

Evaluation of Window Screen Traps That Reduce the Mosquito Population in Insecticide Resistance Areas of North-Eastern Tanzania

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Background:

In a growing scenario of insecticide resistance due to the extensive usage of LLINs and IRS, the demand for an efficient, insecticide-free, and environment-friendly vector control tool is vital. The National Institute for Medical Research of Tanzania (NIMR), in collaboration with the University of Helsinki, developed a novel strategy that focuses on blocking mosquito-human contact to reduce malaria transmission by using a state-of-the-art screened (3D screens) window double screen traps (WDST).

Methods:

Children aged six months to 14 years from selected clusters were screened for malaria using MRDT and hemoglobin level. Entomological parameters were established by routine mosquito collection using CDC-light traps, while insecticide resistance (IR) analysis was conducted using WHO susceptibility tests on adult mosquitoes raised from larvae sampled from the respective site. Both arms also received the pyrethroid-treated LLIN's and were observed for 52 weeks in which epidemiological and entomological data were collected routinely (every six weeks).

Results:

All 14 clusters had resistant mosquitoes to pyrethroid insecticides, and they were randomized into control and treatment arms (7 in each arm), and only treatment arm received 3D-WDST. All 14 clusters composed 901 households, and out of these, 411 households from the control cluster received 3D-WDST (92.5% coverage). The Pearson correlation between the *Anopheles gambiae* population and the rate of malaria prevalence was significant ($p = 0.036$, CI = 95%). Similarly, the rate of malaria prevalence was significantly correlated to low hemoglobin levels.

Conclusion

Malaria, anemia, and mosquito density were reduced drastically in intervention clusters than control clusters. WDST technology is acceptable among communities in the study area.

Recommendation:

WDST technology is suitable in areas of mosquito resistance, where chemical methods such as the use of LLINs, IRS, or larviciding are failing.

Keywords: Malaria, Insecticide resistance, 3D-WDST, cross-sectional studies, longitudinal studies.

