministry of Health and Family Welfare, Bangladesh, which was discussed in our earlier article (Ahsan et al. 2021).” Page 6, Line 133 to 135.

We also added,

“Dengue cases were identified based on clinical symptoms (including fever and rash) and/or laboratory tests for IgM or IgG antibodies to DENV, and nonstructural 1 protein (NS-1) of DENV”. Page 6, Lines 135-137.

Line 100: Please clarify the period most important: monsoon or post-monsoon season.

Response: Bhai, please clarify it.

Line 105: How much is "increase sharply"? Please clarify it.

Response: Bhai, please clarify it.

“In Bangladesh, the pre-monsoon season typically occurs from March to May, characterized by rising temperatures and increasing humidity. This period precedes the onset of the monsoon rains, and the weather becomes progressively warmer. Post-monsoon, spanning from September to November, follows the monsoon season. During this time, rainfall subsides, temperatures moderate, and humidity decreases, leading to more pleasant and dry weather conditions.”

Line 115-116: I suggest replacing "i) compare the annual and monthly cases in the first [2000-2010] and recent decade [2011-2022]" to "compare the annual and monthly dengue cases between 2000 and 2022".

Response: Thank you, for your valuable time for this comment. As we compared the mean of two decades. We can’t make this change.

Line 117: Please clarify clinical parameters  
  
Response: Bhai, please clarify it.

Line 125: Consider removing "which was discussed in our earlier article."

Response: Bhai, please clarify it.

Line 188: I suggest replacing the standard deviation with interquartile dengue cases.  
  
Response: Thank you, for your valuable time for this comment. We changed tables and results, accordingly.

“Between 2000 and 2022, DGHS reported a total of 244,246 dengue cases, with an annual mean of 10,619 cases (interquartile range [IQR]: 859.5-5805.5), including 849 fatal outcomes with a case-fatality ratio (CFR) of 0.34%. Between 2000 to 2010, the mean annual number of dengue cases was 2,216 (IQR: 480-3182) which increased over eightfold in the following decade (2011-2022) at 18,321 (IQR: 1405-28429)”

Line 189: Please "indicating" to "with"

Response: Thank you, for your valuable time for this comment. We changed it.

Line 189-190: This sentence needs to be revised; it also seems that the "eight folds" (should be stated eight-fold) difference is not supported by the statistical analysis applied (e.g., p-value = 0.219). Additionally, this sentence appears contradictory to the first sentence of the Results section. Please clarify it.

Response: We replaced “fold” with “times” and also changed the sentence to remove the confusion.

Line 204: This sentence is unclear about "4292 degree-hour/year of heat" Please clarify this point.  
  
Response: Bhai, please clarify it.

Line 211-221: Could you include the interpretation of GF information instead only the number or more or less than 1? This could help the reader interpret the findings. Same thing for M-K trends analysis and Sen's slope test.

Response: Thank you, for your valuable time for this comment. We are unable to show it because there are 101 values greater than 1 and the rest are less than 1. However, to make it clear we added a sentence in the methods.

“GF greater than 1 indicates a high transmission period and less than 1 indicates a low transmission period.” Page 7, Lines 176-177.

We also added,

“We also conducted a Mann-Kendall (M-K) trend analysis to determine possible upward or downward trends (Yue and Pilon 2004). The null hypothesis posits no monotonic trend, while the alternative hypothesis suggests the presence of a trend, which could be positive, negative, or non-null. We also performed Sen's slope test to assess variations in annual dengue cases and deaths. The slope greater than 0 indicates an upward trend and less than 0 indicates a downward trend of a given period” Page 8, Lines 189-195.

Line 230-233: Figure 4 shows the stabilization of cases with a range that can increase and decrease. The ARIMA model could also be performed in incidence instead of the absolute number of cases.

Response: Bhai, please clarify it. I can’t understand what they asked.

Line 248: please discuss potential impacts of increasing temperature on vector lifespan.  
  
Response: Bhai, please clarify it.

“Increasing temperatures can accelerate mosquito development and reproduction, shortening their life cycle. Warmer conditions extend their activity periods, enhance biting rates, and may expand their geographic range, impacting disease transmission dynamics.”

Line 259: how does rainfall affect water storage in Bangladesh and impacts on Ae. aegypti populations?

Response: Bhai, please clarify it.

“Rainfall and Water Storage, Breeding Grounds for Ae. Aegypti, Mosquito Proliferation, Disease Transmission Risk, and Public Health Measures.”

Figure 3. Please describe the meaning of the dashed line in the legend.

Response: Thank you, for your valuable time for this comment. We were unable to show the dashed line in the legend. So, we explained it in the figure title. We also added the below line in the method section.

“GF greater than 1 indicates a high transmission period and less than 1 indicates a low transmission period.” Page 8, Lines 173-174.