As a PhD candidate in **Biostatistics** at the **University of Pennsylvania**, my research spans infectious and non-communicable diseases, childhood diseases, early childhood development, maternal health, indoor environment, groundwater quality, and meteorological factors. This comprehensive approach is rooted in a compassionate disposition towards humanity, cultivated through engaging with various disease studies within the realm of public health.

**Current Research Work on Dengue:** In response to the Dengue outbreak in Bangladesh in 2022, characterized by an unusually late onset of cases and elevated mortality in colder months, our research aimed to uncover the factors behind this resurgence (1). Another study highlighted the prevalence of dengue virus in mosquitoes during favorable weather conditions, underscoring the need for awareness and improved diagnostic strategies (2). Using time series models, we explored correlations between meteorological factors and Dengue incidence, revealing significant associations with dew point, relative humidity, and rainfall (3).

**Future Work on Dengue:** Our future work involves comparing Dengue trends, seasonality, and the impact of temperature and rainfall changes between the first and recent decades in Bangladesh. The analysis includes Mann-Kendall and Sen's slope tests, time series Poisson regression models, and forecasting of Dengue cases (4). Additionally, we aim to explore the relationship between Dengue and water sanitation and hygiene (WASH) facilities.

**Current Research Work on COVID-19**: Our research on COVID-19 investigated the connection between fine particulate matter (PM2.5), meteorological conditions, and infection rates in Bangkok, Thailand. Utilizing the Generalized Additive Model (GAM), we found a positive, non-linear association between relative humidity, absolute humidity, rainfall, and COVID-19 cases (5). Similar studies were conducted in Bangladesh, assessing determinants before and after vaccination and comparing globally reported case-fatality ratios (rCFRs) (6,7). We also delved into the knowledge, attitude, and practices (KAP) toward the COVID-19 epidemic in Southeast and South Asia (8).

**Future Research on COVID-19:** Further research aims at a continental analysis comparing vaccine distribution and case-fatality ratios pre- and post-implementation of vaccine programs using the ARIMA model and the Generalized Linear Mixed (GLM) model.

**Current Research Work on Other Topics**: In a recent study, we investigated early childhood development (ECD) status and its associated factors. Factors such as early childhood education programs, possession of children's books, mothers' educational level, and wealth index significantly influenced ECD status (12). Other studies include a systematic review and meta-analysis of the overall case fatality rate (CFR) of monkeypox worldwide during 1970-2022 (13), an examination of household fuel association with acute respiratory infection (ARI) in under-five children in Bangladesh (15), and an analysis of knowledge of HIV/AIDS among married women in Bangladesh (16).

**Future Research on Other Topics:** Future research involves predicting human rabies cases in Bangladesh, comparing rabies virus sequences in South Asian countries, and exploring non-communicable diseases in South Asian countries. Additionally, ongoing projects include investigating the ECD, health care utilization among women, global prevalence and factors of exclusive breastfeeding, neonatal tetanus, factors associated with E-coli and diarrhea in Bangladesh, patient satisfaction, and quality of life (QoL) of Rohingya Refugees in Bangladesh, and health-related factors affecting school dropout rates among children.

In summary, this comprehensive research portfolio reflects my commitment to addressing critical health issues, employing statistical methodologies to derive meaningful insights, and contributing to the broader field of public health.

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