Field evaluation of sandfly xenodiagnosis entomological technique for detecting Leishmania infection transmission in Sri Lanka

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Understanding the transmission dynamics of Leishmania infection through vector-host interactions is critical for epidemiological surveillance and control of Cutaneous Leishmaniasis (CL) in Sri Lanka. While xenodiagnosis has traditionally been performed under laboratory settings, this study represents the first attempt to assess the feasibility and applicability of xenodiagnoses directly on animals living under natural conditions in the field in Sri Lanka. The study was conducted in Matara and Hambantota Districts in Sri Lanka which are known for a high prevalence of CL. F1 progeny of *Phlebotomus argentipes* sandflies (n=50) were exposed to dogs (n=20) and cattle (n=14) for 30 minutes. Post blood feeding, sandflies were incubated under controlled temperature (26°C) and humidity (80–90%). The fed sandflies were sampled at designated intervals: day 4 and day 8 post-feeding. PCR amplification targeting Leishmania DNA was performed to determine infection prevalence. Feeding success was monitored, with average blood-fed female sandflies per host recorded as 11.2 for dogs and 10.6 for cattle. These feeding rates indicate a high level of feeding success (>50%) suggesting that the sandflies are feeding well enough to make the xenodiagnosis method reliable. Although dogs showed a marginally higher sandfly feeding success compared to cattle, no statistically significant difference ($p > 0.05$) was observed in the mean number of blood-fed female sandflies between the two hosts. PCR analysis confirmed absence of Leishmania infection in all tested sandflies. This study successfully demonstrates the feasibility of xenodiagnosis under natural field conditions, establishing reliable sandfly feeding on animal hosts and effectively simulates natural transmission dynamics between hosts and vectors. These findings validate the approach as a valuable tool for epidemiological surveillance and enhancing understanding of CL transmission in endemic areas in Sri Lanka.

Keywords: *Xenodiagnoses*, *Leishmania infection, Phlebotomus argentipes*, *Vector-host interaction*, *Molecular detection*