

# **MALARIA PREVENTIVE MEASURES IMPLEMENTED BY PARENTS OF UNDER-FIVE CHILDREN IN BUKUMBI, TANZANIA**

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## **ABSTRACT**

A quantitative, explorative, descriptive contextual study was conducted to determine to what extent the malaria control measures proposed by the Tanzanian government had been implemented by parents of children aged 0-5 who lived in Bukumbi village. Structured interviews were conducted with 40 parents of children who had been admitted for malaria treatment during 2007. Although respondents had a basic knowledge of malaria preventive measures they did not implement actions preventing the anopheles mosquitoes' breeding in this tropical area. The vicious cycle of poverty, malaria episodes and lack of proper malaria health education hampered the implementation of control measures such as the spraying of houses with insecticides, and clearing pools of stagnant water. Although the government of Tanzania subsidises insecticide treated bed nets the respondents did not maintain these nets and did not renew the insecticide treatment of these nets. The incidence of malaria is unlikely to decline in the Bukumbi village unless all identified factors are addressed.

**KEYWORDS:** Malaria, malaria control, malaria morbidity, malaria mortality, malaria prevention, Tanzania, tropical disease, under five-year-old malaria control

## **INTRODUCTION**

Approximately 5% of the world's population is infected with and approximately one million people die from malaria each year (Cook & Zumla, 2003:1205). About 90% of these deaths occur in sub Sahara Africa (SSA). The majority of infections in Africa are caused by plasmodium falciparum, the most dangerous of the four human malaria

parasites. Other parasites are *plasmodium vivax*, *plasmodium ovale*, and *plasmodium malariae* (Haslett, Chilvers, Boon, Colledge & Hunter, 2002:51).

*Plasmodium falciparum* is dangerous because it is the most effective malaria vector. This type of malaria is the most difficult to control, it causes severe disease and the mortality rate is much higher than for other types of malaria. Almost all deaths are caused by *plasmodium falciparum* (Cook & Zumla, 2003:1206; Africa Malaria Report, 2003).

Malaria continues to be the largest single cause of morbidity in SSA (Savigny, Mayombana, Mwangeni, Masanja, Minhaj, Mkilindi, Mbuya, Kasale & Reid, 2004:2). Young children and pregnant women are the most vulnerable, because of their low immunity. In SSA, 90% of all malaria deaths occur among young children (Africa Malaria Report, 2003).

It is estimated that 94% of Tanzania's 34.6 million people are at risk of malaria as it is endemic in this country (Health and Safety, 2002; The Government of Tanzania, 2003:20). Malaria in Tanzania is believed to be directly or indirectly responsible for about 16 million malaria episodes annually and 100 000 to 125 000 deaths annually. Reportedly 70 000-80 000 of all malaria episodes occurred in the under-five group, accounting for 64% of all malaria episodes in Tanzania (The Government of Tanzania, 2003:19).

In Bukumbi village, 67% of the under five-year-olds were diagnosed with malaria in 2006. Of the total number of malaria-infected children in this village 2.7% died from malaria in 2004 (Tanzania, 2006:2).

Malaria is a preventable disease. Measures have been planned and implemented to address this problem in Tanzania, such as the National Strategic Malaria Control Programme. These preventive measures have been implemented in Bukumbi village by educating parents and other people who attended the hospital for obtaining treatment for their sick children. Despite this educational programme, the under five-year-old malaria rates have not decreased significantly.

## **BACKGROUND OF THE RESEARCH PROBLEM**

Tanzania is one of the poorest countries in the world with an annual Gross Domestic Product (GDP) of US\$213 per capita in 2000, implying that 36% of the population live below the basic needs poverty line (Savigny et al., 2004:9). It is, however, very expensive for any country to control malaria. Malaria is estimated to consume 3.4% of the Tanzanian GDP or about US\$240 million annually (Tanzania National Bureau of Statistics, 2003, cited by Savigny et al., 2004:2-19). Tanzania spent approximately \$11.37 on the health of one individual according to the Ministry of Finance (Government of

Tanzania, 2001, cited by Savigny et al., 2004:12). Of this, US\$2.14 was spent on malaria services. About 75% of malaria expenditures are borne by the households, with the government contributing 20% and non-Government Organisations contributing 5% of the household malaria expenditure. One third of the malaria budget is spent on anti-malarial drugs and almost half on mosquito nets for beds, insecticides, mosquito coils and other preventive strategies. The financial burden is therefore greatest on the poorest households, contributing to the continuing poverty cycle (Savigny et al., 2004:17; The Government of Tanzania, 2003:21). The problem of controlling malaria in poor communities is aggravated by inadequate health structures and poor socio-economic conditions (WHO, 2004).

Malaria can, however, be controlled with the cooperation of all stakeholders, including community members. The global policy “Health for all in the twenty-first century” reinforces active client participation in health care delivery as part of the Primary Health Care (PHC) strategy (Stone, McGuire & Eigsti, 2002:43). Pervasive morbidity and high mortality of malaria persist because of failed commitment between those at risk of malaria transmission and the available preventive and curative health systems (Savigny et al., 2004:2-19).

The Tanzanian Ministry of Health (MoH) has taken steps to address the malaria problem by introducing the National Malaria Medium-Term Strategic Plan. This programme is built around four pillars, namely

- improved malaria case management
- vector control “national scale use of insecticide treated nets (ITNs)”
- prevention of malaria in pregnancy
- malaria epidemic prevention and control, emphasising parents’ knowledge about prevention and control issues to reduce malaria mortality and morbidity rates in the under-five age group (Savigny et al., 2004:2-19; The Government of Tanzania, 2003:8).

In this article, the success of the implementation of pillars number 2 and number 4 of the National Malaria Control Programme Strategic Plan are addressed, because

- parents are educated about early diagnosis, treatment and preventive measures;
- parents could help to lower the morbidity and mortality rates of the under-fives
- studying all four pillars would fall beyond the scope of this study.

The hospital and dispensary centre of Bukumbi village, where the research was conducted, are located in Idetemya ward, Usagara division, in the Misungwi district of the Mwanza region. The Mwanza region lies between the latitudes 2°S and 3°S, and 31°E and 34°E. It has long periods of rainfall, which occur from November to May, and short periods of rain from September to October. Its altitude ranges from 1 000-2 000 metres

above sea level (Kalugula, Mwinuka, Salim, & Mohamed, 2005:11-34), therefore it falls within the unstable seasonal malaria geographical area.

The Bukumbi Hospital serviced a population of 4 290 in 2006. The health care workers provide health education to patients in the outpatient department (OPD) and in the wards. Twelve health-education topics are covered each year with each topic running for one month. According to this schedule, malaria is taught in January only. This type of health education is usually conducted whenever the clients attend to the Reproductive and Child Health Clinic (RCH) or when patients are admitted to the children's ward (Bukumbi Hospital RCH clinic records, 1999-2003).

## **STATEMENT OF THE PROBLEM**

The morbidity and mortality rates of malaria for the under-fives are higher than those of adults in Bukumbi village, Tanzania. The rates could be lower if parents implemented preventive malaria measures. This study investigated to what extent these measures are implemented in Bukumbi village.

## **AIM OF THE RESEARCH**

The aim of the study was to investigate which measures (taught to the parents) had been implemented to control malaria in Bukumbi village.

## **RESEARCH OBJECTIVES**

The objectives of the research were to:

- explore and describe the knowledge of the parents about malaria
- determine where the parents obtained their knowledge;
- explore and describe which of the malaria control measures had been implemented
- identify the factors that prevented parents from implementing malaria control measures.

## **SIGNIFICANCE OF THE RESEARCH**

No recorded research could be found on the measures taken by parents in Bukumbi village to control malaria.

Findings of the current research could be used to improve malaria control programmes and to address the problems parents might experience to implement control measures.

## DEFINITIONS OF KEY TERMS

**Preventive measures** imply the activities executed by parents of under-fives in Bukumbi village to prevent malaria episodes.

**Parents** refer to the under-fives' fathers, mothers, or guardians, who have to implement malaria control measures.

**Malaria** refers to a serious parasitic illness caused by the bite of an infected female anopheles mosquito that produces recurring bouts of fever and which could be fatal to children under-five.

**Under-fives** in this study included children aged 6-60 months in Bukumbi village. Although a more correct term would have been children aged up to and including five years of age, the term "under-fives" has been adopted according to its use in Tanzania's health care services as including children aged 6-60 months.

## RESEARCH METHODOLOGY

No records could be found about parents' implementation of malaria prevention measures in Bukumbi village. Thus an explorative, descriptive, quantitative survey was conducted.

### Research population and sample

The research population comprised 705 parents of under-fives who had malaria during the preceding five years and who resided in Bukumbi village. A purposive sampling method was used to select 40 respondents, who met the inclusive criteria, namely that the parents consented to be interviewed in Swahili and their children had to be under the age of five years, diagnosed with malaria during 2002-2007, treated for malaria at the Bukumbi Hospital or Bukumbi dispensary, living in Bukumbi village.

Twenty respondents from Bukumbi hospital and 20 from Bukumbi dispensary were selected.

### Research instrument

Data were collected during structured personal interviews with the parents. The schedule contained open-ended and closed questions, designed to obtain the following types of information:

- biographic data of respondents

- health education received about malaria
- parents' knowledge about malaria
- measures implemented to prevent malaria
- their children's malaria symptoms
- factors preventing the implementation of malaria preventive measures.

The research instrument was peer-reviewed, discussed with experts in the field and pre-tested before the actual data collection process started.

## **Data analysis**

A statistician used the Statistical Package for the Social Sciences (SPSS) version 14 to analyse the data.

## **Ethical Considerations**

Permission to conduct this study was granted by the Research and Ethics Committee of the Department of Health Studies, Unisa; the health care authorities of Bukumbu hospital and dispensary. Every respondent granted voluntary informed consent prior to being interviewed. All data gathered were kept locked up. Only the researchers and the statistician had access to the raw data. No names were recorded on any interview schedules, and no names were mentioned in the research report.

## **RESEARCH RESULTS**

The biographic data included that the:

- children's malaria episodes occurred between the ages of 6-60 months, most occurred between 7-12 months
- fathers were older than the mothers – the fathers' ages ranged from 31 to 50, and the mothers' ages ranged from 21 to 30
- majority of mothers were married
- mothers 60.0% (n=24) and fathers 62.5% (n=25) had primary school education
- majority of parents had some income, but 80.0% (n=32) of the mothers and 65.0% (n=26) of the fathers were small scale peasant farmers
- highest combined incomes for the families were Tsh260 000/- per year, while the lowest income was reportedly Tsh6700/- per year, and the average income per family per year was Tsh50 260/-. Savigny et al. (2004:2-19) indicate that malaria occurs frequently in the poorest households. This could be true in Tanzania where individual households have to buy insecticides, gauze for their houses' openings and clear stagnant pools of waste;

- majority of parents had three to four children
- parents reported that none of their children had died of malaria (60%; n=24) during the research period, and the majority, 70.0% (n=28) of their children in the under 5 group had only contracted malaria once.

### **Health education received about malaria**

Health education about malaria is scheduled for January only at Bukumbi hospital and dispensary. Of the respondents 75% (n=30) never received health education about malaria prevention from health services in Bukumbi village. The parents could not answer questions during the structured interviews. Out of 10 respondents who had received health education, 9 reported the information to be helpful. Some respondents did not receive health education before their own children became ill.

The most common source of malaria knowledge (97.5%; n=39), was the villagers. However, the respondents were poorly informed about the measures to control malaria, as:

- no respondent could identify the cause of malaria
- 40.0% (n=16) of the respondents did not know that malaria could only be contracted from the bite of an infected female anopheles mosquito
- 55.0% (n=22) of the respondents believed malaria could be transmitted through handling contaminated food
- 75.0% (n=30) indicated that malaria could be contracted by drinking contaminated water or through sexual intercourse (60.0%; n=24).

### **Respondents' knowledge about malaria**

Not all respondents were able to identify the following signs and symptoms of malaria: prostration, impaired consciousness, respiratory distress, abnormal bleeding, jaundice and haemoglobinuria. Respondents confirmed that the following symptoms of malaria:

- high fever (95%; n=38)
- listlessness (97.5%; n=39)
- extreme tiredness (97.5%; n=39)
- vomiting (95.0%; n=38)
- restlessness (92.5%; n=37)
- stomach pain (85.0%; n=34)
- frequent watery stools (85.0%; n=34)
- unconsciousness (85.0%; n=34)
- yellowness of the skin and white areas of the eyes (85.0%; n=34)
- cold fever with sweating (75.0%; n=30)
- convulsions (70.0%; n=28)
- pale skin (70.0%; n=28)

- paleness of the inside of the mouth (52.5%; n=21).

As many as 65.0% (n=26) of parents could not mention specific signs showing that the child's condition was deteriorating; 55% (n=22) mentioned that their children had experienced more than five malaria episodes during the previous year and 30.0% (n=12) said that their children had 2-4 episodes.

In relation to the treatment administered to their children, 7.5% (n=3) did not know what drugs their children were receiving, and 22.5% (n=9) indicated either "yellow syrup" or "red syrup".

### **The preventive measures implemented by parents**

Of the respondents, 42.5% (n=17) did not know how malaria could be prevented and 32.5% (n=13) did not know how to safeguard their children from contracting malaria. No respondent mentioned the use of repellent creams, sprays, burning coils or tablets nor the screening of windows.

Concerning measures that could be taken to inhibit mosquito breeding around the house, respondents were unfamiliar with larvicides, with the use of oil to prevent larvicides' breeding. Of the respondents, 20% (n=8) did not know how to prevent mosquito bites, and 2.5% (n=1) mentioned that it was difficult to achieve. The majority (75.0%; n=30) did not know why special care should be taken to prevent malaria to under-fives.

Few actions were taken to inhibit mosquito breeding around the house; 67.5% (n=27) had never drained accumulated water around their houses and 40% (n=16) had never discarded containers with stagnant water. Most respondents (97.5%; n=39) had never sprayed the outsides of their houses to kill mosquitoes; 77.5% (n=31) had never used mosquito coils; 97.5% (n=39) had never applied repellents to the skins of their children; 75% (n=30) did not know whether repellents were available in Bukumbi village; 85.0% had never sprayed the insides of their houses; and 80% (n=32) did not know that the spraying equipment could be bought in Bukumbi village.

The parents did not implement malaria preventive measures that costed nothing because 30.0% (n=12) allowed their children to go outside every day after dark; no respondent made fires at dusk to keep mosquitoes away; 62.5% (n=25) did not cover all openings of their homes.

All respondents owned mosquito nets, and 67.5% (n=25) indicated that the use of the coupon system for the mosquito nets simplified its availability. The nets were not well maintained by 12.5% (n=5) of the respondents, while 10.0% (n=4) had not been treated with insecticide and 5.0% (n=2) could not remember the name of the insecticide used.



## **The preventive measures not implemented by parents**

The findings revealed that parents often had legitimate reasons for not implementing malaria preventive measures. Although the parents faced many problems making it difficult to combat malaria, 92.5% felt that it was worthwhile to attempt to combat malaria. The factors that prevented parents from implementing preventive measures related to their financial situation, as 75.0% (n=30) did not have the equipment to spray their homes: 85.0% (n=34) could not afford to purchase spraying equipment; 75.0% (n=30) did not have money to purchase insect repellent; 60.0% did not have the money to replace broken gauze screens; 60.0% (n=24) did not have money to treat stagnant water around the house; and 77.0% (n=31) did not have money to replace mosquito nets.

The respondents did not listen to radio broadcasts. Many advertisements are broadcasted about malaria, with information on special prices for products. Whether they owned a radio was unfortunately not asked during the interview. The respondents did not implement preventive actions, which they themselves could do without any costs to themselves. For instance, the parents could clear the environment of stagnant water, repair nets and take responsibility for the health of their children by keeping them inside their homes after dark, and by dressing them in long sleeved shirts and long trousers.

## **Reasons for delaying treatment**

The findings revealed that delays in treatment could be contributed partly to the parents themselves, to the health services and lack of knowledge (especially about the early symptoms of malaria) or of resources. Most of the respondents (75.5%) self-medicated their children by buying drugs from the pharmacy and waiting to see whether there was an improvement in the child's condition. Some respondents (27.5%) consulted traditional healers from time to time, but this did not seem to influence the delays in getting their children treated for malaria at the hospital or dispensary. This is in line with studies done in Nigeria, Zambia, Sudan, Malawi, West Africa and in rural Tanzania (Fawole & Onadeko, 2001:152-157; Kaona & Tuba, 2005:28; Munthali, 2005:127-146; Oladele & Kauna, 2005:2-10; Schellenberg, et al., 2003:581-590; Warsame, et al., 2007:781). Delays in seeking medical care could be influenced by parents' lack of transport or lack of money to pay for transport to take a sick child to hospital.

Delays also occurred at the health care institutions. It took 1-4 hours from patients' arrival at the institution till receiving treatment. This could be attributed to the large numbers of patients and shortages of nurses, doctors and laboratory technicians. Any delay in treatment could jeopardise the prognosis of a child suffering from malaria.

## **The role of the lack of proper family planning services in the control of malaria**

Family planning in this village did not impact on family size, and services were not used to improve the control of malaria, because:

- 35.0% (n=14) of the respondents had more than five children per family and 35.0% (n=14) had 3-4 children
- most mothers in this study were aged 21-30, implying that they could further increase the number of children per household
- large families keep the parents busy to earn money for food, which leads to improper management of their under-fives.

## **Complications of malaria**

Complications can be prevented or managed if parents could be trained to handle these. It was therefore important to determine which complications presented in the children and whether the parents recognised them.

The complications of malaria, which the respondents did not mention, included acute pulmonary oedema, spontaneous bleeding and metabolic acidosis.

Complications mentioned by the parents included coma (30%), low blood sugar (15.0%), convulsions (40.0%; n=16), renal failure (60.0%; n=24), shock (67.5%; n=27) and anaemia (87.5%; n=35).

## **LIMITATIONS**

The sampling method caused difficulty as the respondents who had been included in the research population could not be found again for the sample. This was due to the fact that the homes of the villagers were not numbered. This problem could have influenced the findings although measures were taken to counteract the effects of this problem. If the researcher could have observed the extent to which preventive control measures had actually been implemented, findings might have been different.

## **RECOMMENDATIONS**

The health education programme on malaria in Bukumbi village needs to be improved. Providing health education on malaria only in January each year, is inadequate. Better planned health education sessions, covering all aspects of malaria, should be offered over longer periods in the villages not only at hospitals. Seeing that health education on malaria is spread mostly by word of mouth in this village, health personnel should make

sure that this avenue is pursued and that villagers are well informed. The impact of the health education measures should be measured on a regular basis.

Special attempts should be made to educate mothers, as caregivers of children. It could result in a reduction of the malaria morbidity and mortality rates.

Authorities should work together with members of the village in an attempt to number homes, name streets and blocks to make recording and follow up of cases possible. District health officials should visit villagers at home to assist them in the practical implementation of malaria prevention and control measures.

Poverty, poor education and unemployment should be addressed in this village. The Government of Tanzania will have to mobilise various state departments such as Education, Finance, Welfare, Labour, Health and Agriculture, to improve the circumstance of the villagers, enhancing their capacities to prevent and control malaria. The infrastructure of the village needs to be improved to prevent delays in transporting children to hospital.

Health personnel should attempt to reduce the waiting times for parents with sick children. This will also improve these children's prognoses. Health officials should ensure that mosquito nets are provided on a regular basis to members of this village, particularly those with under-five children. With the handing over of the nets to the parents, health officials should make sure that parents know when and how to treat these nets with insecticides and they should also provide them with the necessary equipment to do so.

As malaria remains a major problem in Bukumbi village, the villagers should receive more assistance in the short term to combat the disease. Education and training of adults should be a priority in order to break the cycle of poverty and disease in Bukumbi village. This would enable them to learn about the issues related to malaria.

More research is necessary to control malaria in Bukumbi village. The following research topics are suggested:

- Vigorous attempts could be made to provide the villagers with the correct health education on the control of malaria after which the success of the health education campaign could be evaluated.
- More research is necessary on the best avenue or communication method to convey the message of malaria control that would have the greatest impact on the villagers.
- More research is necessary on the reasons for not implementing the control measures for malaria by villagers.
- Research could be done on ways to improve the quality of life of the villagers, which should include ways to increase household income and poverty relief.

- Environmental studies should be done to combat malaria in this area.

## CONCLUSIONS

Parents of the under-fives in this village are caught in a vicious cycle of poverty, lack of resources, lack of knowledge, education and training, as well as a lack of knowledge of malaria, poorly paying jobs, lack of transport, large families, and a high incidence of malaria.

Only hard work, the necessary funds and a multi-disciplinary, multi-sectoral approach, which should also include members of the village, can break this cycle. In order to prevent unnecessary deaths of children aged five or younger in Bukumbi village, three major aspects urgently need to be dealt with. Firstly, the poverty of members of this village should be addressed. Secondly, education and training of the villagers should take place and should include health education about the prevention and control of malaria. Thirdly, service delivery by health and other officials to combat the conditions should be improved.

The government of Tanzania has implemented some control methods, such as health education and the provision of mosquito nets. The problem with these health education sessions is that the topic of malaria is only covered during January each year at the Bukumbi health services, and the only people who can benefit from these are parents who bring their children for medical attention during this period. Health education is also provided at the family planning clinics, but if women do not attend these clinics, they do not receive the necessary information on malaria. Mosquito nets are provided for children under the age of five years in this village, but are not always properly maintained or treated with insecticide.

Parents of children can also do more themselves to control the disease in and around their homes by draining stagnant water pools or by covering such water with a thin layer of oil to arrest the mosquitoes' breeding cycles; by keeping doors and windows covered with gauze; by keeping their children indoors after dusk and by dressing children in long sleeves and long trousers after dusk.

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