USING SATSCAN METHOD AND GIS FOR THE IDENTIFICATION OF SPATIAL AND TEMPORAL CLUSTERING OF DENGUE CASES (WITH SPECIAL REFERENCE TO THE KOLONNAWA DIVISION SECRETARIAT)

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Abstract

Dengue fever is a mosquito-borne illness that has a significant impact on developing countries in the tropics. Sri Lanka, as a tropical country, is also impacted by the dengue fever, which has a high morbidity and mortality rate. The Kolonnawa Divisional Secretariat (DS) in Sri Lanka is one of the major dengue transmission divisions in the country. The aim of this study is to map and analyse the spatial and temporal distribution of dengue in the Kolonnawa DS division between April to September of 2019.Using conclusively confirmed individual cases from the Kolonnawa Medical Office of Health (MOH) across the study period, SaTScan software was utilised to identify dengue clusters using the space-time permutation and the Bernoulli purely spatial model. The statistical significance and distribution of clusters were explored using Monte Carlo replication of data sets under the null hypothesis with replications greater than 999 to give a significant level for cluster determination. ArcMap 10.1 was used to display the spatial and temporal clusters associated with the reported cases. SaTScan discovered five space-clusters and three space-time clusters over the study period. The region's excess dengue fever cluster was statistically significant (p 0.05). These cases varied significantly between the divisions during the study period. Most of the reported clusters revealed a high level of spatial distribution in the western half of the kolonnawa DS division such as Welewaththa, Kuruniyawaththa and Sedawaththa divisions. Additional space-time clusters were observed in Udumulla, Gothatuwa, Dodamgahahena, Kotuwila and Malgama divisions. The integration of SaTScan and GIS technologies to analyse household-level dengue cases enables more precise targeting of preventative measures on identified high-risk zones. This mapping of the dengue risk paves the way for the prioritisation of control operations, with high-risk zones labelled as a priority, as well as the organisation of intervention trials or research studies on dengue outbreak prediction.

Keywords: *Dengue, SaTScan, Kolonnawa, GIS*