Seasonal and spatial dynamics of the primary vector of plasmodium knowlesi within a major transmission focus in Sabah, Malaysia

ABSTRACT

Background The simian malaria parasite Plasmodium knowlesi is emerging as a public health problem in Southeast Asia, particularly in Malaysian Borneo where it now accounts for the greatest burden of malaria cases and deaths. Control is hindered by limited understanding of the ecology of potential vector species. Methodology/Principal Findings We conducted a one-year longitudinal study of P. knowlesi vectors in three sites within an endemic area of Sabah, Malaysia. All mosquitoes were captured using human landing catch. Anopheles mosquitoes were dissected to determine, oocyst, sporozoites and parous rate. Anopheles balabacensis is confirmed as the primary vector of. P. knowlesi (using nested PCR) in Sabah for the first time. Vector densities were significantly higher and more seasonally variable in the village than forest or small-scale farming site. However, An. balabacensis survival and P. knowlesi infection rates were highest in forest and small-scale farm sites. Anopheles balabacensis mostly bites humans outdoors in the early evening between 1800 to 2000hrs. Conclusions/Significance This study indicates transmission is unlikely to be prevented by bednets. This combined with its high vectorial capacity poses a threat to malaria elimination programmes within the region.