MOTHERS' DIAGNOSIS OF CHILDHOOD MALARIA, HOUSEHOLD REFERRAL PATTERNS AND DRUG USE IN MUTHURWA AND KIBERA, NAIROBI, KENYA

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University or any other award.

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DEDICATION

To my parents, Mr William Ogutu-Wagara and Mrs Orpah Ogutu.

To my children Lavender, Martin and Oliver.
ACKNOWLEDGEMENT

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<tr>
<td>ACTs</td>
<td>Artemisin-based combination therapies</td>
</tr>
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<td>CHW</td>
<td>Community Health Workers</td>
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<td>FGD</td>
<td>Focus Group Discussions</td>
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<td>HF</td>
<td>Health Facility</td>
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<td>HT</td>
<td>Home Treatment</td>
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<td>ITN</td>
<td>Insecticide Treated Nets</td>
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<tr>
<td>LLINs</td>
<td>Long Lasting Insecticidal Nets</td>
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<tr>
<td>OTC</td>
<td>Over the Counter Drugs</td>
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<tr>
<td>PSI</td>
<td>Population Studies International</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
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<tr>
<td>TH</td>
<td>Traditional Healer</td>
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<td>TR</td>
<td>Traditional Remedy</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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ABSTRACT

This study sought to identify the mothers’ understanding of malaria among the under-fives in Muthurwa and Kibera; knowledge of the symptoms of the disease and type of actions taken. The study also assessed the association between drug utilization in households and preferred sequence of care. Decision making process in households was studied with emphasis on how it affected health-seeking behavior. The study was cross-sectional and a total of 345 questionnaires were administered with Muthurwa and Kibera having 150 and 195 questionnaires respectively. Data was collected using open-structured questionnaires and focus group discussions. Questionnaires were read out in English and translated into Kiswahili where necessary. Results from the study indicated that most of the mothers linked malaria with mosquitoes in both sites (p<0.01). However, some mothers mentioned other causes like sun, cold weather and unhygienic surroundings. Symptoms that respondents in both sites associated with malaria were mainly fever, vomiting, sweating, shivering, loss of appetite, crying, irritability and headache. These were some of the symptoms medical establishments also use in symptomatologic diagnosis of possible malaria infection. In Muthurwa, 86/150 (57.4%) visited a health facility immediately (p<0.05) compared to 54/195 (28%) in Kibera (p<0.01). A total of 69/150 (46%) mothers at least participated in home treatment in Muthurwa (p>0.05) compared to 141/195 (72%) in Kibera (p<0.01). However, those who consulted a traditional healer at least once were 30/150 (20%) in Muthurwa (p>0.05) while Kibera (p>0.05) was 4/195 (2%). Muthurwa residents reported seven sequences of care when their children were ill and Kibera residents reported five of such sequences. When sequences of care were tested against household drug administration in Muthurwa, there was significant relationship in all sequences (p<0.01) except where it started with treatment at home and ended with use of traditional remedies. In Kibera, only home care followed by visit to health facilities was significantly related with household drug administration (p<0.01). Choice of site of help was not significantly related to the mothers’ occupational status in Muthurwa (p>0.05) and in Kibera (p>0.05). Based on the findings of this study, it is concluded that there is significant relationship between household drug administration and sequence of care. There is also significant relationship between the time of recognition of symptoms and action taken. Decisions on source of help are not necessarily influenced by mothers’ occupational status. It is the recommendations of this study that personnel in charge of drug outlets be trained by a trusted agency so that they are made partners in healthcare network. Further research has been proposed to find out how cost of services and perceived seriousness of illness in children influence choice of referral sites and sequence of care.
CHAPTER ONE: INTRODUCTION

1.1.0 Background information

One million or more deaths are due to malaria world-wide each year with majority being children under the age of five years (WHO, 2002). Children in Africa south of Sahara are vulnerable to malaria from about four months of age (Murphy and Breman, 2001). Of those infected, more than 500,000 develop cerebral malaria, 10-20% die and about 7% are left with permanent neurological damage each year (Murphy and Breman, 2001). In Kenya, more than 36% of children under five die before they reach their fifth birthday due to preventable diseases of which malaria contribute 12.2% (Government of Kenya, 1999).

The Kenya’s morbidity patterns over the past 10 years feature malaria as a priority disease (Kubasu, 1997) followed by acute respiratory infections, skin conditions, diarrhea and intestinal worm’s infestation (Government of Kenya, 1999). Malaria mortality in under-5’s almost doubled in eastern and southern Africa over the period 1990-1998 compared with 1982-1989 (UNICEF, 2003). It was during this time chloroquine-resistant parasites increased substantially so that it is likely that some of the increase in child mortality may have been related, to some extent, to the spread of chloroquine-resistant malaria (UNICEF, 2003).

According to the Government of Kenya (1999), under five years old mortality rate was estimated at 97.1 for males, and 98.3 for females per 1000. However, the 1998 Kenya Demographic and Health Survey results show that the under five-mortality rate for the period between 1993 to 1998 had risen to 112 deaths per 1000 live births. Such surveys
reveal that malaria is still a priority disease and there is an urgent need to understand the home management in a slum environment so that its morbidity and mortality patterns can be controlled at the household level.

The need to control morbidity at household level is based on the fact that they are recognized as key community units in health care delivery (UNICEF, 2003). It is, therefore, important that they be equipped with skills to promptly recognize ill health and treat simple symptoms and conditions. Home-based management of fever (HBMF) is one of the promising strategies for improving coverage of prompt effective treatment. Community health workers and mothers of young children need to be trained in the recognition of symptoms and the benefits of prompt antimalarial treatment. Such programmes have been launched in Ghana, Nigeria, and Uganda in June 2002 (UNICEF, 2003). Salako et al., (2001) emphasize the effectiveness of such strategies given that self-care efforts are the norm in various communities and self-treatment is still valuable in protecting against severe attacks of malaria.

Munguti (1998), observed that even though at household level it may not be possible to have a prompt biomedical definition of malaria, local populations have an underlying ability to recognize the symptoms of ‘malaria’ and to associate them with a need to seek treatment. Symptom-based approach has a key advantage when dealing with the general population because many of the symptoms mentioned by respondents seem to reflect correct clinical presentations of malaria. The treatment seeking behavior associated with this approach is also reported to be a sequential process involving several stages like; occurrence of a symptom, the detection of that symptom, the definition of the symptom as a medical problem, the decision to seek care and the actual seeking process. In this case, fever is viewed as symptom alarm for
mothers to recognize that something is wrong in a child and eventually, a professional diagnosis of the underlying cause of fever is critical.

1.1.1 Situation of malaria in Nairobi

It is important to state that even though the study was based in Nairobi, it is an area that is traditionally considered a non-malaria zone (Government of Kenya, 1999). Therefore, published literature that highlights prevalence of malaria in the area is limited; however minimal diagnosis of the disease in various laboratories in the city is apparent. Even though majority of slum dwellers are urban emigrants from various parts of the country including the endemic zones they still maintain some of the traditional approaches applied in their rural homes in diagnosis and treatment of diseases such as malaria. This highlights a problem where accurate knowledge of etiology and transmission is sometimes unrelated to appropriate treatment when a child presents initial signs of illness and requires treatment (McCombie, 1996).

1.2.0 THE RESEARCH PROBLEM

1.2.1 Statement of the problem

The tendency among mothers to give a variety of drugs to children on presumptive diagnosis of illness (particularly malaria) is common. In most cases one type or a combination of antipyretic, antibiotic and ant malarial are administered irrespective of the age of the child. And because home treatment is apparently the norm, it is likely that medication given to the children at home may mask the severity of the condition. This in turn leads to delayed response and panic when symptoms like fever ends up in convulsions in children. Besides, some of those who seek prompt professional help hardly comply with treatment regimen. Malaria information should therefore be included in the health
information mothers receive from under-fives clinics (which many attend regularly) and retail drug outlets. The focus of such information should be on the amount of medication to give, the importance of completing the course of medication, looking for signs of failure to respond to prescription given and seeking immediate treatment at a health facility.

1.2.2 Justification

A number of city dwellers are urban emigrants who still have ties to their rural homes some of which are malaria endemic zones. Given the prior experience, away from Nairobi, in exposure and infection that slum dwellers may have had, there is a tendency by mothers to equate early signs of illness and fever to malaria. Such tendencies lead to presumptive household administration of anti-malaria drugs. Professionals in Public Health have expressed concern on the apparent poor drug use that is gaining ground among the public. When the public have exposed themselves to poor drug use as a result of uninformed self-medication, lack of compliance to treatment guidelines and human error in dispensing drugs; then they run the risk of experiencing drug resistance to conventional treatments. The improper use of the chloroquine was instrumental in facilitating the emergence of resistance to the drug by the malaria parasite, *Plasmodium*, in the 1980’s. Today, resistance to chloroquine exceeds 95 per cent, rendering it virtually useless in the routine treatment of malaria in some areas. Some malaria researchers have also reported a 50% resistance to sulphadoxine/pyremethamine in some areas, raising concern that it too might be irrelevant (UNICEF, 2003). Such trend may lead, in future, to untreatable malaria super-bug and hence a major health crisis in Kenya. It is important, therefore, to have an in-depth knowledge of household process of illness recognition, treatment-seeking behavior,
and household drug administration in childhood management of malaria. This will also give a clear picture of referral practices at household level so that such knowledge can provide informed intervention measures that may result in a significant reduction in morbidity and mortality of children below 5 years.

1.3.0 HYPOTHESES

This study was geared to test the following hypotheses:

(i) There is no relationship between the time of recognition of symptoms and immediate actions mothers take during presumptive childhood malaria in Muthurwa and Kibera.

(ii) Household drug administration has no relationship with households' sequence of care in Muthurwa and Kibera.

(iii) Consultations for the preferred site for treatment, amongst spouses when a child is sick, has no relationship with the employment status of the mother in Muthurwa and Kibera.

1.4.0 OBJECTIVES

1.4.1 General objective

To identify the mothers symptom-based diagnosis of childhood malaria and the subsequent treatment-seeking patterns to appropriate care for Muthurwa and Kibera children under five years old.
1.4.2 Specific objectives

(i) To establish mothers’ perception of causes of malaria.

(ii) To determine preventive measures mothers undertake against possible malaria infection.

(iii) To determine mothers’ recognition of the symptoms of illness and their immediate action.

(iv) To assess the mothers’ administration of antimalarial drugs (medication) on their children.

(v) To establish if the mothers’ employment status influence the choice of treatment sites amongst couples.

(vi) To establish mothers’ preferred sequence of care during the illness episode in children.
CHAPTER TWO: LITERATURE REVIEW

2.1.0 Mothers perceptions, knowledge and preventive measures of childhood malaria

There is limited documentation on the management of urban childhood malaria at home and most of the work carried out has mainly focused on malaria home management in the rural households. Mwenesi et al., (1995) carried out such a study in Kilifi, Kenya, to examine child malaria treatment practices among mothers. The findings show that 83% of mothers spontaneously or on prompting mentioned malaria as a childhood illness that presents with fever. Almost all the mothers recognized overt complications of malaria, namely convulsions, anemia and splenomegaly. In addition to convulsions that were perceived as life threatening, anemia and splenomegaly were treated by use of traditional therapy and conventional medicines like anti-helminths. Anti-malarial drugs and antipyretics were seen as contra-indicated for convulsions and these medications were withheld from children with fits (Mwenesi et al., 1995).

Another study carried out by Munguti (1998) reported that childhood malaria is perceived as a mild illness, inevitable and transient in nature. The mothers believe it is caused by natural processes, not preventable but treatable with modern treatments.

In the urban centers, Ahorlu et al., (1997) established that there is high usage of commercial pyrethrum mosquito coils while the rural households may use smoke from herbal leaves or dung to drive out mosquitoes from the households. Other measures include fanning with a cloth or electric fan. However, respondents in that study admitted that these methods were not totally effective because mosquitoes continued to bite them and they
suffered from malaria. With the increased promotion of Insecticide Treated Nets (ITN’s) in malaria programs (UNICEF, 2003), there is increased awareness and correlation between mosquitoes and infection of malaria among mothers. However, this has not translated to increased use of bed nets due to a variety of reasons. For example, some respondents say they have used the nets in the past but cannot afford to replace old and torn ones, hence stopped to use them (Guyatt et al., 2002). Even though mothers in the urban slums have a link to their original rural communities thus shared ideology and habits, it is equally important to ascertain how they cope with the urban slum childhood febrile illnesses given the different prevailing circumstances and environment.

2.2.0 Mothers’ symptom-based diagnosis of childhood malaria in households

In some countries, for example Burkina Faso, the National Malaria Programs have in the past instituted pilot programs that are designed to provide early diagnosis and prompt treatment of uncomplicated malaria cases at household level (Pagnoni et al., 1997). The mothers are taught to recognize presumptive malaria episodes and they are encouraged to make by themselves the decision to treat their children for farigoan (‘hot body’), while the Community Health Workers (CHW’s) simply held the supply of drugs and were instructed to sell treatments to the mothers upon request, provided the child did not need referral (Pagnoni et al., 1997).

Since one cannot be sure that all parties involved in community research translate the term ‘malaria’ to mean the same thing (Helitzer-Allen et al., 1998), identification of illness have been based on symptoms described by caretakers. Studies from various parts of the world show that local persons may use the term to cover a wider range of illnesses so
that they may refer to the ailments as clinical malaria when it is not. On the other hand, they may call an ailment, especially convulsions, something else when it is malaria. It is therefore important to talk about symptoms of illness, as it is more likely that both researchers and respondents are talking about the same phenomenon (Ahorlu et al., 1997, Munguti, 1998, Baume et al., 2000).

While researchers' opinion may vary on mothers' diagnosing ability, mothers appear in most studies to be quite attuned to the condition of their children (Baume et al., 2000). In spite of the many demands on their time and attention, mothers (unprompted) report in their narratives occasions when irritability, diminished activity, and/or decreased appetite is apparent in their children (Baume, 2002a). Such pre-illness signs alert them that something is amiss with the baby. This leads to the search for a solution that would reverse the illness condition. When fever is part of the pre-illness signs, mothers appear to be quite aware of when it starts and its course during a given period of time. Most narratives include descriptions of the level of fever at various points throughout a day (Baume et al., 2000). Based on the maternal symptom-based diagnosis, this study seeks to evaluate how it affects choice of self-treatment in the house and/or the external treatment-seeking pattern sought by the mother.

2.3.0 Households drug administration during the initial phase of childhood malaria episode

Since mothers are the first source of treatment for their children (Fawole & Onadeko, 2001), it is important to identify what they do when they suspect malaria in their children. Snow et al., (1992) found that 97% of mothers in the study treated their children
with over-the-counter (OTC) drugs from retail outlets. The same was observed in Togo (Deming et al., 1989). In Guinea, Dabis et al., (1989) reported 79% of mothers used OTC drugs while Glik et al., (1989) reported 33% rural and 69% urban mothers treated their children at home, with medication from health facilities. Such studies affirm that the use of retail outlets by mothers for curative services for childhood malaria is rampant and can no longer be ignored.

Surveys in Africa reveal that 80-90% of presumed malaria cases are treated at home (Thera et al., 2000; Fawole & Onadeko, 2001; Nyamongo, 2002). The highly stocked drugs in the households are the paracetamols and antipyretics, followed by antimalarial and antibiotic drugs (Mwenesi et al., 1995). For the rural environments, Aholu et al., (1997), indicates that traditional herbal remedies are equally used for childhood malaria.

In Tanzania, during a program to provide chloroquine for prophylaxis in children, mothers recognized the efficacy of the drug in reducing fever and began diverting the supplies to other household members who were ill with fevers (MacCormack and Lwihula, 1983). While prompt access and administration of drugs may slow fever from progressing to convulsions in children, mothers ought to be keen on treatment guidelines so as to avoid the risk of experiencing drug resistance in young children.

When fever is a dominant symptom, mothers rarely leave it unattended (Baume 2002a). The initial response is to treat it at home and monitor the child’s condition (Baume 2002a). Most mothers report some form of home treatment as their first response to febrile illness (Ruebush et al., 1995) and some of the most common home treatments against fever are the following:
1. Sponging/bathing with tepid to cold water to lower fever, and uncovering the child. This has been encouraged in the health centers and widely adopted by mothers (Baume et al., 2000).

2. Administration of commercial anti-pyretics such as Panadol as initial treatment or at some point in the treatment process (Tarimo et al., 2000).

3. Anti-malarial drugs bought from OTC, pharmacies or drug hawkers which are given to the child when the mother suspects malaria infection (Snow et al., 1992). The majority of children are taken to health centers within 48 hours of noticing fever by the caregiver, thus an indication of prompt treatment by a formal provider (Baume, 2002a). However, because initial treatments abate symptoms, they may in some cases prolong the home monitoring period and delay seeking care from a health facility (Baume, 2002a).

2.4.0 Decision-making process affecting actions taken in home management of malaria

The decision making process and the time it takes to take action plays an important role in the management of malaria. In a study conducted by Mwenesi et al., (1995), 63% of mothers regardless of marital status, age and educational level, reported that they would most frequently seek advice from their husbands before taking an ill child to a health facility; while another 42% would seek advice for retail outlet use. Some mothers consulted because it was expected of them, while others did so because they perceived the illness to be serious or they did not understand its nature (Tanner and Vlassoff, 1998). It is important to determine the actual role these consultations play in the management of childhood malaria. Apparently, this affects the time frame when external help is sought (especially
2.5.0 Household referral patterns

Home treatment with shop-bought drugs is recognized as a valuable means of malaria control (Pagnoni et al., 1997, Salako et al., 2001). It has been proposed that fast-acting drugs be made widely available to parents for home treatment, and that families become knowledgeable in giving prompt and effective treatment (Clarke et al., 2003). This is especially true for uncomplicated malaria and in poor low-literacy populations. The practice of self-medication can be an advantage as it delays fever-related convulsions and lowers risk of death (D’Alessandro et al., 1997). However, in many occasions, the antimalarial drugs used are not those suggested in the national guidelines and they are also given inadequate dosage (Njama et al., 2003). In another study in Nigeria, pregnant adolescent girls were less likely to use the official sector (39% versus 76% of not pregnant adolescents). The reason being that pregnancy is not expected of unmarried girls and it is stigmatized (Okanofua et al., 1992). Actual patterns of care in a community need to be ascertained in order to implement effective corrective measures where misuse of drugs is apparent. Informed awareness of patterns of care in a community might not only improve case management at home but also decrease the misuse of antimalarial drugs, thus delaying emergence of malaria parasite resistance to drugs.

In a clinic-based study carried out by Tarimo et al., (2000), it has been shown that 86.6% of mothers would take antipyretics first on suspecting malarial fever at home. This was meant to prevent occurrence of convulsions, and 92.9% would subsequently go to a professional consultation) for disease management, thus influencing the referral pattern in a household.
modern health facility for further examination and advice from a health worker. This shows that mothers have the potential to correctly manage malarial fevers at home and consult a health facility. However, in other studies, Njama et al., (2003) indicated that caregivers in urban areas were highly receptive to the use of modern health facilities for the treatment of malaria. Ninety seven percent would go to a hospital or clinic as their first or second action if their child was thought to have fever.

Other studies carried out in Tanzania have shown that when the disease would not be detected at the hospital or if the symptoms persisted in spite of anti-malaria treatment then the explanatory model was complemented with the logic of witchcraft, thus consultation with a traditional healer (Muela et al., 1998). Molyneux et al., (1999) found that traditional healers were not an important source of treatment of uncomplicated malaria. However, traditional healers were likely to be consulted for convulsions, splenomegaly and anemia, which the people did not associate with malaria (Molyneux et al., 1999). Some studies have indicated that traditional healers were not considered important in treatment of malaria, sometimes because they did not claim to cure it or because the people already knew how to treat malaria with traditional herbs and modern medicine (Agyepong, 1990, Espino, 1992; Abyan and Osman, 1993; Nyamongo, 2002).

The use of traditional medicines is not always exclusive. For example, in studies carried out in Uganda and Tanzania, some of the mothers who came to health centers had used herbal remedies to reduce fever before coming for consultation (Kengeya-Kayondo, 1993; Tarimo et al., 1998). Few of these medicines have been studied, and some may have value in the treatment of malaria or alleviation of symptoms. For the most part, use of traditional healers and medicines as a sole treatment is low, and a number of studies suggest
that the majority of people recognize the value of modern drugs in the treatment of malaria (Allen et al., 1990; Njama et al., 2003).
CHAPTER THREE: MATERIALS AND METHODS

3.1.0 Description of the study areas

Kibera and Muthurwa are some of the low income settlement areas in Langata and Kamkunji divisions, respectively, in Nairobi, Kenya (Figure 1). Both study sites have been purposively selected. Kibera is the largest shanty town within the division and the city as well. A survey done earlier by AMREF-Kenya in Kibera indicated that there is 20% under five-mortality rate, 43% growth stunting and 5.6% clinical malnutrition (AMREF, 1998). Apart from privately owned AMREF dispensary, Kibera does not have any Government or City Council facilities and therefore, the people in this area have no access to basic health facilities, social amenities and hygiene facilities (AMREF, 1998).

The area is excluded from the plans for city services because the settlements are not legalized and owners have quasi-legal right of occupation or no right at all (AMREF, 1998). Housing is largely of temporary material and majority of the tenants are either poor or fall below poverty line (AMREF, 1998). Urban services such as water and sanitation are quite minimal, while the majority of those affected by such difficult conditions are women and children who spend their time at home most of the day while the men seek employment in the city. Therefore, Kibera socio-economic environment was ideal in answering the question: ‘How does a mother in an urban deprived environment address fever that she presumes to be malaria in an under five years old?’

On the other hand, Muthurwa is one of the low-income settlement zones for subordinate staff of Kenya Railways Corporation (GoK, 1999), in Central District area of Nairobi, Kenya. The study site is strategically placed in the city center, thus easy access to
all the health providers situated in the city and its environs. Muthurwa has over the years deteriorated in sanitation and hygiene. It has one City Council health centre and two private dispensaries. The population that resides here are of low-income level (AMREF, 1998). Therefore, Muthurwa population answered the question: ‘How does a mother in an urban low income environment address fever that she presumes to be malaria in an under five years old?’
FIG: 1 MAP OF THE STUDY SITES (MUTHURWA AND KIBERA)
3.1.1 Study populations

The respondents were mothers (mainly housewives) in both study sites. The numbers of mothers in Muthurwa are estimated to be 7,763, while mothers in Kibera are estimated to be 35,195 (GoK, 1999). The population of Muthurwa was projected to be 18,474 by 2002 (GoK, 1999) and the population of Kibera was projected to be 83,687 by 2002 (GoK, 1999).

3.1.2 Inclusion criteria

People included in this study were the residents in both sites and they must have had continuous residence for at least six months. The household had to have a mother/care-taker; a child aged between 0-5 years old and he/she must have had fever presumed to be malaria in the last two weeks.

3.1.3 Exclusion criteria

The study excluded households without children aged between 0-5 years old. In addition households with children aged between 0-5 years old but had not presented presumed malaria symptom of fever last two weeks when the study was being carried out, were equally excluded. Time frame on when a child was sick last helped the researcher to gather fine details on the illness recollection.

3.1.4 Ethical considerations

Permission to conduct the study was obtained from Kenyatta University (Department of Biological Sciences) and the Ministry of Education. Once in the field,
research objectives and methods were explained to each household identified and signed informed consent was obtained from participants before the research instruments were administered. In the course of an interview, there were cases of informants declining to participate and it was respected without withholding privileges like advising a mother whose child seems still sick after visiting a health clinic. Confidentiality of issues discussed in the questionnaires was ascertained to the interviewees, so that personal issues like consulting with the husband and possibility of visiting a traditional healer was not publicly shared with other respondents.

3.2.0 The study design

Both quantitative (using number of responses or number of respondents per variable) and qualitative data was collected using structured questionnaires that elicited information from the mothers. Three sessions of Focus Group Discussions (FGD) were carried out per site to collect the qualitative data. The above two techniques were used to collect data on the following sub topics: Maternal-symptom-based diagnosis of childhood malaria, the preferred household drug administration, decision making process in the house prior to first contact with a health facility and subsequent referral patterns towards childhood malaria in the two urban sites.

3.3.0 Sampling procedure

Sampling frame was constructed by listing the population households (units) so that the first household was purposively selected and the remaining units were selected at established intervals. The first 150 households who reported symptom-based maternal
diagnosis and/or health professional diagnosis of malaria were considered a depiction of households in Muthurwa. It was appropriate to use a sampling interval of every 4th house for Muthurwa study site. This was because the houses in Muthurwa are built in a parallel alignment. The approach used for selection of mothers in Kibera for the study sample was the cluster sampling. Kibera population was broken into equivalent geographical sub-units. Due to logistics, appropriate clusters were selected using a random sampling method followed by studying all households in each of the sampled cluster so as to identify those who had symptoms related to malaria infection.

To arrive at the ideal sample size, the Fischer et al., (1988) formula for populations was applied as follows:

\[
n = \frac{z^2pqd}{d^2}
\]

where: \(n = \) desired sample size (population >10,000) 
\(z = \) the standard normal deviate, set at 1.96 or corresponds to the 95% confidence level. 
\(p = \) the proportion in the target population estimated 
\(p = 0.5 \)  
\(d = 0.05 \)  
\(Z = 1.96 \)

\[
n = (2)^2 \times (0.5) \times (0.5) \times \frac{0.05}{0.05} = 400
\]

The ideal number of respondents would have been 200 for each study site, however, during the study there were those who consented to be interviewed but in the course of the
interview declined to go through to the end. Muthurwa had 150 households identified, while Kibera had 195 households identified for the study sites respectively.

3.4.0 DATA COLLECTION

3.4.1 Preparatory organization

A pilot study was conducted in Muthurwa and Kibera. A total of 20 mothers participated in two separate FGD. Given that mothers were present during the interviews, they were the ones who validated the relevance of the questionnaires this study intended to carry out. Necessary corrections and clarifications to both the questionnaire and FGD guide were made. Four research assistants (two from each area) were identified and trained by the principle investigator for two days to help in data collection. This was to ensure uniformity in the understanding of the questionnaire.

3.4.2 Data collection technique and procedure

Households in Muthurwa and Kibera provided for the primary data covering maternal-symptom-based diagnosis, household drug administration and decision-making process in households. Community-based sample avoided the bias of facility-based samples in estimating frequency of types of treatment, and permitted examination of treatment patterns for febrile illnesses with a range of accompanying symptoms. It also included cases not seen at the health facility which are as important to understand as those treated by a formal provider. In addition, six FGDs involving 48 mothers in total were conducted. Each group consisted of 8-10 participants.
The pilot study was followed by actual data collection with effect from mid September 2002 to mid January 2003. The main instrument was structured questionnaire, complemented by FGDs and observations. The observations were meant to establish whether there was a mosquito net in the child’s sleeping space as claimed by the mother.

3.4.3 Quantitative data

The structured questionnaire was prepared in English and verbally translated in Kiswahili whenever it was deemed necessary. Filled in questionnaires were cross-checked for completeness and consistency after each day’s work. During the data collection, mothers (in both study sites) turned out to be the main caregivers of the children since most of them were housewives or were having small scale business in the front side of their houses. The study zeroed in on the layman’s patterns of care when children in a household in both study sites presents illness. For example, the following process was distinct in both sites; the occurrence of a symptom, the detection of that symptom, the definition of the symptom as a medical problem, the decision to seek care and the actual sequence of care. In the course of the interview, some mothers felt the questions were intrusive thus withdrawing and refusing to be interviewed any further; this was respected.

3.4.4 Focus group discussions

These were held with mothers who did not provide information on questionnaires. They were also the mothers who were present at the scheduled time for the discussions after giving informed consent. The method used for selecting participants for FGD was by way of convenient sampling (Baume, 2002b). The groups were stratified according to age of the
selected mother and stage of child rearing of the selected mothers. For example, mothers with children who were 10 years and above were assembled together with those who had either one or two under-fives to avoid ‘one sided view’ of what is best for the residential area. Most of the discussions lasted for 45 minutes to one hour so as to accommodate the strained limited free time mothers have in the morning hours. Duration of meetings were dependent on how fast mothers agreed on prioritizing issues concerning the study sites. The discussions involved between 8-10 mothers per session. Two nurses based in Muthurwa Child Welfare and Ante natal care offered assistance where necessary and the following was carried out: when mothers had assembled, the principle investigator carried out the discussion, one nurse was a facilitator, the two assistants based in Muthurwa were taking notes and the other nurse was an observer. She was instrumental in encouraging mothers who tended to be silent during discussions to give their opinions. In addition to the notes all the FGD were recorded onto magnetic tapes.

3.4.5 Constraints experienced

During data collection, mothers expected both monetary rewards and provision of mosquito nets after participating in the interview. The research coincided with national parliamentary campaigns. Owing to this, and multi-ethnic composition of electoral zones, there were suspicion on the motives of the study. For instance, questions such as, “what is your name” and “where do you come from”; were considered ill-motivated and would provide information that could be used against the residents. Mothers were committed
during morning hours thus the study was carried out in the late afternoons or in the evenings.

There were five cases of mothers who withdrew in the middle of the interviews. The study had also intended to involve traditional healers in the vicinity in an interview session. Three out of five traditional healers declined to participate in the intended interview and their choice was acknowledged and respected by the interviewees. One of the reasons they gave was that the required information could be used against them in future.

3.5.0 DATA MANAGEMENT AND ANALYSIS

3.5.1 Quantitative data

(a) All open-ended questions were coded before data entry (Baume, 2002b). Data from the questionnaire was checked for any errors and double entered into a computer using Statistical Package for Social Sciences (SPSS) data entry program. Analysis of quantitative data was done by the use of SPSS version 8 program. The results are presented in descriptive form using frequency tables and cross tabulation tables. Chi-square was used to analyze the relationship between the time of recognition of symptoms and the immediate action mothers took during presumptive childhood malaria in Muthurwa and Kibera. Analysis of association was also applied to demonstrate relationship between mothers' drug administration and sequence of care that was applied in an illness episode. Chi-square test was also applied to demonstrate relationship between preferred site for treatment and the employment status of the mothers. In this study, chi-square results that had level of significance
above p>0.05 was considered not significant. However, level of significance was at p<0.05 and p<0.01.

2.5.2 Qualitative data

The qualitative data from each FGD was transcribed, coded and translated (Baume, 2002b). Analysis was done manually (reading and using calculators) according to the study objective and a summary written. Data from the summary provided necessary explanation for quantitative data and similarities and disparities have been described in the text. In the case of assessing knowledge on how best to keep children away from possible mosquito bites, a mother was viewed as knowledgeable when she mentioned at least three out of six correct ways of eliminating mosquitoes. When a mother mentioned only two or less correct ways, she was considered as having partial knowledge. However, if one mentioned no method of dealing with mosquitoes or an ineffective method, she was considered as one with poor knowledge. The same mode of grouping was also used to identify mothers’ knowledge on the environment that sustains breeding and existence of mosquitoes in Muthurwa and Kibera.
CHAPTER FOUR: RESULTS

In this chapter are presentations of the survey findings. The quantitative results were from the responses of 150 respondents from Muthurwa and 195 respondents from Kibera.

4.1.0 Demographic characteristics of the study subjects

According to demographic characteristics reported in Muthurwa (Figure 2), 64 (42.7%) of the respondents were from Central province, 32 (21.4%) were from Nyanza province, 23 (15.3%) were from Western province and 17 (11.3%) identified with Eastern province. None of the respondents claimed to be originating from Nairobi or North Eastern provinces. However in Kibera, 62 (31.8%) were from Nyanza, followed by 55 (28.2%) from Western Province, 24 (12.3%) were from Eastern Province. Nairobi had 18 (9.2%) and Central Province recorded 18 (9.2%) respectively, while Coast had 8 (4.1%) and North Eastern Province registered 1 (0.5%). Those, in Kibera, who identified with originating from Nairobi, were from Nubian community. Chi square test (Goodness-of-fit) applied showed that there was significant difference between numbers from different regions in Muthurwa ($\chi^2=93.440$, df = 5, P<0.01) and in Kibera ($\chi^2=143.010$, df = 7, P<0.01). When the two sites were compared, [df=(r-1) (c-1)] there was no significant difference between numbers from different regions ($\chi^2=30.397$, df = 35, P>0.05).

As for Muthurwa (Table 1), the youngest mother was 17 years old while the oldest was 42 years old. Kibera on the other hand, had the youngest mother at 17 years while the oldest was 46 years old. The mean age of the study group was therefore 27.69 (Muthurwa) and 25.12 for Kibera. In the age distribution, both sites had majority of mothers in the age
Figure 2: Province of origin for mothers in Muthurwa and Kibera

**MUTHURWA**

- Coast Province: 1.3%
- Eastern Province: 11.3%
- Central: 42.7%
- Nyanza: 21.3%
- Western: 15.3%
- Rift Valley: 8.0%

**KIBERA**

- North Eastern: 6%
- Nairobi: 9.1%
- Coast Province: 3.6%
- Eastern Province: 12.7%
- Central: 9.7%
- Rift Valley: 3.0%
- Nyanza: 34.5%
- Western: 26.7%
### Table 1  Age distribution of mothers in Muthurwa and Kibera

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 20</td>
<td>8</td>
<td>5.3</td>
<td>23</td>
<td>11.8</td>
</tr>
<tr>
<td>20 - 29</td>
<td>92</td>
<td>61.4</td>
<td>138</td>
<td>70.8</td>
</tr>
<tr>
<td>30 - 39</td>
<td>48</td>
<td>32</td>
<td>26</td>
<td>13.3</td>
</tr>
<tr>
<td>40 - 49</td>
<td>2</td>
<td>1.3</td>
<td>8</td>
<td>4.1</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td>195</td>
<td>100</td>
</tr>
</tbody>
</table>
bracket 20-29 [Muthurwa 92 (61.4%) and Kibera 138(70.8%)]. The next majority age bracket was in 30-39 years with Muthurwa having 48(32%) and Kibera 26(13.3%). The least number was in the bracket ‘40 and above’. There was significant difference between numbers of mothers in different age brackets in Muthurwa ($\chi^2=138.960, df = 3, P<0.01$) and in Kibera ($\chi^2=221.677, df = 3, P<0.01$). Comparison between the two sites revealed that there was no significant difference between numbers of mothers in different age brackets ($\chi^2=5.640, df = 6, P>0.05$).

In Muthurwa study site (Table 2), there was 87(58.2%) mothers with class 8 education and below, while Kibera had 113(57.9%) mothers with class 8 education and below. Muthurwa site recorded 55(36.7%) mothers who had form four level of education, while only 8(5.3%) proceeded for further training after completing form four. Kibera had a slightly higher number of mothers who attained at least secondary education 80(41.1%), however, there was only 2(1%) of them with tertiary training. In both study sites, the number of mothers who proceeded beyond secondary education was quite minimal. Using chi square test for goodness-of-fit [df= (n-1)], there was significant difference between the numbers of mothers who attended various level of schooling in Muthurwa ($\chi^2=63.160, df = 2, P<0.01$) and in Kibera ($\chi^2=99.69, df = 2, P<0.01$). However, when mothers in Muthurwa and Kibera were compared using chi square test of independence, there was no significant difference between mothers who attended various levels of schooling ($\chi^2=3.183, df = 4, P>0.05$) [df=(r-1) (c-1)].

Majority of the mothers [92(61.3%) in Muthurwa and 106(54.4%)]
Table 2  The education level of mothers in Muthurwa and Kibera

<table>
<thead>
<tr>
<th>Education level</th>
<th>MUTHURWA</th>
<th></th>
<th></th>
<th>KIBERA</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 8 and below</td>
<td>87</td>
<td>58.2</td>
<td>113</td>
<td>57.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form four</td>
<td>55</td>
<td>36.7</td>
<td>80</td>
<td>41.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary level</td>
<td>8</td>
<td>5.3</td>
<td>2</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td>195</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
in Kibera] were married and living with their spouses (Figure 3). However, 58(35.3%) of the respondents in Muthurwa were reported as single parents. On the other hand, Kibera site recorded 89(45.6%) as single mothers, some of which were young girls staying with their parents. In Muthurwa, mothers who were married were significantly more than those who were single ($\chi^2=7.707$, df = 1, $P<0.01$). However, there was no significant difference between the numbers of mothers who were single and those who were married in Kibera ($\chi^2=1.482$, df = 1, $P>0.05$). Comparison between the two sites revealed that there was no significant difference between numbers of mothers who were single and those who were married ($\chi^2=1.389$, df = 1, $P>0.05$).

In Muthurwa (Figure 4), 67(44.7%) of the mothers described themselves as housewives. A total of 72(48%) reported to be engaged in small scale business, while 11(7.3%) were in some form of employment. However, in Kibera, 130(66.7%) mothers were housewives, followed by 41(21.0%) who were in small scale business and lastly 24(12.3%) mothers were in some formal employment. There was significant difference within types of employment for mothers in Muthurwa ($\chi^2=45.880$, df = 2, $P<0.01$) and in Kibera ($\chi^2=99.723$, df = 2, $P<0.01$). Between Muthurwa and Kibera there was no significant differences ($\chi^2=8.183$, df = 4, $P>0.05$) within types of employment for mothers.

Husbands in Muthurwa (Figure 5) were either in some formal employment [114(76%)]) or in small scale business [36(24%)], while those in Kibera were employed [90(46%)], or in business [57(29%)]) or were unemployed [49(25%)]. All the fathers in Muthurwa were involved in income generating activities while in Kibera there were
Figure 3  The marital status of mothers in Muthurwa and Kibera

**MUTHURWA**

Marital Status

**KIBERA**

Marital Status
Figure 4  Mothers' occupation in Muthurwa and Kibera

**MUTHURWA**

![Bar chart showing mothers' occupation in Muthurwa.]

**KIBERA**

![Bar chart showing mothers' occupation in Kibera.]

**MOTHERS OCCUPATION**
Figure 5: Fathers' occupation in Muthurwa and Kibera

**MUTHURWA**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>70</td>
</tr>
<tr>
<td>Unemployed</td>
<td>24</td>
</tr>
</tbody>
</table>

**KIBERA**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>46</td>
</tr>
<tr>
<td>Business</td>
<td>29</td>
</tr>
<tr>
<td>Unemployed</td>
<td>25</td>
</tr>
</tbody>
</table>
13.3% fathers who were unemployed. There was significant difference within types of employment for fathers in Muthurwa ($\chi^2=25.043$, df = 1, $P<0.01$) and in Kibera ($\chi^2=8.283$, df = 2, $P<0.05$). When types of employment for fathers was assessed between the two sites, in Muthurwa was significantly different from types of employment for fathers in Kibera ($\chi^2=11.456$, df = 2, $P<0.05$).

4.2.0 Mothers knowledge and prevention behavior towards childhood malaria

4.2.1 Knowledge of causes of malaria

Overall, malaria was considered a serious problem in the two sites; there was 100% ‘YES’ response in Muthurwa and a 95% response in Kibera. The other five percent in Kibera acknowledged its presence but did not rate it as a serious problem. When asked about causes of malaria, 137(91%) in Muthurwa and 187(96%) in Kibera, attributed the illnesses to mosquito bites (Table 3). Other possible causes that were mentioned in the interview were unhygienic surroundings [Muthurwa 6(4.0%) and Kibera 2(1%)], cold weather [Muthurwa 5(3.3%) and Kibera 6(3%)] and ‘others’ (Muthurwa 1.3% and Kibera 0%). Mothers who identified mosquito as the cause of malaria were significantly more than those who identified other causes in Muthurwa ($\chi^2=352.240$, df = 3, $P<0.01$) and in Kibera ($\chi^2=360.585$, df = 2, $P<0.01$). When knowledge of what causes malaria was assessed between the two sites, there was no significant difference ($\chi^2=3.444$, df = 6, $P>0.05$).
Table 3. Knowledge of the causes of malaria

<table>
<thead>
<tr>
<th>Causes of malaria</th>
<th>MUTHURWA Frequency</th>
<th>MUTHURWA Percentage</th>
<th>KIBERA Frequency</th>
<th>KIBERA Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosquitoes</td>
<td>137</td>
<td>91</td>
<td>187</td>
<td>96</td>
</tr>
<tr>
<td>Unhygienic surroundings</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Cold weather</td>
<td>5</td>
<td>3.3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>1.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td>195</td>
<td>100</td>
</tr>
</tbody>
</table>

Apart from fever, which was a symptom that every child (95.84%) mentioned in Muthurwa and 143 (95%) in Kibera reported vomiting as illness symptom that was present in the children (Table 4). Within Muthurwa, those who mentioned vomiting were not significantly different from those that did not ($\chi^2=0.443, df=1, P>0.5$). However, in Kibera, those who mentioned vomiting were significantly more than those who did not ($\chi^2=32.782, df=1, P<0.01$).
4.2.2 Time when mosquito bites were experienced.

When mothers were asked during the FGD if they experienced presence of mosquitoes in their environment, Muthurwa community had 98% mothers with 'YES' response while Kibera had 98.5% 'YES response. A total of 145(96.0%) mothers in Muthurwa mentioned night time (Figure 6). One mother said bites were experienced any time of the day, 3(2%) said it was in the evenings and one mother quoted morning hours. According to the mothers in Kibera, optimal time for mosquito bites were mainly at night 123(63.1%), followed by evening hours 63(32.3%) and a few bites in the morning hours 9(4.6%). There was significant difference between times when mosquito bites were experienced Muthurwa ($\chi^2$=410.960, df = 3, $P<0.01$) and in Kibera ($\chi^2$=100.062, df = 2, $P<0.01$). When the two sites were compared using chi square test of independence, there was no significant difference between the times mentioned by the mothers ($\chi^2=3.354$, df = 6, $P>0.05$). In each case majority of the mothers identified night time, followed by evening and lastly morning.

4.2.3 Knowledge of malaria symptoms and symptoms acted upon

Apart from fever which was a symptom that every child had, 51(34%) mothers in Muthurwa and 143(73.3%) in Kibera reported vomiting as illness symptom that was present in the children (Table 4). Within Muthurwa, those who mentioned vomiting were not significantly different from those that did not ($\chi^2=0.450$, df = 1, $P>0.05$). However, in Kibera mothers who mentioned vomiting were significantly more than those who didn’t ($\chi^2=42.467$, df = 1, $P<0.01$). When the two sites were compared, mothers who mentioned vomiting were significantly more than those that didn’t ($\chi^2=32.789$, df = 1, $P<0.01$)
Figure 6  Time when mosquito bites were experienced

MUTHURWA

<table>
<thead>
<tr>
<th>Time</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANY TIME</td>
<td>0.7%</td>
</tr>
<tr>
<td>EVENING</td>
<td>2.0%</td>
</tr>
<tr>
<td>NIGHT</td>
<td>96.7%</td>
</tr>
</tbody>
</table>

KIBERA

<table>
<thead>
<tr>
<th>Time</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MORNING</td>
<td>2.4%</td>
</tr>
<tr>
<td>EVENING</td>
<td>34.5%</td>
</tr>
<tr>
<td>NIGHT</td>
<td>63.0%</td>
</tr>
</tbody>
</table>
Table 4 Symptoms that prompted actions

<table>
<thead>
<tr>
<th>Symptoms that prompted actions</th>
<th>MUTHURWA</th>
<th>KIBERA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of responses</td>
<td>Percentage</td>
</tr>
<tr>
<td>Vomiting</td>
<td>51</td>
<td>34.0</td>
</tr>
<tr>
<td>Sweating</td>
<td>41</td>
<td>27.3</td>
</tr>
<tr>
<td>Shaking</td>
<td>31</td>
<td>20.7</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>42</td>
<td>28.0</td>
</tr>
<tr>
<td>Crying &amp; irritable</td>
<td>31</td>
<td>20.7</td>
</tr>
<tr>
<td>Head ache</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Other symptoms</td>
<td>21</td>
<td>14.0</td>
</tr>
</tbody>
</table>

There was a significantly higher percentage of mothers who mentioned vomiting in Muthurwa compared to Kibera. Those who mentioned vomiting were significantly more than those who didn’t (p < 0.001). There was a significantly higher percentage of mothers who mentioned sweating in Muthurwa compared to Kibera. Those who mentioned sweating were significantly more than those who didn’t (p < 0.001). There was a significantly higher percentage of mothers who mentioned shaking in Muthurwa compared to Kibera. Those who mentioned shaking were significantly more than those who didn’t (p < 0.001). There was a significantly higher percentage of mothers who mentioned loss of appetite in Muthurwa compared to Kibera. Those who mentioned loss of appetite were significantly more than those who didn’t (p < 0.001). There was a significantly higher percentage of mothers who mentioned crying and irritable in Muthurwa compared to Kibera. Those who mentioned crying and irritable were significantly more than those who didn’t (p < 0.001). There was a significantly higher percentage of mothers who mentioned head ache in Muthurwa compared to Kibera. Those who mentioned head ache were significantly more than those who didn’t (p < 0.001). There was a significantly higher percentage of mothers who mentioned other symptoms in Muthurwa compared to Kibera. Those who mentioned other symptoms were significantly more than those who didn’t (p < 0.001).
There were 41(27.3%) mothers in Muthurwa and 93(48.2%) in Kibera who mentioned the evidence of the symptom of sweating. Within Muthurwa, those who mentioned sweating were significantly more than those that did not ($\chi^2 = 6.688$, df = 1, $P<0.01$). However, in Kibera mothers who mentioned sweating were not significantly more than those who didn’t ($\chi^2 = 0.415$, df = 1, $P>0.05$). When the two sites were compared, mothers who mentioned sweating were significantly more than those that didn’t ($P<0.05$)

Those who reported shaking or shivering were 31(20.7%) in Muthurwa and 86(44.1%) in Kibera. Within Muthurwa, those who mentioned shaking were significantly more than those that did not ($\chi^2 = 20.266$, df = 1, $P<0.01$). However, in Kibera mothers who mentioned shaking were not significantly more than those who didn’t ($\chi^2 = 2.713$, df = 1, $P>0.05$). When the two sites were compared, mothers who mentioned shaking were significantly more than those that didn’t ($P<0.01$)

Crying and irritable was also mentioned by 31(20.7%) mothers in Muthurwa and 54(27.7%) mothers in Kibera. Within Muthurwa, those who mentioned crying and irritable were significantly more than those that did not ($\chi^2 = 20.266$, df = 1, $P<0.01$). In Kibera, mothers who mentioned crying and irritable were significantly more than those who didn’t ($\chi^2 = 38.815$, df = 1, $P<0.01$). However, significant difference were not observed between the study sites ($P>0.05$).

Those who reported loss of appetite were 42(28%) in Muthurwa and 116(59.5%) in Kibera. Within Muthurwa, those who mentioned loss of appetite were significantly more than those that did not ($\chi^2 = 5.734$, df = 1, $P<0.01$). However, in Kibera mothers who mentioned shaking were not significantly more than those who didn’t ($\chi^2 = 7.021$, df = 1,
When the two sites were compared, mothers who mentioned loss of appetite were not significantly more than those that didn’t (p>0.05).

Those who reported ‘Other symptoms’ were 23(16%) in Muthurwa and 12(62%) in Kibera. Within Muthurwa, those who mentioned ‘Other symptoms’ were significantly more than those that did not ($\chi^2=41.183$, df = 1, p<0.01). However, in Kibera mothers who mentioned ‘Other symptoms’ were significantly more than those who didn’t ($\chi^2=149.954$, df = 1, P<0.01). When the two sites were compared, mothers who mentioned ‘Other symptoms’ were significantly more than those that didn’t (p<0.05).

As much as crying and irritability, loss of appetite and drooping eye lids may only be behavioral symptoms to an illness, mothers in Muthurwa and Kibera had them as signs indicating that their children are not in optimal health and an illness is about to present itself on the child.

**4.2.4 Time of day when mothers recognized illness and actions taken.**

About 68(45.3%) of mothers in Muthurwa noted onset of illness in the morning while 49(32.7%) noticed illness by mid day (Table 5a). Mothers who noticed illnesses by evening were 17(11.3%) and during the night were 16(10.6%) respectively. A total of 86(57.4%) of these mother sought professional diagnosis upon realizing the child was ill. Mothers who bought drugs first before taking their children to a health facility were 47(31.3%) while those that gave drugs that were kept in the house or observed and tepid sponged their children were 9(6%) and 6(4%) respectively. Using Pearson chi square test, there was significant relationship ($\chi^2=32.789$, df = 12, P<0.01) between when mothers
noted onset of illness in their children and the immediate actions they took \([df=(r-1)(c-1)]\). Over all consultation in Muthurwa community was done mostly in the morning hours and the main immediate action was to visit a health facility. Occurrence of consultation outside the household declined as the day drew to a close.

The approach mothers in Kibera took as immediate action upon presumptive diagnosis of illness was quite different from that of Muthurwa (Table 5b). For example, awareness of illness in a child was mostly in the night 83(42.6%), followed by morning 50(25.6%), then mid day 34(17.4%) and lastly evening 28(14.4%). Unlike Muthurwa, there were only 54(27.7%) mothers in Kibera who immediately sought professional diagnosis when they realized their children were beginning to show signs of illness. However, in terms of occurrence there was not much difference between those who visited the health facilities at night (18 mothers) versus those who visited in the morning (19 mothers). A total of 141 out of 195 (72.3%) mothers initiated treatment at home so that out of the 141 mothers, 99(70.2%) of them bought drugs first before seeking professional diagnosis and treatment in a health facility. Those who tepid sponged and observed their children before taking them to a health facility were 32(22.7%) mothers, while those who gave drugs already kept in the house were 10(7.1%) mothers. None of the mothers in Kibera recorded immediate visit to a traditional healer upon realizing her child was beginning to express symptoms of illness; however four mothers eventually sought traditional remedies after initiating treatment in the household.
Table 5(a) Relationship between when mothers recognized illness in children and actions taken.

**MUTHURWA**

<table>
<thead>
<tr>
<th>ACTION TAKEN</th>
<th>TIME OF DAY</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning</td>
<td>Mid-day</td>
<td>Evening</td>
<td>Night</td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Visit HF at immediately</td>
<td>48</td>
<td>30</td>
<td>3</td>
<td>5</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Bought drugs first</td>
<td>16</td>
<td>14</td>
<td>11</td>
<td>6</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Gave drugs in the Hse.</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Observed the baby</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Visited TH</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>49</td>
<td>17</td>
<td>16</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

5(b) Relationship between when mothers recognized illness in children and actions taken.

**KIBERA**

<table>
<thead>
<tr>
<th>Immediate action taken</th>
<th>TIME OF DAY</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning</td>
<td>Mid-day</td>
<td>Evening</td>
<td>Night</td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Visit HF at immediately</td>
<td>19</td>
<td>11</td>
<td>6</td>
<td>18</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Bought drugs first from shop</td>
<td>21</td>
<td>17</td>
<td>20</td>
<td>41</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Bought from pharmacy.</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Observed &amp; sponged the baby</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>26</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>34</td>
<td>28</td>
<td>83</td>
<td>195</td>
<td></td>
</tr>
</tbody>
</table>
The Pearson chi square test for Kibera data showed that there was significant relationship ($\chi^2=32.445$, df = 9, $p<0.01$) between when mothers recognized onset of illness in their children and the immediate action they took. Most mothers in Kibera noticed illness at night and the most preferred action was to administer home treatment. This reveals that once symptoms are present in the children, mothers do not leave them unattended and so it is critical to encourage them to take immediate actions that effectively eliminate such symptoms.

4.2.5 Preventive measures against possible malaria infection

One hundred and twenty nine mothers (87%) in Muthurwa reported using bed nets on their children’s sleeping space (Table 6). In Kibera, only 51(26%) mothers reported to have nets in their children sleeping space. The majority of mothers in Muthurwa used mosquito nets compared to those that did not ($\chi^2=77.760$, df = 1, $p<0.01$), while the converse was true for Kibera ($\chi^2=44.354$, df = 1, $p<0.01$). Nine (7.3%) mothers in Muthurwa acknowledged occasionally using prophylaxis on their children compared to 2(1%) in Kibera. Significantly, fewer mothers used prophylaxis at both Muthurwa ($\chi^2=123.307$, df = 1, $p<0.01$) and Kibera ($\chi^2=187.082$, df = 1, $p<0.01$) respectively. As for use of herbal remedies, 30(20%) of mothers in Muthurwa reported that they sometimes included herbal remedies compared to only three (2%) of those interviewed in Kibera. Majority of mothers in both Muthurwa ($\chi^2=51.627$, df = 1, $p<0.01$) and Kibera ($\chi^2=183.185$, df = 1, $p<0.01$) did not practice prevention of malaria.
Table 6: Preventive measures towards possible malaria infections

<table>
<thead>
<tr>
<th>Preventive measures</th>
<th>MUTHURWA No of responses</th>
<th>MUTHURWA Percentage</th>
<th>KIBERA No of responses</th>
<th>KIBERA Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use bed nets</td>
<td>129</td>
<td>87.0</td>
<td>51</td>
<td>26.0</td>
</tr>
<tr>
<td>Use prophylaxis</td>
<td>9</td>
<td>7.3</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Use herbs</td>
<td>30</td>
<td>20.0</td>
<td>3</td>
<td>2.0</td>
</tr>
</tbody>
</table>

When the mothers were asked on the best method of keeping the mosquitoes away from their houses, 70.1% of mothers in Muthurwa as well as 61.5% mothers in Kibera mentioned the use of bed nets as the most effective method to keep children from possible bites from mosquitoes. A total of 41(35%) mothers in Muthurwa and 25(21.7%) mothers in Kibera had prior knowledge of shading. 71.4% (59%) mothers in Muthurwa and 62(52.1%) mothers in Kibera mentioned other effective ways of shielding their young ones from mosquitoes. The effective ways the mothers mentioned were, burning mosquito repellents at night, covering garbage, use of insect repellents like, Vaseline mosquito repellent, hanging mosquito net, removing stagnant waters near the houses, clearing long grass around the compound.
using herbal remedies. Overall, Kibera had minimal practice of prevention to malaria infection.

A total of 61% of the mothers (Figure 7) were quite knowledgeable on the environment that sustains the breeding and existence of mosquitoes in Muthurwa while mothers in Kibera were 110(56.4%). A total of 43(21.3%) mothers had partial knowledge on why we have mosquitoes in Muthurwa and the mothers in Kibera were 75(38.5%). However, 10% of mothers in Muthurwa and 10(5.1%) in Kibera mentioned irrelevant causes of presence of mosquitoes in that environment. Most mothers correctly attributed presence of mosquitoes to presence of stagnant water, garbage left unburned, litters of tins with water inside, long grass, dirty surroundings, open sewer systems and warm temperatures. Responses that correctly relate why there were mosquitoes in Muthurwa ($\chi^2=60.760$, df = 1, $p<0.01$) and Kibera ($\chi^2=79.231$, df = 1, $p<0.01$) were significantly more than the incorrect ones.

When the mothers were asked on the best method of keeping the mosquitoes away from their households, 98(65.3%) mothers in Muthurwa as well as 58(29.7%) mothers in Kibera mentioned the conventional methods of shielding children from possible bites from mosquitoes (Figure 8). A total of 41(27%) mothers in Muthurwa and 75(38.5%) mothers in Kibera had partial knowledge of shielding. Only 11(7%) mothers in Muthurwa and 62(32%) mothers in Kibera mentioned ineffective ways of shielding their young ones from possible bites from mosquitoes. The effective ways the mothers mentioned were, burning mosquito coils, spraying insecticides, burning garbage, use of insect repellants like Vaseline mosquito repellant, bed nets, draining of stagnant waters near the houses, cutting long grass
Figure 7  
Knowledge on environment that sustains existence of mosquitoes

**MUTHURWA**

- Poor Knowledge: 10.00%
- Averagely Knowledgeable: 28.67%
- Very Knowledgeable: 61.33%

**KIBERA**

- Poor Knowledge: 5.13%
- Averagely Knowledgeable: 38.46%
- Very Knowledgeable: 56.41%
Figure 8  Knowledge on how to keep mosquitoes away

MUTURWA

![Knowledge distribution chart for Muturwa]

KIBERA

![Knowledge distribution chart for Kibera]
and draining and removing tins filled with water. Most of the mothers, in Muthurwa ($\chi^2=78.120$, df = 2, p<0.01) correctly identified ways of keeping mosquitoes away compared to those that had the fatalistic attitude of ‘nothing’ could be done. When responses in Kibera was assessed, there was no significant difference in responses ($\chi^2=2.431$, df = 2, p>0.05). Upon comparing knowledge between the two sites, there was significant difference on responses on how to keep mosquitoes away from households ($\chi^2=91.048$, df = 4, p<0.05)

4.3.0 Household drug administration

4.3.1 Household drug administration prior to professional consultations.

In the study, 69 out of 150 (46%) mothers in Muthurwa at least participated in some form of home treatment, of which, 47(68%), bought drugs from community shops, nine (13%) used self prescribed drugs from the pharmacies, while 13(11.6%) administered medicine from the house reserves(Figure 9). On noting the beginning of illness in their children, 5(7.4%) mothers embraced conventional tepid sponging and observing before seeking help at health facility. The numbers of mothers in Muthurwa who visited health facilities immediately were not different ($\chi^2=0.960$, df = 1, p>0.05) from those who opted for home treatment.

In Kibera, 141 out of 195 (72.3%) mothers participated at least in some form of home treatment, of which, 99(70.2%), bought drugs from community shops, 10(7.1%) bought self prescribed drugs before seeking medical help. The numbers of mothers in Kibera who visited health facilities immediately were significantly less than those who chose home treatment first ($\chi^2=38.815$, df = 1, p<0.01). When actions between the two sites
Figure 9  
Action taken when mothers noticed onset of illness

**MUTHURWA**

![Graph showing action taken in Muthurwa]  
- 54% visited health facility at once  
- 46% treated at home

**KIBERA**

![Graph showing action taken in Kibera]  
- 72% visited health facility at once  
- 28% treated at home
were compared against each other, majority of mothers in Kibera chose home treatment compared to those in Muthurwa ($\chi^2=62.771$, df = 2, $p<0.01$).

The malaria drugs all mothers acknowledged to have bought from the shops were, Falcidin, Metakelfin, Malaraquin, Chloroquin, Halfan, Amobin, Fansidar, Camoquin, Orodan, Amodiaquin and Malaratab. The mothers within Kibera who chose home treatment first were a majority compared to those who visited health facilities immediately.

### 4.3.2 Household drug administration after professional consultation and provision of drugs

In Muthurwa, a total of 96 mothers out of 134 (71.85%) who visited the health facilities reported that the health officers shared the information of causes of illness in their children before leaving the consultation room (Figure 10). This indicates an improved environment where health issues are shared with mothers so that there is possibility of comprehension on the part of the mothers of what is wrong and opportunity for mothers to contribute towards better health in children. However, 38 out of 134 (28.15%) mothers did not know what was wrong with their children or what the health officer diagnosed in their children. Mothers who discussed childhood illnesses with a professional were significantly more than those who did not ($\chi^2=25.785$, df = 1, $p<0.01$).

On the other hand, Kibera site had a total of 137 (83.03%) mothers who visited a health facility and reported that the health officers shared the information on causes of illness in their children before leaving the consultation room. However, 28 (16.97%) mothers did not discuss with the health officers the illness of their children. Mothers who discussed childhood illnesses with a professional were significantly more than those who
Mothers who discussed their child’s illness with a health professional

**MUTHURWA**

- **NO**: 28.15%
- **YES**: 71.85%

**KIBERA**

- **NO**: 16.97%
- **YES**: 83.03%
did not ($\chi^2=72.006$, df = 1, $p<0.01$). When the two sites were compared, there was no significant difference between Mothers who discussed childhood illnesses with a professional and those who did not ($\chi^2=8.566$, df = 1, $p>0.05$).

All those who visited the health facilities were either given drugs, or purchased at the health facility, or took the prescription to a pharmacy and bought the medicine (Table 7). For mothers in Muthurwa who eventually ended up in health facilities, 103(76.8%) were given the prescribed drugs from the health facilities they visited and 10(7.4%) purchased the drugs from a pharmacy, while 21(15.8%) bought the recommended drugs from the very health center's pharmacy.

In the Kibera study, 125(75.8%) mothers reported to have received the prescribed drugs from the health facilities they visited. A total of 22(13.3%) bought the recommended drugs from a pharmacy. Another 18 (10.9%) mothers got prescription from a health facility and bought the recommended drugs in the pharmacy section of the very health facility. Chi square analysis showed that significantly more mothers in Muthurwa ($\chi^2=115.627$, df = 2, $p<0.01$) and Kibera ($\chi^2=133.782$, df = 2, $p<0.01$) were given prescribed drugs from the health facilities they visited compared to those that bought drugs either from health facilities or pharmacies. However, when acquisition of drugs between the two sites was compared, there was no significant difference ($\chi^2=6.762$, df = 4, $p>0.05$).
Table 7  How the mothers acquired the drugs

<table>
<thead>
<tr>
<th>Source of drugs</th>
<th>MUTHURWA</th>
<th>KIBERA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of responses</td>
<td>Percentages</td>
</tr>
<tr>
<td>Given at the clinic</td>
<td>103</td>
<td>76.8</td>
</tr>
<tr>
<td>Purchased at the clinic</td>
<td>10</td>
<td>7.4</td>
</tr>
<tr>
<td>Purchased at pharmacy</td>
<td>21</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>100</td>
</tr>
</tbody>
</table>
According to mothers in both study sites, the drugs that was prescribed to them in the health facilities was received after the health professionals explained dosage to them. With regard to compliance to prescription, 131(87.3%) in Muthurwa and 150(76.9%) in Kibera, either completed the whole prescription given or discarded the left-over drugs. A total of 19(12.7%) in Muthurwa and 45(23.1%) did not comply with the instruction given in the health facilities and stored medication in the house for future use. The mothers that kept drugs did so because the respondents felt that another member of the family may use it at a later date. Others did so because they continually forgot to give medication at the recommended time, or because symptoms disappeared, or there was presumed recovery.

4.4.0 The care seeking patterns

4.4.1 Sequence of care seeking in households

Mothers who visited 'Health facility only' in Muthurwa were 61(43.3%) and those in Kibera were 54(27.6%) (Table 8). The next group of mothers who followed the sequence 'home treatment-visiting health facility' were 45(28.7%) in Muthurwa and 109(55.6%) in Kibera. Another group of mothers who followed the sequence 'Visited health facility-Visited traditional healer' were 17(11.3%) in Muthurwa while Kibera had none. As for the sequence 'Home – Health facility – Traditional healer' 11(6.7%) mothers from Muthurwa were registered while Kibera had none. Those who ‘Home treated only’ were 12(6.7%) mothers in Muthurwa and 30(15.3%) mothers in Kibera. Those who visited traditional healer only were 2(1.3%) mothers in Muthurwa and Kibera had none. There were 2(1.3%) mothers in Muthurwa and 3(1.0%) in Kibera who followed the sequence ‘Home treatment – Traditional healer’. 

1
Table 8. Sequence of Care-seeking

Number and percentage of cases following a given sequence of care-seeking

<table>
<thead>
<tr>
<th>Sequence</th>
<th>MUTHURWA</th>
<th>KIBERA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of respondents</td>
<td>% of respondents</td>
</tr>
<tr>
<td>Home→HF</td>
<td>45</td>
<td>28.7</td>
</tr>
<tr>
<td>Health Facility</td>
<td>61</td>
<td>43.3</td>
</tr>
<tr>
<td>HF→TR</td>
<td>17</td>
<td>11.3</td>
</tr>
<tr>
<td>Home → HF → TR</td>
<td>11</td>
<td>7.4</td>
</tr>
<tr>
<td>Home {END}</td>
<td>12</td>
<td>6.7</td>
</tr>
<tr>
<td>Home → TR</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Traditional remedy</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

Home=home treatment; HF=Health facility; TR= traditional remedy
Pearson chi square test was carried out to assess relationship between the sequences mothers under took and whether they complied with treatment prescription as was instructed [df=(r-1) (c-1)]. In the sequence ‘Treated at home only’ (Table 9), mothers in Muthurwa ($\chi^2=58.882$, df = 1, p<0.01) and Kibera ($\chi^2=118.182$, df = 1, p<0.01), who did not give medicine as were instructed, were significantly more than those that did. There is therefore a significant relationship between drug utility in households and the sequence ‘Treated at home only’ in this study. In the sequence ‘Treated at home- Visit health facility’ (Table 10), mothers in Muthurwa ($\chi^2=9.324$, df = 1, p<0.01) and Kibera ($\chi^2=41.864$, df = 1, p<0.01) who complied with treatment guidelines were more than those that did not. There is therefore a significant relationship between drug utility in households and the sequence ‘Treated at home- Visit health facility’. In the sequence ‘Visit health facility only’ (Table 11), mothers in Muthurwa ($\chi^2=8.191$, df = 1, p<0.01) who complied with treatment guidelines were more than those that did not. On the other hand, mothers in Kibera ($\chi^2=2.872$, df = 1, p>0.05) did not have significant variation on how they complied with treatment guidelines. There is therefore a significant relationship between drug utility in households and the sequence ‘Visit health facility only’ in Muthurwa and not in Kibera. In the sequence ‘Treated at home- Visit health facility- Used herbal remedy’ (Table 12), responses of mothers in Muthurwa ($\chi^2=0.137$, df = 1, p>0.05) on how they complied with treatment guidelines were not different. There is therefore no significant relationship between drug utility in households and the sequence ‘Treated at home- Visit health facility-Used herbal remedies’ in Muthurwa.
Table 9a. Relationship between the sequence ‘Treated at home only’ and mothers compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
<th>Gave medicine as was instructed</th>
<th>Treated at home only</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>10</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>129</td>
<td>9</td>
<td></td>
<td>138</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td>19</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

Table 9b. Relationship between the sequence ‘Treated at home only’ and mothers compliance to prescription instruction in Kibera.

<table>
<thead>
<tr>
<th>Gave medicine as was instructed</th>
<th>Treated at home only</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>30</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>No</td>
<td>150</td>
<td>15</td>
<td></td>
<td>165</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>45</td>
<td></td>
<td>195</td>
</tr>
</tbody>
</table>
Table 10a. Relationship between the sequence ‘Treated at home – Visit health facility’ and mothers compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
<th>Treated at home only</th>
<th>Gave medicine as was instructed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>45</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>19</td>
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<tr>
<td></td>
<td>Total</td>
<td>105</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>131</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

Table 10b. Relationship between the sequence ‘Treated at home – Visit health facility’ and mothers compliance to prescription instruction in Kibera.

<table>
<thead>
<tr>
<th>Treated at home only</th>
<th>Gave medicine as was instructed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>102</td>
</tr>
<tr>
<td></td>
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<td>No</td>
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<td>Total</td>
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<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>195</td>
</tr>
</tbody>
</table>
Table 11a. Relationship between the sequence ‘Visit health facility only’ and mothers compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
<th>Treated at home only</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
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<tbody>
<tr>
<td>Yes</td>
<td>59</td>
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<td>No</td>
<td>72</td>
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<tr>
<td>Total</td>
<td>131</td>
<td>19</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 11b. Relationship between the sequence ‘Visit health facility only’ and mothers’ compliance to prescription instruction in Kibera.

<table>
<thead>
<tr>
<th>Treated at home only</th>
<th>Yes</th>
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<th>Total</th>
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<tr>
<td>Yes</td>
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<td>8</td>
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<tr>
<td>No</td>
<td>104</td>
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<tr>
<td>Total</td>
<td>150</td>
<td>45</td>
<td>195</td>
</tr>
</tbody>
</table>
Table 12. Relationship between the sequences ‘Treated at home – Visit health facility – Used traditional remedies’ and mothers’ compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
<th>Gave medicine as was instructed</th>
<th>Treated at home only</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>18</td>
<td></td>
<td>139</td>
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<tr>
<td>Total</td>
<td>131</td>
<td>19</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>
In the sequence ‘Visit health facility – Used herbal remedies’ (Table 13), Muthurwa mothers ($\chi^2=0.798$, $df=1$, $p>0.05$) who complied with treatment guidelines were more than those that did not. There is therefore significant relationship between drug utility in households and the sequence ‘Visit health facility- Used herbal remedies’ in Muthurwa. In the sequence ‘Treated at home- Used herbal remedies’ (Table 14), mothers who did not comply with treatment guidelines were more than those that did in Muthurwa ($\chi^2=21.106$, $df=1$, $p<0.01$). However, there was no major variation in responses among mothers in Kibera ($\chi^2=0.914$, $df=1$, $p>0.05$). There is therefore a significant relationship between drug utility in households and the sequence ‘Treated at home- Used herbal remedies’ in Muthurwa and not in Kibera. In the sequence ‘Used herbal remedies only’ (Table 15), mothers who did not comply with treatment guidelines were more than those that did in Muthurwa ($\chi^2=13.976$, $df=1$, $p<0.01$), while there was no major variation in responses among mothers in Kibera ($\chi^2=0.302$, $df=1$, $p>0.05$). There is therefore a significant relationship between drug utility in households and the sequence ‘Used herbal remedies only’ in Muthurwa and not in Kibera.

4.5.0 Decision making process in households

4.5.1 Husbands’ preferred site for referral and the occupation of their spouses

In household having couples, husbands were consulted by their wives on where to take the sick children for treatment (table 16). Most of the fathers preferred taking their
Table 13. Relationship between the sequences ‘Visit health facility – Used herbal remedies’ and mothers compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
<th>Treated at home only</th>
<th>Yes</th>
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<td>18</td>
<td>133</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td>19</td>
<td>150</td>
</tr>
</tbody>
</table>
Table 14a. Relationship between the sequences ‘Treated at home – Used traditional remedies’ and mothers compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
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<tbody>
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<td>3</td>
<td>3</td>
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<tr>
<td>No</td>
<td>131</td>
<td>16</td>
<td>147</td>
</tr>
<tr>
<td>Total</td>
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<td>19</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 14b. Relationship between the sequences ‘Treated at home – Used herbal remedies’ and mothers compliance to prescription instruction in Kibera.

<table>
<thead>
<tr>
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<th>Total</th>
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</thead>
<tbody>
<tr>
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<td>0</td>
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</tr>
<tr>
<td>No</td>
<td>147</td>
<td>45</td>
<td>192</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
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<td>195</td>
</tr>
</tbody>
</table>
Table 15a. Relationship between the sequences ‘Used traditional remedies only’ and mothers compliance to prescription instruction in Muthurwa.

<table>
<thead>
<tr>
<th>Gave medicine as was instructed</th>
<th>Yes</th>
<th>No</th>
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</tr>
<tr>
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<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>131</td>
<td>17</td>
<td>148</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td>19</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 15b. Relationship between the sequences ‘Used traditional remedies only’ and mothers compliance to prescription instruction in Kibera.

<table>
<thead>
<tr>
<th>Gave medicine as was instructed</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated at home only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>149</td>
<td>45</td>
<td>194</td>
</tr>
<tr>
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</tbody>
</table>
Table 16(a) Relationship between husbands preferred sites for treatment and mothers occupation in Muthurwa

<table>
<thead>
<tr>
<th>MOTHERS OCCUPATION</th>
<th>PREferred Sites</th>
<th>Employed</th>
<th>Business</th>
<th>Unemployed</th>
<th>Total</th>
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</thead>
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<td>Health facility</td>
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<td>Traditional remedies</td>
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<td>Employed</td>
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<td>27</td>
<td>59</td>
<td>92</td>
</tr>
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</table>

Table 16(b) Relationship between husbands preferred sites for treatment and mothers occupation in Kibera

<table>
<thead>
<tr>
<th>MOTHERS OCCUPATION</th>
<th>PREferred Sites</th>
<th>Employed</th>
<th>Business</th>
<th>Unemployed</th>
<th>Total</th>
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<tr>
<td></td>
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<td>Employed</td>
<td>9</td>
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<td>65</td>
<td>96</td>
</tr>
</tbody>
</table>
children to health facilities (82 in Muthurwa and 77 in Kibera) when they were sick. In addition, when fathers were consulted, 6(6.6%) in Muthurwa and 29(27.4%) in Kibera opted for purchase of drugs for self medication from shops or pharmacies. There were four (4.4%) fathers in Muthurwa who advised on taking the sick children to a traditional healer. Unlike Muthurwa, Kibera mothers did not have any father who chose to take their child to a traditional healer upon consultation.

When Pearson chi-square test was applied, there was no significant relationship between source of help husbands chose (when consulted) and the occupation status of the mothers in Muthurwa ($\chi^2=10.699$, df = 5, $p>0.05$) and in Kibera ($\chi^2=9.551$, df = 4, $p>0.05$). Therefore, there was no significant relationship between husbands' preferred site for treatment and the mothers' occupation [df=(r-1)(c-1)].
5.1.0 Knowledge of cause of malaria, malaria symptoms and symptoms acted upon

The findings of this study show that the respondents attributed the cause of malaria to mosquitoes. This is consistent with known scientific aspects of the disease. The association of presence of mosquitoes to malaria is common amongst Kenyans following encouragement by the Ministry of Health for households to acquire treated mosquito nets for children under five. Knowledge that relates malaria to mosquitoes has been associated with high acceptance of measures aimed at control of the disease. Similar findings have been reported in studies carried out in Uganda (Njama et al., 2003), Colombia (Nieto et al., 1999) and Malawi (Ziba et al., 1994). Urban caregivers are aware of the relationship between malaria and mosquitoes probably because they have higher levels of education, greater access to media-information, and are in contact with modern health services than their rural counterparts (Tarimo et al., 1998; Molyneux et al., 1999).

Presence of mosquitoes and experienced mosquito bites in children apparently provided a firm foundation as to why mother's readily presumed initial fever in under-fives meant malaria infection. There was also an apparent unawareness among the respondents that even malaria-causing mosquitoes are specific with a specified habitat. Only one young mother in Kibera positively identified the female Anopheles as the vector for the malaria experienced in Kenya. During the FGD in Muthurwa mothers also attributed possible transmission to be when children were out playing in the grass. Although Anopheles usually does not stay in the grass, nuisance mosquitoes do, thus the notion that they also transmit malaria (Stevens, 1984). This highlights a problem where accurate knowledge of etiology
and transmission is sometimes unrelated to appropriate treatment when a child presents initial signs of illness and required medication.

Some respondents also believed in other possible causes such as staying long hours in the sun, cold weather and unhygienic surroundings. This suggests that even though there is correct belief on etiology, traditional myths have not been done away with completely. It is therefore not clear if such mythical beliefs have any significant role in limiting the acceptance of measures aimed at controlling the disease. This is in view of the reasoning that those who do not associate mosquitoes to the disease are unlikely to protect themselves from possible mosquito bites and when they do, they may continue to be exposed in other activities. It is therefore critical to understand cultural beliefs of the disease so that mothers are educated on how to manage the illness (Munguti, 1998; Ryan, 1998; Tanner and Vlassoff, 1998).

In both sites, knowledge of the environment that sustains the presence of mosquitoes was evidently high [92(61%) in Muthurwa and 110(56.4%) in Kibera]. Mothers in Kibera were quite aware of why their environment was sustaining the breeding and presence of mosquitoes. When asked on how best to keep them away, there was a sense of 'nothing' could be done. This is consistent with an observation made by Mwenesi et al.,(1995). According to Mwenesi, childhood malaria is considered a mild illness, transient in nature and inevitable. Therefore, even though they correctly associate malaria with mosquitoes, treatable with modern medicine, there was an apparent fatalistic attitude. The indifference may have been borne out of limited resources that already exist in some of the households.
While Muthurwa residents were apparently quite interested in prevention and control on possible bites and infection of malaria, the respondents from Kibera did not indicate widespread use of bed nets. Being employees of stable companies like Kenya Railways, Muthurwa residents were more financially able to buy basics like beds and mosquito nets. Such results compares well with a study carried out by Obinna et al., (2003) who reported that individuals that earned regular monetary income, for instance, small traders and those employed in formal regular wage-earning sectors were more likely to purchase bed nets. In comparison, some families in Kibera had cases where both the mother and father were unemployed or the mother was a ‘teenage’ still living in the parents’ house. Such situations hindered access to nets. Poor people who practice minimal preventive measures are at risk both of becoming infected with malaria and of becoming infected more frequently (Guyatt et al., 2002). This was also the case in a survey in Zambia which reported that prevalence of malaria infection among the poorest population was substantially high compared to those in stable incomes (Roll Back Malaria National Secretariat, 2001). The low utility of bed nets in Kibera reflects a UNICEF (2003) report, which shows that less than 20% of Kenya’s under five’s sleep under insecticide treated nets and one of the leading factors is poverty.

Other measures taken to prevent mosquito bites in both sites were burning of coils and fanning with cloths. Such measures are ineffective and prolonged exposure to burning coils is believed to cause catarrh (Ahorlu et al., 1997). Buying coils may also seem affordable yet expensive when purchase is accounted for after one year. This makes it necessary for respondents, in both sites, to be encouraged to acquire insecticide treated nets which can remain effective for as long as five years though purchase price may seem
prohibitive. All indications during the study were that Kibera mothers desired to use bed nets but one main hindering factor was cost.

House structures are also important in protecting children from mosquito bites (Ahorlu et al., 1997). Those in Muthurwa had broken windows that were left un-repaired, thus easy entrance by mosquitoes at night. Kibera also had houses that were either semi permanent or temporary make-shifts. Most of the houses in both sites had unscreened windows or door ways as well as open eaves. Human dwelling with any opening more than 1.4mm across (Ahorlu et al., 1997), can allow mosquitoes into a house to bite thus possible infection of malaria. Given that the houses (especially in Kibera), provided no protection to the inhabitants at night (the peak biting period of *Anopheles* mosquito vectors), there was a high chance for mosquitoes to feed on the unprotected children. The immediate and effective protection to the under fives in both communities is use of ITN’s; a practice which is yet to be widely practiced in Kibera.

Emphasis on the importance of using ITN’s should be stepped up in this community so that its residents become actively aware of the greater protection their children will experience. Insecticide treated nets have been shown to reduce numbers of mosquitoes as well as other insect pests such as head lice and bed bugs (Ahorlu et al., 1997). Not only does the ITN act as a barrier to mosquito bites, but also the insecticide repels, inhibits or kills any mosquito attracted to feed. Insecticide treated nets therefore provide protection to children sleeping under it together with others in the household and the community at large (UNICEF, 2003). In response to low re-treatment rates of conventional ITNs in Africa, WHO prompted industry to develop long-lasting insecticidal nets (LLINs)-ready-to-use, factory-pretreated nets that require no further treatment during their expected lifespan of 4-
5 years (Guillet et al., 2001). This strategy adequately addresses even the opportunity for all under fives to be protected during the initial five years and the burden of infection will be significantly reduced in such poor households.

The clinical picture of malaria ranges from mild discomfort to severe disease symptoms that may present in convulsions (Skovbølling; 1999). The features are very diverse, but the majority of attacks develop over a non-symptomatic incubation period of 6-14 days into a pattern of fever attacks. The signs of mild symptoms that are advised in the malaria manual to be acted upon are fever, headache, joint pains and general body malaise (Skovbelling; 1999). When the mothers in the study were asked to mention what they perceive as symptoms of malaria and those that they acted upon, they mentioned mainly fever, vomiting, sweating, shaking or shivering, loss of appetite, crying and irritability as well as headaches. Mothers in this study were clearly aware of pre-illness signs such as irritability, loss of appetite and less activity. Such signs may have led to awareness of fever soon after it was manifest in the children. A similar behavioral response from caregivers was also reported in Baume et al., (2000). Most of the biomedical acclaimed symptoms were similar to the ones mentioned in this study and each illness episode reported was not necessarily associated with all the recorded symptoms.

The identification of malaria by correct symptoms is important as there has been a concern that the use of common symptoms such as fever and headache may lead to over reporting of the disease. Not all cases of fever are malaria but could be, a virus infection giving similar symptoms (Munguti, 1998). However it also important to note that as in other studies (Baume et al., 2000; Tarimo et al., 2000), mothers should promptly act on illness symptoms like fever since late diagnoses can be fatalistic. Such adverse results in
illness may lead to negative responses to health interventions and therefore under utilization of modern health facilities. Just as in Munguti’s study (1998), respondents in Muthurwa and Kibera defined sickness with description of symptoms that were present in an illness episode. Talking about the symptoms provided the researcher and the respondents the opportunity to discuss the same phenomenon.

The mothers’ ability to identify clinical malaria has been studied in some detail in Africa. For instance, studies from Nigeria and Tanzania indicate mothers have low recognition (Molineaux & Gramiccia 1981; Tarimo et al., 1998), while a high recognition rate of malaria symptoms has been reported from Kenya (Ruebush et al., 1995, Munguti 1998, Baume, 2002a). When fever and other symptoms were noticed in the children in this study, mothers (irrespective of the household cash situation) had a clear understanding on how to address the illness. Those who had the means (cash) immediately visited the health facilities of choice. Those with inadequate cash opted for OTC drugs or ‘tepid sponged’ their children until their spouses/relatives were home to provide the cash necessary. This shows that mothers in this study have the potential to correctly manage malarial fevers at home and consult a modern health facility when they are enabled to do so. Such positive attitudes and practices should be reinforced during health interventions for the reduction of morbidity of childhood malaria through improved household case management (Tarimo et al., 2000).

In the recent times, home-based management of fever (HBMF) is considered a promising strategy for improving the coverage of prompt effective treatment. Community health workers and mothers of young children are trained in the recognition of symptoms
and the benefits of prompt drug administration. Such programmes were launched in Ghana, Nigeria and Uganda in June 2002 (UNICEF, 2003). A concluded randomize trial in Ethiopia indicated that the under fives mortality was reduced by 40% as a result of teaching mothers to provide prompt chloroquine treatment for fevers at home (Kidane and Morrow, 2000). Since Kibera mothers were more receptive to home-based management of fever, they ought to have training in the recognition of symptoms and benefits of prompt drug administration.

Muthurwa results were similar to other previous studies which indicated that urban treatment patterns hinge mainly on visiting the health facilities first (Njama et al., 2003). Kibera on the other hand, depicted a rural form of treatment pattern, so that self medication began at home before patients were presented to a health facility (Lubanga et al., 1997, Hamel et al., 2000). Such variations confirm that sequence of care might vary between or even within urban centers. For this reason, locally generated data are important and should be considered during planning, implementation and evaluation of control strategies. Such logistics are critical when important health decisions are made for a city such as Nairobi.

5.2.0 Household drug administration and the sequence of care

In general, the findings show that mothers were quite observant and had insight in monitoring their children’s illnesses. They were aware of and know by name which OTC drugs to use [62% in Muthurwa and 76% in Kibera] and showed some basic diagnosis based on prognosis of each symptom or initial diagnosis. The type of therapy selected amongst these mothers and the lapse between onset of illness and remedial action taken
seemed to depend on perceived etiology, availability of money, time of day, similarity with previous experience and perceived seriousness.

In Muthurwa, only 46% mothers participated in self medication while the rest (54%) relied on health facility diagnosis and drug administration. Specific findings from Kibera show that there was widespread practice of self medication even where health facilities are readily accessible. Home treatment for uncomplicated malaria is common (Djimde et al., 1998) and the results depicted in Kibera (72.3% home treated) confirms a situation that is probably prevalent in most parts of Africa continent (Thera et al., 2000). In addition shop owners in this community were a major source of oral drugs that were used on the onset of illness. A similar scenario where local shops/kiosks provide readily accessible drugs to communities in Kenya has also been reported by Marsh et al., (1999) and Snow et al., (1992). The implications here is that shopkeepers should be made partners in health care network so that they are provided with information about the dosages and appropriate use of drugs which consequently is passed on to their customers. It is critical that these shop owners be trained by a trusted agency (Marsh et al., 1999) so that policies from the ministry of Health are up to date and harmonized not only in the study sites but the whole country.

Another important finding in this study is that mothers in both sites generally treated their children promptly, within 24 hours of onset of illness. Although in both sites home treatment was done for the children as an initial response, it appeared that such treatment did not replace or cause unduly delay for going to the health facility. The mean average of one day indicated that there was fairly prompt treatment on the children by a formal health provider though in some cases initial treatment may have abated symptoms or prolonged the home monitoring period thus causing a delay in seeking treatment in a health facility.
Even though the average period when children were presented to a health facility in Baume et al., (2000) was 48 hours, home treatment (as was the case in this study) did not replace or unduly delay going to the health facility. Similar findings have been reported by Thera et al., (1998). These positive attitudes and practices should be reinforced during health interventions for the reduction of severe morbidity from childhood malaria.

Given that majority of mothers (84.2% in Muthurwa and 86.7%) were given/purchased their medication from the health facilities that they visited; it is an indication that these referral sites had relevant medication for the childhood illnesses in their environs. The mothers therefore had confidence in these facilities had adequate provision for both professional consultation and necessary drugs for childhood illnesses. Muthurwa is a residential place that is right in the city centre, thus option for buying drugs from pharmacies in the city centre is also practiced by some mothers (16%). Mothers in Muthurwa had seven established patterns of care. This suggests that even though these mothers sought help from health facilities first whenever symptoms persisted, they also sought other alternatives like using herbal remedies or over the counter drugs. Such habits predisposed mothers to acquiring medication above and beyond what was necessary for an illness episode; thus there was a possibility of future misuse of drugs when illness symptoms appear.

Even though over half of the respondents (57% in Muthurwa and 52% in Kibera) complied with prescription instructions that they received from the health facilities, a recognizable number in this study (43% in Muthurwa and 48% in Kibera) had a tendency of reserving medication for future use in the household. In Yeboah-Antwi et al., (2001), it is reported that prepacked anti-malarial drugs improved compliance amongst mothers.
Compliance to medication for malaria infection is very critical. One way of ensuring adequate treatment of presumptive episodes of clinical malaria in both Muthurwa and Kibera would be through pre-packed drugs. Upon appropriate training and adequate pre-packed drugs made available (Sirima, 2003), mothers in Muthurwa and Kibera can recognize and treat promptly and correctly malarial episodes in their children. By so doing, the two communities would reduce the incidence of severe disease and thus mortality.

Antimalarial drug resistance has become one of the greatest challenges of treatments in Kenya (UNICEF, 2003). Resistance to chloroquine became evident in the early 1980’s but the change in policy had a time lag of several years until 1998 when it was implemented (UNICEF, 2003). Resistance of *Plasmodium falciparum* to the most affordable alternative drugs such as sulphadoxine/pyremethamine (SP), is also an emerging problem in eastern and southern Africa (UNICEF, 2003), so that Kenya currently is at the initial stages of implementing artemisinin-based combination therapies (ACT’s). Artemisinin-based combination therapies however, are not immediately going to be widely available as a single dose could cost as much as five hundred shillings. Such high cost medication may not be readily available to low income communities like Muthurwa and Kibera. This is why agencies like Population Services International (PSI) are currently involved in the largest malaria social marketing project that hopes to increase use of ITNs to about 60% (UNICEF, 2003). This is believed to be the cheapest alternative that ought to be emphasized (UNICEF, 2003).

Whenever traditional treatment was mentioned (20% in Muthurwa and 2% in Kibera) as was in the majority of cases, it was accessed through a herbalist while the mother administered it. A possible explanation to the few reports in the study is that,
mothers might have denied it if they perceived the interviewing team as belonging to health services. As was the case for some children who were taken to traditional healers when the symptoms persisted, studies like Thera et al., (2000) and Tarimo et al., (1998) have reported communities who deviate from utilizing health facilities for traditional remedies.

5.3.0 Decision-making in households

Upon realizing a child was sick, a spouse was either immediately, or at a later moment, consulted. Consulting the man immediately (85% in Muthurwa and 78% in Kibera) was because the mother believed it was expected of them by protocol, or it was because the man was the breadwinner in the household. Mothers on the overall viewed themselves as the ones responsible to nurse the sick baby and be the ones to take them to the preferred source of treatment.

This compares well with previous documentations which indicate that mothers are mainly the caretakers of ill children in Africa and decision-making at households level is initiated by women, but men often make the financial contributions necessary (Mwenesi 1993, Vlassoff et al., 1995, Ryan, 1998). This also indicates that the social status of the individual with an ill child, affects the steps from concern about an illness to the decision to seek help (Vlassoff, 1994, Nyamongo, 2002).
CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1.0 Conclusions

The following are the conclusions that were highlighted in the study;

1. Majority of mothers in Muthurwa (91.3%) and Kibera (97.4%) had knowledge that correctly associates mosquito bites and perceived malaria infections in the study sites. Knowledge that relates malaria to mosquitoes is associated with high acceptance of preventive measures aimed at control of the disease. A typical example was the use of mosquito nets that was evident in Muthurwa. However, some of the respondents also believe in other possible causes of the disease thus suggesting multcausal beliefs about malaria though there is correct belief in etiology.

2. There is a relationship between household drug administration and sequence of care. The mothers who did not comply with administering medication as instructed by the health professionals were more likely to participate in more than one sequence of care.

3. There is a relationship between the time when mothers noticed onset of illness symptoms and the type of actions that the mother took to address the symptoms of illness. Mothers in Kibera (72.3%) recognized illness between evening and night while those in Muthurwa (57.4%) recognized illness between morning and midday.
The actions that mothers in Kibera took were buying OTC drugs, tepid sponging and observing the children for a while. Those in Muthurwa mostly participated in visiting the health facility at once, though there were those who also practiced tepid sponging, using OTC drugs and observing the child for a while.

4. There is no relationship between where fathers preferred as the site for treatment for their children (upon consultations) and the employment status of the mothers in the household. This may be partly explained by the perception (expressed in FGD discussion) that it's the responsibility of mothers to nurse the sick child while the fathers provide for medical finances necessary.

6.2.0 Recommendations

The following are the recommendations made from the study;

1. Emphasis on the importance of using ITNs should be stepped up in Kibera community so that its residents become actively aware of the greater protection their children will experience. Since cost is considered a major reason for the low utilization, policy-makers and other related public organizations should consider subsidizing part of the cost of ITNs to enable families to invest in them.

2. The government should take advantage of existing community organizations and structures to disseminate information about the importance of completing the anti malaria dose. The potential existing structures such as under-five clinics and community health workers should be tapped.
3. Since shop owners in Kibera were a major source of oral drugs used on suspicion of malaria, consideration ought to be made by the government on how to make them partners in health care network so that they are provided with information about dosages and appropriate use of drugs. It is critical that these shop owners be trained by a trusted agency so that inappropriate use of drugs can be significantly reduced.

6.3.0 Suggestions for further research

1. A study should be carried out in Kibera to assess the socio-economic reasons why there is low use of treated bed nets for under-fives in the community.

2. A study should be carried out in Muthurwa and Kibera to establish how shop owners could be made partners in health care network and how they can be assisted in developing their educative role.

3. Cost of services is one of the predictors that may be further investigated so that its relationship with choice of referral sites is established.
REFERENCES LIST


Sirima, S.B. (2003) Self treatment with pre-packaged antimalarials in Burkinafaso. Tropical Medicine and International Health 8;133-139


CROSS-SECTIONAL SURVEY QUESTIONNAIRE

(I) Instructions for interviewer

1. Interview all mothers or caretakers of children under 5 in selected compounds or households
2. Circle all answers given
3. Do not read out answers to respondents
4. Write in answers if response is not covered by checklist

(ii) Identification

1. Community name:
2. Clinic present? Yes-------- No--------
   Name---------------------------------------------------------------------
3. Interviewer--------------------------------------------------------------
4. Date of interview-------------------------------------------------------
5. Time interview started--------------------------------------------------
6. Time interview concluded------------------------------------------------
7. House number/ house identification--------------------------------------

(iii) Introduction

I am doing health research in this community. I am trying to learn more about health problems here, and am very grateful to you for agreeing to talk with me. May I ask you a few questions about malaria?
A. Socio-economic and demographic data.

1. What is your name?

2. Where do you come from?

3. What is your marital status?
   (A) Single Parent---------  (B) Married---------

4. When were you born?
   Year----------------------

5. How many children do you have?

6. When was your first child born?
   ------------------------Year

7. When was your last child born?
   --------------------------Year

8. Do you have any child that is less than five years old?
   Yes
   No

9. How many are they?
   ------------------------Children

10. Did you attend any schooling during your childhood?
    Yes----------------------
    No----------------------

11. What is your highest level of schooling?
    Lower primary
    Class eight
Form four

Tertiary level

Other------------------------

12. What is your religion?

Christian------------------------

Muslims------------------------

Others------------------------ (Specify)

13. What is the occupation of your husband? (DO NOT ASK THIS IF SHE IS A SINGLE PARENT)

Job title------------------------

14. What is your occupation?

Job title------------------------

15. Has your child/children had malaria during the last three months? (IF NO PROBE FOR FEVER)

Yes------------------------

No------------------------

B. Household treatment seeking behaviours including those surrounding drugs.

1. Is malaria a problem here?

2. What causes malaria?

Sun ---------Mosquitoes---------Unhygienic surroundings---------Cold weather-----

Others--------

3. Has your child/children had the following symptoms/problems at any time in the last three months/presently.
YES---------No-----------DK (don’t know)

Fever
Vomiting
Sweating
Shaking
Shivering
Loss of appetite
Crying and irritable
(DK-Don’t know)

4. You have mentioned that during the past three months/presently (NAME) had fever?
Yes-----------------------------
No-------------------------------

5. At what time of the day did you recognize the onset of the symptoms?
Time-------------------------
DK----------------------

4. What are the symptoms that made you categorize (NAME) as ill/sick?

5. What was/is the next thing that you did?

6. Why?

7. When your child/children had a fever did/have you seek/sought care outside the home?
Yes-----------------------------
No-------------------------------
8. Which provider did you go to first?

Government hospital/clinic
Private clinic
Pharmacy
Shop
Traditional Healer
Relative or Friend
Other----------------------------- (Specify) DK---------------------

9. After you noticed the fever, how soon did you take (NAME) to seek help?

1. Same day
2. After two days
3. After three days
4. After one week
5. Other---------

PROBE IF MORE THAN 12 HOURS

10. Did/has the hospital/clinic tell/told you that your child/children had malaria?

(a) Yes--------------------------------
(b) No--------------------------------

11. Did/has the hospital/clinic prescribe (d) any tablets or syrup to cure your child/children of malaria?

Yes---------------------------------
No---------------------------------
12. Did/have you get/gotten the medicine for your child/children?
Yes----------------------------------
No----------------------------------

13. What was the name of the medicine in the tablets or syrup?
RECORD ALL MENTIONED RESPONSES
DO NOT PROMPT

14. Did/has the doctor who provided you the medicine explain(ed) how to give it
to your child/children?
LET HER RELATE HOW SHE UNDERSTOOD IT

15. Were/are you able to give your child/children the medication as was instructed
by the doctor?
(a) Did some remain?
(b) If yes, where was it taken?
(c) Why?

16. Did (have) you finish giving all of the recommended medicine to your
child/children?
IF NO PROBE WHY?

17. What was/is the form of medication?
Syrup------ Capsule------ Tablets------Powdered------

18. How many tablets or parts of tablets were (have you been) given to your
child/children?
PROBE FOR PARTS OF TABLETS AND NUMBER OF WHOLE TABLETS
GIVEN
19. How did/have you get/gotten the medicine?

Given at the clinic

Purchased it at the clinic

Purchased it at the Pharmacy

Purchased it at the shop

Had/have it at home

Friend/Relative gave (has given) it to me

Other--------------------------------------------------------------- (SPECIFY)

20. Why did/have you not obtain the medicine?

Clinic had run out

Shop/pharmacy had run out

Clinic too far

Cost too high

Other-------------------

21. At the facility or clinic, was/has your child/children (been) given an injection?

Yes--------------------------------- No-----------------------------

22. What was/is the name of the injection?

Chloroquine-------------------

Quinine----------------------

Tetracycline------------------

Other------------------------

DK--------------------------

IF MORE THAN ONE, CIRCLE ALL RESPONSES
23. In your opinion, what is the best medicine for young children when they have malaria?

CHLOROQUINE + ASPIRIN/PANADOL

CHLOROQUINE ONLY

ASPIRIN/PANADOL ONLY

FANSIDAR

FANSIDAR + ASPIRIN/PANADOL

CAMOQUINE

OTHER

DK

Health maintaining (preventive) measures in the household

1. What causes malaria?

2. Do you think there are a lot of mosquitoes around here?

3. What time of the day are they mostly experienced?

4. Why do you think we have mosquitoes in your environment?

5. What do you do to keep them away?

6. Do you use a bednet on your child/children bed/sleeping space?

   Yes

   No

7. Do you give tablets/syrup to prevent your child/children from malaria attacks?

   Yes

   No

8. Do you use herbals medicine for maintaining your child’s health?
Yes

NO

9. Where do you get it?

Traditional healer

Natural environment

Others------------------------ (Specify)

Treatment-seeking pathways in the household

(a) Consultations with the traditional healer

23. How long have you lived in your present home?

-----------------------Years

24. Do you know someone in this or another village who treats people with traditional medicine?

25. How far is the nearest one from your home?

26. What is the specialisation of this traditional healer?

Herbalist------------------------

Faith healer------------------------

Diviner/mganga------------------------

Others------------------------ (Specify)

27. At what stage of the child's illness do you prefer a traditional healer to an established health clinic?

28. Why?

29. What are the management instructions that you normally receive from the Traditional Healer at this stage of the child's illness?
30. Did the child feel better after the treatment?
   Yes-----------------------
   No-----------------------

31. If yes, how soon?
32. Did you do anything else?
   Yes-----------------------
   No-----------------------

33. Give reasons for your response/actions.

34. How long was it since the previous treatment with the Traditional healer?

(b) Consultations with the husband

35. At what stage of the child's illness do you consult 'Mzee'/husband?
36. When you consulted 'Mzee' what was his advice?
37. What was the next thing that you did after consultation with 'Mzee'?
38. Why?
39. After talking to 'Mzee', how long did it take you to seek help outside for the child?

40. What was his preferred place for seeking help?
   Retail shop/Pharmacy------------------------
   Government clinic--------------------------
   Traditional healer-------------------------
   Private clinic-----------------------------
   Others----------------------------- (Specify)
(c) Consultations with the retail outlet.

41. Who is your favorite retail outlet that provides you with medication?

42. Which medicine for malaria do you normally prefer to buy from him?

43. Why?

44. How did you administer them to your child?

45. How many days did it take?

46. Did the child feel better?

Yes---------- No------------------

47. Was there any advice given on dosage?

47. Did you do anything else?

48. After how many days?
FOCUS GROUP GUIDE: COMMUNITY PERCEPTIONS AND MANAGEMENT OF MALARIA.

(i) Community Name: ______________________

Interviewer: ______________________

Date of interview: ______________________

Time interview started: ______________________

Time interview concluded: ______________________

(ii) Introduction

I am doing health research in this community. I am trying to learn more about health problems here, and am very grateful to you for agreeing to discuss with us. May I ask you a few questions on childhood diseases we experience in this community?
A. Background of focus group participants

<table>
<thead>
<tr>
<th>Name and age</th>
<th>Marital status</th>
<th>Education</th>
<th>No. of children</th>
<th>Occupation</th>
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B. Focus Group Discussion

1. What are the signs and symptoms of (use local term for malaria)?

2. How do you treat (malaria) in this community? (PROBE TO MAKE SURE ALL TREATMENTS IS MENTIONED).

3. Which are most effective? Why?

4. When is (malaria) treated? (PROBE WHAT HAPPENS WHEN THE ILLNESS BEGINS AND AS IT CONTINUES OR PROGRESS).

5. What causes (malaria)? (PROBE IF MOSQUITOES ARE NOT MENTIONED)

6. Can (malaria) be spread? How?

7. Can (malaria) be prevented? How?

PROBE: INSECTICIDES? BED NETS? COILS? REASONS FOR USE.
8. Do people use bednets here? PROBE ARE THEY AVAILABLE, ARE THEY AVAILABLE BUT NOT USED, AND IF SO WHY ARE THEY NOT USED?

9. How many people use them? Few, many? Who are they? PROBE IF THEY ARE WOMEN, CHILDREN, EDUCATED PEOPLE.

10. Do any of you use bednet? Why?

11. What are the advantages or disadvantages of bednets?

12. When are they used?

13. Are mosquitoes a problem? How are they kept away? IF NETS HAVE BEEN MENTIONED ASK IF THERE ARE OTHER THINGS PEOPLE DO TO AVOID MOSQUITOES?