KNOWLEDGE OF MALARIA SYMPTOMS, ANTIMALARIAL DRUGS STOCKED AND DISPENSING PRACTISES IN ACREDITED DRUG DISPENSING OUTLETS, IN MOROGORO, TANZANIA

By

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A dissertation submitted in (partial) fulfillment of the requirements for the Degree of Master of Science in Applied Epidemiology of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled "***Knowledge of Malaria symptoms antimalarial drugs stocked and dispensing practices in*** A***credited Drug Dispensing Outlets (ADDO), in Morogoro, Tanzania."*** In (partial) fulfillment of the requirements for the degree of Master of Science in Applied Epidemiology (Msc.AE) of Muhimbili University of Health and Allied Sciences.

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DECLARATION

AND

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I, **Ndalio**, **Thomas Samwel** 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.

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With all those who said even a word to enable the completion of this document, I am honoured to you all and may God almighty bless you all.

DEDICATION

To my beloved wife Elinuru,

Our two daughters Bitress and Karen and our Son Samwel

For their days of loneliness and prayer in all this time when I was away to school

May the fruits which may be harvested from this work be for us all as a family, and God almighty bless us all, In Jesus Name.

Amen

ABSTRACT

The Accredited Drug Dispensing Outlets form the lowest level of health care delivery in Tanzania. Inspite of the course offered to dispensers in ADDOs by the Tanzania Food and Drugs Authority; on detection and treatment of common infectious diseases; there has been a gap on patient's assessment, diagnosis, treatment and counselling tasks in accordance with the evidence based standards. This study assessed the dispensers' knowledge, drugs stocked and dispensing practises in ADDOs in Morogoro Region.

A cross-sectional analytical study of 220 randomly selected dispensers from 220 ADDOs in the three Districts of Morogoro Region; conducted between October and December 2012. Questionnaire interview sessions conducted to assess knowledge of malaria symptoms and reported practises. A checklist was used to assess presence of anti-malarial drugs, treatment supplies and guidelines available. The actual practises were assessed using the "Simulated clients" method. Data analysis was done using SPSS software. Chi square test was used to compare proportions and a *p*-value of less than or equal to 0.05 was considered statistically significant.

Of the total dispensers, Nurse Assistants 206 (94%), Nurse Officers 9 (4.1%); Clinical Officers 3 (1.4%) and Pharmaceutical Assistants 2 (0.9%). More than half (54%) of them attained secondary while the rest had primary education. 185 (84.1%) of the total, trained TFDA special course. Among dispensers, 90% had the knowledge to pick at least two symptoms of uncomplicated malaria in both children and adults. Likewise 67% of them could do the same for severe malaria in both groups. With TFDA taining the likelyhood of correctly identifying the symptoms of malaria was higher in those trained ($P<0.05$), compared to those who did not. More than 90% of ADDOs stock and dispense antimalarial monotherapies at equal proportion with subsidized ALu. The results have shown that, dispensers have knowledge to at least make syndromic management of malaria in ADDOs. The TFDA training course to dispensers has been significant finding.Antimalarial monotherapies area still stocked and dispensed to patients in ADDOs.

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LIST OF ABREVIATIONS

ACT	Artemisinin based Combination Therapy
ADDOs	Accredited Drug Dispensing Outlets
AFENET	African Field Epidemiology Network
ALU	Artemether - Lumefantrine
AMFm	Affordable Medicine Facility for malaria
ANC	Anternatal Care
CHMT	Council Health Management Team
CDC	Centre of Disease Control
DLDB	Duka la Dawa Baridi (Part one Drug shop)
ITNs	Insecticide Treated Nets
IPTp	Intermittent Preventive Treatment in Pregnancy
LLINs	Long lasting Insecticide Nets
MUHAS	Muhimbili University of Health and Allied Sciences
MSH	Management of Science for Health
MOHSW	Ministry of Health and Social Worlfare
MOP	Malaria Operational Plan
NMCP	National Malaria Control Program
OTC	Over the Counter Drugs
PMI	US-President Malaria Initiative

PSU	Pharmaceuticals Services Unit
RHMT	Regional Health Management Team
RMO	Regional Medical Officer
S.P	Sulphadoxine-Pyrimethamine
TFDA	Tanzania Food and Drug Authority
TFELTP Program	Tanzania Field Epidemiology and Laboratory Training
WHO	World Health Organization

DEFINITIONS

National Malaria Diagnostic and Treatment Guideline-Refers to the Standard Guideline developed by the MOHSW Tanzania Mainland to guide the management of malaria in the Country.The Last version was that of 2006, and current the guideline is on final stages of review to incorporate some important updates.

The current malaria treatment policy: This refers to the use of Combination therapy-Artemether-Lumefantrine as the first line drug for the treatment of uncomplicated malaria, and Dihydroartemisinin/Piperaquine phosphate (Duo-cotexin) is used as alternative drug of choice. For severe Malaria Artemether Injection will be the drug of choice with Parenteral Quinine as an alternative drug of choice.This is according to the new National Malaria Diagnostic and Treatment Guideline under Review.

Accessibility: The extent to which the location of supply is in line with location of clients

Presumptive Diagnosis of Malaria: Refers to the diagnosis of malaria basing on clinical symptoms and signs alone, without laboratory component for confirmation

Sufficient knowledge of dispensers: In the context of this study sufficient knowledge of dispensers is the scale set up for those dispensers who were able to state more than two symproms of malaria during questionnaire interview.This was applied in both uncomplicated and complicated malaria, in children less than five years and adults respectively.

Insufficient knowledge of Dispensers: In the context of this study insufficient knowledge of dispensers is the scale set up for those dispensers who were able to state only one or two symproms of malaria during questionnaire interview. This was applied in both uncomplicated and complicated malaria, in children less than five years and adults respectively

CHAPTER ONE

I.0 Background

1.1.0 Malaria case management and ADDOs

Malaria is the world's most prevalent vector-borne disease, caused by a protozoan parasite called *Plasmodium*. According to the World malaria report 2011, there were about 216 million cases of malaria (with an uncertainty range of 149 million to 274 million) and an estimated 655000 deaths in 2010 (with an uncertainty range of 537000 to 907000). Malaria mortality rates have fallen by more than 25% globally since 2000 and by 33% in the WHO African region. Most deaths occur among children living in Africa whereas a child dies every minute from malaria (WHO, 2011).Malaria is the biggest public health problem in Tanzania and is responsible for 30% of the national disease burden, 35% of hospitalizations, and 37% of deaths in children under five years. (Ruta *et al.,* 2009).

Case Management of malaria is the main strategy for control of malaria aiming to eliminate malaria related deaths by 2015. Decrease of deaths depends on successful malaria case management, through early provision of drugs that are efficacious, safe prescribed and taken in right doses and adequate duration (Roll Back Malaria, 2005).

Proper and effective treatment of malaria episode is the strong point in malaria control strategy.This is because inadequate clinical evaluation could cause incorrect diagnosis and inapropriate treatment of malaria in other events.In Tanzania, the private retail sector plays a central role in the provision of malaria treatment, especially in rural areas complementing the areas where public health facility services cannot be delivered successfully (Hetzel *et al*., 2008)**.** It occupies 40% of the population which do not attend health services at the public health facilities (NMCP, 2012).

The retail sector for drugs since then has included two types of licensed drug stores as well as general shops. Part I drug stores (pharmacies) which are allowed to sell all prescription only medicines and need to be headed by a pharmacist; and part II drug stores (in Swahili: Duka la Dawa Baridi) which need to be headed by a person with basic knowledge in medical or health related training. Part II shops were then allowed to sell over the counter (OTC) drugs only (e.g. analgesics/antipyretics). In practise however the dispensers in these shops dispensed much wider variety of medicines, among which is prescription only (Battersby *et al.,* 2003)

In 2002, the Ministry of Health and Social Welfare through TFDA worked with Management Sciences for Health (MSH) to enhance access to Medicine. The program which was funded by Bill and Melinda Gates Foundation, had a strategy to pilot an innovative private sector drug dispenser program and transform the part II drug store –*Duka la Dawa Baridi* into Accredited Drug Dispensing Outlet-*Duka la Dawa Muhimu* in Kiswahili.

The goal of the ADDO program was to improve the access, affordability of quality medicines and pharmaceutical services in rural and peri-urban areas where there are few or no registered pharmacies. This is to be achieved through a holistic approach focusing on dispenser training, accreditation and regulation (Ruta *et al*., 2009).

1.1.1 The current situation of malaria Diagnosis in Tanzania

In Tanzania as in most setting in Subsaharan Africa malaria is the first cause of attendance in Health facilities.Unfortunately the clinical presentation of malaria is one of the least specific of other diseases with a large clinical overlap with other conditions.With the existing algorithms the risk of missing a malaria case on a clinical presentation alone is minimal, while the risk of overdiagnosis and hence drug wastage is increasing as the transmission level decreases (MOHSW, 2012)

1.1.2 Diagnosis of malaria in ADDOs

Unlike the dispensers of the previous part II drug shops which were only supposed to dispense over the counter drugs, those of ADDOs can make critical malaria diagnosis basing on clinical presentations and make appropriate judgement according top the client's condition. In this context therefore the TFDA under the MOHSW took an effort since 2002 to offer a six weeks training to drug dispensers of Part Two drug shops (*Duka la Dawa Baridi*) on how to properly identify and treat malaria, recognize the danger signs of complicated malaria, refer patients to health facilities, and properly keep records and comply with regulations governing the proper dispensing practices.

The MOHSW thereby recognized ADDOs as the first level of health care delivery in Tanzania because majority of the people in the community as previous studies suggest report to the drug outlets for first aid managements before they go the higher level of health delivery.

1.1.3 Antimalarial Drug policy of Tanzania

Treatment of malaria in Tanzania was done using Chloroquine upto 2000 when it was replaced with Sulfadoxine –Pyrimethamine (S.P) following resistance of malaria to chloroquine by 60%.In a period of five years since the change of policy, the monitoring indicated that malaria parasite resistance to S.P had gone up to an average of about 26% as it was obtained in the sentinel sites (from 7.8 to 60.5%).

Resistance to amodiaquine also went up to an average of 11.5 %(6.3-18.2%).At this time therefore a decision for another change was unavoidable. In 2004, the WHO recommended that all countries use ACT as first-line treatment for malaria, as resistance emerged to conventional monotherapies, including sulphadoxine - pyrimethamine, (S.P), chloroquine, and amodiaquine**,** thereby reducing their therapeutic efficacy(AMFm , 2009).

In 2005 the National Malaria Control Programme (NMCP) treatment policy also changed first-line treatment for uncomplicated malaria from sulfadoxine - pyrimethamine (SP) to artemisinin-based combination therapy (ACT) - specifically Artemether-Lumefantrine.

The main goal of the NMCP malaria case management policy was to improve accessibility and use of effective, safe, quality, and affordable antimalarial drugs. Artemether-Lumefantrine was made available at the public and private – faith based health facilities of Tanzania and officially it started to be used in early 2007 (PMI-MOP, 2008). The NMCP at this time also identified the ADDO program as the potential private sector to supplement and distribute subsidized ACT and increase access to first line anti malarial drugs in rural and periurban areas.

Distribution of subsidized ACTs through ADDOs is seen as the best way to expand the availability of ACTs through legally recognized and regulated outlets (Ruta *et al.,* 2008)

At this time some studies documented no or very low availability of ACT in private for profit sectors, including ADDOs and what was available was sold at very high price ranging from 6 to 10 USD per treatment course. This price was unaffordable to the majority of people living in malaria endemic countries (AMFm, 2009).

1.1.4 Affordable Medicine facility for malaria (AMFm)

This is an innovative financing mechanism designed to expand access to the most effective anti-malaria drugs, ACTs. It is a new line of business hosted and managed by Global fund. It is developed with the aim of enabling the countries to increase provision and use of Affordable ACTs through public, private and NGO sectors.In order to achieve this goal the Global fund performs the following core tasks:Negotiate the cost of ACTs with the manufacturers, make co-payments to manufacturers on behalf of the public and private sector wholesalers, pharmacists, etc popularly known as "the first line buyers" and finance the country supporting interventions such as public education, awareness campaigns, healthcare worker trainings, and monitoring and evaluation.

Tanzania mainland and Zanzibar were among the ten African countries invited to pilot the first phase of this subsidy in mid 2010 (Global fund, 2012). AMFm helped to facilitate the availability of ACT in ADDOs at affordable price so that majority of the population living in rural areas could have access to them (Goodman *et al.,* 2007).The drugs were therefore supposed to be available to patients at about USD 0.2-0.5 per treatment course.

Enrolment of ADDOs in Morogoro Region was done in 2006, and supply of subsidized ACT began by July 2007 in Kilombero and Ulanga districts and extended to cover remaining districts of Kilosa, Mvomero and Morogoro Rural by November 2007 (Ruta *et al.,* 2008)

With all these efforts, made by the MOHSW it is the obligation of the private and public health sectors to adhere to the treatment of malaria as recommended by the standard malaria diagnosis and treatment guideline in order to avoid over/under treatment of malaria and ultimately early parasite resistance to ALu which is a very expensive drug.

The study was therefore important to assess the proper management of malaria in ADDOs, the private sector which serve the majority of the population before attending at the higher health facilities.

1.2 Problem statement

Malaria remains a big public health challenge especially in Subsaharan Africa.In Tanzania malaria is a challenge as well, despite the fact that the recent data from the MOHSW shows the prevalence of malaria to have decreased to 18% in underfive children.

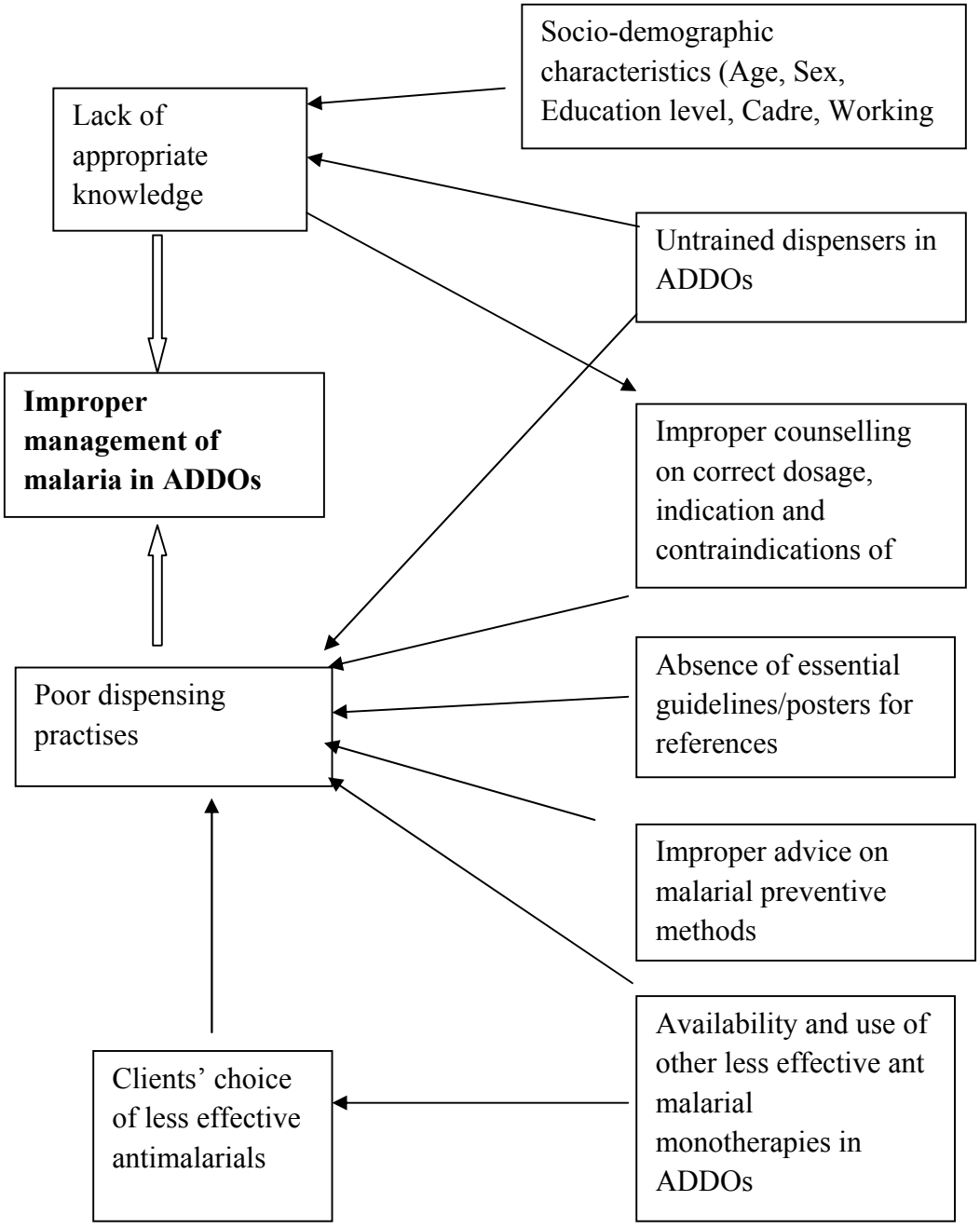
The Acredited Drug Dispensing Outlets(ADDOs) form the lowest level of health delivery in the Country.They are therefore allowed to treat uncomplicated malaria and other common infections; and detects severe form of malaria earlier for referral to higher levels of health care delivery (MOHSW 2006). The dispensers in these outlets were given a special training by the Tanzania Food and Drug Authority(TFDA) on how to handle common infectious diseases; malaria being one of them (MOHSW, 2008).

However there is a knowledge gap on dispenser's assessment, diagnosis, treatment and counselling tasks in accordance with the evidence based standards to ensure adequate quality of malaria case management. The evidence drawn from other studies done in pharmacies shows that the problem is high especially in areas of knowledge on malaria case detection, advice on treatment and adherence to standard guidelines (Kamuhabwa et al., 2011, Minzi et al., 2008, Kibassa, 2005) and studies conducted in Part II drug shops (Ruta et al., 2008).

If this gap was to be left unattended would contribute in malaria mismanagement (over dosage or under dosage, use of less effective monotherapies) which may build up ant malaria drug resistance.

This study is one of the solutions to this gap and it has been able to come up with the suggestions which if used will complement other similar studies in solving the stated problem.

Problem analysis for management of malaria in ADDOs



1.3 Research question

This study intended to answer the following questions:

1. Are the dispensers able to pick malaria symptoms and signs in all age groups?
2. How is the general Dispensing practise of the ADDOs dispensers?
3. What types of antimalarial drugs are stocked in ADDOs?
4. What essential supplies and guidelines are available in ADDOs?

1.4 Objectives

Broad objective:

To determine the knowledge of malaria symptoms among dispensers, ant malarial drugs stocked and dispensing practices in ADDOs in Morogoro region, Tanzania

Specific objectives

1) To determine the ADDOs dispensers existing knowledge of malaria symptoms among persons of all age groups in Morogoro region.
2) To determine the types of ant malarial drugs stocked in ADDOs in Morogoro region
3) To determine the dispensing practices of ant malarial drugs among ADDOs dispensers' in Morogoro region
4) To determine the availability and adherence of guidelines for dispensing ant malarial drugs by ADDOs dispensers in Morogoro Region

1.5 Rationale for the study

Drugs must be used as recommended by experts including the manufactures, physicians and pharmacists in order to attain the sufficient therapeutic effects. The misuse of drugs has been the main cause of the drug resistance (Shunmay et al 2004).Despite the fact that ALu is a prescription only medicine; it was allowed to be dispensed in ADDO by the government of Tanzania in order to cater for the 35% of malaria clients which attend services at these shops due to different reasons (Ruta *et al*., 2008).

The MOHSW has managed to develop the diagnosis and treatment guideline which guide the health care workers of Public and private health facilities in management of malaria (MOHSW, 2006). This guideline is currently on its final stage of revision by NMCP in order to change the regimen for treatment of severe malaria from injectable Quinine to Injectable Artesunate with parenteral Quinine as an alternative where artesunate is not available(PMI-MOP,2011) and Artemisinin –piperaquine phosphate as an alternative drug to ALu in treatment of uncomplicated malaria(Unpublished source-NMCP).

With all these efforts by MOHSW, still a limited number of studies have existed so far which focus on malaria case management in ADDOs, especially with the current subsidized ACTs. The extent of dispenser's knowledge of symptoms and gereral dispensing practices on malaria management in these drug stores is yet to be determined.

The study was therefore intended to assess the knowledge and practices of ADDO dispensers on malaria case management as they form the key group in dispensing ant malarial in private for profit health facilities.

Information which has been obtained will be of great use to the responsible stakeholders (NMCP, TFDA, Partners in Malaria Tanzania, PSU, RHMT, CHMT) to improve management of malaria especially in private sectors. At client level the study results will help to ensure proper malaria case management and dispensing of antimalarials according to the Standard Malaria Diagnostic and Treatment guideline.

CHAPTER TWO

2.0 Literature review

2.1 Health seeking behaviour of Clients in ADDOs

In sub-Saharan Africa the treatment-seeking behaviour for malaria is complex, often involving several steps and actors, depending on the local health system, society and culture (Combie 1996).

An extensive literature on treatment seeking for malaria and fever in sub-Saharan Africa demonstrates that medicine sellers (legitimate or others) are a widely used source of drugs for fever and malaria. The proportion of caregivers visiting shops during recent childhood illness range from 15% to 83%, with a median across studies of approximately 50% (Tsuyoka *et al*., 2001, Salako *et al*., 2001, Hamel *et al*., 2001).

For example, on the Kenyan coast, shop-bought medicines were used first, or solely, in 69% of childhood fevers treated (Molyneux etal., 1999). In Togo, only 20% of children less than five years of age with fever were seen at a health centre, and about 80% were treated at home with an ant malarial drug obtained from a street or market vendor (Deming *et al*., 1989). Use of medicine sellers is common in both rural and urban areas, among children and adults, and across socioeconomic groups (Njau *et al*., 2006, Biritwun et al., 2000)

Pharmacies serve more as frontline healthcare delivery whereby about 50%-80% of people visit private drug outlet or practitioners for malaria treatment before being attended at health facility (Paula et al., 2003). In most places, the private retail sector has been identified as an important source of drugs close to people's home (Goodman et al., 2004). Many people buy medicines from the retail facilities because they are convenient and often have drugs available when public health facilities are out of stock (Ruta *et al*., 2009).

The supply of subsidized ACT to the private for profit health facilities in Tanzania has started to solve accessibility and affordability problem to approximately 35% of Tanzanians who seek treatment for malaria in private sectors (PMI-MOP, 2008)

2.2 Knowledge on malaria management in private sectors

Management of malaria requires an integrated strategy which ensures access to early diagnosis and treatment with effective anti-malarial, while also undertaking preventive measures that target vector control (WHO, 2010). In order to increase community-wide effectiveness of ant malarial treatment, the popularity of home-management and the quality of treatment obtained from commercial shops need to be better addressed.

Considerable improvement in case-management has been shown to be possible as a result of training private retailers in general shops [Marsh *et al*., 2004] and in drug stores (Mbwasi *et al*., 2005). For the proper case management knowledge of the disease diagnosis and proper treatment is very important. However in studies conducted previously has shown different schools of thoughts on responses from dispensers of drug stores and Pharmacies. In the study conducted in pharmacies of Dar es Salaam (Kibassa, 2005) showed that the knowledge on malaria symptoms and calculation of the drug dosages especially to children was not convincingly good.

For effective management of malaria there has to be an effective correlation between knowledge of malaria diagnosis and effective treatment in terms of effective drug, correct dosage, counselling on use in different age groups.However the results from different studies have shown the knowledge practise conflicts. The results of the study conducted in drug stores of Dar es Salaam (Massele *et al*., 1993) showed that the knowledge of drug sellers on signs and symptoms of malaria was adequate; however 45% of them did not know the correct dose of chloroquine, the antimalarial drug of that time.

2.3 Malaria presentation in Children

Malaria in young children manifest in many different ways, but the classic picture of malaria, with periodic fever, shivering, and sweating, is not realy observed. Malaria can mimic any febrile illness and should be suspected in any febrile child who has recently been in a malarious area.

Older children may manifest the classic periodicity of fever with chills and shivering. After the mosquito bite, children are asymptomatic while the parasites complete the liver cycle and 1 erythrocytic cycle, which takes 8-18 days, depending on the species.Children then become restless, drowsy, apathetic, and anorexic. Older children may report aching body, headache, and nausea. Fever is usually continuous and may be very high (40°C) from the first day of symptoms onset.

Many children have only flulike respiratory symptoms at presentation, with mild cough and cold. These symptoms last in 1-2 days, with or without treatment. Vomiting, mild diarrhea with dark green mucoid stools are often observed symptoms occasionally, profuse diarrhea with dehydration and circulatory failure may also be observed. Convulsions are common and may occur at the onset of the disease, even before high fever has set in.

For the neonates malaria is very rare and normally confused with septicaemia.If really present must be congenital by transplacental transmissions.Normally the babies may have fever, are irritable, refuse to feed, and often develop anemia, jaundice, and hepatosplenomegaly. Children living in an area where malaria is endemic have frequent infections and develop and maintain partial immunity. These children often develop only a low-grade fever, anemia, poor appetite, and malaise. Tiredness, restlessness, cough, and diarrhea are other symptoms that may occur.

2.4 Malaria presentations in Adults

The research focus on malaria in adults especially in people who live in malaria endemic areas is neglected, and the focus has been on children under age of 5 years and pregnant women.This is because malaria related sickness and deaths occur in these groups (Snow etal., 2005) However, early studies in West Africa showed that clinical attacks of malaria also occur in adults living in malaria endemic areas and it results into a considerable cause of death (Smith et al., 2006).

In cases of malaria occurrence in adults the patients have had atypical symptoms which are so individualised between patients. These include Headache, body pain, Fever, Shivering, Abdominal pain, Nausea, Vomiting and Diarrhea (Alfredo et al 2007).

Malaria is an important cause of morbidity and mortality for the pregnant women or the foetus and newborn.The effects of malaria in pregnancy are related to the malaria endemicity with abortion more common in areas of low endemicity and intra uterine growth retardation more common in areas of high endemicity. During pregnancy the naturaly acquired immunity to malaria declines with the reasons yet undetermined (MOHSW, 2006).Pregnant women with malaria are more susceptible to develop severe form of malaria with high fever, cerebral malaria, severe haemolytic anaemia, hypoglycaemia, pulmonary oedema and hyperparasitemia. Therefore early diagnosis and effective case management of malarial illness in pregnantwomen is crucial in order to prevent progression into severe form of malaria which may end up in maternal death.

2.5 Dispensing practises in Pharmacies/Drug stores

The Accredited Drug Dispensing Outlets (ADDOs) is one of the health care deliveries at Category I of health care providers in Tanzania; which is generally tolerated to dispense ACT which is a prescription-only ant malarial drug (MOHSW, 2006).

ADDO dispensers either provide ACT after they receive prescriptions from health facilities (assuming proper diagnosis was done there) or they make decision to dispense ACTs for cases of uncomplicated malaria based on their training and experience.

Ensuring accuracy of drug dispensing is particularly challenging for pharmacies and other drug retailers which typically stock a multitude of different types of ACT and the accurate dosage depends not only on the patient's age or weight but varies by brand depending on the formulation and composition of the active ingredients (ACT watch 2008**).**

Evidence from the study conducted in dispensers of Pharmacies in Dar es Salaam (Kibassa, 2005) showed that more than three quarter had the knowledge of the basis for dosage calculation; however in practise only 28.7% of them were able to give the correct dose of

artemisinin monotherapies to children. This was also the case in study done in Kenya where the regimens dispensed by private retailers were often inadequate with regard to the type of drug and their dosage (Abuya *et al*., 2007). In another study conducted in retail drug outlets in Western Kenya (Andria *et al*., 2012), showed that, the proportion of medicine retailers who recommend the correct treatment was absolutely low. Only 48% would recommend Artemether /Lumefantrine to adults, and 37% would recommend it to children.

Further more in this study, it was discovered that customer demand has an influence on retailer behaviour. Retailer training and education were found to be correlated with anti-malarial drug knowledge, which in turn is correlated with dispensing practices.

Medicine retailer behaviour, including patient referral practice and dispensing practices, are also correlated with knowledge of the first-line anti-malarial medication.

About the choice of treatment evidence from several settings on malaria case management report; showed that ACTs were often underused and many patients continued to receive less effective anti-malarial, such as SP (Onwujekwe *et al*., 2009, Zurovac *et al*., 2007, Zurovac *et al*., 2006). Despite the fact that 79% of febrile patients in Nigeria received ant malarial, only 23% received ACT, others received less effective ant malarial and artemisinin monotherapies (Lindsay *et al*., 2011).This is dangerous as artemisinin monotherapies, resistance is more likely to develop if artemisinin derivatives are taken without a partner drug (Lindegardh *et al*., 2009, WHO 2006). Despite the fact that 79% of febrile patients in Nigeria received ant malarial, only 23% received ACT, others received less effective ant malarial and artemisinin monotherapies (Lindsay *et al*., 2011). Dispensing of certain drug in ADDO is also influenced by the profit generated from the drug, evidence from supervision done in rural Tanzania showed that ADDO business owners were reluctant to dispense subsidized ACT to SP because of significantly less profit margin in ACT compared to that of SP (Ruta *et al*., 2008).

With regard to client counselling on ACT use the study findings from rural Tanzania (Abdunoor *et al*., 2010) indicate that adherence to the ALu regimen is very good following standard instructions from the dispensing healthcare provider, as confirmed by pill counts at the randomized visits. In spite of this information, problems with the dispensing of malaria

treatment have also been observed, with patients frequently receiving inadequate doses and without advice on how the medicines should be taken (Zurovac *et al*., 2008, Hetzel *et al*., 2008).

Food especially dietary fat has been implicated to enhance the bioavilability of Lumefantrine when the patient takes Artemether-Lumefantrinne dose.However in studies conducted in private pharmacies (Kamuhabwa et al., 2011) showed that less than a quarter of the drug dispensers advised the patients on importance of fatty meals when using ALu.

With regard to preventive measures of malaria most of the dispensers (93.5%) mentioned ITNs as preventive measure against malaria and only 24.5% mentioned environmental sanitation as the other preventive measure(Kibassa, 2005)

At peripheral health facilities individual wrongly diagnosed with malaria will be exposed to unnecessary side effects of drugs and true cause of the problem will not be recognised or treated (Amexo *et al*., 2004). Therefore it is important that dispensers in ADDOs adhere to the standard malaria Diagnosis and treatment guideline to avoid all these.

2.6 Availability and adherence to Guidelines

Sustainable management of malaria in ADDOs should be guided by the presence of tools which if adhered to may lead to the best practise. These include Report forms, standard operating procedures for ACT, dose indicator sheets, price indicator sheets, TFDA and MOHSW malaria guidelines for reference, weighing scale (Ruta *et al* 2008)However in study conducted in private pharmacies of Dar es Salaam showed that the dispensers in private pharmacies had poor knowledge in ant malarial dosages as recommended in the guideline. The reason given for this was poor or non involvement of the private pharmacies on preparations and trainings on the new treatment guideline (Minzi *et al.*, 2008

CHAPTER THREE

3.0 Methodology:

3.1 The study area:

The study was carried out in Morogoro region located on the Eastern zone of Tanzania Mainland. The Region is one of 25 Regions of Tanzania Mainland which lies between latitudes 5°58' and 10°00' South of the Equator and between longitudes 35°25' and 38°30' East of Greenwich. The size of the Region is 73,039 square kilometers (second largest region after Tabora). It is bordered to seven Regions. Tanga and Manyara to the north, Coast Region and Lindi to the eastern side. On the western there are Dodoma and Iringa Regions while Ruvuma is located in the southern side of the Region. Administratively the Region is divided into 6 Districts and 7 Local Government Authorities which include Morogoro Dc, Morogoro Town council, Mvomero Dc, Kilosa Dc, Kilombero Dc and Ulanga Dc.The current District of Gairo is established administratively but the Council was still on process during the study period, The District Executive Director of Kilosa was responsible for Gairo also.

Morogoro Region experiences climate of moderate temperature of around 25^0C almost throughout the year, and the average annual temperature varies between 18^0C to 30^0C in lowlands. Generally, the Region experiences two major rainfall seasons; that with long rains between November and May and short rains between January and February.The average annual rainfall varies between 600mm and 1800mm. Apart from the Uluguru mountain ranges, most (80%) of the region is flat, with a risk of standing water following the rainy period. The climatic condition of Morogoro favors mosquito breeding and malaria transmission. The burden of communicable diseases is still a challenge to the Region.Malaria, HIV/AIDS and Tuberculosis are among the most communicable diseases occurring in the Region.Malaria is endemic in Morogoro with the estimated prevalence of 15.7**%** in children of age 6-59 month **(**TDHS 2008**).** Malaria ranks number one in both outpatient and inpatient diagnoses made in the region and it is the leading disease in terms of mortality in both underfive and above five in the Region (RHMT, 2011)

Morogoro was chosen for study purposely from 16 Regions enrolled in ADDO system because it is second Region of the pilot program of ADDOs (2006) after Ruvuma (2003). The region has more registered ADDOs (660) when compared to other Regions enrolled ADDO which serve more of rural community (Dar es Salaam left because it serves more of urban community). This is the Region in which training by TFDA, supply of subsidized ACT and essential supplies and tools for management was done earlier compared to other Regions enrolled in ADDO programme except for Ruvuma which was the first in Pilot programme. According to the study on ACT accessibility in ADDOs in Morogoro (Ruta et al,2008) accessibility of ACT was increasing but the part of Quality of case management was yet to be determined by other studies.This study is probably one of them.

3.2 Study Design

This was a Cross-sectional study of 220 ADDO dispensers selected randomly from Morogoro Municipal, Kilosa and Kilombero Districts of Morogoro Region.This study was conducted between October and December 2012.

3.3 The study population:

These included all dispensers from the ADDOs selected from the three Districts of Morogoro Region.

Inclusion Criteria

All dispensers found dispensing drugs in ADDOs during the whole period of study, and who granted consent to participate in study.

Exclusion criteria

All ADDO veterinary shops

Failure to grant consent

ADDOs which were found regularly closed during the study visit

3.4 Sample size Estimation

3.4.1 Number of study participants

The minimum sample size for the study was determined from the formula:

$$n = \frac{z2p\,(100 - p)}{\varepsilon^2}$$

n=the desired sample size (calculated in infinite population)

Z=standard normal deviation usually set as 1.96 which correspond to 95% confident interval

P=proportion of the drug sellers estimated to have sufficient knowledge in malaria presentations. In this case **53%** (Kibassa Brycesson 2005)

ε=tolerable margin of error 6%

The sample size (n) = $1.96^2 * 53(100-53)/6^2$

266

Adjusting the sample size according to the finite target population. The target population includes the number of dispensers in 660 ADDOs of Morogoro region (N) which are 803 dispensers.

Adjusted sample size formula: **(n') =n/1+n/N**

n'=Adjusted sample size

n = sample size calculated in infinite population

N = Target population

n' =266/1+266/803 =200.The adjusted sample size = **200** participants

Adjusting for non response 10% of the sample size (20 participants) was added. Therefore the total sample size finally was 220 **participants**

3.5.0 Sampling procedures

Multistage sampling procedures were used to obtain the required sample size above**.**

Stage I: Selection of the Districts

These were selected randomly using lottery method after obtaining a list of the Districts from RMO's office. Morogoro Municipal, Kilosa and Kilombero Districts were selected.

Stage 2: Selection of the Number of ADDOs Required

A sampling frame of all registered ADDOs for the three Districts selected was obtained in the office of the Regional pharmacist. Probability proportion to size (PPS) was used to select ADDOs representation at each District according to the number of ADDOs present.

Stage 3: **Selection of the ADDOs in Respective Districts for visit**

Random sampling was applied to determine the ADDOs in which the sample size of the respective District was to be obtained.The Districts were divided into geographical zones in order to ensure representation of the whole District.Morogoro Municipal was divided into four zones where in each zone ADDOs were picked randomly to obtain the required sample size. Kilosa and Kilombero were divided into 2 big zones where the ADDOs required were obtained.A total of 220 ADDOs were visited for Questionnaire interview. (Same number as the sample size)

Stage 4: Selection of the study participants for Questionnaire interview

In each ADDO only one participants was selected for study.In ADDOs where more than one participants werefound dispensing, one of them was picked randomly using lottery method.About 81% of the ADDOs selected to be visited had only a single drug dispenser.

3.5.1 Selection of ADDO dispensers for Simulated Client Method

Step 1: Obtaining the number of ADDOs for SCM

Of the total ADDOs selected 30% of them (66 ADDOs) were used for SCM visits. Previous similar studies have reported different proportions of the total sample size for Simulated Client Method. Kibassa, (2005) in his Thesis used 30% of the total sample size while Hetzel *et al*., 2007, used 20% of the total sample size for simulated client method.

Step II: Selection of ADDOs for study visit

Equal number of ADDOs was taken from each District of study; that means 22 ADDOs in each District.A list of ADDOs selected previously from each District was used. A simple random technique using lottery method was applied to obtain the ADDOs to be visited by simulated clients.To ensure representation in the District the Zones used in selection of ADDOs during questionnaire interview was also used in this aspect.

Step III: Selection study participants in SCM

A dispenser involved in questionnaire session was also involved unknowingly to SCM.To avoid confusions and inconviniences only those ADDOs with a single Dispenser were used in SCM.The simulated clients had malarial case scenario with them which would help to assess dispensing practise in these ADDOs. Detailed discussion on this scenario will be seen on part of Data collection technique.

3.6.0 Data collection techniques

3.6.1 Recruitment and Training*:*

Three research assistants were recruited one at each District of study; basing on their knowledge on ADDO activities and acceptance of the budget available, and experience on geographical location of the ADDOs. A half day training was conducted for each assistant on the following: Objectives of the study, data collection process, selection criteria, obtaining consent, interview skills, using questionnaire, recording responses and assuring confidentiality.

3.6.2 Data collection tools and Techniques

3.6.2.1 A structured questionnaire consisting both closed and open ended questions was used to collect information from the dispensers available at the selected ADDOs. Questions were written in English and afterwards translated in to Kiswahili language in order to ensure clear understanding of the participants. Interview was done to each dispenser privately in Kiswahili language. The questionnaire had three sections which include socio demographic characteristics, Knowledge of dispensers on both uncomplicated malaria and severe malaria and reported dispensing practises.

Socio demographic characteristics:

This section generated the socio demographic factors which influenced the knowledge and practise of ADDO dispensers on management of malaria. The variable involved were Age (in years), Gender, level of education, Cadre, and working experience. This part also assessed whether the dispenser attended the 6 weeks TFDA course for quality dispensing practises.

Knowledge section:

This section included the questions that measured the knowledge of the ADDO dispensers on presenting symptoms of uncomplicated and severe malaria. The dispensers were assessed for symptoms of malaria in children and adults. An interviwee had the questionnaire with several questions which had multiple correct responses on malaria symptoms. A question answer session was carried out in such a way that if the dispenser gave any of the listed correct response he/she was awarded one point. Probing and question repeat was done to make sure they understood the question and remembered the responses and those who gave incorrect response or failed to answer the question a zero point was awarded. All scores were summed up on analysis using SPSS computer programme; and categories was set as follows:-

For uncomplicated malaria the questions had 7 responses and scores were set as hereunder:

Type of malaria	**Scores of correct responses**	**Knowledge level**
Uncomplicated malaria	1 through 2 correct symptoms	Low knowledge
	3 through 5 correct symptoms	Moderated knowledge
	6 though 7 correct symptoms	High knowledge

For severe malaria the questions had 8 correct responses and scores were set as hereunder:-

Type of malaria	**Scores of correct responses**	**Knowledge level**
Severe malaria	1 through 2 correct symptoms	Low knowledge
	3 through 4 correct symptoms	Moderated knowledge
	5 though 8 correct symptoms	High knowledge

NB: Zero score was not considered in this category for no ADDOdispenser was unable to respond to even a single symptom.

Reported practises

This section included the questions which assessed the daily dispensing practises of the dispensers on Artemether-Lumefantrine,which is currently allowed to be sold in ADDOs at subsidized prices.The questions assessed reported practises with regard to indications and contraindications of ALu, counselling on the uses of the medication and referral habits in case of no improvements. It also assessed alternative antimalarials to ALu preferred by clients in ADDOs and measures advised to clients to prevent malaria in community.

Ant malarial stocking and guidelines available

A checklist was prepared as part of the questionnaire to assess the types of ant malarial currently stocked in ADDOs. It also used to collect information on available guidelines, dose indicator sheets, Themometer, weighing scale and referral forms.

3.6.2.2 Simulated Client Method (SCM) was used to access the actual behaviour and practise of the ADDO dispensers with regard to provision of the services on management of malaria. It concentrated on the aspects like proper history taking, instructions and information given to the client after dispensing ant malarial drug. The principal researcher (simulated client) with fictitious case scenarios of malaria visited the selected ADDOs requesting for ant malarial medication. A specific record sheet containing the information regarding the drug, questions and advice was developed. The simulated client was required to fill the sheet not more than 15 minutes after leaving the particular ADDO store, in order to minimize recall bias.

The simulated client Method has been frequently used to assess practise in both low and high income countries (Weiss et al., 2010, Madden et al., 1997). Simulated Client Method is practical and consistent way to measure actual practises and has become increasingly common throughout the world (Chuc, 2002)

In Tanzania SCM has been used in several studies done in private pharmacies to assess the practise of the drug dispensers on artemisinin monotherapies (Kibassa , 2005), also to assess the practise of dispensers on non adherence to prescriptions on dispensing antibiotics (Makanzo, 2009) and practise on management of malaria and other childhood illness in drug stores (Nsimba, 2007).

Data collection procedure:

The principal investigator and three assistant's one at each District of study participated in data collection. Before commencement of the study training was conducted to research assistants on what the study was all about and its purpose.The participants of the study were required to read, understand the written consent and sign before interview. The responses given were recorded on a questionnaire.The part of Simulated client method was done by the Principal investigator in order to avoid bias on simulation.Other research assistants participated in Questionnaire interview sessions.

3.6.3 Pre-testing of instruments

Pretesting of questionnaire was done in few selected ADDOs in Morogoro Municipal. This was aimed at checking if the questionnaire was well understood and whether the sequence of questions was logical. A brief discussion with research assistant participating in pilot process was then held to make necessary modifications to the questionnaire, ready for data collection process.

3.7 Data management

All filled in questionnaires and checklists were manually checked daily for data completeness, and validity. Omissions and corrections were made as were found necessary. Data were entered into a computer, coded and analysed using using SPSS version 16.0 software. Data cleaning were done by running frequencies and cross tabulations. Frequencies of continuous and categorical variables, means and standard deviations of ages were calculated and cross tabulation to determine statistical associations were done.

Knowledge levels of **Low**, **Moderate** and **High** depending on the cutoff values set previously was **RECATEGORISED** in order to obtain Binary set of outcomes as hereunder:-

Knowledge levels	**New outcome variable**
Low	Insufficient knowledge
Moderate+High	Sufficient knowledge

This outcome variable was then used in cross tabulations in order to test for statistical associations between variables. Chi square and Fischer exact tests and p value at 5% significance level (two tailed test) were used to test statistical associations of the variables. The variable that were found to be significant at $P<0.05$ from bivariate analysis were entered into a logistic regression model.Backward stepwise (Likelyhood ratio) method was used to obtain significant variable upon granting Odds ratio and 95% confidence intervals.

Dependent and Independent Variables

Dependent variable:

- Knowledge of malaria symptoms
- Proper dispensing practises

Independent variables:

- Socio-demographic characteristics
- TFDA training
- Work experience
- Presence of essential guidelines for references

3.8 Ethical consideration

The ethical clearance for this study was sought from Research and Publication Committee of MUHAS. A letter for permission to conduct study at these private drug stores was sought from the MOHSW through Pharmacy Council. The permission to conduct study in Morogoro Region was sought from all levels of administration concerned. In order to get informed consent, the participants were told the objectives of the whole study and how the data collected will be of used. Those who agreed after knowing the aim of the study were enrolled in the study and those who disagreed on voluntary basis were excluded from the study. Confidentiality of the answers to questions given in the course of study was kept throughout the study period and names of the participants were not used in questionnaires. Refusal to participate in this study did not affect them in anyway.

CHAPTER FOUR

4.0 RESULTS:

4.1 Socio-demographic characteristics of the study participants

Table 1 shows the demographic characteristics of the study participants. In total, 220 dispensers were recruited in study and were involved in the interview session. The age of the dispensers ranged from 19 years to 72years with the mean age of 33.29±10.85 years. About 65% of them are in age group of 19 to 34 years.Female account for about 90% of the total participants.Majority of dispensers (39.1%) was recruited from Kilosa District. More than half (54 %) of them had attained secondary and post secondary education while the rest had primary education. The large majority (93.6 %) were Nurse Assistants (Attendants). The work experience of the majority (54%) was five years and above.

Table 1: Socio-demographic characteristics of the drug dispensers (N=220)

Variable	Descriptions	Frequency	%
Age group(Years)	<35	144	65.5
	35-44	52	23.6
	45+	24	10.9
	Total	220	100
Sex	Male	22	10
	Female	198	90
	Total	220	100
Education level	Primary level	102	46.4
	Secondary level	115	52.3
	Post secondary	3	1.4
	Total	220	100
Cadre(profession)	Nurse Assistants(Attendants)	206	93.6
	Nurse officers	9	4.1
	Clinical officers	3	1.4
	Pharmaceutical assistants	2	0.9
	Total	220	100
Adress of drug dispensers	Morogoro Municipal	59	26.8
	Kilosa	86	39.1
	Kilombero	75	34.1
	Total	220	100
Working experience in Drug outlets	< 5 years	101	45.9
	5+Years	119	54.1
	Total	220	100

Table 2: Proportion of the dispensers who trained TFDA special course in Districts visited (N=220)

TFDA course	Municipal	Kilosa	Kilombero	Total
Yes	56(30.3)	74(40)	55(29.7)	185(100)
No	3(8.6)	12(34.3)	20(57.1)	35(100)
Total	59(26.8)	86(39.1)	75(34.1)	220(100)

From table 2 above; more than 80% of the dispensers who were found working in ADDOs during study period have had trained a TFDA course for good dispensing practices. Kilosa District was found to have more dispensers who trained with TFDA.

4.2. Knowledge of malaria symptoms

Table 3: Knowledge on symptoms of malaria in children < 5 years (N=220)

	Uncomplicated malaria	Severe malaria
Knowledge levels	n(%)	n(%)
Low	24(10.9)	70(31.8)
Moderate	170(77.3)	137(62.3)
High	26(11.8)	13(5.9)
Total	220(100)	220(100)

From the table3 above; More than 60% of the dispensers interviewed have the moderate knowledge on malaria in children aged below 5 years

Table 4: Knowledge of symptoms of malaria in children >5 years and Adults (N=220)

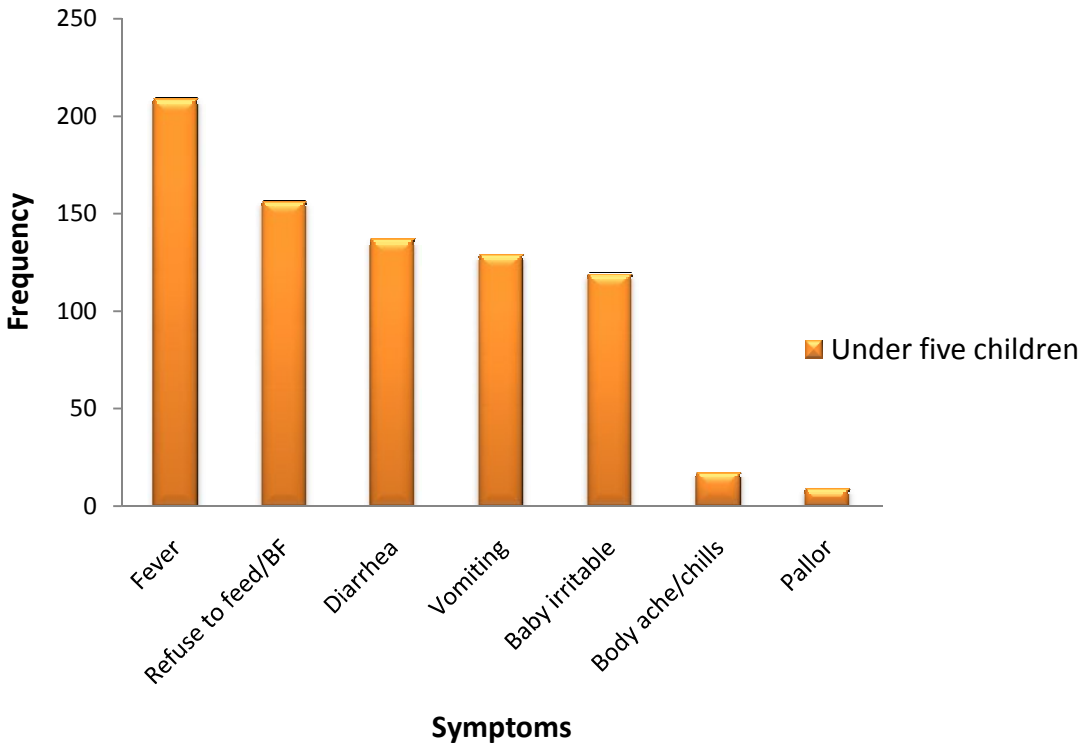
	Uncomplicated malaria	**Severe malaria**
Knowledge levels	**n(%)**	n(%)
Low	19(8.6)	77(35)
Moderate	150(68.2)	125(56.8)
High	51(23,2)	18(8.2)
Total	220(100)	220(100)

From table 4 above: Above 65% of the dispensers interviewed had moderate knowledge on symptoms of uncomplicated malaria in >5 years children and Adults. However only about 57% of them had moderate knowledge on symptoms of severe malaria on the same group.

The commonly reported symptoms of uncomplicated malaria in Children

Figure 1 show; Fever (95%), refusal to feed (70.9%), diarrhea (62.3%) and vomiting (58.6%), were the most commonly reported symptoms of uncomplicated malaria while pallor (4.1%) was the least reported.

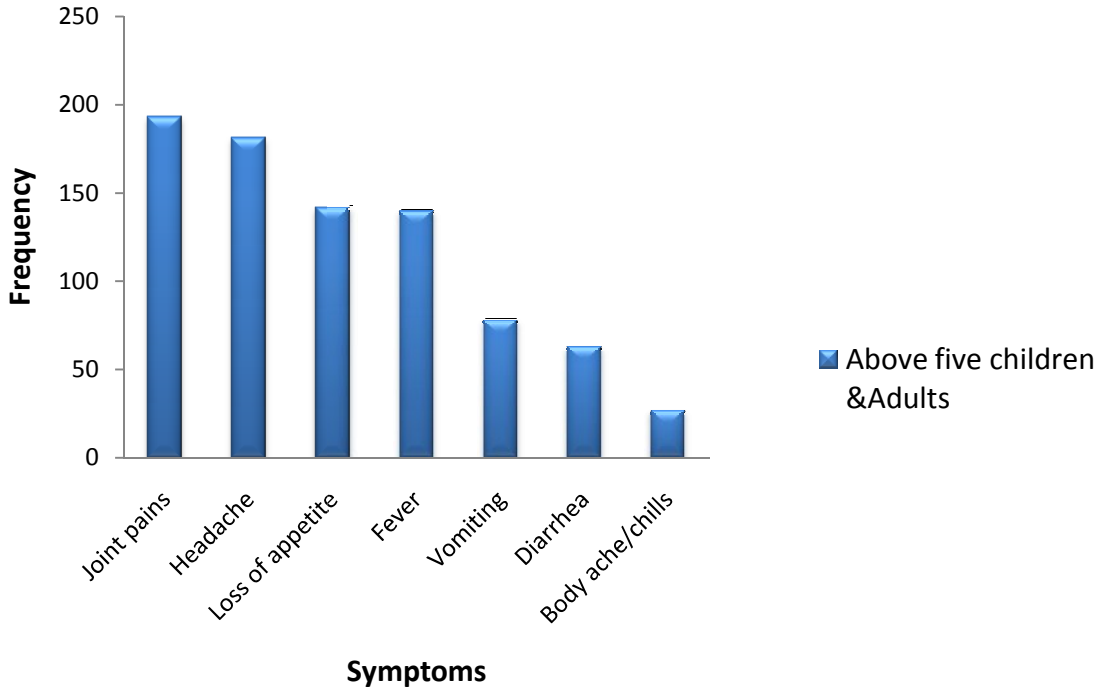
Figure 1: Frequency distribution of commonly reported symptoms of uncomplicated malaria in underfive children



The commonly reported symptoms of uncomplicated malaria in Adults (N=220)

Figure 2 shows; Joint pains (87.7%), Headaches (82.3%), Loss of appetite (64.5%) and fever (63.6%) were the most frequently reported symptoms.

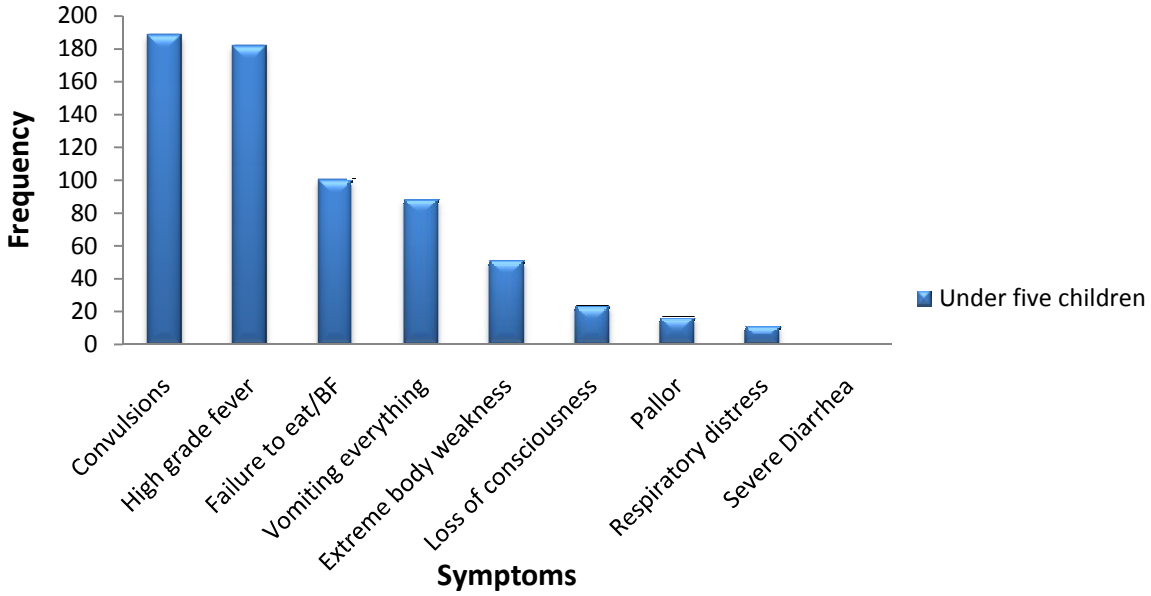
Figure 2: Frequency distribution of commonly reported symptoms of uncomplicated malaria in Adults



The commonly reported symptoms of severe malaria in Children (N=220)

Figure 3 shows; Convulsions (85.4%) and High grade fever (82.7%) and were the most symptoms mentioned.

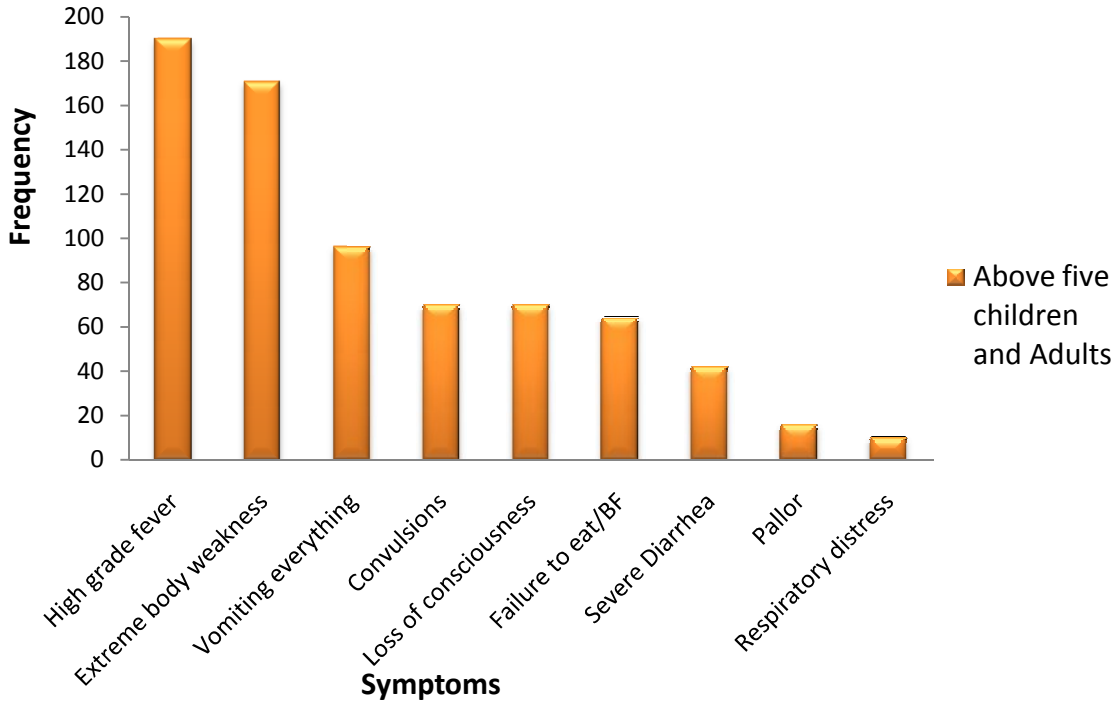
Figure 3: Frequency distribution of the commonly reported symptoms of severe malaria in children



The commonly reported symptoms of severe malaria in Adults (N=220)

Figure 4 shows; High grade fever (86.4%) and extreme body weakness (77.7%) were the commonly reported symptoms for severe malaria.

Figure 4: Frequency distribution of commonly reported symptoms of severe malaria in Adults



4.3 Types of antimalarial drugs stocked in ADDOs

Table 5**:** The types of ant malarial drugs available in ADDO's (N=220)

Characteristics	All Districts combined	**Antimalarial stocking by Districts**		
Antimalarial Medication	N(%)	Morogoro Municipal n(%)	Kilosa n(%)	Kilombero n(%)
Artemether-Lumefantrine	220(100)	59(26.8)	86(39.1)	75(34.1)
Sulfamethoxipyrazine-Pyrimethamine(Metakelfin)	220(100)	59(26.8)	86(39.1)	75(34.1)
Sulfadoxine-Pyrimethamine(Oroder)	217(98.6))	58(26.8)	86(39.6)	73(33.6)
Quinine	207(94.1)	49(23.7)	86(41.5)	72(34.8)
Amodiaquine	202(91.8)	50(24.8)	79(39.1)	73(36.1)
Dihydroartemisinin/Piperaquine phosphate(Duo-cotexin)	63(28.6)	27(42.9)	20(31.7)	16(25.4)
Artemisinin/Pyperaquine(Artequick)	31(14.1)	12(38.7)	10(32.3)	9(29)
Sulfamethoxipyrazine/Pyrimethamine +Artesunate(Co-malafin)	29(13.2)	19(65.5)	7(24.1)	3(10.3)
Artemether-Naphthoquine(ARCO)	14(6.4)	7(50)	4(28.6)	3(21.4)
Artemether Inj.	9(4.1)	6(66.7)	0(0)	3(33.3)

Table 5 above shows; All (100.0%) of the ADDOs visited had a stock of Artemether – Lumefantrine and Sulfamethoxipyrazine-Pyrimethamine (Metakelfin). Other antimalarial which were also found in ADDOs include Sulfadoxine-Pyrimethamine (98.6%) Amodiaquine (91.8%) and Quinine (94.1%).Other ACT's apart from ALu were found stocked in more proportion in Morogoro Municipal as compared to the other two Districts visited.

Table 6: The proportion of essential supplies available and adhered to in ADDOs (N=220)

	All 3 Districts combined	Essential supplies by District		
Essential supplies available	**N(%)**	**Morogoro Municipal n(%)**	Kilosa n(%)	Kilombero n(%)
TFDA Training manual	171(77.7)	53(31)	71(41.5)	47(27.5)
National malaria guideline	2(0.9)	19(50)	1(50)	0(0)
Dose indicator sheets for ALu	86(39.1)	3(3.5)	53(61.6)	30(34.9)
Referral form	67(30.5)	2(3)	42(62.7)	23(34.3)
Weighing scale	39(17.7)	14(35.9)	13(33.3)	12(30.8)
Thermometer	41(18.6)	18(43.9)	15(36.6)	8(19.5)

Table 6 above shows; More than three quarters (78.0%) of the ADDOs had the TFDA training manual; less than half of the ADDOs had dose indicator sheets (39.1%) and referral forms (30.5%). Compared to the other two Districts visited for study Kilosa was found to have more proportion of TFDA training manuals, Dose indicator sheets for ALU and referral forms.

4.4 Dispensing practises in ADDOs

In aggregate Artemether /Lumefantrine (96%) and S.P (95%)were dispensed in ADDOs in almost equal proportion.However in individual drug regime Sulfamethoxipyrazine/Pyrimethamine was dispensed the second(55%) from ALu,then followed by Sulfadoxine Pyrimethamine(40%)

Figure 5: Percentage distribution of commonly dispensed(sold) antimalarials as reported in ADDOs

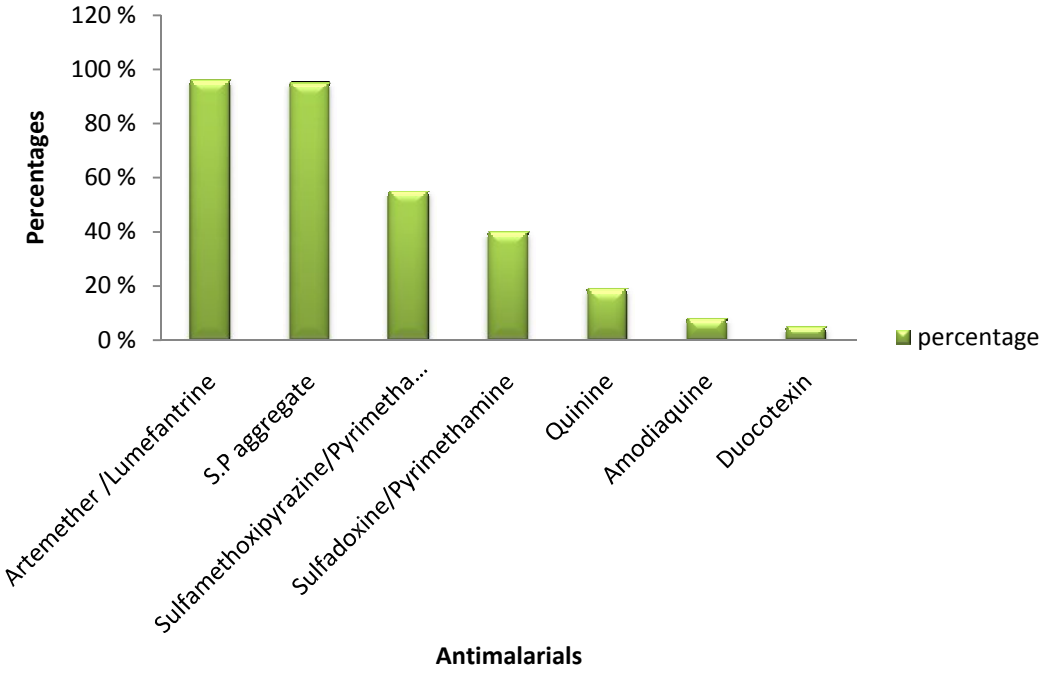


Table 7: The proportion of drug dispensers who stated correctly dosage of Artemether-Lumefantrine (N=220)

Dose according to body weight		
Dispensers correct responses:	N	%
< 5kg infant (up to3 months)		
I will not give ALu	151	68.6
5-15 kg (3month-3 years)		
I will give 1 tablet(total dose 6)	189	85.9
15-25 kg(3-8 years)		
I will give 2 tabs(total 12)	213	96.8
25-35 kg(8-12 years)		
I will give 3 tabs(total 18)	205	93.2
35+kg(12+years)		
I will give 4 tabs(total 24)	213	96.8
Pregnant woman(first trimester)		
I will not give ALu	172	78.2

Table 7 above shows; More than 85% of the dispensers stated correctly appropriate ALu dosage in different age groups;except for the responses in special groups(first trimester pregnant women and children of body weight <5kg) where response was less than 80% of the dispensers.

Table 8: The proportion of dispensers who stated correctly indications and contraindication of Artemether-Lumefantrine (N=220)

Indications of taking ALu	Number	%
Malaria by clinical presentations	216	98.2
Malaria after laboratory test	8	3.6
Whoever with Dr's prescription	7	3.2
Contraindications of taking ALu	N	%
First trimester pregnancy	175	79.5
A child with < 5kg body weight	148	67.3
Drug(ALU) reaction	85	38.6
Unimproved within 14 days of correct ALu administration	7	3.2
Severe form of malaria	73	33.2

From table 8; above sixty percent of the total dispensers knew that ALu was contraindicated in first trimester of pregnancy (79.5%) and children below 5 kilograms of body weight (67.3%). Other contraindications to ALu which were mentioned by less than forty percent of the dispensers were drug hypersensitivity (38.6%) and severe form of malaria (33.2%)

Table 9: Client counseling practices reported by the drug dispensers in ADDOs (N=220)

	Client counselling practises	Frequency	
	Dispensers responses	N=220	%
A: On Artemether -Lumefantrine use			
1	Advice on dose schedule	204	92.7
2	Advice on Importance of fatty meals before medication	173	78.6
3	Advice on importance of dose completion	94	42.7
4	Counsel on repeat dose if vomited 30min. after drug administration	4	1.8
B: What to do if no improvement			
1	Advice to go to nearby health facility	214	97.3
2	Advice to come back to the shop for alternative medication	6	2.7
C: On malaria prevention strategies			
1	Advice on ITN's use	220	100
2	Advice on environmental management	126	57.3
3	Advice on use of mosquito repellants/sprays	29	13.2
4	Advice on S.P prophylaxis for pregnant women	5	2.3

Table 9 shows; Majority of the dispensers 204(92.7%) reported to advice the clients on how to use Artemether-Lumefantrine; and 173(78.6%) counseled on importance of fatty meals before administering the medication.

In case of no improvement with Alu 214(97.3%) of total dispensers would prefer to advice the clients to go to the nearby health facility. Only few (2.7%) would advice the clients to come back to the ADDO for alternative medication in case of no improvement.

On malaria preventive strategies all drug dispensers interviewed [220(100%)] reported to advice the clients with malaria to use ITNs to protect them from future mosquito bites while 126(57.3%) advised them on environmental management.

Table 10: Types of information sought from interviewer during Simulated client Method (N=66)

Expected information that dispenser was supposed to ask	**Yes**		**No**		**Total**
	n	%	n	%	N (%)
Asked on symptoms of malaria	47	71.2	19	28.8	66(100)
Asked about duration of the symptoms	32	48.5	34	51.5	66(100)
Asked about symptoms of related diagnoses	6	9.1	60	90.9	66(100)
Asked about prior treatment at health facility	24	36.4	42	63.6	66(100)
Asked about prior laboratory test for malaria	35	53	31	47	66(100)
Asked about prior antmalarial drug taken	41	62.1	25	37.9	66(100)
Asked about any antmalarial drug reaction	11	16.7	55	83.3	66(100)
Advised on use of antimalarial drug as per client preference	30	45.5	36	54.5	66(100)
Advised on alternative ant malarial drug to Artemether-Lumefantrine	34	51.5	32	48.5	66(100)
Advised on correctness of dosage	64	97	2	3	66(100)
Advised on importance of fatty meals on using ALU	63	95.5	3	4.5	66(100)
Malaria preventive advice given	10	15.2	56	84.8	66(100)

Table10 above shows; A total of 66 dispensers were assessed by a SCM; more than two thirds (71.2%) asked about symptoms of malaria in the simulated client with malaria and about a half (53.0%) asked about prior laboratory test , less than a half (48.5%) asked about the duration of symptoms and, about a third (36.4%) asked about prior antimalarial treatment.

Only a small percentage (6%) bothered to look for the differential diagnoses of malaria. About 62% of the dispensers visited by simulated clients asked them about prior antimalarial drug taken at home and only 16.7% asked about hypersensitivity reaction accompanied with antimalarial drugs**.**

Despite the fact that 51.5% of the total dispensers agreed to dispense antimalarial drugs as per recommendation of the National Malaria guideline; 45.5% of the total agreed to dispense antimalarial as per client choice/preference.

51.4% advised on alternative medication to ALu for treatment of uncomplicated malaria. On counseling of drug use 97% of dispensers advised the clients correctly on dosage (being ALu or S.P), 95.5% of dispensers were able to advice on fatty meals before use of Artemether-Lumefantrine; however only 15.2% remembered to give malaria preventive advice to clients

4.5 Bivariate analysis: Factors affecting dispenser's knowledge levels

Table 11: Association between Dispensers' characteristics and knowledge levels of uncomplicated malaria in children (N=220)

Variables		**Knowledge levels**				
	Options	**Insufficient N (%)**	**Sufficient N (%)**	**Total N (%)**	**Test**	**P-Value**
Age group(Years)	<35	15(10.4)	129(89.6)	144(100)	Chi	
	35+	9(11.8)	67(88.2)	76(100)	square	0.8
Sex	Male	5(22.7)	17(77.3)	22(100)	Fisher's	0.07
	Female	19(9.6)	179(90.4)	198(100)	exact	
Level of Education	Primary level	9(8.8)	93(91.2)	102(100)	Chi	0.4
	Secondary level	15(12.7)	103(87.3)	118(100)	square	
Cadre	Nurse Attendants	21(10.2)	185(89.8)	206(100)	Fisher's	0.2
	Other Cadres	3(21.4)	11(78.6)	14(100)	exact	
TFDA training	Yes	15(8.1)	170(91.9)	185(100)	Fisher's	0.005
	No	9(25.7)	26(74.3)	35(100)	exact	
Working experience(Years)	< 5 years	15(14.9)	86(85.1)	101(100)	Chi	0.08
	5+ years	9(7.6)	110(92.4)	119(100)	square	
	Total	**24(10.9)**	**196(89.1)**	**220(100)**		

The table above shows; Attending TFDA training course (p=0.005) was statistically associated with dispensers' sufficient knowledge of uncomplicated malaria in children.

Table 12: Association between dispensers' characteristics and knowledge levels of Severe malaria in children (N=220)

Variables		Knowledge levels				
	Options	**Insufficient N (%)**	**Sufficient N (%)**	**Total N (%)**	**Test**	**P-Value**
Age group(Years)	<35	48(33.3)	96(66.7)	144(100)	Chi	0.5
	35+	22928.9)	54(71.1)	76(100)	square	
Sex	Male	8(36.4)	14(63.6)	22(100)	Chi	0.6
	Female	62(31.3)	136(68.7)	198(100)	square	
Level of Education	Primary level	28(27.7)	74(72.5)	102(100)	Chi	0.2
	Secondary level	42(35.6)	76(64.4)	118(100)	square	
Cadre	Nurse Attendants	65(31.6)	141(68.4)	206(100)	Fisher	0.7
	Other Cadres	5(35.7)	9(64.3)	14(100)	's exact	
TFDA training	Yes	48(25.9)	137(74.1)	185(100)	Chi	0.00
	No	22(62.9)	13(37.1)	35(100)	square	
Working experience(Years)	< 5 years	40(39.6)	61(60.4)	101(100)	Chi	0.03
	5+ years	30(25.2)	89(74.8)	119(100)	square	
	Total	**70(31.8)**	**150(68.2)**	**220(100)**		

The table above shows; Attending TFDA training (P=0.00) and working experience of 5 years and above (p=0.03) respectively, were statistically associated with dispensers' sufficient knowledge of of severe malaria in children.

Table 13: Association between Dispensers' characteristics and knowledge levels of uncomplicated malaria in Adults (N=220)

Variables		**Knowledge levels**				
	Options	**Insufficient N (%)**	**Sufficient N (%)**	**Total N (%)**	**Test**	**P-Value**
Age group(Years)	<35	12(8.3)	132(91.7)	144(100)	Chi	1.0
	35+	7(9.2)	69(90.8)	76(100)	square	
Sex	Male	3(13.6)	19(86.4)	22(100)	Fisher's	0.4
	Female	16(8.1)	182(91.4)	198(100)	exact	
Level of Education	Primary level	10(9.8)	92(90.2)	102(100)	Chi	0.6
	Secondary level	9(7.6)	109(92.4)	118(100)	square	
Cadre	Nurse Attendants	17(8.3)	189(91.7)	206(100)	Fisher's	0.3
	Other Cadres	2(14.3)	12(85.7)	14(100)	exact	
TFDA training	Yes	14(7.6)	171(92.4)	185(100)	Fisher's	0.2
	No	5(14.3)	30(85.7)	35(100)	exact	
Working experience(Years)	< 5 years	14(13.9)	87(86.1)	101(100)	Chi	0.01
	5+ years	5(4.2)	114(95.9)	119(100)	square	
	Total	**19(8.6)**	**201(91.4)**	**220(100)**		

The table above shows; working experience of 5 years and above in drug outlets was statistically associated with about 95% of dispenser's sufficient knowledge of uncomplicated malaria in Adults. (p=0.01)

Table14: Association between dispensers' characteristics and knowledge of Severe malaria in Adults (N=220)

Variables		Knowledge levels				
	Options	**Insufficient n (%)**	**Sufficient n (%)**	**Total N (%)**	**Test**	**P-Value**
Age group(Years)	<35	51(35.4)	13(59.1)	144(100)	Chi	0.8
	35+	26(34.2)	130(65.7)	76(100)	square	
Sex	Male	9(40.9)	13(59.1)	22(100)	Chi	0.6
	Female	68(34.3)	130(65.7)	198(100)	square	
Level of Education	Primary level	29(28.4)	73(71.6)	102(100)	Chi	0.06
	Secondary level	48(40.7)	70(59.3)	118(100)	square	
						0.8
Cadre	Nurse Attendants	73(35.4)	133(64.6)	206(100)	Fisher's	
	Other Cadres	4(28.6)	10(71.4)	14(100)	exact	
TFDA training	Yes	55(29.7)	130(70.3)	185(100)	Chi	0.00
	No	22(62.9)	13(37.1)	35(100)	square	
	< 5 years	42(41.6)	59(58.4)	101(100)	Chi	0.06
Working	5+ years	35(29.4)	84(70.6)	119(100	square	
experience(Years)				0		
	Total	**77(35)**	**143(65)**	**220(100)**		

The table above shows; TFDA training to dispensers (p=0.00), was statistically associated sufficient knowledge of severe malaria in adults as compared to those untrained.

4.6 Bivariate analysis: Factors affecting dispensers practise in ALu Dosage

Table 15: Association between dispensers' characteristics and indication of Alu in first trimester pregnancy (N=220)

Study variables	Options	ALu at first trimester				
		Contraindicated N (%)	Indicated N (%)	Total N (%)	Test	P – value
Age group(Years)	<35	107(74.3)	37(25.7)	144(100)	Chi-square	0.05
	35+	65(85.5)	11(14.5)	76(100)		
Sex	Male	20(91)	2(9)	22(100)	Fisher's exact	0.2
	Female	152(76.8)	46(23.2)	198(100)		
Level of Education	Primary level	81(79.4)	21(20.6)	102(100)	Chi-square	0.7
	Secondary level	91(77.1)	27(22.9)	118(100)		
Cadre	Nurse Attendants	159(77.2)	47(22.8)	06(100)	Fisher's exact	0.3
	Other Cadres	13(92.8)	1(7.2)	14(100)		
TFDA training	Yes	153(82.7)	32(17.3)	185(100)	Chi-square	0.000
	No	19(54.3)	16(45.7)	35(100)		
Working experience(Years)	< 5 years	73(72.3)	28(27.7)	101(100)	Chi-square	0.05
	5+ years	99(83.2)	20(16.8)	119(100)		
Total		**172(78.2)**	**48(21.8)**	**220(100)**		

The table above shows; having received TFDA training course (p=0.00) was statistically associated with dispensers' knowledge of ALu contraindication to first trimester pregnancy.

Table 16: Association between dispensers' characteristics and indication of Alu to children of body weight <5 kilograms (N=220)

Study variables	Options	ALU to <5 Kg body weight				
		Contraindicated N (%)	**Indicated N (%)**	**Total N (%)**	**Test**	**P – value**
Age group(Years)	<35	92(63.9)	52(36.1)	144(100)	Chi	0.04
	35+	59(77.6)	17(22.4)	76(100)	square	
Sex	Male	15(68.2)	7(31.8)	22(100)	Chi	0.9
	Female	136(68.7)	62(31.3)	198(100)	square	
Levelof	Primary level	77(75.5)	259(24.5)	102(100)	Chi	0.04
Education	Secondary level	74(62.7)	44(37.3)	118(100)	square	
Cadre	Nurse Attendants	140(68)	66(32)	206(100)	Fisher's	0.6
	Other cadres	11(78.6)	3(21.4)	14(100)	exact	
TFDA	Yes	140(75.7)	45(24.3)	185(100)	Chi	0.000
training	No	11(31.4)	24(68.6)	35(100)	square	
Working	< 5 years	62(61.4)	39(38.6)	101(100)	Chi	0.03
experience(Years)	5+ years	89(74.8)	30(25.2)	119(100)	square	
Total		**151(68.6)**	**69(31.4)**	**220(100)**		

The table above shows; Dispensers age of 35 years and above (p=0.04); Attending TFDA training (p=0.00) and working experience of 5 years and above (p=0.03) even if a dispenser has primary level education (p=0.04) were statistically associated with dispensers' knowledge of ALu contraindication to children of <5 kilogram body weight.

4.7 Multivariate analysis

Table 17: Multivariate analysis of factors affecting dispenser's knowledge on uncomplicated malaria symptoms

	U 5 children	Adults
Independent Variables	AOR(95%CI)	AOR(95%CI)
Sex of the dispenser		
Female	2.80(0.90,8.77)	
Male	1.0	
Received TFDA course		
Yes	3.95(1.55,10.06)	1.34(0.43,4.20)
No	1.0	1.0
Work experience		
<5 years		1.0
5+ years		3.67(1.27,10.57)

From the table above, If other variables are kept constant, those who received TFDA training were 3.9 (CI; 1.5 – 10.1) times more likely to correctly identify symptoms of uncomplicated malaria in children as compared to dispensers who did not receive the training.

Table 18: Multivariate analysis of factors affecting dispensersknowledge on severe malaria symptoms

	U 5 children	Adults
Independent variables	AOR(95%CI)	AOR(95%CI)
Received TFDA course		
Yes	4.83(2.26,10.33)	4.0(1.88,8.51)
No	1.0	1.0
Level of education		
Primary level	0.82(0.45,1.50)	
Secondary level	1.0	
Work experience		
5+ years	1.42(0.76,2.63)	1.29(0.71,2.34)
<5 years	1.0	1.0

From the table above, If other variables are kept constant, those dispensers who, trained with TFDA were 4.8 (CI; 2.3 – 10.3) times more likely to correctly identify symptoms of severe malaria in children and 4.0 (CI; 1.9 – 8.5) times more likely to do so for severe malaria in adults, as compared to those who did not receave the training.

Dispensers with work experience of 5 years and above in drug outlets were 3.7 (CI; 1.3 – 10.6) times likely to identify the symptoms of uncomplicated malaria in adults as compared to those of experience below five years.

Table 19: Multivariate analysis of factors affecting dispenser's knowledge on indication of ALu in special groups (First trimester pregnant women&children with < 5kg body weight**)**

	Indication of ALu in first trimester pregnancy	Indication of ALu in Children <5kg body weight
Independent variables	AOR(95%CI)	AOR(95%CI)
Age		
35+ years	0.60(0.30,1.17)	0.60(0.30,1.17)
<35 years	1.0	1.0
Sex of the dispenser		
Female	0.78(0.27,2.29)	
Male	1.0	
Received TFDA course		
Yes	6.79(3.08,14.94)	6.79(3.08,14.94)
No	1.0	
Level of education		
Primary level		1.49(0.79,2.79)
Secondary level		1.0
Work experience		
5+ years	0.87(0.45,1.70)	0.93(0.48,1.80)
<5 years	1.0	1.0

From the table, TFDA course was significantly associated with awareness of ADDO dispensers to discover the contraindications of ALu to pregnant women at their first trimester and children below 5 kg body weight .If other variables are kept constant;those who received TFDA training were 3.1 (CI; 3.1 – 14.9) times more likely to be aware of the indications of ALu to first trimester pregnant women and 6.8 (CI; 3.1 – 14.9) times more likely to do so in contraindications of taking ALu to children of less than 5kg body weight.

CHAPTER 5

5.0 DISCUSSION:

5.1 Brief summary

This study has used the key indicators to assess the knowledge and everyday practises of the ADDO dispensers of Moprogoro Region. It has shown that the dispensers in ADDOs have better knowledge on picking malaria symptoms in children and adults.The reason identified from the positive findings of the study is that dispensers who received TFDA course regardless of their cadre in health,level of education have been able to bring about better outcomes in diagnosis and treatment of malaria.The study has also demonstrated that despite the fact that accessibility of ALu is 100% in ADDOs of MorogoroRegion ,the dispensing practises are still influenced by other antimalarial monotherapies present in market.This is a challenge on implementation of the current malaria treatment policy of Tanzania.The study has also been able to show that the majority of employee of ADDOs include the young generation of less than 35 years of age,of which 90% of them are female.This finding is also similar to previous survey (Ruta et al.,2009) where by about 90% of the dispensers employed in ADDOs of Morogoro and Ruvuma Region were women. The probable reason for this could be because the Nursing course especially in Tanzania is more or less a women course that is why most of them who trained one year course in Nursing were also trained by TFDA to handle drug dispensing activities in ADDOs.

5.2 Knowledge of Uncomplicated Malaria symptoms

If properly utilized, pharmacies and drug stores are expected to be the most reliable entry point for educating the patients on drug use especially in malaria risk groups such as pregnant women. (Kamuhabwa et al. 2011). Since the presentation of malaria differ in children below five years of age and those above five years and adults for obvious reasons the classification of knowledge in this study was also stated basing on these categories.

As far as the cut off points set forth are concerned, more than three quarter of the dispensers interviewed in this study had sufficient knowledge on uncomplicated malaria symptoms in children.This is contrary to the previous study (Kibassa, 2005) done in pharmacies of Dar es Salaam where by the knowledge of the dispensers on malaria presentation in children was found to be only 53%. Fever was mentioned as the most common symptom of presentation of uncomplicated malaria in children for about 95% of the dispensers interviewed .This is supported by previous studies in Nigeria(Oladipo et al., 2013) where by fever was the leading symptom of presentation (91%) to children who were found with positive blood slide for malaria parasites. For the adults, the study has shown that about 68% of the dispensers had the moderate knowledge and only 23% had high knowledge on uncomplicated malaria in children of age more than five years and adults.Headache and joints pains were the most common reported symptoms of malaria presentation in adults reported by more than 80% of the dispensers in this study. The findings were similar to those of the study conducted in pharmacies of Dares Salaam (Kibassa, 2005) Most of these adults made their self diagnosis through these particular symptoms and flu like symptoms and they just reported to ADDOs for seeking antimalarial medication. Fever has been implicated as the symptom of malaria in most parts of tropical Africa where the burden of malaria is greatest and where severe disease and mortality is confined to children less than five years of age. One of the reasons for presumptive treatment is the fear of rapid mortality of untreated malaria, especially in young children (Oladipo et al., 2013).The intergrated Management of childhood illness (IMCI)recommends that fever can be used as screening diagnostic test during peak malaria seasons even in areas little as 5% of febrile children actually have parasites on blood smear(Bloland et al., 2003) However the clinical presentation of malaria is highly variable and overlaps with that of a number of other common illnesses, including pneumonia, which is associated with significant morbidity and mortality [Berkley et al., 2005].Therefore Presumptive management of fevers and/or other suspected symptoms of malaria, as malaria results in significant overdiagnosis and overtreatment, and possible missed opportunities to detect and treat other causes of febrile illnesses in children(PMI-MOP, 2011).

5.3 Knowledge of severe malaria symptoms

Severe Plasmodium falciparum malaria is a medical emergency. Delay in diagnosis and provision of appropriate treatment may lead to serious complications and even death. (MOHSW, 2006).Anaemia and cerebral malaria are the commonest presentation of severe malaria in Tanzania.They cause high morbidity and mortality associated with malaria especially in young children and pregnant women(MOHSW, 2006).

The aim of TFDA dispenser training on malaria was for early diagnosis and treatment of malaria in order to prevent the occurrence of disease complications. Therefore, if a severe form of malaria patient is reported to the ADDOs the dispenser must be able to make a quick diagnosis, give appropriate antipyretic and refer immediately to the next level of care where proper management will be done (MOHSW, 2008).

In this study the knowledge of dispensers on severe malaria was not satisfactory in both children and adults depending on the cut off points set forth for knowledge scale assesment.Sixty two percent of the dispensers had moderate knowledge for severe malaria in children and fifty seven percent in adults respectively.Only 6% of the total dispensers had high knowledge on severe malaria in children and so does 8% in adults respectively.

This is a slight improvement in ADDOs contrary to the finding on the study conducted in pharmacies (Kibassa, 2005) and in rural part two drug outlets (Hetzel et al., 2008). This slight improvement calls for continuous education package for dispensers to improve their knowledge because without knowledge updates with time in these dispensers who read very little; knowledge decay will be an obvious finding. Education as an intervention has proved to be useful in improving the knowledge of the drug dispensers in pharmacies and drug outlets.In the study to improve private pharmacy practise in Vietnam there were a significant improvement in management of acute respiratory infection in children before and after intervention (11% to 30% correctly managed) as compared to control pharmacies which dropped from 10% to 7% (Chuc, 2002).

High grade fever (86%) appeared in this study as the common symptom of severe form of malaria in both children and adults.

This is not surprising in Tanzania and other malaria endemic zones; as several studies done elsewhere have shown that study participants mentioned fever as the most common symptom of malaria.As for the dispensers knowing this symptoms is a credit for they will refer the patients earlier for early confirmation of the diagnosis in health facilities.

Convulsions (85%) was commonly mentioned symptom of severe malaria in children while extreme body weakness (78%) was mentioned commonly in adults with severe form of malaria.Contrary to the previous study (Kibassa 2005) in which convulsion was mentioned by only 6% of the pharmacy dispensers; in this study 86% of the dispensers were able to mention convulsion as the most common danger sign to children brought for care in ADDOs. Convulsion is one of the general danger signs used by IMCI practitioners in children who need to be refered urgently to the hospital.The reason as to why this symptom was highly reported in ADDOs is probably the fact that most dispensers in ADDOs of Morogoro Region participated in IMCI training course offered at their Region, thus they were taught of the general danger signs.

Other signs include unable to eat or breastfeed, vomiting everything and lethargic or loss of consciousness (MOHSW, 2012). Anaemia presentationwas also assessed in this study.Signs of respiratory distress were mentioned by only about 5% of the dispensers, and only 7% of the dispensers mentioned pallor regardless of the degreeas an indicator of anaemia in severe form of malaria.Since anaemia is the most common cause of death in persons with severe form of malaria especially children; these results are not satisfactory.Therefore continuous education /retraining is needed to update the drug dispensers on malaria diagnosis and complications.

5.4 Antimalarial drugs stocked in ADDOs

The delivery of subsidized ACTs through ADDOs was viewed as perhaps the best approach to home-based management of malaria in Tanzania as affordable and quality malaria medicines are supplied close to rural communities and where the public health facilities cannot afford to offer services (Ruta et al., 2008)

This study has actually proved the success of the National Malaria Control programme goal to increase accessibility of Artemether –Lumefantrine to ADDOs and other private health sectors

in a subsidized prize. All of the outlets visited in this particular study in Morogoro Region were found stocking Artemether-Lumefantrine.This shows accessibility of ALu by 100% compared to the previous study where assessment of the pilot programme in Morogoro and Ruvuma Regions showed the accessibility of at least one type of subsidized ACT in ADDOs was 73% on average (Ruta et al., 2008).

The policy change to increase accessibility of affordable ACT in private sectors and ADDOs was also accompanied with the strategy to remove artemisinin- monothereapies and other monotherapies from the market because of the prior reports of resistances.There were no artemisinin monotherapies found in ADDOs in this study but other monotherapies were found in ADDOs in a significant proportion. S.P tablets and syrups; which included sulfadoxine/Pyrimethamine (Oroder) and Sulfamethoxipyrazine /pyrimethamine (Metakelfin, ekelfin, malafin) were found stocked in ADDOs for an average of 99%. Amodiaquine tabs and syrups were also found stocked in ADDOs for about 92% of the ADDOs visited. This is a serious challenge to promoting the use of ACTs in the community. The policy of Tanzania still allows S.P to be used by Pregnant women in Intermittent Preventive Treatment of Malaria (MOHSW,2006); however the extent of the S.P stocking in ADDOs reflects that these drugs are not only used for IPT purpose but also for treatment of uncomplicated malaria by other groups as well.Therefore there is a need for the MOHSW through pharmacy council to review the availability of the stock of monotherapies especially at the private health facilities focusing the source of these medication and make sure all abide by the recommendation of the National malaria diagnosis and treatment guideline.

Other ACTs apart from ALu were also found in in some ADDOs for an average of 16%, especially in those located in urban and peri urban areas.Their use is so limited to most people simply because of the price which range from six to ten thousands Tshs per dose. These included Dihydroartemisinin/ Pyperaquine phosphate (Duo-cotexin) by 29%, Artemisinin/ Piperaquine (Artequick) by14%, Sulfamethoxipyrazine / pyrimethamine + Artesunate (Co-malafin) by13% and Artemisinin / Naphthoquine (ARCO) by 6%

5.5 Avilability of essential Supplies

Sustainable management of malaria in ADDOs should be guided by the presence of tools which if adhered to may lead to the best practise. These include Report forms, standard operating procedures for ACT, dose indicator sheets, price indicator sheets,

TFDA and MOHSW malaria guidelines for reference, weighing scale (Ruta et al 2008).The training of TFDA to drug dispensers was also accompanied with supply of the training manuals, dose indicator sheets for ALu , referral forms, dispensing registers and report forms.The findings in this study was that TFDA training manual were missing in 22% of the drug outlets,Dose indicator sheets and Price indicator sheets for ALu were missing in about 61% of the ADDOs, and referral forms missing in about 70% of the total ADDOs visited. This was contrary to previous studies in ADDOs (Ruta et al, 2008) where the majority of ADDOs had drug registers, ACT quarterly report forms, ACT price and dose indicator sheets, and referral forms, though their use was a challenge. The missing of ALu dose indicator sheet, price list and referral forms in such high percentages calls for the MOHSW through programmes concerned to review the sustainability of the system which distribute these supplies. Other supplies also assessed include Weighing scale and Themometer which were missing on average of 82% of the total ADDOs visited.The presence of thermometer and weighing scale respectively in ADDOs is of importance for the purpose of diagnosing fever in a more scientifical way and give ALu to clients as per weight of the client instead of using age. Only 2(0.9%) ADDOs had the National malaria diagnosis and treatment guideline of 2006.These manual were not supplied to the ADDO shops by MOHSW .This study found it important to assess their availability for the purpose of informing the MOHSW to devise the way in which they can plan to distribute these guideline not only to public health facilities but also in private facilities including ADDOs so that all can follow the same National recommendations.The previous studies done in pharmacies of Dar es Salaam (Minzi et al., 2008), showed that the dispensers in private pharmacies had poor knowledge in ant malarial dosages as recommended in the guideline. The reason given for this was poor or non involvement of the private pharmacies on preparations and trainings on the new treatment guideline.Also in theMalaria country profiles of July 2011, the report from Tanzania showed that there were poor

supervision of the health facilities and adherence to the guidelines.This challenge hinders improvements of the quality of the health care delivery even in public and private health facilities in Tanzania.

5.6.0 Dispensing practices

5.6.1Types of antimalarial dispensed:

Despite the fact that the ADDOs stock multitudes of antimalarial drugs, still the recommendation of the National Malaria diagnosis and treatment guideline still remain the gold standard to be followed by all health care personnels.However in this study Artemether – Lumefantrine and S.P (sulfamethoxipyrazine /pyrimethamine & sulfadoxine /pyrimethamine were dispensed in almost equal proportion to people coming for care in ADDOs (96% for ALu and 95% for S.P).Further more even those willing to dispense ALu to their clients with uncomplicated malaria,were also willing to dispense S.P to their clients in case of stock outs of ALu.They were not ready to leave a client go to the other ADDOs for ALu which is lacking at their outlets.In the previous study conducted in private drug outlets in Muheza,Tanga showed that local brands of SP accounted for 74% of sales volume, compared to Amodiaquine (13%), Quinine (11%) and ACT (2%).The study showed that SP was best-selling, and use was not reserved for IPTp, as stipulated in the national anti-malarial policy(Ringsted et al., 2011). In areas where SP drug resistance remains high, unregulated SP dispensing to people other than pregnant women may lead to the risk of ultimately jeopardizing effectiveness of the IPT strategy (Ringsted et al., 2011)

5.6.2 Dosage of Artemether-Lumefantrine in ADDOs

In this study the ability of the dispensers to give correct dosage to their clients was good. On average 87% of the total dispensers in ADDOs reported to dispense ALU to clients of different age groups and weights in a correct way.However on part of drug contraindication to special groups eg pregnant women and children below 5 kilogram weight still leaves a room for improvement.

In this study about 22% also agreed to dispense Artemether –Lumefantrine to pregnant women at the first trimester. This is somehow an improvements in ADDOs compared to practices in pharmacies as stipulated in previous study done in Pharmacies of Dar es Salaam (Kamuhabwa et al, 2011). In the latter study about 33% of the dispensers were willing to dispense Artemether –Lumefantrine during the first trimester of pregnancy.

The knowledge gained from the TFDA training course has been significantly associated to dispensers awareness of the contraindications of ALu to first trimester pregnancy and children of less than 5 kg body weight.The previous studies have recommended that unless the benefits outweigh the risks artemisinin should not be used in the first trimester of pregnancy because of its teratogenic effects including foetal resorption (Clark et al., 2004). With regard to ALu in children, 32% of the dispensers in ADDOs were willing to dispense ALu to the neonates and infants of body weight 5 kilogram and below.

Since the safety and efficacy of Artemether-Lumefantrine to children of body weight below 5 kilograms has not yet been established, its use in this group is not recommended (MOHSW, 2006). Further more the studies_suggest that malaria in neonates is very rare and signs and symptoms resemble those of septicaemia in newborn.

Therefore if one is suspected, thorough examination must be done in hospital or health facilities equipped to do so, and if malaria diagnosis is made quinine is the drug of choice (MOHSW, 2006).The diagnosis of malaria in ADDOs is by clinical symptoms; and this is also the basis for dispensing Artemether –Lumefantrine and other antimalarials to clients. In this study, 98% of the dispensers stated to dispense Artemether-Lumefantrine after diagnosing malaria by clinical symptoms. These situations were obviously expected to happen in ADDOs as confirmation of malaria by rapid tests (mRDT) in Tanzania is done only from the level of Dispensary.

5.6.3 ALu administration counselling on adherence

Treatment of uncomplicated malaria with effective antimalarials is a cornerstone of malaria control efforts, providing individual benefits by curing infection and preventing disease sequelae, and even death; also preventing the community from infectious reservoir and thus averting emergence and spread of drug resistance (WHO, 2010).

Effective treatment is dependent on the use of efficacious antimalarial drug taken according to the optimized regimen. In this study about 93% of the dispensers in ADDOs reported to properly advice the clients on timing of dose administration of Artemether-Lumefantrine. However giving the first dose of Alu under observation as it is advised in the national malaria diagnosis and treatment guideline of Tanzania was a challenge to all ADDOs visited. Food especially dietary fats enhance the bioavilability of Lumefantrine. It is known that in patients with uncomplicated malaria extent and variability of lumefantrine absorption improved with clinical recovery as normal food intake is resumed (Ezzet et al., 1998).

In this particular study about 79% of the dispensers reported to counsel their clients on taking fatty diets when taking Artemether-Lumefantrine dose.This shows improvement copared to previous study conducted in pharmacies of Dar es Salaam (Kamuhabwa et al., 2011) where only about 25% of the dispensers advised their clients about the importance of fatty meals when using ALu. Adhrence and completion of ALu dosage by the clients in an important point towards patients recovery from malaria and prevent unnecessary parasite burden and resistance to the community which would have been resulted by improper drug administration.In this study only 43% of the dispensers did mention the point of counselling the patients on adherence and completion of the dose of ALu.

Proper patient counselling on dose administration and completion of dose enhances adherence to the medication given. In the previous study conducted in Rural Malawi (Kimberly et al., 2011) showed that overall adherence to ALu treatment for uncomplicated malaria was moderate, and children, who are the most likely to die of malaria, were less adherent than adults. The study suggested interventions for this challenge as introduction of child-friendly antimalarial formulations, direct observation of the first dose, use of the ALu package as a visual aid for instructions, and enhancing patient preference for ALu.The similar recommendations were also suggested by the study in Rural Tanzania (Abdunoor et al., 2010)

5.6.4 Counselling for malaria prevention

Malaria prevention package is an important entity in management of malaria, because it targets the community itself which bear the burden of malaria.In this study preventive measures against malaria using ITNs was mentioned by 100% of the ADDOs visited in Morogoro.This is a remarkable improvement from the previous study in pharmacies of Dar es Salaam (Kibassa, 2005) where the use of ITNs was mentioned by 93.5% of the dispensers.

This high response may have been attributed by malaria massive public promotion of the use of ITNs through different strategies which includeTanzania National Voucher Scheme(Hati punguzo), a public-private partnership for pregnant women and caregivers of infants to obtain highly-subsidized ITNs using vouchers at local ITN retailers; Underfive coverage campaign strategy which envolved free Net distribution for all children less than 5 years of age.This campaign ended in May 2010 with ultimate distribution of 8.7 millions LLINs.Universal coverage campaign which ended in September 2011 with distribution of about 14.6 million LLINs to all members of the family in Tanzania Mainland(PMI-MOP,2012).All these campaigns may have drawn attention even of the ADDO dispensers for they were fully implemented within the community where most of the ADDOs are located.

Environmental management is another prevention measure was mentioned by 57% of the total dispensers interviewed.This is a slight improvement contrary to the study conducted in pharmacies of Dar es Salaam (Kibassa, 2005) where only 24.5% of the dispensers were aware that environmental sanitation is a preventive measure.This suggest that more continuous education to dispensers is needed to inform them on importance of this preventive measure of malaria to their clients.

The use of S.P as antimalarial prophylaxis in pregnant women was mentioned by only2.3% of the total dispensers.This is not surprising as according to the Guidelines of Tanzania intermittent prevention Treatment (IPTp) strategy to prevent malaria in pregnant women using S.P as the drug of choice is done in Anternatal Clinics not in ADDOs. However ADDO dispenser may also receive pregnant women who suffer from malaria because they work nearby people's premises.

Thus there is a need to educate them even more on IPT strategy so that they can impart knowledge to pregnant women to attend ANC for IPTp.The National Malaria Diagnosis and treatment guideline of Tanzania insist on IPTp as one of preventive measure is management of malaria in pregnant women.

5.6.5 Compare real and reported practices by simulated client method

The simulated client method was done in this study to substantiate the findings reported in the interview session. From the discussion in previous pages the knowledge of dispensers in uncomplicated and severe form of malaria symptoms was found somehow satisfactory (moderate knowledge by 72% average in both children and adults, and average of 66% moderate knowledge on severe malaria in both children and adults).

In real practice 71.2% of the dispensers who were visited by simulated clients were able to ask about malaria symptoms before dispensing any antimalarial.These findings are contrary to the previous study (Kibassa, 2005) where knowledge on malaria symptomatology in pharmacies was found insufficient. However only 48% of the dispensers were able to ask about duration of the symptoms and only 9% bothered to demand symptoms of other related diagnoses.

This is important because symptoms of malaria may overlap with the symptoms of other disease conditions including pneumonia, UTI, Pulmonary Tuberculosis etc. Therefore inquiring more of the symptoms may help to distinguish disease conditions and possibly refer the patients earlier for further investigation at the health facilities. The previous literature (MOHSW, 2012) has shown that there is no single symptom typically suggestive of malaria.

Despite of challenges of improper history taking in ADDOs it is a good start for them because in the previous era of part two drug outlets the dispensers were meant for only dispensing over the counter drugs without any proper history taking. Therefore for further improvement efforts are still needed to educate the dispensers on proper history taking especially in common infectious diseases at their area. Sixty two percent of the dispensers were able to ask the simulated client about prior antimalarial drug taken in this illness but only about 17% of them did ask about the history of hypersensitivity to any antimalarial drug. This is also supported by

the previous discussion in this study results whereas only about 39% of the drug dispensers knew that Alu was contraindicated to people with hypersensitivity to it.

The training offered by TFDA to dispensers of ADDOs was meant to make a revolution to their minds and assist them manage according to the standard treatment guidelines of the country. In this study despite the training only 51.5% of the dispensers visited by simulated clients were able to dispense as per recommendation of National Malaria Diagnosis and Treatment guideline. About 46% of the dispensers allowed to be influenced by the clients demand for a certain type of antimalarial drug they wanted and 51% of these dispensed alternative antimalarial to ALu which were mostly monotherapies.

With regards to the counselling on ALu use, 97% of the dispensers visited by simulated clients advised them correctly on timing of the dose of ALu. On counseling on fatty diets 96% of dispensers visited by the simulated clients counseled them correctly on fatty meals before ALu.These answers do not deviate much from what was reported in interview. From the previous study elsewhere 78% of the dispensers gave correct instruction to clients taking antimalarial in their outlets (Kibassa, 2005).

Finally malaria preventive advice to simulated clients was given by only 15% of the dispensers contrary to what was said during interview session. This may have been contributed by different factors some of which may be business factors, dispensing as usual. Therefore there should be a comprehensive package to update regularly the knowledge of dispensers in drug outlets; which should cover areas of prevention, symptomatology, treatment and general health education on malaria case management.

5.7 Limitations of the study

- This study was conducted in only 3 Districts of one Region and results of the study may serve as fair estimate of the situation in Morogoro but not generalised to other parts of the country**.**

- The Simulated Client Method use is an effective methodology for assessing the practises and behaviours of the health care workers; however it is limited in this study in the sense that it was not done in all ADDOs in which questionnaire interview was done.The results of the representative dispensers may not have represented all other dispensers.

- The SCM is also limited in the sense that it doesn't involve the consent taking of the participant in its application.

- This study involved only the participants from ADDOs and was entirely quantitative study.The Qualitative aspect of the community members could help especially in answering some questions regarding dispensing practises ie high demand and dispensing of antimalarial monotherapies in ADDOs. Another study to address this may probably help.

- Some drug dispensers hesitated to cooperate with great perception that the investigator was associated with ADDOs premises inspection.In areas where this happened or proved impossible to collect data even upon granting permission letters and ethical clearance the researcher moved to other ADDO dispensers willing to grant consent.

CHAPTER SIX

CONCLUSION AND RECOMENDATIONS

6.1 CONCLUSION

i. The dispenser's knowledge of malaria symptoms in ADDOs is satisfactory though there is still a room for improvement in recognition of more common symptoms of severe malaria in both children and adults as per recommendations of the National Malaria Diagnostic and treatment guideline of Tanzania.

ii. The dispenser's knowledge on ALu dosage calculation and dispensing to different age groups and counselling on use is good; however the contraindication part of it leaves a room for emprovement especially in special group's i.e pregnant women and infants below 5kg of body weight.

iii. Antimalarial monotherapies are still present in market.This challenges the recommendation of dispensing practises according to the Standard Malaria diagnostic and treatment guideline and predicts the early occurrence of parasite resistance to Artemether-Lumefantrine.

iv. The use of S.P for treatment of malaria in ADDOs instead of prophylaxis offers a substantial challenge to IPTp programme for pregnant women.

v. Though the awareness on preventive measures of malaria was somehow good the practical counseling on these measures to clients was not satisfactory

vi. Sustainability of essential working supplies and tools in ADDOs is questionable, and proper supportive supervision is not encouraging.

6.2 RECOMENDATIONS

The Acredited Drug Dispensing Outlets (ADDOs**)** do not only just deal with drug dispensing of over the counter drugs but the MOHSW has authorized them to deal also with presumptive malaria case diagnosis and treatment using prescription only medicine. They are also supposed to refer cases of diseases which are out of scope of their conduct to the next level of the health facility for proper diagnosis and treatment. The finding from the study has revealed that the knowledge on malaria symptoms is so far encouraging but the practises do not conform the recommendation of the Standard Diagnostic and treatment guideline of Tanzania.Therefore the study recommends the following:-

1. Since the TFDA special training to dispensers has been found very useful; there is a need for the MOHSW through Pharmacy Council to provide comprehensive health updates regularly to ADDO dispensers on malaria and other common infectious diseases management.

2. The MOHSW is advised to review the implementation package of ADDO programme especially the sustainability of the supplies and tools needed for quality diagnosis and dispensing services in ADDOs

3. Though the country practises free market economy,there is a need for the Regulatory Authorities of the MOHSW to review the availabilities and use of monotherapies present in market so as to prevent early occurrence of parasite resistance to Artemether-Lumefantrine and othe alternative ACTs.

4. There is a need for the MOHSW to envolve private sectors even from ADDOs to participate in preparation of guideline, train and ultimately use them so as to maintain harmony in malaria management in the whole country.

5. Further studies are recommended to assess the perceptions of the community on the new antimalarial drug recommended by the government to be sold in community and how ADDOs will adhere to the existing regulations

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APPENDICES

APPENDIX A: 1) QUESTIONNAIRE (ENGLISH VERSION)

QUESTIONNAIRE FOR THE DRUG DISPENSERS IN ADDOs

Questionnaire No----------

Date----------

Name of the shop----------

District----------Number of the drug dispensers----------

Self Introduction:

Hi, my name is ----------; I am a student researcher from MUHAS Dar es Salaam; I am doing data collection for a research titled" **Knowledge of malaria symptoms, ant malarial drugs stocked and dispensing practises in ADDOs of Morogoro Region** "I have with me, a permission from MUHAS, Pharmaceutical council of Tanzania, from RMO and DMOs offices (**show permit**) which allow me to interview drug dispensers from private retail ADDO shops. The results from this study are meant for academic purpose only. Your own answers will be confidential. I need to interview each person individually. Do you allow me to continue interviewing you please?

YES/NO----------

A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age of the dispenser ---------- [ ]

2. Sex of the dispenser

1=Male [ ]

2= Female

3. What is your marital status?

1. Married
2. Single [ ]
3. Cohabiting
4. Divorced
5. Widow/widower

4. What is your level of education?

1. Primary education
2. Secondary education (form iv)
3. Secondary education (Form six) [ ]
4. Tertiary level
5. Elimu nyingine(taja)----------

5. Cadre/proffession

1. Pharmaceutical technician
2. Pharmaceutical assistant [ ]
3. Nursing officer
4. Assistant Nursing Officer
5. Nurse
6. Nurse assistant
7. Red cross trainnee

8. Clinical officer

9. Clinical assistanti

10. Others(Mention)----------

6. Did you attend and complete the six weeks training offered by TFDA to drug dispensers?

1=Yes (**If yes show me the certificate**) [ ]

2=No

7. What is your working experience in ADDOs? ----------

B: GENERAL QUESTIONS

No/	**Question**	**Options(Probe)**	**1=Yes**	**0=Non response /No**
8	What disease conditions for which you store most of the medications in your ADDO?	1. Fevers/malaria 2. Diarrhoea diseases 3. Cough/chest pains 4. Joint/muscle pains 5. Anaemia 6. Skin diseases 7. Sexually transmitted Infections 8. Others (mention)		
9	From where do many of your clients come from?	1. From nearby health facility(with prescription) 2. Directly from home 3. Others	**[ ]**	

10	Under what condition do you advise referral of your clients to the nearby health facility?	**Options(probe)**	**1=yes**	**0=non response**
		1) High grade fever 2) General body weakness 3) Dehydration 4) Severe diarrhea 5) Chronic cough 6) Cough up blood 7) Client with recurrent fevers		
11	What are the general dangers signs if when a child has; must be advised for referral to the health facility?	1) Vomiting everything 2) Lethargic/unconscious 3) Convulsions (at home/current attack) 4) Failure too drink or breast feed 5) Others(mention)----------		

C: KNOWLEDGE ON SYMPTOMS OF MALARIA

No/	Question	Options(probe)		
12	What the clinical features of malaria in children?		**1=Yes**	**0=Non Response/ No**
		1) Fever 2) Chills 3) Diarrhea 4) Vomiting 5) Irritability of the child 6) Palmer pallor 7) Refusal to feed/breastfeed 8) I don't know 9) Others (mention)		
13	What are the clinical features of malaria in adults?	1) Fever 2) Chills 3) Diarrhea 4) Vomiting 5) Headache 6) Joint/muscle pain 7) Loss of appetite 8) I don't know 9) Others(mention)_____		

14	What are the clinical features of severe malaria in children do you know?	1) High grade fever 2) Convulsions 3) Extreme body weakness 4) Respiratory distress 5) Palmer/conjuctival pallor 6) Failure to eat /breastfeed 7) Vomiting everything 8) Loss of consciousness 9) I don't know 10) Others(mention)		
15	What are the clinical features of severe form of malaria in adults do you know?	1) High grade fever 2) Loss of consciousness 3) Extreme body weakness(Prostration) 4) Respiratory distress 5) Palmer/conjuctival pallor 6) Failure to eat 7) Vomiting everything 8) Severe diarrhea 9) I don't know 10) Others(mention)----------		

D: AWARENESS & PRACTISES OF DISPENSERS

No/	Question	Options	**Answer**
16	Have you ever heard/read about the presence of the National malaria guideline of Tanzania?	1. =Yes 2. = No	**[ ]**
17	What is the first line drug of choice for malria according to the guideline?	1. =Quinine 2. =Artemether-Lumefantrine 3. =S.P 4. =Artemether Inj. 5. =Amodiaquine 6. =I don't know 1. =Others(mention)	**[ ]**
18	What is the second line drug of choice for treatment of malaria according to the guideline?	1. = Quinine 2. =Artemether-Lumefantrine 3. =S.P 4. =Artemether Inj. 5. =Amodiaquine 6. = I don't know 7. =Others (mention)	**[ ]**
19	How many tablets will you give to a child of 3 months (with <5 kg)	1=I will not give ALu 2=One tablet(Total 6) 3=Two tablets(Total 12) 4=Three tablets(Total 18)	**[ ]**

		5=Four tablets(Total 24) 6=Others (mention).....	
20	How many tablets will you give to a child of 3months to 3 years(weight 5-15 kg)	1=I will not give ALu 2=One tablet(Total 6) 3=Two tablets(Total 12) 4=Three tablets(Total 18) 5=Four tablets(Total 24) 6=Others (mention).....	**[ ]**
21	How many tablets will you give to a child of 3 -8 years,weight(15-25)kg	1=I will not give ALu 2=One tablet(Total 6) 3=Two tablets(Total 12) 4=Three tablets(Total 18) 5=Four tablets(Total 24) 6=Others (mention).....	**[ ]**
22	How many tablets will you give to a child of 8 -12 years,weight(25-35)kg	1=I will not give ALu 2=One tablet(Total 6) 3=Two tablets(Total 12)	

		4=Three tablets(Total 18) 5=Four tablets(Total 24) 6=Others (mention).....	[ ]
23	How many tablets will you give to a child of 12+ years,weight 35+kg	1=I will not give ALu 2=One tablet(Total 6) 3=Two tablets(Total 12) 4=Three tablets(Total 18) 5=Four tablets(Total 24) 6=Others (mention).....	[ ]

25	Under what conditions are you going to advice your client to use Artemether-Lumefantrine?	Responses(probe)	**1= Yes**	**0= Non response/ No**
		1) Whoever with malaria by clinical symptoms 2) Whoever with malaria after laboratory test 3) Whoever with doctors'prescription demanding for ALu 4) Whoever looking for ALu without doctors prescription and with no symptoms of malaria 5) Others(mention)----------		
26	What are the contraindications of using ALu?	1) First trimester pregnancy 2) A child with body weight less than5 kg 3) Drug reaction 4) Unemprovement with ALu administration within 14 days of 5) Severe malaria 6) Others(mention)		

27	What advice on drug use do you give to the client you dispense ALu to?	Responses(probe)	**1= Yes**	**0 = non**

				response/No
		1) On dose schedule 2) Importance of Fatty meals before medication 3) The importance of dose completion 4) Repeat the dose if vomited 30 minutes after drug administration 5) Others(mention)		
28	What indicators should the the patient look at had he/she emproved with the care given?	1) Fully recovery 2) Recovery of appetite 3) Fever goes down to normal 4) Others(mention)------		
29	In case of non emprovement what do you advice your client?	1) Go to nearby health facility 2) Come back to the shop to collect alternative medication 3) Others(mention)----------	**[ ]**	
30	What preventive advice do you give to the clients who come for treatment of malaria in your ADDO?	**1)** Use ITNs **2)** On environmental sanitation **3)** Use mosquito repellants/sprays **4)** Pregnant women attend		

		ANC as scheduled for S.P **5)** Others(Mention)		
31	What antimalarial drugs you frequently sell at your ADDO?	1) Aspirin / Paracetamol 2) Artemether-Lumefantrine 3) S.P -Metekelfin / Fansidar 4) Duo-cotexin 5) Amodiaquine 6) Quinine 7) Others (mention)----------		
32	What are your client's preferences; Single or multiple doses of antimalarial drugs?	1=Single doses 2=Multiple doses	**[ ]**	
33	If yes to Q32 above give the reasons for their preferences.	1. Easy to complete the dose 2. Quick relief 3. Many tablets are easily forgetable 4. Others(mention)----------	**[ ]**	
34	In case you don't have ALu in your ADDO what drug do you prefer to give to the clients for treatment of malaria?	1=Orodar/Sulphadar –S.P 2=Metakelfin/S.P 2=Amodiaquine 3=Duo-cotexin 4=Quinine 5=Artequick 6=Malafin	**[ ]**	

		7=Co-malafin 8=Others(Mention)	
35	Before the onset of the subsidized ALu what was the price of the ALu available?	1=Tsh<5000 2=Tsh5000+ 3= Alu was not available by then 4= I don't know	**[ ]**
36	What is the price of ALu currently?	----------	
37	What is your opinion regarding the profit you earn from selling subsidized ALu?	**1.** Little profit **2.** Adequate profit **3.** Moderate profit **4.** No profit **5.** I don,t know	**[ ]**

E: ANTIMALARIAL AND ESSENTIAL SUPPLIES AVAILABLE IN ADDO

38	**What antimalarial drugs do you have at your ADDO currently?**	**Drugs**	**Responses**	**Answer**
		Aspirin / Paracetamol	1=yes 2=No	
		Mseto / ALu	1=Yes 2=No	
		Metakelfin / SP	1=Yes 2=No	
		Fansidar/S.P	1=Yes 2=No	

		Duo-cotexin	1=Yes 2=No	
		Amodiaquine	1=Yes 2=No	
		Quinine	1=Yes 2=No	
		Artemether	1=Yes 2=No	
		Co-malafin	1=Yes 2=No	
		Artequick	1=Yes 2=No	
		Accor (Artemether-Mefloquine)	1=Yes 2=No	
		Others(mention)		
39	**Do you have the following at your ADDO? (show me)**		**Responses**	**Answer**
		1=National malaria guideline	1=Yes 2=No	
		2=TFDA manual	1=Yes 2=No	
		3= Malaria dose indicator sheets for ALu	1=Yes 2=No	
		4=Refferal form	1=Yes 2=No	
		5=Weighing scale	1=Yes 2=No	
		6=Themometer	1=Yes 2=No	

APPENDIX A: 2) QUESTIONNAIRE (SWAHILI VERSION*)*

DODOSO KWA WATOA DAWA WA DUKA LA DAWA MUHIMU.

Namba ya dodoso----------

Tarehe----------

Jina la duka----------

Wilaya/Manispaa---------- Idadi ya watoa dawa------- ----------

Utambulisho:

Habari,

Jina langu ni ----------; Mimi ni mwanafunzi mtafiti kutoka Chuo kikuu cha Sayansi za Tiba Muhimbili Dar es Salaam.Ninakusanya taarifa za utafiti kuhusu "**Ujuzi wa dalili za ugonjwa wa malaria dawa za malaria zilizopo na jinsi zinavyotolewa kwa wagonjwa mkoani Morogoro**". Nina ruhusa kutoka chuoni kwangu ; kutoka Baraza la wafamasia,Mkoani na wilayani kwako (**onyesha ruhusa)** wakiniruhusu kuwahoji watoa dawa wa Maduka ya dawa Muhimu mkoani Morogoro. Majibu ya utafiti huu ni kwa ajili masomo yangu.Majibu yako yatakuwa ni siri na hayataathiri ajira yako kwa namna yoyote ile. Nahitaji kumuhoji kila mtu peke yake. Je unaniruhusu kukuhoji?

Ndiyo/Hapana----------

A: HABARI BINAFSI KWA MTOA DAWA

1. Umri wa mtoa dawa---------- [ ]

2. Jinsia ya mtoa dawa

1=Mume [ ]

2= Mke

3. Umeolewa/umeoa?

6. Nimeolewa/nimeoa
7. Sijaolewa/sijaoa [ ]
8. Ninaishi kinyumba
9. Nimeachika
10. Ni mjane/mgane

4. Kiwango cha elimu cha mtoa dawa

9. Elimu ya msingi
10. Elimu ya sekondari(kidato cha nne)
11. Elimu ya sekondari(kidato cha sita) [ ]
12. Elimu ya chuo
13. Elimu nyingine(taja)----------

5. Ujuzi/taaluma ya mtoa dawa

11. Mteknolojia wa dawa
12. Mteknolojia msaidizi wa dawa [ ]
13. Afisa Muuguzi
14. Afisa Muuguzi Msaidizi
15. Muuguzi
16. Muuguzi msaidizi
17. Mhitimu Mafunzo ya Msalaba mwekundu

18. Tabibu

19. Tabibu Msaidizi

20. Wengine(Taja)----------

6. Je ulihudhuria na kufuzu mafunzo ya watoa dawa yaliyoendeshwa na Mamlaka ya chakula na da**wa?**

1. Ndiyo (**Kama ndiyo nionyeshe cheti cha kufuzu**) [ ]
2. Hapana

6. Je una uzoefu wa miaka mingapi kwenye kazi hii ya kutoa dawa? ----------

B: MASWALI YA JUMLA

Namba	**Swali**	**Majibu**	**1=Ndiyo**	**0=Hapana**
8	Ni maradhi gani haswa ambayo huwa unakuwa na dawa zake kwa wingi hapa dukani?	1. Homa / homa za malaria 2. Kuhara / homa za matumbo 3. Kikohozi / Vifua 4. Maumivu ya viungo / misuli 5. Upungufu wa lishe / damu 6. Magonjwa ya ngozi 7. Magonjwa ya zinaa 8. Mengineyo (Taja)		
9	Je ni aina gani ya wateja wanakuja kwa wingi	1. Wenye cheti cha daktari kutoka katika		

	hapa dukani kwako kutaka ushauri na / au tiba?	kituo cha kutolea huduma 2. Kutoka nyumbani moja kwa moja 3. Wengine		
10	Ni hali gani mteja akiwa nayo huwa unamshauri aende ngazi ya juu ya huduma ya afya?	Majibu		
		1) Homa kali / joto kali mwilini 2) Mteja ambaye amedhoofika sana 3) Upungufu wa maji 4) Mteja anayeharisha sana 5) Mteja anayekohoa kwa muda mrefu 6) Mteja anayekohoa damu 7) Mteja mwenye homa za muda mrefu		
11	Ni dalili gani za hatari mtoto akiwa nazo utashauri aende kwenye ngazi ya juu ya tiba?	1) Kutapika kila kitu 2) Kupoteza fahamu/kuchoka sana 3) Degedege(nyumbani au hapa dukani) 4) Kushindwa kunyonya au kunywa 5) Nyingine Taja----------		

C: UJUZI WA DALILI ZA MALARIA

Namba	**Swali**	**Majibu**		
12	Ni dalili zipi ambazo mtoto mdogo akiwa nazo utahisi ana malaria?		**1=Ndiyo**	**0=Hapana**
		1) Homa / joto la mwili kupanda / mwili kuwa wa moto 2) Kutokwa na jasho / kutetemeka baridi 3) Kuharisha 4) Kutapika 5) Mtoto kutokuwa mchangamfu na kulialia 6) Viganja kuwa vyeupe 7) Mtoto Kukataa kula/Kunyonya 8) Sijui 9) Nyinginezo (taja)		
13	Ni dalili zipi ambazo mtu mzima akiwa nazo utahisi ana malaria?	1) Homa / joto la mwili kupanda / mwili kuwa wa moto 2) Kutokwa na jasho / kutetemeka baridi 3) Kuharisha 4) Kutapika 5) Kichwa kuuma 6) Maumivu ya viungo / misuli / mgongo 7) Kukosa hamu ya kula 8) Sijui		

		Nyinginezo (taja		
14	Ni dalili zipi ambazo mtoto mdogo akiwa nazo utahisi ana malaria kali?	1) Mtoto kuwa na joto kali sana 2) Mtoto kupatwa na dege dege 3) Mtoto kuishiwa nguvu / kuwa dhaifu sana na kushindwa kusimama 4) Mtoto kupumua haraka haraka na kuhema kwa shida 5) Viganja / mboni ya jicho kuwa nyeupe sana 6) Mtoto kushindwa kula / kunyonya 7) Kutapika kila kitu 8) Kupoteza fahamu 9) Sijui 10) Nyinginezo(taja		
15	Ni dalili zipi ambazo mtu mzima, akiwa nazo utahisi ana malaria kali?	1) Mtu kuwa na joto kali sana 2) Mtu kupoteza fahamu 3) Mtu kuishiwa nguvu / kuwa dhaifu sana na kushindwa kusimama 4) Mtu kupumua haraka haraka/ kuhema kwa shida 5) Viganja / mboni ya jicho kuwa nyeupe sana 6) Mtu kushindwa kula 7) Kutapika sana 8) Kuharisha sana 9) Sijui 10) Nyinginezo(taja)----------		

D: UFAHAMU & UTENDAJI WA WATOA DAWA

Namba	Swali	Majibu	**Jibu sahihi**
16	Je umeshawahi kusikia/kusoma kuhusu uwepo wa muongozo wa Taifa wa malaria?	1. Ndiyo 2. Hapana	**[ ]**
17	Dawa namba moja inayopendekezwa kwenye muongozo wa sasa wa taifa katika kutibu malaria isiyo kali ni ipi?	1. =Kwinini 2. =Dawa mseto 3. =S.P 4. =Artemether 5. =Amodiakwini 6. =Nyingine(Taja) 2. =Sijui	**[ ]**
18	Ni dawa ipi inayopendekezwa kwenye muongozo wa sasa wa Taifa katika kutibu malaria iwapo dawa ya kwanza itashindwa?	1. =Kwinini 2. =Dawa mseto 3. =S.P 4. =Artemether 5. =Amodiakwini 6. =Nyingine(Taja) 7. Sijui	**[ ]**
19	Je mtoto mwenye umri wa miezi miwili (Kilo nne na	1=sitampa ALU 2=kidonge kimoja(jumla 6)	

	nusu) akiwa na malaria utampa kiasi gani cha dozi ya ALU?	3=vidonge viwili(Jumla 12) 4=Vidonge vitatu(Jumla 18) 5=Vidonge Vinne(Jumla 24) 6=Vinginevyo(taja).....	[ ]
20	Je, mtoto wa umri miezi 3 hadi miaka 3(kilo 5-kilo15) akiwa na malaria huwa unampa kiasi gani cha dozi ya ALu?	1=sitampa ALU 2=kidonge kimoja(jumla 6) 3=vidonge viwili(Jumla 12) 4=Vidonge vitatu(Jumla 18) 5=Vidonge Vinne(Jumla 24) 6=Vinginevyo(taja).....	[ ]
21	Je, mtoto mwenye umri wa miaka3-8(kilo15-25) akiwa na malaria huwa unampa kiasi gani cha dozi ya ALu?	1=sitampa ALU 2=kidonge kimoja (Jumla 6) 3=vidonge viwili(Jumla 12) 4=Vidonge vitatu(Jumla 18) 5=Vidonge Vinne(Jumla 24) 6=Vinginevyo(taja).....	[ ]

22	Je mtoto wa umri wa Shule, miaka8-12(kilo25-35) akiwa na malaria huwa unampa kiasi gani cha dozi ya ALu?	1=sitampa ALU 2=kidonge kimoja(jumla 6) 3=vidonge viwili(Jumla 12) 4=Vidonge vitatu(Jumla 18) 5=Vidonge Vinne(Jumla 24) 6=Vinginevyo(taja)	**[ ]**
23	Je mteja wa umri wa miaka 12na kuendelea (kilo35na kuendelea) akiwa na malaria utampa kiasi gani cha dozi ya ALu?	1=sitampa ALU 2=kidonge kimoja(jumla 6) 3=vidonge viwili(Jumla 12) 4=Vidonge vitatu(Jumla 18) 5=Vidonge Vinne(Jumla 24) 6=Vinginevyo(taja).....	**[ ]**
24	Je mama mjamzito, mimba changa ya miezi miwili akiwa na malaria utampa kiasi gani cha dozi ya Alu?	1=sitampa ALU 2=kidonge kimoja(jumla 6) 3=vidonge viwili (Jumla 12) 4=Vidonge vitatu (Jumla 18) 5=Vidonge Vinne (Jumla 24) 6=Vinginevyo (taja	**[ ]**

25	Ni katika hali gani utamshauri mgonjwa atumie dawa ya ALu?	Majibu	**1= Ndiyo**	**0= Hapana**
		1) Mgonjwa anayehisiwa kuwa na malaria kwa dalili 2) Mgonjwa mwenye malaria baada ya kupima 3) Yeyote mwenye cheti cha daktari akitaka ALu 4) Yeyote anayetaka dawa mseto bila cheti cha daktari na asiye na dalili za malaria 5) Nyingine taja----------		
26	Ni katika hali gani utamshauri mgonjwa asitumie dawa ya ALu?	1) Ni mjamzito miezi mitatu ya mwanzo 2) Mtoto chini ya kilo tano 3) Kuwashwa kutokana na dawa 4) Kutopata nafuu ndani ya siku 14 baada ya kumeza dawa 5) Malaria kali		
27	Je ukishampa mteja dawa ya ALu huwa unampa ushari gani kuhusu matumizi ya hiyo dawa?	Majibu	**1= Ndiyo**	**0= Hapana**
		1) Muda mwafaka wa kumeza dozi ya kwanza na dozi zinazofuata		

		2) Umuhimu wa chakula (cha mafuta) wakati wa kumeza dozi 3) Umuhimu wa kumaliza dozi 4) Umuhimu wa kurudia dozi kama ametapika chini ya nusu saa baada ya kumeza		
28	Je huwa unamshauri mteja aangalie vigezo gani ili kujua kama dawa inamletea nafuu?	1) Hali ya afya ikiimarika 2) Hamu ya kula ikirudi 3) Homa ikishuka 4) Mengineyo(Taja)----------		
29	Je, huwa unamshauri mteja wako achukue hatua gani endapo hatopata nafuu?	1) Aende haraka kwenye kituocha afya cha karibu 2) Arudi tena dukani kuchukua dawa nyingine 3) Mengineyo(taja)---	**[ ]**	
30	Ni ushauri gani wa kujikinga na malaria unatoa kwa wagonjwa wanaokuja kutibiwa malaria	**1)** Watumie chandarua chenye dawa **2)** Mazingira ya		

	hapa dukani kwako?	makazi yawe safi **3)** Tumia dawa za kupuliza kuua mbu **4)** Wajawazito wahudhurie kliniki mapema kupewa dawa ya kuzuia malaria **5)** Mengineyo(Taja)		
31	Ni dawa zipi za malaria ambazo huwa unaziuza mara kwa mara hapa dukani?(anzia ya kwanza mpaka ya mwisho)	1) Aspirin / Paracetamol 2) Mseto / ALu 3) Metekelfin / Fansidar / SP 4) Duo-cotexin 5) Amodiaquine 6) Quinine 7) Nyingine(Taja)----------		
32	Kwa uzoefu wako wateja wako wengi wanapendelea dawa ya malaria ya dozi moja au dozi zaidi ya moja?	1=dozi moja 2=dozi zaidi ya moja	**[ ]**	
33	Kama jibu la swali 34 ni (1) Ni sababu zipi wanakueleza wagonjwa wanaopenda dawa zenye dozi moja tu?	1. Rahisi kumaliza dozi 2. Zinaponya haraka 3. Vidonge vingi ni rahisi kusahau		

		4. Nyinginezo--------	
34	Ukiwa hauna dawa mseto dukani kwako unapendelea kutoa dawa gani kutibu malaria isiyo kali?	1=Orodar/Sulphadar –S.P 2=Metakelfin/S.P 2=Amodiakwini 3=Duo-cotexin 4=Kwinini 5=Artequick 6=Malafin 7=Co-malafin 8=Nyingine(Taja)	**[ ]**
35	Hapo awali kabla serikali haijaleta ALu iliyolipiwa, ulikuwa unauza ALu kwa bei gani?	1=---------- 2= Alu haikuwepo	**[ ]**
36	Kwa sasa hivi unauza ALu kwa bei gani	----------	
37	Nini maoni yako kuhusu faida unayopata baada ya kuanza kuuza ALu kwa bei iliyopangwa?	**1.** Faida ndogo **2.** Faida kubwa **3.** Faida kiasi **4.** Hakuna faida	**[ ]**

		5. Sijui	

E: DAWA NA VIFAA VILIVYOPO KWENYE DLDM

38	Ni dawa gani za malaria unazo leo hapa dukani?(Angali a)	**JIBU**	**JIBU**	**ALAMA**
		Aspirin / Paracetamol	1=Ndiyo 2=Hapana	
		Mseto / ALu	1=Ndiyo 2=Hapana	
		Metakelfin / SP	1=Ndiyo 2=Hapana	
		Fansidar/S.P	1=Ndiyo 2=Hapana	
		Duo-cotexin	1=Ndiyo 2=Hapana	
		Amodiaquine	1=Ndiyo 2=Hapana	
		Quinine	1=Ndiyo 2=Hapana	
		Artemether	1=Ndiyo 2=Hapana	
		Co-malafin	1=Ndiyo 2=Hapana	
		Artequick	1=Ndiyo 2=Hapana	
		Accor (Artemether-Mefloquine)	1=Ndiyo 2=Hapana	
		Nyingine(Taja)		

39	Je unavyo vifaa vifuatavyo hapa dukani?**(Nionye she**)	**KIFAA**	**JIBU**	**ALAMA**
		1=Mwongozo wa malaria wa Taifa	1=Ndiyo 2=Hapana	
		2=Kitabu cha mafunzo cha mamlaka ya chakula na Dawa(TFDA)	1=Ndiyo 2=Hapana	
		3=Mwongozo wa dozi za malaria(dose indicator sheets)	1=Ndiyo 2=Hapana	
		4=Fomu ya Rufaa	1=Ndiyo 2=Hapana	
		5=Mzani(wa kupimia uzito)	1=Ndiyo 2=Hapana	
		6=Themometer	1=Ndiyo 2=Hapana	

APPENDIX B: SIMULATED CLIENT METHOD SHEET

No----------

Name of the Pharmacy----------District----------

A simulated client shall present before the drug dispenser in ADDO with the following scenario:" **'I feel I have symptoms of malaria, I kindly need any of the drug to help this situation."**

Below are questions or responses expected from the Dispenser?

1	Sex of the drug dispenser	1) male 2) Female
2	Asked about symptoms of malaria	1) Yes 2)No
3	Asked about duration of the problem	1) Yes 2) No
4	Asked for symptoms of other related illnesses?	1)Yes 2)No
5	Asked whether the client went to health facility before?	1) Yes 2) No
6	Asked whether tested for malaria before?	1) Yes 2) No
7	Asked about ant malarial drug taken before	1)Yes 2)No
8	Asked about any ant malarial drug reaction?	1)Yes 2)No
9	Asked about the drug the client prefers to use	1)Yes 2)No
10	Advised accordingly ant malarial drug according to the National Guideline	1)Yes 2)No
11	Advised on alternative drug other than ALu	1) Yes 2) No
12	Name the drug advised on	

13	Correct dosage	1)Yes 2) No
14	Instruction on how to use the drug correctly	1)Yes 2) No
15	Possible side effects of the drug told	1)Yes 2) No
16	If ALu ,any advice on Fatty meals	1)Yes 2) No
17	Any malaria preventive advice given to the client?	1) Yes 2) No
18	If yes to Q19 what advice?	
19	Refused to give the medication	1) Yes 2) No

In response to what the drug dispenser may ask below is the guide for the simulated client

- A male Adult of 35 years old with body weight 65 kg, experiencing fevers, general body weakness, and loss of appetite. He has not been given any medication apart from Paracetamol believed to calm down fever shortly.
- The man doesn't remember whether he has had malaria before although the symptoms which feel similar as these one occurred 5 years ago and managed with local herbs. However he finds the herbs helpless with these current symptoms.
- The man was not seen by the doctor regarding this problem but he should be ready to accept whatever advice given by the dispenser.

APPENDIX C: 1) CONSENT FORM (English Version*)*

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

INFORMED CONSENT FORM

ID-NO ----------

Consent to participate in study

Foreword

Greeting! My name is **Dr. Ndalio, Thomas Samwel**

I am a student of Masters of Science in Applied Epidemiology of Muhimbili University of Health and Allied Sciences (MUHAS).I am doing a research on " **Knowledge of malaria symptoms, ant malarial drugs stocked and dispensing practices in Accredited Drug Dispensing Outlets (ADDOs) in Morogoro Region, Tanzania,2012"**

Purpose of the study

The study intends to find out the knowledge of malaria symptoms among dispensers, ant malarial drugs stocked and dispensing practices in ADDOs in Morogoro region, Tanzania .The results of the study will help to compliment the available information on improving the management of malaria in private for profit facilities.

What participation involves

I f you agree to participate in study you will be required to answer a series of questions in the interview guide or questionnaire prepared for study

ConfidentialityAll the information we shall collect from you will be kept confidential and no one will be told on what you have said and entered into the computers, and we shall only use your study identification number and not your name.

Risks

I do not anticipate that any harm will happen to you or your family as a result of participating in the study. There will be no additional compensation to you or your family.

Right to withdraw or alternatives

Taking part in this study is completely voluntary. You have the right to participate or decide otherwise without giving any reason for your decision. Once you have decided to participate you are also free to terminate your participation at any time.

Benefits

If you agree to take part in this study I hope that the information obtained from this study will be beneficial to you and other health workers in the region to improve private health care management. A small group of scientific experts who are not involved in implementing this study will monitor the results of this study and how we conduct this research. We shall inform you about any new information that may be generated from this study.

Who to contact

If you have any questions about this study you are free to contact, the principal investigator,

Dr. Ndalio, Thomas Samwel (0784- 430675) and Dr.Donath Tarimo, Muhimbili University of Health and Allied Sciences, P.o Box 65001, Dar es Salaam. Tel 0784-496718

If you have any questions/concerns about your rights as a participant you may contact Prof M. Aboud, Chairman of MUHAS Research and Publications Committee. P.O.BOX 65001 Dar es Salaam. Tel 2150302-6

If you agree to this interview, please sign this consent form.

I ……. have read and understood the contents of this consent form and my questions have been sufficiently answered. I therefore agree to participate in this study.

Signature of the interviewee ……..... Date ……

Signature of the interviewer ……....……. Date ……

APPENDIX C: 2) CONSENT FORM (Swahili version)

FOMU YA RIDHAA YA KUSHIRIKI KATIKA UTAFITI

CHUO KIKUU CHA AFYA NA SAYANSI ZA TIBA MUHIMBILI

KURUGENZI YA UTAFITI NA UCHAPISHAJI

Namba ya utambulisho----------

Ridhaa ya kushiriki kwenye utafiti

Hujambo!

Jina langu ni **Dk Ndalio,Thomas Samwel**.Mimi ni mwanafunzi wa shahada ya uzamili ya sayansi katika masuala ya Epidemiolojia ya Chuo Kikuu cha Afya na Sayansi za Tiba Muhimbili.Ninafanya utafiti kuhusu "**Ujuzi wa kuhudumia wagonjwa wa malaria ,dawa zilizopo na jinsi zinavyotolewa kwa wagonjwa katika maduka ya dawa muhimu mkoa wa Morogoro".**

Dhumuni la utafiti

Utafiti huu unalenga kujua ni kwa jinsi gani watoa dawa kwenye maduka ya dawa muhimu wana uelewa kuhusu dalili za malaria,ni dawa gani za malaria wanazo na ni kwa jinsi gani wanawahudumia wagonjwa wa malairia wanaotembelea maduka yao.

Kinachohitajika katika ushiriki

Ili kushiriki katika utafiti huu inabidi kukubali na kujiunga kisha utajibu maswali kwenye muongozo wa maswali yaliyotungwa kwa ajili ya utafiti huu

Usiri

Kila kitu kitabakia kuwa siri na kitatumika kwa ajili ya utafiti tu.Hakuna mtu yeyote atakayeambiwa kuhusu majibu uliyotoa. Taarifa zitaingizwa kwenye ngamizi kwa kutumia namba ya utambulisho na sio jina lako.

Madhara

Sitegemei hatari yoyote itokee kwako au familia yako kutokana na ushiriki wako katika utafiti huu.

Haki ya kushiriki

Ushiriki wako katika utafiti huu si lazima. Una uwezo wa kukubali au kukataa bila kutoa sababu zozote za kufanya hivyo. Naendapo utakubali, unaweza kubadili uamuzi wako wakati wowote bila kuathiri haki zako za msingi.

Kwa mawasiliano

Ukiwa na maswali yoyote kuhusu utafiti huu, uwe huru kuwasiliana nami, mtafiti mkuu,

Dk Ndalio Thomas Samwel (0784-430675) au Dr Donath Tarimo-Chuo Kikuu Cha Tiba na sayansi za Afya Muhimbili- Simu 0784-496718

Kama utakuwa na maswali kuhusu haki zako kama mshiriki, unaweza kumpigia Prof M. Aboud, Mwenyekiti wa kamati ya utafiti,Chuo Kikuu cha Afya na Sayansi za Tiba, Muhimbili. Simu namba 2150302-6

Kama umekubali kuhojiwa, tafadhali saini hapa:

Mimi.....….. nimesoma na kuelewa kilichoelezwa kwenye fomu hii na maswali yangu yamejibiwa kiufasaha. Hivyo ninakubalikushiriki na kuhojiwa kwa ajili ya utafiti huu.

Sahihi ya mhojiwa …….. Tarehe ……..

Sahihi ya mhoji…… Tarehe……