Abstract No: MO-01

Investigating the effect of climate factors on dengue incidence in Kandy, Sri Lanka

H. A. N. Madhumali[1] and N. Varathan[1]*

[1] Department of Mathematics and Statistics, University of Jaffna, Sri Lanka

Dengue, a mosquito-borne disease, poses significant public health challenges in tropical and subtropical regions globally. About two-thirds of the world's population live in areas infected with dengue. It is one of the major emerging public health problems locally as well as globally. Dengue has been hyper-endemic in Sri Lanka in recent years. According to the epidemiology unit of Sri Lanka, dengue fever and the more severe dengue hemorrhagic fever became nationally notifiable diseases in Sri Lanka in 1996. The prevalence of dengue infections on a yearly basis has been increasing over time. Now it has become the leading killer mosquito infection in Sri Lanka. In urban areas, the dengue incidence is the highest, notably highest in Colombo and Gampaha districts. Currently, Kandy district is the third highest-risk area for dengue transmission in the country. The incidence of dengue was caused by several factors, one of which is the climatic conditions referring to temperature, rainfall, and humidity were reported to be important influential dengue transmitters. Since climate conditions influence the dengue transmission cycle, the relationship between dengue incidence and climatic conditions is investigated in this study. This study focuses on developing a suitable statistical model that describes the relationship between dengue incidence and meteorological factors such as temperature, humidity and rainfall in Kandy. Since the dengue incidence is a count data, the Poisson regression approach is considered to fit the model. For this study, monthly dengue incidences in the city of Kandy from 2007 to 2019 were obtained from the epidemiology unit of the Ministry of Health of Sri Lanka. The monthly climate data in the city of Kandy (monthly average temperature in ^{o}C, monthly average humidity, and monthly average rainfall in mm for the same period) were obtained from yearly statistical abstracts from the Department of Census and Statistics of Sri Lanka. Since the data was identified as over-dispersed, which has higher variance than the mean value, the negative binomial model was incorporated. Finally, models were compared with respect to the deviance values and the Akaike Information Criteria. Results reveal that the negative binomial model is the best-fitted model for the data. Further, rainfall was identified as the most significant variable for the dengue incidence in Kandy. The results of this research may help to improve the precaution strategies against dengue incidence in the near future. That is, the relevant authority may alert the public during the rainy season and do pre- cleaning activities of the environment.

Keywords: Climate factors, Dengue transmission, Public health, Over-dispersion, Poisson-regression