BARRIERS TO PROMPT AND EFFECTIVE MALARIA TREATMENT AMONG CHILDREN UNDER FIVE YEARS OF AGE IN MPIKA DISTRICT

BY

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Bachelor of Medicine & Surgery

A dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Science in Epidemiology

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8th June 2014

DECLARATION

I, **Silweya David** hereby declare that this dissertation is my original work and has not been presented for any other awards at the University of Zambia or any other university.

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CERTIFICATE OF APPROVAL

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ABSTRACT

Prompt and effective malaria treatment is a key malaria control strategy in Zambia, which has helped to reduce the incidence of malaria and consequently, reduce the infant mortality rate. However, studies done in Zambia show that as low as 19 percent of children under five years of age are accessing prompt and effective malaria treatment at health facilities in the rural settings. The barriers to this important malaria control strategy need to be established. Therefore, this study aimed at determining barriers to prompt and effective malaria treatment among under five children in Mpika district.

This was mixed method study design combining both quantitative and qualitative methodology; analytical cross-sectional study and focus group discussions respectively. The quantitative sample size of 380 caretakers of under five children and eight health workers were considered. For qualitative method, eight focus group discussions (FGDs) involving caretakers of children under five years of age were held comprising a total of 78 participants.

The study found that out of the total sample size of 380 participants, only 14 percent of children diagnosed with malaria received prompt and effective malaria treatment. The following were barriers to prompt and effective malaria treatment: caregivers residing at a distance of more than five kilometres to the health facility (OR 2.09 95%CI: 1.03 – 4.22 P = 0.041, inadequate household income (OR 2.89 95%CI: 1.18 – 4.39 P = 0.001), self-treatment of children at home with antipyretics prior to seeking care (OR 1.83 95%CI: 1.28 – 3.26 P = 0.018 and lack of community health education (IEC) (OR 2.14 95%CI: 1.10 – 4.13 P = 0.024). Moreover, non-availability of antimalarial drugs at health facilities and the use of herbal medicines were reported in FGDs to be associated with delays in seeking appropriate malaria treatment.

The findings of this study highlight the factors that negatively influence access to prompt and effective malaria treatment in a rural setting of Zambia. It underscores the need to formulate and implement interventions aimed at fostering appropriate health seeking behaviours that are setting-specific among caretakers of under five children, through community health education. There is also a need to address the socioeconomic constraints, both at household and health facility level that hinder access to early and effective malaria treatment in children.

This dissertation is dedicated to my wonderful family, without whose love, motivation and encouragement this study could not have been a success.

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LIST OF ACRONYMS

ACT	Artemisinin-Based Combination Therapy
AM	Antimalarial drugs
CHAs	Community Health Assistants
DCMO	District Community Medical Office
DHMT	District Health Management Team
FGDs	Focus Group Discussions
IEC	Information Education and Communication
IPT	Intermittent Presumptive Treatment
IRS	Indoor Residual Spraying
LLITNs	Long Lasting Insecticide Treated Nets
MDGs	Millennium Development Goals
MoH	Ministry of Health
NMSP	National Malaria Strategic Plan
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
RHC	Rural Health Centre
WHO	World Health Organization
ZCHSA	Zambia Child Health Situation Analysis
ZMIS	Zambia Malaria Indicator Survey

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 Background

Malaria remains one of the major public health problems and continues to contribute significantly to the mortality and morbidity in Africa, despite it being a treatable and preventable condition (Masiye and Rehnberg, 2005). Annual figures of approximately 300-500 million cases and over 1 million deaths are recorded globally in children below the age of five years. The majority of these malaria infections occur in the sub-Saharan region were the most complicated forms of the infection are prevalent (Teklehaimanot and Bosman, 1999; Tarimo and Mismanage, 1998). Moreover, such high statistical figures have been attributed to the fact that as high as 74 percent of the population in sub-Saharan Africa resides in malaria endemic areas (WHO fact sheet, 2005).

1.2 Malaria burden in Zambia

In Zambia, malaria is endemic and contributes significantly to morbidity and mortality, especially among the vulnerable groups of pregnant women and children under the age of five years. Studies done in Zambia show that 40 percent of the infant mortality rate, 20 percent of the maternal mortality rate and 45 percent of hospital admissions and outpatient department visits can be attributed to malaria (Tuba et al., 2010 and MoH, 2010). As early as 1994, Zambia has been involved in the international malaria control efforts through the Roll Back Malaria (RBM) initiative. The signing of the Abuja RBM declaration seeks to halt and reduce the malaria mortality to half, by 2015. In this light, effective malaria control strategies will ensure that the country attain this benchmark set in the Millennium Development Goals (MDGs) four and six (Zambia RBM, 2010).

1.3 Malaria control strategies in Zambia

Despite the huge malaria burden in Zambia, significant progress towards its elimination has been made. The recent progress is attributed to increased availability and coverage of key malaria interventions: mass distribution and utilization of insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS) of eligible households; prompt malaria diagnosis coupled with effective case management with Artemisinin-based combination therapy; and intermittent presumptive malaria treatment (IPT) of all pregnant women.

The Ministry of Health (MoH) in collaboration with various stakeholders has been championing judiciously the enforcement of the Roll Back Malaria (RBM) initiatives in Zambia. One cardinal malaria control strategy aims at prompt and effective malaria treatment of over 80 percent of all febrile children within the first 24 hours of onset of symptoms in order to reduce infant mortality (National Malaria Strategic Plan, 2006–2010). This ambitious goal can only be fully realized by the prompt presentation of all febrile children to health facilities where they can be investigated promptly and receive a recommended effective malaria therapy.

1.4 Prompt and effective malaria treatment in under five children

The Zambia Malaria Indicator Survey (ZMIS) for 2010 showed that only 19 percent of children under the age of five years with malaria took an antimalarial drug within 24 hours of onset of symptoms. Children under the age of five years are the hardest hit by malaria infection because they lack the acquired immunity towards the infection. Therefore, delay in seeking treatment for uncomplicated malaria could cause the infection to progress from mild to severe forms and ultimately death within the first 24 hours of onset of symptoms (Baume, 2002; WHO/UNICEF, 2003). The designated regimen for malaria treatment in children is the Artemisinin based combination therapy (ACT) as the first-line therapy. Quinine, on the other hand, is still reserved as the drug of choice for complicated malaria (MoH, 2003).

Although fever is quite a common presentation among childhood illnesses, malaria still accounts for the vast majority of these febrile illnesses (Tarimo et al., 2000). Prompt malaria screening in all childhood febrile illnesses and appropriate treatment are critical in reducing childhood-related morbidity and mortality (WHO, 2005). Further, studies have shown that as high as 90 percent treatment for suspected childhood malaria is done inappropriately at home (Lubanga, 1990). The majority of children with fever receive their initial treatment at home and outside the formal health care, for example, from traditional healers and local drug stores (McCombie, 1996; William and Jones, 2004). Other studies have also shown that formal treatment in most instances is only sought after initial treatment had fails to alleviate the febrile episodes experienced by the child. The caregivers' choice of where to seek initial malaria treatment is influenced by

accessibility to health care, severity of presumed malaria infection and caregiver's level of education (Schellenberg, 2000; Miguel et al., 1998 and Ahmed, 2001). Other factors have been mentioned to have had a direct bearing on the treatment seeking behaviours of the caregivers namely, the cultural beliefs about the cause, the treatment and prevention of malaria (Schellenberg, 2000). Studies done in several African countries, reveal that children under the age of five years are susceptible to developing complicated malaria and likely to die when infected with malaria in endemic areas because of the delays in seeking treatment at a formal health facility and inappropriate initial treatments given to them (Littrel et al., 2011; Thera et al., 2000; Fawole and Onadeko, 2001). Further, studies have clearly indicated that mothers or caregivers are the first people to spot a fever episode in a child; a symptom which usually necessitates seeking care from either the informal sector or the formal health sector. Childhood fevers assumed to be of malaria origin, contribute significantly to morbidity and mortality among under-fives, accounting for 30 percent of all infant mortality (MoH, 2010). The role of caregivers in reducing malaria-related mortality and morbidity among the under five children cannot be over-emphasized. Thus, it goes without saying that in order for prompt malaria diagnosis and effective case management of all suspected malaria cases within 24 hours to be realized, caregivers must be able to recognize the symptoms of malaria immediately they occur and seek appropriate malaria treatment (Baume, 2002).

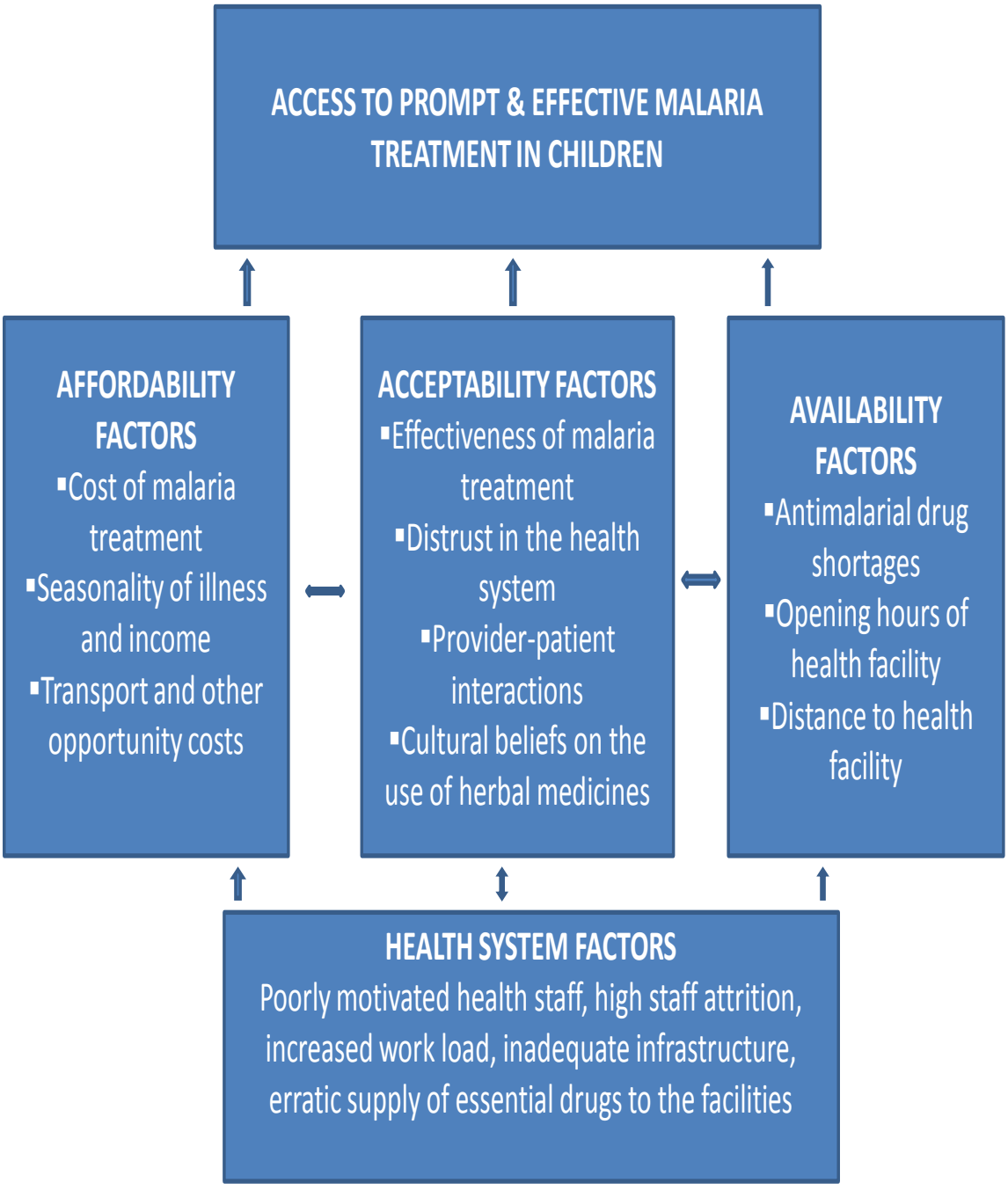
1.6 Statement of the problem.

Access to health care of children under the age of five years is limited and continues to be a major public health problem more so in the rural settings of Zambia (Halwindi et al., 2013). The Roll Back Malaria (RBM) initiative set targets for 2010 of ensuring that 80 percent of children under five years of age with malaria receive prompt and effective treatment within 24 hours of symptom onset (RBM, 2005-2015). However, the majority of African countries are far below this target, with fewer children with malaria being treated promptly and effectively (Chuma et al., 2009 and Hetzel et al., 2008). The Zambia malaria indicator survey 2010 report showed that as low as 7.6 percent of febrile children with suspected malaria infection, sought prompt malaria treatment from the health facilities in Muchinga province. Mpika district, the largest district in Muchinga province, had an increase in malaria related mortality in children under five years of age, from 48/1000 to 90/1000 from 2008 to 2010 respectively (Mpika DHMT Annual report, 2010). It was further noted that children with malaria presented to health facilities late, more often than not, with severe complications of malaria, such as severe anaemia and cerebral malaria; moreover, the patient lag time from onset of symptoms to seeking care ranged from three to five days. Furthermore, health facilities experienced frequent stocks of the recommended antimalarial drugs, thus ended up referring patients with malaria to higher levels of care, to access malaria treatment, namely, Chilonga Mission Hospital and Mpika District Hospital (Mpika DHMT annual report, 2010). Accessibility of early health care in Mpika district is further compounded by geographical barriers due to the mountainous nature of the terrain in the district and the fewer health facilities in relation to the catchment populations. In this regard, home based malaria management in the form of self-treatment is often opted for, after self-diagnosis based on presumptive symptoms of malaria with non-biomedically approved therapies such as antipyretics and herbal medicines. It has been noted that the major cause of high infant mortality rates in malaria endemic areas like Mpika is the delay in seeking prompt and effective treatment for suspected malaria infections. This makes the infection progress to complicated malaria; a difficult condition to manage at first level health care of the rural health centre (Muller et al., 2003).

1.7 Study rationale

This study is placed within the context of the millennium development goals (MDGs) number four and six, aimed at reducing infant mortality by two thirds by halting and reversing the incidence of malaria by 2015. Infant and under-five mortality rates in Zambia still remain high at 95 and 168 per thousand live births, respectively (UNICEF Zambia fact sheet, 2010). Moreover, 17 out of every 100 children born in Zambia will not live to see their fifth birthday (Zambia childhood survey report, 2010). Malaria remains one of the major causes of death in children under five years of age. It must be said that early diagnosis and prompt treatment forms the cornerstone of an effective malaria control program, because it shortens the duration of the disease; most importantly, halts the progression of malaria to its complicated forms and untimely deaths of children. Understanding these barriers and how they interact to impact access to prompt and effective malaria treatment in Mpika district have been relatively piecemeal. Therefore, there is a need to determine the important bottlenecks to prompt and effective malaria treatment in children under-five years of age, which could serve as a springboard to foster better planning for future malaria interventions, thus improving case management at the individual, community and district level.

1.8 Problem analysis diagram



Modified from Chuma et al., 2010 page 4.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

2.2 Global perspective

Malaria, described by Hippocrates in the fourth century BC, is one of the oldest diseases ever known to mankind. Despite its evolution through time, it still poses a greater threat to humanity, more so to the people in the endemic areas of tropics and sub-Saharan Africa (Palanco, 2003). An estimated 3 billion people, almost half of the world's population, resides in areas where malaria transmission occurs. The human toll of malaria is staggering, causing 350 million and 500 million episodes of clinical malaria each year and leading to an estimated one million deaths (Hay et al., 2004). The majority of these deaths occur in sub-Saharan Africa and predominantly among children under the age of five years. Malaria has indeed been identified as one of the leading killer diseases in children below the age of five years; accounting for almost 5 deaths in 10, worldwide and 1 death in 5 in sub-Saharan Africa (Hay et al., 2004).

2.3 Regional perspective

Sub-Saharan Africa is the region hardest hit by malaria (Sezi, 1997). Most of sub-Saharan Africa comprise highly endemic areas of stable malaria transmission where infection is common, and the populations tend to develop some immunity against the disease. In these areas, children and pregnant women are most at risk of developing severe symptoms or dying from malaria infection. In areas of low epidemic or unstable malaria transmission, such as the highlands and desert fringes, few people have built-up natural immunity and thus adults are also at risk of becoming seriously ill with malaria. Malaria is caused by parasites that are transmitted by infected mosquitoes that most often bites at night. The malaria parasites enter the human bloodstream through the bite of an infected female Anopheles mosquito (Breman, 2001). Of the four malaria parasites that affect humans, Plasmodium falciparum is the most common in Africa and the deadliest (World Malaria Report, 2012). Malaria typically results in flu-like symptoms that appear 9–14 days after an infectious mosquito bite. Initial symptoms can include headache, fatigue and aches in the muscles and joints, fever, chills, vomiting and diarrhoea; they can quickly progress into severe disease and death. Among young children, fever is the most common symptom of malaria. Children under age five are

most likely to suffer from the severe effects of malaria because they have not developed sufficient naturally acquired immunity to the parasite. A severe infection can kill a child within hours. Prompt and accurate diagnosis is a key component of effective disease management. The 'gold standard' is parasitological diagnosis through microscopic examination of blood smears; although, rapid diagnostic tests (RDTs) are a new technology whose use is growing. Prompt and effective treatment of malaria within 24 hours of the onset of symptoms is necessary to prevent life-threatening complications. There are several challenges to providing prompt and effective treatment for malaria in Africa. First, the majority of malaria cases are not seen within the formal health sector. Second, the resistance of P. Falciparum parasites to conventional antimalarial monotherapies, such as chloroquine, sulfadoxine-pyrimethamine and amodiaquine, has become widespread, resulting in new treatment recommendations (Londono et al., 2009). The World Health Organization now recommends treating malaria using Artemisinin-based combination therapies. These are based on combinations of Artemisinin, extracted from the plant Artemisia annua, with other effective antimalarial medicines (WHO: Guidelines for the Treatment of Malaria, 2010). When combined with other medicines, Artemisinin derivatives are highly potent, fast acting and very well tolerated (Zwanga et al., 2009 and Nosten et al., 2007). The Roll Back Malaria report of 2010 highlighted that, in many malaria endemic countries, coverage with effective and prompt access to treatment is still low. The WHO 2010 fact sheet, stated that as low as 20 percent children in Africa's malaria endemic areas presenting with febrile illnesses, seek treatment at a health facility. Moreover, a study in Blantyre-Malawi found that only 37.4 percent of the children with febrile illness received prompt malaria treatment (Holtz et al., 2003).

2.4 Local perspective

Malaria is a major public health problem in Zambia, and its devastating effect is felt more in the two susceptible groups; pregnant women and under 5 children. Despite great strides made in prompt malaria diagnosis using newer technologies such as RDTs and treatment with recommended combination drugs: Artemisinin-based Combination Therapy, malaria is still a major contributor to mortality in children under 5 years of age in Zambia (MOH, 2010). The Zambia indicator malaria survey for 2010 report also

showed that as low as 19 percent of under 5 children with malaria, sought treatment at a health facility within 24 hours of the onset of symptoms. Barriers that negatively impact on this key malaria control strategy in Zambia are similar to other African rural settings.

2.4.1 Factors affecting prompt malaria treatment

Studies done in sub-Saharan Africa have proposed the following barriers to prompt malaria treatment in children under five years of age: socioeconomic, cultural perceptions of the attributable cause of malaria, geographical barriers in the form of distance and mountains, non-availability of a health facility in the locality, drug stock-outs at the health centres and use of fever relief methods at home e.g. tepid sponging or use of antipyretics.

The need for prompt diagnosis and effective treatment to prevent progression of malaria to severe disease and death essentially raises two cardinal issues: first, the choice of a safe and efficacious antimalarial drug and second, questions about how to maximize equitable access to rationally prescribed treatment. In order to address the first point, Artemisinin-based combination therapies have been advocated as treatment of choice in Africa (White et al, 1999). Zambia has adopted this policy since 2004. With regard to the second point, it is widely accepted that access to quality treatment is insufficient in many settings. The poorest people often have the least access to effective treatment (Victora et al., 2003). Moreover, the underlying causes of this situation are increasingly debated. At a local community level, however, the situation is a lot more complex and availability and affordability of drugs are only few among a number of factors influencing prompt diagnosis and effective malaria treatment (McCombie, 2002).

2.4.2 Economic factors

There is a strong correlation between malaria-related morbidity or mortality and poverty. Gallup and Sachs (2001) argued that malaria produces poverty more than the other way around. The likelihood of poor households seeking prompt and effective treatment when they fall ill is low (Chuma et al., 2010 and Schellenberg et al., 2003). The opportunity, direct and indirect costs associated with malaria undoubtedly, are barriers to access of treatment. Most of the time, these costs are substantially huge for an average family, thus pushing these vulnerable households into the vicious circle of disease and poverty,

where sickness begets poverty and poverty makes disease prevention unattainable (Gollin and Zimmermann, 2007).

2.4.3 Cultural factors

In Zambia, there are different concepts of malaria in the population depending on the signs and symptoms of the disease. A clear distinction is often made between uncomplicated and severe forms of malaria. While uncomplicated cases with "fever" as a main symptom are usually known as malaria and often associated with mosquitoes, there are different taxonomies for symptoms of severe malaria. "*Ukusanfula*" for example, stands for febrile convulsions and is often linked to supernatural causes. Uncomplicated malaria is usually treated with antimalarials or antipyretics, whereas the understanding of the causation of "*Ukusanfula*" leads to a more complex process of treatment-seeking behaviours, often involving traditional medicine or healers at some stage (Makemba et al., 1996). Another crucial element is the timing of a disease episode, both during the year and during the day. Disease episodes occurring during the farming season may bear a higher risk of not being addressed adequately compared to episodes taking place during other times of the year. This is partly related to the increased work burden at that time, but also to the lack of finances before the new harvest. Similarly, episodes taking place during the night or on the weekends when health facilities are closed may result in delayed treatment.

2.4.4 Physical barriers

In certain instances, caregivers could be highly motivated to seek prompt treatment, but are inadvertently set aback by physical barriers to access. There is enough evidence in many African settings that suggest strongly that the further the caregiver lives away from the health facility, the more likelihood of seeking care late and the poorer the outcome of malaria infection (Chuma et al., 2010; Al-Taiar et al., 2008; Nonvignon et al., 2010). Many rural communities in Zambia do not have a health facility within the 5 kilometre radius; accessibility to the few health facilities in these rural settings is further constrained by geographical barriers such as mountains, thick forests and rivers lacking crossing points.

2.4.5 Infrastructure

Inadequate infrastructure can discourage caregivers from seeking formal health care services. Many rural areas in Zambia have no health facility within the 5 km radius of their residence; hence, communities are required to cover long distances to seek health care. The few available health facilities are either dilapidated or smaller to meet the ever growing catchment populations, as the demand for health care has increased.

2.4.6 Staffing levels of health facilities

A shortage and a high attrition of qualified health staff, especially in the rural health facilities in Zambia, has a negative impact on quality health service delivery. The few available staffs are often stressed and irritable due to a huge patient burden and thus are not able to provide quality health care.

2.4.7 Poverty

The Government of Zambia has recognized that present poverty levels are unacceptably high. In 2010, 69.7 percent of the Zambian population was living below the poverty datum line, with expenditure below the level to provide for basic needs, compounded by low monthly incomes of below K500.00 (CSO, 2010). Rural poverty is more prevalent, deeper and more severe than urban poverty. In situations like these, families worry more about their daily sustenance at the cost of seeking health care for their illness. This could be the reason for proportion of low access to prompt and effective malaria treatment in children under five years of age.

They are several reasons children under-five years of age in malaria-endemic countries do not get prompt and effective malaria treatment. Moreover, not a single solution exists to tackle the problem holistically; instead, multiple-level interventions are needed.

CHAPTER 3: OBJECTIVES

3.1 Broad objective of the study

The broad objective of the study was to determine the barriers to prompt and effective malaria treatment among children under-five years of age with malaria in Mpika district.

3.2 Specific objectives

(1) To determine the proportion of children under-five years of age who received prompt and effective malaria treatment at health facilities in Mpika district.

(2) To determine health service barriers that affected prompt and effective malaria treatment in Mpika district.

(3) To determine socio-demographic characteristics of caregivers associated with prompt and effective malaria treatment in children under-five years of age.

(4) To establish caregivers' treatment-seeking behaviours when they suspect their child has malaria.

3.3 Research questions

1. What is the proportion of children under five years of age receiving prompt and effective malaria treatment in Mpika district?
2. What are the health service barriers that affect prompt and effective malaria treatment?
3. What socio-demographic characteristics of caregivers are associated with prompt and effective malaria treatment.
4. What treatment-seeking behaviours do caregivers adopt when they suspect their child has malaria.

3.4 Null hypothesis

There is no relationship between prompt and effective malaria treatment in children under-five years of age and the following factors

i. Socio-demographic characteristics of caregivers.
ii. Treatment-seeking behaviours of caregivers when a child has malaria.
iii. Health service factors.

3.5 Alternative hypothesis

There is a relationship between prompt and effective malaria treatment in children under-five years of age and the following factors

i. Socio-demographic characteristics of caregivers.
ii. Treatment-seeking behaviours of caregivers when a child has malaria.
iii. Health service factors.

3.6 Operational Variables

3.6.1 Dependent variable

Dependent variable	**Cut-off point**	**Indicators**
Prompt and effective malaria treatment; under five children suffering from malaria who had early access to, and are given an appropriate malaria treatment within 24 hours of symptom onset, at the health facility. Artermisinin-based combination therapy (ACT) are the appropriate recommended first-line antimalarial drugs for comfirmed uncomplicated malaria in Zambia.	Proportion of under 5 children treated with an ACT within 24 hours of symptom onset (same day). Proportion of under 5 children treated with an ACT after 24 hours of onset of symptoms (more than 1 day).	Prompt & effective Treatment Delayed Treatment

3.6.2 Independent variables

In this study the independent variables are listed below

3.6.2.1 Socio demographic characteristics of caregivers

Independent Variables	Cut-off point	Indicators
❖ Gender of child	Female Male	Female Male
❖ Age of Child		0-12 months 13-24 months 25-36 months 36-48 months 49-60 months
❖ Relation of caregiver to child	Parents Other relatives	Mother Father Others Uncles Aunties Grandparents
❖ Age of caregiver	Teenagers Youth Adult	18-20yrs 21-35yrs >36 yrs

❖ Marital status of the caregiver	Single Married	Single Married Widowed Divorced
❖ Education level of the caregiver	Uneducated Low education Average education High education	None Primary Secondary College/University
❖ Education level of Head of household	Uneducated Low education Average education High education	None Primary Secondary College/University
❖ Occupation of Head of household	Formal employment Informal employment	Employed Businessman Farmer Self employed
❖ Income of Head of household	Adequate Not adequate	< K300.00 K500-K700.00 > K700.00

3.6.2.2 Barriers to prompt and effective malaria treatment

(Reason for delay) ❖ Reasons why the child was not taken to a health facility on the same day (<24 hours) after developing malaria symptoms	Condition not serious. No money to take the child to the health centre. Long distance to clinic (> 5 km to health facility). The child fell sick at night.
(Treatment source) ❖ Source of malaria treatment	Health facility Local shops Herbal medications
(Distance) ❖ Distance to health facility	Near (< 5km to the health facility) Far (> 5km to the health facility)
(Barriers) ❖ Physical barriers	Long distance to clinic (> 5 km to health facility). Other geographical barriers (rivers, forest and mountains).
(Knowledge) ❖ Knowledge fever as a sign of malaria	Yes (knowledgeable) No (Not knowledgeable)
❖ Knowledge about treatment of malaria in under 5 children	Coartem Fansidar Quinine Paracetamol

❖ Initial treatment source	Health facility Shop Traditional healers Self treatment
❖ The decision influencing treatment seeking at the health facility	Worsening of the child's condition. Severity of symptoms.

3.6.2.3 Health service barriers

Variable	**Indicators**
❖ Availability of AM drugs at the health facility	Always Sometimes
❖ IEC Sessions on malaria in the community.	Yes No
❖ Frequency of IEC sessions on malaria.	Monthly Quarterly Annually
❖ Staffing levels at health facilities	Well staffed facility (Having at least 2 or more health personnel). Poorly staffed facility (0-1 health personnel).

CHAPTER 4: METHODOLOGY

4.1 Study site

The study took place in Mpika district situated in the southern part of the Muchinga Province in Zambia (Appendix xi). Mpika is the largest district in Zambia with a surface area of approximately 41 000 square kilometers (Appendix xii). Mpika district shares boundaries with Lundazi and Mambwe districts of Eastern province across the Luangwa river; Kasama, Luwingu and Chilubi Island are to the West of Mpika, separated by the Chambeshi River. In the North, Mpika shares borders with Chinsali District and to the south lie, Serenje district of Central Province. The district has 623 kilometers of gazetted road and several ungazetted roads, which pose a challenge to communication because the majority of the roads in the district become impassable in the rainy season making access to some health facilities difficulty. The district has two hospitals that cater to the health needs of the communities, namely Mpika District Hospital and Chilonga Mission Hospital and 25 Rural Health Centers (RHCs). The study took place in eight selected rural health centres namely, Mpika urban, Chilonga, Chalabesa, Kabinga, Kasenga, Zambia National Service and Chibansa. Malaria is endemic in this area and occurs throughout the year with incidence rates peaking during the rainy season. The district HIMS report showed alarming statistics of 110,014 and 111, 843 malaria infections among children under five years of age in 2010 and 2012 respectively. In 2010, a national census estimated the population of Mpika to be 261,425 persons, with a population growth rate of 3.8 percent. The local economy is based on agriculture, with the majority of households earning a living through subsistence farming. This region was chosen for the study because of its high malaria endemicity, especially during the rainy season.

4.2 Study design

This was a mixed method study design combining both quantitative (analytical cross-sectional study) and qualitative methodology (Focus group discussions).

4.3 Study period

The study took place from 30th May, 2013 to 14th July, 2013.

4.4 Study population

The study populations were caregivers with children under five years of age diagnosed with malaria, attending the selected rural health centres and health workers manning these health facilities were chosen to tackle the objective on health service barriers.

4.5 Sampling methodology

4.5.1 Sample size calculation

The sample size calculation was based on the assumption that the proportion of under five children who received prompt malaria treatment was 34 percent (ZMIS, 2010). The statistical significance level of 5 percent and standard normal deviate at 95 percent confidence level set at 1. 96 were used. The non-response of 10 percent was taken into consideration and thus using the formulae, the final sample size of 380 was obtained (Dupont and Plummer, 1990).

$$N=\frac{Z^2 \text{ X } F\ (100-P)}{(E)^2}$$

Where; N = sample size required.

Z = being 1.96^2 at alpha 0.05 (degree of certainty).

P = the proportion of under-five children who received prompt malaria Treatment- 34 percent ZMIS, 2010.

F = Confidence level of 95% (100-P).

E = the error level of 5 percent.

Therefore, the required sample size was:

$$= \frac{1.96^2 \text{ X } 0.34\ (1-\ 0.34)}{(0.05)^2}$$

= 345 + 10% non response rate (35). The final sample size was 380**.**

The inclusion criteria were caregivers, with febrile children less than five years of age diagnosed to have malaria by the health workers at the health facility, through either Malaria blood slide or Rapid Diagnostic Test (RDT). These were individually interviewed through exit interviews, on their treatment seeking patterns prior to visiting the health facility and reasons for attendance at the health facility in the local language, using structured questionnaires. Exclusion criteria were caregivers with children who

were not diagnosed with malaria or had a negative malaria laboratory result, attending the health facilities. Moreover, non-permanent residents and children older than five years were also excluded. Refusal to participate in the study also warranted exclusion. However, care was taken to ensure that such participants were not deprived of the health care which they could have received otherwise.

4.5.2 Sampling of health facilities

The type of sampling that was used in this study is a multi-stage sampling. The first stage was the sampling of health centres. The health centres were identified through probability proportion to size sampling, from a sampling frame of all the 25 rural health centres (RHCs) in Mpika district. Using Probability Proportion to Size, eight rural health centres were selected (Appendix xiii).

4.5.2.1 Sampling of study participants

The second stage was sampling of the participants attending the health centres with their under five children diagnosed with malaria. The number of caregivers to be sampled at each rural health centre was determined by the catchment population of that particular health facility, proportional to the total cumulative catchment populations of all the 8 chosen rural health centres. This was done by dividing the catchment population of the RHC by the total cumulative catchment population of all the 8 RHCs, then multiplying by the required sample size of 380 (Appendix xiv). Thus, required sample size for each facility was as follows: Mpika Urban, 82; Kabinga, 42; Chalabesa, 88, Chiundaponde, 43, Nabwalya, 53; ZNS, 20; Chibansa, 30 and Chikobo rural health centre, 22 (Appendix xiii). The selection of study participants who met the inclusion criteria at each health facility was done using simple random sampling. On each under five clinic day, caregivers of children under the age of five years with a confirmed malaria diagnosis attending the selected Health Posts were given numbers, and then these numbers put in a box and shaken. The eight numbers were picked at random from the box to allow chance for every member to participate in the study. The caregivers whose numbers were picked are the ones who were included in the study population and recruited daily for exit interviews, untill the desired sample size was achieved for that particular health centre. On each clinic day a maximium of 8 participants at each facility were interviewed.

4.5.3 Sampling of focus group discussion participants

Purposive sampling was used to select participants for Focus Group Discussion (FGD). The participants for FGDs were caregivers who met the inclusion criteria but were not selected for the structured interviews. The venue was chosen where the FGD were conducted, after completion of the individual survey interviews. A total of eight FGDs were held, with homogenous groups composed of 8–10 caregivers at each health facility.

4.5.4 Sampling of health workers at the facilities

Most of the health centres in the district were manned by least one health worker, thus conveniance sampling of health care providers found at the selected rural health centre was done and these were interviewed with a semi-structured interview guide.

4.6 Data collection

The data collection was done by a research team constituting of eight trained research assistants; these included two Enrolled Nurses, four Nursing students and two Laboratory Technicians. The research team was oriented to the study and tools to be used for data collection. The data collection tools were pretested at one of the rural health centres and were revised appropriately based on pilot testing experiences. When data collection started, each research assistant was assigned a rural health centre to collect data for a period of 10 days until the required sample size for that particular health facility was met. Supervision of research assistants was made by the Principal Investigator who went to all the selected facilities. The principal investigator with the help of the research assistants conducted the FGDs at each health facility during the supervisory visits. The data collection exercise was done within 10 days.

4.7 Data collection techniques

Both qualitative and quantitative data collection methods using an interview guide and a structured questionnaire, respectively, were employed to provide a broader understanding of barriers to accessing prompt and effective malaria treatment among children under the age of five years in Mpika. The FGD provided much more detailed information than that obtained from the structured interviews. The combination of data collection techniques known as triangulation maximizes the quality of data collection and reduces the chance of bias.

4.7.1 Quantitative Structured interview schedule

The structured interview schedules were used in exit interviews with study participants to collect the data. Caregivers who consented were the only ones interviewed.The exit interviews were conducted on caregivers with children under-five years of age whose febrile illness was confirmed to be malaria, by a clinician. These were individually interviewed on their treatment-seeking behaviours prior to seeking care at the health centre and their attendance reasons.

4.7.2 Health facility interviews

The health care providers were interviewed using another semi-structured questionnaire.

4.7.3 Focus group discussions

A total of eight FGDs composed of homogenous groups were conducted with the caregivers who met the inclusion criteria in each of the health facilities. The discussions were all recorded on the audio tapes after obtaining consent. The researcher emphasized that there were no right or wrong answers; encouraged all to participate; respect the opinions of others and urged participants to raise issues that were important to them. Focus group discussion took approximately one and half hour. The researcher led the discussions accordingly, using the interview guide covering all the outlined themes, while the research assistants helped with note taking, time keeping, recording of body language and other nonverbal communications.

4.8 Data management and analysis

4.8.1 Qualitative data processing and analysis

First was a transcription of the recorded data from all the FGDs and its' translation in English. Second, was the cross checking of recorded data with transcripts. Textual data that was derived from the focus group discussion was analyzed using qualitative content analysis. The process begun with immersion- reading and rereading of the text and reviewing notes in order to gain an understanding of their content. As the text was read, I looked for emerging themes and begin to attach labels or codes to the chunks of text that represented these themes. Codes were used because they acted as are street signs, inserted in the margins of my handwritten notes to remind me where I was and what I could see. Once the text was coded, I explored each thematic area, first displaying in

details the information relevant to each category and then reducing this information to its essential points. Once the text was coded, I tallied the frequency of selected concepts as indicated by the codes. This was done by conducting a coding sort, which is the collection of similarly coded blocks of text done manually using high lightening or cut and paste techniques. These simple frequencies helped me identify major themes expressed by the participants. Having pieces of text that relate to a common theme together in one place also enable me to discover new sub-themes and explore them in greater depth. As I read, reread and coded text, I begin to formulate ideas what the data is telling me, then started a more formal analysis examining separately and fully, important themes as they emerged from the data. Moreover, numbers were typed in the original transcript to identify participants while ensuring their confidentiality. Clustering segments around these key themes, made it possible to extract meaning from the data. Furthermore, I continued organizing information associated with each theme, and begun to form a hypothesis at the same time paying attention to specific vocabulary that participants used to discuss the topic. I concluded the qualitative analysis by presenting a list of themes and their examples by stating the relationships among the themes identified from the analysis.

4.8.2 Quantitative data processing and analysis

4.8.2.1 Data entry

The researcher checked the interview questionnaires for completeness before starting data entry. Thereafter, the data was double entered into a computer in an EPI data software package. Then it was checked for errors and cleaned by checking for information from questionnaires.

4.8.2.2 Data analysis

The data was analyzed using a statistical software called STATA Version 11. The data analysis types used were descriptive analysis and analytical statistics.

i. Descriptive analysis

In this analysis; frequency counts, graphical illustrations and cross tabulations were derived.

ii. Analytical analysis

Logistic regression analysis was used for analytical analysis. The dependent variable prompt and effective malaria treatment is a binary outcome. In this study, the statistical significance level of 5 percent (i.e. P-value < 0.05) was used. Thus, variables which had a P-value of less than 0.05 were considered to be statistically significant. First, univariate logistic regression analysis of each independent variable with the dependent variable was performed. Second, from the univariate analysis, variables that were found to be significant (p-value < 0.05) were then entered in the multivariate logistic regression analysis to formulate a best-fit model from which, adjusted odds ratios, P-values and confidence intervals were computed. The variables found to be significant barriers were distances to health facilities, household income, knowledge of malaria symptoms, its transmission and treatment and community health education on malaria.

4.9 Ethical considerations

The following protocols were followed in this study:

i. The research proposal was reviewed and approved by the University of Zambia Biomedical Research Ethics Committee (UNZABREC).

ii. Permission to conduct the study in Mpika district was sought from Chief Chikwanda, Mpika District Medical Office and Health facility in-charges.

iii. Consent was sought from the caretakers of children under five years of age diagnosed with malaria, to take part in the study. Those who refused to participate were not interviewed.

iv. Study participants were assured of anonymity by interviewing them individually and in privacy. Participants' names were not written on interview schedules, only numbers were used and no other persons apart from the researcher and supervisors were allowed access to the research data.

v. Confidentiality was assured to the participants and were told that they were free to withdraw from the study if they so wished at any time.

vi. Risk /discomfort: some questions were uncomfortable to the participants, thus participants were told to feel free to answer only questions that they were comfortable with.

vii. Benefits: study participants were informed that there were no direct benefits of participating in the study, but that the information they provided, would give a better understanding of what needed to be done to improve the management and control interventions of malaria in children under five years of age in the district thus benefiting their community in the future.

viii. During FGDs, permission to record the discussions was sought from the participants before recording.

ix. Information obtained was not disclosed to the public. The recorded material was strictly used for data analysis and later erased.

CHAPTER 5: RESULTS

5.1 Socio demographic characteristics of participants

This chapter provides an overview of the general study results starting with a description of the baseline characteristics of the study participants.

Table 1: Demographic characteristics of study participants

Age of children with malaria	**Percentage % (n/N)**
0-12 months	20.5% (78/380)
13-24 months	29.0% (110/380)
25-36 months	19.7 % (75/380)
37-48 months	11.8% (45/380)
49-59 months	19.0% (72/380)
Gender of the children	
Male	52.4% (199/380)
Female	47.6% (181/380)
Age of caregiver	
15-24 years	30.8% (117/380)
25-34 years	40.5% (154/380)
35-44 years	21.8% (83/380)
>45 years	6.40% (26/380)
Relationship of caregiver to the child	
Mother	77.1% (293/380)
Father	17.1% (65/380)
Grandmother	5.0% (19/380)
Others	0.80 % (3/380)
Education level of caregiver	
No School	12.1% (46/380)
Primary	65.3% (248/380)
Secondary	21.8% (83/380)
College	0.80% (3/380)
Education level of head of household	
No school	7.90% (30/380)
Primary	61.6% (234/380)
Secondary	27.6% (105/380)
College	2.90% (11/380)
Occupation of head of household	
Employed	9.40% (36/380)
Business	8.20% (31/380)
Farmer	82.4% (313/380)
House hold income	
Adequate	29.5% (112/380)
Not adequate	70.5% (268/380)

Table 1 shows the socio demographic characteristics of the respondents. The table shows that a total of 380 caregivers of children aged below five years diagnosed with malaria were interviewed during the study. The majority of these children were males, aged between 13-24 months 110/380 (29.0 percent). Most caregivers were mothers 293/380 (77.1 percent), aged between 25-34 years 154/380 (44 percent). The majority of the caregivers only went as far as primary level education (65.3 percent), while 12.1 percent had no formal education. Similarly, 234/380 (61.6 percent) of Heads of household had attained primary education and only 7.9 percent had no formal education. Most of the Heads of households were earning their living through subsistence farming 313/380 (82.4 percent) and their household income was said to be inadequate 268/380 (70.5 percent). The average income for peasant farmers was so low such that, nearly all of it was` spent on food than on seeking treatments for illnesses such as malaria.

5.2 Prompt and effective malaria treatment

5.2.1 The proportion of children who received prompt and effective malaria treatment

Table 2 and figure 1 show that only 53/380 (13.9 percent) of children diagnosed with malaria received prompt and effective malaria treatment, while 86.1 percent (327/380) were treated after 24 hours of onset of malaria symptoms. It must be said that such delays could led to the illness progressing to complicated malaria. The commonest antimalarial drug prescribed to these children was Artemether Lufamenthrine (Coartem) (91.5 percent). Such delays contribute to progression of malaria illness to becoming complicated malaria. The reasons most caregivers (31.2 percent) gave for seeking care late, was the long distance to travel to the health facilities, compounded by lack of financial resources (19.3 percent). In the study, 64.5 percent (245/380) mentioned fever as a symptom they first saw in their child to suspect malaria illness. Moreover, in many malaria endemic areas, all febrile illnesses are considered as malaria. The other symptoms mentioned include convulsions (12.1 percent), poor appetite (10 percent), and vomiting (9.8 percent). The practice of self-medication with antipyretics among caregivers was also common 55.0 percent (209/380), although 36 percent (137/380) caregivers said they did not give any form of treatment to the child prior to seeking health care.

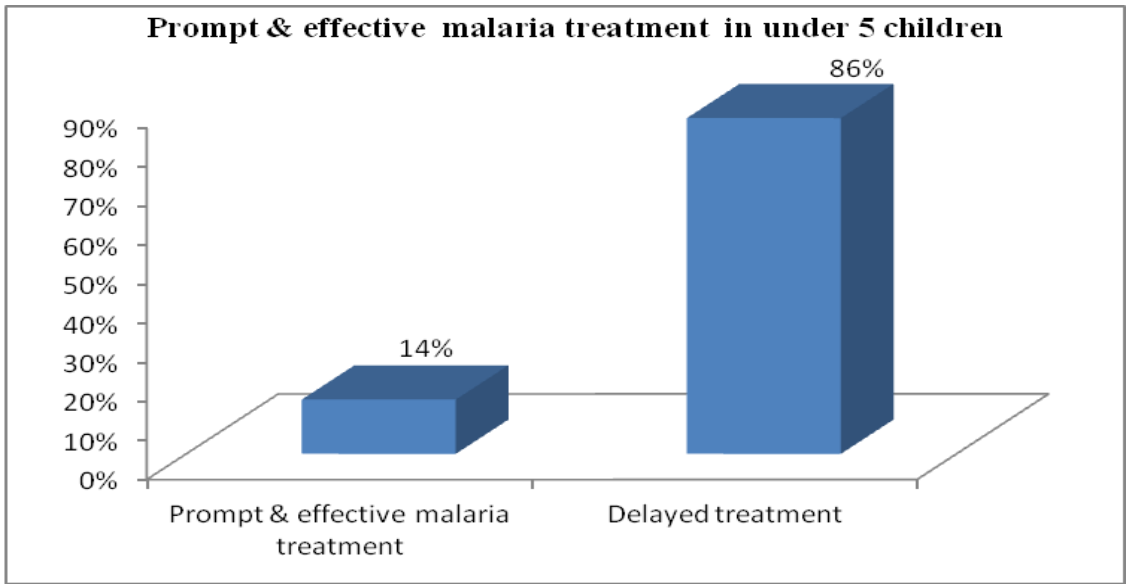


Figure 1: Proportion of participants with prompt and effective malaria treatment.

Figure 1 shows that as low as 14% under 5 children received prompt and effective malaria treatment, while 86% had delayed treatment; a recipe for malaria complications.

Table 2: Characteristics of study participants who had prompt & effective malaria treatment or delayed malaria treatment.

Prompt and effective malaria treatment	**Percentages**	
Children treated with an ACT within 24 hours of onset of symptoms	13.9%	(53/380)
Children treated with an ACT after 24 hours of onset of symptoms	86.1%	(327/380)
Reasons for delay of treatment		
Didn't think of seeking care	14.4%	(47/327)
No one to take the child to a health facility	6.7%	(22/327)
No money for transport	19.3 %	(63/327)
Long distance to the health facility	31.2%	(102/327)
The child fell sick at night	28.4%	(93/327)
Malaria symptoms the child presented with		
Convulsions	12.1%	(46/380)
Fever	64.5%	(245/380)
Poor appetite	10.0%	(38/380)
Vomiting	9.80%	(37/380)
Shivering	1.80%	(7/380)
Diarrhoea	1.80%	(7/380)
Initial treatment given to children at home		
Antipyretic	55.0%	(209/380)
Antimalarial	2.40%	(9/380)
Antibiotic	1.10%	(4/380)
Herbal medication	0.50%	(2/380)
Sponging	5.0%	(19/380)
No treatment given	36.0%	(137/380)

5.3 Barriers to prompt malaria treatment

5.3.0 Physical barriers

5.3.1 Distance to health facility

The study found that 310/380 (81.6 percent) of caregivers interviewed were found to reside approximately more than 5 km from the health facility and 70/380 (18.4 percent) lived within the 5 km radius of the health facility as shown in the figure below.

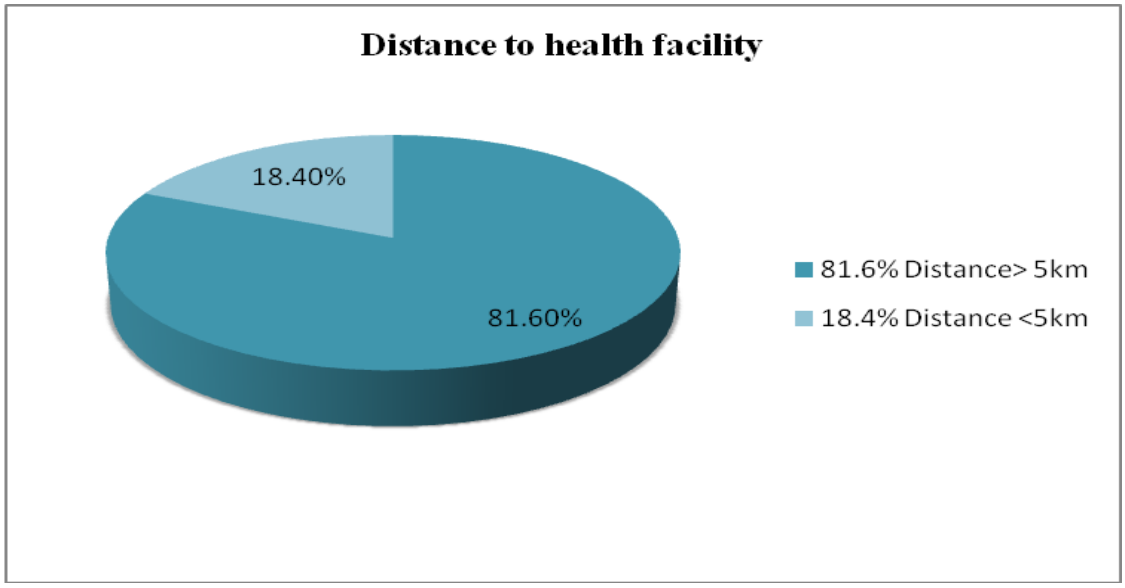


Figure 2: Distance of health facility to participants home.

5.3.2 Mode of transport to the health facility

When the study participants were asked as to their mode of transport to reach the health facility, the study found that 65 percent (247/380) of the respondents had to walk on foot to the health centre, while 23.2 percent (88/380) were cycling and only 11.8 percent (45/380) used motor vehicles (hiking or public transport).

5.3.3 Type of physical barriers encountered

The study showed that 79.5 percent (302/380) caregivers encountered the following barriers to reach the health facilities, whose distribution is shown below.

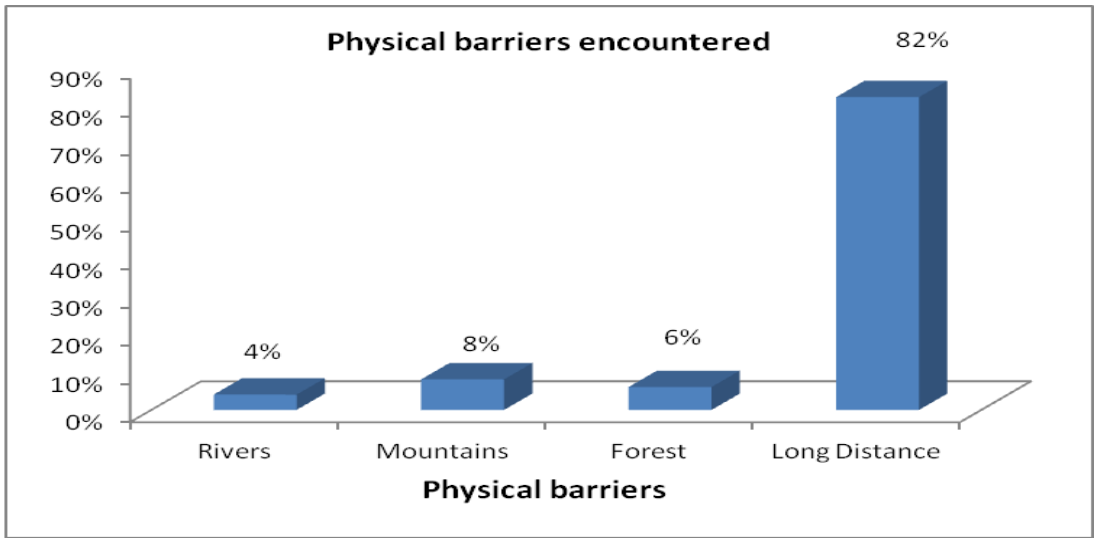


Figure 3: Barriers encountered to reach the health facility

5.3.4 Source of malaria treatment

The study participants were asked about the source of antimalarial drugs for their under five children; 96.6 percent (367/380) said they got the drugs from the health centre, while 3.4 percent (13/380) bought the drugs from the local shops.

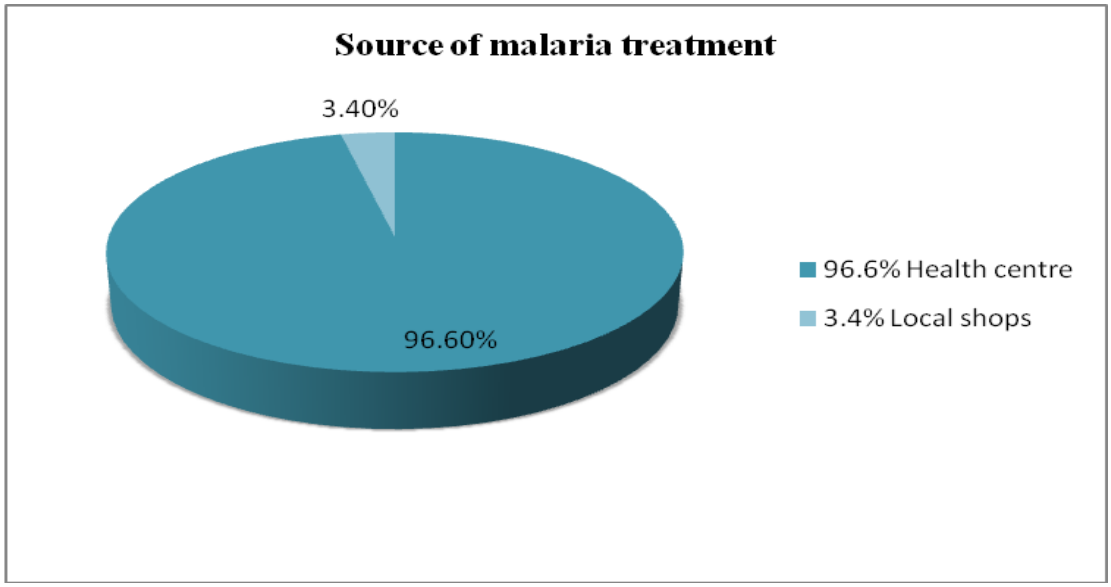


Figure 4: Caregivers source of malaria treatment

5.4 Social barriers

5.4.1 Knowledge on the cause of malaria

The study also assessed the knowledge of the respondents regarding the causative agent for malaria. Thus, 93.2 percent (354/380) correctly identified mosquitoes as a vector that transmits malaria through bites. However, 3.4 percent caregivers mentioned poor hygiene and cold weather respectively, as the cause of malaria infection.

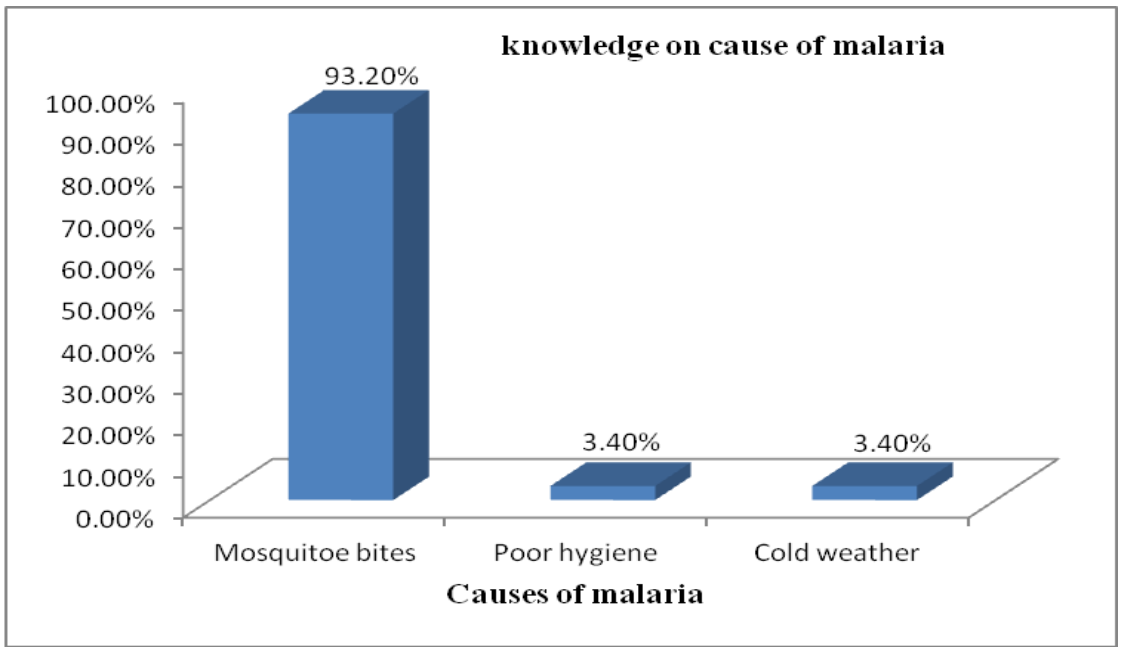


Figure 5: Study participants Knowledge on cause of malaria

5.4.2 Knowledge on malaria treatment

The study also found that knowledge among caregivers regarding malaria treatment was overwhelming, 98.4 percent were knowledgeable and only 0.8 percent did not know how malaria is treated among children under five years of age.

5.4.3 Knowledge on types of antimalarial drugs

The study found that 72.4 percent (275/380) caregivers knew that Coartem was an antimalarial drug used to treat malaria in children. While 18.9 percent (72/380) and 4.5 percent (17/380) mentioned Fansidar and Quinine, respectively, as antimalarial drugs used in children. However, 3.9 percent (15/380) thought that Paracetamol was an antimalarial drug, while 0.3 percent (1/380) did not know any antimalarial drug currently in use, for treating childhood malaria.

5.5 Health system barriers

5.5.1 Availability of antimalarial drugs at the health facility

The study found that 69.2 percent (263/380) of the caregivers said they were not supplied with antimalarial drugs at the facility due to shortage of drugs, while 30.8 percent (117/380) said they usually found drugs at the health centre.

5.5.2 Malaria health education in the village

The study participants were asked if health education on malaria was ever conducted in their village and its frequency; 64.7 percent (246/380) said no, and 35.3 percent (134/380) said yes. Moreover, 64.3 percent (86/134) said the health education was conducted quarterly, 33.3 percent (45/134) said annually, and 2.4 percent (3/134) said they had monthly sessions of health education in their community.

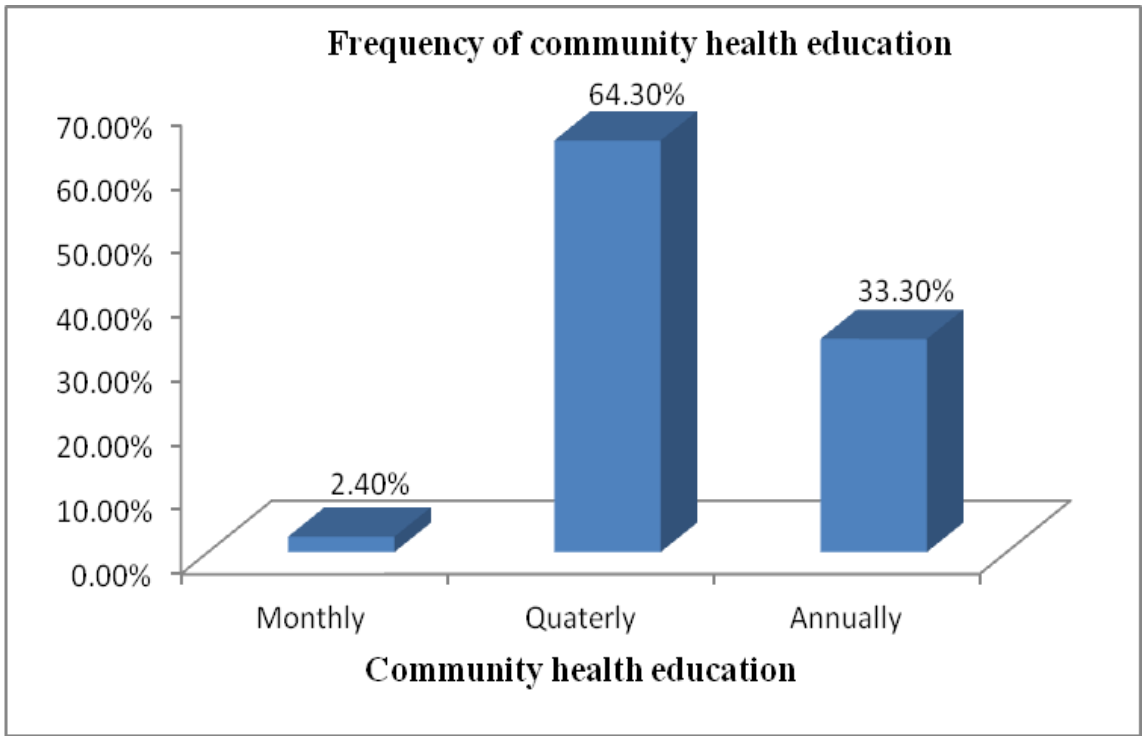


Figure 6: Frequency of health education in the community

5.6 Barriers to prompt and effective treatment of malaria in under five children.

The Table 3 shows the association between the dependent and independent variables. Logistic regression analysis was used to generate a univariate model. The factors that are significant barriers were determined by the odds ratios of less or greater than 1, their 95 percent confidence interval not including a value of 1 and P-value ($P < 0.05$).

Table 3: Univariate logistic regression analysis of predictors of prompt and effective malaria treatment in under 5 children in Mpika district.

Risk factor	Proportion	Odds ratio (Confidence Interval)	P value [1]
Initial malaria treatment			
Antipyretic	55% (209/380)	2.04 (1.16 - 3.58)	0.014
Other treatments	45% (171/380)	1.00	
Malaria symptoms the child had			
Fever	77% (291/380)	1.14 (0.58 – 2.25)	0.71
Other symptoms	23% (89/380)	1.00	
Distance to health facility			
> 5 kilometres	82% (310/380)	2.60 (1.36 – 4.99)	0.04
<5 kilometres	18% (70/380)	1.00	
Hou sehold income			
Not adequate	71% (268/380)	3.23 (1.76 – 5.90)	0.000
Adequate	29% (112/380)	1.00	
Occupation of head of household			
Informal Employment	91% (344/380)	3.34 (1.53 – 7.31)	0.002
Formal employment	9% (36/380)	1.00	
Gender of children			
Male	52% (199/380)	1.23 (0.68 – 2.23)	0.49
Female	48% (181/380)	1.00	
Education level of caregiver			
Never attended school	12% (46/380)	1.04 (0.42 – 2.59)	0.94
Basic education	88% (334/380)	1.00	
Knowledge on malaria transmission			
No	60% (153/380)	0.41 (0.21 – 0.81)	0.011
Yes	40% (227/380)	1.00	
Knowledge on type of malaria drugs			
No	1% (3/380)	0.075(0.007 – 0.84)	0.04
Yes	99% (377/380)	1.00	
Source of malaria drugs			
Local shops	10% (13/380)	0.33 (0.09 – 1.11)	0.08
Health center	80% (367/380)	1.00	
Presence of physical barriers			
Yes	79% (302/380)	2.20 (1.15 – 4.19)	0.017
No	21% (78/380)	1.00	
Health education (IEC)			
No	65% (232/380)	2.09 (1.12- 4.23)	0.029
Yes	35% (148/380)	1.0	

[1] **Tested by Univariate analysis**

Table 3 shows the barriers associated with prompt and effective malaria treatment in children less than 5 years of age in Mpika district. The binary logistic regression measured the odds of treatment after 24 hours of onset of symptoms (delayed malaria treatment) vs treatment within 24 hours of onset of symptoms (Prompt and efffective malaria treatment). The Univariate analysis found the following factors to be significantly associated with increasing the odds of the child not receiving prompt and effective malaria treatment: initial self-treatment with antipyretics given to the children at home (OR 2.04 95%CI: 1.16- 3.58 P= 0.014), residing at distance of more than five kilometer to the health facility (OR) 2.60, 95%CI: 1.36 – 4.99 P = 0.04), inadequate household income (OR 3.23 95%CI: 1.76 – 5.90 P = 0.00), Head of household being in informal employment (OR 3.34 95%CI: 1.53 – 5.44 P = 7.31), not having health education (IEC) done in the community (OR 2.09 95%CI: 1. 12 – 4.23 P = 0.029) and presence of physical barriers (OR 2.20 95%CI: 1.15-4.19 P= 0.017). However, caregiver knowledgeable on malaria transmission (OR 0.41 95%CI: 0.21 – 0.81 P = 0.011) was found to decrease the likelihood of under five children not receiving prompt malaria treatment. The analysis showed absence of association between prompt malaria treatment and gender of the child (OR 1.23 95%CI: 0.68 – 3.23 P = 0.49), children who presented with fever (OR 1.14 95%CI: 0.58 – 2.25 P = 0.71), education level of caregiver (OR 1.04 95%CI: 0.42 – 2.59 P = 0.94) and source of antimalarial (OR 0.33 95%CI: 0.09 – 1.11 P = 0.08).

Table 4: Multivariate logistic regression analysis of predictors of prompt and effective malaria treatment in under 5 children in Mpika district.

Risk factor	Proportion %	Adjusted odds ratios (Confidence intervals) OR (CI)	P values[2]
Initial self treatment at home			
Antipyretics	55% (209/380)	**1.83 (1.28- 3.26)**	**0.018**
Other treatments	45% (171/380)	1.00	
Distance to health centre			
>5 kilometres	82% (310/380)	**2.09 (1.03 – 4.22)**	**0.041**
<5 kilometres	18% (70/380)	1.00	
Household income			
Not adequate	71% 268/380)	**2.89 (1.18 – 4.39)**	**0.001**
Adequate	29% (112/380)	1.00	
Head of household occupation			
Informal employment	91% (344/380)	2.16 (0.92 – 5.07)	0.075
Formal employment	9% (36/380)	1.00	
Knowledge on malaria transmission			
No	40% (153/380)	2.06 (0.99 – 4.23)	0.054
Yes	60% (227/380)	1.00	
Health education in community			
No	65% (232/380)	**2.14 (1.10 – 4.13)**	**0.024**
Yes	35% (148/380)	1.00	

[2]Tested by multivariate analysis

Table 4 shows the results of a multivariate logistic regression model. When all the significant variables from the univariate model were entered into the model and analyzed together, the following variables were found to be significant barriers against prompt and effective malaria treatment among children under five years of age: self-treatment with antipyretics prior to taking the child to the health facility (OR 1.83 95%CI: 1.28 - 3.26 P = 0.018). This means that caregivers who gave their children antipyretics were 1.83 more likely to delay malaria treatment because the child fevers may subside, an assumption that his or her condition has improved when, in fact not. Caregivers residing at a distance of more than five kilometres to the health facility (OR 2.09 95%CI: 1.03 – 4.22 P = 0.041). This shows that caregivers who stay more than 5km from the health facility were 2.1 times more likely not to have prompt malaria treatment for their children than those staying less than 5km from the facility. Household income (OR 2.89 95%CI: 1.18 – 4.39 P = 0.001), caregivers whose income was said to be inadequate were 2.9 times less likely to seek prompt malaria treatment, than those whose income was said to be adequate. Not having health education (IEC) done in the community (OR 2.14 95% CI 1.10 – 4.13 P = 0.024), increases the likelihood of delayed malaria treatment. Community health programs are important because the raise awareness on malaria prevention and treatment, thus making communities more proactive rather than reactive to the management of childhood febrile illnesses.

The following variables were not significantly associated with prompt and effective malaria treatment in under five children: occupation of the Head of household (OR 1.31 95%CI: 0.52 – 3. 30 P = 0.060). Furthermore, knowledge on malaria transmission (OR2.06 95%CI: 0.99 – 4.23 P = 0.054), this shows that caregivers who were not knowledgeable about malaria transmission were 2 times less likely to seek prompt malaria treatment for their under 5 children than those that were knowledgeable though the result was not significant.

5.7 Focus group discussions findings

Through the process of coding and sorting data and developing thematic matrices, it was found that the following contextual barriers hampered access to prompt and effective malaria treatment in under five children: long distance to the health facility, use of antipyretics in the initial treatment at home, the laziness of the caregivers, use of herbal medicines and the fear of being shouted at by health workers.

5.7.1 Distance to the health facility

In the quantitative analysis, statistical logistic regression analysis revealed that children of caregivers staying more than 5 km from the health facility were associated with delayed malaria treatment; equally during FGDs, long distances that caregivers needed to travel either by foot or cycling to reach the health facility was a prominent barrier that emerged. This was compounded by the presence of physical barriers such as passing through thick forests and traversing mountains, which are common physical barriers in Mpika district.

"*The problem is that we stay very far from the health centre; for instance, I stay in Itongo area, which is very far. So, if we suspect the child has malaria, we wait until the next day to see whether the child will improve"* (FDG, female caregiver)

5.7.2 Perceived severity of the fever

Malaria was recognized as a major problem in all the FGDs and fever was also positively associated as the main symptom of malaria. Caregivers, however, classified fever as mild and severe body hotness. Children with mild body hotness were not taken to the health facility, not until their fever became severe body hotness.

"*Most of the time when we see that the child has developed vomiting, shivering and mild fever, we wait for the child to develop severe body hotness also, before we take the child to the health facility. Most of the time when we take such a child with mild fever, they get his blood and test, they tell us that the child has no malaria, and thus we are sent back home on some other medication. If we take the child with high fever, they always find the malaria parasite; that's the reason we wait at home for the child to develop high fever"* (FGD, male caregiver).

5.7.3 Initial treatment of suspected malaria

The most common initial home treatment for suspected malaria illness that emerged from the FGDs was the use of antipyretics such as Paracetamol, which were mostly left over medications, from the previous illness or procured from the local shops called "*tutembas*". However, use of antipyretics was cited as the cause of delay in accessing care for the sick child, since the fever would normally subside after taking Paracetamol, thus the caregiver could interpret this as an improvement in the child's condition.

"What causes us not to bring the children the same day they develop fever is that we give the children Panadol; the fever usually goes down, so when we wake up the following day the child feels much better, so we don't bring the child to the health centre" (FGD, female caregiver).

5.7.4 Non-availability of antimalarial drugs of health facility.

A stock out of antimalarial drugs at the health centres is another barrier that emerged from the FGDs and interviews with rural health centre staffs. The reasons attributed to the drug stock outs was mainly erratic supply of health facility drug kit which contained essential medicine and supplies from the District Health Office and huge malaria burden in the catchment populations.

"*When we take our sick children to the health centre, sometimes the health workers there tell us they don't have medicine to treat malaria; they refer us to either Mpika District Hospital or Chilonga General Hospital where such medicine are readily available, so we have to go back to the village to prepare ourselves to go to these hospitals which are very far away"* (FGD, female caregiver).

"*We normally receive the medicine kit once every 2 months. When the community hears that the medicine kit has arrived, they come in numbers such that within a week we run out of all the antimalarial drugs, and RDT test kits*" (In-depth interview, RHC In-charge).

5.7.5 Fear of being shouted at by the health workers

The FGD revealed that caregivers were afraid of being shouted at, by the health personnel when they took a very sick child to the health facility: "*Women are afraid, if*

the child becomes very sick and if they take the child in that state to the health centre, they are shouted at by the health workers" (FGD, male caregiver).

"Most of the time when the child has a very high fever, the child convulses. These convulsions make us mothers afraid. When the child convulses, it's the men who carry the child on their backs, we join them later at the hospital" (FGD, female caregiver).

5.7.6 Occupation of Head of household

Regarding the association between Head of household occupation and prompt malaria treatment, almost all the participants in the FGDs were in informal employment working as subsistence farmers.

"*Even if you have a husband who is working or not working, when the child falls ill, we all want the life of the child; its us the mothers who rush the child to the clinic so that the life of the child is spared, even if it means walking a long distance to reach the clinic*" (FGD, female caregiver).

5.7.7 Use of herbal medication

The FGDs revealed that some caregivers were able to link febrile convulsions to malaria, and these mentioned that when their child with fever starts convulsing they rush the child to the health centre to get treatment. However, other caregivers could not link febrile convulsions to malaria, thus associated convulsions to epilepsy called "*chipuputu*". The initial treatment for febrile convulsions that such caregivers gave their children, were concoctions of traditional medicines mostly following advice from their parents or in laws. When they noticed that the condition of the child was worsening, the child was then taken to the health centre.

"*Some of our parents or in-laws tell us to use herbal medication, especially if the child is convulsing (umusanfu)". Herbal medication was given to my child when he started fitting, but there was no improvement, until I just decided to bring the child to the hospital, that's when the child got better after being treated by the doctor"* (FGD, female caregiver).

5.8 Survey of the health facilities

5.8.1 Availability of antimalarial drugs at the health facilities

Table 5 shows that of the eight health workers In-charges of the facilities interviewed, 6 (75 percent) indicated that their facility experienced stock outs of antimalarial drugs, while 2 (25 percent) indicated that they didn't. These two facilities were hospital affiliated centres (HAC) namely Chilonga Hospital- HAC and Mpika District Hospital-HAC. Traditionally, these two facilities got regular supplies of drugs from the government through Medical Stores Limited (MSL). Furthermore, Rural Health Centres were referring patients with malaria for further management to the two hospital- HACs when they experienced stock outs of drugs, or they had a complicated case of malaria.

Table 5: Survey of health care providers at the facilities.

Stock outs of antimalarial drugs	**Percentages**
Sometimes	75% (6/8)
No	25% (2/8)
Treatment options when no malaria drugs at the facility	
Send patients away	0% (0/8)
Refer to other facilities	100% (8/8)
Malaria health education in community	
Yes	63% (5/8)
No	37% (3/8)
Staffing levels at the facility	
Clinical officers	11 % (2/19)
Nurses	37% (7/19)
Environmental Health Technicians (E.H.Ts)	11% (2/19)
Classified Daily Employees (C.D.Es)	42% (8/19)

5.8.2 Malaria health education in the community

The study found that only 5 out of the 8 facilities sampled were conducting regular community health education on malaria. The others 3 facilities mentioned lack of transport, as their motor bikes for outreach services had broken down. However, this was compounded by the vastness of the catchment area of the RHCs and low staffing levels. These prevented them from carrying out malaria health education in the community.

5.8.3 Staffing levels at health facilities

The study found that most RHCs were manned by qualified health staff, namely 3 (11.0 percent) Clinical Officers, 4 (37.0 percent) Nurses and 1 Environmental Health Technician respectively. Most of the health centres had at least one Nurse and a Daily Casual Employee (CDE).

CHAPTER 6: DISCUSSION

This study explored the barriers to prompt and effective malaria treatment in children aged below five years of age in Mpika district. A wide range of interconnected factors at both household and health system level are said to influence access to early and efficacious malaria treatment in children under five years of age (Hetzel et al., 2007). The following barriers were identified in the study: distances to health facilities; household income; knowledge of malaria symptoms; its transmission and treatment; community health education on malaria; availability of antimalarial drugs at the health facilities; and staffing levels of health facilities.

This study found that an alarming low proportion of children diagnosed with malaria received prompt and effective malaria treatment in the rural district of Mpika, a finding consistent with a study done in Blantyre-Malawi (Holtz et al., 2003). In 2005, Prisca Kasonde, in her study on the utilization of intermittent presumptive treatment (IPT) of malaria in the Chongwe district found that pregnant women residing near to the health centres did not go to the facility to acquire malaria prophylaxis during pregnancy. They considered domestic activities to be far more important than IPT. This vital information also holds true in my study of barriers to prompt under five malaria treatment were caregivers considered domestic chores to be far more important than seeking prompt health care for their sick children. It was noted that extreme poverty propelled people to prioritize other activities such as subsistence farming rather than seeking health care. The use of an effective malaria treatment was equally low among study participants. In this study, most children with malaria were initially treated with antipyretics such as paracetamol before being taken to the health facility, where they were given recommended antimalarial treatments. This finding is also consistent with a study done in Tanzania were a huge proportion of children received antipyretics as first action at home, prior to being taken to the health facility (Hetzel et al., 2008). Self-treatment is the most common initial treatment in childhood malaria, especially in rural areas of Africa, where three quarters of malaria cases occur (Foster, 1995). Although antipyretics are widely used as a treatment option for childhood fevers, these are not the

biomedically recommended treatment for malaria. Self-treatment of malaria may have many disastrous consequences of propagating malaria infection to complications.

Home malaria remedies result in children presenting with complicated forms of malaria to health facilities (Menon et al., 1988). As noted in the FGDs, caretakers would wait until the illness resolved or subsided, but sometimes it could indeed worsen. At that point, it might be too late; as such delays of even a few days might prove deadly in cases of complicated malaria in children. Attempts should be made to change the behaviour patterns and the mind-set of these people, emphasizing that home remedies are not the answer to treating a fever due to malaria. Caregivers need to understand that if their children are healthy, they will have more time for subsistence farming. All fever cases among children under five years of age, whether at home or at a health facility, should be promptly investigated and treated with an antimalarial drug when confirmed to be malaria. It should also be noted that prompt malaria treatment is life saving and cost-effective than delayed treatment, which results in malaria complications needing skilled medical personnel to handle, who unfortunately are usually in short supply in most rural health centres. It is for this reason that it is imperative to administer an appropriate treatment whenever a child has malaria. These findings highlight the need to come up with malaria control strategies that are setting-specific, which can promote better care-seeking behaviours among caretakers so that all children in community suspected to have malaria receive prompt and appropriate treatment. This will go a long way in reducing the morbidity and mortality associated with treating complicated malaria.

The study also found that caretakers living more than 5 kilometre from the health facilities were less likely to access prompt malaria treatment for their children. This finding is in support of the study done in Uganda, which highlighted that caretakers who travelled greater than 5 km to the health facilities were more likely to have delayed malaria treatment than those that travelled less than 5 kilometres to the health facilities (Rutebemberwa et al., 2009). Long distance has long been pointed out by many studies as a common barrier to formal health care in rural settings (Baume, 2000 and Kiwanuke et al., 2008). From FGDs, it was clear that long distance makes caretakers adopted a wait-and-see approach, consistent with the findings by Chibwana, 2009. Moreover, some

of the strategies being advocated to combat the problem of long distance in Zambia by the Ministry of Health include: the use of volunteers called Community Health Assistants (CHAs) trained to conduct Home-based management of malaria (HMM). HMM involves the CHAs making a confirmed malaria diagnosis with Rapid diagnostic testing (RDT) then providing an appropriate antimalarial to malaria children within the community (WHO, 2010). The use of CHAs is widely practiced in many countries in Africa and some parts of Asia (WHO, 2010). Evidence that they are effective is broadly encouraging, where adequate training, supply of drugs and supervision can be maintained, but this is not a light undertaking (WHO Malaria fact sheet, 2010). The study also highlighted that only a quarter of caretakers were fathers and over three quarters were mothers. Studies have shown that male involvement in the management child illness improves access to health care of the child (Halwindi et al., 2013). This can be attributed to the fact that more often than not, fathers play a pivotal role in regulating women-child access to prompt malaria treatment through control of home income, women mobility and health care decision (Halwindi et al., 2013).

The cost of seeking health care has often been mentioned as a major hurdle to malaria treatment in the sub-Saharan Africa (Chuma, 2009). Inadequate household financial resources were cited as one of the barriers to prompt malaria treatment in the study. This finding is consistent with the fact that household income has a bearing on access to health care services available to the caretaker, as those with adequate income are able to access the health facilities easily as opposed to self-medication. Mpika district is mostly rural; as such, most study participants were peasant farmers with seasonal household income. This, coupled with transport costs and other opportunity costs of taking children to the health facilities instead of farming, interacted to make access to effective malaria treatment more difficult for the poor households. This challenge can be addressed by implementing favourable economic policies for local peasant farmers in the district. At present, the local farmers are faced with a lot of challenges such as poor farming methods and lack of favourable markets for their farm produce. Therefore, any policy aimed at improving the livelihood of these farmers will need to be structured around such important issues of improving their farm produce and a favourable market. The

potential spin-off of such an undertaking will not only improve health service accessibility, but also improve their standard of living, thus significantly reducing vulnerability to illnesses of their children. Furthermore, some of the other strategies aimed at reducing the cost of treating a malaria illness in children, such as HMM have shown to increase uptake of early malaria treatment.

The majority of caretakers in the study were knowledgeable about the cause, transmission, symptoms and treatment of malaria, despite the low proportion of their under 5 children promptly treated for malaria that was found in the study. Furthermore, the study found that caregivers who were more knowledgeable about malaria were more likely to seek prompt malaria treatment for their under 5 children than those that were not knowledgeable. However, a study done in rural Nigeria showed that knowledge of caretakers on malaria transmission does not always translate into prompt malaria treatment in under 5 children, though such knowledge only tends to improve personal protective behaviours such as use of insecticide treated bed nets (Ahorlu, 2006 & Rutebemberwa, 2009). It is clear that for strategies aimed at increasing caretaker's knowledge on malaria to have any meaningful impact in fostering better treatment seeking behaviours, other external factors that influence it need to be put into context.

The study demonstrated that community health education on malaria increased the likelihood of prompt and effective malaria treatment among under 5 children; however, during FGDs, caretakers revealed that most of the IEC sessions on malaria were conducted at the health facility by health staffs when caretakers took their children for routine under five clinic days, as opposed to being conducted in the community. There is a need to broaden the target population for the IEC sessions to include caretakers who do not come to health facilities. In this vein, there is a need to increase awareness through health campaigns in the community and through school health programs by audio-visual means such as drama; emphasizing the importance of households to adopt malaria control and preventive strategies. Although the extent to which such social mobilization campaigns influence change in health seeking behaviours has not been exhaustively investigated, studies that have examined this issue do not consistently show a correlation between care seeing and malaria-related knowledge (Halwindi et al., 2013).

The survey of health workers revealed that most rural health centres in the district poorly manned and experienced frequent antimalarial drug stock outs. This led to the available limited staff being overburdened by a huge turn over of patients. The ACT stock-outs resulted in patients being referred to the two hospitals further away to access malaria treatment, a similar finding in a study done in Malawi (Ewing et al., 2011). In Zambia, the recommended first-line malaria treatment is the use of Artemisinin-based combination treatment (ACT), which can only be obtained at the health facility with regard to the rural settings. It was also discovered that the health centres were supplied with limited antimalarial drug stocks in the drug-kit which they received monthly from the district hospital compare to the catchment population, thus resulting in frequent stock-outs of medicines at the health centres. Therefore, it is important that national malaria strategies, through the Ministry of Health increases the allocation of ACTs in the drug kits to improve essential commodity security at facility level, hence improving prompt access to effective antimalarial treatment. In addition, staff attrition was found to be high in the district, thus more trained health care providers are needed if the vision of provision of quality health care as close to the family is to be realized in the district.

6.1 Study limitation

The study was conducted in selected rural health centres in Mpika District and thus the extent to which these findings can be generalized to other settings is limited. The ideal situation would be to collect data from all health centres and care givers with children under the age of five years in Mpika District. This was hindered by geographical barriers, time, and financial limitations. Furthermore, the interviewees were caregiver who had sought care at the health facilities. However, those caregivers of children with malaria but who did not come to the health centre could not be interviewed introducing a form of bias. Despite these limitations, the findings from this study bring to the fore some important barriers to prompt malaria treatment in a rural setting, thereby providing a platform on which malaria control strategies can be formulated. However, there is a need for further research using other methodologies to explore in-depth these factors that negatively impact on prompt and effective malaria in children under five years, in order to have a much deeper perception of not only structural but also the cultural and social factors at play.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

The study sought to explore the barriers to prompt and effective malaria treatment in under five children in Mpika district. The study found that a low proportion of caretakers of under five children with malaria, sought care promptly at the health facilities. Longer distances to travel to health facilities, inadequate household income, as well as shortage of antimalarial drugs at facilities propels caregivers towards the practice of self-medication and other non-biomedically approved malaria treatments such as antipyretics or herbal medication, resulting in delayed malaria treatment. It is important that sufficient stocks of anti-malarial drugs are made widely available at the health facilities to have a successful intervention in the district, more so in a country like Zambia where the costs of ACT in private pharmacies are quite exorbitant for ordinary citizens. Factors that negatively impact on access to prompt malaria treatment are so complex such that even in a country like Zambia, they differ from one locality to the other. Therefore, there is a need to look at the local context in coming up with solutions. Finally, there is an urgent need to direct additional resources towards addressing some of the barriers identified to reduce the morbidity and mortality associated with malaria among the under five children in the rural settings.

7.1 Recommendations

In Mpika district, malaria has been cited as the major contributor to under five morbidity and mortality (Mpika DHMT annual report, 2010). Thus, it is important that the factors identified in this study that act negatively on prompt and effective malaria treatment in under five children be addressed by the relevant authorities, for the country to attain the MDGs on maternal and child health. The following are some of the recommendations made from the study:

1. The District Community Medical Office (DCMO) needs to ensure that health centres are adequately staffed and have sufficient stocks of antimalarial drugs.

2. The DCMO needs to strengthen their technical support and supervisory visits to all the health facilities in the district to ensure health workers adhere to malaria treatment guidelines when managing under-five children with malaria.

Furthermore, there is a need to orient health care providers at the facility level in integrated management of childhood illnesses (IMCI) so that rational and efficacious treatment is administered to the children.

3. The DCMO needs to consider repairing motor bikes for health centre staffs so that they can carry out community health education activities on malaria and other childhood illnesses.

4. Community Health Assistants need to be actively involved in malaria activities at the health centre, to help facility staffs that are overburdened with a huge workload. They also need to be supplied with antimalarial drugs and test kits so that they can manage malaria cases they diagnose in the community. This will improve accessibility to prompt malaria treatment by cutting down the distance required to reach RHCs for caregivers residing in distant localities.

5. There is need for the government to consider building more health centres in the district, to reduce on the geographical distances required to reach the nearest health facility.

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APPENDICES

Appendix I: Focus group discussion with caregivers of malaria children.

Topic: Barriers to prompt and effective malaria treatment in under 5 children in Mpika district.

Before we start, I would like to remind you that there is no right or wrong answer in this discussion. We are interested in knowing what each one of you think about the barriers to accessibility of early and effective malaria diagnosis and treatment in children under 5 of age. Please feel free and be frank to share your point of view, regardless of whether you agree or disagree with what you hear. It is important that we hear your opinions.

You probably prefer that your comments are not reported to people outside of this group. Please treat others in this family group as you want to be treated, by not telling anyone about what you hear in this discussion today.

First of all let's start by going around the circle introducing oneself. (Members of the research team also to introduce themselves and describe each of their roles).

Discussion Questions

1. What information do you know about malaria regarding cause, symptom and transmission and treatment?
2. What do you do first, when you suspect your child has malaria?
3. What do you think are the causes of delay in seeking malaria treatment for your child the same day he or she falls ill?
4. How do you perceive service delivery at the health facility?

Summary

Let's summarize some of the key points from our discussion. Is there anything else you may wish to add? Do you have any questions?

Thank you for taking part in the discussion.

Appendix 11: Focus group discussion guide in local language

Local language focus group discussion guide

Ukulanshanya kwine-kwine nebumba lyabanamayo atemwa abasunga abana na malaria

Umutwe: ificingilila ukuposha ubulwele bwa malaria bwino-bwino kabili mukwangufyanya mu bana abali nemyaka iyakufyalwa isano (5) nokwisa panshi, mwi boma lya mpika

Ifyakukonka pakusala abali nabana abasangilwe nobulwele bwa malaria

Elyo tatulatendeka, kuti natemwa ukumicinkula ukuti takwabe ubwasuko bwabufi atemwa ubwacine mukulanshanya kwesu. Icikankala cakutila twishibe efyo cila umo alentontonkanya paficingilila ukuposha malaria bwino-bwino kabili mukwaangufyanya mubana abali nemyaka iyakufyalwa isano (5) nokwisa panshi. Eico ndemilomba ukuti mube abantungwe kabili abakakulwe mukulandapo ifyo mwingacimona. Kabili cikankala ukuti twatesha amapangi yenu nangula amontontonkanyo yenu pali ici.

Ndesubila kuti mwatemwa ukuti amashiwi mwala lundapo pakulanshanya tayele shinikwa kuli abo bonse abashili na ifwe pano. Ngefyo fine bonse tekuti tutemwe icamusango uyu uktucitikila, kanshi kuti cawamisha ukuti twakaka inkama pakukana shimika fyonse ifyo twalalanshyanya ilelo.

Icakubalilapofye, natuilondole bonse ifwe cila umo-umo. Ba membala babakepusha bonse bailondolole cila umo-umo akwete.

Amepusho Yakulanshyanyapo

1. Finshi mwaishiba pa bulwele bwa malaria pamo nga, ifelenga ubu bulwele, ifyo mwingeshibilako uuli na ubu bulwele, ifyo butanda, elyo naifyo bwingu poshiwa atemwe umuti uposha malaria?
2. Fishi mucita pakubala ilyo lyonse mwamona ukuti umwana wenu ali na malaria?
3. Cinshi muletontonyanya icilenga ukuti kube ukuwaya-waya mukufwaya ukuposhiwa kwa malaria mu mwana wenu?
4. Bushe mulolesha shani atemwa mumona shani imibombele yamilimo pacipatala?

Umusapu

Natume umusapu pafikomo fimo-fimo ififumine muku lanshanya kwesu. Bushe kuli nafimbi ifyo mwingatemwa ukulundapo? Namukwatako amepusho?

Natotela nganshi pakusangwa muli uku kulanshyanya.

Appendix III: Focus group consent

Consent to participate in focus group

You have been asked to participate in a focus group. The purpose of the group is to try and understand the reasons as to why children who develop malaria symptoms are not quickly taken to the health facility for treatment within 24 hours of onset of symptoms. The information learned in the focus groups will be used to design public health messages intended to encourage caregivers to promptly seek treatment for malaria infection for their children.

You can choose whether or not to participate in the focus group and stop at any time. Although the focus group will be tape recorded, your responses will remain anonymous and no names will be mentioned in the report.

There is no right or wrong answer to the focus group question. We want to hear many different viewpoints and would like to hear from everyone. We hope you can be honest, even when your responses may not be in agreement with the rest of the group.

Respect for each other, we ask that only one individual speaks at a time in the group and that responses made by all participants be kept confidential.

I understand this information and agree to participate fully under the conditions stated above.

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Signature or mark of subject or legally authorized Date

---------- ----------

Signature of person obtaining consent Date

---------- ----------

Witness to consent if subject unable to read or write Date

Appendix IV: Informed Consent

Consent form to participate in the study

Statement by research participant

The purpose of this study has been explained to me and I understand the benefits, risks and confidentiality of the study. I further understand that, I have the right to withdraw from the research study at any time without any repercussions, not answer questions that I may deem personal and taking part in this study is purely voluntary.

Agree to take part in this study designed to find out what the barriers are, to accessing early and effective malaria treatment in children under 5 years of age.

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Signature or mark of subject or legally authorized Date

---------- ----------

Signature of person obtaining consent Date

---------- ----------

Witness to consent if subject unable to read or write Date

Appendix V: Information sheet for structured interviews

Information sheet for structured interviews

Principal investigator: Silweya David

Introduction

I, Silweya David, a student of Master of Science in Epidemiology from University of Zambia is kindly requesting for your participation in the research study to determine barriers to prompt and effective malaria treatment in children under 5 years of age in Mpika district.

Purpose of the study

To identify barriers to access of early malaria diagnosis and treatment, in children under 5 years of age, at both community and health facility level in Mpika district.

Procedures

You are being asked to agree to a structured interview with a research assistant who will ask you questions about the reasons as to why children who develop malaria symptoms are not quickly taken to the health facility with 24 hours of symptom onset.

Notes will be taken by the research assistant

Risks/Discomfort

You may find some uncomfortable questions. If so, should feel free to say so, and only answer questions that you are comfortable with. However, be assured that whatever you say is confidential.

Anticipated benefits

The information you give us, will give us a better understanding of what needs to be done to improve the management and control intervention of malaria in children under 5 years of age in the district. Although you will not have any direct benefits from this, if malaria control interventions are changed, your community will benefit in the future.

Sharing of new findings

The finding of the study will be communicated to you at the end of the study.

Confidentiality

Confidentiality will be strictly adhered to. A code, instead of your name, will be used during data analysis.

Compensation

There will be no compensation for participating in the study.

Voluntary participation

Your participation in this study is completely voluntary. You have the right to withdraw from the research study at any time without any repercussions. Even if you do not want to join the study, or you withdraw from the study, your child will still receive the same quality of medical care available to you at the health facility.

Persons to contact

If you want to talk to someone about this research study because you think you have not been treated fairly or think joining the study has harmed you, or you have any other questions about the study, you should contact the following.

The Principal Investigator

Silweya David,

Chilonga Mission Hospital

Box 450030, Mpika, Zambia.

E-mail: silweyadavid@yahoo.com.

Cell phone number: +260966936733.

University of Zambia Biomedical Research Ethics Committee

The Chairperson,

The University of Zambia,

Biomedical Research Ethics Committee,

Box 50110, Lusaka, Zambia.

E-mail: unzarec@zamtel.zm.

Telephone number: 01 256067.

Appendix VI: Information sheet and consent in local language

Information sheet and consent in local language

Ipepala ililelanga ubutantiko bwakwipushanya

Umutwe: ifiingilila ukuposhiwa kwa bulwele bwa malaria mukwangufyanya kabili bwino-bwino mubana abali ne myaka ukushinta nakuli isano (5) mwi boma lya mpika.

Kafwailisha mukalamba: Silweya David

Introduction (Umusapu)

In ne Silweya David, umusambi wa masters of science in epidemiology pesukulu likalambe ilya calo ilya university of zambia, ndemilomba ukuti mwinggaibimba mwisambililo ilya kufwailikisha nokwishiba ificingilila ukundapwa kwa bulwele bwa malaria mukwangufyanya kabili bwino-bwino mubana abali nemyaka iyakufyalwa ukushinta nakuli isano (5) mwi boma ilya Mpika.

Inka ya mulandu wesambililo

Kulengula atemwa ukwishiba ificingilila ukwishiba mukwangufyanya kabili nokundapa ubulwele bwa malaria mubana, abali nemyaka nakuli isana (5yrs). Konse mumishi elyo naku cipatala kwine mwi boma ilya Mpika.

Inka ya mulandu wesambililo

Kulenga atemwa ukwishiba ificingililila ukwishiba mukwangufyanya kabili nokundapa ubulwele bwa malaria mubana, abali nemyaka ukushinta nakuli isana (5), konse mumishe elyo na ifyo. ku cipatala kwine mwi boma iya Mpika.

Ifyakukonka

Muleipushiwa ukusumina kukwipusha ukupekanishiwe nabale afwilisha ukufwailisha. Amepusho baleipusha yli pafilenga ukuti umwana uwakwata ifishibilo fya malaria taba mutwele ku cipatala mukundapwa muli ubo bwine abushku ifishibilo fya moneka.Ifyo mukalalondolola bakulalemba pepepala kuli ba kafwailikisha.

Ifingalenga ububi atemwa ukukana misansamusha

Kuti mwasanga ukuti amepusho tayamisekeshe. Nga calloti caba ifyo, muli abakakulwa nokusosa ify. kabili kuti mwayasukafye amepusho ayalemisekeshe. Eico kanshi ndemikonkomesha ukuti fyonse ifyo mulesosa fileba ninkama.

Ubusuma bwinga tumbukamo

Ilyashi muletupela kuti lyatwafwa ukutesha bwino-bwino ifya twingabomba namaka ukupwisha elyo nokucimfya ubulwele bwa malaria ukupwisha elyo nokucimfya ubulwele bwa malaria mubana abali nemyaka iyakufyalwa ukushinta nakuli iisano, muno boma wesu. Nangula tamusendelemo mubusuma bwa ilisambililo lelo abekala mushi bambi kuti caba fwilishako, no kusekelela ubusuma bwingtumbukamo kuntanshi.

Ukusabankanya ifikatumbukamo ifipya

Ifikatumbukamo ifipya muli ilisambililo. Fikasabanka nishiwa kuli imwe panuma fye yakupwafye kwa uyu mulimo.

Ukusunga inkama

Inkama tukashininkisha ukuti yasungwa. Inambala eyo bakabomfya mukashita keshina pa kulolekesha pali fyonse ifyalandilwe.

Amalipilo

Mukwai takuli amalipilo pakubimba muli ilisambililo.

Ukuibimbamo

Mukwai ukuibimba muli ilisambilo atemwa umulimo kwaipelafye. Eico kanshi namukwata insambu ishakufuma muli uyu mulimo isambililo inshita fye iili yonse ukwabula nobwafya panuma. Nangula mwinguibimbamo atemwa iyoo, umwana wenu akapoka ubwafwilisho bwapa cipatala bumo bwine.

Abantu bakumona

Ngacakutila mulefwaya ukulandako nabamo pali ili sambililo iyakufwailisha pamulanda wakuti tamusekelemo ifyo bamisendele atemwa ukuibimbamo kwamiletela ubwafya, nangula namepusho pali uyu mulandu. Kuti mwamo abantu pakeyala akali pesambai

The Principal Investigator

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Chilonga Mission Hospital,

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Mpika, Zambia.

E-mail: silweyadavid@yahoo.com,

Cell phone number: +260966936733.

University of Zambia Biomedical Research Ethics Committee

The Chairperson,

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P.O.BOX 50110, Lusaka, Zambia.

E-mail: unzarec@zamtel.zm,

Fax: +260-21-250753,

Telephone no: 01 256067.

Ipepala lya kusumina napo ukuibimba mwisambililo

Amashiwa ukufuma kuuleibimbamo

Tuka yamulandu wailisambililo nabaulondolola kuli ine elyo nintesha ubusuma bwa bamo ububi mwingatumbukamo elyo nenkama yabamo. Kabili natesha ukuti ndi nensambu ishakufumamo inshita fye iili yonse ukwabula nobwafya panuma, tekuti ngasuke nakumepusho ayo namona ukuti yankuma sana kabili nokuibimba muli uyu mulimo kuipeleshafye

Ukulemba ishina ilya uyu muutu…….

Nasumina ukusenda ulubali muli uku kulanshyanya atemwa ukasambilishyanya ukwepekanishiwe mukuti tweishibe ificingilila ukuposhiwa kwa bulwele bwa malaria mukwaangufyanya kabili bwino-bwino mubana abali nemyaka ukushita nakuli isano (5yrs).

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Ukusaina inshiku

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Ukusina kwa ulesuminisha inshiku

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Kambone ngacakuti uulesumina inshiku

Tekui abelenge atemwa ukulemba

Appendix VII: Local language information sheet/ consent for focus group discussion

Local language information sheet/ consent for focus group discussion

Ipepala lya kulolekesha pa kulanshanya muma bumba

Umutwe: ificingilila ukuposhwa kwa bulwele bwa malaria mukwangufyanya kabili bwino mubana abli nemyaka ukushinta nakuli isano (5) mwi boma lya mpika.

Kafwailisha mukalamba: Silweya David

Umusapu

Ine ne Silweya David, umusambi wa masters of science mu epidemiology pe sukulu likalamba ilya umuno calo ilya University of Zambia, nedmilomba mukwai ukuti mwingaibimba mukulanshyanya nge bamba mwi sambililo ilinga lenga ukuti twaishiba ifcingilila ukuposhiwa kwa bulwele bwa malaria mukwangufyanya kabili bwino-bwino mubana abali nemyaka ukushita nakuli isano (5yrs) mwi boma lya Mpika.

Inka ye sambililo

Kulengula atemwa ukwishiba ifcingilila ukwishiba mukwangufyanya kabili nokuposha ubulwele bwa malaria mubana abali nemyaka ukushinta nakuli isano (5yrs) konse mu mushi elyo naku cipatala kwine mwi boma lya Mpika.

Ifyakukonka

Muleipushiwa ukusimina ukuibimba mukulanshyanya mwibumba ilinono ilya bafyashi abana abamyaka ushinta kuli isano abali no bulwele bwa malaria. Libumba lya bafyashi abali mutanda (6) ukushita kuli pabula (9). Mukwai tulemipusha amepusho ukulingana napafilenga ukuti umwana uwakwata ifishbilo fya malaria tabamutwele ifishibilo fya malaria tabamutwele ku cipatala mukundapwa muli ubp bwine ubushiku ifishibilo fyamoneka. Ukulanshyanya kuti kwaposa insa nagu imo. Kuti twatemwa nokutesha kulubali lwenu ifyo muletontokanya elyo nokumona uyu mulandu. Ifyo tulelanshyanya tulebika na mwiseleti elyo nabakafwa wa kwipusha bakulalemba pepepala.

Ifingalenga ububi atemwa ukukana misansamusha

Kuti mwasanga ukuti amepusho tayamisekeshe. Ngu cakuti caba ifyo muli abakakulwa nokukosa ifyo kabili kuti mwayasuka fye amepusho ayalemisekesha. Eico kanshi ndemikonkomesha ukuti fyonse ifyo mulesosa fileba ninkama.

Ubusuma bwingatumbukamo

Llyashi muletupela kuti lyatwafwa ukutesha bwino-bwino ifya twingbomba namaka ukupwisha elyo nokucimfya ubulwele bwa malaria mubana abali nemyaka yakufyalwa ukushinta nakuli isano muno boma wesu. Elyo tulelanshanya twalamipelako utulyo elyo notwakunya utwa kutalalikako ku mukoshi.

Ukusunga inkama

Inkama tukamona ukuti yasungwa nangula tulebika ifyo tulelanshyanya mwiseleti. Ifyo muleasuka tafyakeshibikwe ukuti nimwebo kabili na mashina yenu tayakalumbulwe.

Ukuibimbamo

Mukwai ukuibimba muli uku kulanshyanya kwa kuipelafye. Namukwata insambu isha kufuma muli uku kulanshyanya inshita fye iili yonse ukwabula nobwafya panuma.

Abantu bakumona

Ngacakuti mulefwaya ukulandako nabamo pali uku kulanshanya pamulandu wakuti tamusekelemo ifyo bamisendele atemwa ukuti pakusangwa mukulanshyanya kwamiletele ubwafya nangula muli namepusho pali iili sambililo, kuti mwamona abantu pa keyala akali pesamba

The Principal Investigator

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E-mail: unzarec@zamtel.zm,

Fax: +260-21-250753,

Telephone no: 01 256067.

Ukusuminishina kwakuibimba mwibumba

Namwipushiwa ukusendamo ulubali mwibumba. Inkaya iili bumba kwesha ukutesha ifilenga ukuti abana abakwata ifilenga ukuti abana abakwata ifishibilo fya malaria tababutwele mukwangufyanya kucipatala mukundapwa muli ubo bwine ubushiku ifishibilo fya tendeka. Ifyo tulelanshyanya mumabumba yesu amahiwi yakabomfiwa mukupanga ilyashi lyakusabankanya kubekala calo palwa bubi mukubakoselesha ukuti abasunga abana bali nobulwele bwamalaria mukundapwa mukwangufyanya.

Kuti mwasala ukuibimbamo atemwa iyoo elyo kuti mwaleka akashitfye akali konse. Nangulatulebika ifyo tulelanshyanya mwiseleti ifyo muleyasuka tafyakeshibikwe ukuti nimwebo kabili namasina yenu tayakalumbulwe

Kumepusho ye bumba takwaba ubwasuko bwino-bwino atemwa ubwa bufi. Tulekabila ukutesha kuli cila umo umo ifyo balentontokanya. Tulesubila ukuti muse abacishinka nelyo mwamona nkuti ifyo mwasosa tafiyene nefyo ibumba lilekabila.

Mukucindikana bonse, kuti twamilomba ukuti tulelekanina pakwasuka elyo nokutila ifyo cila umo alesoso fya sungwa nge nkama.

Natesha amashiwi aya elyo nasumina nokuibimbamo onse mukukonka ifisoselwe pamulu.

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Ukusaina inshiku

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Ukusina kwa ulesuminisha inshiku

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Kambone ngacakuti uulesumina inshiku

Tekui abelenge atemwa ukulemba

Appendix VIII: Structured interview schedule

Structured interview schedule

The University of Zambia

School of Medicine

Department of Community Medicine

Topic: Barriers to prompt malaria diagnosis and effective treatment among under 5 children in Mpika district.

Health Center……..

Name of Interviewer: …….Date: ……/……/…….

Respondent's identification number: ……

Instructions for the interviewer

1. Always greet and introduce yourself before starting the interview.
2. Explain the purpose of the study and ask for permission to interview the participant.
3. Assure the respondent of maximum confidentiality.
4. Explain that the respondents have a choice to participate and the option to withdraw. If the respondent is unwilling to take part, do not force them.
5. Make the respondent sign the consent form before you start the interview, or use the thumb print for those who cannot sign.
6. Do not write the name of the respondent on the interview schedule.
7. Write the appropriate responses in the spaces provided.
8. Tick or circle the correct answers where they are provided.
9. Thank the respondent at the end of the interview.

Section A

Demographic Data

1. What is the sex of child?
    a. Male
    b. Female
2. What is the age of child?
    a. 0-12 months
    b. 13-24 months
    c. 25-36 months
    d. 37-48 months
    e. 49-59 months
3. What is your relationship to the child?
    a. Mother
    b. Father
    c. Grandmother
    d. Others, specify…….
4. How old are you?
    a. 18 – 24 years
    b. 25 – 34 years
    c. 35 – 44 years
    d. 45 and above
5. What is your highest educational level?
    a. Never been to School
    b. primary education
    c. Secondary education
    d. College
    e. University

6. What is highest level of education of head of household?

    a. Never been to school
    b. Basic education
    c. High secondary education
    d. College
    e. University

7. What is occupation of head of household?

    a. Employed
    b. Business
    c. Farmer
    d. Any other (specify)----------

8. What is your marital status?

    a. single
    b. married
    c. divorced
    d. separated
    e. Other (specify)----------

9. Is your household income usually regular and dependable?

    a. Yes
    b. Possibly
    c. Uncertain
    d. No

Section B: Prompt & effective malaria treatment

10. What signs and symptoms did your child have?

    a. Convulsions
    b. Fever
    c. Refusing to eat
    d. Vomiting
    e. Shivering
    f. Diarrhoe
    g. Others, specify…….

11. What did you do for your child immediately after recognizing that the child was ill, before coming here at the health facility?

    a. Give antipyretic
    b. Give antimalarial
    c. Give antibiotic
    d. Give herbal medication
    e. Sponging
    f. Take to health facility
    g. Others

12. Did the family seek help for this malaria episode outside home?

    a. Yes
    b. No

	13. What kind of treatment did your child receive? a. Traditional medicine b. Western medicine 14. How long after onset of symptoms mentioned above, did you take to bring the child to the health facility? a. Within 24 hours b. After 24 hours 15. If more than 24 hours, what were the reason? a. Didn't think of seeking treatment b. There is no one to take care c. Didn't have money d. Distance to health facility was far e. Others……	

Section C: Barriers to prompt malaria treatment

16. What do you think causes malaria?

a. Mosquitoes
b. Unhygienic condition
c. Cold weather
d. Witchcraft
e. Others, specify……..

17. Mention 3 signs of malaria that you know?

a. Fever
b. Headache
c. Joint pains
d. Convulsions
e. Others, specify……

18. Do you think malaria can be transmitted?

a. Yes
b. No

19. Can malaria be treated?

a. Yes
b. No

20. How do you treat malaria in young children?

a. Use western drug
b. Traditional medicine

21.If (a), what is the name of the drug?

a. Fansidar
b. Coartem
c. paracetamol
d. Quinine
e. Others, specify…….

22. Where do you get above drugs from?

a. Health centre
b. Local Shops (tutembas)
c. Community health worker
d. Don't know
e. Others, specify……

23. If health centre, how far is the facility from your home?

a. Near
b. Very near
c. Far
d. Very far

24. What your usual mode of transport to the health facility?

a. Walking
b. Cycling
c. Bus
d. Others, specify ……..

	25. Are there any barriers to get to the health facility? a. Yes b. No 26. If Yes, what are they? a. Rivers b. Mountains c. Forest d. Long distance to the health facility 27. Do you always get the treatment for malaria at the health facility? a. Yes b. No 28. If No and Sometimes, what are the reasons? a. No drugs available b. Facility closed c. No Health staff 29. If (Answer to Q24 is shop), how far is the shop from your home? a. Near b. far 30. Do you always get the treatment for malaria? a. Yes b. No c. Sometimes d. Don't know	

31. How would you rate the services in terms of promptness in malaria treatment?

a. Very satisfactory
b. Satisfactory
c. Bad
d. Very bad

32. Do you have health education session on malaria in your village?

a. Yes
b. No

33. If yes, who does this?

a. Health worker
b. NGO
c. Volunteers
d. Don't know
e. Others. Specify……

34. How frequent are the done?

a. Weekly
b. Monthly
c. Don't know
d. Other. Specify……

Thank you very much for you time

Appendix IX: Local language structured interview schedule

Local language structured interview schedule

Ifyakukonka mu mepusho

Isukulu likalamba muno calo ca Zambia

Muciputulwa ca bumi

Umutwe: Icishingilisha ukuposhiwa kwa malaria mu bana abali na imwaka isano na ukwisa panshi mu citungu ca mpika

Pa health center……

Ishina lya bakepusha …….

Inambala lya kwishibilako abo baleipusha: ……

Ifikomo ifyakukonka pakwipusha

10. Ukuposha umuntu elyo nakwilondolola ilya tanlatendeka ukwipusha.
11. Ukolondolola inka yesambililo elyo nokulomba ulusa kubo uleipusha.
12. Konkomesha kasuka ukuti ukasungu inkama pamaka.
13. Ukulondolola ukuti kasuka aba no kasalapo pakuibimbamo atemwa ukukana. Ngacakutila talefwaya mwiba patikisha.
14. Suminishanyenyi nakasuka kabili cilembwe pepepala elyo tamulatendeka ukwipusha atemwa mubonfye icikumo cabo ica kukuyo negatekuti balembe.
15. Tekwesha ukulemba ishina ilya kwakasuka pacipepala ici.
16. Lemba amasuko balelanda muncenda shipelwe.
17. Congeni atemwa shungulushe ubwasuko bwa cine-cine.
18. Ukutasha kasuka panuma yamepusho.

Section A

Demographic data

1. Bushe umwana wenu mwaume atemwa mwanakashi?

    c. umwaume
    d. umwanakasi
    e.

2. Bushe umwana wenu ali nemyaka iinga?

    f. 0-12 imyeshi
    g. 13-24 imyeshi
    h. 25-36 imyeshi
    i. 37-48 imyeshi
    j. >49 imyeshi

3. Bushe bulupwa noyu mwana bwaba shani ?

    e. Ninebo nyina
    f. Ninebo wishi
    g. Ninebo nakulu
    h. Ngacakuti kuli nafimbi kuti mwalundapo no kulondolola…..

4. Bushe muli nyaka iinga?

    e. Imyaka 15 ukushinta ku 24
    f. Imyaka 25 ukushinta ku 34
    g. Imyaka 35 ukushinta ku 44
    h. Imyaka 45 naukucilapo

5. Bushe mumasambilo yenu mwapelela pii?

    f. Nshafikapo ku sukulu
    g. Napelela mu geledi 7
    h. Napelela mu geledi 12
    i. Nalifika ku musambililo yapamulu
    j. Nalifika ku university

6. Bushe bamutwe wa nganda yenu bafika pes mumasambilo yabo?

    a. Nshafikapo ku sukulu
    b. Napelela mu geledi 7
    c. Napelela mu geledi 12
    d. Nalifika ku musambililo yapamulu
    e. Nalifika ku university

7. Bushe bamutwe wanganda finishe bacita?

    e. Balingila inchito
    f. Niba shimakwebo
    g. Niba shibulimi
    h. Nga kuli fimbi kuti balanda------

8. Bushe mwalyapwa/ atemwa mwaba nawiiba numwina wenu?

    f. nshaupwa
    g. nalupwa
    h. ifyupo fyalipwa
    i. twalipasana nabena mwandi

9. Bushe ka ndalama mubofya panng'anda kamoneka libili-libili, kabili mwalisubilamo?

    e. emukwai
    f. limo limo
    g. nshishibe
    h. iyo mukwai

Section B: Ukusanga malaria mukwangufyanya elyo no kuiposha

10. Bushe fishibilo nshi umwana wenu akwete ifyo mwamwene pahuti mwishibe ukuti ali na malaria?

    h. ukusamfula
    i. umubili ukukaba
    j. ukukana ukulya
    k. ukuluka
    l. ukututuma
    m. ukupolomya
    n. ngakuli nafimbi kuti balunda po…

11. Panuma yakumona ukutila umwana wenu tali bwino, finshi mwacitilepo elyo tamulamuleta ku chipatala?

    h. Ukupela umuti watutalikako umubili
    i. Ukupela umuti wa malaria
    j. Ukupela umuti wa malwela yambi nga icifuba
    k. Ukupela umuti wafimpusa
    l. Ukumupukuta umubili utalale
    m. Ukumutwala umwana kucipatala

12. Bushe mutinshi mwapele umwana wenu?

    c. Umuti wafimpusa
    d. Umuti waku cipatala

13. Bushe umwana wenu mwamuletele lilali kucipatala panuma yakumona ifishibilo ifyo tulumbwile kunuma?

    c. Ubushiku ubo bwine twamwene ifishibilo(< 24 hours)
    d. Ubushiku bwakonkelepo (>24 hours)

14. Ngacakuti mwamuletele panuma yabushiku bumo mulanda nshi cabelele ifi?

    f. Tatwatontonkenya pakufwaya ubwafwilisho bwakuposhiwa
    g. Takwali noumo ukkwafwilisha
    h. Didn't have moneytatwakwete indalama
    i. Intamfu yaku cipatala yalilepa
    j. Fimibi…

Section C: Ifi cingilila ukuposhwa bwangu malaria

15. Mukucimona kwenu finsi filenga ubulwela bwa malaria?

    f. Bamumgwi ngwi
    g. ubusali
    h. ninshita yampepo
    i. ubuloshi
    j. fimbi…

16. Lumbuleni ifishibilo fitatu ifya malaria ifyo mwaishiba?

    a. ukukaba umubili
    b. umutwe ukukalipa
    c. ukukalipa kwafilundwa fya mubili
    d. ukusamfula
    e. nshishibe
    f. fimbi……

16. Mukutontokanya kwenu bushe malaria alambukila?

    c. Ee mukwai
    d. Iyo mukwai
    e. Nshishibe

17. Bushe ubulwele bwa malaria kuti bwaposhewa?

    c. Ee mukuwai
    d. Iyo mukuwi
    e. nshishibe

18. Mubana abanono, bushe ubulwele bwa malaria babucimfya shani atemwe babubombelapo shani?

    c. Mukubomfya imiti shaku cipatala
    d. Umuti wafimpusa
    e. Takwaukunwa umuti uuli onse
    f. nshishibe
    g. fimbe……

19. Ngacakuti ubwasuka bwenu mulipusho iya 22 bwaciba (a) lishina nshi iya uyu umuti?

    f. Fansidar
    g. Coartem
    h. panado
    i. nshishibe
    j. Fembi…

20. Bushe nikwi mupoka imiti inne iyi tulumbwile pamulu?

    f. Ku cipatala
    g. mutuntemba
    h. mumushi
    i. nshishibe
    j. fimbi

	21. Ngacakuti umuti mupoka ku cipatala nintamfu nshi yabapo uku fuma pa nganda pamyenu? e. pepi f. pepi nganshi g. patali h. patali nganshi 22. Bushe ninshila nshi atemwa musangu nshi mwendelelamo ukufika kucipatala? e. Kwenda pamakasa f. Kucofa amacinga g. Niba motoka/ ba saca h. Fimbii… 23. Bushe kwalibako ifimo cingilila ukuya ku cipatala? c. Ee mukwai d. Awe mukwa 24. Ngacakutila mwasumina nifinshi? e. imimana f. impili g. impanga umwafula imiti kabili umushaba bantu h. katwishi i. fimbii…. 25. Bushe mulapoka iyonse umuti wa malaria ku cipatala? c. Ee mukwai d. Awe mukwai	

	e. Limo limo fye f. katwishi 26. Ngacakuti mwakana atemwa ni limo limo fye, bushe cinshi cingulenga ifi? d. Kubula kwa imiti e. Kwisala icipatala f. Kubula kwa bubomfi g. katwishi h. fimbii… i. 27. Kulipushe iyalenga 24 ngacakuti ubwa suko bwenu bwaciba ukutila nimuma shitolo bushe palepa intamfu shinga ukufuma kumyenu? c. pepi d. pepi nganshi e. patali f. patali nganshi 28. Bushe nilyonse mupoka umuti wa malaria? e. Ee mukwai f. Awe mukwai g. Limo limo fye h. katwishi 29. Bushe imbombele mukulingana nokuposha bwangu ubulwele bwamalaria mwaibika pasa/ muimona shani? e. Ubusaka saana f. ubusaka g. iyabipa h. iybipa saana	

	30. Bushe mumushi wenu mulakwata ukusambilila pa bulwele bwa mularia? c. Ee mukwai d. Awe mukwai e. Katwishi 31. Ngacakatila ee, nibani bafuuda? f. Babomfi ba cipatala g. Abatubungwe tushili twa buteko h. abaipeleshafye i. katwishi j. fimbii… 32. Amafundisho yabako panuma yanshiku shingu? e. Cila mulungu f. Cila mweshi g. katwishi h. fimbii **Thank you very much for you time**	

Appendix X: Health worker questionnaire

Health Worker Questionnaire

H/Centre: ……

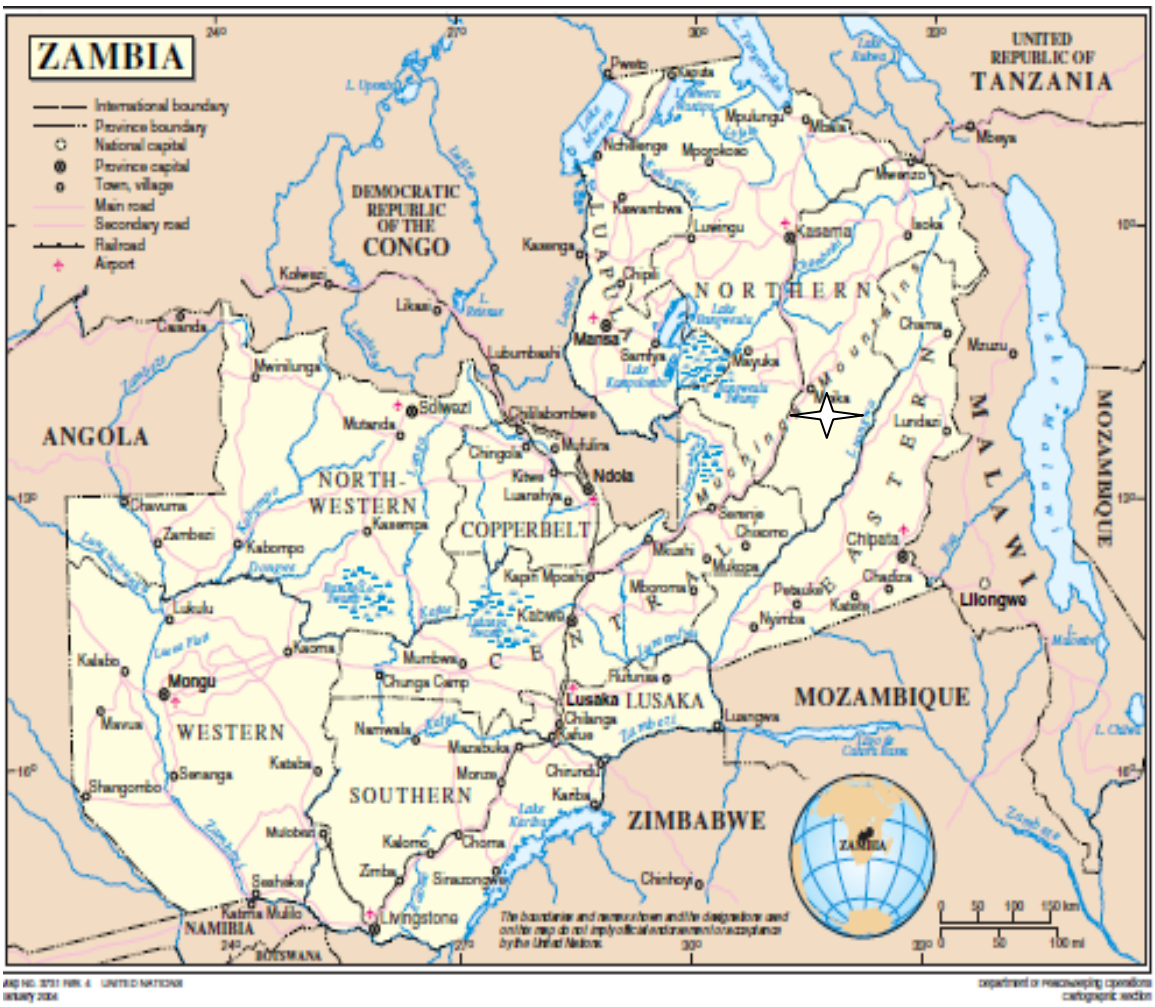
Cadre of respondent: …….

Date: ……..

	Question	Coding Category
.	1. Do you get malaria cases of under 5 children? a. Yes b. No 2. In what state of severity do most of them come……..? 3. How would you rate the promptness in seeking malaria treatment for children under 5 years of age……...? 4. Do you always have malaria drugs in stock? a. Yes b. No c. Sometime 5. Do you receive adequate drugs per your order? a. Yes b. No	

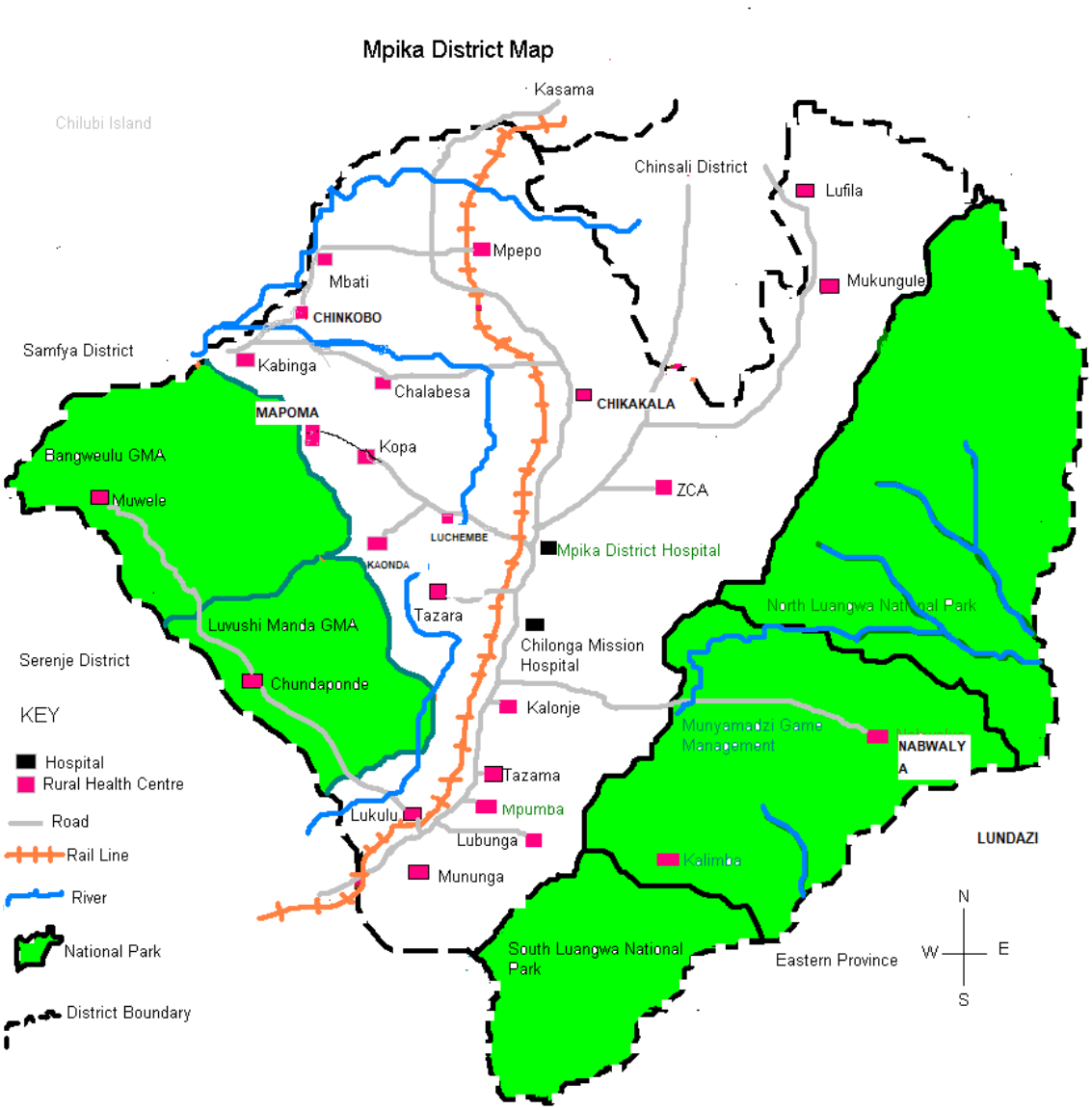
	6. What happens when the drugs are out of stock? a. Send patients away b. Refer to another facility c. We get an emergency supply d. Others 7. Are you trained in IMCI/ how many HW are trained here……..? 8. How many drugs in a week do you open in this facility……..? 9. What happens to the patient when the facility is closed? a. Sent back b. Wait till open again c. Sent to other facility d. Someone attend to them 10. Do you conduct any malaria promotion activities on prompt malaria treatment? a. Yes b. No 11. What promotional activities do you do? a. Community meeting b. Open show c. Provision of drugs in the community d. Others 12. How many staffs of the following cadres do you have here? a. Nurses…….. b. Clinical officers……. c. Enviromental health technologists ……	

Appendix XI: Map of Zambia



Showing the location of Mpika district

Appendix XII: Map of Mpika showing the rural health centres



Appendix XIII: Probability proportion to size selection

Probability proportion to size sampling of RHCs in Mpika district

No.	Rural health center	Catchment population	Cumulative population	Selected sites
1.	**Mpika urban**	**18212**	**18212**	**16000**
2.	Mpepo	12773	30985	
3.	Mbati	7105	38090	
4.	**Kabinga**	**9220**	**47310**	**46195**
5.	Kopa	12039	59349	
6.	Kaonda	4286	63635	
7.	**Chalabesa**	**19527**	**83162**	**76390**
8.	Muwele	11714	94876	
9.	**Chiundaponde**	**9623**	**104499**	**106585**
10.	Mpumba	8912	113411	
11.	Lubunga	5214	118625	
12.	Lukulu	12826	131451	
13.	**Nabwalya**	**11672**	**143123**	**136780**
14.	ZCA	5446	148569	
15.	Lufila	4344	152913	
16.	Mukugule	10948	163861	
17.	**ZNS**	**4488**	**168349**	**166975**
18.	Tazara	16110	184459	
19.	Chilonga-HAC	11776	196235	
20.	**Chibansa**	**6550**	**202785**	**197170**

21.	Chikakala	6796	216377	
22.	Luchembe	6496	222873	
23.	**Chinkobo**	**4915**	**227788**	**227365**
24.	Mapoma	6773	234561	
25.	Kasenga	7000	241561	
	TOTAL		**241561**	

Sampling Interval (SI) = Cumulative population / Number of sites
= 241561/8
= 30195.

Random start=16000

Adding the sampling interval to the random start number, 8 RHCs were selected.

8 Rural health centers selected by PPS to be study sites

1. Mpika urban	**5. ZNS**
2. Chalabesa	**6. Chibansa**
3. Kabinga	**7. Chinkobo**
4. Chiundaponde	**8. Nabwalya**

Appendix XIV: Sample size calculation for each health facility in the study

Sample size calculation for each health facility in the study

No.	Selected RHC	Catchment population	Cumulative population	Sample size calculation	Required Sample size of each RHC.
1.	Mpika urban	18212	18212	18212 x 380 / 84207	**82**
2.	Kabinga	9220	27432	9220 x 380 / 84207	**42**
3.	Chalabesa	19527	46959	19527 x 380 / 84207	**88**
4.	Chiundaponde	9623	56582	9623 x 380 / 84207	**43**
5.	Nabwalya	11672	68254	11672 x 380 / 84207	**53**
6.	ZNS	4488	72742	4488 x 380 / 84207	**20**
7.	Chibansa	6550	79292	6550 x 380 / 84207	**30**
8.	Chinkobo	4915	84207	4915 x380 / 84207	**22**
	Total				**380**