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Association of climatic factors and dengue/ dengue haemorrhagic fever in the Kandy district of Sri Lanka

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A study was carried out to identify the association between climatic factors and dengue /dengue haemorrhagic fever (DF/DHF) incidence in the Kandy district. Monthly data on suspected and serologically positive DF/DHF cases and climatic factors (rainfall, maximum and minimum temperature) from January 2002 – December 2008 were collected from the Regional Epidemiologist in Kandy and the Department of Agriculture in Peradeniya, respectively. Correlation analysis was applied to identify the associations between climatic factors and DF/DHF, for the current (same) month, and, with 1 and 2 months lag periods. Multiple linear regression was applied to identify the relationships between the climatic factors and DF/DHF. Significant and positive correlations were observed between (1) monthly mean rainfall and monthly mean DF/DHF with 1 (r=0.4990, p=0.09) and 2 (r=0.5547, p=0.06) months lag periods, and (2) monthly mean minimum temperature and monthly mean DF/DHF with 1 (r=0.6790, r=0.02) and 2 (r=0.5310, p=0.08) months lag periods. Significant and negative correlations were observed between (1) maximum temperature and DF/DHF (r=-0.2362, p=0.03), and, (2) monthly mean maximum temperature and DF/DHF (r=-0.7532, p=0.004), in the current month. Non significant, but, comparatively high positive correlations (>0.1) were observed between (1) monthly rainfall and DF/DHF (r=0.1016) and, (2) monthly maximum temperature and DF/DHF(r=0.1700), with 2 months lag period, (3) monthly minimum temperature and DF/DHF in the current month (r=0.1150), 1 (r=0.1859) and 2 (r=0.1654) months lag periods, (3) monthly mean maximum temperature and DF/DHF with 2 months lag period (r=0.4629) and (4) monthly mean minimum temperature and DF/DHF in the current month (r= 0.4042). Maximum temperature contributed with R^2 value of 5.6% (p=0.03) and minimum temperature with R^2 value of 0.8% (p=0.41). This study shows that there is an association between climatic factors and DF/DHF. Use of climatic predictions 3 months ahead would be of much value for early warning of DF/DHF transmission periods. Since there is an association between rainfall and DF/DHF, vector breeding sites need to be eliminated in the dry season, before the rains. Associations of climatic factors and DF/DHF were not recorded in Sri Lanka previously, thus, the findings of this study are important for disease control managers for prevention and control of DF/DHF in the district.

Keywords: Climatic factors, dengue, Kandy district