**Overview of Project**

**Project Title: Spatiotemporal Dynamics and Seasonal Trends of Dengue Cases and Mortality in Bangladesh (2020–2023)**

Dengue is a mosquito-borne viral disease transmitted primarily by *Aedes aegypti* and *Aedes albopictus*. Since its first documentation in the 1960s, Bangladesh has experienced recurring outbreaks, with major surges recorded in 2000, 2019, and the deadliest in 20231. This study aims to examine the spatial and seasonal distribution of dengue cases and deaths across Bangladesh districts over a four-year period (2020–2023) using advanced data visualization and statistical tools in R.

The analysis focuses on generating choropleth maps to illustrate district-wise dengue incidence, time series plots to uncover seasonal patterns, and demographic comparisons to assess age and gender-based vulnerability. Monthly trends were explored using line and bar graphs highlighting periods of peak transmission. To understand mortality risks, the case fatality rate (CFR) is evaluated over time. Statistical significance of gender-based differences in infection and death rates is assessed through Chi-squared tests.

All data wrangling, visualization, and statistical testing were performed in R Studio using packages such as readxl, dplyr, tidyr, sf, ggplot2. I believe my analyses successfully pinpointed demographic patterns and geographic hotspots, helping translate raw surveillance data into actionable public health insights.

The findings from this analysis are expected to assist public health officials in identifying hotspots, allocating resources efficiently, and implementing timely interventions. Furthermore, the demographic breakdown provides insights into which age and gender groups are most vulnerable, thereby enhancing preparedness and response strategies.

**References**

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