International Journal of Tropical Insect Science
https://doi.org/10.1007/s42690-021-00690-6

ORIGINAL RESEARCH ARTICLE

Socio-economic and ecological impacts on dispersal of cutaneous leishmaniasis in North Central Province, Sri Lanka

N. M. N. G. Nayakarathna[1] · D. P. W. Jayatunga[1] · G. A. S. M. Ganehiarachchi[1]

Received: 5 June 2021 / Accepted: 30 October 2021

Abstract
Leishmaniasis is a fatal disease caused by a parasitic protist of the genus *Leishmania* through the infected primary vectors, Phlebotomine (Diptera: Psychodidae) female sand flies. In Sri Lanka, cutaneous leishmaniasis (CL) is established in Anuradhapura district. The present study was carried out to determine the socio-economic and environmental factors on the distribution of CL. A survey was conducted among CL patients on selected demographic and socio-economic factors and environmental characteristics at three study localities throughout a year. Phlebotomine sand flies were collected using sticky traps and Centers for Disease Control (CDC) light traps around residences of CL patients. Significant differences were shown between mean abundance of primary vectors and different environmental characteristics. The sand flies were reported to gather in shrubs, jungle areas, gardening areas, wet soil areas, leaf litter and around termite hills. The data obtained showed poor knowledge and lack of awareness about leishmaniasis among the local communities. Therefore, it is paramount to conduct awareness programs on leishmaniasis transmission, potential risk factors, sand fly vector of the disease, preventing the sand fly bites and how domestic surrounding areas must be managed for reducing vector populations to prevent disease spreading among local community.

Keywords Cutaneous leishmaniasis · *Phlebotomus argentipes* · Socio-economic factors · Ecological factors

Introduction

Leishmaniasis is a fatal mammalian disease caused by parasitic protist of the genus *Leishmania*. It is transmitted from zoonotic reservoir hosts through bites of infected Phlebotomine (Diptera: Psychodidae) female sand flies. According to World Health Organization (WHO), this disease is still being spread throughout the world and so far, it is found that up to 350 million people are at risk in 98 countries in Europe, Africa, Asia, and America and has become an enormous global burden (Torres-Guerrero et al. 2017). In addition, human leishmaniasis clinically manifests three main forms: visceral leishmaniasis (VL), cutaneous leishmaniasis (CL) and muco-cutaneous Leishmaniasis (MCL) (McEwire and Satoskar 2014).

Leishmaniasis was not recorded until 1990 in Sri Lanka, however, it took the nature of an imported disease found among overseas employees returning to the country (Naotunne et al. 1990). Until 2001, only a few sporadic cases were detected locally indicating that CL was an emerging epidemic in the island (Athukorale et al. 1992; Siriwardana et al. 2012). In 2008, leishmaniasis became notifiable in the country (Galgamuwa et al. 2018). Since then, leishmaniasis has become established in Sri Lanka with an explosive increase in number. Nowadays, Sri Lanka is endemic for CL with almost all provinces being affected and Polonnaruwa, Hambantota, Matara and Anuradhapura districts are the highly endemic (Rajapaksa et al. 2007; Sandanayaka et al. 2014). However, VL and MCL have shown least occurrence than CL to date.

Several favorable factors, including ecological factors, vector aspects, biological factors, socio-economic conditions, population mobility, and environmental changes may have impacted the highest rate of disease transmission throughout the country during the last two decades. According to the epidemiological unit, Sri Lanka, by the second quarter of 2015, the highest number of CL patients (89 patients out of 291 total CL patients) were recorded from Anuradhapura district of North Central Province. Therefore, the objective of the present study was to determine how the

✉ G. A. S. M. Ganehiarachchi
mangala@kln.ac.lk

[1] Department of Zoology and Environmental Management, University of Kelaniya, Kelaniya 11600, Sri Lanka

Published online: 04 January 2022