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Dengue epidemic identification and its seasonal and spatial variability in the Administrative/Health sub-districts of Matale district from 2005 to 2020

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Dengue has been an important public health problem in Sri Lanka since early 2000s. The disease is endemic in the country and epidemic at 3-5 year intervals. Initially, dengue was prevalent in Colombo and then spread to other large, urbanized centers. During the past two decades, it has spread to towns in Matale district. Identification of seasonal, spatial and epidemic patterns in dengue transmission at fine scale can help understand contributing factors and transmission patterns and dynamics. Our objectives were the identification of dengue epidemics, seasonality of dengue transmission and their spatial variability at a sub-district spatial resolution for 2005-2020. Data on weekly aggregated dengue cases were obtained from the office of the Regional Director of Health Services in Matale from 2005-2020 for the 13 health sub-districts. These are identical to the Administrative Divisions except for the division of Matale and Dambulla between the Municipal Council and remaining areas. Epidemics were identified based on exceeding a threshold of the running average of the weekly average of dengue cases and the standard deviation for the preceding 5 years. Epidemics were detected in 2006, 2009, 2014, 2016, 2017 and 2019. The monthly averages of dengue cases from 2005 - 2020 shows a bimodal distribution with peaks in May to July and October to February. Incidence is twice as likely as during the mid-year as during the end year. This seasonal peak follows in the months after the start of the Yala and Maha seasonal rains in April/May and September/October. In the district, the mid-year averages exceed that of the end-year averages except Dambulla, Galewela, Pallepola, Naula, Ambanganga, Yatawatta and Matale. More detailed analysis is warranted, inclusive of climatic variables to bring out the spatial relationships. This work has provided spatial and seasonal and epidemic characteristics of dengue incidence at finer scale and points the way to including climate, demographic analysis at scales finer than the sub-district.

Keywords: Dengue, epidemics, seasonal variation, spatial variation, Matale district

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