

Brief Communication

The Role of Water Coolers in the Breeding of Anopheles Mosquitoes in Khartoum, Sudan

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Malaria remains a major health problem in Sudan, accordingly more than 40% of the calls at health centers and 20-50% of total hospital admissions are due to malaria. *Plasmodium falciparum* is the predominant species, and is responsible for 85-95% of malaria cases. *Anophels arabienses*, is considered to be the main malaria vector and is present in all of the country and coexist with *An.funustus* and *An.gambiae sensu stricto* (s.s) in some parts of the country⁽¹⁻³⁾.

Vector control is one of the three major approaches recommended by the Role Back Malaria Initiative which was commenced in most malaria countries aiming to halve the malaria burden by year 2010⁽⁴⁾, the main objective of the malaria control is the reduction in morbidity by reducing the level of transmission.

Although more than 40 *Anophline* species of mosquitoes are existing, only few species are involved in the transmission of malaria. The *Anophline* mosquitoes breeding sites vary greatly depending on the climatic conditions and availability of water; this include water pools, water tanks, running water, wells, fountains and overhead tanks. Information on the breeding habits is essential for conduction of anti larval operation.

In Sudan *An.arabiensis* is considered to be one of the most efficient malaria vectors due to its ability to adapt so rapidly to changes in the environment induced by human habitation and agriculture⁽⁵⁾.

Previously malaria in Sudan was restricted to rural and irrigated areas, however due to the rapid and unplanned urbanization combined with technical difficulties in controlling the vectors and the parasites, the disease has expanded to include urban and peri-urban areas, and recently malaria cases in Khartoum, the capital city has markedly increased and become a serious health issue⁽⁶⁾.

The bulks of *An.arabiensis* breeding takes place during and after the rainy season in typical rain water pools, however in addition to rain pools, after the flood of the Blue and White Niles recedes leaving behind many rock pools, this normally happen from October to march, at the time of high flood level, breeding may take place in shallow well⁽⁶⁾.

Previous reports have shown that water coolers which are widely used in hot climatic countries constitute a man-made habitat for breeding of mosquitoes^(7,8).

In this study; we have investigated the possible role of water cooler, which are widely used during the dry season in Sudan.

The study was conducted in January/February 2002. One hundred randomly selected dwelling in the capital were included in the study. The dwelling contained 150 air coolers, 87 of which were in use and had water in them. Six out of them (7%) were found to contain *An. arabiensis* species larval stages, and 8 out of 87 water coolers (9%) were harbored *Culex quinqifasciatus* larvae (Box 1). This data has demonstrated that ability of both

An.arabiensis (principle malaria vector in Sudan) and *Culex quinqifasciatus pipens* to breed in water coolers. *Culex quinqifasciatus pipens* is not known to have any medical importance in Khartoum apart from being the main nuisance mosquitoes in the area.

Box 1: The larvae collection from 100 houses holds included in the study area

Total air cooler Examined	87
Air coolers with Anopheles larvae	6
Percent Air coolers with Anopheles larvae	7%
Air-coolers with Culex larvae	8
Percent Air-coolers with Culex larvae	9%
Air coolers with mix breeding	2
Percent Air cooler with mix breeding	2%

The present study carried out during the winter, where the temperature was relatively low and the water coolers are rarely used, however we have noticed that most of the water coolers examined were containing water. This suggests that water coolers provide excellent breeding sites during the dry winter season.

This study concluded that water-coolers might play a significant role in urban malaria transmission in Sudan. Well designed entomological and parasitological studies are needed to confirm this finding.

A special measures should be implemented by malaria control programs and community in order to control this type of breeding sites including application of laravcidial, and other bio-control agents which have shown to be effective in control of breeding sites in water cooler⁽⁹⁾.

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