Effects of macro climate change on dengue fever incidence in Taiwan

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BACKGROUND: Dengue fever is a vector-born disease raging at tropical and subtropical regions for hundred years of the history in Taiwan. Recently, many studies discussed macro climate changes and extremely weather events may play important roles to impact dengue fever occurrence.

AIM: The aim of this study was to evaluate whether the dengue fever epidemic in Taiwan is associated with the unusual climate events such as El Niño and La Niña events.

METHODS: In this study, the epidemiological data originated from weekly confirmed records at were obtained from the Taiwan Centers for Disease Control. The weather data on typhoon and other events were obtained from the Central Weather Bureau. Oceanic Niño Index (ONI) derived from National Oceanographic and Atmospheric Administration (NOAA) was used to describe El Niño and La Niña events. We obtained data from 1998 to 2010. Multiple regression model was used to evaluate the relationship between unusual climate factors and incidence of dengue fever.

RESULTS: In 1998 to 2002, there were increased events of ONI, which was significantly associated with an increase in the monthly dengue fever incidence per 100,000 person years (B = 0.611; p<0.001). However, the reverse relationship was shown between ONI and dengue fever incidence from 2003 to 2010 (B= -0.182; p= 0.016). Dengue fever incidence was lower in 1998-2002 than in 2003-2010. The results showed lower incidence was positively associated with ONI, and higher incidence was negatively associated with ONI.

CONCLUSION: Our results perhaps explain that dengue fever occurrence was affected by El Niño or La Niña period in Taiwan. Furthermore, the macro climate events such as El Niño or La Niña could be the predictor of dengue fever occurrence in Taiwan. The follow-up monitoring of these special climate events for the effects to vector-born diseases in Taiwan should be warranted.