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Factors affecting transmission of chikungunya using Geographical Information System (GIS)

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Transmission of chikungunya has been observed in many parts of Sri Lanka during the past few years. The objective of this study was to identify possible factors affecting transmission of chikungunya in a high risk area and to intervene and monitor those using GIS. Entomological, environmental, socio-economic and other possible factors were examined with regard to a chikungunya hot-spot in Kandy municipality for 12 months starting from April 2008. Hundred house-holds from 33 clusters were recruited. The distant between each cluster was maintained at a minimum of 200 m. Micro level approaches for collection of position, population, environmental, socio-economic and other related information were performed at each house-hold through a pre-tested questionnaire. Monthly entomological and epidemiological surveillance were conducted for 12 months. Digital topographical maps and meteorological information were obtained. GIS was used to map the selected house-holds and to highlight the spatial and temporal distribution of factors under study. Selected risk area was an urban area where homesteads were the major land use pattern. The weather pattern of the study area was typical that of the Wet Zone. Entomological surveillance conducted showed the presence of high density of *Aedes albopictus* mosquitoes in more than 90% of the key (artificial) breeding habitats. Socio-economic data revealed although all house-holds have a sound knowledge on transmission on dengue including preventive measures, they were less concerned about the key mosquito breeding sites. GIS maps generated during the study showed distribution of these identified factors in all clusters. House index and man hour density of *Ae. albopictus* showed a positive correlation with rainfall, with a lag period of 2 and 3 months. The generalized high density of *Ae. albopictus* suggest that this species may play a major role in transmitting chikungunya in the study area. In conclusion, the presence of high density of *Ae. albopictus* and lack of concern about key mosquito breeding sites in all clusters may be important risk factors. GIS-based maps can be used as an important tool to find out spatial and temporal distribution of possible risk factors in a selected hotspot, which would enable health authorities to prioritize implementation of control activities in a cost effective manner.

Keywords: chikungunya, transmission, factors, map, GIS