

ABSTRACT

Vector control methods such as insecticide treated nets (ITNs) and indoor residual spraying (IRS) have been successful in preventing mosquito-borne diseases like malaria and dengue. However, these methods face challenges including insecticide resistance, high costs, logistical difficulties, low adoption rates, and limited durability. Therefore, there is a need for simpler and more affordable interventions that can be used on a large scale in disease-endemic communities to supplement current approaches. This study evaluated the effectiveness of using insecticide-treated eave ribbons as a potential tool for complementing the current vector control methods. Eave ribbons are pieces of hessian fabric that can be placed around the eave spaces of poorly constructed houses to kill or repel mosquitoes. Laboratory cone bioassays were conducted to assess the efficacy of eave ribbons treated with the organophosphate, pirimiphos-methyl, for killing the malaria vectors, *Anopheles funestus* and *Anopheles arabiensis*, and the dengue vector, *Aedes aegypti*, under varying exposure durations and insecticide doses. In addition, a semi-field experiment was done to assess the efficacy of eave ribbons treated with pirimiphos-methyl against the malaria vectors. Indoor and outdoor biting was assessed by the number of mosquitoes captured indoors in window exit traps and outdoors by human landing catches, respectively. Mortality of recaptured mosquitoes was recorded after 24, 48, and 72 hours. The findings revealed that treated eave ribbons resulted in higher mosquito mortality than the untreated ribbons, but the impact increased with increased exposure duration or dose. The semi-field study indicated moderate levels of bite prevention and mortality of the mosquitoes. At the doses of 1 g a.i./m² and 2 g a.i./m² pirimiphos-methyl, there was no significant protection against *An. arabiensis*, but at the dose of 4 g a.i./m² pirimiphos-methyl, there was only significant protection against outdoor biting *An. arabiensis*, but not *An. funestus*. In conclusion, while insecticide-treated eave ribbons may have potential for controlling malaria and dengue vectors, further research is needed to validate their efficacy in field settings and to identify suitable insecticides or insecticide combinations that are safe and effective.