Short Communication

Ckikungunya Virus Infection and Relationship to Rainfall, the Relationship Study from Southern Thailand

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Abstract

There are several important mosquito borne infectious disease in the tropical countries. Chikungunya virus infection is an important arbovirus in this group. We hereby used a standard medicogeographical analysis to assess the correlation between prevalence of Chikungunya virus infection and rainfall in the endemic area of Thailand, the Southern region. In this work, the correlation was poor but significant. The result is concordant with a similar report from the retrospective analysis from the local center of disease control. Several other factors can affect the pattern of Chikungunya virus infection in the studied endemic area.

Keywords: Ckikungunya virus, Infection, Relationship, Rainfall, Thailand

Introduction

There are several important mosquito borne infectious disease in the tropical countries. Chikungunya virus infection is an important arbovirus in this group (Thiboutot et al. 2010). In Thailand, as a tropical country, this disease can be seen and is still the important local public health problem (Halstead 1966). It is classified into the group of hemorrhagic fever and can manifest with fever, arthralgia and hemorrhage (Halstead 1966, Chhabra et al. 2008).

In fact, the mosquitoes and mosquito-borne viral diseases are common in Thailand. Millions of vector mosquitoes can be seen in Thailand in any areas (Gratz 1993). Due to proper climate, hot and humid, the breeding of mosquito is very good in Thailand and this is the main cause of high prevalence of the mosquito-borne viral diseases (Gratz 1993). The reported prevalence of mosquito-borne viral diseases in Thailand can reach 62/100,000 in some outbreak period of dengue infection (Hemungkorn et al. 2007). Focusing on Chikungunya disease, it is the second common disease (the most common is dengue infection) (Pulmanausahakul et al. 2011). The basic climatogeography in the country might help promote the distribution of this infection. The authors hereby used a standard medicogeographical analysis to assess the correlation between prevalence of Chikungunya virus infection and rainfall in the endemic area of Thailand, the Southern region.

Materials and Methods

The objective of this work was to study on the relationship between the rainfall, an important geographical parameter, and the prevalence of Chikungunya virus infection in Thailand. Since the complete data on other parameters are not available at present, the author studied only a single parameter in this preliminary report. The data on the prevalence of disease (Thai CDC. Available

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at: http://epid.moph.go.th: Accessed 1 May 2010) and rainfall (Royal Irrigation Department Thailand. Available at: http://www.rid.go.th/bid/bid.html: Accessed 1 May 2010) were collected and further processed based on the already published protocol in the previous studies reported from the authors' laboratory (the protocol can be assessed via the cited references) (Wiwanitkit 2006a, Wiwanitkit 2006b). Briefly, after matching between data from the same geographical area was done, the already matched primary data were used for mathematic correlation assessment and a predictive map was further generated based on the derived correlation. To avoid the duplication, the complete details can be seen in the previous authors' publications (Wiwanitkit 2006a, Wiwanitkit 2006b).

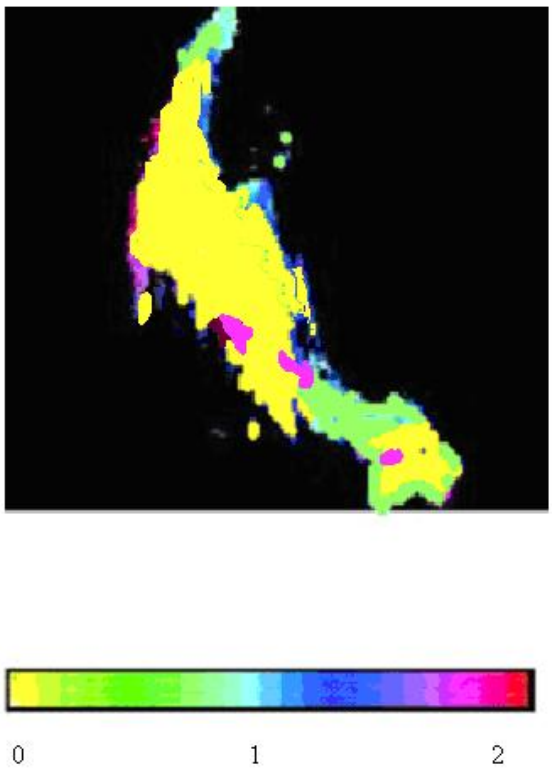

Fig. 1. Predicted prevalence of Japanese encephalitis based on the rainfall distribution in southern region of Thailand. This figure is created based on the results of the present study. The least square equation plot rainfall (X) versus prevalence (Y) is Y= 0.8X+0.6

Results

Averages for prevalence and rainfall were 0.4 (/100,000) and 9.1 (inches) respectively. The derived least square equation plot prevalence (Y) versus rainfall (X) was Y= 0.8X+ 0.6 (r= 0.54, P< 0.05). The predicted prevalence of Chikungunya virus infection based on the rainfall distribution in Thailand is shown in Fig. 1.

Discussion

Mosquito borne arboviral infection becomes the focused problem at present due to many remergings and new emergings in several countries (Weaver and Reisen 2010). Climate factor is mentioned as an important factor contributing to change of the disease epidemiology (Weaver and Reisen 2010). Anyamba et al. (2012) recently detected that "in Southeast Asia, Chikungunya outbreaks were negatively correlated (P< 0.05) with drought conditions, but positively correlated with warmer-than-normal temperatures and rainfall." The study on climate factor and relationship to Chikunguya disease epidemiology can be interesting.

In this work, the correlation was poor but significant. The result is concordant with a similar report from the retrospective analysis from the local center of disease control (Ditsuwan et al. 2011). This confirms that there are several other factors that can affect the pattern of Chikungunya virus infection in the studied endemic area (Ditsuwan et al. 2011). Indeed, this fact can be confirmed based on the data that there are sporadic outbreaks of disease in some years (such as the recent outbreak in 2009) despite there is no change of the pattern of rainfall in Thailand.

In fact, Chikungunya can be classified as a mosquito-borne viral zoonotic disease. The finding on relationship between rainfall and disease cannot completely imply in epidemi-

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ology. Many obvious factors can alter the epidemiology of mosquito-borne diseases especially in zoonotic ones. Some mosquitoes can fly into distance area; hence, the rainfall cannot be the single factor in the epidemiology of this disease.

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