Abstract

Dengue has emerged as an important public health problem in Sri Lanka. The entomological aspects, physico-chemical characteristics and the socio-economic factors that induce breeding habitats of *Aedes aegypti* and *Aedes albopictus*, vectors of dengue, were studied in the Narahenpita Public Health Inspector's area of the Colombo Municipal Council from August to November 2007.

A preliminary survey in 50 premises to accrue basic information on possible *Aedes* breeding habitats in the study area was followed by a general survey, which encompassed a total of 352 premises including normal residences, apartments, shanties, work stations, commercial sites, schools, government and private institutions. All premises were examined both indoors and outdoors for possible *Aedes* breeding sites. The mosquito larvae encountered were collected and identified to species in the laboratory. The selected physico-chemical parameters in *Aedes* positive containers were measured using standard instruments and socio-economic data were gathered by a validated questionnaire. All entomological, physico-chemical and socio-economic data were statistically analyzed.

A total of 174 water holding receptacles including 29 with *Aedes* breeding were observed in the preliminary study. In the general survey, dengue vector breeding was observed in 81 premises. 702 water holding containers that could be considered as "potential" *Aedes* breeding habitats were encountered, where coconut shells were the most abundant receptacle. Of the 127 *Aedes* "positive" water containers and plastic containers were the major breeding habitats of both *Aedes* species in the study area. Fish tanks, glass bottles, clay pots, bird baths and natural containers (bamboo stumps and leaf axils) were among the most attractive containers for vector breeding. The majority of potential *Aedes* breeding containers were found in normal residences (47.24%) followed by work stations (14.17%) and commercial sites (14.17%). For *Ae. aegypti* and *Ae. albopictus,* there were no significant differences either between the number of containers positive or in the mean number of larvae per positive container. Both vector species were predominant in the study site. The larval abundance indices (Premises Index = 23.01%, Breteau Index = 36.08) indicated that the area is high risk for the transmission of dengue, dengue haemorrhagic fever and chikungunya.

The mean temperature of *Aedes* breeding water was 30.1 ± 0.8 °C and the pH values were more or less neutral (mean 6.65 ± 0.47). The mean dissolved oxygen concentrations were 4.09 ± 1.02 mg/l. The breeding sites had a wide range of conductivity (50.2- 1451 µS/cm), turbidity (6.94- 519 NTU) and salinity (0.1- 0.8 ppt). There was a significant positive relationship between the total *Aedes* larval density and the dissolved oxygen (DO). *Ae. albopictus* larval density was positively and significantly related to DO, but negatively related to pH.

The frequency of examining *Aedes* breeding sites, the materials used to construct the wall, floor and the roof of houses, the level of education and income of the householders and the frequency of garbage collection by the local authorities were the most important socio-economic factors which may induce *Aedes* larval breeding. There was a significant association between the frequency of examining for breeding sites and the presence or absence of *Aedes* positive containers.

The recommendations formulated based on these findings will be helpful in controlling dengue vector breeding, and thus preventing disease transmission in such urban areas.