Relation of cholera outbreaks and climatic variables

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ABSTRACT

Cholera is a major public health problem, which alone contributes around 1.4 billion people at risk globally. Recently, many studies have indicated the enhancement of the potential risks of cholera under the changing climate. Hence, a systematic review to summarize worldwide published literatures about the relation between the cholera incidence and climatic variables has been conducted. Additionally, as one of the highest cholera incidents reported in Bangladesh, we have done statistical cross-correlation with cholera incident in Dhaka with its triggering climatic
variables such as mean relative humidity, maximum temperature and rainfall of Dhaka city. Cross-correlation analysis has been conducted using monthly cholera incidence from icddr,b for the past 14 years (2000-2014) and meteorological data from Bangladesh Meteorological Department (BMD). A significant correlation with cholera has found with monthly mean maximum temperature ($r = 0.50$, $p<0.001$) and mean total rainfall ($r = 0.38$, $p<0.001$). Seasonal Auto-Regressive Integrated Moving Average (SARIMA) model was used to determine the impact of climatic variables on cholera. The SARIMA $(1,0,0)(1,0,0)^{12}$ model revealed that AR and SAR ($p<0.001$) were highly significant with seasonal difference. Literature review also confirms that climatic variables are associated with cholera in different scales in different countries. Climatic variables have significant relations with the cholera outbreaks that might be used for preparedness of cholera outbreaks all over the world.

**Key words:** Cholera; Climatic variables; Review; Dhaka; Statistical analysis