Variation of Malaria Incidence in the Moneragala District of Sri Lanka: A Spatial Approach

Markandu Anputhas[1], Susitha Wanigaratne[2], Olivier Briet[1], Dissnayake Gunawardena[3] and Priyanie Amerasinghe[1]

[1] International Water Management Institute, P.O. Box 2075, Colombo, Sri Lanka
[2] Department of Public Health Sciences, University of Toronto, Toronto.
[3] Anti Malaria Campaign, Ministry of Health, Sri Lanka

Malaria is a major public health problem in Sri Lanka. At present however, case counts are very low, which is attributed to the effective control measures adopted during the past decades. Despite the low incidence, outbreaks still occur and the government has to spend its resources (around 0.05% GDP) which are currently planned on district level risk maps. Spatial maps and influence of other covariates at a sub district level has not been undertaken to date. This study investigates the spatial distribution of malaria incidence among the smallest administrative units (Grama Niladhari Divisions - GNs) of the Moneragala district of Sri Lanka and the influence of extrinsic factors that are with and without spatial variability. The global and local Moran's *I* statistics and Geary's *C* statistics were computed to quantify the spatial influence among the GNs. The Poisson regression analysis was performed to investigate the important extrinsic factors affecting the malaria incidence. The analyses showed that there is a strong positive spatial correlation (I = 0.46 and $C=0.78$) among the GNs (n = 319) in the Moneragala district. The rainfall and number of households below poverty line were positively correlated with malaria incidence while the elevation of the GNs and better quality housing (building material of walls) were negatively correlated. Similar results were observed with small differences in coefficient when spatial variability was introduced in the regression model. These findings will be useful for the government control programs, where activities can be focused at a sub district level with plans for more efficient resource allocation within the district.

Key Words: Extrinsic factors, Malaria, Poisson regression analysis, Spatial correlation