ASSESSING MALARIA CASE MANAGEMENT AMONG CHILDREN UNDER FIVE YEARS OF AGE ATTENDING HEALTH FACILITIES IN URAMBO DISTRICT

By

Kambarage Makuri Imori

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Tropical Disease Control of the Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

September, 2013

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled ***"Assessing malaria case management among children under five years of age attending health facilities in Urambo District"***, in fulfillment of the requirements for the degree of Master of Science in Tropical Disease Control of Muhimbili University of Health and Allied Sciences.

_____

Prof: Zul Premji

(Supervisor)

Date: _____

DECLARATION

AND

COPYRIGHT

I, **Kambarage Makuri Imori,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature_____ Date_____

This dissertation is a copyright material protected under the Berne Convention, the Copyright Act 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means, in full or in part, except for short extracts in fair dealings; for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of the Directorate of Postgraduate Studies, on behalf of both the author and the Muhimbili University of Health and Allied Sciences.

ACKNOWLEDGEMENT

This dissertation could not have been completed successfully had it not been for the valuable contributions I received from a number of people including members of academic staff of the School of Public Health, Muhimbili University of Health and Allied Sciences, Dar es Salaam.

First of all, I would like to acknowledge the immense assistance I received from my supervisor, Prof. Zul. Premji who devoted much of his time in going through and shaping the research plan at various stages. His constructive criticisms and comments were of enormous assistance at all stages of the development of this dissertation.

I also wish to thank Mr Z. Abdala and Mr. S.N.Bushuqatale the laboratory technologist in the department of Parasitology and Entomology at MUHAS for the help in microscopic blood slides examination.

Mention should also be made for the contributions I received from my research assistants Amina Bakari, Aziza Ernest, Nosia Twebe, and Mr Osward Itengesha who virtually perceived the research work as theirs and devoted all their time and efforts to ensure that the data collection was completed on schedule. I am similarly grateful to all the in-charges and staff of the health care facilities in Urambo District where research for this dissertation was conducted.

I cannot forget to acknowledge the support and advices I received from my friends, Mr and Mrs Lugano Daimon, Joyce Protas, Simon Chaula and Sadru Green. Support from my husband should also be put on record who took great care of our daughter Sengekirose while I was away.

I finally wish to thank the Ministry of Health and Social Welfare for sponsoring my training and this study project.

DEDICATION

This dissertation is dedicated to my lovely Husband Mr Sebastian Izimbura, my beloved daughter Sengekirose and my father Mr. Makuri Imori.

ABSTRACT

Background

Malaria is still a major public health problem in Tanzania. Due to this, the Ministry of Health and Social Welfare has developed guidelines for malaria case management. The main goal of the guidelines in the country is to attain uniformity and rational use of Antimalarials in malaria case management.

The current guidelines specifically emphasize the use of parasitological confirmatory test using mRDTs or microscopy before taking the recommended ACTs.

Objective

This study aimed to assess malaria case management practices among children under five years of age attending health facilities in Urambo District, as per the National Guidelines for malaria case management of Tanzania.

Materials and Methods

A descriptive and analytical cross sectional survey was conducted at the Out Patient Clinic of randomly selected health facilities in Urambo District from April to mid May 2013. The routine diagnosis and treatment practices were assessed for all children under five years during exit interviews.

Results

The study involved 380 children under five and 87 health care workers.

The prevalence of malaria by mRDTs was 40% and by blood slide read at Urambo was 19.5% and when quality controlled at MUHAS it was 20.5%.

Out of 380 children, 260 (68.4%) had fever.

Medications prescribed to children were as follows: Antipyretics (97.6%), Antimalarials (82.1%), Antibiotics (60%), Haematinics (3.7%) and Antihelminthic (1.8%).

Antimalarials were prescribed for 312 (82.1%) children and ALu was the commonest antimalarial prescribed (81.1%). The others were Quinine injection (17%), Quinine tabs (0.6%) and SP (0.3%).

Among the children prescribed Antimalarials, 186 (59.6%) had negative mRDTs results.

Only 49 (56.3%) health care workers were trained on the guidelines for malaria case management. Guidelines were available in 33 (37.9%) health facilities, availability of diagnostics both mRDTs and microscopes were 100% and 86.2% respectively and ALu availability was 100%.

Conclusions and Recommendations

In this study there was irrational use of Antimalarials. Physical examination was not properly done. This indicates that the National guideline for malaria case management is not strictly followed in Urambo District.

Therefore better strategies for improving health care workers adherence to guidelines are needed.

TABLE OF CONTENTS

Page

CERTIFICATION……...i

DECLARATION AND COPYRIGHT……..ii

ACKNOWLEDGEMENT……...iii

DEDICATION……..iv

ABSTRACT……...v

LIST OF TABLES…….……x

LIST OF ABBREVIATIONS……...xi

WORKING DEFINITIONS……xii

CHAPTER ONE……1

1.1 BACKGROUND INFORMATION……1

1.2 LITERATURE REVIEW……5

1.3 CONCEPTUAL FRAMEWORK……..14

1.PROBLEMSTATEMEN…….....15

1.5 RATIONALE……16

1.6 RESEARCH QUESTION……..16

1.7 STUDY OBJECTIVE……....16

1.7.1 Broad objectiv……..16

1.7.2 Specific objective……17

CHAPTER TWO……18

2.0 Materials and methods……...18

2.1 Study design……...18

2.2 Study area……...18

2.3 Allocation of health facilities……18

2.4 Study population……19

2.5 Variables……19

2.6 Sample size estimation……...19

2.7 Sampling technique and sample selection……..20

2.8 Data collection procedure……...20

2.8.1 Pre-testing……20

2.8.2 Data collection……21

2.8.3 Specimen collection and processing……21

2.9 Data analysis……..22

2.10 Ethical consideration……22

2.11 Study limitation……22

CHAPTER 3…….....23

3.0 RESULTS……...23

3.1 Enrollment of children under five years at the health facilities…….....23

3.1.1: The baseline demographic characteristics……..23

3.1.2: Main complaints of the children and Age group category……24

3.1.3: Clinical and diagnostic parameters…….26

3.1.4: Microscopic blood slides examination……..27

3.1.5: mRDTs results and measured temperature……28

3.1.6: Ant malarial prescriptions at the health facilities……...29

3.1.8: Medications prescribed to the children at the health facilities……...34

3.1.9: Parents or care takers practices at home prior to visit the health facilities…35

3.2: Health facility and Health care workers characteristics……36

CHAPTER 4…….40

4.0 DISCUSSION…….....40

4.1: Children's current illnesses and treatment practices of the parents…….....40

4.2 Investigation of fever in children under five……..41

4.3 Malaria diagnosis……...41

4.4 Anti - malarial prescriptions……...43

4.5 Medications prescribed to children under five……...45

4.6 Health care workers and health facility characteristics……..45

CHAPTER FIVE…….....47

5.0 CONCLUSIONS AND RECOMMENDATIONS…….47

5.1 CONCLUSIONS……47

5.2 RECOMMENDATIONS…….....47

References……....48

Appendices……...54

Appendix 1: Informed Consent form, English Versio……..54

Appendix 2: Informed Consent form, Swahili Versio……..56

Appendix 3: Questionnaire, English Versio…….58

Appendix 4: Questionnaire Swahili Versio……..65

Appendix 5: Ethical clearance lette……..72

LIST OF TABLES

Table 1 Social demographic characteristics of the study participants at health facilities…….24

Table 2 Main complaints of the children and age group at health facility……...25

Table 3 Distribution of the study participants by age group and history of fever, duration of fever, temperature measured in the study and mRDTs results…….27

Table 4 Age group and microscopic blood slides results read at Urambo health facilities and at MUHAS……....28

Table 5 Relationship between mRDTs results and fever at the health facilities……..29

Table 6 Anti malarial prescriptions and recorded temperature at health facilities…..…….30

Table 7 Distribution of Antimalarials prescriptions according to mRDTs results

at health facilities……..31

Table 8 mRDTs results and ALu treatment at health facilities…….32

Table 9 Antibiotics prescriptions and measured temperature at health facilities…….33

Table 10 mRDTs results and antibiotic prescriptions at health facilities…….33

Table 11 Common drugs prescribed to children at health facilities…….....34

Table 12 Parents or care takers practices at home prior to visit the health facilities…….....35

Table 13 Distribution of health care workers per the level of health facility……...37

Table 14 Health care workers trained on the guidelines for malaria case management at health facilities…….38

Table 15 Health facility characteristics at Urambo districts…….39

LIST OF ABBREVIATIONS

ACTs	Artemisinin based Combination Therapies
ALu	Artemether-Lumefantrine
CRF	Case Report Form
DMO	District Medical Officer
ECM	Effective Case Management
HCWs	Health care workers
IMCI	Integrated Management of childhood illness
MCM	Malaria Case Management
MoHSW	Ministry of Health and Social Welfare
MRDDs	Malaria Rapid Diagnostic Devices
mRDTs	Malaria Rapid Diagnostic Tests
NMCP	National Malaria Control Programme
Pf-HRP-2	Plasmodium falciparum Histidine Rich Protein- 2
PH	Power of Hydrogen ion
SP	Sulfadoxine-Pyrimethamine
SSA	Sub-Saharan Africa
VHWs	Village Health Workers
WHO	World Health Organization

WORKING DEFINITIONS

In this study unless specified otherwise herein under or context demands a contrary meaning:

"Assessing" means the process of collecting and analyzing relevant information that will be relied on for decision making;

"Malaria" means a parasitic disease caused by Plasmodium, which is transmitted through the bite of infective female *Anopheles* mosquito.

"Malaria case management" refers to the process of, first, identifying patients who may be suffering from malaria, by diagnosing them through parasitological confirmation either by using a microscope or the mRDTs and, secondly, provision of the anti-malarial drugs as recommended by the National Guidelines for Malaria Diagnosis and Treatment of Tanzania;

"Guidelines" means the National Guidelines for Malaria Diagnosis and Treatment issued by the Tanzania Ministry of Health and Social Welfare in 2006.

"Health facilities" means dispensaries, health centre and the District hospital or any entity of whatever description that provides health care.

''Medications'' refers to Antimalarial given to the child, Antibiotics, Antipyretics and other available drugs at the health facility.

''Parasitological confirmation'' refers to testing the child by either using Microscope or mRDTs.

''Fever'' refers to feeling the child's body hot.

''In the study fever'' refers to measured body temperature $\geq 37.5^0$C

"Correct treatment'' refers to patients tested for malaria and treated with ALu if the test results were positive or not treated for malaria if the test results were negative.

CHAPTER ONE

1.1 BACKGROUND INFORMATION

Malaria means a parasitic disease caused by Plasmodium, which is transmitted through the bite of infective female *Anopheles* mosquito

Malaria parasites belong to the genus *Plasmodium.* The parasites belong to the phylum *apicomplexa* which is the name given for their possession of an apical complex. There are approximately 156 named species of *Plasmodium* which infect various species of vertebrates – four are known to infect humans: *Plasmodium falciparum; Plasmodium vivax; Plasmodium malariae and Plasmodium ovale.*

Among the four species that infect humans; *Plasmodium falciparum* and *Plasmodium vivax* account for 95% of infections. Globally *Plasmodium vivax* has the widest distribution that extends throughout the tropics, sub-tropics and temperature zones; while *Plasmodium falciparum* is generally confined to the tropics. On the other hand *Plasmodium malariae* is rarely distributed, and, *Plasmodium ovale* is confined mainly to Central West Africa and some South Pacific Islands. Of all the malaria parasites; *Plasmodium falciparum* have been found to cause severe malaria, and the reason for this is delay in treatment (Tangpukdee, 2009). The population groups most at risk are pregnant women, mostly affecting primigravidae and children who are under five years of age (WHO, 2010). The main reason for this is that the pregnancy reduces woman immunity to malaria making her more susceptible to malaria infection and increases the risk of illness, severe anaemia and death. In children under five years the reason is due to their lowered immunity (WHO, 2010).

In these groups malaria has been reported to cause deaths, low birth weight, still birth and anaemia (WHO, 2010; MoHSW, 2006).

Global Malaria Situation

Malaria is still a major global health problem and one of the leading causes of mortality and morbidity. To date, malaria remains an important public health problem globally with 3.3 billion people at risk. Each year an estimated 300 million to 500 million people

have been reported to become ill with malaria (WHO, 2010). In 2010, an estimated 216 million cases and 655,000 deaths due to malaria occurred worldwide. Of these, about 81% of the cases and 91% of the deaths were reported from the African Region – mostly affecting children under five years and every 30 to 45 seconds, an African child dies of malaria (WHO, 2011). Consequently, malaria remains to be one of the major causes of deaths among young African children (WHO, 2010). Besides, malaria accounts for 20% of all childhood deaths.

Economically, malaria causes an annual loss of $12 billion which accounts for approximately 40 percent of public health expenditures in Africa (WHO, 2010). Since the year 2000, malaria control efforts have increased globally. As a result there is growing evidence now documenting a substantial decline in malaria transmission, morbidity, and mortality in many countries including Tanzania.

Studies done in different parts of Africa indicate that, the malaria epidemiology is changing. For example in Tanzania the prevalence of malaria among children under five years in 2007 – 2008 was 18%, but in 2012 the prevalence has decreased to 10% as measured by mRDTs and with microscopy is 4%. The main reason for this reduction is due to large scaling up of integrated malaria control strategies including Effective Malaria Case management by using ACTs, Indoor Residual Sprays (IRS) and the use of LLITNs (NMCP. 2012).

The burden of Malaria in Tanzania

Malaria is the single most significant disease in Tanzania affecting the health and welfare of its mainlanders, 43,625,434 million inhabitants according to the 2012 population and housing census. In Tanzania, malaria remains to be the leading cause of high morbidity and mortality as it accounts for 40% of all out-patient attendances (Rugemalila et al., 2006). It is responsible for more than one-third of all deaths, 39.4% of all health care visits, and 33.4% of all hospital admissions among children under the age of 5 years (Mboera et al., 2007). The overall prevalence of malaria in young children, aged 6 to 59 months, in Tanzania as measured by the mRDTs is 10% and with microscopes is 4%. The highest malaria prevalence among children is found in Geita

(33 percent); followed by Lindi, Kigoma and Mara, 26 percent each. The regions with the lowest malaria prevalence among children under five are Arusha, Kilimanjaro, Singida and Iringa (NMCP, 2012).

Urambo district is found in Tabora, a region located in the western part of Tanzania. In 2011, the population of Urambo district was 507,992 inhabitants (MTUHA, 2011). In the same year, the total out-patients among children under five years were 222, 237. Out of that figure, 43,665 were malaria positive which, unfortunately, resulted in 97 deaths. The majority of these cases were clinically diagnosed (MTUHA, 2011).

However, according to a 2010 study malaria epidemiology in Tanzania is changing (Mmbando et al., 2010). In the study, results showed that the prevalence of malaria parasitaemia decreased in lowland villages of Tanzania from 78.4% in 2003 to 13.0% in 2008 and in highland villages from 24.7% to 3.1% in the same period studied. This decrease was associated with the use of bed nets (LLITNs) with a P value of < 0.001. Also the decrease in prevalence has been observed in other parts of Sub-Saharan Africa (O'Meara et al., 2010). Generally in Africa, the decline is attributable to intensified control efforts, particularly; the use of more effective anti-malarial drugs ACTs, scaling up effective use of Insecticide Treated Nets, and Indoor Residual Spraying.

Malaria Case Management

This refers to the process of first identifying patients who may be suffering from malaria, by diagnosing through parasitological confirmation either by using a microscope for the detection of parasite in the blood or the mRDTs, and provision of the anti-malarial drugs as recommended by the National Guidelines for Malaria Diagnosis and Treatment. The major components of the clinical process for malaria case management involves: **clinical assessment**, which includes history taking and clinical examination; **diagnosis**, including the classification of malaria and the use of laboratory support; **effective treatment**; and **adequate counseling** and drug dispensing (Zurovac, 2005). Accurate diagnosis is fundamental for effective malaria treatment.

Traditionally in clinical practice, a case of malaria is confirmed upon microscopic demonstration of *Plasmodium* parasites in a patient presenting with the clinical features of the disease – the most important hallmark being fever. However, in Africa, especially at the periphery of the health care system, microscopic support for malaria diagnoses is not available and malaria is routinely diagnosed on observable clinical symptomatic bases. These problems with malarial diagnoses have also been observed in Tanzania (Font et al., 2001; and Nsimba et al., 2002).

Now there is increasing malaria control efforts like the use of mRDTs, LLITNs and IRS in different settings of Africa including Tanzania, this has lead to documenting evidence which indicates that there is a substantial decline in malaria transmission (D'Acremont et al., 2009). Due to this decline there is a need for treating an individual who is parasitologically confirmed to have the disease.

In Tanzania we have the current National Guidelines for Malaria Diagnosis and Treatment. The main goal of the guidelines is to attain uniformity in malaria case management in the country.

The current guidelines were formulated in 2006 in which ACTs, in the form of ALu, was recommended. The 2006 Guidelines for malaria diagnosis and treatment were revised in 2010. Under the revised version, the Guidelines specifically emphasize on the use of parasitological confirmatory test using the mRDT or microscopy across all age groups before taking the recommended ACTs (NMCP, 2012). These new recommendations have been adopted in the country.

Therefore this study aims at assessing malaria case management among children under the age of five years attending health facilities in Urambo district, Tanzania, as per the National Guidelines for Malaria Diagnosis and Treatment.

1.2 LITERATURE REVIEW

Fever is defined as an elevation of body temperature axillaries ≥ 37.5˚C. Traditionally fever has served as the entry point for presumptive treatment of malaria in African children (Okiro and Snow, 2010).

In Tanzania, before the introduction of the guidelines, 30% of the disease burden borne by the people was from acute febrile illness, predominantly caused by malaria (NMCP, 2007 - 2008).

During this period fever was managed as the marker for the treatment of malaria under the IMCI guidelines. The IMCI guidelines rely on detection of cases based on simple clinical signs, without laboratory tests, and offer empirical treatment. The Integrated Management of Childhood Illness, IMCI, has provided clinical algorithms for managing and diagnosing common childhood illnesses by minimally trained healthcare providers in the developing world having inappropriate equipment for laboratory diagnoses (WHO, 1997).

In Tanzania, the IMCI was introduced in 1996 in an attempt to reduce child mortality. Due to this practice, that is malarial treatment without confirmatory tests, there was a huge outcome of over-diagnosis and over-treatment in many parts of sub-Saharan Africa including Tanzania (WHO, 2008; Nsimba et al., 2002; and Font et al., 2001). This practice resulted in drug resistance of commonly used anti-malarias, Chloroquine and SP.

However, recent changes in the epidemiology of malaria across many places in Africa would suggest that the predictive accuracy of fever or history of fever as a marker of the disease has changed prompting calls for change to diagnosis-based treatment strategies (WHO, 2012; and Okiro and Snow, 2010). This is accompanied by the introductions of new diagnostic test for malaria, the mRDTs, and anti-malarial drugs, Artemesinin Based Combination Therapy (ACTs). All these are expensive, and sustainability is questionable, so, there is a need for treating only individuals who are scientifically proven to have the disease to avoid unnecessary drug use which will predispose an individual to develop drug resistance and other costs. Studies done in Tanzania have

shown that the use of fever alone as a presumptive prompt for anti-malarial treatment would result in a huge over-treatment burden (Reyburn et al., 2004; Nsimba et al., 2002; and Font et al., 2001). This has not only been observed in Tanzania but also in other parts of sub-Saharan Africa: For example in Nigeria 83.1% of the children with fever who tested negative were given the ACTs (Oladosu and Oyibo, 2013) and in Uganda, for instance, 75% of the patients were treated unnecessarily with anti-malarial drugs (Ndyomugyenyi et al., 2007). Based on this observation, the World Health Organization recommends that malaria treatment should begin with parasitological diagnosis across all age groups before taking the recommended ACTs (WHO, 2010; Zarocostas, 2010; and Graz et al., 2011).

Malaria diagnosis is based on clinical criteria, clinical diagnoses, and detection of parasites in the blood, parasitological diagnoses (Microscope and malaria Rapid Diagnostic Tests). Prompt and accurate diagnosis of malaria is an essential component of malaria case management as well as a key for reducing morbidity and mortality (WHO, 2010). Delays in diagnosis and treatment are proven to be the leading causes of deaths in many countries (Tangpukdee, 2009).

In clinical diagnoses, malaria diagnosis and treatment is performed without the benefit of laboratory support. So, it is based on the signs and symptoms presented by patients: fever, loss of appetite, vomiting, diarrhoea, anaemia, absence of cough, high temperature ($\geq 37.5^{\circ}C$); and splenomegaly.

Clinical diagnosis however has some advantages. It is based on observable signs and symptoms, thus easy to perform; it has got high sensitivity; it is cheap, for, it does not require reagents or equipment; and, it does not consume time.

On the other hand clinical diagnosis suffers from the following: it has got low specificity; and, it can lead to misdiagnosis of the presenting illness which can cause an individual to use the drug inappropriately, wastage of drugs, and over-treatment. Inappropriate drug use or over-treatment has the effect of predisposing an individual to develop drug resistance which, more probably, will increase the mortality rate. According to the WHO definition "drug resistance", is the ability of the parasite to

survive or multiply despite the administration and absorption of a drug given in doses equal to or higher than those usually recommended but within the tolerance of the subject. Inappropriate administration of anti-malarial drugs could contribute to the spread of resistance and lead to unnecessary costs to be incurred (Mwangi et al., 2005). Clinical practice was understandable in the past when inexpensive and well-tolerated anti-malarial drugs were still effective.

For decades, as most health facilities in Africa did not perform diagnostic testing, uncomplicated malaria was typically managed in a syndromic approach in which all patients with febrile illness were treated with chloroquine (Chandramohan et al., 2002). Clinical diagnosis of malaria is challenging, because of the non-specific nature of the signs and symptoms, which overlap considerably with other common as well as potentially life-threatening diseases – common viral or bacterial infections, and other febrile illnesses (Chandramohan et al., 2002). The overlapping of malaria symptoms with other tropical diseases impairs diagnostic specificity, which can promote the indiscriminate use of anti-malarial drugs and compromise the quality of care for patients with non-malarial fevers in endemic areas (Mwangi et al., 2005). For example in areas of intense transmission it has been found that reported fever or a history of fever is an unreliable indicator of clinical malaria (Ndyomugyenyi et al., 2007). In areas of lower malaria transmission reports showed that there is higher rates of over-diagnosis (Reyburn et al., 2004; and, Chandramohan et al., 2002).

Reliance on presumptive clinical diagnosis, in the absence of laboratory diagnosis, it has been concluded, results in diagnostic inaccuracy, and over-diagnosis of malaria (Font et al., 2001; and, Reyburn et al., 2004). Despite this, for many years, national malaria control programs recommended treating children under the age of 5 years with fever for malaria, based on febrile symptoms alone. The reasons for this was that most health facilities did not have working microscopes; a trained microscope operator; nor necessary equipment – slides and stains – to perform laboratory tests (WHO, 2010; and, D'Acremont et al., 2009). As malaria interventions have been scaled up through massive injections of financial resources and adequately trained medical personnel, in sub-Saharan Africa, in recent decades; rapid diagnostic tests for malaria have become

available in health facilities, microscopes have been provided, and experts to operate the microscopes have been trained. As a result, the World Health Organization recommended that all suspected cases of malaria must be confirmed with a diagnostic test prior to treatment with the recommended ACTs (WHO, 2010). Therefore at present, clinical diagnosis is no longer reliable in the diagnosis of malaria.

Malaria is diagnosed microscopically by staining thick and thin blood films on a glass slide, to visualize malaria parasites. Microscopic detection and identification of *Plasmodium* species in Giemsa-stained thick blood films, for screening the presenting malaria parasite and, thin blood films, for species' confirmation, remain the acceptable standard for laboratory diagnosis; and, Field's stain is an option. Giemsa stain is a Romanovsky stain and will stain chromatin materials red and cytoplasm blue. Materials needed are Giemsa stain, solvent methanol and buffered water with a PH of 7.2. Field stain consists of the two components of Romanovsky stain in separate solution. These are called Field stain A and Field stain B. It is used to stain unfixed thick blood films. The procedure will stain white blood cells, platelets and parasite but will haemolyse the red blood cells. The main materials required for the procedure are Field stain A solution and Field stain B solution. And, the method applicable is by dipping the unfixed-dried-thick blood film in Field stain A for three (3) seconds; then, carefully rinsing the slide in tap water for another three seconds; followed by dipping the slide in Field stain B for three seconds; and then, rinsing the slide in water again and then making it stand vertically to dry. Then observe the specimen under the light microscope, the parasite chromatin will stain red and cytoplasm blue.

The benefits of a microscopic test are many. The microscopes can differentiate the parasite species and their circulating stages – trophozoites, schizonts, and gametocytes. It is relatively inexpensive and can provide permanent records of the diagnostic findings. Besides, it is used in quantification of the malaria parasites. The other advantage is that microscopy of Giemsa-stained blood film has high sensitivity and specificity when used by a well trained staff; it can detect as low as 50 parasites per micro-litre of blood under the routine condition (Kyabayinze et al., 2008; and, Chilton et al., 2006). Recently conventional malaria microscopic diagnosis and proper training at

primary health care facilities has been shown to reduce the prescription of anti-malarial drugs and, also, it has appeared to improve the appropriate management of non-malarial fevers (Ngasala et al., 2008).

On the contrary microscopic diagnosis suffers from many shortcomings. It is labour intensive and time consuming, resulting in longer delays before the results are released; it requires well trained laboratory technicians; and it needs electricity, so, it is not suitable in remote areas where electricity is not found – in a word, expensive. Consequently studies done in different settings in Africa have shown the absence of the diagnostic equipment, microscopes, resulting in clinical treatment of patients. In Tanzania for example, this was observed in primary health care facilities whereby 94% of the patients were treated clinically and were given anti-malarial drugs unnecessarily (Font et al., 2001). Microscopic test remains the agreed standard for diagnosis of malaria; despite the fact that the provision of microscopic facilities may not always result in accurate diagnoses (Font et al., 2001; and, Reyburn et al., 2004). Also the quality of laboratory diagnoses in many endemic countries is poor, giving unreliable test results (Nicastri et al., 2009). As a result, clinicians often treat patients despite negative results (Nankabirwa et al., 2009; and, Reyburn et al., 2004).

Since the World Health Organization (WHO) recognized the urgent need for new, simple, quick, accurate, and cost-effective diagnostic tests for determining the presence of malaria parasites, to overcome the deficiencies of light microscopes; numerous new malaria diagnostic techniques have been developed. This, in turn, has led to an increase in the use of the RDTs for malaria, which are fast and easy to perform, and do not require electricity or specific equipment (Tangpukdee et al., 2009).

Malaria rapid diagnostic tests, sometimes called "dipsticks" or malaria rapid diagnostic devices (mRDDs), assist in the diagnoses of malaria by providing evidence of the presence of malaria parasites in human blood. The RDTs are an alternative to diagnosis based on clinical grounds or by microscopes, particularly where good quality microscope services cannot be readily provided, more especially, in rural or remote areas where electricity is not found. Malaria RDTs detect specific antigens, say proteins,

produced by malaria parasites that are present in the blood of infected or recently infected individuals. The RDTs are all based on the same principle and detect malaria antigen in blood that is flowing along a membrane containing specific anti-malaria antibodies. Most RDT products are suitable for *Plasmodium falciparum* malaria diagnoses.

The systematic reviews of the earlier studies generally agreed that RDTs are capable of detecting *Plasmodium falciparum* with sensitivity of >90% and with specificity close to 100% at parasitaemias higher than 100 parasites per microlitre of blood (Moody, 2002). Malaria RDT has been reported as being an attractive alternative to routine microscope use with good sensitivity and specificity profiles (WHO, 2009; and, Wongsrichanalai et al., 2007). A recent review reported results ranging from 87.5% to 100% for sensitivity and from 52% to 99.5% for specificity and, implementation of the mRDTs in a moderately endemic area, reduced drastically over-treatment with anti-malarials (Murray et al., 2008).

However, the specificity of this test is hindered by the tendency of the test to remain positive even weeks after a successfully treated malaria (Hawkes and Kain, 2007). Furthermore, it has been reported that exposure to high temperatures and humidity will have a negative impact on the sensitivity of tests; so, poor storage and distribution conditions are likely to affect the performance of even the best tests, leading to false negative results (WHO, 2004). However, it is still reported that, the mRDT performance is high, even when used in routine practice (Hopkins et al., 2008). A study done in Tanzania revealed a dramatic decrease of anti-malarials including the ACTs consumption in health facilities which were using the RDTs (Reyburn et al., 2007).

In summary, the mRDTs are simple to perform, to interpret and provide a definitive answer in about 10 minutes (Shiff et al., 1993). They do not require electricity, so, they can be used in remote areas where there is no electricity. They can detect the parasite even in sequestrated organs. Health workers with minimal skill can be trained in mRDT techniques in periods varying from three hours to one day. To support this, in a study done in Tanzania among the Village Health Workers (VHWs) with minimal training on

the mRDTs in Bagamoyo; the results showed the sensitivity of 84% and specificity of 81% (Premji et al., 1994).

On the other hand, the mRDTs are expensive compared to the use of microscopes. They cannot provide the stage specific of the parasite which is vital for transmission monitoring. They cannot quantify the parasite, no parasite density. They have low sensitivity in low density infection, <100 parasite per microlitre of blood. The mRDTs are mainly donor funded; their sustainability is thus not guaranteed – in Angola (Rowe et al., 2009), and in Kenya (Juma and Zurovac, 2011), as in many of the health facilities in Africa including Tanzania, studies have shown the problem of the mRDTs stock outs. Non adherence to the mRDTs results among prescribers could lead to high demands for drugs which, if not met, might eventually lead to parasite resistance (Ishengoma et al., 2011). And, *Plasmodium falciparum* Histidine Rich Protein 2 (Pf-HRP-2) can circulate for an extended period of time after an infection has been cleared thus giving false positive tests (Rosenthal, 2012).

For many decades, the cornerstone of malaria management in Africa was to treat all febrile children with chloroquine. With high level resistance to chloroquine and improved means of malaria diagnosis; recommendations for the management of malaria in Africa have changed (Rosenthal, 2012). Now it is recommended, by the WHO, that uncomplicated malaria due to *falciparum* should be treated with artemisinin based combination therapies after the malaria cases are being confirmed parasitologically. This recommendation requires the availability of reliable diagnostic tests.

Artemisinin based combination therapy, ACTs, refers to combinations comprising of an artemisinin derivative and another anti-malaria drug. Examples of ACTs are Artemether, Artesunate and Dihydroartemisinin. Artemisinin derivatives are efficacious, short acting and generally safe. The partner drug should be as well efficacious, safe and compatible. Some examples of partner drugs are Lumefantrine, Amodiaquine and Mefloquine.

Artemisinin-based combination therapies are recommended for treatment of uncomplicated *falciparum* malaria in all age groups, except during the first trimester of

pregnancy, and in young children who are below 5kg; while parenteral quinine, artesunate or artemether are recommended treatments for severe malaria. These ACTs are generally considered to be the best current treatment for uncomplicated *falciparum* malaria, and their accessibility to populations at risk and rational use must be ensured (WHO, 2010). In Tanzania these ACTs were implemented in January 2007. ACT (artemisinin-based combination therapy) has made a significant contribution to malaria control and to reducing disease transmission by reducing gametocyte carriage.

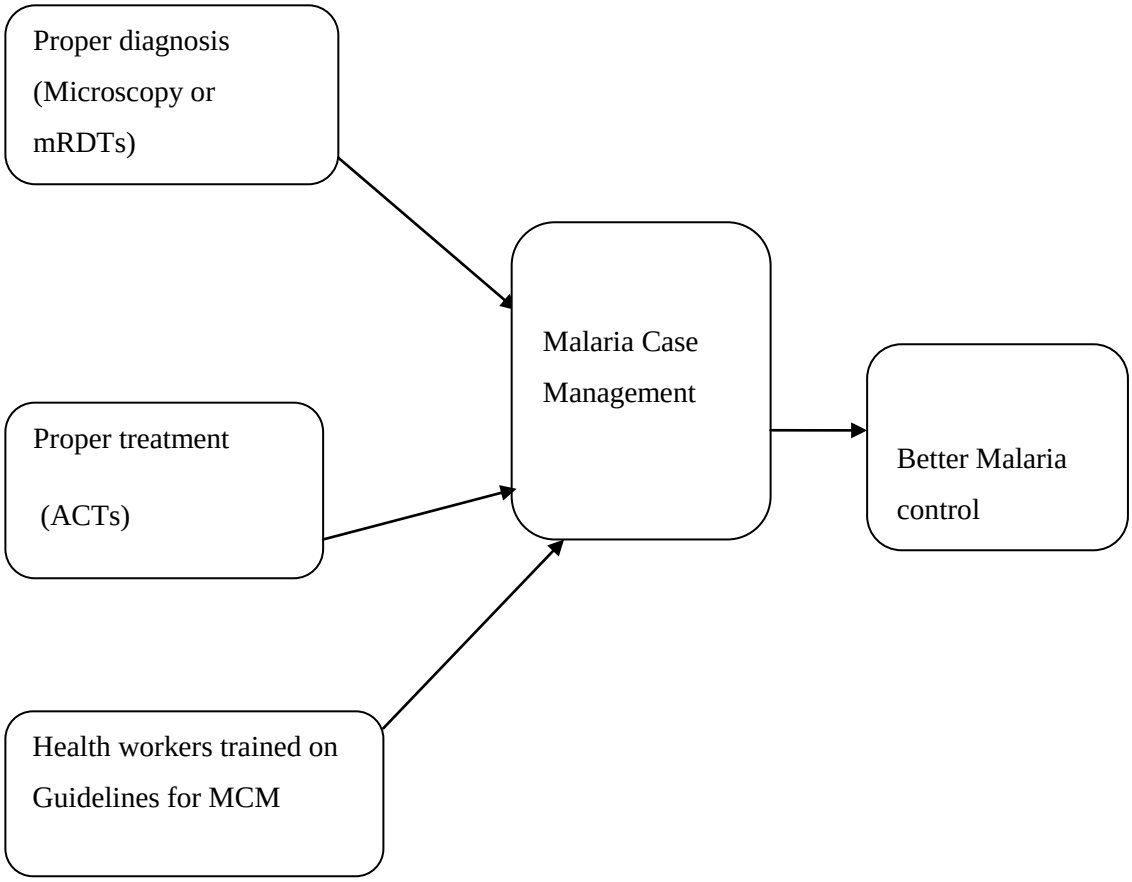
The major problems facing ACTs implementation are; inadequate compliance to the drugs due to its long dosage; stock outs; high costs of the drugs causing sustainability problems; and, prescribers' non-adherence to the recommended guidelines. The ACTs' efficacy is also hindered by the use of mono-therapies like SP and Chloroquine, by some people, which are discouraged due to parasite resistance. These problems have been reflected in many studies on the use of ACTs across Africa. In a study done in Kenya on malaria case management, results showed that 32.8% of the patients who tested negative, were given ALu nonetheless (Juma and Zurovac, 2011). In another study, also done in Kenya, on assessment of the implementation of the new policy on malaria case management, the results showed that ALu was out of stock in about 27% of the health facilities (Nyandigisi et al., 2011). In another study, done in India, among prescribers at the public health facilities showed that the pattern of prescriptions in terms of completeness and rationality was poor (Kumari et al., 2008). In Nigeria, on the other hand, a study conducted there showed that there were insufficient data in the patients' records to determine the appropriateness of the treatment dosage according to the recommended national guidelines for malaria diagnosis and treatment (Onwujekwe et al., 2009; and, Meremikwu et al., 2007).

Studies have shown that, trained health care workers on guidelines for malaria case management and then these health care workers follow the guidelines strictly they can reduce mortality due to malaria and improve patients well being (Chanda et al., 2011, Biai et al., 2007).

However there are number of factors such as, accessibility to the guidelines, in services training, supervisory visits and antimalaria stock outs, which hinders the health care workers to implement the guidelines for malaria case management as recommended. Studies in different parts of Africa has demonstrated this, for example in Kenya study done before and after the introduction of the new guidelines for malaria case management, the results showed that 21.5% of the health care workers were trained on the new guidelines, exposure to supervision were 18% to 13%, accessibility of the health care workers to the guidelines were 6% and ALu stock outs were 27% to 21% (Nyandigisi et al., 2011). In that study, the authors stated that these results are low compared to the needs.

The same issues have been observed in Angola (Rowe et al., 2009) and Zambia (Zurovac et al., 2007).

1.3 CONCEPTUAL FRAMEWORK



1.4 PROBLEM STATEMENT

Malaria is a significant public health problem in Tanzania. Due to this the Ministry of Health and Social Welfare (MoHSW) has developed guidelines for malaria case management. These guidelines are revised regularly based on evidence and changes in recommended anti-malarial drugs and, also, changes in epidemiological patterns. The current guidelines were formulated in 2006 in which ACTs in the form of ALu was recommended. The National Guidelines for malaria diagnosis and treatment were revised again in 2010. In this new revision, the guidelines specifically emphasize on the use of parasitological confirmatory test using the mRDT or microscopes across all age groups before taking the recommended Artemisinin-based Combination Therapy (NMCP, 2012). Despite the presence of these guidelines little is known about how well they are being implemented on the ground at the health facility level (Mugoyela and Minzi, 2011). Also there is growing evidence that malaria guidelines in most of the African countries are not being followed strictly. In Angola a study on assessing the quality of malaria case management at outpatient health facilities, showed that health care providers were not adhering to the recommended guidelines for malaria case management whereby 45.6% of the patients were given the ACTs unnecessarily and the testing rate was as low as 30.7% – contrary to guideline recommendations. Similar problems have been observed in Zambia (Zurovac et al., 2007); in Kenya (Juma and Zurovac, 2011); and, in Nigeria (Mangham et al., 2011) .

Since 2006, no evaluations have been conducted on the implementation of the guidelines in Urambo district. This has resulted in a gap; that, whether the National Guidelines are observed or not. The gap, therefore, provided the need for this study to be carried out in Urambo District which aimed at assessing whether children under five years were managed according to the recommended National Guidelines for malaria diagnosis and treatment.

1.5 RATIONALE

To achieve effective malaria control in Urambo District, it is absolutely necessary to improve malaria diagnosis and treatment as per the National Guidelines for malaria case management. This study will provide scientific evidence on the current practice on malaria case management in the district in comparison with the guidelines; besides, sharing the resultant information with authorities in the district, thus more likely, leading to taking corrective measures in order to bring the practice in conformity with the National Guidelines for malaria diagnosis.

1.6 RESEARCH QUESTIONS

1) What is the proportion of children under five years with fever attending at health facilities in Urambo District?
2) What is the proportion of children under five years with parasitological confirmed malaria attending at health facilities in Urambo District?
3) What is the proportion of children under five years who are given medications for management of malaria at the health facilities in Urambo District?
4) What is the proportion of children under five years receiving anti-malarial drugs with negative parasitological confirmation in Urambo District?
5) What is the proportion of health care workers who received training on the new guidelines for malaria case management?

1.7 STUDY OBJECTIVES

1.7.1 Broad objective

To assess malaria case management practices among children under five years of age attending health facilities in Urambo District, as per the National Guidelines for malaria case management.

1.7.2 Specific objectives

1) To determine the proportion of children under five years of age with fever attending health facilities in Urambo District.
2) To determine the proportion of children under five years of age attending health facilities in Urambo District with parasitological confirmed malaria.
3) To determine the proportion of children under five years of age attending health facilities in Urambo District given medications.
4) To determine the proportion of children under five years of age receiving anti-malarial drugs with negative parasitological confirmation in Urambo District.
5) To determine the proportion of health workers who received training on the new guidelines for malaria case management.

CHAPTER TWO

2.0 Materials and methods

2.1 Study design

A descriptive and analytical cross sectional study was conducted at health facilities located in Urambo district from April to May 2013 to assess malaria case management among children under the age of five years with respect to the National guidelines for malaria diagnosis and treatment of Tanzania.

2.2 Study area

The study was conducted in Urambo district, Tabora, Tanzania. Urambo is one of the six districts in Tabora region; others are Nzega, Igunga, Sikonge, Uyui and Tabora municipal. It has 2 divisions, 16 wards, 57 villages; with 18 dispensaries, 1 health center and 1 district hospital providing health care services. It has two seasons; the dry season, starting from June to November; and, the rainy season starting from December to May, with intense rainfalls from January to April. So, this provides an environment which is important for the breeding sites of the *Anopheles* mosquitoes which are the important factors in the disease transmission.

The main activities within the district are farming. Farmers are involved in tobacco, maize, rice, groundnuts cultivation and honey production. Tobacco and Honey are the main crops for the source of income for the natives within the District. The main language for the natives is Nyamwezi.

2.3 Allocation of health facilities.

Health care facilities were eligible for the study if they were government owned; accessible by road during the rainy season.

A list of health facilities in the district was obtained from the DMO's office. The total health facilities within the District were 20. Out of 20 health facilities in the district, 18 were Dispensaries, 1 Health centre and the District Hospital. Among the 18

Dispensaries, 9 were randomly selected to be involved in the study and the Health centre and the District hospital were involved in the study.

2.4 Study population

Children under five years of age who attended health care facilities during day time were enrolled in the study if they fulfilled the following criteria:

a) Children below the age of 60 months.

b) All sick children who were treated at the outpatient clinics and were exiting the health facilities.

c) Parents or Care takers consent for their children to participate in the study.

2.5 Variables

Dependent variables:

- Malaria Case Management

Independent variables:

- Proportion of children with raised body temperature ($\leq 37.5^0$C).
- Proportion of children parasitologically tested with mRDTs or microscopy.
- Proportion of children given medications.
- Proportion of children given antimalarials with negative parasitological test.
- Proportion of health care workers trained on the Guidelines for malaria case management.

2.6 Sample size estimation.

Sample size estimation for the children under five years of age.

The Sample size was derived from the following sample size formulae:

$$n = \left(\frac{1.96}{d}\right)^2 \pi (1- \pi)$$

Where, n = the desired sample size

π = Proportion of children under five years of age tested negative and prescribed antimalarials (32.8%) = 0.328 (Juma and Zurovac, 2011)

d= marginal error (5%) = 0.05

$$n = \left(\frac{1.96}{0.05}\right)^2 \times 0.328\ (1 - 0.328) = 339$$

When adding 10% for non responses, drop outs and missing data, the sample size becomes; (0.1×339) + 339 = 373, rounded to 380

Therefore, the sample size used in this study was 380 children.

Sample size estimation for the health care workers

All health care workers at each selected health facilities who were available in their working places were interviewed and a total of 87 health care workers were interviewed during the study period.

2.7 Sampling technique and sample selection

Nine dispensaries, one health center and the District hospital were involved in this study. The total sample size of children from each health facility was recruited proportionally to the average number of children attending each facility per month.

Under fives who fulfilled the inclusion criteria were consecutively enrolled in each facility until the required sample per facility was met. Per month, as it was estimated by looking into the health facility register, the dispensary receives, 100 children, the health centre receives, 200 children and the district hospital receives 600 children. Then from these data, calculations were made to get the total sample size from each type of health facility, therefore 201 under five children were obtained from the randomly selected nine dispensaries, 45 children were obtained from the health centre and 134 children were obtained the District hospital.

2.8 Data collection procedure

2.8.1 Pre-testing

Prior to commencing of the study the questionnaires were pre-tested in the two selected dispensaries to check for clarity, sequencing and logical flow so as to make amendments

to the questionnaires where necessary before starting data collection. All the amendments were done and the questionnaire was used for the final data collection.

2.8.2 Data collection.

Structured questionnaires were used to collect information from parents or care takers of the recruited children when they are exiting the health facilities and these questionnaires were typed in Swahili language to easier the understanding.

Prior to the interview, informed consent was obtained from parents or care takers and there was no refusal. During exit interviews, information collected was based on socio-demographic characteristics, history and duration of fever, parasitological diagnosis done and treatment given. Also body temperature was measured by the researcher using digital thermometer when the child was recruited in the study. Information was also collected from patient treatment card (CRF) to verify the information obtained from the parents or care takers.

Information on social demographic characteristics, working experience, level of education and in service training on the National Guidelines for malaria diagnosis and treatment were obtained from the health care workers who were available on the day of the survey. Also questions were asked by the researcher at the health facility on availability of the guidelines for malaria diagnosis and treatment, diagnostics equipments and anti-malarial drugs; and, the presence of wall charts on malaria case management. Data were collected by the principal investigator and the research assistants in all the selected health facilities.

2.8.3 Specimen collection and processing.

During the exit interviews, after informed consent was obtained, blood specimens for examination of malaria parasites were collected from all participating children at the health facility using sterile blood lancets, absorbent cotton wool, methylated spirit and clean wrapped slides.

The blood smears were stained by using Giemsa stain as a gold standard. We stained the blood smears by using Giemsa stain 10%, whereby after each 15 minutes the slides were washed and kept to dry in air, read for examination of the malaria parasites. We

examined the blood slides under microscope with X100 objectives by using oil emulsion to increase contrast.

All specimens were read at Urambo District Hospital by the principal investigator with the help of the laboratory technologist of Urambo hospital. Only thick film was made.

The second reading was done at MUHAS under the department of Parasitology.

After reading the blood slides for malaria, any blood slides with malaria parasites of any density was regarded as positive and those with none were regarded as negative. The aim of sending the blood slides to MUHAS was for quality control assurance.

2.9 Data analysis

Data was entered, processed and analysed using SPSS soft ware packages. Frequencies were calculated and X^2 test was used for differences between proportions.

2.10 Ethical consideration

The aim of this study and benefits to participants, during the survey, was explained. Confidentiality of the information collected from participants was protected. Participants were informed about their voluntary participation and were allowed voluntarily to decide on their own whether to participate in the study or not. After agreement participants were asked to sign the consent form as per MUHAS requirements. There was no harmful procedure or treatment which was used in this study.

Ethical clearance was obtained from MUHAS Ethical Review Board. Permission to conduct this study in Urambo district was obtained from the District Medical Officer (DMO).

2.11 Study limitation

1. A relatively small sample of children who participated in the study may not be a complete representation of all the children under five who seek health services at the studied health facilities.
2. Due to the fact that, clinicians were aware that their practices are assessed this bias was likely to have been promoting a more accurate performance according to the guidelines.

CHAPTER 3

3.0 RESULTS

This study was conducted from April to mid May 2013. There were two groups involved; the first group was children under five years brought to the Outpatient Clinics at the health facilities and the other group was the health care workers.

3.1 Enrollment of children under five years at the health facilities.

A total of 380 children were enrolled and exit interview was done. Out of 380 children studied, 134 (35.3%) children were recruited from the District hospital, 45 (11.8%) were recruited from the Health centre and 201 (52.9%) were recruited from the 9 randomly selected Dispensaries.

Prior to the interview; informed consent was obtained from either the parent or care taker. There was no refusal. These children were mainly referred and were tested with mRDTs as per the National guidelines protocol for fever management.

At the health facilities; all children received mRDTs. A blood slide for examination of malaria parasites was taken from each child in the study. The first reading was done at Urambo health facilities and the second reading was done at MUHAS for quality control assurance.

3.1.1: The baseline demographic characteristics.

Of the 380 children who were recruited in the study majority were males 193 (50.8%). Majority of these children 142 (37.4%) for both sexes were aged between 0-12 months. The mean age was 23.12 months (range – minimum - maximum: 1-60 months).

Out of the 11 Health facilities which were involved in data collection most of the participants came from the dispensaries 201 (52.9%) and majority of these participants were aged from 0-12 months, followed by the District hospital 134 (35.3%) and only 45 (11.8%) were from the Health centre.

Generally from all the selected health facilities, many participants were aged between 0-12 months **(Table 1).**

Table 1: Social demographic characteristics of the study participants at the health facilities.

Variable	**Age group in Months**				
Gender	**0 -12**	**13 -24**	**25 – 36**	**36>**	**Total**
	n=142 (37.4%)	**n=100 (26.3%)**	**n=64 (16.8%)**	**n=74 (19.5%)**	**N=380 (100%)**
Males	72 (18.4%)	47 (12.4%)	32 (8.4%)	42 (11.1%)	**193 (50.8%)**
Females	70 (18.4%)	53 (13.9%)	32 (8.4%)	32 (8.4%)	**187 (49.2%)**
Enrolment sites					
District hospital	57 (15%)	35 (9.2%)	17 (4.5%)	25 (6.6%)	**134 (35.3%)**
Health centre	20 (5.3%)	9 (2.4%)	11 (2.9%)	5 (1.3%)	**45 (11.8%)**
Dispensaries	65 (17.1%)	56 (14.7%)	36 (9.5%)	44 (11.6%)	**201 (52.9%)**

3.1.2: Main complaints of the children and Age group category at health facilities.

Out of the symptoms which were reported by the parents or care takers at the health facilities; fever was the main complaint 371 (97.6%) followed by cough 252 (66.3%), vomiting 129 (33.9%), diarrhea 96 (25.3%) and loss of appetite 44 (11.6%). These symptoms were mainly reported in age group of 0-12 months.

When the association of these symptoms and age group was done, there was significant association seen in vomiting (P value=0.017) and in diarrhea (P value = 0.000) **(Table 2)** below.

Table 2: Main complaints of the children and Age group (months) at the health facilities.

Main complain of the child	**Age group in months**				
Fever	0-12	13-24	25-36	36>	**Total**
	n=142 (37.4%)	**n=100 (26.3%)**	**n=64 (16.8%)**	**n=74 (19.5%)**	**N=380 (100%)**
Yes	140 (36.8%)	98 (25.8%)	60 (15.8%)	73 (19.2%)	371(97.6%)
No	2 (0.5%)	2 (0.5%)	4 (1.1%)	1 (0.3%)	9 (2.6%)
Cough					
Yes	103 (27.1%)	64 (16.8%)	43 (11.3%)	42 (11.1%)	252(66.3%)
No	39 (10.3%)	36 (9.5%)	21 (5.5%)	32 (8.4%)	128(33.7%)
Vomiting					
Yes	55 (14.5%)	38 (10%)	11 (2.9%)	25 (6.6%)	129(33.9%)
No	87 (22.9%)	62 (16.3%)	53 (13.9%)	49 (12.9%)	251(66.1%)
Diarrhoea					
Yes	53 (13.9%)	26 (6.8%)	9 (2.4%)	8 (2.1%)	96 (25.3%)
No	89 (23.4%)	74 (19.5%)	55 (14.5%)	66 (17.4%)	284 (74.7%)
Loss of appetite					
Yes	12 (3.2%)	11 (2.9%)	7 (1.8%)	14 (3.7%)	44 (11.6%)
No	130 (34.2%)	89 (23.4%)	57 (15%)	60 (15.8%)	336 (88.4%)

3.1.3: Clinical and diagnostic parameters.

Fever was reported by the parent or care taker in 371(97.6%) of the children. In the age group of 0-12 months 140 (99%) had history of fever.

At the health facility temperature was not recorded among the study participants despite the availability of thermometers in all the selected health facilities.

During exit interviews the research team measured temperature in all children and recorded that 260 (68.4%) were having temperature ≥37.5˚C.

The prevalence of malaria as measured by mRDTs was found to be 40%.

When Age group category was associated between history of fever, measured body temperature in the study and the mRDTs results; the association was not statistically significant. The P value was 0.164, 0.790, and 0.675 respectively **(Table 3)** below.

Table 3: Distribution of the study participants by Age group and history of fever, duration of fever, temperature recorded in the study and mRDT results at health facilities.

Variable	**Age groups in Months**				
History of fever	**0-12**	**13-24**	**25-26**	**36>**	**Total**
	n=**142 (37.4%)**	**n=100 (26.3%)**	**n=64 (16.8%)**	**n=74 (19.5%)**	**N=380 (100%)**
Yes	140(36.8%)	98(25.8%)	60(15.8%)	73(19.2%)	**371(97.6%)**
No	2 (0.5%)	2 (0.5%)	4 (1.1%)	1 (0.3%)	**9 (2.4%)**
Duration of fever					
<2 days	111(29.2%)	81(21.3%)	51(13.4%)	53(13.9%)	**296(77.9%)**
>2	31(8.2%)	19 (5%)	13 (3.4%)	21(5.5%)	**84 (22.1%)**
Temperature recorded					
< 37.5˚C	48 (12.6%)	32 (8.4%)	20 (5.3%)	20 (5.3%)	**120 (31.6%)**
≥37.5˚C	94 (24.7%)	68(17.9%)	44(11.6%)	54(14.2%)	**260(68.4%)**
mRDTs results					
Positive	57 (15%)	44(11.6%)	22 (5.8%)	29 (7.6%)	**152 (40%)**
Negative	85 (22.4%)	56(14.7%)	42(11.1%)	45(11.8%)	**228 (60%)**

3.1.4: Microscopic blood slides examination.

All children had their blood slides read on the site at Urambo and the same slides were re read at MUHAS. The prevalence at Urambo reading was 19.5% while at MUHAS it was 20.5%. This is in contrast to mRDTs prevalence which was 40%.

Across all age groups tested by Microscopy both at Urambo and at MUHAS, majority of the participants who were tested positive were found in age group category of 13-24 as it is shown in (**Table 4)** below.

Table 4: Age group and microscopic blood slides results read at Urambo health facilities and at MUHAS.

	Age group in Months				
Blood slides read at Urambo	**0 -12**	**13 -24**	**25 – 36**	**36>**	**Total**
	n=142 (37.4%)	**n=100 (26.3%)**	**n=64 (16.8%)**	**n=74 (19.5%)**	**N=380 (100%)**
Positive	20 (5.3%)	26 (6.8%)	8 (2.1%)	20 (5.3%)	**74 (19.5%)**
Negative	122 (32.1%)	74 (19.5%)	56 (14.7%)	54 (14.2%)	**306 (80.5%)**
Blood slides read at MUHAS					
Positive	24 (6.3%)	25 (6.6%)	11 (2.9%)	18 (4.7%)	**78 (20.5%)**
Negative	118 (31.1%)	75 (19.7%)	53 (13.9%)	56 (14.7%)	**302 (79.5%)**

3.1.5: mRDTs results and measured temperature.

Among 260 participants who were found to have raised body Temperature above normal in the study, only 105 (40.4%) were found to have mRDTs positive results and 155 (59.6%) were found to have mRDTs negative. Also 47 (39.2%) among the participants found to have no fever were also had mRDTs positive results. There was no

statistically significant association between fever and mRDT results. The P- value was 0.822 (**Table 5)** below.

Table 5: Relationship between mRDTs results and fever at the health facilities.

	MRDT results		
Measured temperature	Positive **n=152 (40.0%)**	Negative **n=228 (60.0%)**	**Total n=380 (100%)**
No fever (<37.5$^{0\backslash}$C)	47 (39.2%)	73 (60.8)	120 (100%)
Fever (≥37.5^{0}C)	105 (40.4%)	155 (59.6%)	260 (100%)
X^2=0.051	**df=1**	**P value=0.822**	

3.1.6: Ant malarial prescriptions at the health facilities.

3.1.6.1: Association between Ant malarial treatment and recorded temperature in the study.

In the study we found, 260 (68.4) children with raised temperature (≥37.5^{0}C).

Of the 312 (82.1%) children who were prescribed antimalarials; 236 (75.6%) children were found to have fever (≥37.5^{0}C) and 76 (24.4%) were found to have no fever.

The association between fever and Ant malarial prescription was statistically significant (P value was 0.000) **(Table 6)** below.

Table 6: Anti malarial prescriptions and recorded temperature

	Antimalarial prescriptions		
Recorded temperature	Yes	No	**Total**
	n=312 (82.1%)	**n=68 (17.9%)**	**n=380 (100%)**
No fever (<37.5^{0}C)	76 (24.4%)	44 (64.7%)	**120 (31.6%)**
Fever (≥37.5^{0}C)	236 (75.6%)	24 (35.3%)	**260 (68.4%)**
X^2 =42.064	**df=1**	**P value=0.000**	

3.1.6.2: Association between mRDTs results and Anti malarial prescriptions at the health facilities.

Of the 380 children, 312 (82.1%) were given antimalarials, among these 253 (81.1%) were prescribed ALu, 53 (17%) were prescribed Quinine injection, 2 (0.6%) were given Quinine tabs and 1 (0.3%) child was given SP.

Among the children who were prescribed antimalarials 186 (59.6%) had negative mRDTs results, which is equal to 48.9% of the whole study population.

There was no statistically significant association between Ant malarial prescription and the mRDTs results (P value was 0.743) **Table 7** below.

Table 7: Antimalarials prescriptions according to mRDTs results

	Antimalarials prescriptions		
mRDTs results	Yes	No	**Total**
	n=312 (40.0%)	**n=68 (60.0%)**	**n=380 (100%)**
Positive	126 (40.4%)	26 (38.2%)	152 (40.0%)
Negative	186 (59.6%)	42 (61.8%)	228 (60.0%)
$X^{2=}$0.107	**df=1**	**P value= 0.743**	

3.1.6.3 ALu prescriptions and mRDTs results at the health facilities.

Of the 380 children in the study, 253 (66.6%) were prescribed ALu.

Among the children prescribed ALu, 98 (38.7%) were tested positive and were given ALu and 73 (57.5%) were tested negative and they were not given ALu. These children were correctly treated according to the guidelines for malaria case management of Tanzania. In this study **‘‘correct treatment was defined as, the child tested for malaria and treated with ALu if the test results were positive or not treated for malaria if the test results were negative’’.**

On the other hand, 155 (61.3%) of the children prescribed ALu were mRDTs negative.

The association between Alu and mRDT results was not statistically significant (P value 0.494) **(Table 8)** below.

Table 8: mRDTs results and ALu treatment at the health facilities

	ALu treatment		
mRDTs results	**Yes**	**No**	**Total**
	n=253 (66.6%)	**n=127 (33.4%)**	**n=380 (100%)**
Positive	98 (38.7%)	54 (42.5%)	**152 (40.0%)**
Negative	155 (61.3%)	73 (57.5%)	**228 (60.0%)**
X^2= 0.494	**df=1**	**P value= 0.494**	

3.1.7: Antibiotics prescriptions at the health facilities.

3.1.7.1: Distribution of Antibiotics and measured body temperature in the study.

Among the 228 (60%) children given antibiotics, 137 (60.1%) were found to have raised body temperature (≥ 37.5˚C) and 91 (39.9%) were found to have no raised body temperature (< 37.5˚C).

The association between fever and antibiotics distributions was found to be statistically significant. The P value was 0.000 **(Table 9**).

Table 9: Antibiotic prescriptions and measured temperature

	Antibiotic prescriptions		
Measured temperature	**Yes**	**No**	**Total**
	n=228 (60.0%)	**n=152 (40.0%)**	**n= 380 (100%)**
No fever (< 37.5˚C)	91 (39.9%)	29 (19.1%)	**120 (31.6%)**
Fever (≥ 37.5˚C)	137 (60.1%)	123 (80.9%)	**260 (68.4%)**
X^2 =17.683	**df=1**	**P value=0.000**	

3.1.7.2: mRDT results and Antibiotic prescriptions.

Out of 380 children, 228 (60%) were prescribed antibiotics at the health facilities. Among the children who tested negative 140 (61.4%) and 88 (57.9%) children tested positive were prescribed antibiotics. The association between the distribution of Antibiotics and the mRDT results was not statistically significant. The P- value was 0.509 **(Table 10)** below.

Table 10: mRDTs results and Antibiotic prescriptions at health facilities

	mRDT results		
Antibiotics prescriptions	Positive	Negative	Total
	n=152 (40.0%)	**n=228 (60.0%)**	**n=380 (100%)**
Yes	88 (57.9%)	140 (61.4%)	**228 (60.0%)**
No	64 (42.1%)	88 (38.6%)	**152 (40.0%)**
X^2=0.437	**Df=1**	**P value= 0.509**	

3.1.8: Medications prescribed to the children at the health facilities.

A total of 97.6% of the health facility prescriptions included Antipyretics, 82.1% Antimalarials, ALu being the most antimalarial given by (81.1%), and Antibiotics given in 60%, Haematinics 3.7% and Antihelminthic 1.8% **(Table 11)** below.

Table 11: Common drugs prescribed to the children at the health facilities.

Drugs prescribed	**Number**	**Percent**
Antipyretics	371	97.6
Antimalarials	312	82.1
Antibiotics	228	60.0
Haematinics	14	3.7
Antihelminthic	7	1.8
Type of antimalarials		
ALu	253	81.1
Quinine injection	53	17
Quinine tabs	2	0.6
SP	1	0.3

3.1.9: Parents or care takers practices at home prior to visit the health facilities.

Prior to visit the health facilities, 308 (81.1%) of the parents reported to practice the followings while at home; self medication (54.7%), bought medication in private shops (31.8%), went for traditional healers (13.2%) and one child (0.3%) went for private health facility.

When we asked about antimalarials treatment at home before coming to the health facilities, 138 (36.3%) agreed to give their children antimalarial while at home and the common antimalarial received at home was ALu (27.9%) (**Table 12)** below

Table12: Parents or care takers practices at home prior to visit the health facilities.

Parents practices prior to visit the health facility	**Number**	**Percent**
Self medication	208	54.7
Bought medication in private shops	121	31.8
Went for private hospital	1	0.3
Went for traditional healer	50	13.2
Antimalarials used at home		
Alu	106	27.9
Quinine tablets	2	0.5
Quinine injection	3	0.8

3.2: Health facility and Health care workers characteristics.

With respect to health care workers, a total of 87 health care workers were interviewed.

In this study there was no calculated sample size for the health care workers. Only health care workers who were available on the day of the survey at the particular health facility were interviewed. Prior to the interview informed consent was obtained and there was no refusal.

Majority of the health care workers were female (62.1%) and Nurses by cadre (Medical Attendants (29.9%), Assistant Nurse Officers (20.7%) and Enrolled Nurses 19.5%. All of the surveyed health facilities were government owned.

3.2.1: Health care workers characteristics.

During the study period, a total of 87 health care workers were interviewed, including 3 (3.4%) Medical officers, 4 (4.6%) Assistant Medical Officers, 10 (11.5%) Clinical Officers, 18 (20.7%) Assistant Clinical Officers, 2 (2.3%) Nurse Officers, 10 (11.5%) Assistant Nurse Officers, 13 (14.9%) Enrolled Nurses, 26 (29.9%) Medical attendants, and 1 (1.1%) Pharmaceutical Assistant.

Generally per health facility level; many health care workers were interviewed from the District hospital followed by the Dispensaries and the least were the Health centre.

By cadres, the District hospital had the better trained staff compared to the other health facilities. Many of the clinicians (Assistant Clinical Officers) were found at the dispensaries 15 (17.2%) (**Table 13)** below

Table 13: Distribution of health care workers per the level of the health facility

	Level of the Health facility			
Health care workers cadre	**District Hospital**	**Health Centre**	**Dispensaries**	**Total**
Medical Officers	3 (3.4%)	0 (0%)	0 (0%)	3 (3.4%)
Assistant Medical Officers	4 (4.6%)	0 (0%)	0 (0%)	4 (4.6%)
Clinical Officers	9 (10.3%)	1(1.1%)	0 (0%)	10 (11.5%)
Assistant Clinical Officers	3 (3.4%)	0 (0%)	15 (17.2%)	18 (20.7%)
Nurse Officers	2 (2.3%)	0 (0%)	0 (0%)	2 (2.3%)
Assistant Nurse Officers	8 (9.2%)	2 (2.3%)	0 (0%)	10 (11.5%)
Enrolled Nurses	11 (12.6%)	2 (2.3%)	0 (0%)	13 (14.9%)
Medical Attendants	13 (14.9%)	4 (4.6%)	9 (10.3%)	26 (29.9%)
Pharmaceutical Assistant	1 (1.1%)	0 (0%)	0 (0%)	1 (1.1%)
Total	**54 (62.1%)**	**9 (10.3%)**	**24 (27.6%)**	**87 (100%)**

3.2.2: Health care workers trained on the guidelines for malaria case management.

Among the health care workers interviewed only 49 (56.3) were trained on the guidelines for malaria case management. Many of these health care workers stated that, the training they attended was on mRDTs. On the other hand 45 (51.7%) health care

workers did not recall when the training was conducted. The follow up visits after training were poor (**Table 14)** below**.**

Table 14: Health care workers trained on the guidelines for malaria case management at the health facilities.

HCWs trained on guidelines	**Number**	**Percent**
Yes	49	56.3
No	38	43.7
Total	**87**	**100**
When attended malaria training		
Last six months	12	13.8
Last one year	28	32.2
Last two years	1	1.1
More than two years	1	1.1
Don't remember	45	51.7
Total	**87**	**100**

3.2.3: Health facility characteristics.

All the studied health facilities were Government owned. Within the health facilities surveyed, weighing scales were available in 95.4%, clinical mercury thermometers in 100%, working microscopes in 86.2%, mRDTs in 100%, National guidelines were

available in 37.9% and the availability of dosage wall charts were 40.2% for ACTs and 72.4% for Quinine (**Table 15)**.

Table 15: Health facility characteristics at Urambo District

Availability of equipments	**Number**	**Percent**
Weighing scales	83	95.4
Thermometers	87	100
Working microscopes	75	86.2
Malaria Rapid Diagnostic Tests	87	100
National Guidelines for Malaria case management	33	37.9
Wall charts for malaria case management		
ACTs dosage charts	35	40.2
Quinine dosage charts	63	72.4

CHAPTER 4

4.0 DISCUSSION.

This study was conducted in malaria endemic area in an attempt to assess malaria case management practices among children under five years of age attending health facilities in Urambo District, as per the National Guidelines for malaria case management.

The main goal of the guidelines in the country is to attain uniformity and rational use of Antimalarials in malaria case management.

In Tanzania, the current guidelines were formulated in 2006 in which ACTs in the form of ALu was recommended. The National Guidelines for malaria diagnosis and treatment were revised again in 2010. In this new revision, the guidelines specifically emphasize on the use of parasitological confirmatory test using the mRDTs or microscopes across all age groups before taking the recommended Artemisinin-based Combination Therapy (NMCP, 2012).

The findings in this study showed inadequate adherence of the guidelines for malaria case management among children under five under the routine practices at the health facilities in Urambo District.

4.1: Children's current illnesses and treatment practices of the parents or care takers.

In this study population; fever was the most frequent symptom, followed by cough. More than half of the parents or care takers in the study self treated their children at home, mostly with antipyretics and ALu obtained from private drug shops. Similar findings have been observed in other parts of Tanzania (Nsimba et al 2002).

The reason for these similar results is that, both of the studies were conducted during the rainy season in which malaria transmission is known to be high.

4.2 Investigation of fever in children under five.

Traditionally fever has served as the entry point for presumptive treatment of malaria in African children (Okiro and Snow, 2010).

However, recent changes in the epidemiology of malaria across many places in Africa would suggest that the predictive accuracy of fever or history of fever as a marker of the disease has changed prompting calls for change to diagnosis-based treatment strategies (WHO, 2012; and Okiro and Snow, 2010).

During the study period, on exit interview there was no child whose body temperature was recorded on his or her Case Report Form commonly known as *daftari,* despite the availability of thermometers at the health facilities. This unexpected finding may be associated with the tendency of clinicians to measure the body temperature by touching patients.

On the other hand in the study; all children were measured body temperature by the research team and 260 (68.4%) had fever; this figure was higher than 25.3% observed in other parts of the country (Mazigo et al, 2011). The reason for this difference can be explained by the fact that, our study was conducted during the rainy season in which fever due to malaria is high. This was in contrast to their study which was conducted during the dry seasons.

4.3 Malaria diagnosis.

The main purpose of malaria diagnosis in this era is to improve management and delay drug resistance to expensive antimalarials such as the ACTs which are used as 1st line antimalarial drugs in the country.

Laboratory diagnosis can improve rational provisional of malaria treatment (Onwujekwe et al, 2009).

In this study, all children were referred for parasitological confirmation at the health facilities. In all the health facility surveyed; the main diagnostic tools for malaria were mRDTs, despite the availability of functional microscope in 82.2% of health facilities.

On exit interview each child had an mRDTs done. This made the testing rate to be 100%. This was in contrast to the studies done in Kenya; whereby the testing rate was 31% (Nyandigis et al, 2011) and 33.5% (Juma and Zurovac, 2011). Also it has been observed in Angola, where by only 30.7% were tested (Rowe et al, 2009) and in New Guinea only 15% were tested (Pulford et al, 2012). The reason for testing all children in Urambo District, may be explained due to the fact that, these diagnostics (mRDTs) were available in all of the surveyed health facilities and they are simple and easy to perform.

The prevalence of malaria as measured by mRDTs was 40% which was lower than 58.4% as reported in Uganda (Ndyomugyenyi et al, 2007).

On the other hand, in our study all children had blood slides taken. These slides were read at Urambo as the first reading and at MUHAS as the second reading. At the first reading the prevalence was 19.5% and at the second reading the prevalence was 20.5%. This is in contrast to mRDTs results which was 40.0%.

The differences observed in this study between the mRDTs results and the blood slides results, may be explained by the fact that, *Plasmodium falciparum* Histidine Rich Proitein 2 (Pf-HR-2) can circulate for an extended period of time after an infection has been cleared, thus giving false positive results (Rosental, 2012). Also quality assurance of the blood slides can give the low prevalence read in Urambo and at MUHAS.

These figures (slide results) were both higher than 12% observed in other parts of Tanzania (Mazigo et al, 2011) and 16.9% as reported in Nigeria (Oladosu and Oyibo, 2012). Our prevalence was high compared to others, because we did this study during the rainy season, during which malaria transmission is known to be high.

In our study, among the children found to have parasiteamia (slides read at MUHAS), 70.5% had fever and 29.5% had no fever. This was in contrast to the study done in other parts of the country; where by 52.7% who had parasitaemia had fever and the remaining had no fever (Mazigo et al, 2011).

The presence of malaria parasites without fever could be explained in part by the acquired protective immunity. In endemic areas like ours, protective immunity against

malaria is acquired with increase exposure to malaria parasites, which increases with age.

On the other hand in our study, we had a proportion of children who presented with fever but had malaria negative. This indicated that, there could be other causes of fever. As there are studies documenting that, malaria related to fevers are significantly declining, which shows an increase number of fevers related to other causes. Therefore, the shift from presumptive diagnosis to parasitological is recommended (D'Acremont et al, 2010).

4.4 Anti - malarial prescriptions.

Before the introduction of mRDTs, almost all under fives attending primary health facilities were treated with antimalarials provided they had fever which suggests malaria, this led to significant over-treatment. Children managed as malaria without parasite have a high probability of poor clinical outcomes because other causes of illness are missed (Reyburn et al., 2004).

It was found that the use of microscope and proper training for malaria diagnosis significantly reduces prescriptions of Antimalarial drugs when compared to use of clinical algorithm alone (Ngasala et al 2008).

In this study, overall 312 (82.1%) children were prescribed antimalarials. This was lower than 96.4% in New Guinea (Pulford et al, 2012).

The common antimalarial prescribed was Alu 253 (81.1%). This figure was higher than that observed in the studies done in Nigeria whereby only 23% children received ALu (Mangham et al 2011) and in Kenya it was 63.6% (Juma and Zurovac, 2011).

On the other hand in our study 98 (38.7%) tested positive and given ALu and 73 (57.5%) tested negative and not given ALu. This was done in accordance with our definition of correct treatment that; 'Patient tested for malaria and treated with ALu if the test results was positive or not treated for malaria if the test results was negative'. Our figures were higher than 36% observed in Kenya (Nyandigisi et al, 2011) and lower than 79.8% observed in New Guinea (Pulford et al, 2012).

Further more in this study, among children who received Antimalarials, 126 (40.4%) were found to be mRDTs positive and 186 (58.6%) were mRDTs negative. However the non adherence to the negative test results is not unique to Urambo health facilities.

This also has been observed in Kenya whereby 40.4% who tested negative still received Antimalarials (Juma and Zurovac, 2011). In New Guinea 82% tested negative were given antimalarials (Pulford et al, 2012). Other findings have been observed in Nigeria where by 83.1% tested negative but were given Antimalarials (Oladosu and Oyibo, 2012).

Also in our study, 90.8% of the fever children received antimalarials. This figure was higher than 76% of the fever children received antimalarials in Nigeria (Mangham et al, 2011). In this study, the association between fever and antimalarial treatment was found to be statistically significant.

In addition to this; of the confirmed cases by mRDTs in our study, 17.1% were left without antimalarial treatment. This figure was lower than that observed in other health facilities of Tanzania 30% (Font et al, 2001) and in Zambia 22% (Zurovac et al, 2007).

It has been shown that clinicians are unlikely to adhere with this new guideline of mRDTs-directed antimalarials treatment due to their strong preference for a diagnosis of malaria and the tendency to ignore malaria parasitological results (Reyburn et al., 2007).

Studies have recommended that, integrated in- services training supported with supportive supervision, monitoring and evaluation may improve adherence to test results (Juma and Zurovac, 2011 and Font et al, 2001).

During exit interview counseling was done to each parent or care taker concerning his or her child's current illness, and treatment given. Also advice was given to them on the importance of testing before using Antimalarials. The main issues which were emphasized were based on; completing the doses while at home, return to the health facility if the child's condition changes and return for malaria testing after two weeks.

4.5 Medications prescribed to children under five.

Generally**,** a total of the health facility prescriptions included Antipyretics 97.6%, Antimalarials 82.1% (ALu being the most antimalarial prescribed 81.1%), antibiotics 60%, haematinics 3.7% and antihelminthic 1.8%. Similar findings have been reported in other parts of Tanzania (Nsimba et al, 2002).

Antibiotic prescription was highly influenced by mRDTs results in this study; as the negative mRDT children's were highly prescribed antibiotics compared to those who had mRDT positive results. This is consistent with findings in the Eastern coast of Tanzania (Ngassala et al, 2008) and in Uganda (Ndyomugyenyi et al, 2007).

Negative mRDT results may influence the clinicians to consider the alternative cause of fever as being bacterial infection and prescribe antibiotic. However a significant increase in the use of antibiotics in children will likely to cause problem of antibiotic resistance.

In our study, the association between mRDTs results and antibiotics prescriptions was not statistically significant.

4.6 Health care workers and health facility characteristics.

Many of the health care workers interviewed were from the District hospital. The District hospital among the other health facility was owned the trained personnel.

At the dispensary level the main cadre was the Assistant Clinical Officers. This characteristic has been also observed in other health care facilities of a rural area in South-eastern Tanzania (Font et al., 2001).

Studies done in different parts of Africa have shown that if health care workers are trained on the guidelines for malaria case management; and these guidelines are followed strictly they can reduce mortality due to malaria and improve patients well being (Chanda et al, 2011) and (Biai et al,2007**)**. In our study 56.3% of the health care workers were trained on the new guidelines for malaria case management. Our figure was higher than that observed in Kenya 22% (Nyandigisi et al, 2011) and in Zambia 41% (Zurovac et al, 2007).

Clinical supervision after training on the guidelines was in frequent. The same observations were found in Angola (Rowe et al, 2009) and in Kenya both (Juma and Zurova, 2011) and Nyandigisi et al, 2011).

In all the surveyed health facilities, diagnostic equipments both microscopes 86.2% and mRDTs 100% were available. In Kenya both were available in 58% (Nyandigisi et al, 2011) and in New Guinea were 22% (Pulford et al, 2012).

In other places like in Kenya, despite the availability of these diagnostics equipments, the testing rate was low 43% (Juma and Zurovac, 2011) and in Uganda it was 40% (Ndyomugyenyi et al, 2007). This was unique to Urambo health facilities where by all children were referred for laboratory testing.

In our study the guidelines for malaria case management was available in 37.9%. This was in contrast to Kenya whereby only 6% had guidelines (Nyandigisi et al, 2011). Our findings had shown that despite the availability of these guidelines, prescribers still were giving children Antimalarials despite of the negative test results.

Thermometers were available in all of the surveyed health facilities. Despite that, there was no child who was measured temperature. This was unique to Urambo health facilities. In other parts of Tanzania, with the availability of thermometers only 40% were measured temperature (Font et al, 2001) and in New Guinea it was 86.6% (Pulford et al, 2012).

Weighing scales were available in 95.6%, despite that only 77.6% children were measured weight. Similar findings were observed in New Guinea (Pulford et al, 2012). In our study 82.1% children's who were prescribed antimalrials, 87.1% of these were not measured body weight. In this study we found that; the association between antimalarials treatment and weight measurement was not statistically significant.

During the study period all of the health facility had ALu in stock, however ALu stock outs in the previous three months were common.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS.

5.1 CONCLUSIONS.

In this study there was irrational use of Antimalarials. Few who tested positive were treated with recommended antimalarial ALu, however antimalarial treatments for test negative patient were wide spread, with ALu being the dominant choice.

Physical examination was not properly done.

This indicates that, the National guideline for malaria case management is not followed strictly in Urambo District.

5.2 RECOMMENDATIONS.

1. Better strategies for improving health care workers adherence to guidelines are needed urgently.
2. To avoid the current practice of treating every fever with antimalarial drugs; it is important to improve malaria diagnosis and the diagnosis of non malaria fever. This will be achieved by the availability of treatment guidelines at the health facility, clinicians training opportunities, post training follow up together with monitoring and evaluation.
3. Through mass media there is a need for increasing public awareness on self treatment at home on Antimalarials drugs. This is because during the survey on exit interview some of the parents or care takers self treated their children with Antimalarials by giving the wrong doses.

References

Biai, S., Rodrigues, A., Gomes, M., Ribeiro, I., Sodemann, M., Alves, F., Aaby, P., 2007. Reduced in-hospital mortality after improved management of children under 5 years admitted to hospital with malaria: randomised trial. BMJ 335, 862–862.

Chanda, P., Hamainza, B., Moonga, H.B., Chalwe, V., Pagnoni, F., 2011. Community case management of malaria using ACT and RDT in two districts in Zambia: achieving high adherence to test results using community health workers. Malar J 10, 158.

Chandramohan, D., Jaffar, S., Greenwood, B., 2002. Use of clinical algorithms for diagnosing malaria1. Trop. Med. Int. Health 7, 45–52.

Chilton, D., Malik, A.N.J., Armstrong, M., Kettelhut, M., Parker-Williams, J., Chiodini, P.L., 2006. Use of rapid diagnostic tests for diagnosis of malaria in the UK. J. Clin. Pathol. 59, 862–866.

D'Acremont, Lengeler C, Genton B (2010). Reduction in the proportion of fevers associated with Plasmodium falciparum parasitaemia in Africa: a systematic review Malar J, 9:240

D'Acremont, V., Lengeler, C., Mshinda, H., Mtasiwa, D., Tanner, M., Genton, B., 2009. Time To Move from Presumptive Malaria Treatment to Laboratory-Confirmed Diagnosis and Treatment in African Children with Fever. PLoS Med 6, e252.

Font, F., Alonso González, M., Nathan, R., Kimario, J., Lwilla, F., Ascaso, C., Tanner, M., Menéndez, C., Alonso, P.L., 2001. Diagnostic accuracy and case management of clinical malaria in the primary health services of a rural area in south-eastern Tanzania. Trop. Med. Int. Health 6, 423–428.

Graz B, Willcox M,Szeless T,Rougemont A (2011), "Test and treat" or presumptive treatment for malaria in high transmission situations? A reflection on the latest WHO guidelines, Malar J, 10:136

Hawkes, M., Kain, K.C., 2007. Advances in malaria diagnosis. *Expert Review of Anti-infective Therapy* 5, 485–495.

Hopkins, H., Bebell, L., Kambale, W., Dokomajilar, C., Rosenthal, P.J., Dorsey, G., 2008. Rapid diagnostic tests for malaria at sites of varying transmission intensity in Uganda. J. Infect. Dis. 197, 510–518.

Ishengoma, D.S., Francis, F., Mmbando, B.P., Lusingu, J.P.A., Magistrado, P., Alifrangis, M., Theander, T.G., Bygbjerg, I.C., Lemnge, M.M., 2011. Accuracy of malaria rapid diagnostic tests in community studies and their impact on treatment of malaria in an area with declining malaria burden in north-eastern Tanzania. Malar. J. 10, 176.

Juma, E., Zurovac, D., 2011. Changes in health workers' malaria diagnosis and treatment practices in Kenya. Malar J 10, 1.

Justin Pulford., Ivo Mueller., Peter M Siba., Manuel W Hetzel., (2012). Malaria case management in Papua New Guinea prior to the introduction of a revised treatment protocol. BMJ 11, 157

Kumari, R., Idris, M.Z., Bhushan, V., Khanna, A., Agrawal, M., Singh, S.K., 2008. Assessment of prescription pattern at the public health facilities of Lucknow district. Indian J Pharmacol 40, 243–247.

Kyabayinze, D.J., Tibenderana, J.K., Odong, G.W., Rwakimari, J.B., Counihan, H., 2008. Operational accuracy and comparative persistent antigenicity of HRP2 rapid diagnostic tests for *Plasmodium falciparum* malaria in a hyperendemic region of Uganda. Malar. J. 7, 221.

Mangham, L., Cundill, B., Ezeoke, O., Nwala, E., Uzochukwu, B., Wiseman, V., Onwujekwe, O., 2011. Treatment of uncomplicated malaria at public health facilities and medicine retailers in south-eastern Nigeria. Malar J 10, 155.

Mazigo H, Meza W, Ambrose E, Kidenya B, Kweka E (2011): Confirmed malaria cases among children under five with fever and history of fever in rural western Tanzania. BMC Research Notes, 4:359.

Mboera, L.E.G., Makundi, E.A., Kitua, A.Y., 2007. Uncertainty in Malaria Control in Tanzania: Crossroads and Challenges for Future Interventions. Am J Trop Med Hyg 77, 112–118.

Ministry of Health and Social Welfare (2006): National Guidelines for malaria diagnosis and treatment. A.Mwita and F.Molten. -105. United Republic of Tanzania, Ministry of Health and Social Welfare.

Ministry of Health and Social Welfare, Tanzania, Malaria Medium term strategic plan 2008-2013 (2007 -2008), 3:11-12.

Meremikwu, M., Okomo, U., Nwachukwu, C., Oyo-Ita, A., Eke-Njoku, J., Okebe, J., Oyo-Ita, E., Garner, P., 2007. Antimalarial drug prescribing practice in private and public health facilities in South-east Nigeria: a descriptive study. Malar J 6, 55.

Mmbando, B.P., Vestergaard, L.S., Kitua, A.Y., Lemnge, M.M., Theander, T.G., Lusingu, J.P., 2010. A progressive declining in the burden of malaria in north-eastern Tanzania. Malar J 9, 216.

Moody, A., 2002. Rapid diagnostic tests for malaria parasites. Clin. Microbiol. Rev. 15, 66–78.

Mugoyela, V., Minzi, O., 2011. Implementation of artemether-lumefantrine treatment policy for malaria at health facilities in Tanzania. *Risk Manag Healthc Policy* 4, 89–95.

Murray, C.K., Gasser, R.A., Jr, Magill, A.J., Miller, R.S., 2008. Update on rapid diagnostic testing for malaria. Clin. Microbiol. Rev. 21, 97–110.

Mwangi, T.W., Mohammed, M., Dayo, H., Snow, R.W., Marsh, K., 2005. Clinical algorithms for malaria diagnosis lack utility among people of different age groups. Trop. Med. Int. Health 10, 530–536.

Nankabirwa, J., Zurovac, D., Njogu, J., Rwakimari, J., Counihan, H., Snow, R., Tibenderana, J., 2009. Malaria misdiagnosis in Uganda – implications for policy change. Malar J 8, 66.

National Malaria Control Program (2012). Tanzania HIV/ AIDS and Malaria Indicator Survey.

Ndyomugyenyi, R., Magnussen, P., Clarke, S., 2007. Diagnosis and treatment of malaria in peripheral health facilities in Uganda: findings from an area of low transmission in south-western Uganda. Malar J 6, 39.

Ngasala, B., Mubi, M., Warsame, M., Petzold, M.G., Massele, A.Y., Gustafsson, L.L., Tomson, G., Premji, Z., Bjorkman, A., 2008. Impact of training in clinical and microscopy diagnosis of childhood malaria on antimalarial drug prescription and health outcome at primary health care level in Tanzania: a randomized controlled trial. Malar. J. 7, 199.

Nicastri, E., Bevilacqua, N., Sañé Schepisi, M., Paglia, M.G., Meschi, S., Ame, S.M., Mohamed, J.A., Mangi, S., Fumakule, R., Di Caro, A., Capobianchi, M.R., Kitua, A., Molteni, F., Racalbuto, V., Ippolito, G., 2009. Accuracy of malaria diagnosis by microscopy, rapid diagnostic test, and PCR methods and evidence of antimalarial overprescription in non-severe febrile patients in two Tanzanian hospitals. Am. J. Trop. Med. Hyg. 80, 712–717.

Nsimba, S.E.D., Massele, A.Y., Eriksen, J., Gustafsson, L.L., Tomson, G., Warsame, M., 2002. Case management of malaria in under-fives at primary health care facilities in a Tanzanian district. Trop. Med. Int. Health 7, 201–209.

Nyandigisi, A., Memusi, D., Mbithi, A., Ang'wa, N., Shieshia, M., Muturi, A., Sudoi, R., Githinji, S., Juma, E., Zurovac, D., 2011. Malaria Case-Management following Change of Policy to Universal Parasitological Diagnosis and Targeted Artemisinin-Based Combination Therapy in Kenya. PLoS ONE 6, e24781.

O'Meara, W.P., Mangeni, J.N., Steketee, R., Greenwood, B., 2010. Changes in the burden of malaria in sub-Saharan Africa. Lancet Infect Dis10, 545–555.

Okiro, E., Snow, R., 2010. The relationship between reported fever and Plasmodium falciparum infection in African children. Malar J 9, 99.

Oladosu, O.O., Oyibo, W.A., 2013. Overdiagnosis and Overtreatment of Malaria in Children That Presented with Fever in Lagos, Nigeria. ISRN Infectious Diseases 2013, 1–6.

Onwujekwe, O., Uzochukwu, B., Dike, N., Uguru, N., Nwobi, E., Shu, E., 2009. Malaria treatment perceptions, practices and influences on provider behaviour: comparing hospitals and non-hospitals in south-east Nigeria. Malar J 8, 246.

Premji, Z., Minjas, J.N., Shiff, C.J., 1994. Laboratory diagnosis of malaria by village health workers using the rapid manual ParaSight-F test. Trans. R. Soc. Trop. Med. Hyg. 88, 418.

Reyburn H, Mbakilwa H, Mwangi R, Mwerinde O, Olomi R, et al (2007). Rapid diagnostic tests compared with malaria microscopy for guiding outpatient treatment of febrile illness in Tanzania: Randomised trial. BMJ, 334: 403.

Reyburn, H., Mbatia, R., Drakeley, C., Carneiro, I., Mwakasungula, E., Mwerinde, O., Saganda, K., Shao, J., Kitua, A., Olomi, R., Greenwood, B.M., Whitty, C.J.M., 2004. Overdiagnosis of malaria in patients with severe febrile illness in Tanzania: a prospective study. BMJ 329, 1212.

Rosenthal, P.J., 2012. How Do We Best Diagnose Malaria in Africa? Am J Trop Med Hyg 86, 192–193.

Rowe, A.K., De León, G.F.P., Mihigo, J., Santelli, A.C.F.S., Miller, N.P., Van-Dúnem, P., 2009. Quality of malaria case management at outpatient health facilities in Angola. Malar. J. 8, 275.

Rugemalila, J.B., Wanga, C.L., Kilama, W.L., 2006. Sixth Africa malaria day in 2006: how far have we come after the Abuja Declaration? Malar J 5, 102.

Shiff, C.J., Premji, Z., Minjas, J.N., 1993. The rapid manual ParaSight-F test. A new diagnostic tool for *Plasmodium falciparum* infection. Trans. R. Soc. Trop. Med. Hyg. 87, 646–648.

Tangpukdee, N., Duangdee, C., Wilairatana, P., Krudsood, S., (2009). Malaria Diagnosis: A Brief Review. Korean J Parasitol 47, 93-102.

Wongsrichanalai, C., Barcus, M.J., Muth, S., Sutamihardja, A., Wernsdorfer, W.H., 2007. A Review of Malaria Diagnostic Tools: Microscopy and Rapid Diagnostic Test (RDT). Am J Trop Med Hyg 77, 119–127.

World Health Organization (1997). The concept of IMCI in Tanzania (Primarily for child promotion and development by reducing mortality)

World Health Organization (2008). World Malaria Report, [http://www.who.int/malaria/wmr2008/malaria2008.pdf]. accessed on Nov.2012

World Health Organization (2010): Guidelines for the treatment of malaria, Second Edition. Geneva, Switzerland 2010.

World Health Organization (2011), World malaria report. [http://www.who.int/malaria/world_malaria_report_2011.html], accessed on Dec.2012.

Urambo District Annual Health report (2011). Health Information Management System at the District (MTUHA).

Zarocostas, J., 2010. Malaria treatment should begin with parasitological diagnosis where possible, says WHO. BMJ 340, c1402–c1402.

Zurovac, D., Ndhlovu, M., Sipilanyambe, N., Chanda, P., Hamer, D.H., Simon, J.L., Snow, R.W., 2007. Paediatric malaria case-management with artemether-lumefantrine in Zambia: a repeat cross-sectional study. Malar J 6, 31.

Zurovac,, D., 2005. Malaria outpatient management in government health facilities in Kenya: An evaluation of current practices. Thesis submitted to the Open University Health Sciences Faculty, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Appendices

Appendix 1: Informed Consent form, English Version



MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCIES (MUHAS)

INFORMED CONSENT FORM FOR PARENTS OR CARE TAKERS

ID NO.

Consent to participate in research

Greetings! I Kambarage Makuri Imori, a student from Muhimbili University of Health and Allied Sciencies, doing a study on; Assessing Malaria Case Management among children under five years attending at health facilities in Urambo District.

Purpose of this study

The aim of this study is to assess malaria case management practices among children under under five years attending at health facilities in Urambo district, as per National Guidelines for Malaria Diagnosis and Treatment.

Confidentiality

All issues pertaining to child participation will be kept confidential and no any unauthorized person will have access to this information.

Risks

There is no harm for those who will voluntary participate in this study and for those who will be found with positive blood smear will be treated accordingly.

Benefits

Participating in this study allows understanding the quality of malaria case management practices in your facilities, and which will lead to take the appropriate measures to improve the quality of care within your district.

Who to Contact

In case you encounter problems you may contact me through this address: Kambarage Makuri Imori**, MUHAS, P.O BOX 65015 Dar es Salaam**, or if you have serious issues about your child's rights as a participants you may contact **Prof. Mainen J. Moshi, Chairman of the Science and Publications Committee, P.O.BOX 65001. Dar es Salaam. Tel: 2150302-6, 2152489.**

Agreement part

I therefore request you to allow your child to participate in this study; participation in this study will involve asking you some questions on your child's present illness and also blood slide sample will be taken for malaria parasite examination and body temperature will also be measured.

Do you agree? YES: …… NO: …… (Tick appropriately)

I, _____ have read the consents in this form. My questions have been answered. I agree to participate in this study with my child.

Parent / Care taker sign: …….. Date ……..

Witness sign (If parent or care taker cannot read)…… Date……..

Data collector sign: ……. Date ……

***Appendix 2*: Informed Consent form, Swahili Version**



CHUO KIKUU CHA SAYANSI YA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

Fomu ya Makubaliano ya Wazazi au Walezi wa mtoto

Namba ya utambulisho

Habari! Mimi naitwa Kambarage Makuri Imori mwanafunzi wa Chuo Kikuu cha sayansi ya afya na sayansi shirikishi Muhimbili ninayesomea shahada ya uzamili katika fani ya magonjwa ya ukanda wa joto.

Dhumuni kuu

Dhumuni la kufanya utafiti huu ni kuangalia jinsi gani ubora katika utendaji juu ya ugonjwa wa malaria kwa watoto ambao wana umri chini ya miaka mitano unavyofanywa kulingana na miongozo ya kubaini na kutibu ugonjwa huu wa malaria.

Usiri

Taarifa zote za mshiriki zitatunzwa kwa usiri na kamwe hazitatolewa kwa mtu yeyote asiyehusika.

Hasara

Hapatakuwa na tatizo lolote kwa wale watakaokubali kwa hiari yao wenyewe kushiriki katika utafiti huu na kwa wale watakaogundulika kuwa wana vimelea vya malaria watapewa dawa.

Faida

Ushiriki wenu katika utafiti huu utasaidia kujua ubora wa huduma zinazotolewa katika vituo vyenu vya afya na hospitali kulingana na miongozo ya kubainisha na kutibu ugonjwa wa malaria. Pia utafiti huu utasadia kuboresha huduma za afya kuhusiana na ugonjwa wa malaria katika wilaya yenu.

Pia kwa wale watoto watakaogundulika na vimelea vya malaria watapata tiba.

Mawasiliano

Kwa yeyote mwenye kutaka kujua zaidi au kapata tatizo kutokana na utafiti huu anaweza kuwasiliana na mimi kwa barua, akiniandikia kupitia anuani hii Kambarage Makuri Imori**, MUHAS, S.L.P 65015 Dar es Salaam**. Au anaweza kufanya mawasiliano na **Prof. Mainen J.Moshi,** Mwenyekiti wa kamati ya bodi ya chuo ya utafiti na uchapishaji. **S.L.P 65001, Dar es Salaam. Simu: 2150302-6, 2152489.**

Kipengele cha Makubaliano

Baada ya maelezo hapo juu, nakuomba mzazi au mlezi wa mtoto uweze kumruhusu mtoto ashiriki katika utafiti huu, pia nitakuuliza maswali kuhusiana na ugonjwa wa sasa wa mtoto wako, pia nitampima joto lake la mwili na nitamchukua damu kwa ajili ya kwenda katika chumba cha maabara kwa ajili ya uchunguzi ili kubaini kama ana vimelea vya malaria.

Je **Unakubali?** **Ndiyo: ……** **Hapana: ……** (weka tiki panapostahili)

Mimi _____nimesoma maelezo ya fomu hii. Maswali yangu yote yamejibiwa na ninakubali kwa hiyari yangu mwenyewe kushiriki kwenye utafiti huu, pamoja na mtoto wangu.

Sahihi ya mzazi au mlezi: …… Tarehe……

Sahihi ya shuhuda…… Tarehe……

Sahihi ya mtafiti: ……. Tarehe ……

Appendix 3: **Questionnaire, English Version**

QUESTIONNAIRE FOR: ASSESSING MALARIA CASE MANAGEMENT AMONG CHILDREN UNDER FIVE YEARS ATTENDING AT HEALTH FACILITIES IN URAMBO DISTRICT.

Serial number _____

*Name of the Health facility*_____

*Name of interviewer*_____

Date of interview _____

PART A: CHILD'S PARTICULARS FROM PARENT OR CARETAKER

1) Age: *year/s ( ) month/s ( )* (***fill in the brackets the correct age)***

2) Sex: *male ( ) female ( )* ***(Tick accordingly)***

3) What are the main complaints of the child? **(*Tick appropriate)***
   a) Fever
   b) Vomiting
   c) Diarrhoea
   d) Loss of appetite
   e) Others (mention) _____

4) Did your child have fever? ***(Tick appropriate)***

   a) Yes

   b) No

5) For how long has your child been having fever? (***Tick appropriate)***

   a) Less than 2 days

b) 2 days to 14 days

c) More than 14 days

6) Did you do anything before you came to this health facility concerning your child's illness? (***Tick appropriate)***

a) Yes

b) No

7) What did you do? (***Tick appropriate)***

a) I did self medication at home

b) I bought medication from the nearby private chemist

c) I went to private health facility

d) I went to consult tradition healers

8) Did your child take any antimalarial drugs prior to the health facility visit? (***Tick appropriate)***

a) Yes

b) No

9) What was the type of antimalarial drugs taken? (***Tick appropriate)***

a) ALu

b) Quinine tablets

c) Quinine injection

d) Others, specify_____

10) Is this your first or your follow up visit to this health facility for your child's illness? (***Tick the appropriate response)***

a) First visit: Yes ( ) No ( )

b) Follow up visit: Yes ( ) No ( )

PART B: INFORMATION OBTAINED FROM PATIENT HOLDING RECORDS OR PATIENT TREATMENT CARD (CRF)

11) Was the child's temperature recorded in the health facility? ***(Tick according to the CRF records)***

a) Yes

b) No

12) Was the child's weight measured in the health facility? ***(Tick according to the CRF records)***

a) Yes

b) No

13) List the main complaints for the child ***(list according to the CRF records)***

a)
b)
c)
d)

14) Parasitological tests done ***(delete whichever is not applicable***, 'positive'/ 'negative' ***according to the CRF records)***

a) mRDT _____ _____positive / negative
b) Blood slides taken for malaria parasites _____positive / negative

15) Diagnosis given to the child ***(delete whichever is not applicable***, 'Yes' / 'No', ***according to the CRF records)***

a) Malaria _____Yes / No

b) Urinary tract infection _____ *Yes / No*

c) Gastrointestinal infections _____ *Yes / No*

d) Respiratory tract infections _____ *Yes / No*

e) *Other diagnoses* _____mention _____

16) Treatment given to the child ***(Tick only the appropriate TREATMENT according to the CRF records)***

a) Antimalarial drugs

b) Antibiotics

c) Antipyretic

d) Others ___ mention_____

17) Type of antimalarial given to the child ***(Tick the appropriate DRUG according to the CRF records)***

a) ALU

b) SP

c) Quinine tabs or injection

d) Other ACTs

PART C: QUESTIONS FOR HEALTH WORKERS (WILL BE DONE BY THE PRINCIPLE INVESTIGATOR)

1) Age _____*years*

2) Sex: *male ( ) female ( )* (***Tick the appropriate)***

3) What is your level of education? (***Tick appropriate)***

a) Standard seven

b) Form four

c) Form six

d) University level

4) What is your pre-service training? (***Tick appropriate)***

a) Assistant medical officer

b) Clinical officer

c) Assistant clinical officer

d) Medical attendants

e) Others, specify_____

5) For how long have you been working in this health facility? (***Tick appropriate)***

a) Below six months

b) I year

c) 2 years

d) 3 years and above

6) Did you get any in-service training on the guidelines for malaria diagnosis and treatment? (***Tick appropriate)***

a) Yes

b) No

7) If yes, when were you trained?

a) For the last six months

b) For the last one year

c) For the last two years

d) For more than two years ago

8) How many visits by supervisors did you get in the past six months? (***Tick appropriate)***

a) 0 visit

b) 1 visit

c) 2 visits

d) 3 or more visits

PART D: INFORMATION FROM THE HEALTH FACILITY ON EQUIPMENT, DRUGS AND MATERIALS, THIS WILL BE OBTAINED FROM THE HEALTH CARE WORKERS (TO BE DONE BY THE PRINCIPLE INVESTIGATOR)

8) What are the average numbers of children that are seen per day in the health facility (***Fill in the correct number / figure)***

a) Rainy season _____children

b) Dry season _____children

9) What are the types of antimalarial drugs that are available in the health facility? (***Tick appropriate****)*

a) ALU

b) SP

c) Quinine injection

d) Quinine tabs

e) Others: mention_____

10) What are the types of equipments that are available in the health facility? (***Tick appropriate****)*

a) Weighing scales

b) Working microscopes

c) Malaria rapid diagnostic test kits

d) Others

11) Does the health facility have the National Guidelines for malaria diagnosis and treatment? (***Tick appropriate****)*

a) Yes. If yes, confirm

b) No

12) What are the types of wall charts do you have in your health facility regarding malaria case management? (***Tick appropriate****)*

a) ACT dosage charts

b) Quinine dosage charts

c) SP dosage charts

d) There is no wall chart

THANK YOU

Appendix 4: **Questionnaire Swahili Version**

DODOSO LA UTAFITI WA KUANGALIA JINSI GANI UBORA KATIKA UTENDAJI JUU YA UGONJWA WA MALARIA KWA WATOTO AMBAO WANA UMRI CHINI YA MIAKA MITANO UNAVYOFANYWA KULINGANA NA MIONGOZO YA KUBAINI NA KUTIBU UGONJWA WA MALARIA WILAYANI URAMBO .

Namba ya mshiriki _____

Jina la kituo cha afya au hospitali_____

Jina la anayehoji _____

Tarehe ya mahojiano au usaili_____

KIPENGELE A: MAHOJIANO YA TAARIFA YA UGONJWA WA MTOTO KUTOKA KWA MZAZI AU MLEZI

1) Umri……miezi ( ) miaka ( ) (***Weka vema inayohusika)***
2) Jinsia …..mwanamme ( ) mwanamke ( ) (***Weka vema inayohusika)***
3) Ni sababu gani imefanya umlete mtoto hospitali leo? ***(Weka vema inayohusika)***
    a) Homa
    b) Kutapika
    c) Kuharisha
    d) Kukosa hamu ya kula
    e) Mengineyo,taja

4) Mtoto alipata homa usiku?(***Weka vema inayohusika***)

    a) Ndiyo …….
    b) Hapana ……

5) Kama ni ndiyo; kwa muda gani mtoto ameugua homa?(***Weka vema inayohusika)***
    a) Chini ya siku 2

b) Kati ya siku 2 - 14

c) Zaidi ya siku 14

6) Je, ulifanya jambo lolote nyumbani kabla hujaja hapa hospitalini kuhusiana na ugonjwa wa mtoto?(***Weka vema inayohusika)***

a) Ndiyo…….

b) Hapana……

7) Kama ni ndiyo; ulifanya nini? ***(Weka vema inayohusika)***

a) Nilitumia dawa nilizokuwa nazo nyumbani

b) Nilienda kununua duka la dawa

c) Nilienda kutibiwa hospitali binafsi

d) Nilienda kwa waganga wa jadi

8) Je, ulimpa mtoto dawa yeyote ya kutibu malaria kabla ya kuja hospitalini***? (Weka vema inayohusika)***

a) Ndiyo……

b) Hapana……

9) Kama ni ndiyo; ulimpa mtoto aina gani ya dawa ya kutibu malaria? (***Weka vema inayohusika)***

a) Dawa mseto ya malaria (ALu)

b) Kwinini vidonge

c) Kwinini sindano

d) Nyinginezo, taja_____

10) Ni hudhurio lako la kwanza au ni hudhurio la ufuatiliaji katika kituo hiki cha afya?

a) Hudhurio la kwanza Ndiyo…… Hapana……..

b) Hudhurio la ufuatiliaji Ndiyo……. Hapana……

KIPENGELE B: TAARIFA ZILIZOPATIKANA KUTOKA KWENYE DAFTARI AU KADI YA MATIBABU YA MGONJWA.

11) Angalia kama homa ya mtoto imepimwa kwenye kadi yake ya matibabu (***Weka vema inayohusika)***

a) Ndiyo

b) Hapana

12) Chunguza kama uzito wa mtoto umepimwa kwenye kadi yake ya matibabu ***(Weka vema inayohusika)*** .

a) Ndiyo

b) Hapana

13) Chunguza matatizo ya mtoto yaliyoandikwa kwenye kadi yake ya matibabu (***Orodhesha***)

a)

b)

c)

d)

14) Chunguza vipimo vya utafiti wa kimaabara vilivyochukuliwa kwenye kadi ya matibabu ya mgonjwa ***(Weka vema inayohusika)***

a) mRDT ……ndiyo / hapana

b) Damu imechukuliwa kwa ajili ya kuangalia vimelea vya malaria…ndiyo / hapana

15) Chunguza bainisho alilopewa mtoto (***Weka vema inayohusika***)

a) Malaria …….Ndiyo / Hapana

b) Uambukizo kwenye njia ya mkojo…Ndiyo / Hapana

c) Magonjwa ya tumbo……..Ndiyo / Hapana

d) Maambukizo kwenye mfumo wa upumuaji…..Ndiyo / Hapana

e) Upungufu wa damu mwilini……Ndiyo / Hapana

f) Mengineyo…….Ndiyo / Hapana taja----------

16) Orodhesha matibabu aliyopewa mtoto kutoka kwenye daftari lake la matibabu (***Weka vema inayohusika***)

a) Dawa za malaria

b) Dawa za antibiotics

c) Dawa za homa

d) Dawa za minyoo

e) Dawa za kuongeza damu

f) Dawa nyinginezo…….taja

17) Aina ya dawa za malaria alizopewa mtoto ***(Weka vema inayohusika)***

a) Dawa mseto ya malaria (ALU)

b) Dawa ya SP

c) Kwinini vidonge

d) Kwinini sindano

d) Dawa nyingine ,taja

KIPENGELE C: MASWALI KWA AJILI YA WATOA HUDUMA WA AFYA WAKATI WA UTAFITI.

1) Umri….miaka

2) Jinsia …mwanamme ( ) mwanamke ( ) (***Weka vema inayohusika***)

3) Una kiwango gani cha elimu (***Weka vema inayohusika***)

a) Darasa la saba

b) Kidato cha nne

c) Kidato cha sita

d) Elimu ya chuo kikuu

4) Ulipata aina gani ya mafunzo kabla ya kuajiriwa (***Weka vema inayohusika)***

a) Mganga msaidizi
b) Tabibu
c) Tabibu msaidizi
d) Muhudumu wa afya
e) Kada nyingine za afya, taja

5) Una muda gani katika kufanya kazi hii ***(Weka vema inayohusika)***

a) Chini ya miezi sita

b) Mwaka 1 tu.

c) Miaka 2 tu.

d) Miaka 3 na zaidi.

6) Je umepata mafunzo ukiwa kazini kuhusu miongozo ya kubaini na kutibu malaria ***Weka vema inayohusika)***

a) Ndiyo

b) Hapana

7) Kama ni ndiyo, uliyapata lini mafunzo haya

a) Miezi sita iliyopita

b) Mwaka mmoja uliopita

c) Miaka miwili iliyopita

d) Zaidi ya miaka iliyopita

8) Mara ngapi mnapata wasimamizi kwa ajili ya kuangalia huduma zinavyoendeshwa hapa kituoni katika kipindi cha miezi sita iliyopita? (***Weka vema inayohusika***)

a) Hakuna kabisa katika miezi sita
b) Mara moja katika miezi sita
c) Mara mbili katika miezi sita
d) Mara tatu au zaidi katika miezi sita

KIPENGELE D: TAARIFA KUTOKA KITUO CHA AFYA JUU YA VIFAA, DAWA NA MIONGOZO KUHUSU UTOAJI HUDUMA ZA MALARIA WATAKAOHOJIWA NI 'WAFANYAKAZI WANAOTOA HUDUMA KWA WAGONJWA'

9) Je mnaona kiasi gani cha watoto wanaoumwa kwa siku.

a) Katika majira ya mvua tunaona watoto_____

b) Katika majira ya kiangazi tunaona watoto_____

10) Je kituo kina aina gani ya dawa? (***Weka vema inayohusika***)

a) Dawa mseto ya malaria (ALu)
b) Dawa ya SP
c) Kwinini sindano
d) Kwinini vidonge

e) Nyinginezo, .taja

11) Je, kituo kina vifaa gani kuhusiana na matibabu ya ugonjwa wa malaria? ***(Weka vema inayohusika)***

a) Mzani wa kupimia uzito

b) Microscopes zinazofanya kazi

c) Malaria rapid diagnostic test kits (MRDTs kits)

12) Mna aina gani ya mabango kwenye kuta yanayoonyesha jinsi mgojwa wa malaria anavyotakiwa kuhudumiwa? (***Weka vema inayohusika)***

a) Mabango yanayoonesha dozi ya dawa mseto (ALu)

b) Mabango yanayoonesha dozi ya Kwinini vidonge

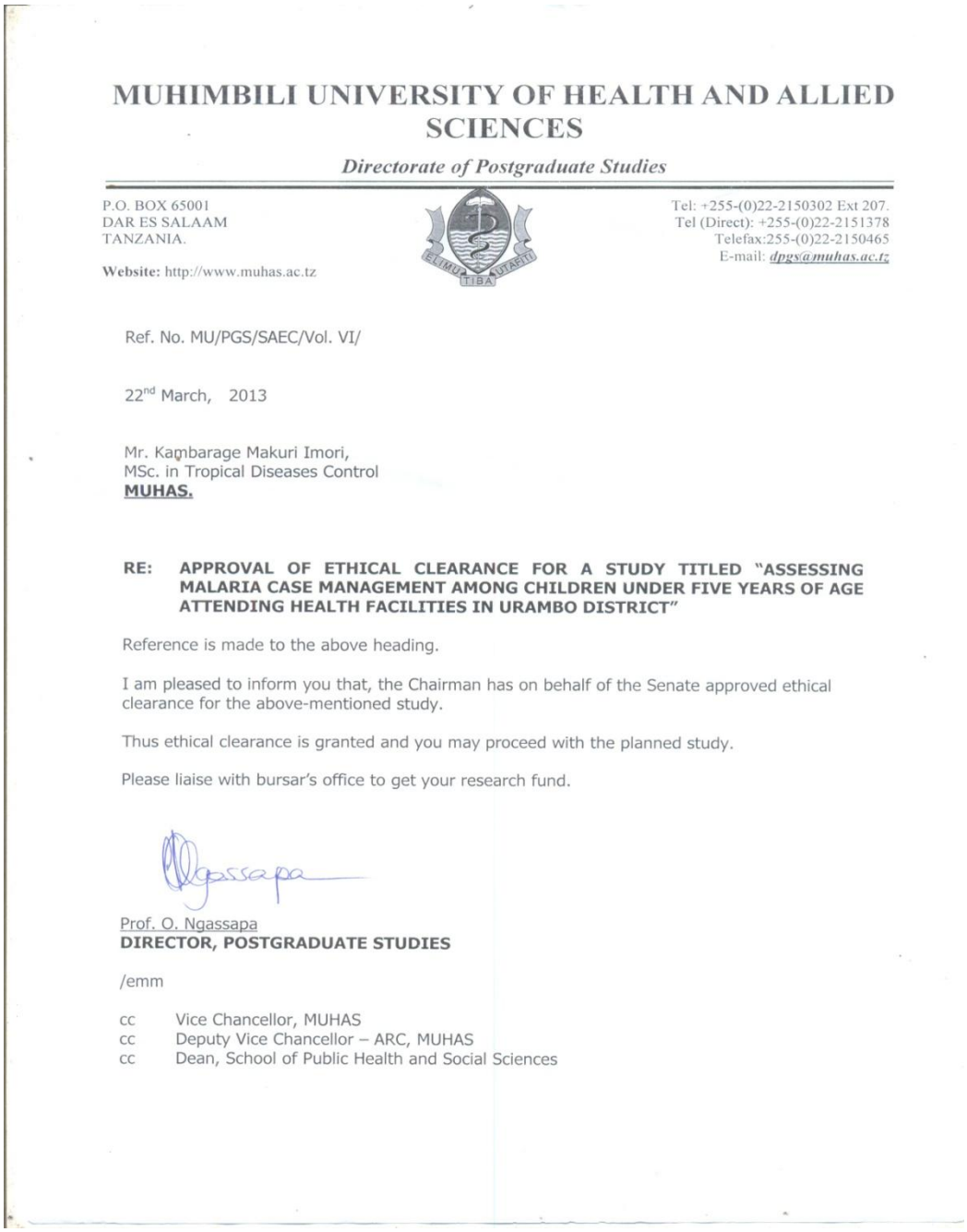
na quinine sindano

c) Mabango yanayoonesha dozi ya SP

d) Hakuna mabango

ASANTENI KWA USHIRIAKIANO WENU

Appendix 5: Ethical clearance letter



MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

Directorate of Postgraduate Studies

P.O. BOX 65001
DAR ES SALAAM
TANZANIA.

Website: http://www.muhas.ac.tz

Tel: +255-(0)22-2150302 Ext 207.
Tel (Direct): +255-(0)22-2151378
Telefax:255-(0)22-2150465
E-mail: *dpgs@muhas.ac.tz*

Ref. No. MU/PGS/SAEC/Vol. VI/

22nd March, 2013

Mr. Kambarage Makuri Imori,
MSc. in Tropical Diseases Control
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED "ASSESSING MALARIA CASE MANAGEMENT AMONG CHILDREN UNDER FIVE YEARS OF AGE ATTENDING HEALTH FACILITIES IN URAMBO DISTRICT"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has on behalf of the Senate approved ethical clearance for the above-mentioned study.

Thus ethical clearance is granted and you may proceed with the planned study.

Please liaise with bursar's office to get your research fund.

Prof. O. Ngassapa
DIRECTOR, POSTGRADUATE STUDIES

/emm

cc Vice Chancellor, MUHAS
cc Deputy Vice Chancellor – ARC, MUHAS
cc Dean, School of Public Health and Social Sciences