AWARENESS AND UTILIZATION OF AFFORDABLE MEDICINE FACILITY MALARIA AMONG CAREGIVERS OF UNDER FIVE CHILDREN IN IBADAN NORTHWEST LOCAL GOVERNMENT AREA, OYO STATE

BY

OJO TOLULOPE (M.B, B.S)

MATRICULATION NO 161702

A PROJECT SUBMITTED TO THE DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS, FACULTY OF PUBLIC HEALTH, COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN.

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTERS OF SCIENCE DEGREE IN EPIDEMIOLOGY AND MEDICAL STATISTICS

JULY 2013

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JULY 2013

DECLARATION

I hereby declare this work is original. The work has neither been presented to any other faculty for the purpose of the award of a degree nor has it been submitted elsewhere for publication.

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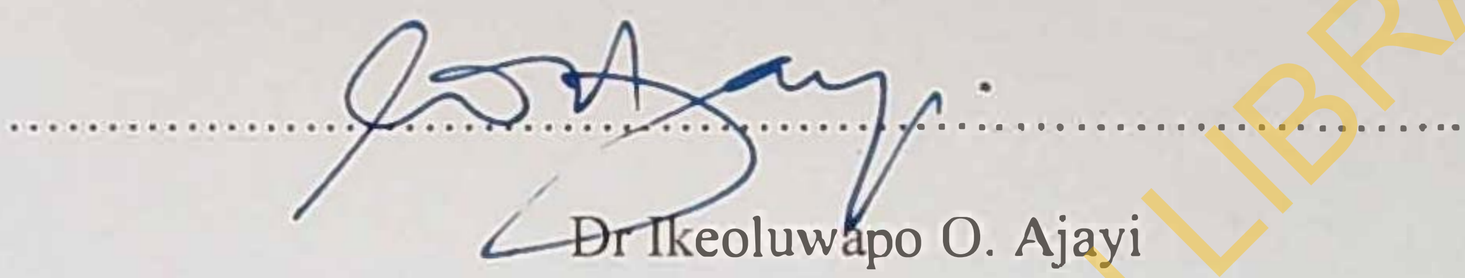
Tolulope Ojo

CERTIFICATION

We certify that this work was carried out in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan under my supervision



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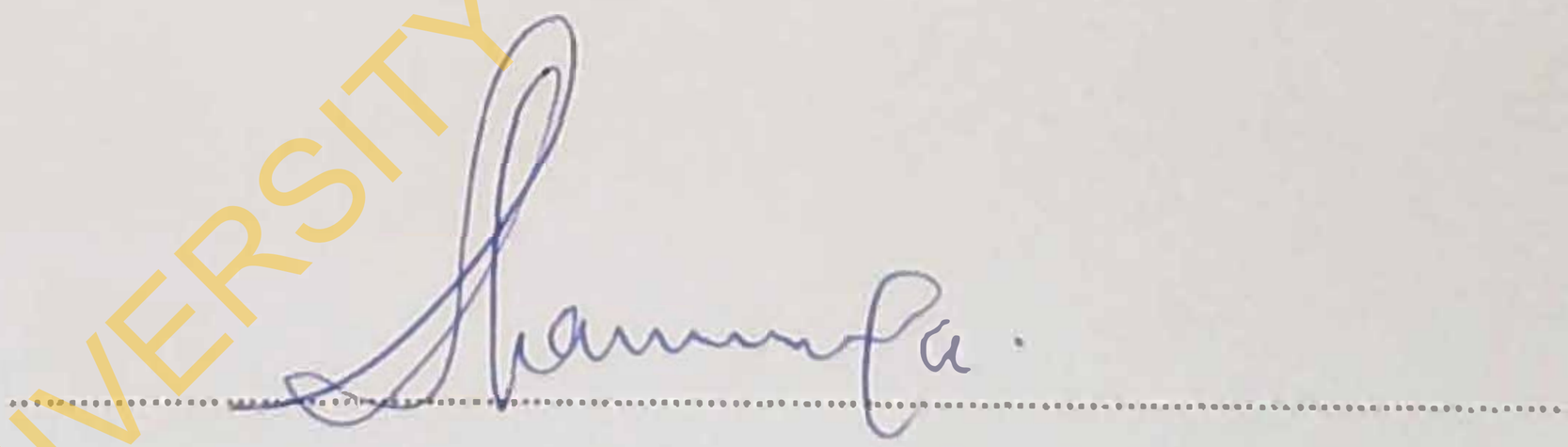

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DEDICATION

This work is dedicated to my husband, OreOlorun for his undying love and support and my parents.

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First and foremost, my thanks to Almighty God for His loving Kindness to me at all times.

I would like to wholeheartedly thank my supervisor, Dr. I.O. Ajayi, I could not have asked for a better one. Not only has she been an amazing role model, she has provided a delightful mix of expertise, friendship and support that made this work possible. I say thank you.

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LIST OF ABBREVIATIONS

WHO	World Health Organization
ACTs	Artemisinin Based Combination Therapy
CQ	Choloroquinne
SP	Suphadoxine-pyremethamine
AMFm	Affordable Medicine Facility malaria
SFH	Society for Family Health
PPT	Pre-packaged therapy
FMOH	Federal Ministry of Health
AL	Artemether-Lumefantrine
PPMV	Proprietary Patent Medicine Vendor
USD	United States Dollar
RBM	Roll Back Malaria
NDHS	Nigeria Demographic Health Survey
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
ITN	Insecticide Treated Net
UNICEF	United Nations Children's Fund
PMI	President's Malaria Initiative
NGO	Non- Governmental Organization
OTC	Over the counter
NAFDAC	National Agency for Food and Drug Administration and Control
LGA	Local Government Area
AS-AQ	Artesunate-Amodiaquinne
HMM	Home Management Malaria
AMFm-ACTs	Affordable Medicine Facility Malaria Artemisinin Combination Therapy

ABSTRACT

Introduction

Access to Artemisinin Based Combination Therapy (ACTs) by most people at risk of malaria has been a challenge. A global subsidy under the initiative Affordable Medicine Facility-malarial (AMFm) was recommended to crowd out monotherapies, expand access to ACTs and therefore decrease the burden of malaria. AMFm-ACTs distribution started in Nigeria in 2011, but its use has not been documented. Hence, this study aimed at determining awareness, pattern of use, utilization and factors influencing utilization of AMFm-ACTs in Ibadan Northwest Local Government Area.

Methods

The study was a cross sectional survey involving the use of cluster sampling technique to select 478 caregivers whose children had fever within two weeks prior to the survey. An interviewer administered questionnaire was used to collect information on awareness, knowledge of symptoms of malaria, sources of drugs, utilization and factors influencing utilization of AMFm-ACTs. Data was analyzed using descriptive statistics, Chi-square and multivariate logistic regression at 5% level of significance.

Results

The mean age of the respondents was 31.0 ± 5.4 years. Many of the caregivers (60.3%) were between 25 and 34 years, (89.3%) were married, and majority (60.6%) was Christians. More than half (61.7%) of the respondents had secondary education while 55.9% were traders. Less than half of the respondents (32.2%) were of high socio-economic status. Awareness of the programme was low as only 9.1% have heard about the programme and less than half (42.9%) have seen the antimalarial packet that has the symbol of the Affordable Medicine Facility malaria. The commonest source of information on AMFm-ACTs was through the radio (31.7%). Overall, 29.2% used AMFm-ACTs as their first line choice of anti-malarial. More than half (54.5%) cited effectiveness of the drug as the main reason for choosing it. More than half of the

respondents (51.2%) bought the drug by themselves while 35% received prescription from health workers. More than half of the respondent (82.1%) reported availability of the anti-malarial whenever they buy it. Overall (61.5%) took the correct number of tablets in relation to their age and also for the recommended days. Most of the respondents discontinued the drug before the recommended time because symptoms got better. On bivarate analysis age group, occupation, level of education, socio-economic status, knowledge of symptoms of malaria, awareness of AMFm-ACTs, availability of AMFm-ACTs and sources of drug were significantly associated with utilization of AMFm-ACTs ($P<0.05$). Logistic regression demonstrated that only awareness (AOR: 13; CI: 5.731-30.509) predicted the use of AMFm-ACTs.

Conclusion- For effective utilization of AMFm-ACTs, this study provides evidence that emphasis should be placed on awareness of this drug among those at risk of malaria and also increasing sensitization on treatment failure associated with cheap antimalarials. It equally proposes that programmes should be in place to educate people on appropriate dosing for AMFm-ACTs.

Keywords: AMFm, Caregivers, Awareness, Utilization

Word count: 458

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Malaria is one of the most important parasitic diseases of mankind, causing almost 5 billion clinical episodes in endemic countries annually, with more than 90% of this burden occurring in sub-Saharan Africa (Breman 2001). In malaria endemic settings, children less than five years (under- five) are particularly vulnerable to severe disease and death when infected with malaria and decisions made by children's caregivers at the appearance of early signs of potential malaria infection (fever) are critical to ensure child health and survival(Littrell et al. 2011).

In response to the increasing burden of malaria caused by parasite resistance to the conventional antimalarial medicines, World Health Organization (WHO), in 2001, recommended the use of Artemisinin Based Combination Therapies (ACTs) in countries where *Plasmodium falciparum* malaria is resistant to the conventional antimalarial medicines such as Chloroquine(CQ), Sulfadoxine-pyrimethamine(SP) and Amodiaquine. Since 2001, deployment of ACT has been slow. (Bosman & Mendis, 2007). So far, widespread public-sector deployment of ACTs has been constrained by their relatively high cost and limited global supply, as well as some lingering concerns about safety (Kachur et al. 2006).

In response to low ACT access and the threat of artemisinin resistance, the Institute of Medicine released a report in 2004 recommending the creation of a global subsidy to make ACTs available through both the public and private sectors at the same price as chloroquinne

and other common therapies(Arrow et al. 2004). By reducing the price of the drugs at the manufacturer level, it is expected that ACTs will flow through the same channels used for single monotherapies, thereby dramatically increasing access to ACTs. This concept was later further developed by the Roll Back Malaria Partnership and developed into a potential new global mechanism known as the Affordable Medicines Facility malaria, for widespread access to ACTs.

The reduced price of this drug is expected to extend down the antimalarial supply chain so that when children's caregivers seek fever treatment at a given outlet, they are more likely to find effective medicines that they can afford(Littrell et al. 2011).

Affordable Medicine Facility-malaria channels involve both the public and private sector. The private sector was included because studies done previously indicated that the majority of patients in many malaria endemic countries seek treatment outside of the formal public sector, with a large proportion accessing treatment through the private sector instead. Studies revealed that patients seeks malaria treatment in the private sector because of distance to, long wait times at, stock out of drugs in the public sector and shortage of skilled providers(Hetzel et al. 2008). Private sector treatment sources vary considerably between and within countries, ranging from private hospitals and clinics to one-room drug shops to general stores and medicine peddlers.

AMFm is currently introduced in a phased manner. A first pilot phase (AMFm Phase 1) is being undertaken in Cambodia, Ghana, Kenya, Madagascar, Niger, Nigeria, Tanzania (mainlandand Zanzibar), and Uganda. The current plan is for Phase 1 to last 2 years and for the Global Fund Board to decide whether to continue, expand, suspend, or terminate the program at its second meeting in 2012. The Board decision will depend on the outcome of the Independent Evaluation, which has been commissioned to determine whether the pilots have

been successful in achieving the AMFm's objectives, and also on the advice of the AMFm Ad Hoc Committee (Schaferhoff & Yamey, 2011).

Society for Family Health (SFH), is the Non-governmental Organization involved in the distribution of AMFm-ACTs in Nigeria. They work hand in hand with the Global Fund Malaria and Pre-Packaged Therapy (PPT) projects to ensure broad access to ACTs in Nigeria. Through the Global Fund and in conjunction with the Federal Ministry of Health (FMOH), SFH is providing subsidized Artemether Lumefantrine (AL) known as ACTm. These medicines are distributed through private health care providers including Proprietary Patent Medicine Vendors (PPMVs) also know as local drug shopkeepers and community-based pharmacies. SFH works closely with the Federal Ministry of Health, on technical matters, education, training, and coordinating on policy and research to move the nation forward on both prevention and treatment issues in its battle against malaria (SFH, 2012)

1.2 PROBLEM STATEMENT

Morbidity and mortality from malaria have persisted because of failed transactions between those at risk of malaria transmission and available preventive and curative antimalarial (De Savigny et al. 2004). In recent years, caregivers have faced new challenges to acquire effective anti-malarial medicines for their children. Cheap and widely available medicines previously relied upon to treat malaria in children, such as chloroquine are no longer effective(Littrell et al. 2011). Most children receive some form of treatment, most often beginning with treatment outside of the formal health care system (e.g. pharmacies, drug shops). In the course of treating a fever episode, multiple treatments are often acquired from a variety of sources (Littrell et al. 2011). In a typical drug supply system, decisions as to where, when, and what quantity of a drug are used are often influenced by price and affordability

considerations more generally, this is true at household level as well as at national level. This high cost of anti-malarial have resulted in caregivers demanding for choloroquine and sulphadoxine-pyrethamine which the parasite are resistant to and artemisininin monotherapies which will further hasten resistance to ACTs. The high costs may also lead them to unofficial sources, which will sell a single tablet instead of a complete course of treatment, and subsequently to increased, often irrational demand for more drugs and more injections. Increasingly people are resorting to self-medication for malaria, which may cause delays in seeking treatment which is against Roll back malaria goal of ensuring that 80 percent of those suffering from malaria have prompt access to, and are able to correctly use, affordable and appropriate treatment within 24 hours of symptoms onset.

1.3 JUSTIFICATION

Nigeria is one of the countries selected for AMFm phase1 distribution. Nigeria started the distribution of AMFm- ACTs in 2011. Despite the fact that distribution has started, its use at community level has not been documented. While some effort at studying the adherence of drug distributors to use of AMFm-ACTs have been done, information on awareness of AMFM-malaria among community members and how it has affected its use is lacking. Studies also done have concentrated on provider's knowledge on the drug, availability and affordability of the drugs at facilities where they are distributed. Hence, this study aimed at determining awareness, utilization, pattern of use and factors influencing utilization of AMFm-ACTs in communities in Ibadan Northwest Local Government Findings from this study will expand the knowledge base of policy makers to formulate appropriate policies that will ensure the use of Affordable Medicine facility Malaria at the community level.

1.4 RESEARCH QUESTIONS

- What is the level of awareness of AMFm among cargivers of under five children in Ibadan Northwest Local Government Area
- What is the prevalence and pattern of utilization of AMFm-ACTs among caregivers of under five children in Ibadan Northwest LGA.
- What are the factors influencing use of AMFm-ACTs among cargivers of under five children in Ibadan Northwest LGA.

1.5 BROAD OBJECTIVE

To assess awareness of AMFm antimalarial drug and use among caregivers of under five children in Ibadan Northwest Local Government Area.

1.6 SPECIFIC OBJECTIVES

1. To assess awareness of caregivers of under five children on AMFm
2. To determine the prevalence and pattern of use of AMFm- ACTs among caregivers of under five children.
3. To identify factors associated with use of AMFm-ACTs among caregivers of under five children.

CHAPTER TWO

LITERATURE REVIEW

2.1 Epidemiology of Malaria

Malaria is a protozoan infection of erythrocytes caused in human beings by five species of the genus *Plasmodium* (*P falciparum*, *P vivax*, *P ovale*, *P malariae*, and *P knowlesi*).

In most cases, malaria is transmitted via the bite of an infected female anopheline mosquito, but congenital malaria and acquisition through infected blood transfusion are well described. *Plasmodium falciparum* is responsible for most malaria-related deaths worldwide and is the predominant *Plasmodium* species in sub-Saharan Africa. Of the 2.4 billion people at risk of falciparum malaria, 70% live in areas of unstable or low endemic risk. Almost all populations at medium and high levels of risk live in sub-Saharan Africa, where the burden of disease, death, and disability from falciparum malaria is high (Crawley et al. 2010). In areas of high stable transmission, morbidity and mortality are highest in young children in whom acquired protective immunity is insufficient to protect against severe disease. Areas of low or unstable transmission are subject to malaria epidemics, and people of all ages are at risk of severe disease (Crawley et al. 2010).

Nigeria is situated between 4° and 13° Northern Latitude and has a suitable climate for malaria transmission throughout the country. The only exception is the area South of Jos in Plateau State where some mountain peaks reach 1600 meters and the altitude of settlements lies between 1200 and 1400 meters. This area can be considered to be of low or very low malaria transmission (FMOH, 2008).

The country exhibits five ecological strata from south to north which define the seasonality and intensity of malaria transmission, and vector species dominance: mangrove swamps, rain

forest, guinea-savannah, Sudan-savannah and Sahel-savannah. The duration of the transmission season decreases from perennial in the south to around 3 months in the northern border region with Chad. In the northern part of the country, transmission is highly endemic during the short wet season as compared with general low transmission during the long dry season. In the southern part of the country, transmission is stable and uniform throughout the year (ACT watch, 2009).

2.2 Burden of Malaria

Malaria mostly affects the economically marginalized, poorly educated and those who lack access to quality health care (WHO, 2005). It is a public health problem of global concern because of its high economic burden on the nation, high mortality in children, pregnant women and non-immune individuals (Benjamin et al, 2004). Despite efforts by public health systems of malaria endemic countries to control the disease the WHO annual malaria reports have, over the years, consistently presented unacceptable high levels of malaria morbidity and mortality in malaria endemic countries. An estimated 3.2 billion people; representing about 50% of the world population are at risk of malaria infection (WHO, 2005).

Malaria was estimated to affect 247 million people and also 3.3 billion was estimated to be at risk of malaria in 2008. It caused nearly a million deaths, mostly of which were children under five years. (WHO, 2008)

Beyond the health toll that malaria inflicts on the poor, the economic impact of the disease is significant, given that disabilities suffered by survivors can last a lifetime. It is estimated that each year Africa loses USD 12 billion due to malaria in direct and indirect costs.(Dalrymple, 2006). Presently in Nigeria, it accounts for nearly 110 million clinically diagnosed cases per year, 60 percent of outpatient visits, and 30 percent hospitalizations. An estimated 300,000

children die of malaria each year in Nigeria. It is also believed to contribute up to 30 percent under-five mortality. In addition to the direct health impact of malaria, there are also severe social and economic burdens on communities and the country as a whole, with about 132 billion Naira lost to malaria annually in the form of treatment costs, prevention, loss of work time, among others (NDHS, 2008).

2.3 Milestones in Malaria Control in Nigeria

Roll Back malaria (RBM) was initiated in Nigeria in 1999. Strategies to achieve its objectives include prompt and effective case management, intermittent preventive treatment of malaria in pregnancy and integrated vector management which include the use of insecticide-treated nets, indoor residual spraying and environmental management. Since the inception of malarial control, several interventions have been put in place which has resulted in the attainment of several milestones. National policies and programmes have been developed and adopted, training manuals have been developed, and health workers and other stake holders have been trained (Chukwuocha, 2012). Based on WHO, for endemic countries with choloroquinne resistant parasites ACTs was adopted and they replaced single monotherapy drugs. These are now manufactured in Nigeria and packaging has been designed for the home management of malaria in cooperation with the Pharmaceutical Manufacturing Group of the Manufacturing Association of Nigeria. ACTs have been given free to under-fives with the support of the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). Intermittent preventive antimalarial treatments are given to pregnant women after the first three months to reduce the risk of anaemia in mother and low birth weight in child. Distribution of long lasting insecticide treated net was also introduced

Presently there is an upward trend in the distribution of ITNs to the local community (Chukwuocha, 2012).

Agencies like UNICEF and the Federal Ministry of Health are propagating the distribution of these effective and long lasting ITNs to primary health centers where its delivery to the local community level will be affected. Subsidized drugs (AMFm) are also being distributed to wipe single monotherapies and to increase access to the poor. Intermittent preventive therapy has also been implemented. Despite these achievements, the control programme has been laden with problems like inadequate epidemiological data, widespread presumptive treatment, incorrect diagnosis and incorrect diagnostic equipment.

2.4 Overview of Affordable Medicine Facility malaria

The transition to ACTs for the treatment of malaria is probably one of the major challenges faced by malaria endemic countries(Bosman & Mendis 2007) . Various approaches are being promoted to increase the use of highly effective drug treatment for symptomatic malaria, either through public sector facilities, community outreach, or the private sector. Several initiatives implemented over the years to improve access to malaria treatment, include strengthening home management of fevers by training private medicine retailers on effective case management; engaging community health workers to dispense anti-malarial drugs and training health workers to diagnose and prescribe anti-malarials appropriately. Some of these interventions have been shown to be effective , but their sustainability remains unknown (Ajayi et al. 2008; Chuma et al. 2009).

Another initiative to ensure effective treatment of malaria was financial support provided by the Global Fund to fight AIDS, Tuberculosis, and Malaria (GFATM). This was reinforced by the US President's Malaria Initiative (PMI) and the World Bank Booster Program. The reinforced initiative was launched in 2005, as additional sources of support; but until now, their financial disbursements have been considerably less than those of the GFATM. These initiatives will collectively contribute no more than one quarter of the global resource requirements for ACTs estimated at 500–600 million treatment courses per year(Bosman & Mendis 2007). These external financial mechanisms are not likely to constitute sustainable and predictable sources of financing in the long term, given that they themselves are subject to fluctuations in donor commitment. In anticipation of this a global subsidy was recommended(Bosman & Mendis 2007).

The Institute of Medicine recommended a global subsidy for ACTs in 2004 as the best means to achieve high coverage and prolong the efficacy of these drug(Arrow et al. 2004). This concept was further developed by the Roll Back Malaria Partnership and launched by the Board of the Global Fund in November 2008 as the Affordable Medicines Facility-malaria (AMFm).The AMFm is designed to assist endemic countries in fighting malaria. It is designed to make ACTs more accessible to malaria endemic zones which is characterized by high level of resistance to older antimalarial drugs, frequent stock outs of ACTs in public sector and high prices of ACTs in private sector. It is expected that when subsidy is introduced, the ACTs price will fall, which will subsequently lead to availability, use and overall decrease the burden of malaria.

The ultimate goal of AMFm is to work within the existing health system including the public, NGO, and private channels to reduce malaria-related mortality and to delay resistance to effective treatment. Within these parameters, the AMFm has four measurable objectives

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which are to increase the availability of ACTs in public and private outlets; reducing the price of ACTs to be comparable with other antimalarials such as CQ, SP, artemisinin monotherapy; increasing the market share of ACTs among antimalarials and increasing the use of ACTs, including among vulnerable groups such as poor people, rural communities, and children. Evidence on the use of key public health services suggests that providing treatment only through public health facilities may fail to reach the poor and the private channel was considered because in many countries, treatment for fever and malaria through self-medication with anti-malarials bought over-the-counter (OTC) from drug vendors is common(Burton et al. 2011; Ajayi et al. 2008; Chuma et al. 2009).

This channel is increasingly being considered as a viable option for improving drug availability to malaria infected individuals, particularly those located further away from public health facilities(Rutta et al. 2011). It is expected to reduce mortality based on the fact that a fully funded AMFm which requires between USD 1,400 and 1,944 million over the course of five years would dramatically expand the market penetration of ACTs, from 20% to 65% of total antimalarial treatment courses. This growth of ACT usage would save an estimated 174,000 to 298,000 lives per year(Laxminarayan et al. 2006).

The availability of low-cost ACTs combined with supporting interventions across the public and private sectors is expected to rapidly shift consumer purchasing patterns toward ACTs, while displacing monotherapies that are ineffective and increase the likelihood of resistance. AMFm also contributes to strengthening of the health system by lowering the financial burden of malaria medicines, thus allowing endemic-country governments to increase the availability of effective medicines throughout the health system. Improved availability of malaria treatment in areas where effective medicines are currently not available will free up health-system resources for both malaria and other illnesses.

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The public and private sectors have distinct and independent drug supply chains, although both are regulated by the (NAFDAC). Quality control is provided by NAFDAC at the point of entry for imported products and at the factory gate for locally-manufactured products.

The public sector system is highly fragmented, with each disease having its own supply chain system. Government agencies and partners are first-line buyers and purchase medicines directly from manufacturers. Manufacturers bid to supply the government through local and international competitive bid processes, managed by the Tenders Unit of the FMOH. However, donors also supply commodities directly to state-level medical stores, and both States and LGAs have funding for procurement. In anticipation of the AMFm pilot, donors are supporting the development of an improved logistics management information system for malaria commodities (ACT watch. 2009).

Procurement in the private sector is informed by government treatment guidelines, but predominantly driven by demand. In-country manufacturers are a key source of commodities for Nigerian wholesalers and distributors: there are almost 40 nationally-registered ACTs that are manufactured in-country (ACT watch. 2009). For products manufactured outside of Nigeria, it is common practice for an importer to act as the sole agent for a manufacturer. While importers are free to choose their suppliers, a tendency to enter into exclusivity agreements is fostered by the stringency of the registration requirements, the amount of time that it takes to develop a relationship with the supplier, and the amount of investment that goes into developing the local market for the imported product.

Figure 1: Flow of co-paid ACTs under the AMFm

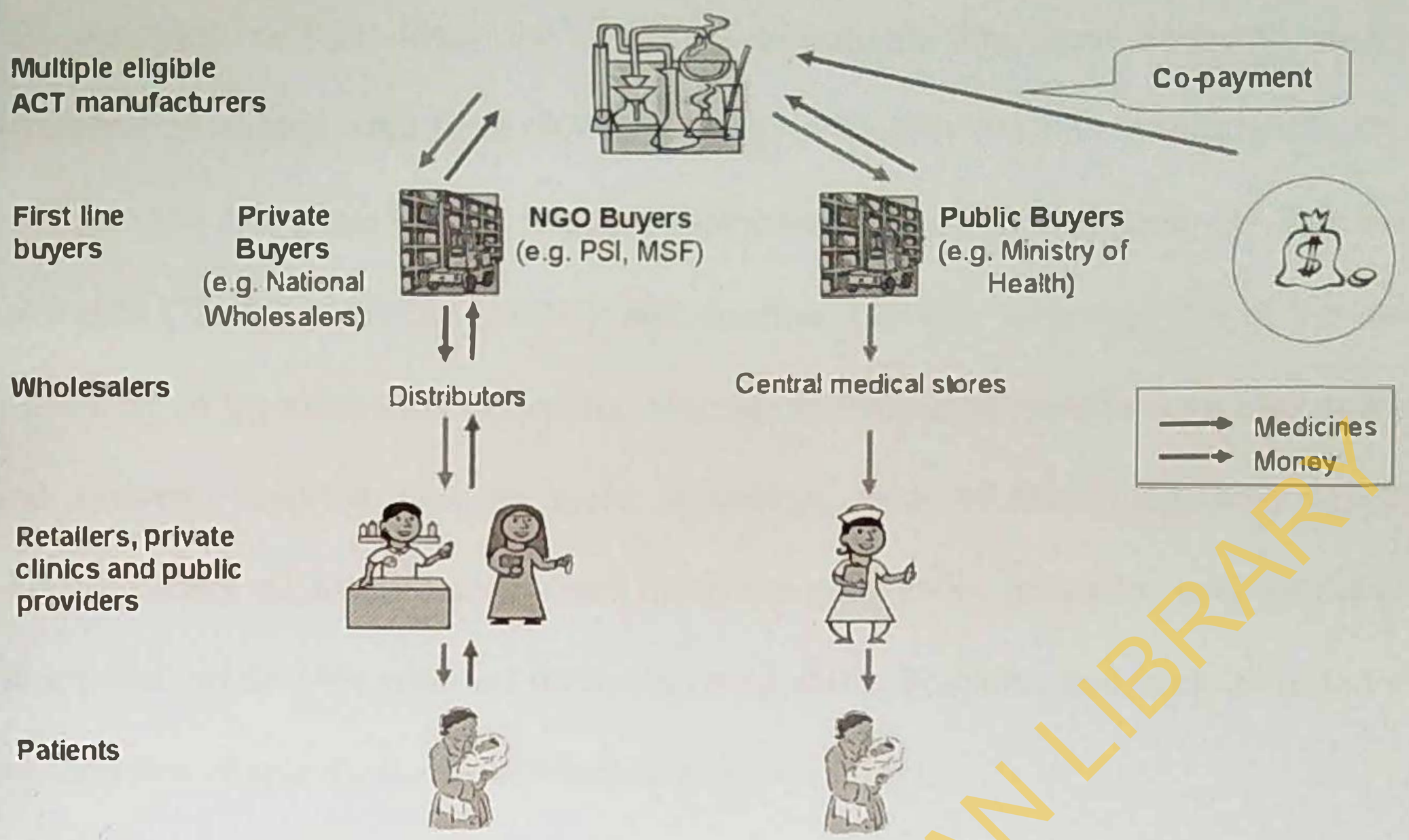

Figure 2.1 : Flow of co-paid ACTs under the AMFm

2.5 Knowledge of symptoms of Malaria among Caregivers of Under Five

The success of malaria control depends on the knowledge of causes and modes of transmission of the disease, health seeking behaviour and practices of malaria.

Studies have shown varied knowledge of symptoms of malaria.

In a study done in Tanzania, four hundred and sixty four respondents (92.1%) knew that malaria is transmitted through mosquito bite. Others attributed malaria to be as a result of bedbugs (0.6%), ticks (1.6%), contaminated water (15%), basking in sun-shine (2.6%), working in the rains (1%) and witchcraft (0.4%). A total of 436 (86.7%), 306 (60.8%) and 162 (32.1%) mentioned fever, vomiting and loss of appetite as major symptoms/signs of malaria, respectively (Safari et al, 2010).

In a more recent done among women with children under the age of five years in rural Ethiopia, Most mothers knew the symptoms of malaria. The most frequently mentioned symptoms of malaria were fever (97%), shivering and chills (94.2%), headache (72.1%) and back pain (60.8%) while the less frequently mentioned were loss of appetite (37.7%), body or joint pain (22.4%), vomiting (11.4%), and diarrheal (3.4%). Less than 1% of the mothers knew none of the symptoms of malaria. Multiple symptoms of malaria were also mentioned and majority reported two or more symptoms, with 91.8% citing both fever and shivering/chills. About 28% recognized fever, shivering/chills, headache, back pain and loss of appetite, while 24% reported fever, shivering/chills, headache and back pain, but didn't mention loss of appetite (Gobena, Berhane &Worku, 2013).

Studies have however noted that improved community knowledge of malaria and its source of transmission promote preventive and personal protective practices amongst the affected populations. For example a study carried out in Ghana showed that knowledge of the aetiology and the transmission of malaria played a role in the utilization of bed nets (Agyepong & Manderson 1999). A recent review done in Ghana showed that lack of ownership and use of bed nets in Kenya and Malawi were due to lack of knowledge of the role that mosquitoes play in the transmission of malaria(Adongo, Kirkwood & Kendall 2005)

2.6 Awareness of Caregivers on Artemisinin Based Combination Antimalarial Therapy

Effective interventions against malaria are available, yet the burden persists, largely because most people at risk of malaria are unaware of the interventions that exist to control malaria and because they have little or no access to these interventions for various reasons, including affordability. A lack of education, information and access to effective interventions has impeded the success of Rollback Malaria (RBM) programmes (WHO 2005). In a study done

In a more recent done among women with children under the age of five years in rural Ethiopia, Most mothers knew the symptoms of malaria. The most frequently mentioned symptoms of malaria were fever (97%), shivering and chills (94.2%), headache (72.1%) and back pain (60.8%) while the less frequently mentioned were loss of appetite (37.7%), body or joint pain (22.4%), vomiting (11.4%), and diarrheal (3.4%). Less than 1% of the mothers knew none of the symptoms of malaria. Multiple symptoms of malaria were also mentioned and majority reported two or more symptoms, with 91.8% citing both fever and shivering/chills. About 28% recognized fever, shivering/chills, headache, back pain and loss of appetite, while 24% reported fever, shivering/chills, headache and back pain, but didn't mention loss of appetite (Gobena, Berhane &Worku, 2013).

Studies have however noted that improved community knowledge of malaria and its source of transmission promote preventive and personal protective practices amongst the affected populations. For example a study carried out in Ghana showed that knowledge of the aetiology and the transmission of malaria played a role in the utilization of bed nets (Agyepong & Manderson 1999). A recent review done in Ghana showed that lack of ownership and use of bed nets in Kenya and Malawi were due to lack of knowledge of the role that mosquitoes play in the transmission of malaria(Adongo, Kirkwood & Kendall 2005)

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by Kwaku et al in 2010 to assess community perceptions of malaria and malaria treatment behaviour in a rural district of Ghana close to 60% of the household heads and 40% of the care-givers interviewed did not know about ACTs. Community respondents who knew about and had ever taken ACTs perceived it to be a good drug; although they mentioned they had experienced some side effects including headaches and body weakness. Community members who were aware of Artesunate -Amodiaquinne (AS-AQ) reported diverse sources of their information about AS-AQ, the commonest being the local radio and/or the National Television stations. About sixty seven percent of household heads in the urban areas and 48.7% of household heads in the rural areas reported the radio and television as the main sources of information; similar responses were solicited from care-givers. Other sources of information about AS-AQ among caregivers included health talk sessions during child welfare clinics, health talk at churches, and discussions with relative. In rural areas, 17.6% of household heads and 37.2% care-givers had heard of AS-AQ during community durbars organised by health workers. In another study done in Jos to determine the Knowledge and treatment practices of malaria among mothers and caregivers of children of under five, it was reported that about 92.4% have not heard of Artemisinin Combination Therapy (ACT) and only 50% of those who had heard of ACT had ever used it for the treatment of malaria (Daboer et al, 2010).

2.7 Utilization of Artemisinin Based Combination Therapy

People's perceptions of the aetiology of illness and their subsequent reaction to illness, such as their treatment-seeking behaviour, their selection or acceptance of available treatment options and their adherence to recommended drug regimens, have a tremendous effect on the use of any anti-malarial drug and play an important role in the effectiveness of a strategy of combination therapy in the prevention of resistance(Bloland et al. 2000).

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In sub-Saharan Africa, the utilization of ineffective drugs in the treatment of malaria in past years has led to treatment failures and drug resistant parasites and elevated rates of mortality, particularly among young children(Saulo et al., 2008).

Following guidance from the World Health Organization, by 2009 the vast majority of *Plasmodium falciparum* malaria endemic countries and territories had adopted ACTs as national first-line treatments for uncomplicated malaria (WHO 2009). Although national policies have changed, use of ACT remains limited in high-burden countries (RBM, 2009). Use of Artemisinin Based Combination is defined as ACT given to a child within 24 and 48 hours of onset of fever (Schaferhoff& Yamey, 2011).

Results from nationally representative outlet surveys in six sub- Saharan countries in 2011 (Benin, the Democratic Republic of Congo, Madagascar, Nigeria, Uganda, and Zambia) discovered that non-artemisinin monotherapies are the most commonly acquired antimalarial drugs for children under five in Benin (76%), the DRC (84%), Madagascar (93%), Nigeria (81%), and Uganda (63%). The most common non-artemisinin monotherapies were chloroquine (Benin, Madagascar,Nigeria), quinine (the DRC, Uganda), and sulphadoxine/pyrimethamine (SP) (Zambia). While just over half of all anti-malarials acquired for children in Zambia was ACT (53%), ACT makes up a relatively small proportion of all anti-malarial treatments acquired for children in Benin (23%), the DRC (10%), Madagascar (3%), Nigeria (13%) and Uganda (36%) (Littrell et al., 2011).

In a study conducted in Kenya in 2004 prior to the supply of subsidized drug it was discovered that out of 418 patients that sought treatment for malaria symptoms and received an anti-malarial 32% and 27% were treated with either SP or Amodiaquine with only 15% receiving Artemeter Lumefantrine and 2% chloroquine (Williams et al. 2004). A year after the launch of the Uganda pilot, usage was 15% within 24 hours and 20% within 48 hours

(compared with 3% and 4%, at baseline respectively). Likewise in another study done in Lagos to determine the practice and determinants of Home Management of Malaria (HMM) among care givers of children below 5 years it was discovered that most children were treated with chloroquine and only a few 4.2% of the children were treated with the recommended ACT.(Okafor & Odeyemi 2010) The most popular drugs used by these caregivers were the sulphadoxine–pyrimethamine antimalarials, followed by chloroquinne. Literatures on utilization of AMFm-ACTs are not available.

2.8 Pattern of use of Artemisinin Based Combination Therapy

Pattern of use according to literatures was described as use of antimalrial drug based on prescription or without prescription and also adherence to antimalarial drugs. Adherence was defined as abiding by the recommended dose and period of usage of ACTs (Onyango, 2012).

Drug-use pattern of anti-malarial has been associated with development of resistant strain and therapeutic failure. Poor practices of drug use threaten combination therapy in two ways: inappropriate dosing which provides increased opportunities for parasites to be exposed to suboptimal blood levels of either drug in the combination; and one or both components may continue to be given as monotherapy. The pattern of anti-malarial drug use in endemic areas of Africa is quite different from the pattern of use of other drugs due to the high intensity of malaria transmission in these areas. In areas of intense malaria transmission, anti-malarial drugs are given repeatedly to treat frequent fevers (even in the absence of malaria) (Carren et al.). The practice of self-medication is also increasingly becoming a major health concern. Self medication is based on presumptive treatment and this has been implicated in the development and spread of anti-malarial drug resistance(Oshikoya 2007). Research finding shows that many illnesses including malaria are treated without consultations from health

professionals. About 12–94% of participants in various surveys have reported self-treatment of malaria (McCombie, 1996). Malaria patients are often brought to a health clinic only after the failure of treatment at home. In a study to assess behaviours during use of anti-malarial drugs by Carren et al it was discovered that 39.4% of respondent use drug with prescription and 61.6%without prescription. In areas where malaria transmission is endemic, about 50-80% of people first visit private drug outlets for malaria treatment and use these anti-malarial drugs even without prescription, a practice which has resulted in patterns such as over-use, under-use and irregular use of these drugs (Malakooti et al. 1998). Knowledge of correct dosage varies and in some cases, it may be lacking. In a study done on consumers' only 29.4% used the correct ACT dosage. Out of those who responded to the question of duration of ACTs therapy, the majority (67.0%) responded incorrectly, mostly identifying shorter treatment duration (less than 3 days) (Carren et al.). In another study by Okafor et al 65% of caregivers would use an incorrect dosage of antimalarials, and only 35% would administer any of the drugs correctly. In total, 57% of caregivers would administer SP drugs correctly, but only 9% of the respondents who preferred chloroquine would use the correct dose. The correct use of antimalarial drug is the key not only to therapeutic success but also to deterring the spread of drug resistance malaria(Omole & Onademuren 2010) .

In another study another carried out to determine adherence to prescribed artemisinin-based combination therapy in Garissa and Bunyala districts, Kenya, it was found that 64.1% of the respondents were probably adherent to ACTs, 31.7% were definitely non- adherent and 4.2% were probably non- adherent. Literatures on pattern of use of AMFm-ACTs are not available (Lawford et al., 2011).

CHAPTER THREE

METHODOLOGY

3.1 Study Area

This study was conducted in Ibadan Northwest Local Government area which is one of the eleven LGAs that constitute Ibadan metropolitan area. Ibadan is one of the largest cities in sub-Saharan Africa and it is home to all people around the country. It is the capital of Oyo state, one of the 36 states of the Federal Republic of Nigeria. It is centrally situated in the south-western part of the country and is 128km north-east of Lagos and 345km south-west of Abuja, the Federal Capital territory. Its central location gives it transport and economic advantage, which to a large extent explains its rapid growth. It is thus the commercial, educational and administrative centre of Oyo State. For administrative purposes the city is divided into 11 Local Government Areas. Five of which are urban. Ibadan is home to an estimated population of 5.6million people from the 2006 census which is. The city is made up essentially; the core inner city areas and the 'new' town. The core areas have many slum dwellings and they are characterised by high population density per household and these core areas constitute about half of the city (Olaniran 1998). The geographic location of the state makes the climate suitable for malaria transmission. The state is located in the rainforest area and experience rainfall for about a period of six months. Areas around the rivers and smaller streams are infested with mosquitoes all round the year, mosquito bites are common and malaria is one of the most important diseases in this region.

Ibadan Northwest Local Government is one the five urban Local Governments. It has a population of 152,834 people of which77, 523 are females while 75,311 are males based on 2006 census (FGN,2007). The inhabitants of Ibadan Northwest are mostly Yoruba while the main occupation are trading and working in the Public civil service. Ibadan Northwest is

bounded on the North by Ido Local Government, on the south by Ibadan Southeast Local Government, on the west by Ibadan Southwest Local Government, and on the east by Ibadan Northeast Local Government. There are 11 political wards and 6 primary health centres (government-owned) in the local government. The settlements in the local government are stratified along inner core (indigenous/slum-like), transitory (developed with little or no space for further development) and peripheral communities (developed with more space for more development). The inner core areas are characterised by slum dwellings with a very high percentage of land devoted to residential land use. The transitory areas represent the commercial areas with a low percentage devoted to residential land use and the peripheral areas represent the 'new' town.

Treatment for malaria takes place in health facilities and at other healthcare providers' places such as private patent medicine shops, pharmacy shops and appointed community medicine distributor places. However, home management of malaria using drugs bought from private patent medicine vendors (PPMVs) and pharmacy is a common practice among caregivers in Nigeria including those in this study LGA.

3.2 Study Design

The study used a cross-sectional design.

3.3 Study Population

The study population was caregivers of under five children in the LGA.

3.3.1 Inclusion Criteria

Caregivers in their reproductive age (15-49years) whose under five children had fever within two weeks prior to the survey were included in the study.

3.4 Sample size calculation

Using the formula for estimating sample size for single proportion

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2.9 Factors determining Artemisinin Based Combination Drug use

Although, Artemisinin Based Combination drug is highly efficacious its price and poor access has remained an undaunted challenge thus preventing the poor from accessing it. ACTs are typically sold at retail prices 20--40 times those of common alternatives such as amodiaquine and sulphadoxine-pyrimethamine (SP), restricting their uptake by consumers. particularly in rural areas (Feachem et al. 2008;Kachur et al. 2006). As a result, most retail sector anti-malarial customers continue to use older therapies for which widespread resistance has been reported or artemisinin monotherapies, which is strongly discouraged by the World Health Organization because their use is likely to accelerate the development of artemisinin resistance (Sabot et al. 2009). Factors deterring the use of artemisinin based combination in literature are socio-cultural factors such as the willingness to pay for quality assured ACTs, consumers' knowledge about the superior efficacy of quality assured ACTs over monotherapies, and consumers' longstanding preference for older treatments. In a study done by Tindabil (Tindabil, 2008), predictors of anti-malarial drug use were age, educational level, and household head. In another study done in Kenya predictors of antimalarial drug use were household head, household source of income, monthly income, duration of use, dosage of drugs and sources of drug (Carren et al.,201)). Also, a study done in Tanzania by in 2011, found that increase access to Government subsidized ACTs increased use of ACTs from 3 to 26% (Rutta et al.,2011).

$$N = \frac{Z^2Pq}{d^2}$$

Where

N= minimum sample size required for the study;

Z= standard Normal deviate a constant which is 1.96 at 95% confidence interval;

P= Percentage Knowledge on AMFm estimated to be (50.0%) as the proportion of caregivers with knowledge on AMFm was not found documented.

q= 1-P

d= level of precision which is (5%)

$$n = \frac{(1.96)^2 \times 0.50 \times 0.50}{(0.05)^2}$$

N= 384

Assuming non- response rate, r to be 10%

$$\text{Adjusted sample size} = \frac{100 \times N}{100-r} = \frac{100 \times 384}{100-10}$$

=430

N is approx. 430

3.5 Sampling Technique

A Cluster sampling of five enumeration areas was done.

Based on the information from National Population Commission, Ibadan Northwest has 509 enumeration areas. It was estimated that an enumeration areas consisted of at least five hundred household and women in reproductive age group represent 22 percent of the total

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3.6 Data Collection

The data collection instrument was adapted from ACT watch survey questionnaires used in seven African countries (ACT watch, 2009) and also questions from literatures that assessed the utilization of Artemisinin based Combination Therapy. The final 51- item questionnaire was in 5 sections:

Section A: This section had questions on respondents' socio demographic characteristics.

Section B: Consisted of questions on Knowledge of signs and symptoms of malaria.

Section C: Consisted of questions on awareness of Affordable Medicine Facility malaria.

Section D: Included questions on use of Affordable Medicine Facility malaria-ACTs

Section F: Included questions on pattern of use of Affordable Medicine Facility malaria-ACTs

Four research assistants with Ordinary National Diploma (OND) were trained for two days to assist with data collection. Research assistants were given packet of AMFm drugs (also known as antimalarial packet with the green leaf symbol). Data were collected over a period one month.

3.7 Pretest and Validation

The questionnaire was translated to Yoruba and back translated to English to ensure consistency in meaning. It took an average of twenty minutes to administer each questionnaire. A pre-test was done in Ibadan North-East, another urban Local Government which was not selected for the study. The flow of questions was modified and ambiguous questions were corrected following the pre-test. Twenty caregivers were interviewed at the pre-test.

3.7.1 Definition of Variables

Use of AMFm was defined as use of AMFm- ACTs within 24-48hours of onset of fever,

Pattern of use of drug was defined as abiding by the recommended dose and period of usage of AMFm- ACTs and also use of dug with or without prescription.

3.8 Data Management

Data was entered, cleaned and analyzed using Statistical Package for Social Sciences version 15 software. Means, standard deviations, range and proportions were used to summarize data. Four questions were used to assess if caregivers were aware of AMFm. Questions that addressed this were:

1) Question addressing if they have heard about AMFm.
2) Question addressing if they have seen packet of antimalarial with the green leaf symbol.
3) Question asking the respondents on their sources of information on AMFm
4) Question asking the respondents on the meaning of the symbol on the drug packet

Concerning the meaning of the symbol on the drug packet, eight questions were asked and the maximum score that the respondents could get in this domain was eight. Respondents were categorised into having a good knowledge and having a poor knowledge. Respondents having scores above the mean were taken to have good knowledge and respondents having scores below the mean were taken to have poor knowledge.

Question was asked to estimate the prevalence of use of AMFm-ACTs. The question that was asked to address this was which antimalarial was used for a child that had fever in the last two weeks.

Concerning factors influencing use of AMFm-ACTs, socio demographic factors, socioeconomic status of the respondents, accessibility, awareness on AMFm, knowledge on AMFm symbol and Knowledge on symptoms of malaria were considered. Access was defined in terms of geographical accessibility to drug shops where AMFm-ACTs were being sold and also availability of AMFm- ACTs. Geographical access was considered good if it takes 30 minutes or less [irrespective of mode of transportation] for someone to reach the source of the drug (Onyango et al, 2012). Socio demographic factors considered were age, marital status, household decision maker, and religion. The respondents were classified into high and low socio economic status. People of low socio-economic status were defined as people living below $2 per day. (RBM AMFm Task Force, 2008). Respondents were categorised as having good knowledge on symptoms of malaria if they have scores above the mean scores; the total obtainable score based on the number of questions asked and score of the response being ten marks.

Correctness of drug taken was assessed with reference to duration of treatment, number of tablets taken in relation to the age of the child, number of days used in taking medication. Duration of treatment, numbers of tablets taken and number of days used in taking

medication was evaluated based on the National treatment guideline for Artemisinin- Based Combination Therapy.

The Chi-square test was used to determine associations between categorical variables. Logistic regression analysis was used to determine the predictors of use of Affordable Medicine facility Malaria. The level of statistical significance was set at 0.05

Variables included in the analysis

Outcome variables

Use of AMFm-ACTs

Pattern of use of AMFm-ACTs

Independent Variables

Socio-demographic characteristics

Age

Marital status

Occupation

Religion

Household decision maker

Awareness of AMFm

Knowledge on AMFM symbol

Knowledge on Malaria symptoms

Access to AMFm-ACTs

3.9 Ethical Considerations

Approval for the study was obtained from the Oyo State Ethical Review Committee. Participation was voluntary and each respondent received detailed information on the purpose of the study following which written informed consent was obtained from participants before questionnaires were administered. Data collected were used only for research purposes and was kept confidential on a password protected computer. Names and addresses were not included in the data collection instrument and thus collected data cannot be linked with any person. Caregivers also received information on Affordable Medicine facility malaria, its usage and dosing following the completion of the questionnaire.

CHAPTER FOUR

RESULTS

Out of 500 questionnaires administered, 480 people responded and 478 duly completed questions were analysed.

4.1 Socio –demographic characteristics of respondents

Table 4.1 below shows the socio demographic characteristics of respondents. The mean age of the respondents was 31.0 ± 5.4 years. Many of the caregivers 287 (60.3%) were between 25 and 34 years, 427(89.3%) were married and many 287 (60.6%) were Christians. More than half 293(61.7%) of the respondents had secondary education while 267(55.9%) were traders. Less than half of the respondents 141(32.2%) were of high socio-economic status.

Table 4.1: Socio-demographic characteristics of the respondents

VARIABLE	FREQUENCY	(%)
Age group (years)		
N= 476		
15-24	58	12.2
25-34	287	60.3
≥ 35	131	27.5
Income		
N= 438		
Low socio-economic status	297	67.8
High socio-economic status	141	32.2
Level of Education		
N= 475		
None	18	3.8
Primary	107	22.5
Secondary	293	61.7
Post secondary	57	12.0
Marital Status		
N=478		
Married	427	89.3
Single	38	7.9
Divorced	6	1.3
Co-habiting	6	1.3
Divorced	1	0.2
Occupation		
N=478		
Trader	267	55.9
Artisan	128	26.8
Civil servant	55	11.5
Others*	28	5.9
Religion		
N=472		
Christian	286	60.6
Islam	186	39.4

*(others were Housewife, Auxiliary Nurse)

4.1.1 Family Characteristics

The number of under five children in a household ranged from one to four with a median of one child. More than half 266(55.6%) of the children were females and about 146(30.5%) of the children were within 25-36months. Most of the caregivers 469(98.5%) were mothers of the children while others 7(1.5%) were grandmothers and aunties. Mostly mothers 425(88.9%) made decision for treatment for their child.

Table 4.2: Family Characteristics of respondents

Variable	Frequency	(%)
Child's Age(months)		
N=478		
6-12	56	11.8
13-24	129	27.2
25-36	146	30.8
37-48	114	24.1
49-59	29	6.1
Child's sex		
N=472		
Male	206	43.6
Female	266	56.4
Decision maker in the home		
N=473		
Mother	425	89.9
Father	48	10.1
Relationship of respondent to Child		
N=474		
Mother	467	98.5
Others*	7	1.5

*others were grandmother and Aunties

4.2 Knowledge on symptoms of malaria

Majority of caregivers 415 (87.6%) had good knowledge of the symptoms of malaria in children. Symptoms mentioned were fever 456(95.6%), poor appetite 236(49.5%), vomiting 132(27.6%) and headache 83(17.4%)

4.3 Awareness of Antimalarials

Choloroquinne was the most mentioned antimalarial 465(97.3%) and 312(65.3%) knew ACTs. Only 203(42.5%) perceived that ACTs was the most effective drug for uncomplicated malaria (Table 4.3) and about 173(36.2%) knew that it was the antimalarial recommended by the Government for the treatment of uncomplicated malaria (Figure 4.1).

Most of the respondents 420(88.8%) gave their child antimalarial drug for fever, 27(5.6%) gave herbs and 17(3.6%) considered the fever not serious enough for the child to be given antimalarial. Out of those that gave their child antimalarial 418(99.8%) responded within 24-48hours of onset fever.

Table 4.3: Respondents Knowledge on the most effective anti-malarial

VARIABLE	FREQUENCY	(%)
Most effective antimalarial		
ACTs	203	42.5
Choloroquinne	142	29.7
Sulphadoxinne-pyremethamine	103	21.5
Amodiaquinne	19	4.0
Quinne	6	1.3
Don't Know	5	1.0
Total	478	100

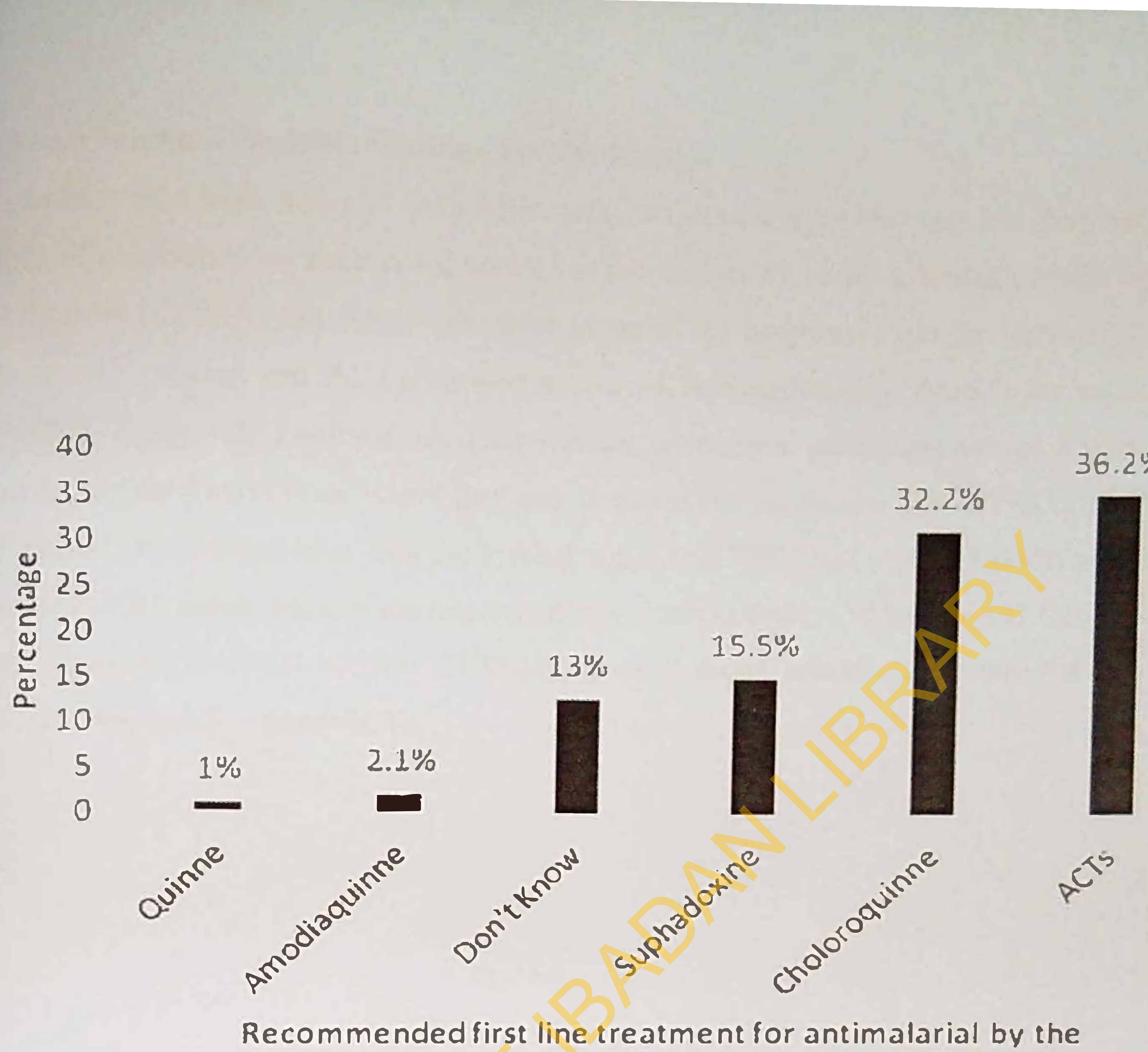

Figure 4.1: Respondents Knowledge on the recommended drug for the management of uncomplicated malaria

4.4 Awareness on Affordable Medicine Facility Malaria

Respondents who were aware of the AMFm programme were 43(9.1%) and less than half 204(42.9%) have seen the antimalarial packet that has the symbol of the Affordable Medicine Facility malaria (Table 4.4). Those who were aware of the programme got the information from diverse sources and the commonest source of information was through the radio 13(31.7%) (Figure 4.2). For those who have seen the antimalarial packet that has the AMFm symbol, the commonest place where they saw it was at the pharmacy 125(62.8%) (Figure 4.3). Out of the 204 that have seen the symbol, only 97 (47.5%) had a good knowledge of what the symbol meant. Most of the respondents who have seen the AMFm logo 183 (89.7%) when shown felt it meant nothing, 23(11.3%) knew it meant subsidized antimalarial and 17(8.3%) mentioned it meant ACTs.

Table 4.4: Awareness of Affordable Medicine Facility malaria

VARIABLE	FREQUENCY	%
Awareness of AMFm programme N=475		
Yes	43	9.1
No	432	90.9
Awareness of AMFm symbol N=475		
Yes	204	42.9
No	271	57.1
Knowledge on meaning of Symbol N=204		
Poor	107	52.5
Good	97	47.5

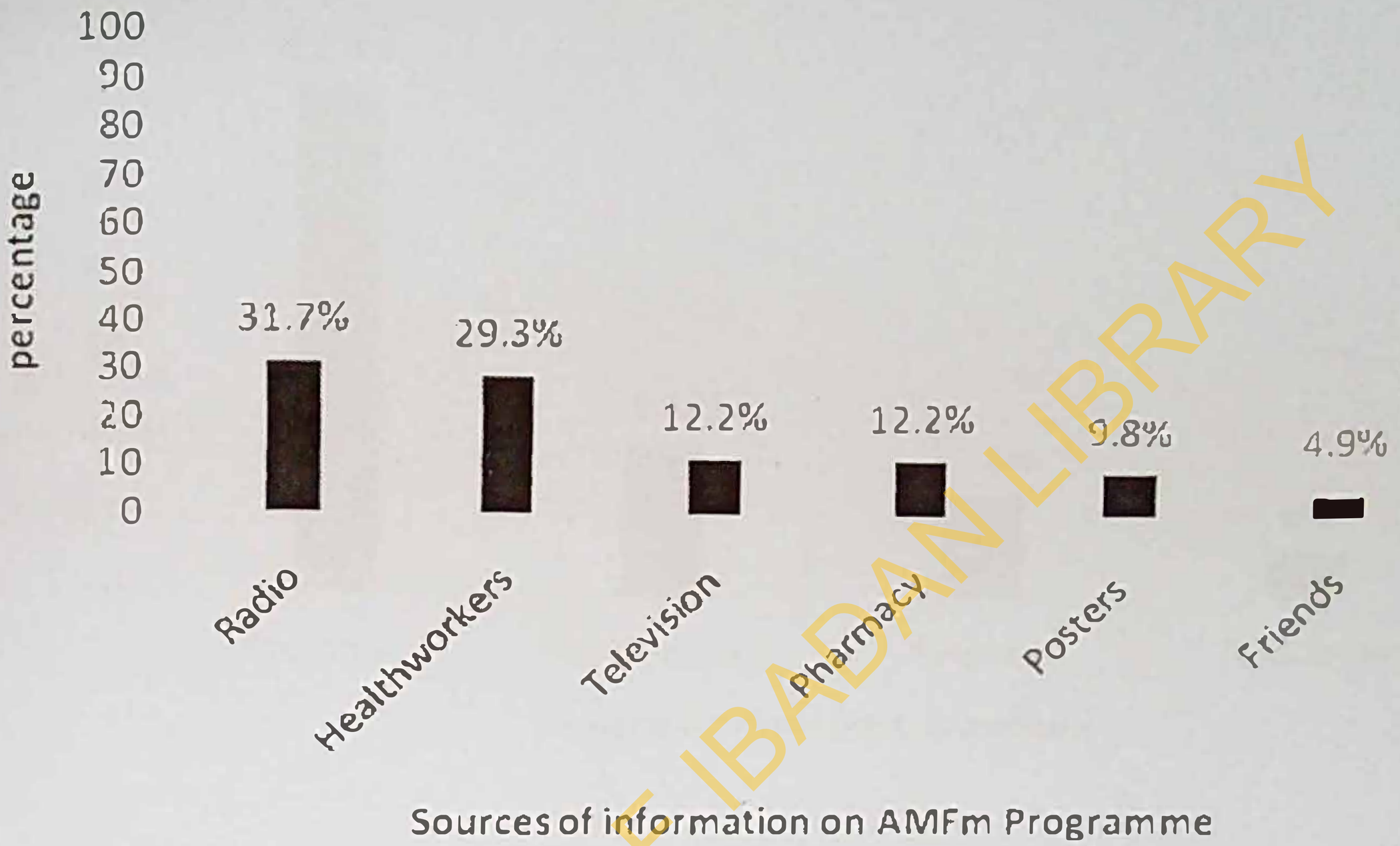

Figure 4.2: Sources of information on AMFm programme

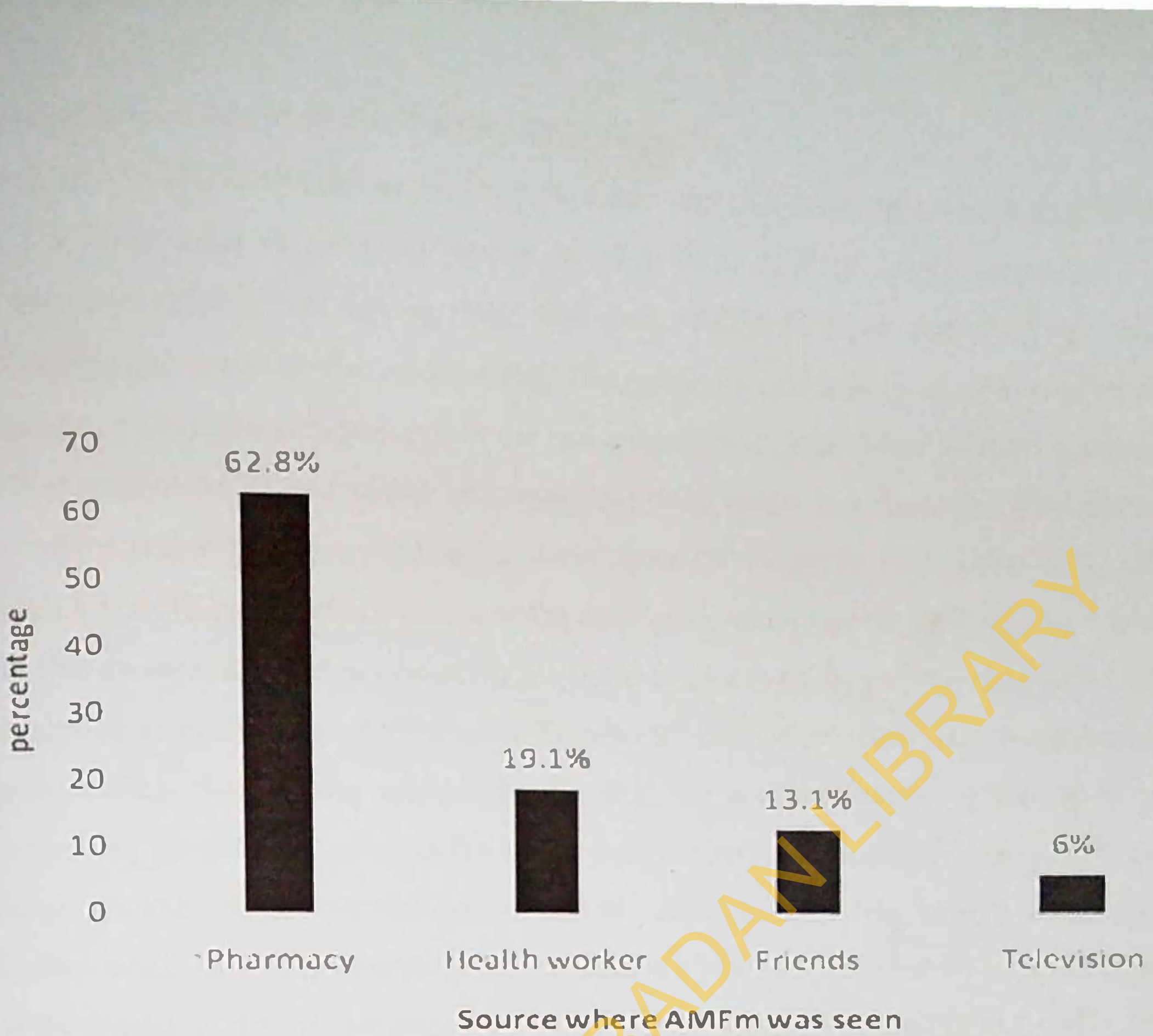

Figure 4.3: Sources of information on AMFm symbol

4.5 Use of Affordable Medicine Facility Malaria-ACTs

Overall, 123(29.2%) used AMFm-ACTs as their first line choice of anti-malarial drug (Table 4.6). The mean price of the drug was N 242.0 ± 90.3. Also the same proportion used choloroquinne 123(29.2%). Among those that used AMFm-ACTs as their first line drugs only 2(1.6%) had to use another antimalarial. The reason given for using another antimalarial was failure of the child to improve with the antimalarial first given. None of the respondents that used AMFm-ACTs had Rapid diagnostic test done before the drug was administered. Many of the respondents acquired anti-malarial from PPMV 48(39.7%) (Table 4.6). More than half 67(54.5%) cited effectiveness of the drug as the main reason for choosing it while 42(34.1%) mentioned recommendation from people as a basis for buying the drug (table 4.7). With regards to availability of AMFm-ACTs majority 101 (91.8%) out of 110 respondents that responded to the question reported that the drug was available whenever they go to buy it. Concerning geographical accessibility to the facility where AMFm-ACTs was bought most of the respondents 93(89.4%) had good access to where the drug was bought When asked what they would do if they happen to miss a dose, 67(54.9%) responded they would ignore the missed dose, 31(25.4%) reported they would extend the days of the therapy, 14(11.5%) reported they would take it immediately they remembered it and 6(4.9%) would double the next dose to compensate for the missed dose (Table 4.8).

Table 4.5: Use of Antimalarials drugs

Use of Antimalarial drugs	Frequency	(%)
Arthesunate/Amodiaquinne	4	1.0
Artesunate	5	1.2
Amodiaquinne	19	4.5
Artemether /Lumefantrine	35	8.3
Sulphadoxine-pyremethamine	112	26.6
Choloroquinne	123	29.2
AMFm-ACTs	123	29.2
Total	421	100

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Sulphadoxine-pyremethamine	112	26.6
Choloroquinne	123	29.2
AMFm-ACTs	123	29.2
Total	421	100

Table 4.6: Sources of AMFm-ACTs

Sources	Frequency	Percent (%)
Supermarket	3	2.5
Public health facility	7	5.8
Private clinic	19	15.7
Pharmacy	44	36.4
PPMV	48	39.7
Total	121	100

Table 4.7: Main Reason for asking for AMFm-ACTs

Variable	Frequency	Percent (%)
Reasons		
Price	1	0.8
Feel much better with it	1	0.8
Availability	2	1.6
Recommended by others	52	42.3
Considered to be effective	67	54.5
Total	123	100

Table 4.8: What respondents mentioned they would do if they happen to miss a dose of AMFm-ACTs

Variable	Frequency	Percent (%)
What would be done		
Ignore missed dose	67	54.9
Extend the days of therapy	31	25.4
Take dose immediately they remember	14	11.5
Double dose whenever they remember	9	8.2
Total	122	100

4.6 Pattern of use of AMFm-ACTs

Duration of treatment with AMFm-ACTs was assessed and results showed that 95(78.5%) took the drug within the recommended three days, 20 (16.5%) took the drug for less than three days and 6 (5%) took the drug for more than three days.

Overall 75(61.5%) took the correct number of tablets in relation to their age and also within the recommended day. Respondents discontinued the drug before the recommended time for the drug because symptoms got better. When asked what they would do with the left over, respondents 19(95.0 %) reported they would keep the drug for another episode of malaria. More than half of the respondents 63(51.2%) bought the drug by self prescription while 43(35.0%) received prescription from health worker.

Table 4.9: Correctness of use of AMFm-ACTs

Variable	Frequency	Percent (%)
Correctness of use		
Correct	75	61.5
Incorrect	47	38.5
Modes of prescription		
Self prescription	63	51.2
Health workers	43	35.0
Others		13.8
Total	122	100

*others were neighbour, friend and relative

4.7Association between demographic factors and use of AMFm-ACTs

Table 4.10 below shows the association between socio-demographic factors and use of AMFm-ACTs.

Of those that used AMFm-ACTs the highest proportion was in the age category 25-34 years and this was statistically significant (p=0.016).

Respondents who were Christians used more of AMFm-ACTs compared to respondents who were muslims but this was not statistically significant (p= 0.059).

More of the respondents who were currently married used AMFm-ACTs compared to those who were not currently married but this was not statistically significant (p= 0.706).

Of those that used AMFm-ACTs the highest proportion was among those who were Public civil servants and this was statistically significant (p=0.000).

Although children who had their mother making decisions for them used more of AMFm-ACTs, this was not statistically significant (p =0.559)

Respondent with tertiary education used AMFm-ACTs compared to with other levels of Education and this was statistically significant (p=0.000).

A higher proportion of those in high socio-economic status used AMFm-ACTs compared to those in low socio-economic status (p= 0.000).

Table 4.10: Association between demographic factors and use of AMFm-ACTs

VARIABLE	USE OF AMFm		Total	X^2	p VALUE
Age	**Yes**	**No**			
15-24years	7(13.5%)	45(86.5%)	52(100.0%)	8.265	0.016*
25-34years	84(32.8%)	172(62.8%)	256(100.0%)		
35 and above	30(26.5%)	83(73.5%)	110(100.0%)		
Religion					
Christianity	85(32.2%)	179(67.8%)	264(100.0%)	3.563	0.059
Islam	37(23.6%)	120(76.4%)	157(100.0%)		
Marital Status					
Currently married	111(29.4%)	267(70.6%)	378(100.0%)	0.142	0.706
Not currently married	12(26.7%)	33(73.3%)	45(100.0%)		
Occupation					
Trader	48(21.0%)	181(79.0%)	229(100.0%)	28.554	0.000 *
Artisans	34(29.3%)	82(70.7%)	116(100.0%)		
Public civil servants	29(54.7%)	24(45.3%)	53(100.0%)		
Others	12(48.0%)	13 (52.0%)	25(100.0%)		
Household decision maker					
Mother	112(29.9%)	263(70.1%)	375(100.0%)	0.341	0.559
Father	11(25.6%)	32(74.4%)	43(100.0%)		
Level of Education					
None	2(18.2%)	9(81.8%)	11(100.0%)	43.229	0.000*
Primary	11(13.1%)	73(86.9%)	84(100.0%)		
Secondary	74(27.6%)	194(72.4%)	268(100.0%)		
Tertiary	36(63.2%)	21(36.8%)	57(100.0%)		
Socio-economic status					
High socio-economic status	65(49.6)	66(50.4)	131(100.0%)	42.400	0.000*
Low socio-economic status	47(18.1)	213(81.9)	260(100.0%)		

*Significant at 5% level of significance.

4.8 Association between Knowledge of symptoms of malaria and use of AMFm-ACTs

A higher proportion of those with good knowledge of symptoms of malaria did not use AMFm-ACTs compared to those with poor knowledge (p=0.030).(Table 4.12)

Table 4.11: Respondents knowledge of symptoms by use of AMFm-ACTs

Variable	Use of AMFm		Total	X^2	Pvalue
Knowledge of symptoms of malaria	**Yes**	**No**			
Good	99(27.0%)	267(73.0%)	366(100.0%)	4.713	0.030
Poor	22(41.5%)	31(58.5%)	53(100.0%)		
Total	121(28.9%)	298(71.1%)			

4.9 Association between awareness and use of AMFm-ACTs

Table 4.13 showed the cross tabulations of awareness of AMFm-ACTs and the use of AMFm-ACTs. A higher proportion of respondents who have heard about the programme used AMFm-ACTs compared to people who have not heard ($p<0.001$). More of the respondents who had seen the symbol of AMFm-ACTs used it compared to those who had not seen it ($p<0.001$). Also, more of the respondents who had a good knowledge of what the symbol meant used AMFm-ACTs compared to those who did not have a good knowledge ($p<0.001$).

Table 4.12: Prior awareness by use of AMFm-ACTs

Variable	Use of AMFm		X^2	Total	pvalue
Heard AMFm	**Yes**	**No**			
Yes	23(54.8%)	19(45.2%)	14.819	42(100.0%)	0.000
No	100(26.3%)	280(73.3%)		380(100.0%)	
Seen AMFm symbol					
Yes	103(26.3%)	84(44.9%)	109.358	187(100.0%)	0.000
No	20(8.5%)	215(91.5%)		41(100.0%)	
Knowledge on meaning of symbol					
Good	55 (57.9%)	259(779.2%)	49.062	314(100.0%)	0.000
Poor	68(20.8%)	40(42.1%)		108(100.0%)	

4.10 Association between accessibility and use of AMFm.

As shown in Table 4.14 more respondents bought the drug because it was available ($p<0.05$). A lower proportion of those who bought the drug from PPMVs used AMFm-ACTs compared to those buying from other sources ($p<0.001$).

Table 4.13: Association between accessibility and use of AMFm.

Variable	Use of AMFm		Total	X^2	Pvalue
Availability	**Yes**	**No**			
Yes	101(96.2%)	4(3.8%)	105(100.0%)	8.597	0.003
No	9(75.0%)	3(25%)	12(100.0%)		
Sources of drug					
Public facility	6(40.0%)	9(60.0%)	15(100.0%)	47.891	<0.001
Private clinic	19(65.5%)	10(34.5%)	29(100.0%)		
Pharmacy	44(44.8%)	58(55.2%)	105(100.0%)		
PPMV	48(18.1%)	221(81.9%)	207(100.0%)		
Access					
Good	89(95.7%)	4(4.3%)	93(100.0%)	**Fishers'exact test**	1.000
Poor	11(100%)	(0%)	11(100.0%)		

4.11 Significant predictors of use of AMFm

Multivariable analysis using logistic regression revealed that the significant predictor of use of AMFm-ACTs was previous awareness of it .Respondents who have seen AMFm-ACT symbol were 13 times more likely to use than those who have not seen.

Table 4.14: Logistic regression on predictors of use of AMFm-ACTs

VARIABLE		OR	95% CI LOWER	95% CI UPPER	pVALUE
Occupation	Trader	0.834	0.209	3.325	0.797
	Artisans	1.511	0.362	6.311	0.571
	Civil servants	0.792	0168	3.748	0.769
	Others(REF)	1.000			
Source of drug	Supermarket(REF)	1.000			
	Public facility	2.453	0.258	23.288	0.435
	Private clinic	5.114	0.598	43.760	0.136
	Pharmacy	1.648	0.240	11.288	0.611
	PPMV	0.571	0.087	3.739	0.559
Level of Education	None(REF)	1.000			
	Primary	0.345	0.048	2.480	0.290
	Secondary	0.751	0.120	4.699	0.759
	Tertiary	1.214	0.163	9.038	0.850
Knowledge of symbol meaning	Poor	1.185	0.531	2.643	0.679
	Good (REF)	1.000			
Income	Low socio-economic status	0.502	0.250	1.009	0.053
	High socio-economic status(REF)	1.000			
Awareness of AMFm programme	No	1.972	0.386	2.446	0.951
	Yes(REF)	1.000			
Awareness of symbol	Yes	13.223	5.731	30.509	0.000*
	No(REF)	1.000			
Knowledge on symptoms of malaria	Poor	1.755	0.704	4.376	0.228
	Good(REF)	1.000			
Age	15-24	0.762	0.183	3.169	0.708
	25-34	1.632	0.816	3.267	0.166
	>35	1.000			

of treatment. Drug shops have been found as favorite sources of drug for home treatment of malaria (Batega, 2004).

5.1.1 Use of AMFm-ACTs among Caregivers of Under Five Children

An assessment of use of Antimalarials within 24-48 hours of onset of fever showed that a similar proportion of caregivers used choroquinne and AMFm as their first line drugs. This is contrary to findings from nationally representative outlet surveys in six sub- Saharan countries (Benin, the Democratic Republic of Congo, Madagascar, Nigeria, Uganda, and Zambia) which discovered that non-artemisinin monotherapies were the most commonly acquired anti-malarial drugs for children under five. The study showed that the mostly used drug in Nigeria was choloroquinne (Littrell et al., 2011). Utilization of chloroquinne has been fuelled by its comparatively low price, familiarity with these older products, past successful treatment experiences and excessive pill burden of arthemeter- lumifantrine. The mean price of AMFm- ACTs was N 242 (±90.2) which amounts to $1.5(±0.6). This price although less than the unsubsidized ACTs, is still more than the stipulated price for children dose. Studies have shown that the price at which AMFm-ACTs are sold in some countries that has adopted the initiative was less than the unsubsidized ACTs but more than the government recommended retail price (Tougher et al, 2012; Bates et al, 2012). For example a study done in Nigeria and Ghana found the adult dose of AMFm- ACTs to be cheaper than non- AMFm drugs but more than the anticipated price by government(Bates et al, 2012). This suggests that the objective of AMFm to increase affordability of the drug has been partly achieved. Although prices are much lower for AMFm-ACTs, research should still be carried out to explore why the drugs are being sold at prices higher than the stipulated Government price by drug sellers and other healthcare providers.

Majority of the caregivers in this study got their drugs from PPMVs. This result is in consonance with literature on treatment seeking pattern for malaria in sub-Saharan Africa where medicine sellers were widely used as sources of drug for malaria and fever (Goodman et al, 2007). Majority of the caregivers reported availability of the drug whenever they go to buy it. This finding is also in consonance with a study done in seven African countries in 2012(Ghana, Kenya, Madagascar, Niger, Nigeria, Uganda and Tanzania) which found out that there was increase in availability and market share of Quality Assured ACTs (QAACT) at the PPMVs except for Niger and Madagascar(Tougher et al. 2012). Reasons given for this in Madagascar included: the predominance of general stores, unfavourable context in terms of economic and political instability. In Niger, unavailability was as a result of lack of full scale public awareness campaigns. Another study done to determine Artemisinin-based combination therapy availability and use in the private sector of five AMFm phase 1 countries found that market penetration of one or more AMFm QAACT was high both in rural and urban areas(Davis et al. 2012).

Findings from this study revealed actions the caregivers would engage in if they happen to miss a dose of antimalarial. Actions reported include ignoring a missed dose, extending the days of therapy, taking the dose when they remember and doubling the next dose. This finding is similar to that found in Kenya where actions reported include ignoring a missed dose, doubling the next dose and narrowing a dosing interval (Carren et al, 2011). These actions have implication for inappropriate treatment which could have a negative impact on malaria treatment safety and efficacy as well as development of resistance.

5.1.2 Pattern of AMFm Drug Use among Caregivers of Under Five

Pattern of drug use is a key factor in determining drug effectiveness. Inappropriate use of drug and incorrect use can translate to resistance by the disease causative agent. Findings

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5.1.2 Pattern of AMFm Drug Use among Caregivers of Under Five

Pattern of drug use is a key factor in determining drug effectiveness. Inappropriate use of drug and incorrect use can translate to resistance by the disease causative agent. Findings

from this study revealed that most of the respondents that used AMFm-ACTs used the drug within the recommended three days and overall more than half of the respondents took the drug correctly. Few studies have been conducted on adherence to ACTs and those that exist lack a uniform methodology or study different drug combinations, making comparison difficult(Fogg et al.,2004:Kachur et al.,2004). However, a study that utilized the methodology used in this study however found a similar finding when the study participants were stratified by age. It was found that children less than thirteen years had a better adherence than children above thirteen years (Onyango, 2012). Findings from this study also revealed that obtaining AMFm-ACTs without prescription was common. This is not surprising given that other studies have consistently demonstrated that self-medication is common in most malaria-prone regions (Onayango, 2012).

5.1.3 Factors influencing use of AMFm-ACTs among Caregivers of Under Five Children

A Previous study done in Kenya have shown that factors influencing antimalarial drug use include who the household head is, household source of income, monthly income, dosage of drugs and sources of drug (Carren et al,2010). Other studies have shown willingness to pay for quality assured ACTs, consumer knowledge superior efficacy, age, educational status and increase access to subsidized ACTs as factors influencing antimalaria drug use (Carren et al.2010). However, in this study, awareness of the symbol of AMFm by the caregiver was the only predictor of use of AMFm. This finding is similar to results on Insecticides treated net where awareness predicted the ownership and use of the nets (Baume and Maurin 2008). Similarly, in a study in Kenya, community awareness activities were reported to have been instrumental to a substantial increase in ACT availability and coverage (Kedenge et al.2013).

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5.2 Limitations

Ascertainment of the drug given to a child can be difficult, especially if the caretaker does not know how to read and write. Therefore samples of the drug packets were used to verify the type of drug given. Caregiver's pattern of use was estimated using caregiver's self report. Recall bias may likely to occur from this but it was minimized by asking for their pattern of use in the last two weeks. None of the respondent reported to have done a Rapid diagnostic test before treatment with malaria however, they could have done it in laboratories without them knowing.

5.3 Conclusion

Findings from this study revealed that awareness of AMFm-ACTs was low and this translated in low utilization of AMFm-ACTs. This may hinder achieving the objectives of AMFm which is to expand access to ACTs. In assessing the pattern of use most of the respondent used the drug correctly although many respondents acquired the drug without obtaining a prescription from any health worker. Significant factor prediciting utilization of AMFm-ACTs in this study was only awareness of AMFm-ACTs.

5.4 RECOMMENDATIONS

Government should increase awareness on subsidized AMFm-ACTs by organizing campaigns and increasing radio jingles on AMFm-ACTs. They should increase sensitisation among community members about the treatment failure rates and the additional costs that could be faced due to treatment with cheap antimalarials. Furthermore, appropriate measures should be in place to ensure that AMFm-ACTs are sold at regulated price. They should also endeavour to educate people on appropriate dosing and treatment for malaria with AMFm-

ACTs and also fujk nd research to explore the reasons why AMFm-ACTs are not sold at stipulated price.

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APPENDIX I

Awareness and utilization of Affordable Medicine Facility malaria among Caregivers of under five children in Ibadan North West Local Government Area, Oyo State.

Introduction

Good day ma,

I am a master's student from the University of Ibadan and I am carrying out a research on awareness and utilization of Affordable Medicine Facility Malaria among caregivers of under five children. Your sincere response will help me to assess the awareness and use of AMFm in Ibadan North West Local Government. All information disclosed will be held in high confidentiality.

I would be grateful if you participate

Serial Number _____ Date:

SOCIO-DEMOGRAPHIC DATA

1) Age at last birthday (in years) _____

2) Sex 1) Male 2) female ☐

3) Occupation _____

4) Marital status

1) Single 2) Married 3) separated ☐

4) Co-habiting 5) Divorced 6) Widowed

5) Religion ☐

1) Christianity 2) Islam

3) Traditional 4) others (specify) _____

6) Level of education

1) No formal education ☐

2) Primary school

3) Secondary school

5) Tertiary

Others specify ----------

7) What is your average income at the end of the month? _____

8) Did any of your children under five have fever in the last two weeks?

1) Yes ----------continue interview

2) No ---------- stop interview

9) How many children less than five years do you have in your household? _____

10) What is your relationship to the child (ren) _____

1) Mother

2) Grandmother

3) Auntie

Others specify _____

11) How old is this child who had fever? _____

12) What is the sex of this child who had fever? _____

13) Who is the decision maker in this household that determines how children under five with febrile illness suspected to have malaria should be treated?

1) Mother 2) Father 3) Grandparents

Others specify.....

KNOWLEGDE ON MALARIA

14) What are the common signs of malaria in a child under 5 years of age? (Don't Prompt). Tick the ones mentioned

SIGNS	YES	NO
Fever/high temperature		
Vomiting		
Headache		
Diarrheal		
Cough		
Joint pains		
Malaise/body weakness		
Poor appeptite		
Body ache		
Chest pains		

15) What are the common signs of a life threatening illness in a child under 5 years of age with malaria? (Tick all responses). Do not prompt.

SIGNS	YES	NO
Fever/high temperature		
Vomiting		
Headache		
Diarrheal		
Cough		
Joint pains		
Malaise/body weakness		
Poor appetite		
Body ache		
Chest pains		

16) How quickly should you respond to fever in a child under 5 years of age? (Circle one response.)

1) Immediately 2) Same day (within 24 hours) 3) Next day (within 48 hours)

4) More than two days later 5) don't know

Others specify_____

17) Which of these antimalarials have you heard about? (Multiple choice)

1) choloroquuine 2) Amodiaquinne 3) Mefloquuine 4) Quinne

5) ACTs (coartem, Larimal, Lonart), 6) Sulphadoxine-pyrimethamine(Fansidar)

Others specify.....

18) Which of the antimalarials do you think is the most effective in the treatment of malaria at this time? (Circle one)

1) choloroquine 2) Amodiaquinne 3) Mefloquine 4) Quinne

5) ACTs (coartem, Larimal, Lonart), 6) Sulphadoxine-pyrimethamine(Fansidar)

15) What are the common signs of a life threatening illness in a child under 5 years of age with malaria? (Tick all responses). Do not prompt.

SIGNS	YES	NO
Fever/high temperature		
Vomiting		
Headache		
Diarrheal		
Cough		
Joint pains		
Malaise/body weakness		
Poor appetite		
Body ache		
Chest pains		

16) How quickly should you respond to fever in a child under 5 years of age? (Circle one response.)

1) Immediately 2) Same day (within 24 hours) 3) Next day (within 48 hours)

4) More than two days later 5) don't know

Others specify_____

17) Which of these antimalarials have you heard about? (Multiple choice)

1) choloroquuine 2) Amodiaquinne 3) Mefloquuine 4) Quinne

5) ACTs (coartem, Larimal, Lonart), 6) Sulphadoxine-pyrimethamine(Fansidar)

Others specify.....

18) Which of the antimalarials do you think is the most effective in the treatment of malaria at this time? (Circle one)

1) choloroquine 2) Amodiaquinne 3) Mefloquine 4) Quinne

5) ACTs (coartem, Larimal, Lonart), 6) Sulphadoxine-pyrimethamine(Fansidar)

19) Which of the antimalarial is the one recommended by the Government for use in the treatment of uncomplicated malarial in children?

1) choloroquine 2) Amodiaquinne 3) Mefloquine 4) Quinne

5) ACTs (coartem, Larimal, Lonart), 6) Sulphadoxine-pyrimethamine(Fansidar)

AWARENESS ON AMFm

20) Have you heard about AMFm programme that reduces the price of antimalarial known as ACTs?

1) Yes 2) No

If no to question 20 skip to question 22

21) How did you hear about it?

1) Television
2) Radio
3) Health worker
4) Internet
5) Pharmacies/drug shop
6) Friends
7) Posters

Others.....

22) Have you seen or heard of this antimalarial with this symbol of green leaf on the packet before? (Interviewer to show packet of AMFm drug with the symbol).

1) Yes 2) No

If no skip to 25

23) Where did you see or heard about ACTs with this symbol on the packet

1) Television
2) Health worker
3) Internet
4) Pharmacies/drug shop
5) Friends
6) Posters

Others.....

24) This symbol on the drug packet means

		Yes	No	I don't know
1	Effective/quality antimalarial			
2	Affordable antimalarial			
3	An antimalarial in high demand			
4	Effective/quality medicine			
5	Artemisinin based combination			
6	It means nothing			
7	Recommended treatment			
8	Subsidized medicine			

USE OF ACTs (Including AMFm)

25) You mentioned that your child has suffered a fever / high temperature / hot body in the last 2 weeks. How many days ago did the fever start? .....

26) Is this child still suffering from a fever today?
1) Yes 2) No

27) What time of day, on the first day, did the fever start? (Circle one response)
1) Morning 2) Afternoon 3) Dusk / Early evening 4) Night time

28) Did you give your child antimalarial drug for this fever?
1) Yes 2No

If no skip to question 52

29) When did you commence the drug for your child?
1) Same day 2) Next day 3) Two days after 4) 3 or more days after

30) Who prescribed the antimalarial that was used?
1) Doctor 2) Nurse 3) self 4) pharmacist 5) drug shop attendant
6) Neighbor 7) friend 8) relative
Others _____

31) What was the name of the anti-malarial drug that you used?
1) ACTm 2) Choloroquinne 3) Sulphadoxine-pyrimethamine 4) Atersunate/amodiaquinne
5) Artesunate 6) Amodiaquinne 7) Artemeter/lumefantrine
Others specify----------

32) How much did the antimalarial cost? _____

33) What was the main reason for choosing the anti-malaria used?
1) Price 2) availability 3) Recommended by others
4) Considered effective 5) prescribed by a health worker
6) Fewer tablets at once 7) Feel much better with it
Others specify----------

34) Where did you obtain the drug for your child?
1) Public health facility 2) Private clinic / private hospital 3) Pharmacy
4) Proprietary Patent Medical Vendor (PPMV) 5) Supermarket
6) Community Health Worker / Extension Worker
Other specify ----------

35) Did you use antimalarial that have this symbol? (Interviewer to show packet of AMFm drug with symbol).
1) Yes 2) No

If no skip to 40

36) If you bought AMFm, do you always get the antimalarial whenever you go to buy it?

1) Yes 2) No

37) How long did it take you to get to the place you bought AMFm

---------- (in minutes)

38) Did your child do any malarial test (RDT) before the antimalarial was prescribed?

1) Yes 2) No

39) How much did the test cost?

_____

40) Did you have to use another antimalarial for this fever?

1) Yes 2) No

41) Why did you use another antimalarial for this fever?

1) Child did not improve 2) side effects of the drug

Others_____

42) Which of these antimalarial did you use again?

1) ACTm 2) Choloroquinne 3) Sulphadoxine-pyrimethamine 4) Atersunate/amodiaquinne
5) Artesunate 6) Amodiaquinne 7) Artemeter/lumefantrine
Others specify----------

PATTERN OF USE OF ACTs (including AMFm)

43) How many times a day did your child used the drug? _____

44) How many of the drugs were taken each day _____

45) How many days did your child take the drug mentioned above?

1) 1 day 2) 2days 3) 3 days 4) 4 days

Others specify _____

46) Were you given any advice on how to administer this antimalarial by the provider?

1) Yes 2) No

If no skip to 48

47) Which of the following advice were you given?

1) How to administer the medicine at home
2) Importance of completing the full course
3) What to do if the child vomits after ingesting the medicine
4) What to do if the child does not get better following treatment
5) What foods to give the child with the medicine
6) How to store the medicine at home

Others specify.....

48) Did your child use all of the antimalarial you were given?

1) Yes 2) No

If yes skip to 51

49) Why did your child not finish all of this antimalarial?

1) Symptoms got better 2) was told to stop by a friend/relative

Others specify _____

50) What did you do with the left-over? 1) threw it away 2) kept to use again later?

Others specify _____

51) What would you do if child happens to miss the dose of antimalarial?

1) Ignore the missed dose 2) would take it immediately when remembered

3) Would double the next dose to compensate for missed one 4) Extend the days of therapy

6. Others specify.....

52) Why was no antimalarial given? (Circle all that apply.)

1) Fever was not serious
2) Waited for fever to go away
3) No money for antimalarial
4) No transportation
5) The place where antimalarial could be obtained was too far away
6) No one in the household had time to obtain antimalarial
7) Did not know where to go to get antimalarial
8) Antimalarial was not available at outlet
9) Still ill, waiting for fever to get worse before buying antimalarial
10 = Fever went away

Other specify _____

APPENDIX II

INFORMED CONSENT FORM

My name is Tolulope Ojo. I am a master's student at the University of Ibadan. I am carrying out a study on Awareness and Utilization of Affordable Medicine Facility Antimalarial among caregivers of under five children in this Local Government. I will need to ask you some questions but please note that your answers will be kept very confidential. You will be given a number and your name will not be written on the form so that your name will never be used in connection with any information given. The information you and other people give will be used by Government to help find a solution to the problem and increase distribution of affordable Medicine facility Malaria. Your honest answers to the questions will help to better understand what people think, say or do with respect to Affordable Medicine Facility Malaria. After this exercise health education will be given on what affordable Medicine Facility Malaria is to caregivers and also the correct dosage for children under five will be taught.

You are free to refuse to take part in this programme. You have a right to withdraw at any given time if you choose to. We will greatly appreciate your help in responding to the survey and taking part in the study.

Consent; Now that the study has been well explained to me and I fully understand the content of the study process, I will be willing to take part in the study

_____ _____

Signature/thumb print of participant Interview Date

_____

Signature/thumb print of witness/Date (if required)

Appendix III

Dosing schedule for Arthemeter –Lumefantrine in Nigeria

		Number of tablets per dose					
Weight(kg)	Approximate	Day 1		Day 2		Day 3	
	Age(yrs)	1st	8hrs	24hrs	48hrs	48hrs	60hrs
5-14	5mnths ≤ 3yrs	1	1	1	1	1	1
15-24	3-7 years	2	2	2	2	2	2

Appendix III

Dosing schedule for Arthemeter –Lumefantrine in Nigeria

		Number of tablets per dose					
Weight(kg)	Approximate	Day 1		Day 2		Day 3	
	Age(yrs)	1st 8hrs		24hrs	48hrs	48hrs	60hrs
5-14	5mnths ≤ 3yrs	1	1	1	1	1	1
15-24	3-7 years	2	2	2	2	2	2

TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to

the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/231

19th June, 2012

The Principal Investigator,
~~Department~~ of Epidemiology, Medical Statistics
& Environmental Health,
College Of Medicine,
University of Ibadan,
Ibadan.

Attention: Ojo Tolulope

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "Awareness and Utilization of affordable Medicine Facility Malaria among Caregivers in Ibadan North West Local Government Oyo State".

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey, to you, the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the committee will monitor, closely, and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

4. Wishing you all the best,

OYO STATE RESEARCH ETHICAL REVIEW COMMITTEE
MINISTRY OF HEALTH, OYO STATE

Mrs Sylvia Adepoju
Director, Planning, Research & Statistics
Secretary, Research Ethical Review Committee