Molecular and entomological studies on the transmission and detection of Lymphatic Filariasis in Gampaha District, Sri Lanka.

N. D. Asha Dilrukshi Wijegunawardana

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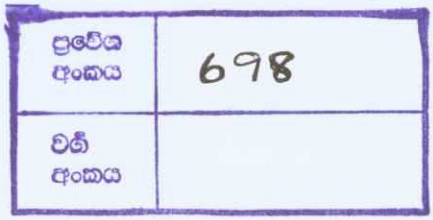

Molecular Medicine Unit

Faculty of Medicine

University of Kelaniya

Sri Lanka

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ABSTRACT

Entomological and epidemiological tools are considered important to monitor the chemotherapy-based filariasis eradication programs aimed at stopping the transmission of *Wuchereria bancrofti* by its obligatory mosquito vector. Objectives of this study were the comparison of dissection of mosquitoes and Polymerase Chain Reaction Enzyme-Linked Immunosorbent Assay (PCR-ELISA) tools for the detection of parasitic filariasis infections, identification of current epidemiological status in the Gampaha District, Sri Lanka. Field study was conducted in 45 sites in all Medical Officer of Health (MOH) areas in the Gampaha district, Sri Lanka; identified by the Anti Filariasis Campaign (AFC) as having high-risk for bancroftian filariasis transmission. Indoor-resting *Culex quinquefasciatus* mosquitoes were collected by aspiration from 20-30 houses per each site. Part of the mosquitos was used for dissection and the remainder was used for PCR-ELISA to detect the filarial parasites in *C. quinquefasciatus* mosquito. According to the results a total of 175 *W. bancrofti*-infected mosquitoes were found in 32 batches (out of 90 batches), giving an overall infection rate of 8.20%. The site wise prevalence of infected and infective larvae ranged from 0% to 46.88% and 5.29% respectively, with a mean larval density of 5 larvae per infected mosquito. A total of 4050 mosquitoes in 270 pools of head, thorax and abdomen were processed by PCR-ELISA during two study periods. A significantly higher overall infection rate was observed in head and thorax pools than in abdomen pools ($p = 0.05$) (13.7% head, 14.4% thorax and 2.2% abdomen pools). Point estimates of prevalence of *W. bancrofti* infected *C. quinquefasciatus* mosquitoes, as assayed by PCR-ELISA, ranged from 0% to 62.96% and 55.56% respectively for the two study periods. Mosquito infection

rates as assayed by PCR-ELISA for the two consecutive study periods were 12.59 and 7.65 respectively. The association of dissection based prevalence rates with PCR based rates as determined by the Pearson correlation coefficient were 0.176 and 0.890 for two study periods. Furthermore, the probability associated with a Student's paired t-test, with a two-tailed distribution for the infection prevalence rate resulted by dissection and PCR-ELISA were 0.394 and 0.023 respectively for the two study periods. Following mass treatment, *W. bancrofti* infection prevalence had not reduced significantly as observed by these two methods (P = 0.05 and P = 0.005). As an average, for two study periods, of the 30 sentinel sites, 41.7% was having *C. quinquefasciatus* mosquitoes positive for *W. bancrofti* transmission whereas it was 36.7% for the non-sentinel sites. Of the 1073 participants (286 children, 787 adult) screened, 6 were positive in 2 sites (Hekitta and Pethiyagoda) for mf, respectively giving microfilaremia prevalence rates of 0.5% and 3.4% which were greater than the country's present rate (0.18%). Also mean mf density (mf/60 µl blood) of 2 and 7 per positive slide were observed from above two sites respectively. The overall results indicated that PCR-ELISA could be used as a powerful entomological tool for rapid assessment of lymphatic filariasis transmission in endemic areas of Sri Lanka, and it was more sensitive than the traditional dissection technique.

Key words: Filariasis, *Wuchereria*, entomology, epidemiology, MDA