THE AVAILABILITY AND USE OF ANTI-MALARIAL DRUGS IN HOUSEHOLDS IN KIBAHA DISTRICT, TANZANIA, 1996

By

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ABSTRACT:

A cross-sectional study was conducted in Kibaha district of the Coast region in Tanzania, to investigate the availability of antimalarial drugs in households. This included the source, proportion of stocking, how they stored and used for malaria treatment.

Mothers of under-fives were interviewed on how their under-five children get treated when they have malaria.

Prescribing habits of the drug-sellers from the villages where household survey was done were also investigated. A Swahili questionnaire was used for the interview.

A study sample was obtained by a multistage sampling technique. Out of 8 wards 2 were picked randomly Tumbi and Mlandizi. Five villages were picked randomly as well, three from Tumbi and two from Mlandizi. In each village a list of ten cell leaders was made and in total 75 ten cell leaders were selected randomly and their households included in the study. A total of 1000 households, which was 5% of all households in the district according to the 1988 Census (Bureau of Statistics, 1989 were included in the study. The interviewees were 1000 heads of households, 515 mothers of underfives and 249 members who were sick with malaria during the last month prior to the interview.

The study found that 32.6% of the households do keep antimalarials and the stocking of drugs among other things was found to be determined by distance to the nearest health facility, household size, number of underfives, employment status, educational status and age of the head of the household.

Although 91.8% of the interviewees reported their nearest health facility was publicly owned which provide either free or cheap medical services, 55% of the interviewees had not visited those facilities for more than 6 months despite the fact that they reported to have fallen ill in that period. This is because in most of the time, public health facilities have a shortage of drugs.

It was also found that 65.7% of respondents practice self medication, and the sources of their drugs are 79.7% from drug-stores, 19.7% ordinary shops, 0.2% from health personnel and 0.5% from other sources.

For mothers or the caretakers of underfives, 51.8% of them were found to keep drugs for their children. Educational status of the mother was the key determinant in keeping drugs at home, and Chloroquine syrup was the commonest antimalarial given to underfives.

Only 18.6% of mothers were found to give their children the correct dose of chloroquine, the remaining either gave under-dose or overdose. Some did not know their children weight or gave inappropriate dose schedule like two or three times a day. Hence, it was found that management of malaria in underfives was insufficient and improper.

On expiring dates of drugs, only 17.6% of respondents knew the expiring dates of the drugs they used. Of those who did not know about the expiry dates, 80.4% agreed that it was important to know it. Majority of respondents knew that expired drugs could either be poisonous or could not cure the disease. Some of the drugs were found to have been stored for a long period (up to 6 months).

Majority of drug sellers (78%) had primary education and 51% were below 20 years of age.

About 47.1% of drug-sellers in ordinary shops gave under-dose to their clients while 25.5% gave only two tablets of chloroquine, and that was regarded as a sufficient dose. The client was more likely to get a wrong dose of chloroquine if he bought it from ordinary shops than from drug stores.

It is recommended that the Ministry of Health should be strict on regulations governing drug stores and pharmacies when registering them, and regularly inspect staff who work in them. Such staff should be qualified at least with a

certificate in pharmaceutics. The Ministry should also organize a seminar on correct management of malaria with chloroquine for shopkeepers who sell over the counter drugs.

Through mass media people should be educated on dangers of self medication and importance of knowing the expiry dates of the drugs before taking them.

Studies should be initiated by Ministry of health to look into the proportion of patients who get drugs and those who get only prescriptions when they visit health facilities. This will help to show the magnitude of drug shortages in health facilities. Also there is a need to know if patients are getting correct information on drugs dosages.

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LIST OF ABBREVIATIONS

EDP	=	Essential Drugs Programme
IFAT	=	Indirect Fluorescent Antibody Test.
MOH	=	Ministry of Health
MCH	=	Maternal and Child Health
RMA	=	Rural Medical Aide
SAREC	=	Swedish Agency for Research Cooperation
TDR	=	Tropical Diseases Research
UNICEF	=	United Nations Children's Fund
WHO	=	World Health Organization

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DECLARATION

I, Zebwe Auckland Mbatiya, solemnly declare 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 field work in partial fulfillment of the requirements for the Degree of Masters of Science in Tropical Diseases Control.

SIGNATURE

14/11/1997

DATE

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CHAPTER 1

1.1 INTRODUCTION:

Malaria is one of the major health problems in Tanzania. For more than three decades, malaria has been one of the major causes of morbidity and mortality in the country. Furthermore, it is generally noted that malaria contributes about 15% of hospital attendances, about 10% of hospital admissions and it accounts for 4 - 5% of hospital deaths (Chiduo, 1989, Kilama & Kihamia, 1991).

Tanzania has been described as a sea of intense malaria transmissions with few "islands" of little transmissions. These islands are found at altitudes higher than 2000 meters above sea level (Fivawo, 1986).

The surveys for human malaria infections conducted in the lower Rufiji Basin in Tanzania, before and after the long rains in 1981, showed overall asexual malaria parasite of 38.6%, gametocyte rate of 3.8% and spleen rate of 21.1% before the rains. Also asexual malaria parasite of 44.5%, gametocyte rate of 2.8% and spleen rate of 17.3% after the rains (Matola, 1985).

Kibaha district which is the study area situated along the coastal belt of Tanzania. In the district, malaria transmission occurs throughout the year and is holo-endemic.

The district has mean annual rainfall of 40 - 80". The mean minimum and maximum temperatures are 75°F and 90°F respectively. Thus, malaria transmission continues at a high level throughout the year with some accentuation during May - July and to a lesser extent December - January. These two peaks closely followed the long and short rains respectively when the bulk of annual rainfall of 40 - 50" occur. Furthermore, abundant fresh water standing all year round in creeks, swamps, pools and rice fields ensured the presence of large numbers of Anopheles gambiae and Anopheles funestus (Clyde, 1967).

In developing countries, antimalarial drugs are distributed through several different networks and are purchased by governments, private sector and individuals. At present the world market is dominated by chloroquine by virtue of its safety, wide availability and low price (Foster, 1994).

In developing countries approximately 20% of the total production of chloroquine is distributed through national control programmes and 80% through other channels; and chloroquine is said to be the second or third most widely consumed drug in the world (Foster, 1994).

Self-medication for malaria is widely practiced around the world, and although many home treatment episodes are

successful, the risk of under or overdosing is always present (Foster, 1994). Reasons for the widespread use of self-medication range from distance and cost of seeking care, also from the formal health services to cultural beliefs which suggest that traditional care is more appropriate, and that modern care may be fatal (Foster, 1995).

Tanzania released its standard treatment guidelines and the National Essential Drug List which also includes management of malaria. Since a large proportion of patients with malaria get treatment outside the health facilities there is a need to know the extent of such treatment and their sources of medicines (Mlavwasi, 1994).

1.2 PROBLEM STATEMENT AND RATIONALE OF STUDY

In developing countries antimalarial drugs are distributed through a variety of channels in both public and private sectors, where the official malaria control programmes account for 25 - 30% of chloroquine distributions (Foster, 1991). The unofficial drug sellers in markets, streets, and village shops account for as much as half of antimalarials distributed in many developing countries (Foster, 1991). Use of antimalarials through the health services is often poor, drug shortages are common and over prescriptions and overuse of injections are significant problems (Foster, 1991). Drug costs may also prevent patients from getting the necessary treatment for malaria, and this may lead to obtaining drugs from unofficial sources, most likely buying less than the prescribed or the complete course of treatment.

The sale of modern medicines by untrained peddlers, general merchants, and other drug sellers is common in most developing countries (Kafle et al, 1992). Drug sellers operating in the informal sector are often the first source of health care outside the home. Reasons given by patients using private drug sellers include expediency, convenience, efficacy of the medicines, dependability of supply and reasonable cost; while at the same time self-medication

through private drug sellers can be ineffective, wasteful and sometimes distinctly harmful (Kafle et al, 1992).

A study done in Dar es Salaam, Kinondoni district, showed that 73.3% of the sampled households do stock drugs at home and antimalarials were 19.6% of different drug preparations stocked (Mlavwasi, 1994). In this Kibaha study the aim was to look into the proportion of household which keep antimalarials and the reasons of doing so.

Although there are several antimalarial drugs, chloroquine is the drug of first choice in treating malaria and is the only antimalarial drug present in essential drug kits used in public dispensaries (Ministry of Health, 1988).

In Tanzania shopkeepers are allowed to dispense chloroquine over the counter without a prescription. These drugs are packaged in different trade names e.g. Shelyquine, Nivaquine, Malaraquine, Homaquine, Tanzaquine etc. It is doubted if they give appropriate instructions to clients on importance of taking appropriate dose, finishing the course and possible side effects. Thus there were a need to know the proportion of people who use chloroquine and how they use them in terms of dosages and compliance.

Knowing that antimalarial drugs are not always present in public health facilities can prompt people to stock them at home for use when someone in the household gets sick. It

has been observed that in many rural dispensaries and health centres, the attendance is high during early days of the month and become less in last days of the month. Knowing that drugs are available only in a certain period of the month, could prompt people to pretend to be sick and consequently visit health facilities during stocked days. Drugs which are stocked at home may loose potency easily due to poor storage as most of them are wrapped in envelopes or folded papers which expose them to heat and air. Furthermore, since expiry dates of drugs are written on tins or packets, the drugs purchased near to the expiry dates could expire unnoticed at home and used unsuccessfully to treat malaria. This may result into delay in recovery and also it can lead to other complications like anaemia and even death.

There are anecdotal evidence that chloroquine has been reported several times to be used as suicidal agent especially by teenagers. Thus a bulk of chloroquine at home can impose danger if kept exposed. Thus there was a need in this study to find out how long antimalarials are stored and where are storage places. It was important also to find out if they know the expiry dates of drugs they used or stored.

So far, studies on use of antimalarials known to the author done in Tanzania were limited to Dar es Salaam city.

Dar es Salaam is known to be the most served region with private dispensaries and pharmacies thus the sources of drugs and the reasons for keeping them may be different from other parts of the country.

One study focused on availability and use of all types of modern drugs at households but did not mention the proportion of households which keep antimalarials, though antimalarials were 19.6% of drugs found in homes (Mlavwasi, 1994).

Another study conducted in Dar es Salaam on the management of malaria showed that only 20% of drug sellers knew the correct dosages of chloroquine while 50% do give advice to their clients (Massele, et al. 1993). The same study showed only 20% of people who purchased drugs from shops and 30% of patients at dispensaries knew the correct dosages for chloroquine. This indicates that more than a half of those who buy drugs from the shops were likely to get incorrect doses of chloroquine.

Also there is a problem of lack of correct drug information from drug sellers to clients. Only half of them give advice and only 20% know the correct doses of chloroquine (Massele et al, 1993).

This study which was done at Kibaha focused on peoples practice on malaria management at home and the type of

information people get while purchasing or obtaining the drugs. It also found out if there is a dosage compliance and what happens to drugs which remain unused. Also peoples' knowledge on expiry dates of drugs together with where they kept their drugs and for how long the drugs were kept in their households were inquired.

The study done on knowledge and management of malaria in Dar es Salaam concentrated on adults management but in this study mothers of underfives were asked on how their children below five years got treated from malaria.

In health facilities mothers are supposed to be given medicines and when the prescribed medicines are not in stock, prescriptions are issued to them to buy medicines somewhere else. Because of that, this study looked at doses of chloroquine given by mothers of underfives to their children.

1.3 REVIEW OF LITERATURE:

1.3.1. Malaria as a disease.

Human malaria is a disease of wide distribution caused by Sporozoa of the genus Plasmodium. There are four species of parasites that infect man:

* P. falciparum
* P. vivax
* P. malariae
* P. ovale

The differentiation of the species depends on the morphology and staining of the parasites and associated changes in the infected cells. The most common and important infections are those caused by P. falciparum and P. vivax. Mixed infections also do occur.

Malaria is transmitted from man to man by female Anopheles mosquitoes, of which there are hundreds of species. Some are very efficient while others are not so efficient and, still, others are not capable of transmitting it. Clinically malaria is characterized by fever, hepatomegaly, splenomegaly, ranging degrees of anaemia and various syndromes resulting from the involvement of individual organs.

Malaria is found in regions lying roughly between latitudes 60°N and 40°S. It is still commonly found throughout most of Africa, South America, South East Asia and Arabian Peninsula and the Western Pacific countries (Bruce Chwatt, 1980). Malaria has been eradicated from the whole of Europe, most of North America, including the whole of the USA, most of the Caribbean, large parts of Northern and Southern South America, Australia, Singapore, Japan, Korea and Taiwan (Bruce Chwatt, 1980).

Malaria is still the most important parasite disease in Africa with an estimated incidence of 20 million cases per year. In Sub-Saharan Africa, some 200 million people are chronically infected and of these about one third suffer acute manifestation of the disease in the course of a year (WHO, 1992). However, administrative, economic and political problems as well as problems of insecticide resistance in the vector and drug resistance in the malaria parasite frustrate progress in eradicating malaria in some countries,.

1.3.2 DIAGNOSIS:

The diagnosis of malaria is both clinical and parasitological. Parasitological diagnosis is done by examining thick blood films stained with field or Giemsa stains. However, negative blood slide does not necessarily

rule out presence of malaria. Malaria pigments derived from haemoglobin of the invaded red cell and made up of haem and denatured protein, can be identified (Manson et al, 1987).

Although species diagnosis can be made on thin film stained with Leishman or Giemsa stains, as a rule, only ring forms and gametocyte are found in the peripheral blood in falciparum malaria unless the infection is severe, in which case, schizont also appear. In cases of Vivax, malariae and ovale malaria, all forms of development of the asexual parasites are found in peripheral blood (Lucas and Gilles, 1991).

1.3.3 TREATMENT:

In all forms, especially in Plasmodium falciparum malaria the usual antimalarial drugs (4-aminoquinolines) must be given as soon as diagnosis is made. Even when P. falciparum is only suspected and before the result of blood examination is received, if the patient is very ill the anti-malaria drugs are indicated.

The treatment of acute attack of all forms of malaria is the same in regard to the elimination of blood schizont, but for P. vivax, P. Malaria and P. ovale, the addition of an 8-aminoquinoline compound (primaquine) to the usual 4-aminoquinolines (chloroquine, amodiaquine) is advisable.

The 8-aminoquinolines act on exoerythrocytic schizont, the 4-aminoquinolines do not. The 8-aminoquinolines have little action on the asexual forms and should not be relied upon to cure attacks if used alone (Manson-Bahr et al, 1987).

Other available antimalarial drugs are Quinine available for oral or parenteral administration, Fansidar (pyrimethamine and sulphadoxime), Metakelfin, Halofantrine chloride (Halfan), Mefloquine and recently available in Tanzania, Paluther.

In 1990, the Ministry of Health produced the National Drug Policy. Amongst other things it also put emphasis on drug availability especially on drug selection, procurement and distributions.

On selection the policy, it calls for careful selection procurement and distribution and quality assurance. It stipulates that selection should be in accordance with the concept of essential drugs and shall be based on specific criteria such as: diseases pattern; safety efficiency and quality; costs; and therapeutic advantages. Furthermore, the procurement policy aims at securing both the necessary quality and quantity of pharmaceutical products according to the national drug list, which will meet the medical needs of majority of the population. The aim is to ensure that

essential drugs are always available to those who need them and are distributed in a cost-effective manner (MOH 1990).

However, Tanzania has been unable to purchase most of the drugs it needs. For example, it was estimated that the nation needed US$ 55 Million a year to finance drugs and hospital equipment, yet the annually available finances for the years 1986 to 1988 was 4.9, 6.4 and 5.5 million US$ a year respectively. This amount was enough to satisfy only 10% of the nations needs in the health sector (Chiduo, 1989). Thus it can be inferred that, public health services can not satisfy the health care demand as far as disease treatment is concerned. The situation become worse when the health personnel lack knowledge on correct management of malaria. A study done in Dar es Salaam on knowledge and management of malaria showed that only 65% of Rural Medical Aides (RMAs) could remember the correct dose of Chloroquine for an adult with clinical malaria (Massele et al, 1993).

With trade liberalization, individuals and private companies are allowed to import authorized drugs hence people get medication either in private health facilities or outside health facilities.

A study done in Kenya rural area on self-treatment of malaria, found that self-treatment was extremely common; of 138 episodes of febrile illness 60% were treated at home with

herbal remedies or medicines purchased at local shops and only 18% received treatment at a health centre or hospital, no treatment was sought by the remainder (Ruebush et al, 1995).

Apart from formal health facility services self-medication plays an important role in malaria treatment. A cross-sectional study done in Dar es Salaam, Tanzania to assess the extent of self-medication with antimalarial drugs and malaria treatment seeking behaviour, found that 15.3% of respondents admitted to having ever used malaria chemoprophylaxis. Also 8.0% reported to be current users of chemoprophylaxis and among them (current users) some reported having used Quinine and Fansidar. While 71.7% reported having treated themselves with home kept antimalarial drugs for a suspected malaria fever, 72.7% admitted of having bought antimalarial drugs from private pharmacies or shops (Mnyika, Killewo and Kabalimu, 1995).

Although chloroquine is the commonest used antimalarial drug for self-medication, other antimalarials are also used as well. In survey of proprietary pharmaceutical products used in self-medication in Kenya, 16 products of antimalarials were found; of them 6 contained chloroquine, 4 contained pyrimethamine, 1 contained pyrimethamine and Dapsone, 1 contained pyrimethamine and sulphadoxine, 1

contained proguanil and 1 contained chlorproguanil (Maitai et al, 1981).

In Harare, Zimbabwe self-medication was common in 95% of the households. The average number of drug types per households was found to be four. The commonest items encountered were analgesics, cough, cold and sore throat preparations; dermatologicals, gastrointestinals and antimalarials. The majority of the respondents usually choose an appropriate drug for a particular symptom while the sources of the medication found in the households were chemist or pharmacy, shop or supermarket, hospital or clinic, friends and relatives (Kasilo et. al., 1991). This indicates that antimalarials are among the common kept drugs at home and can be obtained from other sources than health facilities.

Although over-the-counter medications are an important component of health care for treating illnesses, such practices are associated with other risks. These include over or under-dosage, drug poisoning and development of drug resistance. Such a case was reported in Senegal, where an adult had a severe accidental chloroquine poisoning. This intoxication was a result of the widespread practice in Senegal of taking mild doses of chloroquine for a few days (ie 300 mg x 3 for 3 or 5 days) following the onset of any

fever suspected of being malaria attack. In this case it was demonstrated that self-medication can be the cause of severe chloroquine poisoning responsible for arrhythmia (Demaziere et al, 1995). Thus it was important to know the prescribing behaviour of drug-sellers.

In Togo, the principal strategy for preventing death from malaria in children is said to be a prompt treatment of fever with antimalarial drugs (Deming et al, 1989). Household surveys to find out how underfives get treated when they fall sick with malaria were conducted in rural areas of Togo. Mothers were interviewed on treatment given to 507 children underfive years of age who had recent fever. Altogether, 20% of children were seen at a health centre during their illness, while 83% were treated at home with antimalarial drugs. While 97% of children who got home treatment received drug on the first day of fever, 17% of children who attended health facilities were seen on the first days of fever. However, chloroquine was used in 94% of cases of home treatment with average total dose of 12.8 mg/kg body weight against WHO recommended dose of 25 mg/kg body weight (Deming et al, 1989). This showed that majority of children received chloroquine at home were likely to get under dose. Thus in this Kibaha study mothers were also asked how much chloroquine they give to their underfives.

To substantiate the self-medication can be associated with development of drug resistance, a study was done in Viantane, Laos, where an artificial dam lake on the Nam river is located. This is hypoendemic zone, parasite density index 3 and the low spleen rate 2.3%. Immunofluorescent antibody tests (IFAT) antibodies were examined in 419 subjects. The seropositivity of 195 persons below 15 years was 13.7% while in above 15 years seropositivity was 61.6%. Automedication with aminoquinolines was assayed by urinary analysis in 125 outpatients.

Of these 36 (28.8%) were positive, 89 (71.2%) were negative. The frequency of positive blood films for P. falciparum was higher in subjects with aminoquinolines in the urine (36.1%) than in those without (10.1%). Chloroquine sensitivity of 15 stains of P. falciparum displayed resistance in 39.3% (Gibona et al, 1992).

The other problem of self-medication is delay of getting proper treatment where there is misdiagnosis. The major symptom of malaria is fever hence most people will take drugs which will bring down fever first and if symptoms persist then, antimalarials are taken. This sometimes can be fatal especially to children when the underlying disease is masked by antipyretic (Eskerud et al, 1991).

1.4 STUDY HYPOTHESES:

1.4.1 Households get stocked drugs from public health facilities more frequently than from private health facilities.

1.4.2 Households stock more than one type of antimalarial drugs at any one time.

1.4.3 Distance to nearest health facility makes households to stock antimalarials.

1.4.4 People don't know how to use correctly the drug they are stocking.

1.4.5 Households with underfives, are most likely to stock drugs than those who do not have underfives.

1.4.6 Drug-sellers do give wrong drug information to their clients.

1.4.7 People do not know the expiry dates of drugs they are taking.

1.4.8 Households stock and use expired drugs.

1.5 BROAD OBJECTIVES:

1.5.1 To determine the availability of antimalarial drugs, user's knowledge and practice on malaria management in households at Kibaha district.

1.5.2 To determine prescribing habits of the drug-sellers.

1.6 SPECIFIC OBJECTIVES:

1.6.1 To determine the proportion of households which stock antimalarial drugs in the district during the interview.

1.6.2 To determine the sources of antimalarials stocked at home.

1.6.3 To determine number and types of antimalarials stocked in households.

1.6.4 To determine average duration the drugs are kept at home.

1.6.5 To find out places where drugs are kept at home.

1.6.6 To determine the reasons for keeping antimalarial drugs at home.

1.6.7 To determine the proportion of households stocking antimalarial by distance to nearest health facility.

1.6.8 To determine proportion of peoples' self medication in treating malaria fever and the antimalarials used.

1.6.9 To determine the proportion of mothers or caretakers who stock antimalarials for underfives.

1.6.10 To determine the proportion of mothers or caretakers who give correct dose of chloroquine to their under-fives.

1.6.11 To determine the number and types of antimalarials used to treat self diagnosed malaria fever since the last visit to a health facility.

1.6.12 To determine the user's knowledge on the expiry dates of the antimalarial drugs.

1.6.13 To determine proportion of drug-sellers who give advice to their clients and type of information given.

1.7 DEFINITION OF TERMS:

1.7.1. Self-medication

Its defined as the voluntary use of drugs or medicine by a patient to eliminate or reduce perceived symptoms without official prescription or consultation with a qualified health personnel (Saeed, 1988).

1.7.2 Members of household

Household member is defined as a person or a group of persons living together and sharing a common source of food (Ngallaba et al, 1993). It includes guests who were spending more than a month.

1.7.3 Household

It is defined as a room or group of rooms inhabited by people as a separate living quarter (Abramson, 1984).

1.7.4 **Antimalarial drugs**

Any drug proven pharmacologically capable of killing any developmental stages of malaria parasites.

1.7.5 **Availability of antimalarial drugs at households**

Presence of any type of antimalarial drugs in households.

1.7.6 **Stocking of antimalarial drugs at home**

Presence of any antimalarial drugs during interview or within a month before interview which are not used for the current illness. It includes also drugs available in a household which were acquired to cure malaria but was not used or finished and stored instead.

1.7.7 **Knowledge of symptoms of malaria**

The respondent will be categorized as knowing the signs and symptoms of malaria if he or she mentioned three or more signs and symptoms of malaria correctly.

1.7.8 **Correct knowledge of chloroquine dosage for malaria treatment**

1. For an adult dose: mentioning (4-4-2) or 4 tablets on first and second day and 2 tablets on third day.

2. For children: mentioning correctly number of tea spoonful of chloroquine syrup the child is given which will be equivalent to 10 mg/kg body weight on day 1 and 2 and 5 mg/kg body weight on day 3. (5 ml contain 50 mg of chloroquine base which is equivalent to 1 teaspoon).

1.7.9 Clients

These are recruited adults from households surveyed. After the purpose of the study was explained to them, they were given money to go and buy antimalarial drugs from drug stores or ordinary shops.

CHAPTER 2

2.0 METHODOLOGY:

2.1 Description of study site

Kibaha district is one of the six administrative districts of Coast Region of Tanzania. The district has 8 wards comprising Kibaha town and 38 villages. Kibaha town has only one Kibaha ward. The remaining 7 wards are in rural areas. Kibaha town is situated 40 kilometres from Dar es Salaam along Morogoro road.

According to the 1988 census Kibaha District had a total population of 81,966 (40,629 males and 41,337 females). Using the national annual growth rate of 3.2% (National census 1988) Kibaha could be estimated to have a total population of 108,105 inhabitants.

The district is situated west of Dar es Salaam city. The district shares borders with: Kinondoni district of Dar es Salaam Region to the east, Kisarawe district of Coast Region to the south, Morogoro district of Morogoro Region to the west and Bagamoyo district of Coast Region to the north-west.

The district has a mean annual rainfall of 40 - 80" The mean minimum and maximum temperatures are 75 F and 90 F respectively. There is abundant fresh water standing all the year round in swamps and rice fields along Ruvu river which

ensure the presence of large numbers of mosquito vectors. Thus malaria transmission occurs throughout the year and is holoendemic (Clyde, 1967).

The major tribes of the district are Zaramo, Ndengereko Rufiji, Matumbi, Kwere and Doe. The majority of inhabitants are peasants. The major food crops grown are maize, millet and rice while cash crops are cashewnuts and simsim.

2.2 Organisation of health services:

The district has a total of 24 health facilities of which 10 are publicly and 14 privately owned. There is one public hospital, one public rural health centre, 8 public dispensaries and 14 private dispensaries. One of the public dispensary is located in the National Service Camp area, while 3 of the private dispensaries are affiliated to missions (2 Roman Catholic and 1 Assemblies of God). The remaining private dispensaries are located within Kibaha township and in a small town of Mlandizi which is about 35 kilometres from Kibaha town along Morogoro road.

Kibaha district hospital is located at Tumbi area within the Kibaha Education Centre area. The hospital is the regional referral hospital but it also serves as a district hospital and a major centre for emergency accidents which happen on Morogoro road. There is also an urban health

centre which gives service mostly to Mkoani, Maili-Moja and Mwanalugali residents.

2.3 The target population

The target population of this study was all the households in Kibaha district. Assuming an average of 5 members per household then the district with over 100,000 population is estimated to have over 20,000 households. The study also included drug sellers in Kibaha district selling medicines either in class I, class II or in ordinary shops. The number of drug sellers in the district were not known prior to the start of the study. After the household surveys, Ward Executive Secretaries gave a list of drug-stores and shops. There were 3 registered pharmacy shops (Class I) in Maili-Moja Kibaha, 2 of them had Pharmaceutical Technicians, while one is a Clinical Assistant (RMA). There were 5 registered medical stores (Class II) one at Picha ya Ndege, Kibaha and 4 at Mlandizi. The one at Picha ya Ndege had a sales lady who was a retired nurse while those of Mlandizi the sales girls were 2 secondary school leavers and the other two were standard seven leavers with First Aid training from the Red-Cross. All the drug stores and ordinary shops selling antimalarials in the sampled villages were included in the study.

2.4 The study population

Heads of households, in selected sample, mothers of under-fives and any other member who was sick in last month before the interview date in selected households were interviewed. All Drug sellers in each village were covered when house to house interviews were conducted.

2.5 Study design

A cross-sectional study in which the prevalence of self-medication of antimalarials, stocking and reasons for drug stocked were sought. The study was conducted from the 5th to 31st of August 1996. House to house interviews were conducted using a swahili questionnaire. The questionnaire was first written in english and later translated into Swahili by the author with assistance of the supervisor. The pre-testing of the swahili questionnaire was done to make sure questions were understood and should give the desirable responses. In each household, the head of the household, a mother or caretaker of an underfive(s) and any other member who was sick within the last month prior to interview were interviewed. Management of malaria to under-fives and knowledge of correct use of antimalarials were investigated. The drug sellers prescribing habits were assessed as well.

2.6 Sample size estimation/selection

The minimum sample size of the households required for the study was obtained using the following statistical formula:

$$n = \frac{Z^2 Pq}{d^2} \quad \text{where:}$$

n = The desired minimum sample size where target population is more than 10,000.

Z = The standard normal deviation set at 1.96 which corresponds to the 5% significance level.

P = The proportion of households in the target population who uses correctly the stocked antimalarials at home. For Kibaha district is not known hence is set at 50% which can give a large sample size.

q = Proportion of households which don't stock antimalarials (I - P).

d = Required size of standard error which is set at the 0.05 or at 5%.

$$\frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

Since this is a multistage sampling to cater for design effect we multiply by a factor which is 2 (2 stages of sampling).

Hence 384 x 2 = 768.

Add 20% to cover houses which had their household members assumed to be away during the interview: i.e non responses.

= 768 + 154 = 922.

2.7 Sampling technique:

Multistage sampling:

Out of 8 wards, two wards were selected randomly by using a table of random numbers. The selected wards were Tumbi and Mlandizi. From Mlandizi ward, out of four villages two were selected randomly. These are Mlandizi A and B. In Tumbi ward out of seven wards, three were selected randomly. These are Maili-Moja, Bokotimiza and Picha ya ndege. From each village a list of ten-cell leaders were obtained from the ward executive officer. At Maili-moja there were 80 ten-cell leader where 25 were randomly selected for study to represent urban population. In Bokotimiza there were 18 ten-cell leaders and 11 (61%) were randomly selected while Picha ya Ndege had 25 ten-cell leaders and 14 (60.9%) were randomly selected. In Mlandizi A there were 23 ten-cell leaders and

13 (56.5%) were selected randomly while in Mlandizi B there were 39 ten-cell leaders where 22 (56.4%) were selected randomly. All households belonged to the selected ten-cell leaders were included in the study.

A total of 85 ten-cell leaders with 1000 households (108% of estimated size) in selected villages were included in the study.

In households the following were interviewed:

- The head of household or his wife.
- Mother(s) or care taker(s) of an under-five(s) if the house had an underfive(s).
- Any other member of the household who reported to be sick in the last month prior to the interview.

  The head of the household was the one who identified this other member who was sick.

The head of the household was interviewed because he or she is assumed to be the most well informed person of the illnesses of his or her household members and their management in the household.

The other member who was sick was interviewed because older members of the family are assumed to make their own decisions on where to seek treatment on their own without necessarily having a prior consultation with the head of the household.

2.8 Research Instruments and Data Collection:

The data collection was done by the Principal Investigator (author) and four Research Assistants. Two Research Assistants were recruited from health personnel of Kibaha Hospital and from Muhimbili Medical Centre.

Training of the research assistants was done before data collection was done. The training and questionnaire pretesting was conducted in Kibaha. The questionnaire was corrected for options which were not applicable and some of the questions found to be inappropriate were reframed.

2.9 Ethical issues:

The research clearance was obtained from the College's Ethical Committee, District Commissioner and District Medical Officer. Letters were issued to introduce the researchers to Ward Executive Officers of the selected wards (Tumbi and Mlandizi). In all selected villages, a research team met with the village leaders and informed them about the aim of the study and how it will be conducted. The Village leader was then asked to make or give a list of his ten-cell leaders, from which a random selection of the ten-cell leaders whose households to be included in the study were selected from. The selected ten-cell leaders in each village met the research team and were informed about the

purpose of the study. Each ten cell leader conveyed the message to his or her households a day or two before the interview. Consent was obtained from each interviewee before the interview.

2.10 Data Collection:

For each household visited, the interviewer was escorted by the ten-cell leader for introduction to the head of household. The head of household was interviewed and in households where there were underfives, their mothers or caretakers were interviewed. The other member of the household who was reported to be sick from malaria during the last one month prior to the interview was also interviewed. The household member was interviewed irrespective of whether he or she was the head of the household or the mother or caretaker of underfives.

The information collected was:

2.10.1 what parents do when their under-fives get malaria. This included where they seek treatment and if they give home stocked drugs or bought drugs, and the dose they give.

2.10.2 the information clients get when obtaining the drugs. This includes dosages, importance of finishing the course and possible side effects.

2.10.3 the awareness of people about expiry dates of drugs.

2.10.4 what is the place of storage of drugs and duration of storage.

A Swahili questionnaire was used for data collection. The questionnaire consisted of:

- Identification of household and interviewee.
- Demographic characteristics.
- Respondents knowledge of malaria symptoms and signs.
- Respondents knowledge of malaria treatment, drugs including types and dosage.
- Respondents behaviour on acquiring antimalarial drug, stocking the drug and self medication.
- Place of storage of drugs and knowledge on expiry dates.
- There were closed and open ended questions.

The Principal Investigator checked all questionnaires everyday after the research assistants had collected the data and to check if they were filled properly and numbered serially.

Drug sellers were recorded on how they sell their antimalarials in terms of dosage and, if any instructions are given regarding the use, compliance or side effects. Type and number of drugs given and information or instructions given to client were recorded. The age, sex and education status of the drug-seller were also recorded.

"Clients" (who were assigned to buy antimalarials from drug stores or ordinary shops) were recruited from adults living in the sampled households. After they have been told the purpose of the study, they were given money and asked to purchase a full adult dose of an anti malarial from a specified drug seller. The "client" was escorted by a researcher (author) to the shop (drug seller). The aim was to have clients with money requesting a full dose of an antimalarial from a drugs store. To avoid a recall bias, on conversation done between the client and the drug-seller, from the client to the researcher, the researcher was present to listen and record their conversation later; the amount and types of drugs bought were also recorded. To avoid bias of the presence of researcher, the researcher did

not interfere with their conversation and did not write any thing infront of them. He was like any other customer.

2.11 Variables:

The following variables were recorded for analysis.

2.11.1 HEAD OF HOUSEHOLD

Independent variables:

- Age
- Sex
- Occupation
- Educational status
- Marital status
- Source of antimalarial drugs
- Presence of under-fives in households
- Distance to nearest health facility
- Household size
- Number of under-fives
- Knowledge of symptoms and signs of malaria
- Knowledge of signs of recovery from disease
- Reason for obtaining or buying antimalarial drugs
- Types of antimalarial drugs stocked
- Number of antimalarial drugs stocked

Dependent variables:

- Stocking of antimalarials
- Self medication of antimalarial drugs
- Correct use of antimalarial drugs

2.11.2 MOTHER OR CARETAKER OF UNDERFIVE

Independent variables

- Age
- Educational status
- Weight of underfive

Dependent variables

- Duration of storage of drugs for underfives
- Stocking of drugs for underfives
- Dose of chloroquine they give to their underfives

2.11.3 OTHER MEMBER WHO WAS SICK LAST MONTH

Independent variables

- Age
- Educational status
- Place treatment was sought
- Duration of storage of drugs

Dependent variables

- Knowledge of signs and symptoms of malaria
- Awareness of expiry dates of drugs

2.11.4 DRUG-SELLERS

Independent variables

- Age
- Sex
- Educational status

Dependent variables

- Dose given to client
- Instructions given to client

2.12 Data Entry, Validation and Analysis:

Data entry was done using the SPSS computer package using a fixed field format. The responses of closed ended questions were pre-coded while that of open ended questions had coding done after completion of study and before data entry.

Validation of data entry was done where inconsistencies and abnormal entries were detected. A frequency print-out of all variables was done and abnormal or missing entries were traced. Guided by serial numbers all questionnaires with

abnormal entries were searched, information verified and necessary corrections made.

Data analysis for household survey was done by using the SPSS computer package. Multivariate analysis was done as well with assistance of the supervisor.

2.13 Limitations of the Study:

2.13.1 Since the scarcity of drugs in the nearest health facilities could influence people's behaviour to stock drugs at home then the bias would have been minimized if the drugs situation in health facilities were also looked at. However, this was not among the objectives of this study.

2.13.2 Due to multipartism, villages had leaders who belonged to different parties. There was a tendency for some of the ten-cell leaders who were to accompany the research team to refuse to assemble at the office of a chairman who belonged to a different political party. However, when such an event happened a village secretary escorted researchers to ten-cell leaders.

2.13.3 One of the villages studied, three months prior to this study, some village leaders had been involved in a study which gave them gifts. So there was a tendency for some of the village leaders to demand gifts before escorting the interviewer. The author explained to them that this research is part of learning and has no big funding, but the outcome of it will be more beneficial to them than the gifts. Thereafter, the leaders understood and escorted the researchers.

2.13.4 When the study was conducted some men were at work leaving their wives to be interviewed. In some households where both the man and his wife were present the wife was likely to volunteer to be interviewed than the husband. Hence interviewees were more females than males. To improve participation of males the study was also done in Saturdays and Sundays which are not working days.

2.13.5 The interviews at Mlandizi ward started two days after the drug kit had been opened at Mlandizi Health Centre. Since people from Mlandizi A and B are getting health services from this centre, more

respondents from these villages reported to get treatment from public health facility.

CHAPTER 3

3.0 RESULTS:

A total of 1000 households were included in the study. This was 108% of the estimated sample size. This was a result of multiple tenancy and some ten cell-leaders having more than the estimated 10 households.

Table No. 1: Profile of Interviewed People

HEADS OF HOUSEHOLDS:

CHARACTER	RANGE	MEAN	MEDIAN	STD DEVIATION
Age (years)	17 - 90	37.1	35.0	15.0
Household size	1 - 20	5.0	5.0	2.8
Distance to nearest H/facility (Km)	0.25 - 10	2.7	2.0	2.2

Table No. 1 above shows that people who were interviewed ranged between 17 and 90 years of age. It also shows that the household size ranged from 1 to 20 members.

The same table No. 1 shows that most of sample population did live within a walking distance .

Table 2: Distribution of Head of Households by Age and Sex

AGE GROUP (YEARS)	SEX				TOTAL	
	MALE		FEMALE			
	No	(%)	No	(%)	No	(%)
16 - 30	86	(19.2)	362	(80.8)	448	(44.8)
31 - 45	106	(34.8)	199	(65.2)	305	(30.5)
46 - 60	86	(52.4)	78	(47.6)	164	(16.4)
61+	41	(49.4)	42	(50.6)	83	(8.3)
Total	319	(31.9)	681	(68.1)	1000	(100.0)

Table No. 2 above shows that majority of respondents were females 68% and were less than 46 years of age 75.3%.

Table No. 3: Characteristics of Heads of Households

		NO	%
Sex:	Males	319	(31.9%)
	Females	681	(68.1%)
Education Status:	No formal education	240	(24.0%)
	Adult education	44	(4.4%)
	Primary education	646	(64.6%)
	Secondary education	54	(5.4%)
	Post secondary education	16	(1.6%)
Marital Status:	Single	130	(13.0%)
	Married	737	(73.7%)
	Divorced/separated	75	(7.5%)
	Widow/widower	58	(5.8%)
Occupations:	Peasants	687	(68.7%)
	Employees	97	(9.7%)
	Businessmen/women	91	(9.1%)
	Self employed (Carpenters, Tailors, Artisan, etc)	125	(12.5%)

Table No. 3 above shows that most of respondents were females (68.1%), married (73.7%), and peasants (68.7%).

Table No. 4: Profile of Mothers or Caretakers of Underfives:

Age:	RANGE	MEAN	MEDIAN	STD DEVIATION
	15-55	27.5	26	6.9

Education Status:

No formal education	74 (14.4%)
Adult education	21 (4.1%)
Primary education	393 (76.3%)
Secondary education	21 (4.1%)
Post secondary education	6 (1.2%)

Table No. 4 above, shows that majority of mothers (76.3%) had primary education and were young, with mean age of 27.5 years.

Table No.5: Profile of other members who were sick within the last month before the interview:

	RANGE	MEAN	MEDIAN	STD DEVIATION
Age:(years)	8 - 80	32.5	35	13.6

Education Status:	
No formal education	31 (12.5%)
Adult education	11 (4.4%)
Primary education	182 (73.4%)
Secondary education	14 (5.6%)
Post secondary education	10 (4.0%)
TOTAL:	248 (100.0%

Table No. 5 shows that majority of the members reported to be sick had primary education and had a wide range in their ages.

Other research findings not shown in a table show that, about 91.8% reported that their nearest health facility was a public facility and only 8.2% reported that the nearest health facility was a private one. About 52.3% of the

interviewed households had children below 5 years of age and about 47.7% reported to have no underfive children.

Among those who reported to have underfives, 35.6% had 1, 12.7% had 2 and 4.0% had 3.

When they were asked when they last visited a health facility for any illness episode, 55.1% reported that it was more than 6 months ago, 22.1 said it was between 2 to 5 months ago, 8.3% said it was a month ago, 6.1 % said it was between the last 2 - 3 weeks ago, while 8.4% said they sought care within the last week prior to the interview.

Most of the respondents, 83.4% reported to have visited public health facilities and only about 16.6% reported to have visited private facilities.

Table No.6: Place treatment sought in last episode of malaria by distance to nearest health facility

PLACE TREATMENT SOUGHT	DISTANCE			TOTAL
	< 3.0 Km(%)	3.0-5.9 Km.(%)	6.0+ Km(%)	No. (%)
Drug Store	8 (57.2)	3 (21.4)	3 (21.4)	14 (4.0)
Ordinary shop	175 (69.4)	47 (18.7)	30 (11.9)	252 (72.6)
Health facility/post	19 (35.9)	7 (13.2)	27 (50.9)	53 (15.3)
Home kept drugs	13 (56.5)	6 (26.1)	4 (17.4)	23 (6.6)
Others (friends)	4 (80.0)	-	1 (20.0)	5 (1.5)
Total	219 (63.1)	63 (18.2)	65 (18.7)	347 (100.0)

Table No. 6 shows that 57.2% of respondents who sought treatment from drug stores and 69.4% of those who sought treatment from ordinary shops, lived close to health facilities. Also the same table no 6, show that only 15.3% of respondents got treatment from health facility or health post, and the remaining 8% of respondents either used home stocked drugs or from other source like a friend. this implies that although health facilities are close to the people they do not have drugs always.

Keeping of antimalarial drugs at home:

Respondents were interviewed on stocking drugs at home. Out of 1000 respondents interviewed, 326 (32.6%) agreed that they have kept antimalarials at home and chloroquine tablets were the most reported drug mostly kept at home (41.9%). Table No. 7 below show the distribution of drug types stocked during the interview.

Table No. 7: Distribution of drug types found kept in households during interview

DRUG TYPE	HOUSEHOLDS	%
Chloroquine tablets	178	41.9
Chloroquine injection	35	8.2
Chloroquine syrup	44	10.4
Antipyretics (Panadol, Aspirin)	117	27.5
Septrin	21	4.9
Others	30	7.1
Total	425	100.0

Other findings (not shown in a table) indicate that, respondents were asked where they got the drugs they kept at home, most of them (80.1%) reported to have had obtained them from drug-stores, while 6.4% got them from public health facilities, 5.6% from ordinary shops, 4.8% from private health facilities and 3.2% from other sources like missionary sisters, friends etc. This implies that about 88.8% of them used money to obtain drugs.

Furthermore, when asked why they kept the drugs at home, most of them (54.2%) said it is a home stock to use when in need, while 27.7% said it is a precaution for a sickness which may happen at night, 5.2% kept them for first aid, 4.8% said health facilities were far from their homes, 4.0% said because there were no drugs in public health facilities and the remaining 4.0% gave other reasons.

It was also important to know whether stocking antimalarials in households was associated with educational status of head of household, presence of under-five children in households or household size.

Table No. 8: Proportion of households who had antimalarials by number of under-fives

HAVE ANTI-MALARIALS DRUGS	NUMBER OF UNDER-FIVES				TOTAL
	0	1	2	3	
Yes	113 (23.7%)	148 (41.6%)	52 (40..9%)	13 (32.5%)	326 (32.6%)
No	364 (76.3%)	208 (58.4%)	75 (59.1)	27 (67.5%)	674 (67.4%)
Total	477 (100%)	356 (100%)	127 (100%)	40 (100%)	1000 (100%)

From Table No. 8 above the household with no underfives were less likely to keep drugs, only 23.7% had kept drugs while households which had one child, 2 and 3 children the proportion which kept drugs was 41.6%, 40.9% and 32.5% respectively. The difference was statistically significant ($P < 0.001$). Indicating that this is not a chance variation.

Table No. 9: Proportion of households which had antimalarials by distance to the nearest health facility

HAVE ANTI-MALARIAL DRUGS	DISTANCE			TOTAL
	<3.0 km	3.0-5.9 km	6.0+ km	
Yes	204 (31.2%)	74 (41.8%)	48 (28.4%)	326 (32.6%)
No	450 (68.8%)	103 (58.2%)	121 (71.6%)	674 (67.4%)
Total	654 (100%)	177 (100%)	169 (100%)	1000 (100%)

Table No. 9 above shows that people living between 3.0-5.9 kilometres to the nearest health facility, were most likely to keep antimalarials at home while those living 6.0 kilometres or more were least likely to keep antimalarials ($P<0.025$). This indicates that the distance to a nearest health facility can influence the keeping of antimalarials and this is significant at 5% level. Those living 6.0 kilometres or more are mainly from Bokotimiza village. Majority were peasants except 6 primary school teachers. Hence not stocking drugs can be due to financial problems.

Table No. 10: Proportion of households who had antimalarials by household size

HAVE ANTI-MALARIALS DRUGS	HOUSEHOLD MEMBERS			TOTAL
	1 - 2	3 - 5	6+	
Yes	32 (18.4%)	149 (32.9%)	145 (38.9%)	326 (22.6%)
No	142 (81.6%)	304 (67.1%)	228 (61.1%)	674 (67.4%)
Total	174 (100%)	453 (100%)	373 (100%)	1000 (100%)

Table No. 10 above shows that the bigger the household size the more the likelihood of a household to stock antimalarials. Households with 1 - 2 members, about 18.4% kept antimalarials, while those with 3 - 5 and 6 or more, 32.9% and 38.9% did stock antimalarials respectively. The difference was statistically significant ($P<0.001$).
This indicates that the household size is a significant determinant of keeping antimalarials at home, and it is significant at 1% and at 5% level.

Table No. 11: Educational status of heads of households by whether households had antimalarials

EDUCATIONAL STATUS	HAVE ANTIMALARIALS		TOTAL
	YES	NO	
No formal education	48 (20%)	192 (80%)	240 (100%)
Adult education	12 (27.3%)	32 (72.7%)	44 (100%)
Primary education	232 (35.9%)	414 (64.1%)	646 (100%)
Secondary and Post Secondary education	34 (48.6%)	36 (51.4%)	557 (100%)
Total	326 (32.6%)	674 (67.4%)	1000 (100.0)

Table No. 11 above shows that people with no formal education had a low probability of keeping drugs at home (20%) and probability increased as one attained more education. The highest probability of having antimalarials was found in people of secondary and post secondary education (48.6%), while those with primary education who were the majority of sample population only, 35.9% kept antimalarials. The difference between educational status is statistically significant ($P < 0.001$.). This show that education is a variable which significantly influence keeping of

antimalarials. It is significant at 5% level and even at 1% level.

Keeping antimalarials for Under-five Children:

About 523 households reported to have had under-fives in their households, but only 515 (98.5%) of mothers or caretakers were available for interview and were asked if they usually keep drugs for their under-fives. About 267 (51.8%) agreed that they do.

Table No. 12: Age group of Mothers or Caretakers of Under-fives by whether they usually kept Drugs for their Underfives

MATERNAL AGE (YEARS)	KEEPING DRUGS		TOTAL
	YES	NO	
< 21	44 (51.2)	42 (48.8)	86
21 - 30	156 (54.4)	131 (45.6)	287
31 - 40	61 (49.6)	62 (50.4)	123
41+	6 (31.6)	13 (68.4)	19
Total	267 (51.8)	248 (48.2)	515

Table No. 12 above shows that mothers who were aged between 21 - 30 years were likely (54%) to have reported keeping drugs at home for their underfives than those from

other age groups. Also mothers with age 41 years and above were least likely to have reported to keep drugs for their under-fives. But the difference is not significant (P>0.1.). This shows that age of mother is not a significant determinant at 5% level of keeping antimalarials for underfives.

Table No.13: Educational Status of Mothers or Caretakers by whether they usually Keep Drugs for their Under-fives

EDUCATIONAL STATUS	KEEPING DRUGS		TOTAL
	YES	NO	
No formal education	28 (37.8%)	46 (62.2%)	74
Adult education	11 (52.4%)	10 (47.6%)	21
Primary education	207 (52.7%)	186 (47.3%)	393
Secondary education and Post secondary	21 (77.8%)	6 (22.2%)	27
Total	267	248	515

Table No. 13 above shows that mothers with no formal education (38%) were least likely to report to have been keeping drugs for their underfives, while mothers with secondary and post-secondary education (78%) were most likely

to report to have been keeping drugs for their underfives. The difference is statistically significant ($P < 0.025$). This showed that education status of mother is a significant determinant at 5% level of keeping antimalarials for their underfives.

Mothers were asked to mention symptoms seen in children which prompt them to keep drugs at home. Fever was the symptom mentioned by most mothers, where out of 267 mothers who reported to keep drugs, 93.6% mentioned fever, while vomiting was mentioned by 23.6%, cough by 22.5%, diarrhoea by 15.0% and 10.5% mentioned other symptoms like body weakness, failure to suck and twitches.

For drugs which they usually kept for their children, chloroquine syrup was the most reported drug for it was kept by 221 out of 267 (82.8%), followed by paracetamol syrup which was mentioned by 128 (47.9%), Septrin syrup by 62 (23.2%), cough syrup by 39 (14.6%), chloroquine injections by 18 (6.7% and others like Ampicillin syrup, eye ointment etc mentioned by 30 (11.2%).

Most of those drugs were obtained from drug-stores 90.4% while 2.9% of drugs were from ordinary shops, 2.6% from private dispensaries, 2.2% from public dispensaries and 1.8% drugs obtained from other sources like Missionary Sisters.

Mothers were as well asked if they got instructions from the seller on how to use the drugs, about 96.1% said they were given instructions and only 3.9% said they were not given instructions on how to use the drugs.

Duration of storage of Drugs:

Since drugs kept at home are likely to expire unnoticed due to poor storage facilities and ignorance, the respondents were asked to mention how long they had kept those drugs and the places the drugs were kept.

Table No. 14: Where drugs were kept by duration of storage

PLACE OF STORAGE	STORAGE DURATION					
	1 WEEK	2-3 WEEKS	4 WEEKS	OVER 4 WEEKS	TOTAL	%
Cupboard/wardrobe	18	19	5	6	48	19.2
On the table	17	19	7	7	50	20.1
In a drawer of the table	9	6	4	0	19	7.6
In a tin with a lid	15	16	14	7	52	20.9
In a plastic bag	17	3	3	2	25	10.0
Others	17	25	10	3	55	22.1
Total	93	88	43	25	249	
%	(37.3%)	(35.3%)	(17.3%)	(10%)		

Table No. 14 above shows that about 37.3% of respondents reported to had kept drugs for one week, while 35.3% of respondents kept for 2-3 weeks, 17.3% of respondents kept for 4 weeks and 10% of respondents kept for more than 4 weeks. This implies that about 27.3% of respondents kept their drugs for a month or longer thus bringing doubt to their potency.

Also it is shown that tins, tables and cupboards are the places where drugs were likely to be kept, whereby 20.9%, 20.1% and 11.2% of drugs were reported to be kept in or on them respectively.

Storage of underfive drugs:

Drugs for under-fives were reported to be stored for a period which ranged from 1 week to 24 weeks. Mean duration of 2 weeks and 2 days, Median 2 weeks with a standard deviation of 2.4.

Table No. 15: Educational status of mother or caretakers by duration of storage of underfives' drugs

EDUCATION OF MOTHERS	DURATION STORED				
	1 WEEK	2-4 WEEKS	5-8 WEEKS	>8 WEEKS	TOTAL
No formal education	5	10	2		17
Adult education	6	4			10
Primary education	57	92	2	5	156
Secondary education	8	7			15
Post secondary education	2	1			3
Total	78	114	4	5	201
Percent	38.8%	56.7%	2.0%	2.5%	100%

Table No. 15 above shows that only 39% of mothers reported to had kept drugs for a week. Since in most cases under-fives children use drugs in form of syrup, then 61% of the mothers who reported to store drugs for more than one week were likely to give their children drugs which had lost potency. Also from the same Table No. 15 mothers with secondary or post-secondary education were less likely to store drugs beyond 4 weeks.

Ability to Pay for Malaria Treatment:

Public rural health centres and public dispensaries were providing free medical services except Kibaha district hospital which charged patients for consultation and medicines. However due to scarcity of drugs people reported to buy drugs from other sources after getting a prescription from a Public health facility. Thus, respondents were asked when there were no free medicines from public health services could they afford to pay for malaria treatment in private dispensaries. Only 53.5% agreed that they could afford while 46.5% said they could not (Not in a table).

Those who said that they were not able to pay for private treatment were asked what they do when they become ill or when one of the household member falls sick, 72.0% answered that they will take prescription from public health

facilities and buy drugs in a drug store or an ordinary shop, 16.9% said they would seek assistance or loan to buy drugs, 6.5% said they could just stay at home and wait for the natural process, 3.3% reported to take local herbs while 1.3% said they would wait for the Roman Catholic Sisters who give them free drugs every Sunday.

Self Medication:

Respondents were asked if they buy antimalarial for home treatment prior to seeking health care from health facilities. Findings which are not tabulated showed that most of them, 65.7%, agreed that they do, while 34.3% said they do not. Regarding the place where they buy drugs, 79.7% said they buy drugs from drug-stores, 19.7% from ordinary shops, 0.2% from health personnel while 0.5% reported other sources like Missionary Sisters, etc.

Different types of antimalarials were used for self-medication but chloroquine was the drug reported by most respondents. Of those who reported to be self medicating, 51.7% reported to be using chloroquine. This is shown in Table No. 16 below.

Table No. 16: Drugs respondents reported to be bought for self-medication of malaria by sex.

DRUG TYPE	SEX		TOTAL (%)
	Male (%)	Female (%)	
Chloroquine	268 (45.5%)	321 (54.5%)	589 (57.4%)
Panadol/Asprin	102 (33.8%)	200 (66.2%)	302 (29.4%)
Septrin	25 (55.6%)	20 (44.4%)	45 (4.4%)
Quinine	31 (75.6%)	10 (24.4%)	41 (4.0%)
Fansidar/ Metakelfin	21 (58.3%)	15 (41.7%)	36 (3.5%)
Others (Halfan, Comaquine	10 (79.9%)	3 (20.1%)	13 (1.3%)
Total	450 (43.9%)	576 (56.1%)	1026 (100%)

Table No. 16 above shows that chloroquine was the most (57.4%) reported antimalarial drug used for self medication than others. Also Quinine and other recent antimalarials like Halfan, were most reported by males (79.9%) than females.

Table No. 17: Symptoms which drove people to self medicate for malarial by sex

SYMPTOM	SEX		TOTAL (%)
	Male (%)	Female (%)	
Fever	221 (38.6%)	352 (61.4%)	573 (40.3%)
Headache	129 (41.9%)	179 (58.1%)	308 (21.6%)
Joint pains	103 (37.7%)	170 (62.3%)	273 (19.6%)
Vomiting	44 (38.6%)	70 (61.4%)	114 (8.0%)
Nausea	5 (33.3%)	10 (66.7%)	15 (1.1%)
Others	60 (43%)	80 (57%)	140 (9.8%)
Total	562 (39.5%)	861 (60.5%)	1423 (100%)

NB: Total of symptoms exceeds number of respondents as one person could mention more than one symptom.

Table No. 17 above show fever was the most (40.3%)mentioned symptom which induce people to buy antimalarials. Other symptoms mentioned include body weakness, chills, loss of appetite, dizziness and failure to play with other children.

Most people (95.8%) mentioned the subsiding of the symptoms as a sign of recovery while 2.8% said they check their blood in laboratory after taking all drugs they bought.

Unavailability of Drugs for Underfives in Health Facilities:

Mothers were asked to report if there was a situation where their sick children were taken to public health facilities and did not get the prescribed medicines from those health facilities. Most of them, 88.5% reported that there were times when they never got the drugs. When asked what actions they usually take when they miss drugs, 93.0% reported to obtain prescriptions and buy drugs from drugs-stores, while 2% said they take their children to private dispensaries, 4.4% reported that they just return home and wait for natural course of disease and 0.7% reported to wait for Missionary Sisters from Dar es Salaam.

Dose of Chloroquine for Under-fives:

When asked on the dose of chloroquine for under-fives, only 27.6% said that it depends on the child's weight and 3.5% said they give what a medical personnel prescribes, while 68.9% answered either they do not know or gave answers which also indicated that they do not know the right dose. Mothers were asked to mention the body weight of their underfives and later the weights were verified by looking at their MCH cards. Mothers were asked also how much chloroquine they gave their underfives and how they gave it. The amount of chloroquine which was reported to be given was

compared with the child's weight and decided whether was the right dose or not. A teaspoonful of chloroquine syrup was regarded as 5 millilitres which contains 50 milligramme of chloroquine base. Also a table spoonful of chloroquine syrup was regarded as 10 millilitres which contains 100 milligramme of chloroquine base. It was found that (not shown in a table) 35 mothers (6.8%) did not know the weight of their underfives. Only 124 mothers (24.1%) reported to give correct dose of chloroquine according to weight of the child. Also 113 mothers (21.9%) reported to give underdose, 110 mothers (21.5%) reported that they do not know what they give, 105 mothers (20.4%) reported to give tea spoon or spoonful more than once per day schedule, and 28 mothers (5.5%) reported to give overdose according to the body weight of their children. These findings indicate that majority of mothers (76%) are likely to give their underfives wrong doses of chloroquine.

Other Member who was sick within the last month prior to survey:

There were 249 members who were sick within last one month and out of them 135 (54.2%) mentioned 3 or more correct symptoms of malaria while 114 (45.8%) mentioned less than 3 symptoms. The highest number of symptoms and signs mentioned

was 7. People with higher educational status were found to know more symptoms and signs than those with low or no formal education as shown in Table No. 18 below.

There were 10 symptoms and signs of malaria which were mentioned by respondents. These were fever, joint pains, headache, nausea, vomiting, body weakness, twitching, chills, loss of appetite and dizziness.

Those who mentioned three or more symptoms and signs were assumed to know the signs and symptoms of malaria while those who mentioned less than three symptoms belong to the category don't know.

Table No. 18: Educational Status of the household members who reported to have been sick in the last month by Knowledge of Symptoms of Malaria

EDUCATIONAL STATUS	KNOWING SYMPTOMS		TOTAL
	DON'T KNOW	KNOW	
No formal education	19 (61.3%)	12 (38.7%)	31
Adult education	6 (54.5%)	5 (45.5%)	11
Primary education	82 (45.1%)	100 (54.9%)	182
Secondary education	4 (28.6%)	10 (71.4%)	14
Post secondary education	3 (30%)	7 (70%)	10
Total	114	134	248

According to the definition of those who know and those who do not shown on page 70, the above categorises the responses as those who knew and those who did not know symptoms.

Those members who reported to have been sick in the last month prior to the interview were asked to mention which antimalarial drugs they knew. Eight types of antimalarials were mentioned. Chloroquine was the drug mentioned by 237 people out of 249 (95.2%), followed by quinine mentioned by

55 (22.1%), Fansidar by 38 (15.3%), Metakelfin by 31 (12.4%), Septrin by 26 (10.4%), Camoquine (Amodiaquine) by 13 (5.2%), Halfan (Halofantrine chloride) by 6 (2.4%) and Mefloquine by 1 person (0.4%). (Not shown in a table).

Since chloroquine was the most known and most used drug, respondents were also asked to mention the adult dose of chloroquine, 73.7% mentioned correct dose while 26.3% reported an incorrect dose. They were also asked to mention the place where they sought treatment during their last episode of malaria. Most of them reported to seek treatment from drug-stores (42.6%) and public health facilities (39.4%). The remaining sought treatment from private dispensaries 11.2%, ordinary shops 5.6% and home kept drugs 1.2% (Findings not in a table).

The respondents were asked if they got the required complete dose, 85.5% said they got a complete dose while 14.5% reported that they did not. Those who did not get a complete dose mentioned different reasons as to why they did not get the correct dose (Table No. 19).

Table No.19: Reasons for not obtaining a complete dose by where antimalarials were obtained

REASON	WHERE ANTIMALARIALS OBTAINED				TOTAL (%)
	PUHF	PRHF	OS	HS	
Scarcity of drugs in public dispensary	13 (92.9%)	0	0	0	13 (36.1%)
Home stock had few drugs	0	0	0	10 (100%)	10 (27.8%)
Insufficient money to buy whole dose	0	0	5 (50%)	0	5 (13.9%)
I got injection only	1 (7.1%)	1 (50%)	0	0	2 (5.6%)
I bought few and fever disappeared	0	0	2 (20%)	0	2 (5.6%)
Others: -I don't know the dose	0	1 (50%)	3 (30%)	0	4 (11.1%)
-Few drugs in shops, etc					
Total	14 (38.9%)	2 (5.6%)	10 (27.8%)	10 (27.8%)	36 (100%)

KEY: PUHF = Public Health Facility
PRHF = Private Health Facility
OS = Ordinary Shop
HS = Home Stock

Table No. 19 above shows that public health facilities are the commonest reported place (38.9%) where respondents got insufficient dose of antimalarials. They are followed by ordinary shops and home stock reported by 27.8% and 27.8% respectively. Private health facilities were the least reported places (5.6%) where people obtained insufficient dose. Also scarcity of drugs in public health facilities was the reason reported most (36.1%), for not obtaining a complete dose of antimalarials.

Household members who reported that they had malaria in the last month prior to the interview were asked to mention the type and number of antimalarials they used to treat their malaria. Out of 249, 124 (49.8%) reported to had used chloroquine dose correctly while 74 (29.7%) said they used chloroquine under-dose, 61 (24.5%) said they combined with antipyretics (either Panadol or Aspirin), 26 (10.4%) said they used Fansidar or Metakelfin, 16 (6.4%) said they used Quinine and the other 16 (6.4%) said they used other antimalarials like Camoquine, Halfan, Septrin. Majority, 203 (81.5%) reported to have had finished the drugs given while 18.5% said they did not finish. For those who did not finish the course, 45.7% gave the reason that they used chloroquine injection and the vial remained, 39.1% they felt better before finishing drugs hence kept the remaining drugs, while

10.9% were still taking the drugs and 4.3% stopped using the drug because of side effects like blurred vision, palpitations etc (Not shown in a table).

Regarding places where these remaining drugs were kept, most of them were stored on the table and in cupboard, 27.1% and 22.9% respectively.

Table No.20: Places where the remaining drugs were kept by respondents knowledge of expiry dates of the drugs

WHERE DRUGS ARE KEPT	KNOWLEDGE OF EXPIRY DATES		
	Yes (%)	No (%)	Total (%)
In cupboard/wardrobe	5 (38.5)	8 (61.5)	13 (27.1)
On the table	6 (46.2)	7 (53.8)	13 (27.1)
Drawer of the table	1 (33.5)	2 (66.7)	3 (6.3)
In a tin	4 (66.7)	2 (33.3)	6 (12.5)
In plastic bag	0	4 (100.0)	4 (8.3)
Others (coat)	1 (11.1)	8 (88.9)	9 (18.8)
Total	17 (35.4)	31 (64.6)	48(100.0)

Table No. 20 above, shows that only 35.4% of those who kept the remaining drugs knew the expiring dates of their drugs. Also those who knew expiry dates of their drugs were

likely to keep drugs secure in a tin 4 out of 17 (23.5%) than those who did not, 2 out of 31 (6.5%).

Awareness of Expiry Dates of Drugs:

Household members who reported to be sick within the last month were asked if they were told about the expiry dates of the drugs they were given. Only 14.6% reported that they were told and 85.4% said that they were not told.

Table No. 21: Places where the respondents reported to have got treatment by whether they were told that drugs may expire

WHERE GOT DRUGS	TOLD EXPIRY OF DRUGS		
	Yes (%)	No (%)	Total (%)
Health facility	21 (18.6%)	92 (81.4%)	113 (45.7%)
Drug store	15 (14.3%)	90 (85.7%)	105 (42.5%)
Ordinary shop	0	20 (100%)	20 (8.1%)
Home kept drugs	0	3 (100%)	3 (1.2%)
Friend/relative	0	6 (100%)	6 (2.4%)
Total	36 (14.6%)	211 (85.4%)	247 (100.0)

Table No. 21 above shows that those interviewees who got their drugs from health facilities and drug stores had a higher chance of being told about the expiry dates of their

drugs than those who got them from other sources. Also, only 17.6% of them said they knew about expiring dates of their drugs although they were not told by the dispenser, however, 82.4% said they did not. Those who knew the expiry dates of their drugs were also asked the sources of their information. About 90% said they read the label, while some could not mention the source, 7.5% said drugs loose potency on the day the dose ends and, 2.5% said it is when they recover from the disease when they know that the drug is potent.

Those who did not know the expiry dates of their drugs were asked if they thought it was important to know the expiry dates, and 80.4% replied that it was, while 19.6% said it was not.

Those who said it was important were asked why they thought so. About 42.4% said expired drugs can not cure a disease, 33.3% said expired drugs can be poisonous, while 24.2% said it is important to know so that they use potent drugs which can cure the disease.

Those who said it is not important to know the expiry dates were also asked why they thought so. About 41.0% responded that they were not told by the medical personnel that it was important to know expiry dates, 23.1% said they were not medical personnel to know expiry dates of drugs while 20.5% said they did not know and the remaining 15.4%

said drug-sellers are the experts and are the ones who are supposed to know.

Table No. 22: Education status of other member reported to be sick within the last one month by knowledge of expiry dates of drugs

EDUCATION STATUS	KNOWLEDGE		TOTAL (%)
	Yes	No	
Informal education	2 (6.7%)	28 (93.3%)	30 (12.4%)
Adult education	1 (9.1%)	10 (90.9%)	11 (4.5%)
Primary education	31(17.5%)	143(82.5%)	174(71.9%)
Secondary education	4(28.6%)	10(71.4%)	14 (5.8%)
Post Secondary education	4(30.8%)	9(64.3%)	13 (5.4%)
Total	42(17.4%)	200(82.6%)	242 (100%)

(7 Household members not asked were below 15 years of age)

Table No. 22 above shows only 17.4% reported to know expiry dates of their drugs. Also respondents with no formal education were less likely to report to know expiry dates than those with education. The probability increases as one attained more education but the difference was not statistically significant at 5% level ($P > 0.05$).

Drug-Sellers Prescribing Habits:

About 59 drug-sellers were interviewed and evaluated. These are persons selling medicines in either Class I Pharmacy, Class II Pharmacy or Ordinary shops which sells drugs over the counter.

Class I and Class II Pharmacies have been referred to as Drug Stores in this study.

Table No. 23: Profile of Drug Sellers

		RANGE	MEAN	MEDIAN	STD DEVIATION	
Age(years):		14-55	24.3	20	9.7	
					NO	(%)
Sex:	Males				38	(64.8%)
	Females				21	(35.2%)
Educational Status:						
	No formal education				1	(1.7%)
	Adult education				4	(6.8%)
	Primary education				46	(78.0%)
	Secondary education				6	(10.2%)
	Post secondary education				2	(3.4%)

Table No 23 above shows that majority of drug sellers were males (64.8%) and were young with mean age of 24.3 years. Majority of drug sellers had primary education.

Drug sellers performance.

Seven clients who visited the drug-stores got correct doses of antimalarials needed except one client who wanted Camoquine from a pharmacy and got only 3 tablets instead of 8(3 on first and second days and 2 on third day). This was what the manufacturer recommended to be taken, 3 as a single dose.

Out of 59 clients, 57 who were given chloroquine to treat malaria, i.e 96.6% only 2 were given Panadol (3.4%), and 1 (1.7%) was given Piriton to control itching though instructions on how to use Piriton was incorrect. He was not told to take Piriton half an hour before Chloroquine. The other two were given Metakelfin and Camoquine 3 each. Those who received chloroquine were given different amount of tablets and different treatment schedules.

Table No. 24: Distribution of Chloroquine Regimen as Prescribed by Drug-sellers

TYPE OF SHOP	AMOUNT	AMOUNT/ DOSE	DOSES PER DAY	TOTAL DAYS	CLIENTS	%
Ordinary	12	4	4/2/2/2/2	4	1	1.8
Shops	10	4	4/2/2/2	3	8	14.0
	10	4	4/4/2	3	15	26.3
	8	4	4/4	2	1	1.8
	8	2	2x2	2	1	1.8
	8	4	4/2/2	3	2	3.5
	6	4	4/2	2	4	7.0
	4	4	4	1	4	7.0
	2	2	2	1	13	22.8
	8	4	4/2/2	1	1	1.8
	4	2	2x2	1	1	1.8
Drug Stores	10	4	4/4/2	3	6	10.5
Total	NA	NA	NA	NA	57	100%

NA = Not applicable.

Table No 24 above shows that out of 57 clients who got chloroquine only 30 got correct amounts of an adult dose i.e. 52.6%. Those who got under-dose 13 (22.8%) were given only 2 tablets, 5 (8.8%) were given 4, another 5 (8.8%) were given 8 tablets and the last 4 (7.0%) were given 6 tablets.

The amount of antimalarials to be given was decided by drug-seller and clients were only requested to ask for a full dose which will cure malaria so as to test if the drug-sellers knew the dose of chloroquine.

Chloroquine brands of Dawaquine, Malaraquine and Homaquine are imported from abroad where they are produced, therefore the treatment schedule written on the boxes and packets is that what is practiced in those countries, that is 4 tablets first day followed by 2 after 6 hours then 2 on second and third day respectively. However, there is an extra instruction for Homaquine which says another 2 tablets should be taken on the fourth day hence making a total of 12 tablets.

Other findings which are not tabulated, out of 57 drug-sellers who sold chloroquine only 14 (24.6%) asked their clients if they wanted a full dose or otherwise, and 2 (3.5%) asked what types of antimalarial they wanted. However, those who were not asked requested to be given full adult dose,

except 2 clients who said they had only 200 shillings which was enough for only 6 tablets hence got 6 tablets each.

The instructions from drug-sellers to client was recorded and assessed on whether it was appropriate. Out of 59 drug-sellers 3 (5%) did not give any instructions to their clients, while 25 (42.4%) sellers of ordinary shops gave wrong instructions or information to their clients. Despite giving under-dose, two told their clients to use Aspirin with Chloroquine to prevent itching, one was recorded to be saying taking 4 tablets of chloroquine or 2 tablets of chloroquine and 2 Aspirin gives similar effect.

Another drug-seller said if one takes 4 chloroquine tablets he or she will be able to cure malaria but with Dawaquine (sugar coated chloroquine) only 2 tablets are enough. Finally instructions given to clients, were analysed whether it was correct or otherwise and only 19 (32.2%) of drug-sellers gave correct information to their clients while 12 (20.3%) gave inadequate information or another country's schedule. 9 (15.3 %) advised their clients to take other country's schedule while 1 failed to advice on how to control itching (Not shown in a table).

MULTIVARIATE ANALYSIS:

Multivariate logistic regression model was done using the household survey data. From the previous tables (No 8 - 11) it has been shown that stocking of antimalarials in households is related to household size, number of underfives in households, distance to the nearest health facility and educational status of the head of household. The objective for this regression analysis is to find out which one among the factors gives a highest probabilities of stocking antimalarials in a household when other factors are controlled.

Keeping antimalarials at home is the dependent variable used in this model. Independent variables that are used are those that have been found to influence decision to keep antimalarials at home. Demographic characteristics such as age, sex, number of years of formal education are also included as independent variables. Employment status, household size, number of underfives in households and distance to the nearest health facility were also included.

A step-wise logistic regression analysis was done using STATA software package. The model formula used is:

$$\ln\left(\frac{P}{1-P}\right) = a + b1Age + b2Sex + b3Fsize + b4Emplo + b5Edct + b6Distan + Under5$$

where p = Probability of keeping antimalarials at home.

1-p = The probability of not keeping antimalarials at home.

a = Constant

Explanation of variables used

HAVE DRUGS: 1. Yes

0. No

EDUCATION: 1. Less than 9 years of formal education

0. 9 or more years of formal education

FAMILY SIZE: Number of household members

EMPLOYMENT: 1. Employed

0. Otherwise

UNDERFIVES: Number of underfives in households.

DISTANCE: Distance to the nearest health facility.

AGE: Age of head of household.

SEX: 1. Male

0. Female

RESULTS OF THE HOUSEHOLD MODEL

TABLE NO. 25: Multivariate results

Logit estimates

Number of observations = 983

Chi-square (7) = 52.50

P. value = 0.0000

Log likelihood 590.29418

HAVE DRUGS	ODDS RATIO	STD ERROR	t	P.VALUE
AGE	0.9861346	0.0055914	-2.462	0.014*
SEX	1.171381	0.1905824	0.972	0.331
F/SIZE	1.114996	0.0303984	3.993	0.000*
EMPLO	1.635195	0.3836924	2.096	0.036*
EDUCT	0.5579887	0.1493349	-2.180	0.029*
DISTAN	1.015886	0.0379254	0.422	0.679
UNDER5	1.22018	0.1090671	2.226	0.026 *

* = Significant at 5% level.

Table No. 25 above shows that older heads of households have a lower probability of keeping antimalarials than young ones. Males are shown to have a higher probability of keeping antimalarials at home by 17% than females but the difference is not statistically significant (P = 0.331). The bigger the household size the higher is the probability of keeping the antimalarials at home. The parameter is highly significant (P.value = 0.000).

Table No 26 also shows that the person who is employed has higher chances of keeping antimalarials than others by 63% and the difference is statistically significant (P = 0.036).

The person who has less than 9 years of formal education has less chances of keeping antimalarials at home than one who has 9 or more years of formal education by 56% (P = 0.029). Employment could be correlated with education status as respondents with 9 or more years of formal education are likely to be employed. However, employment has an added advantage of having a regular income to an educated person enabling the person to buy drugs for keeping at home. The table show odds ratio for employment is 1.635 while for education status is 0.558. This indicates that employment gives higher probability of keeping drugs at home than education without education. The table also show that the

distance to the nearest health facility appears to influence keeping of antimalarials through those living close to health facilities have less chances of keeping antimalarials. However the finding is not statistically significant (P value = 0.673). This means that the distance to a nearest health facility is not a determinant of keeping antimalarials in households. Presence of underfives also do influence keeping of antimalarials, the higher the number of underfives the higher the probability of keeping antimalarials in a household(P = 0.026).

It further shows that the highest probability of keeping antimalarials is found in households with many household members.(P = 0.000).

CHAPTER 4

4.0 DISCUSSION:

The results of this study have shown that most people live within reach of a health facility. The mean distance to the nearest health facility was 2.7 kilometres while 83.1% of households were within 5 kilometres to the nearest health facility. About 91.8% of the households, their nearest health facility was a public one.

The study found that majority of antimalarials used within households do not come from public health facilities. While only 6.4% of drugs found in households came from public health facilities, 85.7% of drugs were bought from drug stores and ordinary shops and 4.8% came from private dispensaries. This indicates that, although public health facilities are within reach to most of the respondents, these facilities do not have drugs most of the time. All 5 villages/township visited for interview had ordinary shops selling chloroquine tablets of various trade names and 3 of them had drug-stores which sold other antimalarial types. The study done in Dar es Salaam (Mlavwasi, 1994) found that, only 26% of stocked drugs came from public health facilities while the biggest share (33.6%) came from private hospitals

or dispensaries. Pharmacies, medical stores and ordinary shops contributed 30.4% of stocked drugs.

Households with under-five children were expected to stock more antimalarial drugs than those without, because children get more frequent attacks of malaria per year than adults due to lower immunity (Manson's et al, 1987) hence, that explain why there is a need to reserve drugs to be used when those attacks happen. It has been shown that not only households with under-five children stock antimalarial drugs than those without but even those with more children have a higher probability of stocking drugs than those with few children. Households with fewer members were found to have low probability of stocking drugs than houses with a bigger number of members. While households with 1 - 2 members only 18.4% kept antimalarials, 32.9 of those with 3 - 5 members kept the drugs, and 38.9 of those with 6 members also did. Other things being equal, the probability of having a sick member in a household increases as the number of members increases. Assuming drugs are not always available in public health facilities households with more members will be tempted to keep drugs than those with fewer members.

The probability of stocking varied with educational status. Respondents with no formal education had less probability of storing antimalarials than those with formal

education. Likewise the probability of keeping antimalarials increased with education. While those with no formal education only 20% kept drugs, 27.3% of those with adult education, 35.9% of those with primary education and 98.6% of those with secondary and post secondary education also kept drugs. People with more education are easily exposed to various health information including treatment of malaria. Kayisire found that in Bagamoyo educational status was a significant predictor of positive perception of malaria. People with more years of education were likely to take more precautions for their health than those without education (Kayisire, 1991).

Not only orally administered drugs were found to be homely stored but also injectables. Chloroquine injection bottles constituted 8.2% of the drugs kept. Mlavwasi also found in Kinondoni, Dar es Salaam that, 6.2% of stocked medicinal drugs were injectables and most of them were chloroquine (Mlavwasi, 1994). In some other areas many injectables were reserved for children. In some households they were for adults with a belief that chloroquine injection cure faster than tablets (Wyatt, 1984). Some respondents agreed that sometimes they used their injectables for treatments outside health premises. This increases the risk

of introducing infection as observed by Wyatt regarding popularity of injections in the third world (Wyatt, 1984).

4.1 Storage of household drugs:

The way drugs are stored in drugs-stores, hospitals and at homes can influence the potency of drugs. Each drug has its optimal temperature, light and moisture in order to become potent after a certain duration. Many drugs are destroyed by direct light and require protection (MOH/UNICEF 1988). In this study only 36.5% of drugs were found to be stored in secure closed places (tins, wardrobe, drawer). As it was reported in Kinondoni, Dar es Salaam, one third of drugs were found to be stored in closed places (Mlavwasi, 1994). This means that a large number of drugs kept at home are likely to be destroyed by either heat, light or moisture before they could be used. Furthermore storing drugs for longer period than is required could result into production of toxic degradation products, reduce therapeutic potency and development of resistance to pathogens (Kiyingi, et al, 1993). About 42% of drugs in this study were stored for a month or more and, it is known that in malaria treatment only quinine treatment can continue for a week or two (Manson Bahr et al, 1987). Since drugs kept for too long are likely to loose potency, antimalarials stored for a long period may

fail to clear malaria parasites and lead to the development of drug resistant strains.

4.2 Storage of Drugs for Under-fives:

Most of the drugs stocked were syrup and few injectables which usually loose potency after 14 days of first opening of the sealed bottle. Although mean duration of storage of drugs for under-five encountered was 16 days, about 25.2% of drugs were stored for 3 weeks and above while 2% stayed for more than 3 months. Such drugs are expected to do more harm than cure a child when used because it introduces toxic products to the child or delays cure hence risking the development of other complications of malaria like anaemia or even death.

4.3 Reasons for obtaining and storing drugs at home:

Most of the respondents said they obtain drugs they stored for self-treatment or their children. About 82% kept drugs for emergency purposes, treating themselves or their children when they happen to fall sick. This indicates that people do expect to have malaria attack any time and they may start on home treatment before going to a health facility. Trostle observed this as well (Trostle, 1988).

4.4 Ability to pay for malaria treatment:

It was found that most of the respondents who did not get medicines from a public health facility obtained antimalarials from drug stores (72.6%) rather than ordinary shops (15.3%). This could be attributed partly to the fact that Chloroquine sold in drug stores were of non proprietary names while that of ordinary shops were that of various trade names which were more expensive. (Author's observation) Another explanation is that most of them had prescriptions from public health facilities hence instructed to buy drugs from drug stores. About 53.5% of respondents in this study agreed that they could afford to pay for malaria treatment while 46.5% said they could not. This figure is higher than that found by Hussein in Dar es Salaam region, where only 30% of the population reported that they could afford to pay for medical services (Hussein, 1995).

This can be explained by the fact that, majority of patients in this study got a prescription after having a consultation and sometimes with investigations were done in public health facilities before purchasing the drugs. This is relatively cheaper than visiting a private health facility.

4.5 Self medication:

In this study majority of respondents 65.7% agreed that they buy drugs for home treatment prior to visiting health facilities. This is self medication. A study done in Riyadh, Saudi Arabia found that more than 58% of all interviewed patients practiced self medication (Saeed, 1988). This indicated that self medication is not only a problem along the Coast of Tanzania, but a problem in other developing countries too. It was found in this study that health workers were not a likely source (0.2%) of medication people use for self medication. Scarcity of drugs in public health facilities can be a reason of this finding.

Malaria accounts for a higher percentage of hospital attendance (morbidity) and mortality. Fever is among the major symptoms of malaria (Mansons et al 1987), therefore it is not surprising that every fever was considered to be malaria by most respondents (87.2%) who practiced self medication. About 89.6% of the respondents mentioned chloroquine as the mostly used antimalarial for self medication. But other antimalarials were also reported to be stocked or used by the respondents, this shows that although chloroquine is the commonly used drug, other antimalarials are also used for self medication. Some of the consequences of such practices are that, the drugs may be used against the

Standard treatment guidelines and Essential Drugs list (Standard treatment guidelines and Essential Drug list, 1991). The outcome may be resistance to drugs which have been reserved as a second line or third line treatment drugs.

4.5 Treatment of Malaria to Under-five Children:

About 52% of mothers or female guardians kept drugs for their children, indicating that majority of the mothers do keep drugs at home for their children to use when they fall sick. Early motherhood was thought to be associated with low education due to drop out from schools. Although age of mothers of underfives ranged from 15 to 55 years, age of the mother was not found to be a determinant of whether to keep drugs for a child or not.

When it came to mothers education in relation to keeping drugs for their children, it was found that mothers with lower educational status were less likely to keep drugs than those with higher educational status. Mothers who are more educated could have more information including health education, hence they know the importance of early diagnosis and treatment of diseases in children.

Fever was the most prevalent symptom (93.6%) which induced mothers to keep drugs for their children. As in the case of adults most of these drugs were obtained from

pharmacies or drug-stores 90.4% while 2.9% from ordinary shops, 2.6% from private dispensaries and only 2.2% from public health facilities. This show that although underfives are exempted from cost-sharing in Public health facilities in Tanzania only few children get free treatment.

Although majority of mothers, 96.1% did get information on how to use these drugs when they were obtaining them. About 80% of mothers were found to give wrong doses of chloroquine to their children indicating that they could have been given wrong information, or they did not understand the information that were given.

4.6 Chloroquine dosage for underfives:

Among mothers who obtained prescriptions from Public health facilities and bought drugs from drug-stores, only 31.1% knew the dose of chloroquine for underfive. However, only 18.6% of mothers gave their children correct dose. Taking into consideration those who were instructed by nurses, only 23.3% of mothers gave correct dose to their under-fives, while 21.9%% were found to give under-dose and 20.4% of mothers gave their children in wrong schedule. Worse still 22.1% of mothers did not know what dose of chloroquine they gave their children and others either did not know their children's weight or gave over-dose. These

findings tell us that home treatment of malaria in under-fives could be inadequate, irregular and sometimes improper.

4.7 Chloroquine Dosage for Adults:

Although malaria treatment using chloroquine is common and the treatment schedule is widely spoken, only about 54.2% of interviewees knew at least three symptoms and signs of malaria which is slight lower that what was found by Kayisire (63.8%) at Bagamoyo; the same region and neighbouring district (Kayisire, 1991).

Since fever, headache and joint pains are the commonest symptoms of malaria in adults and were mentioned by majority of people, we can assume that majority of respondents knew the symptoms of malaria.

In rural areas chloroquine is the drug which is mostly available in dispensaries and in ordinary shops and is also a drug of first choice (National Essential Drugs List, 1990). This study confirms that it is the most widely used drug even for home treatments and most of the adults (74%) used it correctly.

The scarcity of drugs in the public dispensaries induced people to stock and use drugs at home. The ability to pay for drugs at the time of illness from pharmacies is another reason behind the stocking and use of drugs at home. Hence

some of the respondents reported to use insufficient dose due to lack of enough money.

The study also show that a substantial number of people do not complete the doses of drugs prescribed or bought for a malaria episode because symptoms subside earlier. This is partial treatment and is likely to result into development of chloroquine resistant parasites as was found by Giboda (Giboda et al, 1992).

4.7 Awareness of Expiry Dates of Drugs:

The expiry dates of the drugs is important and should be known by the consumers in order to be sure that the drugs one is taking are potent.

In this study only 17.6% knew the expiry dates of their drugs and those who knew the expiry dates of their drugs knew by reading the label on the bottle or packet. However, even majority of those who did not know the expiry dates were eager to know them. Some of the respondents doubted if all drug sellers observed expiry dates and communicate this to their customers. For example, if the original tin from which tablets were taken had its expiry date over, drug-seller might not tell. The antimalarials in packets have printed expiry dates but these are expensive. While 10 tablets of non propriatory chloroquine cost 100 Tanzanian shillings the

same 10 tablets of Malaraquine or Shelyquine cost 400 Tanzanian shillings (Author's observation). There were 19.6% respondents who said it was not important to know the expiry dates of drugs they are taking. They said this is the responsibility of medical personnel and drug-sellers who should know. If all drug sellers do observe the expiring dates, then there would be no problem, but if some drug sellers can sell expired drugs either unknowingly or otherwise, then there is a danger of taking expired drugs simply because of good faith in the person selling them.

4.9 Drugs-Sellers' Prescribing habits:

Drug stores and ordinary shops play a big role in malaria management and self medication. Only 52.6% of the drug sellers who sold chloroquine gave correct adult dose to their clients. However, all drug-stores and pharmacies gave correct dose of chloroquine. This indicates that more than half of clients who buy chloroquine from ordinary shops are likely to get under-dose or overdose.

Although recommended treatment schedule for an adult in Tanzania is 4 tablets of chloroquine on first and second day and 2 tablets on third day, most chloroquine brands sold in ordinary shops come from outside the country and are written differently according to their drug schedule. Thus some

drug-sellers of ordinary shops instructed their clients to use manufacturer treatment schedule which was not consistent with the national guidelines (Standard treatment guidelines, 1991).

In summary, this study found that one third of the households did stock antimalarials. The stocking habit was found to be influenced by the age of the head of the household, educational status of head of household, household size, number of under-fives in the household and employment status of the head of the household.

Although majority of respondents (66%) agreed to be practicing self medication, only 53% of the drug-sellers who sold chloroquine gave correct adult dose to their clients. Also, majority of clients who obtained chloroquine from ordinary shops were given incorrect dose. This shows that if a person does not know the correct dose of chloroquine, is likely to take a wrong dose if he or she obtains it from an ordinary shop.

CHAPTER 5

5.0 CONCLUSIONS AND RECOMMENDATIONS:

The major findings of this study are as follows:

5.1.1 One third of the study population stock antimalarials at home. The stocking of antimalarial drugs is determined by among other things the size of household, number of underfives in the household, educational status of the head of the household, age and employment status of the head of the household.

Drug stores or pharmacies and ordinary shops are the major sources of drugs used either in treatment of malaria or for stocking.

5.1.2 Chloroquine is a drug used by many people for home treatment of malaria. However, other antimalarials are also used as well (including the rare drugs in the country like Mefloquine).

5.1.3 Most of the mothers do keep drugs for their underfive children and the habit was found to be correlated with level of education. Fever was the commonest symptom which promoted mothers to keep drugs while chloroquine syrup was the commonest drug kept.

5.1.4 Only about 20% of under-fives do get correct dose of chloroquine, as most mothers do not know what dose they should give their underfives, and about 25% of drugs stored for children are likely to be used when they have expired as they are stored for more than 2 weeks.

5.1.5 Majority of people know signs and symptoms of malaria, drugs which treat malaria and correct dose of chloroquine for an adult, but they are not aware of expiry dates of the drugs they are taking.

5.1.6 Half of the drug-sellers do not know the correct dose of chloroquine hence a client who does not know the dose of chloroquine is likely to be served with incorrect dose.

5.2 RECOMMENDATIONS:

In view of what has been found in this study the following are recommended:

5.2.1 The Ministry of health should have a programme through various mass media to teach people about the dangers of home treatment before getting prescription, importance of knowing expiry dates of drugs before taking them and possible consequences if somebody is using expired drugs. Among the functions of MCH clinics is to conduct health education programmes. So MCH clinic sessions should be used to teach mothers on how to measure correct doses for their children according to weight, how to store the drugs and to dispose of drugs which have expired.

5.2.2 Health education programme to shopkeepers on treatment of malaria should be conducted. This should include correct dose per weight, importance of finishing the dose/course, what side effects their clients might experience and what should be done to curb side effects. Also the Ministry of

health should control the drug sellers and monitor their performance from time to time.

5.2.3 In this study it has been found that majority of respondents did not get antimalarials from the health facilities, also mothers of underfives reported to give their children chloroquine orally twice or three times a day. Thus it is recommended studies should be conducted in health facilities to look into the availability of antimalarials and prescribing behaviour of health workers.

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