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A review and critical appraisal of epidemiological and spatial analysis of dengue cases in the Kuching district of Sarawak, Malaysia.

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Abstract

Introduction: Dengue disease is a tropical and subtropical mosquito-borne viral illness and is a major health concern in Malaysia. Various studies conducted to analyse and review the disease particularly to determine the impact of dengue disease on the Malaysian population.

Methods: A comprehensive review of published literature on the topic presented to discuss on method of study, exclusion and inclusion criteria, extraction and selection of sample size and data.

Result: The authors focused on the study of dengue cases in Sarawak, however, only a single paper reported the number of dengue cases in Sarawak specifically in the Kuching district.

Conclusion: The authors hope that this work will be helpful to promote more studies to be performed in the whole of Sarawak population to validate current burden of dengue disease in Sarawak.

Keywords: dengue, spatial analysis, Sarawak

Introduction

Dengue disease is a tropical and subtropical mosquito-borne viral illness involving mainly DENV-1, DENV-2, and DENV-3 serotypes (1). It is a major health concern worldwide due to its high morbidity and mortality. Malaysia ranked third among countries in the Western Pacific Region (WPRO) in terms of the number of reported cases of dengue disease in the period 1991–2007 (1).

Dengue fever first reported in Malaysia in the early 1900s (3) and became a public health problem in the 1970s (4) in which significant outbreaks of dengue fever occurred with a gradual increasing pattern of incidence and death. Current determination of dengue disease cases in Malaysia is by clinical diagnosis using the WHO criteria (5).

In Sarawak, 871 dengue cases reported last year which showed an alarming increase compared to the year 2014 with 539 cases only (2). Hence, this study aimed to examine the dynamics of dengue transmission and characteristics of the disease specific to the Kuching District of Sarawak, Malaysia. From the study, it was hoped that it can be the tool in the prevention and control effort of the disease.

Method

1. Searching, identifying and selecting studies for review

Searches of paper titles, abstracts and full text content performed in April 2017 in Google Scholar, PubMed and ResearchGate databases. Search terms used were (a) 'dengue death' and Sarawak', (b) 'dengue cases' and 'Sarawak' and (c) 'dengue mortality' and 'Sarawak'.

The review involved studies of dengue cases in Sarawak or the district in Sarawak only within the time frame of recent ten years. Virological and entomological studies of dengue serotypes excluded.

Using the three search terms within each of the aforementioned databases, one paper yielded from ResearchGate which meets the inclusion and exclusion criteria of the review.

2. Study included

The study reviewed published in ResearchGate in 2016, an epidemiological and spatial analysis focused on dengue cases diagnosed in Kuching district of Sarawak between January 2011 and October 2011.

3. Appraisal

The study evaluated based on its design and findings.

Critical Review

Several literature survey and analysis conducted to describe the epidemiology of dengue disease in Malaysia between 2000 and 2012 (6,7,8). Based on these studies, the incidence rate was consistently high with annual deaths reported increasing over the years. We found only one study which had carried out a retrospective data analysis focused on dengue cases diagnosed in the Kuching District from January 2011 to October 2011. However, the result obtained did not reflect current burden of dengue cases in the Kuching district as data collected on specific short period particularly from January 2011 to October 2011. The results also cannot be extrapolated into Sarawak population as the analysis done on a small selected sample size.

Utilisation of distance methods

In this article, spatial analysis applied to identify clusters of dengue epidemiology using the Average Nearest Neighbour (ANN) method. ANN enables a visual presentation of where dengue cases are more prevalent and a pattern of incidence can be seen based on density of clusters. However, a setback with this method is that in reality, points are distributed in a bounded region, resulting in a distribution different from the normal distribution. Known as the 'edge effect', the author applied the K-function method to overcome this limitation and to correct this statistical test. Therefore, statistical method used for data presentation is justified.

Peak transmission period in Sarawak

Dengue occurs nationally in Malaysia, with increased risk in urban and periurban areas. According to Cheah W.K. et.al (2014), peak transmission occurs in the late monsoon season (October through February in east peninsular Malaysia, Sabah, and Sarawak; July through August in west peninsular Malaysia) (9). However, this study was not conducted during the peak transmission period for Sarawak which is between January 2011 and October 2011. Hence, bias have been introduced.

Population density

The population density data for Kuching District was not available in this study as stated by the authors. The authors also mentioned that clusters of dengue likely arose with higher-density population areas. Based on a review by Cheah W.K. et. al on dengue research in Malaysia, dengue cases more concentrated in urban areas hence correlates the cluster of cases in Kuching's largest city. However, data retrieval may be skewed towards city areas as most cases are highly probable reported from areas with more healthcare facilities available which concentrated in more developed areas of the Kuching District. To overcome this limitation for future studies, it would be appropriate to carry out a study of dengue cases with population density data available concurrently.

Conclusion

We believe the latest improvements to the surveillance system in Malaysia should be implemented, or pursued over the next few years in order to greatly monitor the burden of dengue fever and the impact of disease control measures in the future.

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