

Entomological and epidemiological investigations in a newly established focus of cutaneous leishmaniasis in Kegalle district, Sri Lanka

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Leishmaniasis is a protozoan infection transmitted by phlebotomine sand flies. The published information on the vector distribution, abundance and potential risk factors that are favorable for disease transmission in Kegalle district are not available. Hence, understanding the trends in disease establishment, epidemiological characteristics, and the bioclimatic suitability of the area for disease prediction. The total number of leishmaniasis patients notified in Kegalle district and Sri Lanka from 2016-2020 was obtained from the Epidemiology Unit, Sri Lanka. Rambukkana and Warakapola Medical Officer of Health (MOH) areas that have reported the highest numbers of cases from 2016 – 2018 in Kegalle district were selected as the study sites in the current study. Patients were visited and socio-economic, demographic, environmental and awareness-related information was collected using an interviewer-administered questionnaire. A randomly selected household with no records of CL in the same locality of the patient household was included as the control group to match the case group at a 1:1 ratio. Entomological surveys were conducted from July 2019- July 2020 using standard entomological techniques. Bioclimatic suitability was evaluated using ecological niche modeling (ENM). A total of 107 patients were reported from Rabukkana and Warakapola MOH areas from 2016-2020. Of them 88 were traced and included in the study. The risk factors were assessed using the chi squared test at 95% confidence intervals. Age was divided into ten-year age groups for analysis. The findings indicate that leishmaniasis in the Kegalle district progressed to the outbreak level within 3 years since the first recorded case in 2016. School students (n=22, 25%, P<0.05) and individuals between 11-20 years of age (n = 33, 37.5%, P<0.05) were identified as the main risk groups. The presence of composting sites (n=65, 73.9%, P<0.05) that provide potential breeding grounds for sand flies, abandoned lands (n=63, 71.6%, P<0.05) which are potential diurnal resting sites of adult sand flies, and suboptimal (dark or normal) lighting conditions (n=87, 98.8%, P<0.05) in the house that may facilitate vector activity were denoted as significant risk factors for leishmaniasis occurrence compared the control group. The level of awareness of the disease was poor in both the test and control groups. Ecological niche modeling revealed that the areas closer to the Kurunegala district, a predominant leishmaniasis endemic district in the intermediate zone, have high bioclimatic suitability for leishmaniasis. The sand flies including, *P. argentipes* (n=121, 42%) and *S. zeylanica* (n=164, 56.9%) were present in high densities in this area. Hence, the control efforts focused on raising awareness, while implementing vector control and effective case management, prioritizing the high-risk areas is vital.

Keywords: Leishmaniasis, Patients, Sand flies, Risk factors, Ecological niche modelling

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