

Effectiveness of Transfluthrin-coated inflammable-fumes insecticide-paper (Rambo TM) in the prevention of malaria in Kano, Nigeria, 2010

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Background

- ❑ Malaria is holo-endemic in Nigeria
- ❑ It remains an important cause of morbidity and mortality, especially in children
- ❑ Accounts for:
 - 110 million cases per year
 - 60% of outpatient visits
 - 30% hospitalizations
 - 300,000 children deaths annually
- ❑ Roll Back Malaria (RBM) interventions remain unacceptably low
- ❑ We conducted a randomized controlled trial in Kano-Nigeria to determine effectiveness of Transfluthrin-Coated Inflammable-Fumes Insecticide-Paper (TCIP) [Rambo™] on indoor mosquitoes and malaria

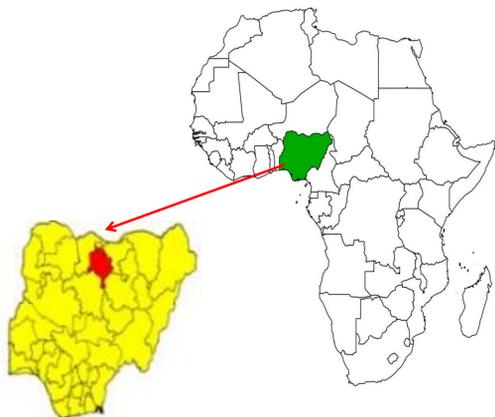


Figure 1. Map of Africa highlighting Nigeria and Kano state

Methods

- ❑ Two randomly selected communities (Panshekara and Danbare) selected as intervention and control arms respectively
- ❑ We systematically selected 150 households (HHs) from each community
- ❑ All Selected households had doors and windows 'netted' with mesh-wire
- ❑ Intervention community (Panshekara) had 'TCIP' administered in addition to mesh wire netting
- ❑ Additional 10 HHs randomly selected from each community as internal controls and were neither 'netted' nor administered TCIP
- ❑ Blood sample was collected at baseline and 3-monthly for malaria parasite microscopy and haematocrit
- ❑ Pyrethrum Spray Collection (PSC) at baseline and monthly to obtain adult mosquitoes for entomology
- ❑ We identify malaria vector species by polymerase chain reaction (PCR)
- ❑ Enzyme-linked – immune sorbent–assay (ELISA) used to identify circumsporozoite protein (CSP) of *Plasmodium falciparum*

Results

- ❑ A total 2565 persons were studied; 1208 from Panshekara 1357 from Danbare
- ❑ Proportion of females in the study were 477 (39.5%) and 579 (42.7%) from Panshekara and Danbare respectively

Table 1. Age and gender characteristics of study subjects from Panshekara and Danbare communities, Kano state, 2010

Variables	Panshekara (Intervention)	Danbare (control)
Mean age (SD) (yrs)	36.13±14.4	47.19±16.8
Gender		
Female (%)	477 (39.5%)	579 (42.7%)
Male	731	778

- ❑ Trend in malaria episodes through the study period comparing intervention and control communities (Fig.1).
- ❑ There was also reduction in proportion of participants with anaemia and parasitaemia in the intervention community.

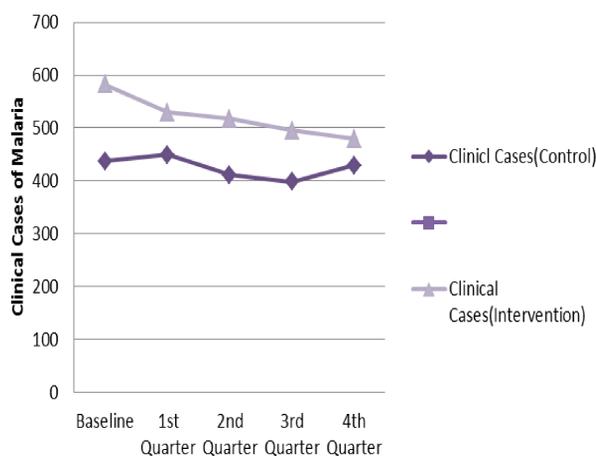


Figure 1. Trend in malaria episodes in both control and intervention communities compared to baseline

- ❑ There was significant reduction in the number of clinical cases of malaria over the period of the study in the intervention community while episodes of malaria attack in the control community remained similar.
- ❑ Of 1592 *Culex species* collected, 911 (57.2%) were from the internal control, 440 (27.6%) from the screened 'netted' and 241 (15.1%) from 'netted +TCIP' treated HHs
- ❑ In comparison to the baseline pre-netting phase, wire netting alone provided 51% protection against the nuisance of *Culicine* mosquitoes, while netting plus TCIP provided 73% protection against *Culicine* mosquitoes

Table 2. Indoor resting density (IRD) of Anophelines from the 2 study community

Period	Panshekara (intervention)	Danbare (control)
May -July	35	50
Aug - Oct	28	356
Nov - Jan	0	12
Feb – March	0	4
Total	63	422

- ❑ Entomological studies revealed:
 - Of the total of 396 *Anopheline* malaria vectors, 339, 27 and 30 were from the control, 'netted' and 'netted +TCIP' treated sites respectively
 - The main malaria vectors species were *An. gambiae* and *An. arabiensis*
 - CSP of *P. falciparum* were seen in all the 3 vector species



Figure 3. Blood sample collection for malaria parasite microscopy and haematocrit

Conclusions

- ❑ The use of wire netting reduce cases of clinical malaria, parasitaemia as well as density of malaria vectors
- ❑ The addition of TCIP further confer additional protection against malaria and malaria vectors.

Recommendations

- ❑ Malaria control programmes should have a multi-pronged approach targeting the vectors as well as the environment.
- ❑ Since an important deduction from this study is that malaria/mosquito are never homogenous even within the same wards.
- ❑ Further study should evaluate cost-effectiveness of the various approaches