MALARIA CONTROL PROGRAMME: SITUATIONAL ANALYSIS OF MALARIA CONTROL ACTIVITIES FOR THE ROLL BACK MALARIA INITIATIVE AT GEITA DISTRICT- 2001

By

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (MPH) OF THE UNIVERSITY OF DAR ES SALAAM

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The undersigned certifies that he has read and hereby recommend for acceptance by the University of Dar es Salaam dissertation titled "MALARIA CONTROL PROGRAMME: SITUATIONAL ANALYSIS OF MALARIA CONTROL ACTIVITIES FOR THE ROLL BACK MALARIA INITIATIVE AT GEITA DISTRICT-2001" in partial fulfillment of the requirements for the degree of Master of Public Health (MPH).

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I declare solemnly that the whole or part of this dissertation has never been submitted for a degree in any other University. It is a result of my own sole effort and fieldwork in partial fulfillment of the requirements for the degree of Master of Public Health (MPH) of the University of Dar es Salaam

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DEDICATION

This work is **dedicated** to: -

My Mother and my dear late Father

My beloved wife, Caroline and,

My loving children Eric and Irene

ABSTRACT

In 1998, the World Health Organization (WHO) launched the Roll Back Malaria Initiative whose objectives are to achieve a significant reduction in morbidity and mortality due to malaria. The RBM strategy identifies the provision of rapid diagnosis and treatment as its fundamental technical element. It also recognizes the use of ITNs as an effective tool in controlling malaria.

A cross-sectional study was conducted in Geita District to assess the currently practised malaria control activities in the context of the RBM Initiative. In the study 200 under-five children (patients), 200 mothers and 8 clinicians were studied. The study revealed that the good knowledge that the clinicians had did not go hand in hand with their clinical skills in managing malaria. It was found out that proper history taking and physical examination were inadequately done. This was evident during participatory observation of clinician-patient interaction and further information on this was gathered through exit-interviews with mothers. Through exit interviews, only 62% of the mothers said the clinicians greeted them. Chest examination with a stethoscope to rule out pneumonia was incompletely done. . Examination to detect the signs of meningitis was done in 54% of the patients. Throat examination was performed in 18% patients only. In all the children we observed and through exit interviews no single urine microscopy was requested despite the fact that urinary tract infection is a common cause of fever in children and can mimic malaria. Only 52 mothers (26%) were given instruction to return for follow-up.

The study identified a number of factors that were associated with poor patient management. These were: inadequate number of staff, lack of continuing education at places of work and poor diagnostic facilities. A review of hospital-based malariometric data revealed that the number of patients with malaria has increased. For example, in the year 2000, malaria formed 1048 (70.3%) of the total 1490 admissions of under-five children. It was also responsible for 46.1% of total outpatient attendance in the under-five age group. Malaria accounted for 53% of total under-five deaths. In children above 5 years, malaria accounted for 50.3% of total outpatient diagnoses.

Furthermore, malaria was responsible for 64% of under-five admissions in the first four months (January-April) of the year 2001. Several factors that contribute to the high prevalence of malaria in the District are climatic and ecological ones that favour survival of the vectors and transmission of the disease, e.g. presence of large stagnant and slow moving water bodies as well as the presence of multiple ground excavations as a result of human undertakings in search of soil for construction purposes, both these factors offer good breeding sites for mosquito.

The RBM Initiative recognizes ITNs as an effective tool in malaria control. The study found a very low rate of ITNs use in the District. Only 16 (8%) of the 200 mothers that were interviewed reported to have ITNs.and only 47 (23.5%) said that they were aware of ITNs.

In order to reduce the burden of malaria disease in the District there is a need to improve the management practices of clinicians through regular continuing education on malaria case management, and promotion of ITNs use.

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DEFINITIONS

Clinic	A place where individuals go for initial contact with a health facility and where preliminary diagnosis is made and treatment initiated
Clinician	A health personnel trained in the human medical field to manage an individual's health problem or disease. In this context a Medical Officer, an Assistant Medical Officer and a Clinical Officer are all collectively known as clinicians.
Drug resistance	is the ability of the parasite to survive and /or multiply despite availability of therapeutic levels of the drug and can be relative (yielding to increased doses of the drug tolerated by the host) or complete, (withstanding maximum doses tolerated by the host).
Fever	In this context, fever means axillary temperature of 37.5 C or higher
Mothers	Women who take care of children
Outpatient	A patient who does not stay overnight at a health facility
Self-medication	Is the voluntary use of drugs or medicines by a patient to eliminate or reduce perceived symptoms without an official prescription or consultation with qualified health personnel.

Treated Nets	These are nets that have been treated within the past three months.
Untreated Nets	These are nets that are not treated at all or treated beyond three months

ABBREVIATIONS

DALYS	Disability Adjusted Life Years
DDT	Diethyl Diethnomide
DFID	Department for International Development (UK)
DHMT	District Health Management Team
EDP	Essential Drugs Programme
GDP	Gross Domestic Product
HMIS	Health Management Information System
HSRs	Health Sector Reforms
IEC	Information, Education and Communication
IM	Intra-muscular
IMCI	Integrated Management of Childhood Illness
ITNs	Insecticide Treated Nets
MOH	Ministry of Health
NGOs	Non-governmental Organizations
NMCP	National Malaria Control Programme
OPD	Outpatient Department
RBM	Roll Back Malaria
S-P	Sulfadoxine-Pyrimethamine
TBAs	Traditional Birth Attendants
WBC	White Blood Cells
WHO	World Health Organization

INTRODUCTION

Malaria is the most important parasitic disease of man. The human disease is a protozoan infection of red blood cells transmitted by the bite of a blood-feeding *anopheles* mosquito. Malaria is a serious disease that causes more morbidity and mortality than any other human disease. It threatens the lives of 40% of the World's population (about 2 billion people) in 100 countries (WHO, 1994). In these countries, about 300 to 500 million clinical cases are reported each year, from which 1.5 to 2.7 million die per year (WHO, 1994). Most of the deaths occur among children under five years. Musil *et al* (1999) noted that every 15 seconds a child somewhere dies of malaria. Malaria does not only affect children but also includes women in their first or second pregnancy, non-immune adults and travellers. The World Health Organization and World Bank rank malaria as the largest single component of disease burden in Africa. Malaria accounts for 10% of Africa's disease burden and contributes about 35 million DALYS that are lost in Sub-Saharan Africa due to premature deaths and disability, (World Bank, 1993). Outside Africa, malaria is also a major public health problem in parts of Asia, Latin America, the Middle East, Eastern Europe and the Pacific, (WHO, 1994). Asia and the Americas are thought to have some 5 to 20 million cases per year. Most of these (about 80%) occur in Asia, (WHO, 1994).

Aetiology and Transmission

Malaria is a disease caused by four species of protozoan parasites of the genus *Plasmodium.* The most prevalent species is *Plasmodium falciparum* in Sub-Saharan

Africa, and is responsible for the most severe manifestations of the disease. The parasite matures and reproduces sexually in the female *Anopheles* mosquito, which transmits the infective sporozoite to humans. Transmission occurs through the female mosquito, which requires a blood meal for the development of her eggs. Malaria transmission does not occur at temperatures below 16°C or above 33°C, and altitudes greater than 2000 metres because development in the mosquito called sporogony cannot take place. The optimum conditions for transmission are high humidity and an ambient temperature between 20°C and 30°C. Although rainfall provides breeding sites for mosquitoes, excessive rainfall may wash away mosquito larvae and pupae (Gillies, 1988).

The situation in Tanzania

Since time immemorial, malaria has been the most important parasite of man in Tanzania, and the disease is of public health significance (Kilama and Kihamia, 1991). Since the colonial era in Tanzania, malaria has been a leading cause of morbidity and mortality in the country. Between 1985 and 1988 malaria accounted for 28% to 30% of all outpatient attendance at the health centre and dispensary level. The hospital admissions had risen from 12% overall to 22.6% in the 1980's (Kilama and Kihamia, 1991). The incidence of malaria is on the increase. In the past decades, WHO led a global campaign to eradicate malaria that failed? The concept of eradication was followed by the idea of control so as to reduce the malaria burden to levels, whereby malaria is not a disease of public health significance. In order to address the ever-worsening malaria situation, the worldwide anti-malarial strategy, WHO Global Malaria

Control strategy, was adopted by The Ministerial Conference of October 1992 in Amsterdam (WHO, 1993). The overall goal for the malaria control strategy is to reduce malarial mortality and morbidity and the social and economic cost of malaria.

The strategy has four fundamental elements: -

- To provide early diagnosis and prompt treatment.
- To plan and implement selective and long-lasting preventive measures including vector control.
- To detect early and to contain or prevent epidemics.
- To strengthen local capacities in basic and applied research to permit and promote the regular assessment of a country's malaria situation, in particular the ecological, social and economic determinants of disease, (WHO, 1993).

For Tanzania, only the first of the four elements, *viz provision of early diagnosis and prompt treatment* for the disease was satisfactorily attempted, but chloroquine resistance and the introduction of cost sharing as demanded by Health Sector Reforms have hampered this. The government, Non-governmental organizations and the donor community provided poor support for the other three elements. Earlier efforts to control and/or eradicate malaria in Sub-Saharan Africa were not successful. The Roll Back Malaria Initiative (RBM) launched by WHO in October 1998 has initiated new efforts aimed at reducing morbidity and mortality due to malaria significantly. This can be

achieved by strengthening the capabilities for malaria control at all levels in endemic countries, (WHO, 1998). Although Roll Back Malaria is a Global Initiative, Africa is the spearhead of RBM because it bears 90% of the burden of the disease with regard to mortality, (WHO, 1998). Rolling Back Malaria is one of the World Health Organization's highest priorities. The RBM has six elements: -

1. Evidence-based Decisions
2. Rapid Diagnosis and Treatment
3. Multiple prevention
4. Focused Research
5. Well-coordinated Action
6. Dynamic Global Movement.

The seven values of Roll Back Malaria include: -

1. RBM is a social movement supported by a global partnership.
2. The RBM strategy builds on past experience is evidence-based and focuses on outcomes.
3. Country and community priorities drive actions to Roll Back Malaria.
4. People, especially children and women are at the centre of the RBM movement.
5. RBM partners function in concert but independently; partners' contributions reflect their comparative advantages.

6. The RBM movement strengthens health services to help communities tackle all serious illnesses.
7. RBM involves a range of sectors such as education, agriculture and environment.

The strategy for malaria control in Africa will focus on strengthening case management as well as prevention of malaria through personal protection measures. Prevention involves reduction of human mosquito contact and chemoprophylaxis, which should be targeted to the high-risk groups. Reduction of human mosquito contact involves use of Insecticide Treated Mosquito Nets (ITNs). Chavasse (1999) emphasized the use of ITNs as advocated, by WHO through RBM, which recognizes ITN as a promising tool in malaria control. The RBM movement has shown increasing interest in integrating ITNs into malaria control policies and programmes, (Chavasse *et al*, 1999). The MOH has also realized and insist that the use of ITNs is an effective measure in the reduction of malaria transmission. A vaccine would present additional tool but we still do not have one, which meets the criteria for a good vaccine. The first trial of the SPF66 vaccine in Tanzania gave hope of future efficacious vaccine but did not prove so in other trials in the Gambia, (Musil *et al*, 1999).

PROBLEM STATEMENT AND RATIONALE OF THE STUDY

Institutional-based data show malaria to be the leading cause of both morbidity and mortality in Tanzania. In terms of morbidity, malaria is the leading cause of outpatient attendance in all regions (ranging from 24% to 42% of all diagnoses) and on a nationwide basis accounts for approximately 31.4% of all outpatient diagnosis (MOH, 1994). Malaria is also the leading cause of hospital admission; the rate of hospital admissions due to malaria has doubled between 1970 and 1985, from around 10% to over 20% (Mwaluko *et al*, 1988). Case fatality rates among admissions of severe cases are excessively high, estimated at 12% to 15% in children and the rate continues to increase. This high figure also applies to Geita district like elsewhere in Tanzania and may be due to a combination of factors: ineffective treatment at peripheral health facilities and/or self-medication, late reporting at health facilities and ineffective treatment given at referral institutions (Hill, 1996).

This situational analysis is a baseline study before the RBM Initiative activities take off at the district .The gist of the study is to describe existing malaria control activities so that the data can be useful to the RBM Initiative.

The need to fight against malaria in Geita district is more urgent today than ever before in the past because of: -

- Rapid urbanization as a result of migrant population to the recently opened Geita gold mine.
- Implementation of development projects such as road construction and water conservation dams that serve as vector breeding sites.

- Multiple ground excavations in search of soil for construction purposes- thus increasing breeding sites.
- In Geita district, like elsewhere in Tanzania the main malaria control strategy is *early diagnosis and prompt treatment*. Early diagnosis and prompt treatment, especially in children is a priority, preferably at the household level. Caretakers of children, *viz* women, must recognize malaria symptoms and signs.

Based on the situation above, it is imperative that control strategies need to be revisited and strengthened in order to rectify the deteriorating malaria situation in the district. Furthermore, in view of the ongoing Health Sector Reforms (HSRs), the district will have to plan its own malaria control. Since malaria is the greatest killer and therefore a priority there is a need to assess the malaria control activities currently in practice.

The capacity at district level is very limited. Members of the District Health Management Team under the District Medical Officer would need continuing education relating to malaria case management, control, epidemic preparedness and the like. The investigator, therefore, believes that the information collected will be the basis for re-planning of the control activities in the District.

LITERATURE REVIEW

Malaria as a public health problem in Tanzania was recognized quite early in the country. Malaria control in the country went hand in hand with the colonization process. During the Germany colonial era chemoprophylaxis by mass quinine administration to all people in the town of Tanga and Dar es Salaam was practised. Vector control measures in all urban areas were well established. Indeed by independence in 1961, sixty-eight (68) urban centres and development areas had effective malaria control programmes, (Clyde, 1967). Deteriorations in urban vector control started during the early 1970s following government decentralization. The oil crisis of the 1970s and its attendant economic squeezes resulted in less government financial allocations to health at a time when malaria control inputs, many of which were oil based, were caught in galloping inflation. The accompanying mass retrenchment of workers dealt a heavy blow to malaria control, (Kilama, 1983).

Malaria in endemic areas is particularly dangerous in young children due to their immature immune system. It is a major cause of death among children in Africa, (WHO, 1988). Malaria is a major cause of paediatric morbidity and mortality in Kinshasa, Zaire, and is of value in quantifying the impact of the disease on overall childhood survival in the city (Greenberg *et al*, 1989). About 1 million people die of malaria each year, 90% of them occurring among the African children, 1 child out of 20 dies of malaria before the age of 5 years, (Najara, JA, 1992). The Global Ministerial Conference on malaria in Amsterdam, (WHO, 1992) adopted what came to be known as WHO's Global Malaria Control strategy. The objectives of the strategy are "to prevent mortality and to reduce

morbidity and social and economic loss due to malaria through the progressive improvement and strengthening of local and national capabilities". The strategy identifies *the provision of early diagnosis and prompt treatment* as its first fundamental technical element of the strategy, (WHO, 1992). In Tanzania, improvement and strengthening of local and national capabilities is a task that is likely to take a long time given the weak economic state of the country.

Government budget allocation to the health sector has been declining and continues to decline. For example the government budget allocated to the health sector declined from 7.1% in 1976 to 3.7% in 1986/87 of the total government budget, (Chiduo, 1991). The problem of malaria in Tanzania has been and continues to be the most challenging of all health problems, (NMCP, 1997). According to the National Malaria Control Programme (1997), malaria control should focus on access to good case management of malaria disease. The National Malaria Control Programme emphasizes early diagnosis and prompt treatment, information for prompting community participation and effective early referral of malaria cases. However, prompt, effective treatment faces some practical problems in Tanzania. At the peripheral level, where there are usually no pharmacies, only chloroquine is available from retail shops and kiosks. Resistance to chloroquine has been described as "the most serious and intractable of technical problems in many (malaria endemic) developing countries, (Wernsdofer, 1982).

Evidence of resistance to Sulfadoxine-Pyrimethamine was initially reported in non-immune travellers, (Stahel *et al,* de Geus *et al,* 1982 and Vleages 1982). Later studies by Kilimali and Mkufya, (1985) in semi-immunes in Muheza gave a failure rate of only

5.3% in one of six localities. Ronn *et al,* (1996) and Trigg *et al,* (1997) working in the same area later reported high (74%) resistance to SP. A study by Alin *et al,* (1997) working at Kibaha reported a resistance rate of 15%. There is pressing need to evaluate SP in more areas (including Geita) in Tanzania, particularly regarding its suitability as the new first line drug for malaria treatment in Tanzania.

A 1972 Regional Health Conference received with considerable doubt a case report on chloroquine resistant *Plasmodium.falciparum* acquired by an American on a short residence in Tanzania (Olsen and Spenser, 1974) The first incontrovertible report on chloroquine resistance acquired in Tanzania was by Campbell *et al,* (1979), which was also in an American traveller. In 1982, (Kihamia and Gill, 1982) provided the first clear report of chloroquine resistance in semi-immune Tanzanians. Resistance of *Plasmodium.falciparum* malaria in Africa to chloroquine has been documented in several countries: Tanzania, (Onori, 1984, Kihamia, 1986), Zimbabwe, (Mutambu, 1984). Resistance has been defined as the ability of the parasite to survive and multiply despite availability of therapeutic levels of chloroquine and can be relative (yielding to increased doses of the drug tolerated by the host) or complete (withstanding maximum doses tolerated by the host), (Bruce-chwatt, 1981).

For the first time nets treated with DDT were used during the Second World War (Lengeler *et al,* 1996). Resistance, human toxicity and ecological concerns have restricted the use of DDT in recent years. The introduction of new synthetic pyrethroids in the 1970s that are less toxic to humans but effective in killing and repelling mosquitoes has lead to possible practical implementation of large-scale ITNs

programmes, (Chavasse *et al*, 1999). However, cases of acute pyrethroid poisoning had been reported in China. In 1989 several deaths suspected to be due to acute pyrethroid poisoning were documented (He *et al,* 1989) Successful implementation of ITNs programmes requires a sound understanding of technical, social and operational issues, (Chavasse *et al,* 1999). However, there are a few good examples of successful, sustainable, large-scale operational projects of ITNs in the World, (Chavasse *et al*, 1999). A good example of a successful, and sustainable large-scale ITN project is the government ITNs project in Sichuan China, which has maintained coverage of 96.7% per year.

One of the advocated means of dealing with malaria is to use Insecticide Treated Nets, (ITNs). Matteson (1999) noted that the use of Insecticide Treated Nets is an important aspect of malaria control since it prevents mosquitoes from reaching humans and hence reduces mosquito biting, (Matteson *et al*, 1999). Studies from several countries: The Gambia, Kenya and Ghana have shown a reduction in overall child mortality ranging from 17% to 63% as a result of ITNs use, (Lengeler *et al,* 1996). Morbidity reduction in Kenya and Tanzania (Bagamoyo Study) was 30% to 40% and 55% respectively, while in the Gambia it was up to 63%(Lengeler *et al,* 1996). The RBM recognizes ITNs as promising tool in controlling malaria. The RBM Movement has shown an increasing interest in integrating ITNs into malaria control policies and programmes, (Chavasse *et al*, 1999). In Tanzania the Ministry of Health recognizes and encourages the use of ITNs as an effective measure in the reduction of malaria transmission in the country.

Malaria Case – Management in endemic areas

In countries where malaria is highly endemic anti-malarial drug treatment of all young children with fever is recommended when diagnosis cannot be based on microscopy results. In some endemic countries like China and Ethiopia community health workers diagnose and treat malaria empirically based on history of fever. The experience in these and several other countries shows that the use of community health workers has significantly aided the implementation of malaria control activities, (WHO, 1984). In Thailand efforts are being made to provide appropriate anti-malarial treatment to populations in remote areas so as to reduce mortality. In highly endemic areas efforts are made to establish primary health posts to provide populations with appropriate anti-malarial treatment.

In The Gambia, primary health care workers purchase various kinds of essential drugs under supervision and sell them to community members. The money collected is put into a revolving fund and used to purchase more drugs, thereby ensuring sustainability

An evaluation study of the EDP programme in Zambia by Bexell (1991) showed that the prescriber devoted very little time to talk to patients. Examination of patients was rarely done and when interviewed the patients complained that they had not been told anything about the drugs given and how to use them. The reason for the inadequacy in the diagnosis and treatment of malaria appear to be the fact that there are no clinical parameters, which alone would permit a reliable diagnosis of malaria. At present the microscopic detection of parasites appears to be the most reliable method for diagnosing malaria.

Diagnosis and treatment of malaria aimed at reduction of mortality and morbidity among risk groups

Clinical features of malaria

Malaria is an acute disease. Patients usually present with fever, chills and profuse sweating. The clinical features of malaria vary from mild to severe, according to the species of the parasite present, the patient's state of immunity, the intensity of the infection and the presence of accompanying conditions such as malnutrition, anaemia or other disease.

Fever is the most common feature of malaria. It may persist for several days, accompanied by headache, aching joints and general body malaise. In infants the early symptoms of malaria may be quite variable and difficult to recognize. They may be limited to poor appetite, restlessness and loss of normal interest in the surrounding. Some patients, especially children may present with a cough and/or diarrhoea or with convulsions.

In *plasmodium falciparum* (which constitutes more that 90% of the cases in Tanzania), the headache, nausea and vomiting are usually more severe than in other types of malarial infection and there is a greater tendency towards the development of delirium, haemolytic anaemia and jaundice. The mortality is much greater than in other forms of malaria.

Anaemia is a major cause of morbidity and mortality associated with malaria especially in young children and pregnant women. It results from repeated or chronic malaria infection yet it is often not recognized and so cases of malaria frequently go untreated.

Clinical assessment

The assessment of any sick patient will depend upon the resources available to a clinician. In health facilities without laboratory services diagnosis is based on signs and symptoms. A detailed history should be obtained for every patient. This, combined with a thorough physical examination, should then guide differential diagnosis, management and treatment. Malaria should be suspected if any of the features detailed above are identified.

Laboratory diagnosis

Where laboratory facilities are available, blood smear examination should be performed routinely if malaria is suspected. Treatment decisions should then be based on the findings. The following investigations may be done depending on the capability of the laboratory and the clinical indications:

Urgent laboratory investigation

- Thick and thin blood smears for malaria parasites.
- Blood glucose estimation in patients with altered consciousness.
- Haematocrit and/or haemoglobin.
- Lumbar puncture to exclude meningitis.

Interpretation of blood smear results

Two methods are commonly used in reporting blood smear results.

Parasites per microlitre of blood

In this method it is assumed that I microlitre (μl) of blood contains 8,000 white blood cells (WBC). The number of parasites counted relative to the number of WBC counted can thus be converted to the number of parasites per microliter, (μl) of blood by the simple formula given below: -

$$\frac{\text{Number of parasites x 8000 WBC}}{\text{Number of WBC counted}} = \text{parasite per } \mu\text{l}$$

The "plus" system

This is a semi-quantitative method developed for epidemiological purposes rather than disease management. It is less satisfactory and is not recommended.

Correlation between methods of blood slide reporting

+ 1 – 10 Parasites per 100 fields	4-40 parasites per μl
++ 11 – 100 parasites per 100 fields	40 – 400 parasites per μl
+++ 1 – 10 parasites per one field	400 – 4000 parasites μl
++++ 11 – 100 Parasites per one field	4000 – 40,000 parasites per μl

THE CHANGE OF MALARIA DRUG POLICY IN TANZANIA

Management of uncomplicated malaria

Treatment of malaria depends on its clinical presentation and its diagnosis as either uncomplicated or severe. The objectives of treatment are to provide rapid and long lasting clinical cure, to reduce morbidity including malaria related anaemia and to halt the progression of simple disease into severe and potentially fatal disease.

First line treatment with sulfadoxine-pyrimethamine (SP)

The first line drug for the treatment of uncomplicated malaria is sulfadoxine/pyrimethamine – SP tablets e.g. Falcidin®, Fansidar®, Laridox®, Malostat®, Orodar®.

Dose: Treatment with SP tablets (sulfadoxine 500mg and Pyrimethamine 25mg), should be given as single dose of 25mg/kg body weight of the sulfa component. This schedule should be applied to all SP drugs, including sulfalene/Pyrimethamine (e.g.

metakelfin®). There is no pharmacological, parasitological or clinical reason to give a second dose of SP one or two weeks after the original treatment dose.

Non-response to malaria treatment with SP

Apparent non-response to SP may be due to several reasons including:

- Fever/symptoms from a cause other than malaria
- In adequate dosage
- Poor quality of the drug
- Vomiting of the drug and
- Parasite resistance to the drug.

Treatment of fever

SP is effective in clearing parasitaemia but it has little anti-pyretic action so it produces a less dramatic clinical cure than that which used to be associated with chloroquine. Patients with fever should be given an anti-pyretic drug like paracetamol or Aspirin every 4 to 6 hours (maximum 4 doses in 24 hours) until symptoms resolve, usually after three days.

Dosage schedule for treatment of uncomplicated malaria using SP: Sulfadoxine 500mg + Pyrimethamine 25mg tables and sulfalene 500mg + Pyrimethamine 25mg tables: -

Age (years)	Weight (Kg)	SP tablets as single dose
2 up to 4 months	5 up to 7	¼
4 up to 12 months	7 up to 11	½
1 to 5	11 up to 19	1
5 to 9	19 up to 30	1½
9 to 14	30 up to 45	2
14 and above	Over 45	3

OBJECTIVES

BROAD OBJECTIVE

Assessment of currently practised malaria control activities in Geita District

SPECIFIC OBJECTIVES

1. To determine time taken to diagnose malaria from detection of symptoms at home to the time of contact with a health facility.
2. To determine clinicians level of knowledge about malaria case management.
3. To determine availability and use of insecticide treated nets (ITNs).
4. To determine the prevalence of malaria in the district hospital.

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METHODOLOGY

Description of study area

Geita district is one of the 7 districts of Mwanza region. It borders with Kahama district in the South, Lake Victoria in the North, Sengerema district in the East and Biharamulo district in the West. The district has an area of 7,825 sq. km of which 6,775 sq. km is land and 1050 sq. km is covered by water. Administratively, the district is divided into 7 divisions, 33 wards, 174 villages and 734 hamlets. Available demographic data indicate that the district currently has 720358 people of whom 368,512 are males and 351,846 females. The population of under-five children in the district is 127,542. The district has a natural population growth rate of 3.6% (2.8% for national) per year. The district experiences two main rain seasons; the short rains occur between October and December, followed by spells in January and February. The main rains start in March and extend through to May. A cool dry season follows this and extends from June to September. The district gets enough and reliable rain falls. Annual rainfall ranges from 800mm (Southern part) to 1200mm (Northern part). Temperatures range from 17°C to 29°C. Minimum humidity is 35% and maximum humidity 60% at the end of rainy season. The main occupations are subsistence farming and livestock rearing which, accounts for 74.2% of the district GDP. Fishing contributes 6.9% of GDP while small scale processing industries and artisan gold mining contribute 8.4% of GDP. The rural people grow their own maize, cassava, wet rice, millet, sorghum and various types of vegetables as the main food crops and cultivate ground nuts, and cotton as cash crops. The district is inhabited by four main ethnic tribes, the Wasukuma, the Wasumbwa, the

Warongo and the Wazinza all being permanent small-scale peasants. They share almost similar social organizations, cultural heritages and have many similar vernacular words and phrases.

The District Health Care

Health care is provided by both formal and informal sector. The former consisting of village health posts, dispensaries, health centres and hospital. Health services are delivered through 46 health facilities, which include one (government) district hospital, 5 health centres and 40 dispensaries.

At the district level, one can identify three levels of health services organization, the dispensary which is the first official level headed by a Clinical Assistant (formerly known as Rural Medical Aide – RMA) with three years of medical training after primary or secondary education, the health centre headed by a Clinical Officer (Medical Assistant) with three years of medical training after secondary education and the district level headed by a Medical Officer. In addition some villages have village health posts, which are run by village health workers. There are 212 villages' health workers and 170 trained birth attendants (TBAs) in the District.

The Major Health Problems in the District

It is estimated that about 60% of the population of Geita district has access to a health facility within a radius of 5 km. It is also estimated that 24% of the district population has access to clean water. However, some district health status indicators are not encouraging. For example, the maternal mortality rate is 554/100,000 total births

compared to a national average of 529/100,000 total births. The major health problems in the district are malaria, upper respiratory infections, diarrhoeal diseases, eye infections, pneumonias, anaemias, intestinal worms and ear infections.

HEALTH STATISTICS – GEITA HOSPITAL 2000

Children under 5 years: -

- Total admissions (all causes): 1491
- Admissions due to malaria alone: 1048
- Malaria specific morbidity = $\frac{1048}{1491} \times 100 = 70.3\%$

Malaria specific morbidity for under five years children for the year 2000 was 70.3%

Malaria specific mortality

- Total deaths (all causes): 109
- Total deaths due to malaria: 58

Therefore, malaria specific mortality was: $\frac{58}{109} \times 100 = 53\%$

Malaria accounted for 53% of all deaths of children under- five years.

Children above 5 years and adults: -

- Total number of admissions (all causes): 3022
- Total number of admissions due to malaria: 1143

Malaria specific morbidity: $\frac{1143}{3022} \times 100 = 37.8\%$

In children above 5 years and adults, malaria was responsible for 37.8% of all admissions.

- Total number of deaths of children above 5 years and adults (all causes): 238
- Deaths due to malaria alone: 80
- Malaria specific mortality (5 years and above): $\frac{80}{238} \times 100 = 33.6\%$

HEALTH STATISTICS FOR JANUARY – APRIL 2001

Children under 5 years: -

- Total admissions (all causes): 808
- Total admissions due to malaria: 518
- Malaria specific morbidity= $\frac{518}{808} \times 100 = 64\%$

From January – April 2001, 64% of the admissions were due to malaria.

Malaria specific mortality: -

There were a total of 108 deaths out of which 35 were due to malaria; therefore malaria specific mortality was 32.4%.

STUDY DESIGN

The study was a cross-sectional descriptive survey. It was conducted at the outpatient clinic. Through exit interviews, mothers of under-five children were asked about case-management practices and attitudes of clinicians. In addition, participatory observation method was used to assess case-management practices of clinicians by observing their interaction with patients.

STUDY POPULATION

The study population comprised health workers (clinicians) engaged in malaria case management, under- five children and their mothers/caretakers (in the reproductive age 15 – 44 years).

SAMPLE SIZE

Patients

Malaria patients (under fives) and their mothers were used in the study to determine clinician's malaria case management practice. The sample size was determined by assuming a normal distribution prevalence of 50% since no other study has been apparently done before

and also accepting 95% as the precision of the study, and therefore 0.05 (5%) as the maximum acceptable error by using the following formula:

$$n=\frac{Z^2_{\alpha} P(1-P)}{\epsilon^2}$$

Where n=sample size

Z_{α} = standard normal deviate corresponding to a two-sided significance level of α

P = is the expected prevalence of malaria in the target population (in this case for Geita is 50%)

ϵ = margin of error (maximum acceptable error) on p which is 0.05.

Sample size:

$$N = \frac{(1.96)^2 \times 0.5\ (1-0.5)}{(0.05)^2} = 400$$

Total sample size = 400

However, the study sample was divided equally into two groups as follows:

- Under five children = 200
- Mothers (15 – 44 years) = 200

Health workers

For participatory observations 8 clinicians were observed because this was the total number of clinicians available in the hospital during the study period.

SAMPLING METHOD

Convenience sampling was used. All children under-five years of age and their mothers who happened to be attending the outpatient clinic on the day the researcher and research assistants were present, were included in the study.

DATA COLLECTION

The study population comprised 200 patients (under-fives) and 200 mothers who had come to hospital for treatment with symptoms suggestive of malaria. Before starting the actual fieldwork, the following had to be done: -

- A letter to introduce the researcher was handled to the District Medical Officer who granted permission.
- Pre-testing of the research methodology and the questionnaires was conducted to find out whether: -
    - The wording of the questions was clear.
    - The sequence of questions was logical.

After the pre-testing, some modifications on the questionnaires and the methodology as a whole were made. Two research assistants were recruited and received training on the aim of the study and its objectives. During data collection interviewer administered questionnaires were used. The questionnaires for the clinicians were aimed at assessing their knowledge on malaria symptoms, their examination skills and management practices and also their attitude towards patients.

Information gathered in both patient clinician interactions and patient-exit interviews focused on the following: -

- History taking
- Physical examination including checking temperature
- Whether the clinician weighed the patient or enquired about the weight before prescribing the drugs

- Whether the clinician requested a blood smear for malaria suspected patients
- Whether patients were greeted or not
- Whether patients were treated basing on signs and symptoms
- Whether patients with negative blood smear results received ant malarial drugs
- Whether patients were told about the diagnosis
- Whether the clinician explained to the patient/caretaker how to use the given drugs
- Whether the clinician gave instructions regarding dosage schedule
- Whether patients/caretakers were instructed to return immediately in case no clinical improvement or condition worsens.
- Whether caretakers were given explanation on the side effects of prescribed drugs.
- Whether patients or guardians were satisfied with malaria treatment.

DATA PROCESSING AND ANALYSIS

After successful completion of the fieldwork, the Principal researcher returned to the Institute of Public Health of Muhimbili University College of Health Sciences. The questionnaires were numbered serially. The responses to the open ended questions were reviewed, categorized and then coded. Data entry and analysis was carried out using computer programme Epi Info 6.

ETHICAL CONSIDERATIONS

The Ethical clearance was obtained from the College's Ethical Committee. A letter was issued to introduce the Researcher to the District Medical Officer of Geita district. Equipped with the letter of introduction and ethical clearance, the Researcher introduced himself to the District Authorities, namely, the District Medical Officer, the District Executive Director, and the District Commissioner. The District Authorities were informed about the aim of the study and how it will be conducted. Permission was then granted to the Researcher to go ahead with his research.

Before starting data collection, informed consent was obtained from the participants (interviewees). All participants were made to understand that their responses would be kept confidential and that their names would not appear on the questionnaires. Research Assistants were instructed to approach participants in a polite manner.

STUDY LIMITATIONS

1. The presence of the Researcher during patient – clinician interaction might have changed routine clinical practice of the clinicians leading to some bias
2. The presence of the Researcher during patient –exit interview might have also influenced the responses from participants (interviewees) leading to some bias.

RESULTS

A total of 200 under-five children were included in the study. The mean age was 22 months (standard deviation 14.5). The age distribution is shown in table 1. In addition, the other cohort consisted of 200 mothers of under-five children. Through exit interviews, mothers were asked questions regarding case-management practices of clinicians. Apart from this mothers were also asked about availability of insecticide treated nets in their households.

TABLE 1: The age-distribution of under-five children observed

Age group (in months)	Number	%
0 – 11	73	36.5
12 – 23	33	16.5
24 – 35	41	20.5
36 – 47	32	16
48 – 60	21	10.5
Total	200	100.0

The majority of the children were below 24 months (more than 50%) while the older age group of 4-5 years comprised only 10%.

Delay in seeking health care

This was measured as time taken from the onset of symptoms as noted by the mother to the time of contact with a health care provider. It was found out than on average, there was delay of three days in seeking treatment (mean 2.7, SD 1.2) as shown in table 2. The minimum time was 1 day and maximum was 14 days.

TABLE 2: Delay in seeking health care

Time delay	No. of children	%
Within one day	12	6%
1 – 2 days	69	34.5%
2 – 3 days	81	40.5%
More than 3 days	38	19%
Total	200	100.0%

Self-treatment before contact with a health facility

Despite the fact that a significant proportion of children were brought to the health care facility after 2 days following onset of symptoms, efforts were made to initiate self-treatment at home as shown in table 3 Of the 200 children in the study, 145 children (72.5%) had already received some kind of self-treatment before their initial contact with a health care provider. One hundred and twenty two (84.1%) had bought some drugs from private pharmacies Self-treatment using drugs available at home was given to 21 children (14.5%) Only 2 children (1.4%) were sent to a traditional healer.

Table 3: Proportion of children who got help (self-treatment) before initial contact with a health facility

Type of help	No. of children	%
Self-medication using drugs available at home	21	14.5%
Drugs brought from private pharmacy	122	84.1%
Sent to a traditional healer	2	1.4%
Total	145	100.0%

Table 4: shows malaria symptoms as reported by the mothers during exit interviews. History of fever was noted in 200 children (100%). Fever was the most common presenting complaint. Vomiting associated with fever was reported in 90 patients (45%). History of diarrhoea was noted in 46 patients (23%). History of body weakness was reported in 92 patients (46%). Only 10 patients (5%) gave history of headache. This was mainly in older age group of 48 to 60 months (4 to 5 years).

TABLE 4: Malaria symptoms as reported by the mother

(N=200)

Symptom	Number of mothers	%
History of fever	200	100.0%
History of vomiting	90	45.0%
History of diarrhoea	46	23.0%
History of joint pains	8	4.0%
History of body weakness	92	46.0%
History of headache	10	5.0%

Case-Management Practices

Case-management practices included the interaction between clinician and patient. Through exit interviews mothers were asked specific questions using questionnaires to collect information about the clinician-patient interaction.

Table 5: shows the findings of the exit interviews. With regard to greeting, 124 mothers, (62%) said clinicians greeted them. In 25 cases, (18.7%) temperature was measured by a doctor;, In 109 patients , (81.3%) a nurse measured it. In total, temperature was measured in 134 patients (67%) and in all cases a thermometer measured it. Clinicians informed mothers of their children's problems or diagnosis in 132 cases (66%). All 200 patients (100%) had blood slide for malaria parasites taken and in all cases prescriptions were written after blood slide results. Regrettably relevant explanation on the use of drugs and their side effects was given only in 27 cases (13.5%) and 5 cases (2.5%)respectively. Only 52 mothers (26%) were given instructions to come back for follow-up after completion of treatment or in case condition got worse. Worse still only 30 mothers (15%) got instructions on proper home-based care or management of their patients. Regarding client satisfaction, 179 mothers (89.5%) said that they were satisfied with the services rendered to them.

TABLE 5: Findings about management practice and attitude of clinicians during Patient/guardian exit-interview

Management practice and attitude	Number	%
Parent/guardian greeted by clinician	124	62.0%
Temperature measured by a doctor	25	18.7%
Temperature measured by a Nurse	109	81.3%
Temperature measured by a thermometer	134	67%
Informed about diagnosis/problem	132	66.0%
Blood slide for malaria parasites taken	200	100.0%
Patient given anti-malarial treatment	199	99.5%
Prescription written after B/S results	200	100.0%
Patient given all prescribed drugs	199	99.5%
Relevant explanation on use of drugs	27	13.5%
Information about side-effects of drugs	5	2.5%
Instructions to return for follow-up	52	26.0%
Instructions of home based care	30	15.0%
Satisfaction with services rendered	179	89.5%

Table. 6: gives some information about the cause of malaria as perceived by the 200 mothers interviewed. One hundred seventy one mothers (85.5%) of mixed education backgrounds know that mosquitoes cause malaria. Only 29 mothers (14.5%) said that they do not know the cause of malaria.

TABLE. 6: Knowledge of the cause of malaria according to mothers interviewed (N=200)

CAUSE OF MALARIA	NUMBER	%
Mosquitoes	171	85.5%
I don't know	29	14.5%
TOTAL	200	100.0

Table. 7: shows availability of mosquito nets (regardless of type) in the households. Of the 200 mothers in the study 131(65.5%) had mosquito nets in their households and 69(34.5%) had no mosquito nets. Individual interviews were conducted to collect information on the availability of ITNs. In this context, an Insecticide Treated Net is defined as a net that has been treated within the last 3 months. The other nets are referred to as untreated or plain nets and these are defined as nets that have no Insecticide since they were bought. Of the 200 mothers interviewed 16 mothers (8%) reported to possess ITNs as per given definition

TABLE. 7: Availability of mosquito nets in the household of interviewed mothers-

NETS	ITNs	NETS*
Available	16 (8%)	131(65.5%)
Not available	184(92%)	69(34.5%)
Total	200(100%)	200(100%)

*Nets: These are nets, which have no Insecticide since they were bought.

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Table. 8: shows the results of interviews with mothers conducted to find out whether they were aware of the use of ITNs and their treatment. Of the 200 respondents, 47(23.5%) said they were aware of the use of ITNs and their treatment. The remaining 153 (76.5%) said they were not aware of ITNs and their treatment.

TABLE. 8: Mothers' awareness of the use of ITNs and their treatment

Awareness of ITNS	Number	%
Aware of ITNs	47	23.5%
Not aware of ITNs	153	76.5%
TOTAL	200	100.0%

Table. 9: shows the cost of mosquito nets as per interviewed mothers. The price of untreated mosquito net ranged between Tshs. 3000/= and 4,000/=. Of the 131 interviewees104 (79.4%) gave the price of Tshs. 3,500/= per net while 25(19.1%) said Tshs. 3000/- per net Only 2(1.5%) put the price at Tshs. 4,000 per net. The majority of the people in the District are peasants depending mainly on food crops. The cost of mosquito nets is unaffordable for the majority of the people.

TABLE. 9: Cost of mosquito nets

COST	NUMBER	%
Tshs. 3,000/=	25	19.1%
Tshs. 3,500/=	104	79.4%
Tshs. 4,000/=	2	1.5%
TOTAL	131	100.0%

Table. 10: shows the findings from 50 interactions of the clinicians with patients. A checklist was used to assess their relationship. The results were as follows: Ninety two percent (92%) of the clinicians looked at and listened to their patients, and 77.6% of the clinicians allowed their patients to express or explain their symptoms. Temperature was taken in 100% of the interactions. In 96% of interactions the clinicians examined their patients for signs of anaemia. Abdominal palpation for splenomegally was performed in only 12% of the interactions. Examination for neck stiffness to exclude meningitis, which may mimic malaria, was elicited in 54% of the interactions. Chest examination with a stethoscope to diagnose pneumonia whose clinical features may resemble those of malaria was done in only 14% of the interactions. Blood slides for microscopic confirmation of the diagnosis were requested in 98% of the interactions. In 96% of the interactions patients had their weights known before drug prescription. Patients were given relevant explanation on drug use in only 40% of the interactions. Patients were not given instructions regarding follow-up in 88% of the interactions. Regarding consultation time, it was observed that majority of patients (88%) were seen for 5 to 15 minutes and only 12% were seen for less than 5 minutes. It is a responsibility of all clinicians to make sure that early diagnosis, prompt and effective treatment is available to all those who need it. There is need to develop practical guidelines for the management of patients with fever. A study by Premji *et al* (1995) showed that development of a clinical protocol for proper history taking and complete physical examination reduced the clinical diagnosis of malaria by half. This implies that not

every fever is malaria and that febrile patients may therefore be misdiagnosed and serious conditions like pneumonia and meningitis be missed.

TABLE. 10: Management practices by clinicians in 50 interactions with patients during participatory observation:

Management practice	Number	%
Looking at and listening to patients	46	92%
Allowing patients to express themselves	38	77.6%
Taking temperature	50	100%
Examination for signs of anaemia	48	96%
Abdominal palpation for splenomegaly	6	12%
Examination for neck stiffness	27	54%
Chest examination with a stethoscope	7	14%
Examination of ears, nose and throat	9	18%
Requesting for blood slides	49	98%
Weighing patients before drug prescription	48	96%
Instructions on drug use given to patients	20	40%
Patients given instructions to come back	6	12%
Patients consultation between 1-5 minutes	6	12%
Patients consultation between 5-15 minutes	44	88%

Hospital- based Malariometric Data-

Regarding the **prevalence or load of malaria** a review of the past (2000) and present (2001) malaria situation in the District hospital was done. Data collection was done using available information from health information system data, hospital annual reports and records. The load of malaria in the hospital was found to be as outlined below: -

In the year 2000 malaria was responsible for 1048 (70.3%)of the total 1491 admissions of children under-five years of age. Death attributable to malaria was 53% of total deaths in the same age group and year. As regards outpatients' attendance, malaria was responsible for 46.1% of total outpatients diagnoses in the under-five year group. In children above 5 years, malaria accounted for 50.3% of all outpatient diagnoses. The total admissions for children above 5 years were 3022 for 2000. Of these, 1143 (37.7%) were due to malaria. Malaria specific mortality in children above five years was 33.6%).

Hospital data for the period from January to April 2001 show that 64% of the total admissions of children under-five years of age were due to malaria. Malaria was also responsible for 32.4% of all deaths in the same age group and same period. These findings indicate that malaria is still a major cause of morbidity and mortality in Geita. It is the leading cause of outpatient attendances, more than 40%. This figure is higher than the National figure of 33%, Ministry of Health Statistics Abstract (1998). The study also found out that malaria accounted for more than 50% of overall hospital admissions.

DISCUSSION

This three-week study in Geita District clearly indicated that the problem of malaria was increasing. Data collected show that in the year 2000 malaria was responsible for 48.2% of overall outpatient attendances, 70.3% of overall under-five admissions and 53% of overall under-five mortality, (Geita hospital annual report 2000). Between January and April 2001, of the total 808 under-five admissions, malaria accounted for 518 patients (64%) and malaria specific mortality was 32.4%. The main malaria control activity performed in the District hospital has been that of diagnosis and treatment of patients with fever and other complaints due to malaria and/or its complications. This activity is integrated in the general heath care services. Several problems have been encountered with regard to malaria case management. The major problems as identified by the District Health Management Team included:

- A rising number of patients with malaria, particularly children under-five years and pregnant women.
- A growing problem of chloroquine resistance.

This problem of chloroquine resistance put the clinicians responsible for patient management in a great dilemma and makes correct patients management an increasing challenge for them. With the introduction of sulfadoxine-pyrimethamine (Fansider^{R}) as the first line drug for uncomplicated malaria, it is hoped that the problem posed by chloroquine resistance will be solved.

Management Practices of Clinicians

During participatory observation of patient-clinician interaction, it was observed that most of the clinicians were not taking a detailed history as required by good medical practice The reason for this was the big work load at the OPD relative to the number of clinicians usually present at one point in time. The other reason we discovered through observation was lack of the necessary skills in history taking and physical examination. Clinical diagnosis of malaria was mainly based on fever. However, all presumptive diagnoses of malaria were referred for blood slide microscopy. We were not sure whether this was the routine practice or it was due to change in behaviour influenced by presence of an observer. The other observation was that all febrile patients (children) received anti-malarial treatment irrespective of blood slides results. When questioned on this issue, majority of clinicians replied that a negative blood slide does not rule out malaria in a feverish patient in a malaria endemic area like Geita. Probably, this assumption is based on the suggestion of the WHO Expert Committee on malaria, which recommends that in highly endemic areas, and during the peak transmission period, anti-malarial drug is given to all young children with fever since malaria can be a complicating factor. Findings during both clinician-patient interactions and patient-exit interviews indicate that fever was the main presenting symptom. The other common symptoms were vomiting and diarrhoea. Vomiting in combination with fever was reported by 90 patients (45%) while fever and diarrhoea was reported by 46 patients (23%). A study by Rooth and Bjorkman (1992) also found fever, vomiting and diarrhoea to be the most common presenting symptoms of malaria in under-five children. These

findings are almost similar to our findings. A study done by Premji *et al,* (1995) also found similar findings, that fever was the commonest presenting symptom. A study by Trape *et al* (1985) indicated that symptoms suggestive of malaria were more useful in "ruling out" the diagnosis of malaria than in confirming it. The implication of this statement is that blood slide examination for microscopic confirmation of parasitaemia is useful in order to support the clinical diagnosis. History taking was done incompletely because the clinicians were not enquiring further about other symptoms of malaria in addition to fever, which was obvious as it was the main presenting complaint in all patients. The study noted deficiencies in physical examination of sick children Examination to exclude other causes of fever was incompletely or rarely done. It is a known fact that acute respiratory infection, urinary tact infection, and meningitis all can mimic malaria. Proper history taking and thorough physical examination can exclude most of them. For instance chest examination by auscultation was done in only 14% the interactions. There was no single request for urine microscopy to rule out urinary tract infection, which can present as febrile illness. Only blood slide for malaria parasites was requested routinely, as if the only cause of fever was malaria.

Throat examination was rarely done. Only in 18% of the interactions was the throat examined. Many cases of acute tonsillitis are missed in this way.

One good practice that was observed during patient-clinician interaction was that majority of the clinicians examined for signs of anaemia in 96% of the interactions. This practice should be encouraged and be done routinely. This is important in this particular area because the most frequent form of severe malaria in among the outpatients and the

inpatients was severe anaemia with or without impending heart failure. Severe anaemia among under-fives presenting with malaria in Geita is a major problem. In this context severe anaemia was defined as haemoglobin of less than 25%.

The other deficiencies noted in the management practices of clinicians were: relevant information on drug use was not given in 60% of the interactions. This is a serious issue, because lack of proper explanation on dosage, frequency of administration and expected results may adversely affect compliance. With the introduction of 'SP' (Fansidar) as the first line anti malaria drug this information on use is very important now than ever before. Patients should be told that Fansidar acts slowly and has no anti-pyretic effect (like chloroquine) and that a child should be given paracetamol (panadol) to lower body temperature. Some patients were coming back after 1 or 2 days only, saying that there was no improvement simply because no proper explanation was given to them to indicate that Fansider acts slowly. Without proper explanation being given there will be many unnecessary re-attendances for perceived treatment failure.

On the other hand the majority to patients (88%) were seen for 5 to 15 minutes, although this is still below the recommended standard of 15 minutes by the International Children's center (Fountaine 1992.) Good case management includes among other things, drug information with respect to dosage schedules, side effects and advice on home-based care. We feel there is a need to conduct continuing education regularly for clinicians as well as other health care providers to address the identified deficiencies in clinical apprentice. The correct diagnosis of malaria is a pre-requisite for proper and effective treatment. To achieve this, high quality laboratory services are crucial. During

our study we found out that although microscopy is the most reliable means of malaria diagnosis, sensitivity and specificity of laboratory tests done in the hospital were very low. The reasons for this are lack of trained laboratory technologist and lack of good microscopes. The laboratory is staffed with laboratory assistants only. In the year 2000 a total of 10,591 blood smears from OPD were examined and 4908 (46%) were positive for malaria parasites only. This low number of parasitaemia among the clinical malaria suspects in this hospital could be explained partly due to technical problems as all staff involved in the preparation and examination of the blood smears have no special training in these procedures. The other reason could be the high prevalence of self-medication with chloroquine before hospital consultation. As indicated earlier in this study, 72.5% of patients had sought and received some kind of home based treatment before arrival to hospital.

The other issue studied was the time lapse between mothers perception of illness of their children to the time of initial contact with a health facility. During patient-exit interviews we found out that the majority of patients (81%) reported within two days after the onset of symptoms to hospital. We also found that 72.5% of the patients had begun some form of treatment at home before hospital consultation. This clearly shows that self-medication is a common practice in Geita District as it is in other malaria endemic areas in Africa.

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Making use of home-based care/treatment a reality

The Roll Back Malaria Strategy advocates the provision of early diagnosis and prompt treatment as its fundamental element in controlling malaria (WHO, 1992). To achieve this objective, the potential role of women as channel through which disease control can be affected needs to be realized and addressed properly. Mothers and other caretakers of children must be taught the symptoms of malaria. This will ultimately enable them to recognize the disease early and taken appropriate action. There is a need to do a simple research on the knowledge, attitudes, perceptions, and practice of women with respect to the causes, treatment, prevention and control of malaria. The existing methods of home-care including treatment for malaria need to be acknowledged and strengthened by all resources available for them to provide prompt and effective treatment for the disease.

While the RBM strategy recognizes and appreciates the importance of improving the health services for effective health care delivery, it has failed to acknowledge the role of home-care. Home care or self-medication is very common in malaria endemic areas in Africa South of the Sahara.

In Guinea, self-medication was practised by 19% of the population and in rural Ghana by 94% of the population. This is higher than in our study, which was 72.5% for urban Geita. A change in drug policy has recommended 'Fansidar' as the first line anti-malarial drug. This drug is likely to be the most used for self-medication in the near future in this country. Drug information on 'Fansidar' should be provided and distributed to individuals and communities stating clearly the dosage schedules, side effects and precautions. This can be done through posters in Kiswahili.

There is a need also to include a topic on malaria treatment at home in the school health programme. This will equip the school children with knowledge and skills on home-based malaria treatment. These children can administer the drug to their young brothers and sisters at home or can help their mothers in correct drug use. The advantage of self-medication at home is that is increases the number of children who receive anti-malarial drugs before hospital consultation (Deming, *et al* 1989). However, self-treatment at home by uninformed user may lead to inadequate or incorrect dosages and inappropriate dosage schedules. A study by Deming *et al.* (1985) in Togo found that 71% of patients treated at home received less than the recommended dose of drug.

CONCLUSION

The study has shown that malaria is a public health problem in Geita district. In fact the disease is increasing steadily despite some efforts being made to roll it back. Factors contributing to the increase in the burden of the disease in the District include: -

- Rapid unplanned urbanization as a result of migration of non-immune people into an endemic area in search of employment at Geita gold mine
- Multiple ground excavations in search of soil for construction purposes-thus increasing breeding sites
- Chloroquine resistance
- Inadequate malaria control measures/ lack of malaria control workers
- Presence of huge pool of infected humans
- Lack of use of ITNs
- Sub-optimal case management at health facilities

People most at risk are children under-five years Hospital based malariometric data for the year 2000 show that in the year 2000, malaria was the leading cause of OPD attendances. It accounted for 46.1% of the total under-five attendances and was also responsible for 50.3% of attendances above five years. Malaria was also the leading cause of hospital admissions. It was responsible for 70.3% of total admissions of children below five years of age and for 37.8% of children above five years. Malaria was also the leading cause of death of children under-five years accounting for 53% of total deaths For the first four months (January-April) of the year 2000, malaria was

responsible for 64% of total admissions of under-five years children. Two main problems were identified as being responsible for the high malarial morbidity and mortality. These problems were: late referral with a mean delay of 2.7 days and a range of 1-14 days before treatment at a health facility .The other problem was sub-optimal management at all levels of health facilities. The study also found some common mistakes in management. The mistakes were mainly due to failure to recognize clinical features of severe malaria such as: severe anemia, acute renal failure, hypoglycaemia, haemoglobinuria, etc.

Although the health care management differs at various levels of the health services, the clinical features of severe malaria must be recognized as early as possible and appropriate anti-malarial chemotherapy given as a matter of urgency. The study found severe anaemia to be the most frequent form of severe malaria in children seen at Geita hospital. Blood transfusion prevents death in such children. Life threatening anaemia causes high mortality unless blood transfusion is given. The anaemia is due to acute haemolysis or chronic low-grade parasitaemia. Rapid diagnostic facilities and early effective case management reduces duration of fever, development of severe anaemia and mortality. During the study it was discovered that self-medication is a commonly practised behaviour. Of the 145 mothers interviewed, 143 (98.6%) had done self-medication before contact with a health facility. It is a type of self-care that might be used to increase community coverage of malaria control by the use of drugs through training of parties involved in self-medication at community level. Since malaria is endemic in Geita, the diagnosis should always be suspected in patients complaining of

fever. All children in malaria endemic areas like Geita should be treated for malaria if they have fever even if there are also other causes of fever present. Principles of treatment are to shorten the course of the disease and prevent complications.

RBM is one of the World Health Organization's highest priorities. RBM has six elements. One of its six elements is rapid diagnosis and treatment. In response to the RBM Initiative the emphasis should be placed on early diagnosis and prompt treatment. The RBM Initiative also advocates the use of ITNs as a promising tool in malaria control. The study has shown that despite the low level of formal education among the interviewed mothers, the great majority (85.5%) knew the cause of malaria as being mosquitoes *(mbu)*. They also know that untreated nets can prevent malaria Unfortunately only 23.5% were aware of ITNs and worse still only 8% possessed ITNs. The majority complained that the nets were too expensive for them. Ninety-eight and half percent (98.5%) of the interviewees said the market prices of the conventional nets ranged from Tshs 3000 toTshs3500.

Regarding case management, proper history taking and thorough physical examination of children seen at all levels of the health care delivery system should be mandatory. The practice must be inculcated in all trainee health professionals. Regular training and re-training on laboratory procedures of malaria diagnosis should also be organized periodically for laboratory personnel so as to improve diagnostic accuracy.

RECOMMENDATIONS

The study has shown that malaria is increasing in Geita District. The author suggests/ recommends the following strategies for malaria control in the District: -

1. In order to minimize delay in seeking health care appropriate and relevant Information, Education and Communication (IEC) messages and materials should be developed and distributed to facilitate public awareness creation on the importance of prompt health care seeking behaviour.
2. To provide guidelines on malaria treatment at home so as to improve self-care and home treatment for malaria.
3. To teach mothers and caretakers of children the symptoms of malaria so that they can recognize the disease early enough and take appropriate action.
4. To provide malaria treatment guidelines to all clinicians so as to assist them to make correct decisions on malaria case management.
5. To have a programme of continuing education for clinicians as well as other health care providers on correct management of malaria cases.
6. To conduct regular training and re-training for laboratory personnel on laboratory procedures of malaria diagnosis in order to improve diagnostic accuracy.
7. To promote the use of ITNs through IEC messages.
8. To ask or advise the Government to waive taxes on ITNs materials so that the poor can afford to buy the ITNs.

9. To ask ITNs manufacturing industries to find possibility of making permanently treated nets to overcome the problem of re-treatment of nets.
10. To promote community involvement in identification, prioritization, planning, implementation, monitoring and evaluation of malaria control activities in the District.

REFERENCES

Alin, M.H; Ashton, M. Kihamia, C. M *et al,* (1997) Clinical Efficacy and Pharmacokinetics of Artemisinin Monotherapy and in Combination with Mefloquine in patients with Falciparum malaria. *British. Journal of Clinical Pharmacology*. June, 41: 587.

Bruce-chwatt,L Black, R.H. *et al,* (ed) (1981) *Chemotherapy of malaria*. World Health Organization. Geneva 112.

Campbell, C.C. Chin, W. Collins E. *et al, (1979)*. Chloroquine-resistant *plasmodium falciparum* from East Africa: cultivation and sensitivity of the Tanzanian I/CDC strain from an American tourist – *Lancet* 1979, Dec. 1,2: 1151-

Chavasse, D Reed, C. and Attawell, K. (1999*). Insecticide Treated Nets, ITNP, A handbook for Managers*, Malaria consortium, London and Liverpool p.2.

Chiduo A. (1991). Health services in Tanzania: Future perspectives and policy options: *Health and Disease in Tanzania* pp 296 – 308. Herper Collins Academic 1991

Clyde, D. F. (1967). *Malaria in Tanzania*, London, Oxford University Press, 1967.

De Gens, A. Meuvissen, H. and Van Rijn, A. (1982) A case of Tanzania. *Tropical Geographical Medicine 34: 261-263*

Deming, MS Gayibor, A *et al,* (1989) Home treatment of febrile children with anti-malarial drug in Togo. *Bulletin of WHO.* 67 (6): 695-700.

Foutaine, D. (1992) evaluating a health unit. Evaluating health action in the third world. Children in the tropics. *Review of the International Children's Centre* Paris No 198 pg 39- 44

Greenberg, A. E; Ntumbanzondo, M. Ntula, N. Mawa, L. Howel, J. Davachi, F. (1989) Hospital based surveillance of malaria related paediatric morbidity and mortality in Kinshasa Zaire *Bulletin of WHO* vol.67 No. 2 WHO Geneva p.g 189-196

Gillies,M.T(1988) *Anopheles* mosquitoes; vector behaviour and bionomics. *Malaria*: *Principles and Practice of malariology* Edinburgh; Churchill Livingstone: p 453-485.

Hill, J. (1996). A situation analysis and opportunities for malaria control support in Tanzania. Malaria consortium.

Kihamia, C.M. and Gill, H S (1982). Chloroquine Resistant Falciparum Malaria in semi-immune Native African Tanzanians, *Lancet* ii, 43, 1982.

MEDICAL LIBRARY DAR ES SALAAM

Kihamia, C.M. (1986). The role of chemotherapy in malaria control in Tanzania: *Italy-Tanzania Health co-operation programme and CUAMM.* Dodoma.

Kilama, WL (1983). Malaria control in Tanzania: Vector control. In malaria control policy, Ministry of Health, *Mimeo*,

Kilama, WL and Kihamia, CM (1991) Malaria: *Health and Disease in Tanzania*.Herper Collins Academic, 1991.

Kilimali, V A E B and Mkufya, A R (1985) *In vivo* and *in vitro* Assessment of the sensitivity of *Plasmodium falciparum* to sulphadoxine-pyrimethamine combination (Fansidar) in six localities in Tanzania where chloroquine resistant P.*falciparum* has been detected: *Transaction of the Royal Society in Tropical Medicine and Hygiene*. 79; 483

Lengeler, C. Cattani, J.and de Savigny, D. (1996). Impact of ITNs on malaria morbidity and mortality. Net Gain, Draft copy. WHO/IDRC. Geneva and Ottawa. Pp: 6-9.

Matteson, P.C. Allsopp, R. Khaware, R.K; Kumar, P; Langer, J; Liroff, R.A.; Mullins G.R. and Ramex, J. (1998) *Insecticide Treated Nets, Disease Vector management for Public Health and Conservation*. WWF. Washington DC. P. 4.11.

Ministry of Health (MOH); *Health statistics* Abstract: Dar-es-Salaam; Health Information Systems Unit (1994).

Musil, R.K.; Bahrambegi, R; Newsome, S; Perry, K; Garlfield, R; Johnson, B.L.; Orris P, Keyselling, H; and Walker, K (1999) Public statement on malaria and use of DDT.*The Modern Malaria Control Handbook.* PSR, Washington DC 1999 pp 97.

Musil, R.K.; Bahrambegi R; Newsome, S.; Perry, K; Garlfield, R; Johnson, B.L.; Orris, P.; Keyselling, H. and Walker (1999) Vaccines, *The Modern Malaria Control Handbook*, PSR, Washington DC 1999 pp 91-91.

Mutambu, C. L.. Dallas, AB C;. Olwny, C. L. M..(1984). Chloroquine-resistant pl*asmodium falciparum* malaria in Zimbabwe: *British Medical Journal* Vol: 292: 22 Feb.

Mwaluko, GMP. Kilama; W L. Mandara; M.P. Murru M. and Macpherson CNL (1988) *Health and Disease in Tanzania* Harper Collins Academic 1988.

Najara, JA. Liese,,BH. Hammer J. (1992) Malaria, "New pattern and perspective" *World Bank technical paper.* No. 183.

National Malaria Control Programme (NMCP), MoH,Tanzania (1997). Plan of operations 1997 – 2000.

Olsen, VV and Spencer, SS Chloroquine Resistant Falciparum Malaria in Tanzania: A case report. In C. Anderson and WL Kilama (editors) *Parasitoses of man and Animals in Africa*. East Africa Literature Bureau Dar es Salaam pg. 85 – 91.

Onori E. (1984). The problem of *Plasmodium falciparum* drug resistant in Africa south of the Sahara. *Bulletin of the WHO,* 62 (suppl.) 55 – 91.

Payne, D (1998): Use and limitations of light microscopy for diagnosing malaria at the primary health care level. *Bulletin of the WHO*, 66: 621-626

Premji Z, Olsson L, Kevo T, Fransson, A.S, Olsson N, Bwijo B, Minjas JN and Bjorkman A (1995). Malaria Diagnosis Practices and effectiveness at different health care levels in Tanzania.By Zul Premji 1966. A collected text of malaria control measures collected.

Ronn, AM;. Msangeni, H A; Mhina, J; *et al,*.(1996) High Level of Resistance of *Plasmodium falciparum* to sulfadoxine-pyrimethamine in children in Tanzania: *Transaction of the Royal Society of Tropical Medicine and Hygiene.* 1996, 90; 1179 –

Rooth, I. And Bjorkman, A. (1992) Fever episodes in a holoendemic area of Tanzania: Parasitological and clinical findings and diagnostic aspects related to malaria: *Transaction of The Royal Society of the Tropical Medicine Hygiene. Vol. 8 pg 479-482*

Stahel, E.A.; Degremont and U.Lagler (1982) Pyrimethamine/sulfadoxine resistant falciparum malaria acquired in Dar es Salaam, Tanzania (letter*) Lancet* 1982 – May 15 .1: 118 – 1119.

Trape JF, Peelman P and Morault-Peelman B (1985) Criteria for diagnosing malaria among semi-immune population exposed to intense transmission. *Transaction of the Royal Society of Tropical Medicine and Hygiene* 79: 435-442

Trigg JK, Mbwana,H; Chambo, O*; et al,(*1997) Resistance to pyrimethamine/sulfadoxine in *Plasmodium falciparum* in 12 villages in North East Tanzania and a test of chlorproguanil/dapsone. *Acta Tropica 63: 185 – 189*

Vlengels, M.P.;Weststeyn J C; and Meuwissen, J .H;(1982) Fansidar-resistant *Plasmodium falciparum* infection from Tanzania. *Tropical Geographical Medicine* 34: 263 – 265

Weernsdofer WH (1982). Drug resistant malaria. UNDP/WORLD BANK/WHO Special programme for Research and Training in Tropical Diseases, Geneva 1992.

World Health Organization, (1989). Malaria diagnosis: *Bulletin of the WHO.*: Vol. 66: pg 575

WHO (1992): *Global Malaria Control strategy*. A report prepared for the ministerial conference on Malaria. Amsterdam 26 – 27 Oct 1992.

World Bank. 1993. *World development reports 1993: Investing in health.* Oxford University Press, New York, NY USA. P. 329.

World Health Organization (1993): *A Global strategy for malaria control* Vol. 71 No. 6 pp. 763 – 772.