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Evaluation of the spatial and temporal trends of dengue outbreaks in Akurana, Central Province, Sri Lanka

N W B A L Udayanga,¹ P A D H N Gunathilaka,² M C M Iqbal,³ P H D Kusumawathie,⁴
M M M Najim,⁵ U S Amerasinghe⁵ and W Abeyewickreme^{1*}

¹*Molecular Medicine Unit, Faculty of Medicine, University of Kelaniya, Ragama,*

²*Biotechnology Unit, Industrial Technology Institute, Colombo 07,*

³*Institute of Fundamental Studies, Kandy,*

⁴*Anti-Malaria Campaign, Regional Office, Kandy,*

⁵*Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Ragama.*

Renowned as the world's fastest growing vector borne disease, dengue has become one of the major health issues in Sri Lanka leading to an alarming concern due to recent outbreaks throughout the country. Despite the immense efforts taken by the relevant authorities to reduce the rate of mortality, the average number of dengue cases recorded in each year remains around 30,000-35,000 without being changed significantly over time in Sri Lanka. Investigation of the trends in spatial and temporal distribution patterns of dengue is often treasured in the drafting and implementation of management/action plans to ensure effective management of dengue epidemics at regional scale. Thus, a statistical and geo informatics based analysis of the recent trends in dengue distribution was carried out to identify spatial and temporal trends in distribution patterns of Dengue in the Akurana Medical Officer of Health (MOH) area. Monthly records of reported dengue cases from 2010 to 2014 of the Akurana MOH area were obtained and were subjected to a scatter plot analysis in MINITAB (version 14.12.0) to identify the temporal patterns in the recorded dengue cases. Spatial maps of the recorded dengue case distribution in each GND for each month and for the whole study period were prepared by using Arc GIS 10.1. The spatial and temporal variations of dengue outbreak distribution within the Akurana MOH (at GND level) were analyzed to identify the recent trends in dengue incidence. Akurana, Bulugathenna, Dippitiya, Dunuwila, Konakalagala and Neeralla localities could be identified as areas with relatively high risk to dengue outbreaks throughout the study period, while localities such as Balakanduwa, Delgasgoda, Delgasthenna, Malgamandeniya, Marahela, Palleweliketiya and Udaweliketiya emerged as areas with low risk. As suggested by the results of the paired-Chi square test [$>X_{2(30, 0.95)} = 43.773$], the emergence of dengue outbreaks indicated a significantly declining trend of recorded dengue cases in most of the GNDs (Aswadduma, Delgasgoda, Kurugoda, Malgamandeniya, Palleweliketiya and Walahena etc.) during the recent years. The evaluation of the trends in temporal and spatial distribution of dengue outbreaks at the localized level, could be recommended as a useful tool in the planning and implementation of action plans to control the rise of dengue, while evaluating the efficacy of already implemented control measures at regional scale.

Keywords: Dengue, GIS, temporal and spatial trends

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