A Statistical Approach to Define Thresholds for Dengue Epidemic Management in Akurana Medical Officer of Health Area, Kandy District of Sri Lanka

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Stegomyia indices, namely; Premise Index (PI), Breteau Index (BI) and Container Index (CI) are used forvector management approaches in Sri Lanka. Properly defined threshold values for larval indices are of higher importance to provide forecasts on dengue epidemics and also for effective larval management of dengue vectors. However, such critical thresholds are poorly defined for Sri Lanka. The present study aimed to define threshold values forabove larval indices for dengue epidemic management in the Akurana Medical Officer of Health (MOH) in the Kandy District. Larval surveys were conducted on a monthly basis from January, 2016 to June, 2018. Four larval indices, namely BI for *Aedesaegypti* (BIA) and *Aedesalbopictus* (BIB), PI and CI were calculated. Further, monthly larval indices of AkuranaMOH area from January, 2012 to December, 2015, were obtained from the MOH office, along with monthly reported dengue cases for the entire study period. Receiver Operating Characteristic (ROC) curves in SPSS (version 23) were used to assess the discriminative power of the larval indices in determiningdengue epidemics and thresholds based on larval indices. As indicated by the area of ROC curve (AUC), the BIA (0.661) and PI (0.637) were having a notable discriminative power to forecast dengue epidemics at a two-month lag period. Both BIB (0.397) and CI (0.526) were non-informative influencers at one and two-month lag periods. The BIA and PI were better predictors of dengue incidence than BIB and CI. Based on the ROC curve, three risk thresholds were defined for BIA as Low Risk (BIA≤2.1), Moderate Risk (3.9≤BIA<4.85), and High Risk (BIA≥4.85), with respect to *Ae. aegypti*. According to the PI, thresholds were defined as Low Risk (PI≤6.2), Moderate Risk (7.7≤ PI<9.9), and High Risk (PI≥ 9.9). Threshold values defined for BI of *Ae. aegypti* and PI, could be recommended to be considered in implementing vector control efforts in the above study area for effective dengue epidemic management, through pre planned entomological management of dengue vectors.

Keywords: Dengue, Aedes, Larval Indices, Thresholds

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