Declaration

I Khamis Ameir Haji declare that this research report is my own work conducted in Zanzibar. This research report has not been submitted for any degree to any other university.

January, 2012

Abstract

The study on durability and efficacy of long lasting bed nets and distribution of malaria vector mosquitoes was conducted in the West district of Zanzibar between January-June, 2011. Mosquito collection and insecticide resistance testing was extended to Pemba island following initial work done by the Zanzibar Malaria Control Programme (ZMCP) indicating the occurrence of pyrethroid resistance on Pemba. Mosquito collections were done using indoor and outdoor methods (pyrethrum spray catches, artificial pit traps, and CDC light traps) from four randomly selected sites. World Health Organization (WHO) guidelines were used to conduct resistance testing on the mosquitoes and cone bioassays for bed nets evaluation.

The study revealed that malaria vector mosquitoes collected on Pemba and Unguja islands from January – April, 2011, belonged to the *Anopheles gambiae* complex. Molecular identification showed that *Anopheles arabiensis* was the most prevalent sibling species followed by *An. merus*. Longitudinal studies with a wide geographical coverage are recommended to monitor changes over time on malaria species composition.

Pyrethroid resistance was confirmed from Pemba island for the first time in the region following ZMCP assays. However, this was not the case on Unguja island where malaria vectors were found to be almost fully susceptible against the pyrethroids used for malaria control in Zanzibar. The results demand that a routine, systematic monitoring campaign for insecticide resistance is implemented so that the impact of control efforts across the islands can be predicted and understood. As a part of resistance

management, the Zanzibar Malaria Control Programme has recommended a shift to bendiocarb (carbamate) for indoor residual spraying in a rotation system. Again the rotation of the insecticides may allow a reduction of selection pressure on pyrethroids.

Following an evaluation of long lasting insecticide nets (LLINs) in the field, > 66% were found in poor physical condition after 3 years. Moreover, bioassays on these nets showed far less mortality than that recommended by WHO. More studies are required to determine whether these nets are still effective at reducing the numbers of bites received by humans. Finally, these results suggest that the LLINs distributed in 2008 to the West district are no longer effective against malaria vectors in Zanzibar and therefore replacement is of paramount importance for the community to remain protected.

Dedication

This dissertation is dedicated to my Mama Mrs Kazija Abdullah and the rest of my family members whose support and contributions have made this work possible.

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