

INTENSE MALARIA TRANSMISSION IN MTERA DAM AREA: NEED FOR PROMOTING INSECTICIDE TREATED NETS AMONG, FISHERMEN, TANESCO STAFF, AND VILLAGERS LIVING AROUND THE DAM

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Introduction

Mtera dam is built across Great Ruaha River on the border of Dodoma and Iringa Regions to generate electricity for the Tanzania Electric Supplies Company (TANESCO). The area is generally semi-arid with an average rainfall of 400mm per year, most of which falls between November and early April. The temperature ranges between 20°C and 30°C. In 1980 the dam was officially opened to form lake Mtera measuring about 50km long and 5km wide. As a result, lake fishing activities increased considerably attracting fishermen from all over Tanzania, Kenya, Malawi, Zambia and Congo Democratic Republic (former Zaire). In addition to the varied fishing human population there are about 100 TANESCO staff and their families. The home places, from which the people around Lake Mtera come, include those known to be little affected by malaria, and of which the residents have a low immune status for malaria.

Malaria situation before lake formation

The intensity of malaria transmission and prevalence in Mtera area was assessed in April 1975 during the rainy season, about five years before the dam was completed and river flooded to form the lake (Mosha 1976; Goosen and Goosen-Kleipas 1986). The results of that study showed that the density of *Anopheles gambiae s.l.* was low averaging 6.1 mosquitoes per house, and none of the 471 Anophelines was found infected with sporozoites suggesting that malaria transmission was extremely low. Parallel parasitological assessment done in April 1975 amongst the people in Mtera area indicated an overall malaria parasite rate of about 23.5% (208/886). The indicator age group 2-9 years was found to have a parasite rate of 32.8% (76/232) suggesting that Mtera area which is semi arid was mesoendemic for malaria. Such area is characterised by a constantly low incidence of malaria which peaks seasonally into what are known as minor seasonal epidemics. Occasionally and sometimes at regular intervals of 3-4 years these minor seasonal epidemics might erupt into significant sporadic epidemics. During the April, 1975 survey, evaluation of the efficacy of the then 600 mg standard dose of chloroquine in the treatment of malaria was not done as the susceptibility of malaria parasites to chloroquine was still considered to be quite high in Africa (Goosen and Goosen-Kleipas, 1986).

Aim of the study

The aim of the present study conducted between 28/4/1994 and 7/5/1994 was to evaluate the malaria situation

in Mtera 20 years after the lake had fully formed (It took about five years, 1980-1985, for the water level to reach the highest mark) and recommend feasible malaria control measures.

Specific Objectives of the study

Specifically, the study sought to determine in the population the extent of malaria infection, and level of haemoglobin as measured by packed cell volume. Also, assessed were the species, density and infectivity of Anopheline mosquitoes which transmit malaria.

Materials and Methods

Study Area

Seven villages within five-kilometre distance from the lakeshore were randomly chosen for this study. These included Chipogoro, Loje (Uwanja wa Ndege), Kisima (Kibwegere), Migoli (Changarawe), Migoli (Bwawani), Mtera (Kijijini), Izazi (Mnadani).

Methodology

Community-based cross-sectional malaria survey was done involving a total of 3587 people of whom 909 were aged 2-9 years. In this sample, the types of malaria parasites present, parasite rate and density, and blood packed cell volume were measured. Anopheline mosquitoes were caught by CDC light traps, and pyrethrum spray catch. The mosquitoes collected were identified, counted, and dissected for sporozoites. Then their density in a house, and degree of being infective was determined. Larval search was done on the lake margin and in isolated water bodies. Larvae were identified and recorded.

Results

In April 1994 a remarkably different malaria situation was seen from the results of the survey as described in this section with the 1974 observations in square brackets. *Plasmodium falciparum* was still the predominant malaria parasite at 97.3% (1760/1809), [99%]. Overall malaria parasite rate had increased to 50.4% (1809/3587), [23.5%, 208/886], while among the 2-9 year old children it had reached 59.3% (539/909) [32.8%, 76/232]. The same group of children showed an increase in the average density of parasites from 336 to 684 malaria parasites per microlitre of blood between 1974 and 1994. The mean packed cell volume among 2-9 year olds remained almost unchanged at 38.3 in 1974 and 36.2 in 1994.

The observation of mosquitoes caught revealed that, average density of *An.gambiae* in a room was 25.2 mosquitoes in 1994 as opposed to 6.1 in 1974. Similar values for *An. funestus* were 0.0 and 0.7 respectively. Only *An. gambiae* were found inhabiting puddles along the lake margin at a density of 0.1-1.0 larvae per dip. Dissection for sporozoites in 1994 indicated that 3.4% (5/147) *An. gambiae* were positive for sporozoites, unlike in 1974 when none out of 471 *An. gambiae* was found with sporozoites. The 32 *An. funestus* dissected in 1994 were found to have no sporozoites. In 1974 there were no *An. funestus* caught in the survey. Informal observation and discussion suggested that several people appreciated the protective utility of bednets against mosquitoes but only a few used bednets.

Discussion, Conclusion and Recommendations

The present 1994 study showed that malaria had increased from mesoendemic to hyperendemic level with parasite rate of 59.3% among the 2-9 year olds. These children harboured higher numbers of parasites than before lake was formed. This suggests that there was increased malaria transmission. The higher numbers of indoor resting mosquitoes found and the presence of many infective mosquitoes explains the changed pattern of malaria indicators among the children as well as adults observed. It is of interest to note that for 1974 and 1994 the levels of haemoglobin as measured by PCV did not differ much despite increased malaria infection. This

could be attributed to the iron compensatory effect of fish eating enjoyed by the majority of the people.

In view of the increased malaria transmission to Mtera area, and the influx of people including non-immunes in fishing and other businesses to Mtera, it is considered quite justifiable to promote the use of insecticide treated nets among the people in the area. This is particularly important in that by 1992 *P. falciparum* chloroquine resistance (and perhaps resistance to other antimalarials) in the nearby Pawaga Division had already reached higher levels at 30.3% (Alilio *et al.*, 1992). Thus there is a need of people being protected from infective and other mosquitoes with the use of insecticide treated mosquito nets.

Reference

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