

**Socioeconomic Differentials in Childhood Malaria Prevalence among Children of Civil servants and market women in Ibadan-North Local Government Area**

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A Dissertation submitted to the Department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria in partial fulfilment of the requirements for the degree of M.Sc. in Epidemiology

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## CERTIFICATION

I certify that this M.Sc. research was carried out by Lilian CHILEKE in the Department of Epidemiology and Medical Statistics faculty of public health, University of Ibadan under my supervision.

 7/9/2012

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## DEDICATION

I dedicate this dissertation to God Almighty for His love, mercy and protection;  
The Alfa and Omega.

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## ACKNOWLEDGEMENTS

I am most grateful to God Almighty, “The Everlasting king of glory” for life, strength and victory.

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To my sweetheart (my husband) I’m truly indebted to you. What could I have done without you. In you I found a father, elder brother, friend and teacher. Who never uses my weakness against me but corrects me all the time patiently. You are just one in a million. To the best son in the world- Success, thanks for bringing so much joy and peace to my life.

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## ABSTRACT

Studies on malaria among under-five children in Nigeria have focused largely on preventive behaviours and healthcare providers' knowledge of treatment regimen. They were motivated by concerns about the impact of poverty and lack of awareness on aggregate under-five mortality statistics. However, negligible attention has been paid to health condition among children of the middle class and the rich and the fact that there could be differentials in mortality across socioeconomic status. This study therefore was carried out to examine under-five malaria between two socioeconomically distinct groups that included market women and civil servants in Ibadan North Local Government Area (LGA).

The study employed comparative cross-sectional survey design using quantitative data collection technique. A total of 410 respondents were selected for interview through a multistage purposive sampling method, beginning with the selection of Ibadan North LGA which hosts the State Secretariat, Agodi, three markets, the University of Ibadan and a numerous banking institutions. While 202 respondents were selected at the Secretariat which has 17 ministries, 208 respondents were chosen from the Bodija market, which is the largest of all the markets in the LGA. In each of the sites, women that had at least one under-five child at the time of the study and consented to participate in the research were sampled. Data were analysed using descriptive statistics, Chi-square and Logistic Regression. The level of significance was set at 5%.

Most of the respondents (53.2 %) had tertiary schools education; 69% of them were between 25 and 36 years and 96% either had and/or catered for between one and two under-five children. The majority of the respondents (99%) heard about malaria from health facilities. On knowledge, 67.6% strongly agreed that mosquito bites cause malaria, 43% identified non-use of ITN, 50% stated that the disease can lead to death if not treated, 52% and 51% correctly identified its symptoms and stated that prompt treatment could prevent deaths respectively. Knowledge score of respondents, measured by some indices, indicated that 94% had good knowledge of childhood malaria, out of which 66% disposed their refuse inappropriately to indicate disparity between knowledge and action. Respondents' level of wealth ( $\chi^2 = 4.628$ ,  $df = 2$ ,  $p < .099$ ), level of education ( $\chi^2 = 5.708$ ,  $df = 4$ ,  $p < 0.222$ ), type of occupation ( $\chi^2 = 2.319$ ,  $df = 1$ ,  $p < 0.128$ ), and age ( $\chi^2 = 4.758$ ,  $df = 4$ ,  $p < 0.313$ ) did not have statistically significant association with knowledge of malaria in under-five children. While level of education ( $\chi^2 = 152.110$ ,  $df = 4$ ,  $p < 0.001$ ), drugs most often used for initial treatment ( $\chi^2 = 79.295$ ,  $df = 4$ ,  $p < .001$ ) and ever-used ACT for treatment ( $\chi^2 = 36.642$ ,  $df = 2$ ,  $p < 0.001$ ) were significantly associated with respondents' occupation, facility accessed on detection of symptoms was not ( $\chi^2 = 8.365$ ,  $df = 5$ ,  $p < 0.137$ ). Odds Ratio (OR) shows that respondents of middle and rich classes were almost 4 and 2 times respectively more likely to have knowledge of malaria than to the poor; civil servants were 1/0.034 (29.412) times less likely than traders to have ever-used ACT on their children for treatment of malaria, with Confidence Interval of 0.472-0.289.

In this study parents' knowledge of malaria was not a sufficient condition for low prevalence given the discrepancy between knowledge of under-five malaria and actions taken. Socio-economic status did not necessarily influence positive attitude and behaviour towards childhood malaria. Reorientation should therefore target parents since malaria is pervasive in all households.

**Key words:** Childhood malaria, preventive behaviour, treatment regimen, intervention.

**Word count:** 498







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## LIST OF ACRONYMS

<b>ACT</b>	Artemisinin-Based Combination Therapy
<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>AMANET</b>	African Malaria Network Trust
<b>CDC</b>	Centers for Disease Control And Prevention
<b>CI</b>	Confidence Interval
<b>DALY</b>	Disability- Adjusted Life Years
<b>DALYs</b>	Disability-Adjusted Life Years
<b>DRC</b>	Democratic Republic Of Congo
<b>GDP</b>	Gross Domestic Product
<b>HIV</b>	Human Immune Virus
<b>HMIS</b>	Health Management Information Systems
<b>IMCI</b>	Integrated Management of Childhood Illness
<b>IPT</b>	Intermittent Preventive Treatment
<b>LMICS</b>	Low and Middle Income Countries
<b>MIS</b>	Malaria Indicator Survey
<b>MMI</b>	Malaria Vaccine Initiative
<b>MMV</b>	Medicines for Malaria Venture
<b>NDHS</b>	Nigeria Demographic And Health Survey
<b>NIAID</b>	National Institute of Allergy and Infectious Diseases
<b>NIH</b>	National Institutes of Health
<b>RBM</b>	Roll Back Malaria
<b>RC</b>	Reference Category
<b>SES</b>	Socioeconomic Status
<b>SPSS</b>	Statistical Package for Social Sciences
<b>UNICEF</b>	United Nations Children's and Education Fund
<b>USAID</b>	United States Agency for International Development
<b>WHO</b>	World Health Organization



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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Malaria is and has always remained the most complex and strong health problem facing humanity accounting for one to three million deaths per year (Stratton, O'neill, Kruk & Bell 2008; WHO 2000). Malaria is transmitted by female anopheles mosquitoes and ranks as one of the most life-threatening parasitic diseases in the tropics particularly sub-Saharan Africa (Adeneye, Jegede, Mafe & Nwokocha 2007). It is a major cause of death and affects about 40 percent of the world's population especially those in less developed countries where effective prevention and case management are undermined by delay in disease recognition, treatment decisions and poor access to intervention (Iwalokun, Agomo, Egbuna, Iwalokun, Adebodun, Olukosi *et al*, 2011). Research shows that at least 300 million acute cases of malaria are reported annually with women and under-five children as most vulnerable (WHO 2008).

Adeneye (2011) reported that in a stable malaria transmission area such as Nigeria, infection during pregnancy leads to about 10,000 maternal deaths each year, 8-14 percent of low weight babies and between 3 and 8 percent of infant deaths. As Omotosho, Ganiyu and Rabi (2009) noted, malaria accounts for about 40 percent of public health expenditure, 30-50 percent of in-patient admissions and up to 50 percent of out-patient visits in areas of high malaria transmission. Malaria is endemic in environments characterized by poor sanitary conditions particularly in places with stagnant water to breed mosquitoes. As such, the prevalence of malaria differs by residential patterns, household environment and level of awareness about prevention and treatment options.

Malaria is understood to be both a disease of poverty and a cause of poverty in most African countries (Mwagani, 2002). Poor people are at increased risk both of becoming infected and of becoming infected more frequently. Heggenhougen *et al* (2003) noted that in malarious regions, the poor and underprivileged are most at risk and



experience the most mortality because of precarious living conditions and often health services.

Social class is a powerful determinant of a multitude of factors that affect the prevalence of diseases: access to resources, such as medical care and adequate housing; the nature of the physical environment; and individual resources, such as income and education that lead to differential opportunities. For example, large gradients in life expectancy by income level, educational attainment, social class, ethnic background, place of residence, among others have been repeatedly discovered in populations during the twentieth century. The association between lower social class status and adverse physical and mental health has been reported in the United States. Higher socioeconomic status is consistently associated with longer life (Wilkinson 1996).

The association between health and socioeconomic factors has been extensively investigated in Western industrialized societies. In developing countries however, the investigation of socioeconomic inequity and disease epidemiology that has received the most attention relates to malaria. In fact, Heggenhougen, *et al* (2003) confirm that socioeconomic factors are clearly related to the risk for malaria. Alnwick (2000) also observes that malaria afflicts primarily the poor, who tend to live in dwellings that offer little or no protection against mosquitoes. Furthermore, Brown (1997:122) notes that “the continuation of brutal poverty and hunger in much of the world is undoubtedly linked to large numbers of unnecessary deaths from malaria.” Child mortality rates are known to be higher in poorer households and malaria is responsible for a substantial proportion of these deaths. In a demographic surveillance system in rural areas of the United Republic of Tanzania, under-5 mortality following acute fever (much of which would be expected to be due to malaria) was 39 per cent higher in the poorest socioeconomic group than in the richest (Mwagani, 2002).

A survey in Zambia also found a substantially higher prevalence of malaria infection among the poorest population groups (Roll Back Malaria [RBM] National Secretariat, 2001). Even the severity and burden of the disease weighs disproportionately against the poor. Malaria infection during pregnancy is a major public health problem. In most endemic areas of Africa, pregnant women are the main adult risk group for malaria.



The symptoms and complications of malaria during pregnancy differ with the intensity of malaria transmission and thus with the level of immunity acquired by the pregnant woman (Roll Back Malaria [RBM], 2004).

This comparative study of civil servants and market women in Ibadan aims at understanding the impingement of women's socioeconomic status on childhood malaria in relevant contexts. Some of the variables to measure socioeconomic factors as they relate to malaria in children include place of residence, household income, nutritional status and mothers' education among others.

## 1.2 Statement of the Problem

Malaria is a major threat to public health in Africa (Nafo-Traoré 2005), and remains the leading cause of death in children under 5 years in this region (Black, Morris & Bryce 2003 & WHO, 2005a). However, poverty is a major factor in malaria prevention and treatment as an estimated 65% of Nigeria's population lives in poverty (WHO 2011). Despite the National policy of ACT as the first-line treatment of uncomplicated malaria, Malaria Indicator Survey (MIS) 2010 indicates that over 70% of children treated for malaria in Nigeria received chloroquine or SP (Sulfadoxine-Pyrimethamine).

Malaria contributes disproportionately to mortality statistics in Nigeria. For instance, the Nigeria Demographic and Health Survey (2008) shows that apart from the fact that an estimated 300,000 children die of malaria each year, it has negative social and economic consequences on families and communities. The NDHS also shows that malaria accounts for about 11 percent of maternal mortality cases, 25 percent of infant mortality and 30 percent of under-five mortality.

Several studies on malaria examined it in the context of pregnancy, infant and under-five children; a large majority of these studies did not investigate the influence of women's social and economic differences in understanding of the disease. As such, data on the effects of residential patterns, income and access to health facilities, women's educational levels and nutrition among others on childhood malaria are negligible. This neglect has accounted for a wide gap in literature. In addition, differences among the



middle and high status groups are understudied, which may be responsible for neglect of the groups in planning, control and implementation of malaria programmes.

Most women of low socioeconomic status reside in slums characterized by overcrowded apartments without mosquito nets, in places of marked environmental pollution, areas of none or blocked drainages with stagnant water, poor waste disposal system, houses surrounded by bushes and hardly have access to health facilities mainly due to their inability to defray the costs of health care services. Consequently, the incidence of malaria in such areas is high relative to places with better facilities. In addition, due to low socioeconomic status, most women in this category find it difficult to patronize facilities such as the University Teaching Hospital (UCH) Ibadan and other institutions with relatively adequate equipment when their children require medical attention. Rather these women visit Primary Health Centres (PHCs) where services are less expensive.

Indeed, childhood mortality arising from malaria could be avoided with adequate understanding of the etiology, symptoms and treatment options. Yet, several Nigerian children needlessly die from the disease and as a result inflict psychological and emotional pains on their family members. Nwokocha and Awomoyi (2009) had pointed out the relationship between childhood mortality and high fertility among Nigerian women. For some of these mothers, prolific childbearing is the surest means of ensuring replacement for dead children. Research has shown that numerous cases of maternal mortality in Nigeria are linked to short-interval child spacing (Nwokocha 2006). This study aims at investigating malaria among under five children of two groups of women with a view to understanding the differences and similarities in perception, attitude and practices related to the condition.

### **1.3 Justification**

In Nigeria, malaria is a major public health problem where it accounts for more deaths and cases than any other country in the world. About 97% of Nigeria's population is at risk of malaria, 3% remaining of the population live in the malaria free highlands (Nigeria malaria fact sheet, 2011). Each year, as high as 100 million malaria cases are recorded in Nigeria with over 300,000 resulting in deaths (Uzochukwu & Onwujekwe



2004). Compared with 215,000 deaths from HIV/AIDS, malaria poses a major health challenge in Nigeria (Nigeria malaria fact sheet, 2011). Also malaria contributes disproportionately to maternal mortality statistics (Nwokocha 2006). Research shows that the prevalence of under-five malaria in south west Nigeria is 40-50%, which is the highest in the country (Nigeria malaria fact sheet, 2011). This high prevalence of under five malaria in the southwest despite interventions by government and agencies makes it a major public health issue.

This study is significant for several reasons; in particular, it will contribute in bridging gaps in literature on a recurring phenomenon such as malaria among children. Different research attempts have been made to understand issues pertaining to malaria generally especially in the tropics including Nigeria. For instance, malaria in pregnancy (UNICEF/NPC 1998; Arkutu 1995), morbidity and deaths among children due to malaria (Kelley, Kelley, Cheick, Ousmane & Marty 2001; WHO/UNICEF 2003) and as a public health problem (Federal Ministry of Health 2005; UNICEF 2004). However, little is known about the implications of women's differential status on childhood malaria. Yet, most Nigerian mothers are closer to their children than do fathers who are mainly engaged in activities that keep them away from home for most hours of the day.

Women by virtue of their occupation can also be classified into economic groups and this has implications for malaria morbidity and mortality. Past studies paid attention to the differentials between the two extreme classes – poor and rich – with the middle or other groups often neglected (Rasheed *et al* 2000; Holtz *et al* 2002). Perhaps, this lack of emphasis on women's role results from patriarchal ethos and male domination that largely ignores activities of females even in situations that affect them directly (Nwokocha 2007). This study stands to bridge that knowledge gap.

In terms of practical significance, considering the pervasiveness of childhood malaria and infant mortality and morbidity in Nigeria and sub-Saharan Africa generally, the research will open up new research frontiers that will stimulate new insights among scholars. It is only when adequate understanding of the phenomenon is made that feasible interventions can be suggested and implemented. Recommendations of this study which will be designed to reflect context-specificity can become instruments for policy making



that could be used in sensitizing stakeholders on the consequences of childhood malaria both at micro family and macro society levels.

#### **1.4 Research Questions**

1. What is the prevalence of malaria in under-five children of civil servants and market women?
2. What are the socioeconomic factors that affect malaria among children of women in the two groups?
3. What are under-five malaria preventive strategies adopted by civil servants and market women?
4. What are the childhood malaria treatment options chosen by women in the two groups?

#### **1.5 Objectives of the Study**

The general objective of the study is to compare the differences in childhood malaria between children of civil servants and market women with a view to understanding the influence of socioeconomic factors. The specific objectives include, to:

1. Determine the prevalence of malaria in under-five children of civil servants and market women in Ibadan North LGA.
2. Determine the socioeconomic factors associated with malaria in children of women in the two groups.
3. Compare use of childhood malaria preventive strategies between civil servants and market women.
4. Examine the treatment options adopted for malaria in under-five children between the groups.



## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Malaria

Malaria has been, and still is, a major public health problem causing much of human morbidity and mortality especially among children under the age of five years in sub-Saharan Africa (Bryce *et al* 2005). After pneumonia and diarrheal, malaria is the 3<sup>rd</sup> leading cause of death for children under five worldwide (Nigeria malaria fact sheet 2011). Among various infectious diseases affecting humans, Malaria parasite is responsible for a very high number of deaths. According to the WHO, in year 2000 alone malaria accounted for 300 – 500 million cases and about 1-3 million deaths per year.

Studies have identified four distinct species of *plasmodium* malaria parasite infecting humans including *P. falciparum*, *P. vivax*, *P. ovale* and *P. malaria*. Of these, *plasmodium falciparum* is the most dangerous human malaria parasite and responsible for the most severe cases of malaria and deaths (LaCount, *et al* 2005). According to Bryce *et al* (2005), 94% of deaths due to malaria worldwide occur in Africa. However, national and international malaria control programmes have been implemented, including: Integrated Management of Childhood Illness (IMCI); Roll Back Malaria initiative; the Global Fund and AIDS, Tuberculosis and Malaria (ATM) Programme.

Major progress in the prevention and treatment of malaria has been reported through the adoption of Artemisinin combined therapy (ACT) from several countries (WHO 2006), the use of insecticide treated bed nets and Intermittent Preventive Treatment (IPT) for pregnant women and children (White 2005). Moreover, despite the existence of effective treatment and protective measures, malaria continues to be a major health issue (Alilio *et al*, 2004 & Yamey G., 2004).

#### 2.2 Global Epidemiology of Malaria

Malaria affects half of the world's population, or 3.3 billion people residing in 106 countries and territories (Nigeria malaria fact sheet 2011). According to the WHO estimate, 216 million cases of malaria occurred in 2010, 81% in the African region.



During the same period there were 655,000 malaria deaths with 91% of these occurring in Africa. Under five children alone made up 86% of the total percentage.

High malaria transmission intensity, limited access to adequate treatment, increasing parasite resistance to affordable and safe medicines (chloroquine, sulphadoxine-pyrimethamine and amodiaquine), increasing vector resistance to widely used insecticides, delays in care-seeking and inappropriate treatment at home or community level, are some other major causes of this deleterious situation (Ajayi *et al*, 2008a, 2008b).

### 2.3 Epidemiology of Malaria in Sub-Saharan Africa: A focus on Nigeria

In Sub-Saharan Africa, thirty countries account for 90% of global malaria deaths. Democratic Republic of Congo (DRC), Nigeria, Ethiopia, and Uganda collectively account for nearly 50% of the global malaria deaths. After HIV/AIDS, Malaria is the second leading cause of death from infectious diseases in Africa. Almost one-fifth of deaths among children under 5 in Africa is due to malaria (Nigeria malaria fact sheet 2011). In Nigeria for instance, malaria is responsible for 60% of outpatient visits and 30% of hospitalizations among this category of children. Data show that the highest malaria prevalence of close to 50%, in children age 6-59 months, is in South West, North Central, and North West regions. Diversely, the least prevalence rate, of 27.6 percent, is in the South-East region (Nigeria malaria fact sheet 2011).

### 2.4 Social Class and Malaria in Africa

Malaria is caused by a large number of environmental factors, which affect its distribution, seasonality and transmission intensity (Snow *et al*, 1999). Although there is a great diversity of anopheles species in Africa, members of the *Anopheles gambiae* complex are the principal vectors of malaria throughout most of the continent. Most malaria epidemics in Africa are due to *Plasmodium falciparum*, the most lethal and dominant species found on the continent.

According to a study by Worrall, *et al* (2003), malaria is often said to be a disease of the poor or a disease of poverty. The key focus of the work was on differences among socio-economic groups though there are various dimensions of potential vulnerability to



malaria that encompass social, demographic and geographic elements among others. It has been demonstrated that the linkages between malaria and poverty are needed to guide the design of effective policies and tools to tackle malaria and poverty together (Worrall, *et al* 2003).

## **2.5 Indicators for measuring socioeconomic differentials**

This section examines socio-economic differentials of malaria incidence as measured by occupation, location and housing type, income/expenditure and education among others.

### **2.5.1 Occupation**

Occupation is one of the determinants of socioeconomic differences which may in turn, to some extent, determine the employment opportunities available. However, like education, the effects of occupation (on the risk of malaria infection and to a less extent the utilization of interventions) are difficult to separate from the effects of Socioeconomic Status (SES), and such separation may be artificial and of limited operational importance. Agricultural labourers, for instance, may not only place themselves at risk through increased contact with the malaria vector but also, through their migration, place others at greater risk by contributing to the spread of the disease (Martens and Hall, 2000).

### **2.5.2 Location and housing type**

Rural locations can be associated with increased malaria risk for both epidemiological and socioeconomic reasons. Similarly, urban residence can be accompanied by potentially protective socio-economic factors against malaria risk such as high level of education and high income (Rashed *et al*, 2000). A number of studies have used urban and rural variables in their analyses of risk factor and transmission rates. In Malawi, for example, Holtz *et al.* (2002) examined urban location, among other potentially socioeconomically relevant variables such as the education of caregivers and housing construction materials, to examine determinants of ITN use, anaemia and parasitaemia. The results revealed rural residence as the highest risk factor for parasitaemia in children under five years of age, even after controlling for bed net use.

In addition, evidence from Malawi reveals that rural children, as well as women with lower levels of education, are more likely to suffer from fever compared to urban



children and women with better levels of education. Certain type of housing may influence malaria transmission.

### **2.5.3 Income/expenditure**

Household income is another measure of socioeconomic differences in childhood malaria (Worrall *et al* 2003). Families of low income are faced with more immediate needs such as food and shelter than malaria preventive strategies like use of nets or spraying of insecticides. Income will also to a large extent influence type and place of residence wherein poorer people rent cheaper apartments in poor neighborhoods characterized by degradation.

Nwokocha and Awomoyi (2009) had stated that environmental conditions are important determinants of child health. Poor sanitation, hygiene and water sources are associated with increased incidence of waterborne diseases, particularly diarrhea. While crowding is linked to increased incidence of pneumonia, measles and other airborne diseases, indoor pollution increases the risk of respiratory conditions. In addition, vector density is implicated in the incidence and prevalence of several diseases particularly malaria (Jamison *et al*, 2006).

### **2.5.4 Wealth Index**

Information on wealth index is difficult to collect. Individuals experience recall problems and at times misstate their incomes for various reasons (UNICEF 2008). As a measure of household cumulative living standard it is computed by using information on assets or household possessions perceived as indicative of wealth. Worrall *et al* (2003) reported a study in ten sub-Saharan African countries that revealed differences by asset index as it relates to the number of under-five that slept under a net the night preceding the survey. The differences in anti-malarial treatments by socioeconomic status favoured persons in highest quintile groups.

### **2.5.5 Education**

Education is a key/major determinant of the lifestyle, social and economic status an individual enjoys. According to NDHS (2008), educational attainment has a strong effect



on health behavior and attitude. Of the type of healthcare sought first in the childhood fever episode (Fawole and Onadeko, 2001), 28.8% of those with no formal education went to a health facility first compared to 40.2% of those mothers/caregivers with secondary education that visited a health facility for initial treatment. About 52.6% of uneducated mother constituted the majority of those who went to the traditional healers whereas patent medicine sellers were more frequently patronized by educated mothers (41%) than illiterate mothers (25%) (Fawole and Onadeko, 2001). Malawi 2000 DHS data reveal that frequency of fever occurrence were more likely to occur in women with lower level of education as compared women with higher level of education (Ndawala *et al*, 2000).

## **2.6 Socioeconomic factors associated with malaria in children**

The burden of malaria is greatest among poor countries. While only 0.2% of global malaria deaths are found in the world's richest population quintile, 57.9% of global malaria deaths are concentrated among the world's poorest population quintile. (Gwatkin & gullot, 2000). It has been reported that malaria disproportionately affects poor countries, with 58% of the cases occurring in the poorest 20% of the world's population (Barat, Palmer & Basu 2004). Within countries, there is contradictory evidence on whether the poorest experience more febrile episodes, and quite strong evidence that the severe consequences of malaria are borne most heavily by the poorest citizens. These investigators call for more research on financial and non-financial factors that limit accessibility and use of malaria control services by the poorest, who remain the most vulnerable. When the burden is measured as Disability-Adjusted Life Years (DALYs), 58% of the total global burden of malaria is concentrated among the poorest 20% of the global population, while only 0.2% of total global DALYs are lost by the richest global 20% ( Gwatkin and gullot, 2000).

Sachs and Malaney (2002) demonstrated a correlation between the presence of malaria in a country and that country's Gross Domestic Product (GDP), arguing that there is an inverse relationship between the two and that malaria causes underdevelopment. It has been argued also that because the burden of malaria is concentrated in poor countries,



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there is inequity in allocation of global research funds especially by the pharmaceutical industry, since domestic purchasing power for new malaria products is very limited, especially for anti malarial drugs (Medicines for malaria venture, 2001).

According to results from a Nigeria community-based survey, the poor have a heavier burden of malaria than the rich. The survey which took place in four states, showed that individuals with a mean income below N300/day (<USD2/day) were less likely to perceive malaria as a preventable disease, when they experienced an attack or period of illness when compared with individuals earning greater than N300 per day (Chestrad, 2000).

Studies have measured socioeconomic status in ways that do not fall into the categorization used above. However, some studies that did not address malaria are also included because they used certain proxies of socio-economic inequalities that could be explored in future research. A study by Brokerhoff and Hewett (2000) had noted that ethnicity might be an important marker of socio-economic inequalities even among the poor. The authors reported that ethnicity may influence norms and attitudes towards health and education, resulting in disparate immunization rates, child mortality, and the number of antenatal care visits in some countries. Issues related to ethnic differences in childhood mortality have been discussed and it has been suggested that economic disparities among relevant ethnic groups be reduced in order to influence health inequities that lead to increased mortality (Brokerhoff and Hewett, 2000).

Thai-Myanmar border revealed differences in the health situation of communities divided along ethnic and class lines (Panvisavas, 2001). In the study, the incidence rate among non-Thais, most of whom were socio-economically disadvantaged immigrants, was twice that of the Thais, who were generally less poor and not socially marginalized. Reasons for the higher rate among non-Thais may be centered around a lifestyle that is compromised by poverty. Their work and housing characteristics, for instance, produced increased vector exposure, while their lack of financial means prevented access to bed nets and health insurance.

The association between malaria and under nutrition is complex, yet improved nutrition lessens the severity of malaria episodes and results in a decrease in malaria



deaths. Caulfield and others report a meta-analysis of the effect of iron supplementation on malaria morbidity and concluded, on one hand, that there was a heightened risk of infection and increase in malaria attacks and spleen enlargement with supplementation. On the other hand, that treatment was associated with significant increases in hemoglobin and decrease in severe anemia (Caulfield, Richard & Black 2004). The researchers argued that deficiencies in vitamin A, zinc, iron, folate, and other micronutrients are responsible for a substantial proportion of malaria morbidity and mortality. They state that the attributable fraction of nutritional deficiencies to malaria attacks in children less than five years of age globally is 8.2 for those underweight ( $Z$  score  $\leq 2$ ), 20.1 with zinc deficiency, and 20 with vitamin A deficiency; they ascribe the fraction of deaths in children less than five years old attributable to nutritional deficiencies as 57.3 for underweight children, 20.1 for those with zinc deficiency, and 19.5 for children with vitamin A deficiency.

Socioeconomic inequities include differences that are "systematic, socially produced (and therefore modifiable) and unfair" (Whitehead *et al*, 2006). Because young children are developing physically and mentally and because they depend on others to ensure their health, they are particularly susceptible to socioeconomic inequities that lead to marked differences in terms of morbidity and mortality.

Globally, most deaths of children under-five years of age are caused by a few conditions, namely neonatal causes, pneumonia, diarrhea, malaria, measles and HIV/AIDS, (Hay *et al*, 2004) with malnutrition being an underlying cause in about a third of these deaths (Marsh *et al* 1995). There are huge inequities in child under nutrition and mortality between and within countries (Hay *et al*, 2004; & Caulfield *et al*, 2004). Although under-five mortality rates have recently declined in most low and middle income countries (LMICs), equity analyses have shown that the relative mortality gap is widening between rich and poor countries and also within most countries between rich and poor children, because mortality reductions tend to be greater among the affluent (Trape, 2001).

Addressing socioeconomic inequities in child health and nutrition will be essential to achieve the Millennium Development Goals, as current rates of progress in most



LMICs are insufficient (Royall *et al*, 2004). However, countries can get on track "if they can combine good policies with expanded funding for programs that address both the direct and the underlying determinants of health-related goals" (Royall, *et al* 2004), meaning that effective programmes take equity considerations into account. Clearly, socioeconomic factors are not the only type of inequities that are relevant to child health; geographic inequities - for example urban/rural differences - are also relevant, particularly as these affect the availability of health care (Molineaux, *et al* 1980). In addition, cultural factors such as beliefs, practices, gender relations among others are important issues in understanding under five malaria in some Nigerian societies.

## 2.7 Knowledge, Attitude and Practices towards Malaria

Malaria remains a major public health issue and a cause of morbidity and mortality in all age categories in most parts a sub-Saharan Africa. Yet, several individuals in this region appear to have a fair knowledge of disease including associating malaria with mosquito bites, its prevention and treatment therapies (Hlongwana, Mabaso, Kunene, Govende & Maharaj 2009).

Knowledge of issues related to malaria is important for individuals and for the nation to meet the international goals on health and survival. These goals according to Adeneye (2011) include the Okinawa Goals; the New Partnership for Africa's Development (NEPAD) programme of action; the Millennium Development Goal of reducing under five mortality by two-thirds and maternal mortality by three quarters in 2015; the Abuja Declarations particularly in the area of malaria control which is targeted at protecting 60 percent of pregnant women and children under five years by year 2005 through the use of LLINs; health reforms in Nigeria through the Roll Back Malaria programme that aimed to reduce malaria prevalence by 50 percent by the year 2010.

Indeed, one major objective designed by NEPAD to ensure sustainable development on the continent was alleviation of disease burden by empowering people to act to improve their own health through achievement of health knowledge (Adeneye 2011). Studies show that persistent high prevalence of malaria results mainly from non-treatment of uncomplicated malaria at health facilities especially self treatment probably due to false-confidence about knowing treatment regimen (Muller *et al* 2003; Guyatt and



Snow 2004; Kofoed *et al* 2004). Issues of misconceptions about malaria lead to taking inappropriate steps in both prevention and treatment. It has been observed that treatment-seeking behaviour depends largely on cultural perception and beliefs about the cause and cure of illness (Nuwaha 2002; WHO 2006).

Poor treatment practices among several individuals especially illiterates whereby analgesics, which are pain-killers, are taken instead of prescribed antimalarials have been noted by Adeneye (2011). As studies indicate, disregard for the real cause of a medical condition such as malaria could explain the drive towards use of analgesic and home-treatment most times with drugs purchased from local patent medicine stores (Muller *et al*, 2003; WHO 2007). The attitude of not taking prompt action to treat malaria or ignorantly access inadequate facilities could lead to severe consequences since deaths arising from malaria could occur in few hours or days (Adeneye 2011). The World Health Organization (2007) had stated that the majority of deaths in children resulting from malaria occurred within 48 hours from the onset of illness.

To be sure, increasing adherence to correct treatment dosage and schedule through behavioural change will go a long way to reducing the risk of complications in malaria and thus improve child survival (Salako *et al* 2001; Brieger *et al* 2003). A study on malaria in Ogun State found a link among poor treatment practice, lack of awareness and low use of malaria control interventions (Adeneye 2011).

## **2.8 Efforts to control malaria in Africa**

There has been increasing optimism about improved malaria control, particularly in Africa where the vast majority of people affected by the disease reside (Yamey, 2000). This new positive attitude is based on major advances in malaria research and public health practices, and epidemiologic and economic analyses of malaria burden regarding cost-effective ways to lessen it. Most crucial has been the political, strategic, and financial support for malaria scientific studies and control actions. The support has come from a variety of recently formed coalitions—from the scientific and policy-making communities in countries most affected by the disease, by formation of public-private partnerships to develop new drugs and vaccines, from national and international



organizations that had not traditionally supported malaria work, from foundations such as the Wellcome Trust, with a long history of malaria research support, and those more recently committed to malaria research, operations, and training such as the Fogarty International Center, National Institutes of Health (NIH), the Howard Hughes Medical Institute, the Ellison Foundation, the United Nations Children's Fund (UNICEF), the European Commission, and the Bill & Melinda Gates Foundation (World Health Organisation, 2002).

The Global Fund for Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS), Tuberculosis and Malaria (Global Fund), the Medicines for Malaria Venture (MMV), the Malaria Vaccine Initiative (MVI), the African Malaria Network Trust (AMANET), the Gates Malaria Partnership based at the London School of Hygiene and Tropical Medicine, and the Malaria Research Institute at the Johns Hopkins University Bloomberg School of Public Health are just a few of the new initiatives focusing on malaria that bring added perspective, innovation, energy, and resources to the growing malaria-related budgets and programs (World Health Organisation, 2002).

Major growth in malaria research and control programmes has also occurred in organizations with a long commitment to malaria work—the National Institute of Allergy and Infectious Diseases (NIAID, NIH), Centers for Disease Control and Prevention (CDC), U.S. Agency for International Development (USAID), World Health Organization (WHO), and many other organizations. A clarion call for more efforts to better understand and control malaria came from representatives of 44 of the 50 African malarious countries who met in Abuja, Nigeria, in 2000 and vowed to bring national and international attention and resources to battle this perennial disease (Yamey, 2000).

Malaney and others state that although the correlation between malaria and poverty is apparent, the nature of the linkages in terms of directions and causation is less so, and different methodologic approaches provide widely divergent perspectives (Malaney, Spielman & Sachs, 2004). They reviewed the evidence on both the macroeconomic and microeconomic impact and seek to explain why the former provides estimates of burden that are much greater than the latter. They argue that the economic



externalities associated with malaria make the burden much greater than the sum of the costs of individual cases. For example, if malaria affects schooling decisions of households, then this could change long-term income streams in a much more marked fashion than would be expected from a case-by-case analysis of costs.

Jones and Williams (2004) point out that epidemiologists and economists have dominated the burden literature but noted that culture, beliefs, and political contexts affect perceptions, individual behaviors and social structure which individually and collectively impinge on malaria. It is important to understand the social burden, or the process through which social and cultural factors affect the biomedical burden of malaria. Society's perceptions of disease, malaria, and perceived risk influence people's willingness to change their health behaviors, but the political and economic contexts, social organization, and cultural rules affect their ability to change behavior.

Recently, the concept of social vulnerability was developed to highlight the importance of social factors that make some groups or individuals more susceptible to infection or more vulnerable to the consequences of infection. For example, women may be limited in their access to cash and ability to take decisions on their own, thus affecting their ability to seek treatment for a sick child (Jones and Williams, 2004). The investigators argue that understanding the socio-cultural dimensions of the burden of malaria is vital to the development of interventions to assist vulnerable groups.

## **2.9 Health Systems and the Malaria Burden**

Health management information systems (HMIS) including routine surveillance systems at health facilities provide the immediate visible evidence of the burden of malaria, which is the basis for planning. Most malaria-related morbidities are treated at home and within the community by informal health services and networks. Ageypong and Kangeya-Kayondo (2004) used a case study from a rural district of Ghana to illustrate the wide difference between estimates of the burden of "febrile illness presumed malaria" based on routine HMIS data, and that derived from community level data on morbidity and health seeking behavior of households. For every patient with febrile illness seen in facilities, there were 4–5 such episodes in the community. Given the urgency of changing drug use policies in Africa, and exploring associated costs and



logistics, it is urgent that better and more timely data on burden be available to health service planners. The report by Agyepong and Kengeya-Kayondo highlights the current practices of treatment-seeking families, indicating how much self-treatment through purchase of drugs occurs. These practices which are widespread in most malarious countries, raise questions on what appropriate policy response should be.

Hanson (2004) outlines how the tools of economic analysis can contribute to such discussions. She argues that there are powerful economic arguments to support public action to increase the uptake of effective malaria interventions. Market failures are likely to arise from the monopoly power of pharmaceutical firms. Another important form of market failure arises from “externalities,” which are benefits or costs of consumption or production that are not fully valued by the consumer/producer. As a result, the level of consumption is often not optimal. Externalities affect, for example, availability and deployment of ITNs, residual insecticide house spraying, environmental control, and, potentially, Artemisinin-based Combination Therapy (ACT). Commercial markets are unlikely to guarantee adequate uptake of interventions where there is widespread poverty. Limited public resources mean that prioritization is necessary.

Economic analyses help decision making by setting priorities through cost-effective analyses, understanding how markets for interventions operate, and the extent to which different approaches reach the poor, the prime target of public actions. A recent and very important theme in research and policy debates has been the impact of malaria on different socioeconomic groups and the extent to which the poor are reached by interventions.

## **2.10 The Role of Research and Invention**

Great progress has been made in development of vaccines for malaria. For instance, it has been noted that there were 35 candidate malaria vaccines in clinical development, many of which are, or soon to be in clinical trials (Ballou, Arevalo-Herrera, *et al* 2004). Of these, the pre-erythrocytic vaccines that target sporozoites or schizont-infected liver cells, preventing the release of primary merozoites from infected hepatocytes, have received the most attention; 16 candidate vaccines are in this group.



While only a 100% protective response translates into sterile immunity for a vaccine directed against this stage of the parasite, responses that are 80–90% effective may delay onset of patent parasitemia and elicit an eight-fold reduction in circulating infectious sporozoites.

These investigators report that the RTS, S/AS02A vaccine, based on the circumsporozoite protein of the 3D7 clone of *P. falciparum*, showed some protection in humans over two transmission seasons, including reduction of febrile malaria attacks. It is crucial to formulate the vaccine with the proprietary adjuvant AS02A. The formulation stimulates Th-1 cellular immune responses, which were shown to be important in clinical trials. The protective immunity conferred by this vaccine wanes over time. The RTS, S/AS02A vaccine development and testing is an excellent example of private-foundation-public partnership, in that Glaxo-Smith-Kline Bio, the Malaria Vaccine Initiative (supported by the Bill & Melinda Gates Foundation), and governments in Gambia, Mozambique, and elsewhere are partners in its testing.

The target for the 15 candidate asexual stage vaccines is the merozoite, initially released from infected hepatocytes, which rapidly enter circulating red blood cells. The complex process of merozoite invasion of red blood cells requires contact, adherence, and orientation to the cell-wall membrane, and involves numerous parasite proteins located on the surface of the merozoite and targeted by circulating antibodies. Merozoite surface protein 1 (MSP-1), MSP-2, MSP-3, and apical membrane antigen 1 are the most studied asexual stage vaccine antigens. Although antibodies directed against the parasite are essential, cell-mediated mechanisms are critical for acquired immunity (Hoffman, et al, 2002). Variability in parasite genetic composition is a major hurdle in development of blood-stage vaccines. Production of antibodies against the carboxy-terminal portion of MSP-1 has been achieved and the antigen adjuvanted as falciparum merozoite protein-1/AS02A. A trial of this vaccine in children is scheduled in western Kenya (Moree and Ewerts, 2004).

Antibodies directed against several sexual parasite stage antigens can prevent infectious sporozoite development in the salivary glands of *Anopheles* mosquitoes. These transmission-blocking vaccines (TBVs) have received much-deserved increased attention



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over the past 10 years and two antigens are in development. The TBVs do not protect individuals receiving them from malaria infections. High coverage with an effective vaccine will be needed to stop malaria transmission. This is why TBVs are called the “altruistic” vaccines. Sexual stage antigens have proven to be complex proteins with complex folding requirements and formulation of immunogenic vaccines remains a challenge. *Plasmodium vivax* antigen Pvs25 produced in *Saccharomyces cerevisiae* elicits antibodies in mice, rabbits, and non-human primates and blocks transmission in membrane feeding assays. *Plasmodium falciparum* antigen Pfs25 expressed in *Pichia pastoris* appears promising. Another very intriguing approach is to irradiate large numbers of sporozoites, effectively producing a killed parasite asexual-stage vaccine. This revisiting of work begun 30 years ago merits increased attention (Hoffman, Goh, Luke *et al*, 2002).

The key to success in malaria vaccine development will be increased funding and support by public-private partnerships, particularly for production of test lot vaccines by good manufacturing procedures and conducting phase 1 and 2 studies. It is very encouraging that RTS, S/AS02A, modified vaccine Ankara-multi-epitope thrombospondin-related adhesive protein (MVA-ME TRAP), and MSP-1/AS02A vaccines are now being tested in pediatric populations in malarious settings, the most vulnerable group. One of the greatest needs that is sure to increase over the next several years is for more qualified clinical investigators in malaria-endemic and non-endemic countries to carry out the vaccine studies.

The major decisions for introducing malaria vaccines and other new or improved interventions to control malaria into a country will be made by national policy makers. These persons must use the results of research wisely to minimize delays and get the most benefit once a malaria vaccine is ready for use. Moree and Ewart review the factors to consider for rational decision-making when introducing a malaria vaccine (Moree & Ewart 2004). These are disease burden, economic burden, cost-effectiveness of existing anti-malaria interventions, financing plans, delivery and infrastructure systems, and the selection of specific new vaccines, malaria and otherwise. Key decisions will depend upon a vaccine’s ability to reduce morbidity and mortality and competing demands for funding (Worrall, *et al* 2003).



## 2.11 Use of childhood malaria preventive strategies

Use of malaria preventive strategies is a function of the perception of a prospective user about the efficacy of an intended strategy. This perceptual role is performed by parents or caregivers for under-five children. Generally, prevention and treatment of malaria are undermined by several factors in different settings where the disease is prevalent. For instance, Maslove, Mnyusiwalla, Mills, Gowan, Attaran and Wilson (2009) from their review of numerous literature observed that barriers to use of bed-nets include cost and ease of use. Other factors identified are barriers to effective prevention include eating a balanced diet, drinking herbal teas, wearing charms or amulets, and vaccinating children. Yet others believe that malaria cannot be prevented.

The WHO (2008; 2011) had noted that mosquito nets and spraying of insecticides are the best preventive measures against malaria; they are cost effective, efficacious and safe. The advantages of using nets cannot be overstated considering that issues pertaining to mosquitoes being resistant to certain insecticides and the side effects do not arise. However, ignorance and cultural beliefs and practices are significant factors in poor prevention of the disease. As Maslove *et al* (2009) stated, the most frequently identified causes of malaria included environmental factors (excessive heat, wind, or cold), dietary factors (eating oily foods, certain fruits and grains, or too much of the same foods), drinking or bathing in dirty water, and supernatural causes (witchcraft, sorcery, and possession by spirits).

It has been observed that malaria prevention programmes that target the generality of people in community achieve better results than those that focus on vulnerable groups such as women and children (Killeen, Smith, Ferguson, Mshinda, Abdulla, Lengeler and Kachur 2007).

## 2.12 Treatment options adopted for malaria in under-five children

The role of mothers in treatment of malaria in children is critical to cure of the disease. Seeking, obtaining and use of appropriate medication are linked to relevant decisions and accessibility to approved drugs. A study by Malik, Hanafi, Ali, Ahmed and Mohamed (2006) found that mothers that usually delay in seeking care from health facilities go through several options before deciding to patronize these facilities.



Ideally, the type of antimalarial drug to be used should depend on many factors such as the type of plasmodial infection detected or suspected, resistance pattern of the parasite in the given area, chemoprophylactic or chemotherapeutic agents received by the patient and of course the presence of clinical or laboratory evidence of severe falciparum infection (Bavdekar, Nadkarni, and Deshmukh C.T. 1996). In addition, the severity of disease, the drug susceptibility of the infecting parasites, and the availability of medications and resources should also form the basis for malaria treatment (Stauffer and Fischer 2003)

## **2.0B THEORETICAL FRAMEWORK**

This study is anchored on the Health Belief Model (HBM). Conceptualized on the basis of four main constructs, the model is embedded in the perception of the actors as the driver of health seeking behaviour (Rosenstock and Becker 1966 & 1974 respectively). The model supposes that perceived susceptibility to under-five malaria would likely motivate mothers to seek health services related to treatment of malaria in their children with zeal. Ordinarily, such perception should engender early and sustained care seeking in facilities with perceived requisite competencies. This would not be the case for those who view malaria as a normal childhood condition that does not require special care.

The model views perceived severity in relations to already established illness conditions, in this case malaria in under five children. Ordinarily, perception of seriousness of such illness condition would not only make for recourse to early care but also patronage of perceived adequate facilities. Yet, due to ignorance about symptoms of life-threatening conditions, requiring urgent attention, some situations are never perceived as serious. As studies have indicated, malaria related deaths, just like other conditions that lead to mortality, are strongly associated with indecisiveness in seeking care, sub-standard health services and lack of medical supplies at critical periods (UNICEF 2000; Population Reference Bureau 2000; United Nations 2000).

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Perceived benefits emphasize calculations, among potential actors, pertaining to the merits and costs of either taking or avoiding a specific health related action within a



given illness scenario. This construct assumes that individuals will take actions considered appropriate for handling threatening situations, in this case malaria among children. The appropriateness of a given action will be to the extent that other alternatives are less desirable or even inimical to successful treatment outcomes; unnecessary delays in transferring emergency cases to medical facilities, patronizing inadequate facilities and engaging in dangerous activities individually and collectively determine the health status of children. Delays may be related to inability of women and mothers to take decisions at critical moments, even when severity is perceived, without approval of their husbands in line with patriarchal ethos (Nwokocha 2006) that pervade some Nigerian communities.

The model conceives perceived barriers in terms of assumed and practical limitations to health seeking. For instance, an actor may conclude that some facility is inadequate to offer minimal care either due to poor state of equipment or personnel bereft of current knowledge in medical practice or both. It could also be that treatment charges are exorbitant or that staff are rude and hardly consider the feelings of patrons. Nwokocha's (2006) study among the Ibani of River State, Nigeria found that the people avoided facilities that do not readily attend to the needs of patients. These among other reasons may serve as disincentives for not patronizing a facility even if the latter is reputed for competence.

Similar to some HBM constructs, the Rational Choice Theory conceives individuals as able to weigh the advantages and demerits of an intended action before taking such action which ought to be directed at ends or goals (Friedman & Hechter 1988). As such, actors have the capacity to make choices among alternatives within the context of available resources and prevailing conditions. However, such ability must be considered relative to a prospective actor's level of awareness about the efficacy of these alternatives in dealing with a particular illness condition. Consequently, the theory makes meaning only when it is established that an actor understands the nitty-gritty of available medical systems and therefore possesses the capacity to genuinely assess the options. For instance, an illiterate family or mother may not be aware of the essence of patronizing a facility during her child's malaria related emergence. Indeed, this theory engages issues related illness perception and its relationship with healthcare seeking for individuals or



given illness scenario. This construct assumes that individuals will take actions considered appropriate for handling threatening situations, in this case malaria among children. The appropriateness of a given action will be to the extent that other alternatives are less desirable or even inimical to successful treatment outcomes; unnecessary delays in transferring emergency cases to medical facilities, patronizing inadequate facilities and engaging in dangerous activities individually and collectively determine the health status of children. Delays may be related to inability of women and mothers to take decisions at critical moments, even when severity is perceived, without approval of their husbands in line with patriarchal ethos (Nwokocha 2006) that pervade some Nigerian communities.

The model conceives perceived barriers in terms of assumed and practical limitations to health seeking. For instance, an actor may conclude that some facility is inadequate to offer minimal care either due to poor state of equipment or personnel bereft of current knowledge in medical practice or both. It could also be that treatment charges are exorbitant or that staff are rude and hardly consider the feelings of patrons. Nwokocha's (2006) study among the Ibani of River State, Nigeria found that the people avoided facilities that do not readily attend to the needs of patients. These among other reasons may serve as disincentives for not patronizing a facility even if the latter is reputed for competence.

Similar to some HBM constructs, the Rational Choice Theory conceives individuals as able to weigh the advantages and demerits of an intended action before taking such action which ought to be directed at ends or goals (Friedman & Hechter 1988). As such, actors have the capacity to make choices among alternatives within the context of available resources and prevailing conditions. However, such ability must be considered relative to a prospective actor's level of awareness about the efficacy of these alternatives in dealing with a particular illness condition. Consequently, the theory makes meaning only when it is established that an actor understands the nitty-gritty of available medical systems and therefore possesses the capacity to genuinely assess the options. For instance, an illiterate family or mother may not be aware of the essence of patronizing a facility during her child's malaria related emergence. Indeed, this theory engages issues related illness perception and its relationship with healthcare seeking for individuals or



Significant-Others such as children. In what follows, a synthesis of the theoretical perspectives is presented diagrammatically in a conceptual framework.

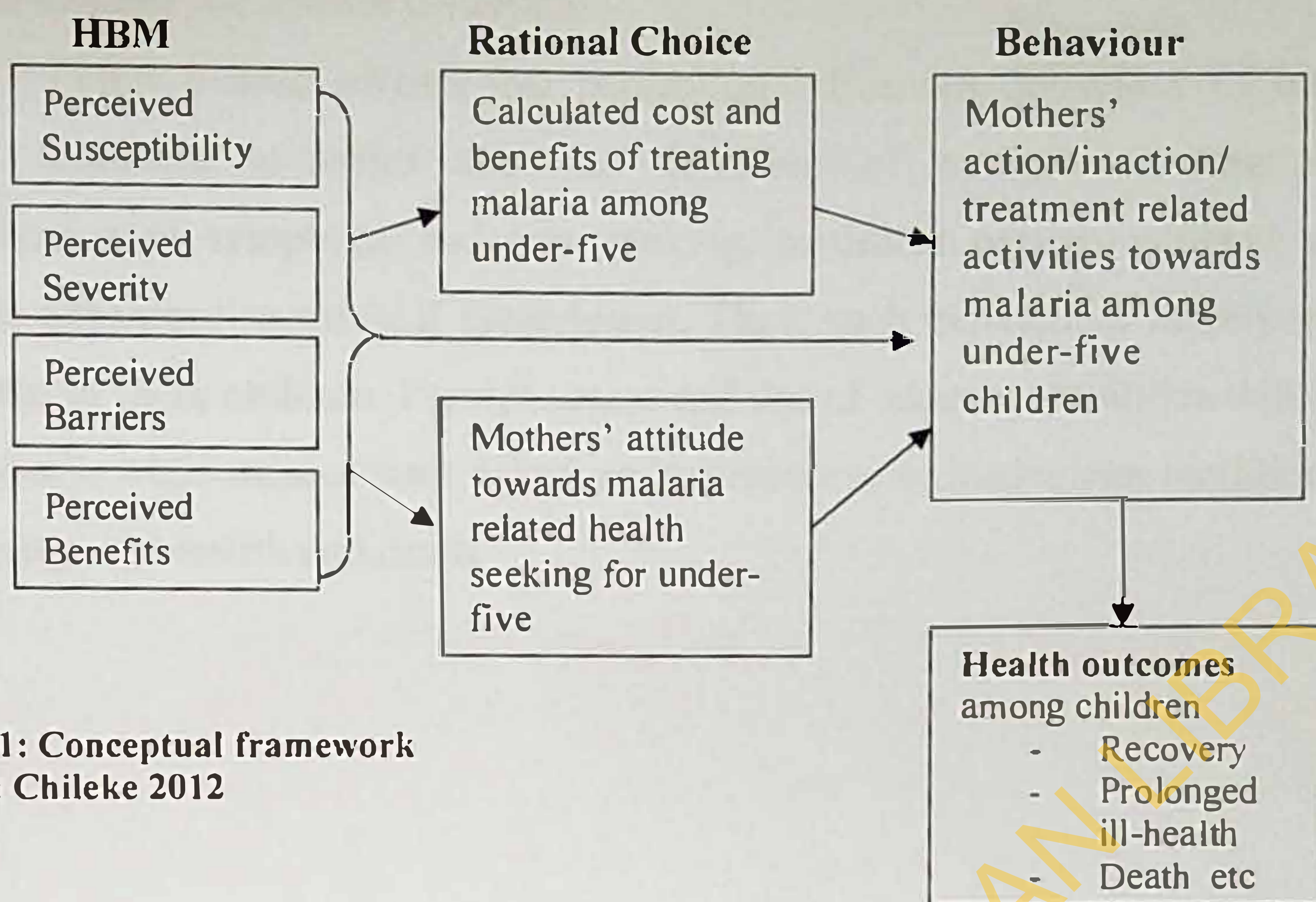


Figure 1: Conceptual framework  
Source: Chileke 2012

The framework shows relationships among relevant factors as the arrows indicate, ultimately revealing the interaction between the dependent and independent variables. The socioeconomic status of women in terms of education and awareness to a large extent affect their worldview and perception. For instance, literate women are more likely than their illiterate counterparts to perceive their mosquito-exposed under five children as susceptible to malaria. To be sure, lack of awareness could lead to misconception of the cause of malaria which may be ascribed to factors such as hot weather, intake of oily food, spiritual attack among others. Perceived susceptibility or the cause of malaria in children has implications for both preventive strategies that mothers may employ and the treatment options that could be adopted when disease had occurred

Civil servants majority of whom had some level of formal education are likely to have better assessment of the severity of the disease condition and the benefits of early detection and treatment than market women. The perceived barriers between the two groups of women will also differ in relation to access to information, educational qualifications, income, place of residence among others. These perceptions impinge on



the attitude of mothers towards health seeking for children with particular reference to malaria. The framework shows that attitude has a direct link with action or inaction of mothers towards the disease condition.

Figure 1 also reveals that perception influences behaviour of mothers as it affects treatment activities such as detection of symptoms, duration between identification of symptoms and care seeking, treatment options adopted and attitude towards adherence to medical prescription. Thus, such behaviours largely affect health outcomes of these children. Prompt access and use of adequate facilities will likely result in recovery, while unnecessary delays and/or recourse to inadequate facilities could lead to prolonged ill-health and death.

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## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 Study Area**



The study was conducted in southwest Nigeria. Ibadan which is capital of Oyo State and arguably the largest city in West Africa was purposively chosen for the research due to its cosmopolitan status relative to other core Yoruba towns. It is located in south western part of the state covering a total land area of 3,123 km (Adegoke 2011). Ibadan is made up of 11 Local Government Areas (LGAs) and inhabited mainly by the Yoruba; people from other ethnic groups such as Igbo, Hausa, Edo, and Ibibio among others also reside in the city. While some of these LGAs are situated in urban locations, others are largely rural. Ibadan inhabitants engage in numerous income-generating activities, however the majority are traders. Others are public/civil servants, farmers and artisans.

Ibadan North which was also purposively selected for the study is one of the most notable LGAs in the city due to the presence of University of Ibadan established in 1948, Oyo State Secretariat, the old Ibadan Airport, Bodija market and a host of other banking institutions and agencies. There are three major markets in Ibadan North Local Government including Eleyele, Bodija and Sango. Bodija market was specifically selected due to its characteristic large size.

### 3.2 Study Sites

The Study sites for this research are Bodija market and Oyo State Secretariat both located in Ibadan North LGA.

Bodija market: is popular for several reasons including housing a popular Abattoir that attracts people from all parts of the city. In addition, unlike most markets in Ibadan, several items are traded in the market such as plastic, food stuff, materials for interior decoration, wood for furniture and roofing, adult and children's wears and among others. It serves as distribution point for produce and food stuffs from northern part of the country. It is also an organized market with numerous Traders' Associations.

Oyo State Secretariat: located at Agodi, it is the first government secretariat complex in Nigeria. It has establishments including 17 ministries, six parastatals and numerous institutions (Fawole, Aderonmu & Fawole 2005). The secretariat is situated close to the University College Hospital (UCH), a number of commercial banks and the State House of Assembly among others. A staff clinic is also available in the complex.



### 3.3 Study Population

The study was carried out among Market Women and Civil Servants. Respondents comprised women who had a child or children age five years and below.

#### 3.3.1 Inclusion Criteria

- Mothers who currently have a child or children age five years and below.
- Women who consent to participate
- Must be undertaking their professional/occupational activities at selected sites in Ibadan –Oyo State secretariat and Bodija market.

#### 3.3.2 Exclusion Criteria

- Mothers who met all the inclusion criteria above but did not accept to participate in the survey for various reasons.
- Those mothers that are not undertaking their activities at the selected sites.

### 3.4 Study Design

Comparative cross-sectional design was used for the study.

### 3.5 Sample Size Determination

According to Chadha (2006), sample size for estimating the difference between two population proportions with about equal sample size in the two groups can be determined using the formula:

$$n = \frac{Z_{1-\alpha/2}^2 \{p_1(1-p_1) + p_2(1-p_2)\}}{d^2}$$

Where  $P_1$  and  $P_2$  are the anticipated population proportions for the two groups,

$Z_{1-\alpha/2}$  is the probability estimates from the normal distribution,



d is the absolute precision required on either side of the value of the difference between proportions.

Therefore, given a 95% level of confidence,

$$P_1 = 50\%$$

$$P_2 = 40\%$$

$$\text{and } d_2 = 10\%,$$

Where  $P_1$  = prevalence of childhood Malaria among civil servants' children.

$P_2$  = prevalence of childhood malaria among market women's children.

Arbitrary prevalence value of 50% was used since a literature search for prevalence of childhood malaria among the two groups yielded no data.

$$n = \frac{(1.96)^2 \{(0.5 \times 0.5) + (0.4 \times 0.6)\}}{(0.1)^2} = 188$$

Correcting for a 10% non-response rate,

$$\text{Formula} = \frac{1}{1 - F}$$

the minimum sample size per group is  $n = 208$

For the two groups =  $208 \times 2 = 416$

### 3.6 Sampling Technique

Multi-stage Sampling technique was used in selecting all eligible and consenting respondents at Bodija market and Oyo State Secretariat, Ibadan. The first stage involved the purposive selection of Ibadan North LGA due to the large number of markets and government establishments in the area. Simple random technique was used in selecting Bodija Market, while purposive method was adopted in choosing the Oyo State Secretariat. The third stage involved clustering of Bodija market according to items sold in different sections; the Secretariat was clustered by ministries. Finally, mothers of under-five children were selected for the study.



### 3.6.1 Data Collection Instrument and Procedure

A pre-coded English questionnaire and a Yoruba translated version were tested for validity and consistency before the actual survey was carried out in other settings (Sango market and Federal Secretariat) similar to the study locations. The first part of the questionnaire contained questions on socio-demographic characteristics of respondents while the second part assessed the prevalence of under-five malaria. The third section dealt with socioeconomic factors and their impingement on childhood malaria, and the fourth and fifth parts examined the preventive strategies and treatment options respectively. Substantive data were collected through selection of respondents that met the inclusion criteria at the two study sites.

### 3.6.2 Data collection method:

*Market women:* The arrangements of the stalls in the market are in lines/rows and the lines/rows are labeled A-Z. Each line/row has about 50 shops; eligible participants were interviewed purposively from one shop to the other (consecutively) until the sample size allocated to the market women was achieved.

*Civil servants:* In the case of civil servants, sample size (202) was divided equally among the 17 ministries; eligible participants were selected and interviewed from each ministry going from one office to other until the sample size was achieved.

### 3.6.3 Data analysis

Questionnaire data were sorted, cleaned, coded, entered and analyzed using the Statistical Package for Social Sciences (SPSS software) version 15.0. Univariate analysis which indicated frequencies and percentages were used in describing and summarizing relevant variables. Bivariate analysis (Cross tabulations) was carried out, using Chi-square test to investigate association between the categorical dependent and independent variables. Logistic regression was used to predict the strength of the association among relevant variables. Level of significance was set at 5%.



### 3.6.4 Procedure for computing respondents' knowledge of childhood malaria

Knowledge of risk factors to malaria was assessed by requesting the respondents to determine what the risk factors of malaria were. The responses were on the scale of strongly agree (SA) to strongly disagree (SD), with the most correct answer scoring 5 points. The final malaria knowledge score was obtained as the sum of the separate answer scores and could range from 6-30. The knowledge score was categorized into good and poor knowledge respectively. For convenience, the knowledge was scored based on 100%.

Those that had 65% above (scored 23 and above) were classified as having good knowledge of childhood malaria. While a respondent with less score was classified as having poor knowledge (VanGenderen *et al*, 2012).

	SA	A	U	D	SD
Mosquito bite can cause malaria					
Children who don't sleep under insecticide treated net (ITN) will have malaria	"	"	"	"	"
Malaria can kill if not treated	"	"	"	"	"
Symptoms of malaria include fever, head ,cough, catarrh, vomiting , loss of appetite, inability to play, weakness of the body	"	"	"	"	"
The effect of untreated childhood malaria are prolonged ill-health, can lead to other type of illnesses, death	"	"	"	"	"
Seeking prompt medical care in childhood malaria can prevent complications and even death due to malaria	"	"	"	"	"

### 3.6.5 Procedure for measuring respondents' wealth status using the wealth index

Wealth quintile ranges were calculated on weighted frequency distribution of household items such as;

Does your household have the following items which are in good working order:	
Electricity?	1. Yes      2. No



A radio?	1. Yes	2. No
A television?	1. Yes	2. No
A mobile telephone?	1. Yes	2. No
A non-mobile telephone?	1. Yes	2. No
A refrigerator?	1. Yes	2. No
A cable TV?	1. Yes	2. No
A generating set?	1. Yes	2. No
Air conditioner?	1. Yes	2. No
A computer?	1. Yes	2. No
Electric iron?	1. Yes	2. No
A fan?	1. Yes	2. No

Respondents that scored 49% or less were categorized as belonging to low (poor) wealth quintile group. The cut-off for medium and highest (rich) wealth quintile were 50-74 and 75% respectively (Oladebo *et al*, 2010).

Rich = 75% and above (9 and above)

Middle = 50 – 74% (6 -8)

Poor = 49 below (5 and below)

### 3.6.6 Limitations

The limitations of the study included that the researcher found it difficult to reach out to some people, while some others exhibited impatience in completing the questionnaires, particularly market women. As such some items on the questionnaire schedule were left non-responded. In addition, occupation may not be a perfect measure of socioeconomic status, considering the fact that some market women have tertiary school education while some women in the public service only have basic formal education. More importantly, only civil servants at the Oyo State Secretariat were included in the study while those in other establishments, in the selected LGA, were excluded notwithstanding their level of knowledge about under-five malaria. Again, only market women at the Bodija were involved in the research, while their counterparts in



Sango and Eleyele markets were excluded. These exclusions undermined collection of data from different settings and the generalizability of the findings of the study.

### **3.6.7 Ethical Considerations**

Ethical approval was sought from UI/UCH Review Board. Thus, throughout fieldwork, ethical issues will be given adequate consideration. For instance, confidentiality of the respondents was fully guaranteed to the extent that information cannot be linked to any of them. Their consent was sought before participation in the study and their right to withdraw at any point they deem necessary was communicated to them prior to commencement of participation in completing the questionnaire schedule. In addition, the benefits of the research such as its likely impact on policies were made known to the respondents in line with global standards.

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## CHAPTER FOUR

### RESULTS

This chapter presents the findings from data generated during fieldwork with a view to discussing relevant variables and their associations in explaining childhood malaria between two distinct groups in Ibadan-North LGA. Data are presented in tabular and chart forms and the analysis revolves around frequency distributions, cross-tabulations and regression. Results are presented based on responses from 410 respondents. However, due to the skipping of some items on the questionnaire schedule by some of the respondents, for whatever reasons, analysis of some items did not reflect the total number of study subjects in all cases, and was based on the actual number of responses.

Table 4.1 shows the frequency distribution of the respondents on selected socio-demographic characteristic; which include age, marital status, religion, ethnic group, educational level, occupation and Children-Ever-Born (CEB). The age category indicates that the highest proportion 174 (42.4%) of the respondents is aged 31-36 years, while the least proportion (3.2) of the women are aged 19-24years. The mean age of the respondent was 33.97.

Most 371 (90.5%) of the respondents were married, while a negligible proportion (less than one percent) of the respondents were either separated or divorced. Most of the respondents 273 (67%) were Christians as compared to about 30% of the respondents who were Muslim. As regards ethnic group, the highest proportion (85%) belonged to the Yoruba ethnic group, while about 11% of the women were Igbo respondents. The majority (53%) of the respondents attended tertiary level of education, while the least proportion (7%) of the respondent had no formal education. According to occupation categories, a higher proportion (51%) of the respondents was traders as compared to 49% of the respondents who were civil servants. The distribution of the women by child-ever-born shows that, a higher proportion (95.5%) of the women had less or equal to four children, compared to 4.5% of the respondents with greater or equal to four children.



**Table 4.1: Frequency distribution of respondents by selected socio-demographic characteristics**

Variable	Frequency	Percent
<b>Age</b>		
19- 24	13	3.2
25- 30	109	26.6
31-36	174	42.4
37-42	82	20.0
43+	32	7.8
Mean = 33.97 ± 6.000		
<b>Marital Status</b>		
Single	30	7.3
Married	371	90.5
Separated/divorced	2	0.5
Widowed	7	1.7
<b>Religion</b>		
Christianity	273	66.6
Islam	132	32.2
Traditional	3	0.7
Others	2	0.5
<b>Ethnic Group</b>		
Yoruba	349	85.1
Igbo	43	10.5
Hausa	16	3.9
Others	2	0.5
<b>Education</b>		
No formal education	18	4.4
Primary school	58	14.1
Secondary school	105	25.6
Tertiary school	218	53.2
Others	11	2.7
<b>Occupation</b>		
Trader	208	50.7
Civil servant	202	49.3
<b>No of Children-Ever-Born (CEB)</b>		
≤ = 4	383	95.5
>4	18	4.5

Table 4.2 shows that about 96% of the respondents have 1 to 2 under five children they carter for, while 4% of the women have three or more under five children they carter for.



**Table 4.2: Distribution by number of under five children had or being catered for**

<b>Number of U5 children</b>	<b>Frequency</b>	<b>Percent</b>
1-2	394	96.1
$\geq 3$	16	3.9
Total	410	100

Table 4.3 shows the frequency distribution on sources of information on malaria and indicates that virtually all the respondents (99%) have ever heard about malaria. The highest proportion of the respondents (99.0%) heard about malaria from health facilities, while (39.0%) heard from friends, 35.0% from relatives. The least proportion (30%) of the respondents heard from the newspaper.

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**Table 4.3: Distribution of respondents by ever-heard and sources of information on malaria N = 410**

	Frequency	Percent
<b>Ever heard about malaria</b>		
Yes	406	99.0
No	4	1.0
<b>From relatives</b>		
Yes	142	34.6
No	268	65.4
<b>From friends</b>		
Yes	161	39.3
No	249	60.7
<b>From health facilities</b>		
Yes	405	98.8
No	5	1.2
<b>From radio</b>		
Yes	253	61.7
No	157	38.3
<b>From television</b>		
Yes	242	59.0
No	168	41.0
<b>From newspapers</b>		
Yes	122	29.7
No	288	70.3

Table 4.4 presents data on some under-five malaria related knowledge issues. Over 96% either strongly agreed or agreed that mosquito bite causes malaria while about 84% agreed and strongly agreed that children who do not sleep under Insecticide Treated Net (ITN) will likely suffer from malaria. Those who stated that malaria could lead to death if not treated constituted 92.2% of the study sample. Among the subjects 410 (100%), nearly 52% strongly agreed that fever, headache, coughing, catarrh among others are identifiable symptoms of malaria while about 42% simply agreed that these symptoms suffice. Respondents who either agreed or strongly agreed that the effects of untreated malaria include prolonged ill-health, disability, other types of ailment and death together



constituted about 91% of the total while those who agreed or strongly agreed that prompt medical care leads to prevention of complications were about 89%.

**Table 4.4: Percentage Distribution of Respondents by Knowledge about Malaria in Children**

	<b>Strongly disagree % (N)</b>	<b>Disagree %(N)</b>	<b>Uncertain %(N)</b>	<b>Agree %(N)</b>	<b>Strongly agree %(N)</b>
Mosquito bite causes malaria	1.0(4)	0.2(1)	0.7(3)	28.8(118)	67.6(277)
Children who do not sleep under ITN will have malaria	1.5(6)	3.7(15)	8.8(36)	41.5(170)	42.4(174)
Malaria can kill if not treated	0.2(1)	0.7(3)	2.7(11)	42.7(175)	49.5(203)
Symptoms include fever, headache, cough, catarrh, vomiting, loss of appetite etc	1.0(4)	1.7(7)	2.2(9)	42.2(173)	51.7(212)
Effects of untreated malaria include prolonged ill-health, disability, other types of ailment and death	1.2(5)	2.2(9)	4.1(17)	39.3(161)	51.5(211)
Seeking prompt medical care can prevent complications and death	1.2(5)	3.7(15)	3.4(14)	38.0(156)	51.0(209)

Table 4.5 shows the distribution of the respondents according to the method of disposal of refuse. The highest proportion (34.0%) of the respondents disposed of their refuse in a dumpsite followed by about 32.0% of the respondents that dispose of their refuse in bushes, and 23.0% that burn their refuse. The least proportion (2.0%) of the respondents throws their refuse in gutters. This indicates that 66% of the respondents disposed of their refuse in places other than dumpsites.



**Table 4.5: Distribution of refuse disposal methods used by respondents**

Method of refuse disposal	Frequency	Percent
Bushes	130	32.3
Stagnant water	12	3.0
Dump site	138	34.3
Gutter	9	2.2
By burning	91	22.6
Others	22	5.5

Table 4.6 shows facilities or health providers that mothers patronize when symptoms of malaria are detected in their under-five. Most (80.2%) of the respondents took their babies to the hospital for treatment of malaria, while the least proportion (3.5%) of the respondents patronized pharmacies, patent medicine dealers and other outlets.

**Table 4.6: Where children are taken for treatment on detection of malaria symptoms**

Places for children's treatment	Frequency	Percent
Hospital	319	80.2
Traditional healer	24	6.0
Self/home treatment	22	5.5
Pharmacy/patent medicine store	12	3.0
Health centre	19	4.8
Others*	2	0.5

\*Others include faith based clinics and homes

Table 4.7 shows that about 94% of the respondents had high knowledge about childhood malaria while only 6% exhibited low knowledge.

**Table 4.7: Distribution of respondents' malaria knowledge**

Variables	Frequency	Percent
Good knowledge	353	93.6
Poor knowledge	24	6.4
Total	377	100



Table 4.8 shows that the prevalence of childhood malaria increases as the wealth status of the respondent increases. The highest prevalence of knowledge (44.9%) was among the rich respondents, as compared to 37.3% and 11.5% prevalence among women who belong to the middle and poor wealth statuses respectively. However, this variation was not statistically significant ( $p = 0.099$ ).

**Table 4.8: Distribution of respondents' wealth status by knowledge of childhood malaria**

Wealth status	Knowledge		Total
	Good knowledge <i>N</i> %	Poor knowledge <i>N</i> %	
Poor	33 11.5%	5 1.7%	38 13.2%
Middle	107 37.3%	8 2.8%	115 40.1%
Rich	129 44.9%	5 1.7%	134 46.7%
<b>Total</b>	269 93.7%	18 6.3%	287 100.0%
Pearson's Chi-square (df)	4.628 (2)		
Significance value	0.099		

Table 4.9 shows variation in the knowledge of malaria according to level of education. The highest prevalence of knowledge (50%) was among women with tertiary education, while about 24% and 14% prevalence were observed among the respondents with secondary and primary school education respectively. The observed difference was not significant ( $p = 0.222$ ).



**Table 4.9: Distribution of respondents' educational qualification by knowledge**

Educational qualification	Knowledge		Total
	Good knowledge N %	Poor knowledge N %	
No formal education	17 4.5%	1 3%	18 4.8%
Primary school	52 13.8%	1 0.3%	53 14.1%
Secondary school	89 23.6%	6 1.6%	95 25.2%
Tertiary education	188 49.9%	14 3.7%	202 53.6%
Others	7 1.9%	2 0.5%	9 2.4%
Total	353 93.6%	24 6.4%	377 100.0%
<b>Pearson's Chi-square (df)</b>	<b>5.708 (4)</b>		
<b>Significance value</b>	<b>0.222</b>		

Table 4.10 shows a cross-tabulation of respondents' occupation and knowledge, which shows that 50% of traders have high knowledge relative to 44% of civil servants. With the significance value of 0.128, occupation does not have statistically significant relationship with knowledge of malaria in under-five children.

**Table 4.10: Distribution of respondents' occupation by knowledge**

Occupation	Knowledge		Total
	Good knowledge N %	Poor knowledge N %	
Trader	199 50.1%	9 2.4%	198 52.5%
Civil servant	164 43.5%	15 4.0%	179 47.5%
Total	353 93.6%	24 6.4%	377 100.0%
<b>Pearson's Chi-square (df)</b>	<b>2.319 (1)</b>		
<b>Significance value</b>	<b>0.128</b>		

Table 4.11 presents the relationship between respondents' age and knowledge of malaria among the under-five. Specifically, Table 4.13 reveals that respondents age 31-36 have



the highest percentage 150 (39.8%) with high knowledge. The next are those in the age category of 25-30 years 94 (24.9%). The least in the high knowledge group are those of ages 19-24 and 43 and above with 9 (2.4%) and 27(7.2%) respectively. Generally, 93.6 percent of the respondents had high knowledge relative to only 6.4% with low knowledge. The table indicates that respondents' ages do not have statistically significant relationship with knowledge of malaria in under-five children.

**Table 4.11: Distribution of respondents' age by knowledge**

Age	Knowledge				Total
	Good knowledge	N %	Poor knowledge	N %	
19-24	9 2.4%		2 0.5%		11 2.9%
25-30	94 24.9%		9 2.4%		103 27.3%
31-36	150 39.8%		8 2.1%		158 41.9%
37-42	73 19.4%		3 0.8%		76 20.2%
43+	27 7.2%		2 0.5%		29 7.7%
Total	353 93.6%		24 6.4%		377 100.0%
<b>Pearson's square (df)</b>	<b>Chi-</b>		<b>4.758 (4)</b>		
<b>Significance value</b>			<b>0.313</b>		

Table 4.12 shows that only 1.8% of both traders and civil servants have more than 150,000 as monthly income. For both traders and civil servants those with estimated monthly income of less than or equal to ₦40,000 were 26.3% and 19% respectively. Respondents whose incomes were more than ₦40,000 comprised 9.1% traders and 14.6% civil servants. This observed difference was statistically significant.



**Table 4.12: Estimated monthly income and occupation of respondents**

Estimated monthly income	Occupation				Total
	Trader	N %	Civil servant	N %	
<40,000	101		73		174
	26.3%		19.0%		45.3%
>40,000	35		56		91
	9.1%		14.6%		23.7%
<100,000	33		25		58
	8.6%		6.5%		15.1%
>100,000	24		23		47
	6.3%		6.0%		12.2%
More than 150,000	7		7		14
	1.8%		1.8%		3.6%
Total	200		184		384
	52.1%		47.9%		100.0%
Pearson's Chi-square (df)			9.827 (4)		
Significance value			0.043		

Table 4.13 shows distribution of respondents by adoption of malaria prevention strategies. A high proportion (49.2%) of respondents who adopted strategies to prevent malaria were among traders compared to 45.4% among civil servants. This was not significant ( $p = 0.7$ ).

**Table 4.13: Whether malaria prevention strategies were adopted**

Adopted malaria prevention strategies	Occupation				Total
	Trader	N %	Civil servant	N %	
Yes	193		178		371
	49.2%		45.4%		94.6%
No	10		11		21
	2.6%		2.8%		5.4%
Total	203		189		392
	51.8%		48.2%		100.0%
Pearson's Chi-square (df)			154 (1)		
Significance value			0.694		

As Table 4.14 shows there is no statistical association (0.137) between where children are taken for treatment when symptoms are detected and occupation of mothers. Table 4.16



clearly shows that the percentage difference between traders and civil servants is negligible with the highest percentage difference being (3%) for the 'Traditional healer' category. Apart from the 'others' category, respondents that accessed pharmacy and/or chemist shop on detection of malaria symptoms were of the least percentage representing 1.3% and 1.8% among traders and civil servants respectively.

**Table 4.14: Facilities accessed on detection of malaria symptoms by occupation**

Where children are taken on detection of malaria symptoms	Occupation		Total
	Trader N %	Civil servant N %	
Hospital	161 40.5%	158 39.7%	319 80.2%
Traditional healer	18 4.5%	6 1.5%	24 6.0%
Self/home treatment	9 2.3%	13 3.3%	22 5.5%
Pharmacy/chemist shop	5 1.3%	7 1.8%	12 3.0%
Health centre	7 1.8%	12 3.0%	19 4.8%
Faith-based clinics/patent medicine stores	1 0.3%	1 0.3%	2 0.5%
Total	201 50.5%	197 49.5%	398 100.0%
<b>Pearson's Chi-square (df)</b>	<b>8.365 (5)</b>		
<b>Significance value</b>	<b>0.137</b>		

Table 4.15 indicates that more traders (49.2%) than civil servants (29.5%) had ever-used ACT for treatment of malaria among under-five children. Out of the 24 percent that had never used ACT, civil servants constitute 18.4 percent. This was statistically significant ( $p = 0.001$ ).



**Table 4.15: Association between ever-used ACT and occupation of respondents**

Ever-used any ACT for treatment of malaria on children	Occupation		Total
	Trader N %	Civil servant N %	
Yes	159 49.2%	101 29.5%	260 76.0%
No	19 5.6%	63 18.4%	82 24.0
Total	178 52.0%	164 48.0%	342 100.0%
<b>Pearson's Chi-square (df)</b>	<b>36.642 (2)</b>		
<b>Significance value</b>	<b>0.001</b>		

Table 4.16 shows that *Coartem* is the drug mostly used by civil servants (23.3%) while *Fansidar* is the one mostly used by traders (20.4%). The least used drugs include *Amalar* (3.2%) among civil servants and *Coartem* (9.3%) among traders. This is statistically associated at 0.001 significance level.

**Table 4.16: Drugs mostly used by mothers for initial treatment of malaria and respondents' occupation**

Drugs most often used by mothers for initial treatment of children	Occupation		Total
	Trader N %	Civil servant N %	
Chloroquine	44 15.8%	17 6.1%	61 21.9%
Fansidar	57 20.4	14 5.0%	71 25.4%
Amalar	31 11.1%	9 3.2%	40 14.3%
Coartem	26 9.3%	65 23.3%	91 32.6%
Others	0 .0%	16 5.7%	16 5.7
Total	158 56.6%	121 43.4%	279 100.0%
<b>Pearson's Chi-square (df)</b>	<b>79.295 (4)</b>		
<b>Significance value</b>	<b>0.001</b>		



Table 4.17 shows variation in the prevalence of under-five malaria across the population subgroups. The prevalence of under-five malaria was highest (37.5%) among the respondents in the age group 43 years and above, while the lowest prevalence (22.9%) was among the women in the ages 31 to 36 years old. This observation is not significant ( $p=0.664$ ). According to marital status, the prevalence was more (33.3%) among the formerly married respondents as compared to 26.3% and 24.5% respectively among the currently married and single respondents. This is not significant ( $p=0.372$ ). By level of education, the prevalence was highest (30.5%) among the respondents with tertiary level of education and lowest (7.8%) among the respondents with primary education. This observation is statistically significant ( $p=0.006$ ). The prevalence of under-five malaria was 27.2% among traders, compared to 22.3% among civil servants. This is not statistically significant ( $p=0.282$ ). It was lower (21.6%) among Christians compared to 30.3% among Muslims. This is not significant ( $p=0.076$ ). There is a statistically significant association ( $p<0.0001$ ) between monthly income of the respondents and the prevalence of under-five malaria among the respondents, as the prevalence was highest (41.8%) among the respondents whose monthly income was  $< 100,000$  and lowest (17.8%) among the respondents whose monthly income was  $< 40,000$ . The prevalence was lowest (16.8%) among the respondents who belong to the middle wealth category and highest (38.7%) among the respondents who were poor. This observed difference is statistically significant ( $p=0.022$ ). There is no statistically significant association between knowledge and where the respondents dispose of their refuse with prevalence of under-five malaria ( $p=0.26$  and  $0.09$ ).



**Table 4.17: Association of socio-economic variables with ever had malaria**

Variables	Ever had malaria in last 2wks		Total (100)	$\chi^2$	P-value
	No (%)	Yes (%)			
<b>Age group</b>					
19-24	6 (75.0)	2 (25.0)	8 (100)	2.391	0.664
25-30	72 (75.0)	24 (25.0)	96 (100)		
31-36	118 (77.1)	35 (22.9)	153 (100)		
37-42	56 (75.7)	18 (24.3)	74 (100)		
43+	15 (62.5)	9 (37.5)	24 (100)		
<b>Marital status</b>					
Single	14 (73.7)	5 (26.3)	19 (100)	3.130	0.372
Currently married	249 (75.5)	81 (24.5)	330 (100)		
Formerly married	4 (66.7)	2 (33.3)	6 (100)		
<b>Level of education</b>					
No education	14 (87.5)	2 (12.5)	16 (100)	12.403	0.006
Primary	47 (92.2)	4 (7.8)	51 (100)		
Secondary	70 (75.3)	23 (24.7)	93 (100)		
Tertiary	130 (69.5)	57 (30.5)	187 (100)		
<b>Occupation</b>					
Traders	131 (72.8)	49 (27.2)	180 (100)	1.160	0.282
Civil servants	136 (77.7)	39 (22.3)	175 (100)		
<b>Religion</b>					
Christian	181 (78.4)	50 (21.6)	231 (100)	3.139	0.076
Islam	83 (69.7)	36 (30.3)	119 (100)		
<b>Monthly income</b>					
< 40,000	131 (82.4)	28 (17.6)	159 (100)	20.618	0.000
> 40,000	57 (78.1)	16 (21.9)	73 (100)		
< 100,000	27 (51.9)	25 (48.1)	52 (100)		
> 100,000	31 (68.9)	14 (31.1)	45 (100)		
> 150,000	7 (77.8)	2 (22.2)	9 (100)		
<b>Wealth category</b>					
Poor	19 (61.3)	12 (38.7)	31 (100)	7.603	0.022
Middle	89 (83.2)	18 (16.8)	107 (100)		
Rich	95 (72.0)	37 (28.0)	132 (100)		
<b>Knowledge</b>					
Poor knowledge	13 (65.0)	7 (35.0)	20 (100)	1.277	0.259
Good knowledge	237 (76.2)	74 (23.8)	311 (100)		
<b>Refuse disposal</b>					
Bushes	91 (80.5)	22 (19.5)	113 (100)	9.598	0.087
Stagnant water	6 (60.0)	4 (40.0)	10 (100)		
Dump site	87 (75.7)	28 (24.3)	115 (100)		
Gutter	3 (42.9)	4 (57.1)	7 (100)		
Burning	58 (69.0)	26 (31.0)	84 (100)		
Others	17 (85.0)	3 (15.0)	20 (100)		



## LOGISTIC REGRESSION ANALYSIS

Table 4.18 shows logistic regression output of ever had malaria (last 2wks) on socio-economic variables. Respondents who belong to the middle and rich wealth categories respectively were about 3.3 and 3.5 times as likely to have had their under-five children come down with malaria in the last 2 weeks before the survey compared to the respondents who belong to the poor wealth categories ( $p=0.017$  and  $0.024$  respectively). According to level of education, respondents who had primary, secondary and tertiary education were about 20%, 79% and 87% respectively less likely to have had their under-five children with malaria, compared to the respondents with no education. This observed difference is not statistically significant ( $p>0.05$ ). Respondents, whose monthly income was less than 40,000, were about 5% more likely to have their under-five children with malaria as compared to the respondents with no formal education. This is not statistically significant at  $p=0.91$ . As compared to those that ear less than 40,000, respondents that earn less than 100,000 were about 65% less likely ( $p=0.02$ ) to have their under-five children with malaria, while those that earned between >100,000 to >150,000 were about 50% ( $OR=0.49$ ,  $CI=0.2-1.2$ ) and 20% ( $OR=0.83$ ,  $CI=0.14-4.78$ ).



**Table 4.18: Logistic regression of ever had malaria (last 2wks) on socio-economic variables**

Variables	P-value	Odds ratio	95.0% C.I. for Exp(B)	
			Lower	Upper
<b>Wealth categories</b>	0.046			
Poor (RC)				
Middle	0.017	3.478	1.250	9.681
Rich	0.024	3.283	1.166	9.241
<b>Level of education</b>	0.039			
No education (RC)				
Primary	0.851	0.795	0.073	8.693
secondary	0.160	0.207	0.023	1.863
Tertiary	0.076	0.133	0.014	1.237
<b>Income</b>	0.097			
< 40,000 (RC)				
> 40,000	0.914	1.049	0.443	2.480
< 100,000	0.019	0.352	0.147	0.842
>100,0000	0.112	0.491	0.204	1.181
>150,000	0.832	0.827	0.143	4.777
Constant	0.072	6.846		

Table 4.19 shows that respondents in the middle class were almost 4 times more likely to have knowledge of malaria as compared to the poor. This difference was statistically significant ( $P = 0.039$ ). Rich class respondents were about 2 times more likely to have knowledge of malaria compared to the poor. This is not statistically significant  $P = 0.261$ . Muslims were 0.8 times more likely to have knowledge of malaria as compared to Christians. This observed difference was not statistically significant ( $P = 0.601$ , 95% CI OR = 0.271 – 2.130).



**Table 4.19: Logistic regression result of knowledge with wealth index and religion**

Variable	Odds Ratio (OR)	P value	95%CI OR lower	95%CI OR upper
<b>Wealth index</b>				
Poor (RC)				
Middle	3.909	0.039	1.068	14.304
Rich	1.929	0.261	0.613	6.070
<b>Religion</b>				
Christian (RC)				
Islam	0.759	0.601	0.271	2.130

RC = reference category

Married respondents were about 0.3 times more likely than single respondents to have their children suffer from malaria, separated and/or divorced respondents were 0.2 times and those that are widowed were 0.1 times more likely than respondents that are single to have children that experienced malaria in the two weeks following the survey.

**Table 4.20: Logistic regression result showing respondents' occupation and selected variables**

Variable	Odds Ratio (OR)	P value	95%CI OR lower	95%CI OR upper
<b>Ever-heard of malaria</b>				
Trader(RC)				
Civil servants	0.767	0.282	0.472	1.244
<b>Ever-used ACT</b>				
Trader(RC)				
Civil servants	0.034	0.002	0.472	0.289
<b>Knowledge score</b>				
Trader(RC)				
Civil servants	0.521	0.133	0.222	1.221

RC = reference category

Table 4.20 indicates that respondents who are civil servants were 0.8 times more likely than traders to have ever-heard about malaria in under-five children. The table also shows that civil servants were 1/0.034 (29.412) times less likely than traders to have ever-used ACT on their children for treatment of malaria. It also showed that civil servants were 0.5 times more likely than traders to have good knowledge of malaria in their children.



## CHAPTER FIVE

### DISCUSSION, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Discussion

The age of respondents indicated normal distribution with the youngest and oldest respondents together making up only 11 percent of the total. This is either because they were too young to have under-five children considering that most women in Southern Nigeria spend time acquiring education (Nwokocha, 2009) or aged to have children within five years of age to cater for. Christian respondents are over hundred percent more than Muslims which does not reflect the real general picture of the dichotomy. As expected, the Yoruba constituted an overwhelming majority of respondents (85%). Considering Otite's (2000) classification of Nigeria into 389 ethnic nationalities, groups other than the three major ones constitute a negligible percentage (0.5%). This could be either because Ibadan may not be considered a destination of choice comparable to Lagos, Abuja and Port-Harcourt among others or that the professions and/or locations chosen for the study are not prioritized by in-migrants as residents of the city.

Data revealed very high tertiary education attainment rate among respondents (53.2%) far beyond the national average of 11.3% (NPC 2009). These rare statistics could be explained by several factors including that the location of the study, Ibadan North LGA, hosts notable institutions such as the University of Ibadan, the University College Hospital, the Federal and State Secretariats, numerous banking institutions, a Polytechnic and different private secondary schools among others that could directly or indirectly influence residents. But more importantly, most of the civil servants had tertiary school education.

Results showed prevalence of malaria to be high (30.5%) among respondents with tertiary education while the prevalence was 7.8% among respondents with primary school education. This is in contrast with the Malawi DHS (2000) data which reveals that frequency of fever occurrence was more likely to occur people with lower level of education as compared with higher level of education (Ndawala *et al* 2000). The prevalence of malaria was lowest (16.8%) among the respondents who belonged to the



middle wealth category and highest (38.7%) among the respondents who were poor. This is similar to the study by Qwatkin and Gullot (2000), which revealed that the burden of malaria is greatest among poor countries. Only 0.2% of global malaria deaths are experienced within the world's richest population quintile, while 57.9% occurred among the poorest (Qwatkin and Gullot 2000).

Respondents' knowledge of under-five malaria was very good but does not reflect the level of action taken to ensure prevention or when the disease had occurred, treatment. This discrepancy between knowledge and behaviour could have resulted from respondents' inability to perceive their children as susceptible to the disease or that a particular condition was not severe. This situation would have contributed disproportionately to high infant mortality in Nigeria estimated at 77 (Population Reference Bureau 2012) and more specifically to under-five mortality rate of 143 (UNICEF 2010).

Results indicate that age of respondents did not influence their knowledge of malaria in children. Interestingly, respondents age 43 and above, who ordinarily by their experience should have good knowledge, presented one of the worst knowledge scores among the categories. Probably, women in the middle or their reproductive life had better knowledge of malaria in children due to better acquaintance with current information on preventive strategies and treatment regimen than older women. For instance, women in their 60s may not have been exposed to Insecticide Treated Nets and ACT in dealing with illness condition. Therefore, the tendency to continue following the traditional ways of handling malaria in children will be high. Times are changing and without continuous updating in knowledge through awareness and sensitization schemes, an individual's knowledge would become obsolete relative to contemporary reality (Heggenhougen, Hackethal & Vivek. 2003) and could account for high mortality among children generally and under-five in particular.

This study examined under-five malaria prevalence among respondents' children two weeks preceding the survey; an interval that had also been adopted by other studies (Runsewe-Abiodun, Ogunfowora and Fetuga 2006; Amodu 2007; Lawton 2012). The prevalence of malaria among the children of traders in Bodija market was found to



be 27% while the children of civil servant in Oyo State Secretariat was 22%. Higher prevalence in traders as compared to civil servants could be as the result of exposure to dirty environment of the market. Also most traders are likely to be farmer, and as Martens and Hall's (2000) study revealed, agricultural labourers for instance may not only place themselves at risk through increased contact with malaria vector but also, through their migration, expose others by spreading some of these diseases.

Respondents who were classified as rich had better knowledge of malaria than the middle and poor classes which could be a function of more exposure to information and technology such as television, internet, and radio among other sources. People of low class are usually concerned primarily with the basic necessities of life such as food, shelter and clothing and may hardly focus on information that could improve their health conditions in the medium and long run. Yet, if Nigeria is conceived as a nation with two dominant classes, as has been argued in several quarters (Nwokocha 2007), where individuals are either rich or poor; by collapsing the latter with the middle class, the percentage of the rich will then be less. This will thus translate to the lower class having more knowledge of childhood malaria, which may be a function of more frequent malaria experiences among their children.

However, the results indicated non-statistically significant relationship between level of education and knowledge of malaria in under-five suggesting that such awareness could be gained from other sources outside the formal education settings. Experience may rather play a more crucial role in what an individual knows or cues to action in handling under-five malaria than what was learned in school. In the same vein, respondents' occupation did not influence their knowledge significantly, an indication that other factors could determine the extent to which such knowledge is gained.

The estimated monthly income of traders and civil servants revealed no significant difference to suggest that respondents' occupation did not determine their wealth status as much as household items did. Although it could be argued that income determines an individual's place of residence and what is acquired as household property as a proxy of measuring wealth, other factors such as inheritance, gifts and covetous behaviour could explain wealth index among individuals and groups. Therefore, it is difficult to make



categorical statements about who the wealthier respondent is. Moreover, for various personal, religious or ideological reasons some individuals hardly divulge valid information on their income.

Although data had revealed that slightly more traders than civil servants adopted malaria preventive strategies and accessed hospitals on detection of malaria symptoms in their under-five children, they also outnumbered civil servants who had ever-used ACT. The association between ever-used ACT for treatment of malaria on children and occupation specifically showed that more traders (49.2%) had used ACT for treatment of malaria among their under-five children than civil servants (29.5%). This could be as a result of the fact that most malaria programmes and outreaches were mainly targeted at the market people/traders believed to have poor knowledge. However, although it would seem that traders made more efforts at handling episodes of malaria in children, this could have largely translated to self-medication, which is a critical factor accounting for unnecessary delays in accessing appropriate facilities such as hospitals (Foster 1995). Indeed, these traders together patronized Traditional healers and undertook self-home-treatment more than civil servants did to further account for delays in accessing health facilities. Nwokocha (2007) had noted unnecessary delays in reaching medical facilities as a major indirect cause of death among Nigerians especially the uninformed, poor and rural residents.

The study clearly revealed the implications of environmental conditions for exposure to malaria. Thus improper disposal of refuse particularly emptied into stagnant water and gutters accounted for blocked drainages and hosting of mosquito lava. Disposing refuse at designated dump sites is the surest way of ensuring a clean environment and reducing the number of mosquitoes and malaria transmission. Incidentally, only few respondents disposed their refuse in these sites.

## 5.2 Conclusion

This study focused on women and mainly mothers of under-five children due to their closeness to young family members especially where men and fathers for various reasons are not available for most part of the day. Although an overwhelming majority of



households in Ibadan North are governed by patriarchal ethos, understanding the role of women is central to making critical analysis on childhood malaria. The comparative approach adopted whereby traders and civil servants were selected as participants made for robust information. However, data indicated that occupation is not a significant factor for determining people's perception, attitude and behaviour towards malaria issues.

Good knowledge of malaria may be an advantage only where it translates to action. In this study, there was a marked discrepancy between what is known and behaviour which could account for lack of emphasis on appropriate intervention on the premise that little needed to be done in a particular context. Thus, malaria prevalence in under-five children in Ibadan North LGA, like most other locations in Nigeria, is high irrespective of efforts by governments and agencies at ensuring reduction in the burden of the disease. We note that high prevalence of under-five malaria in Ibadan North and the city in general contradicts the claim of good knowledge among respondents. Attitude towards preventive strategies and treatment options, for the most part, still suggests respondents' perceptual and behavioural deficiency in dealing with childhood malaria.

### **5.3 Recommendations**

Malaria is a medical condition that can be eliminated with sustained efforts and commitment by individuals and governments. The following specific recommendations are suggested:

1. Although results indicated good knowledge about malaria among respondents, parents' behaviour towards prevention and treatment, in some cases, was inappropriate. For instance, self-medication using ACTs and unnecessary delays in accessing health facilities were noted among a large percentage of respondents. Therefore, the need for awareness creation and sensitization among the people irrespective of profession or place of residence should be prioritized as a way of preventing unnecessary deaths. Such reorientation should focus on specific issues that affect adequate use of knowledge by respondents in handling illness conditions among under-five children.
2. Notwithstanding what the people know about malaria, environmental policies and/or laws should be put in place and vigorously enforced. A situation whereby some residents



of the city empty their refuse bins and sewage into the drainage system when it is raining encourages both environmental decay and breeding of mosquitoes and should attract severe penalty to serve as deterrent. It is suggested that sanitary inspectors should be empowered by local authorities to inspect homes and public places and where appropriate recommend penalties including prosecution in competent courts.

3. Community physicians should be employed to visit homes in the area and other places of high prevalence. Such visits will bolster access and use of facilities and that way discourage self-medication and abuse of therapies. People are more likely to be persuaded to utilize such healthcare when this caliber of health personnel gets to their homes for guidance and/or treatment.

4. More research on childhood malaria needs to be undertaken particularly among rich and highly educated persons among whom literature has been scanty. Paucity of information on this group is either due to the erroneous assumption that malaria is not an issue for this category of people or deliberately avoided by researcher for envisaged difficulty of collecting data from the group. For this reason, data on childhood malaria have tilted significantly towards the poor.

5. The mass-media should do more to educate the populace on health issues generally and malaria in particular especially among children.



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## APPENDIX 1

### Differentials in Childhood Malaria among Children of Civil servants and market women in Ibadan-North Local Government Area

Dear Respondent,

I am Lilian CHILEKE, an M.Sc. student of the Department of Epidemiology, Medical Statistics and Environment Health (EMSEH), Faculty of Public Health at the College of Medicine, University of Ibadan. This questionnaire is aimed at collecting information on childhood malaria in Ibadan, for academic purposes only. Your responses will be greatly appreciated. Be assured that all information will be treated with utmost confidentiality.

Please note that you are at liberty to discontinue participation in the study at any time you deem necessary, for whatever reason(s).

***I consent/willingly agree to participate in the study:***

***signature.....Date.....***

<b>SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS</b>			
S/N	QUESTIONS	OPTIONS	
1.	Age of mother		
2.	Marital status	1. Single 2. Married 3. Separated/divorced 4. Widowed 5. Co-habiting 6. Other, specify.....	
3.	Religious background	1. Christianity 2. Islam 3. Traditional 4. Other, specify.....	
4.	Ethnic group	1. Yoruba 2. Igbo 3. Hausa 4. Other, specify.....	
5.	Highest level of education attended	1. No formal education 2. Primary school 3. Secondary school 4. Tertiary school education 5. Other, specify.....	
6.	Occupation	1. Trader 2. civil servant 3. Other, specify.....	
7.	State the number of Children-Ever-Born (CEB)	.....	
8.	How many under five children do you have or cater for?	.....	
<b>SECTION B: KNOWLEDGE/PRESUMPTIVE DIAGNOSIS MALARIA</b>			
9.	Have you ever heard about malaria?	1. YES 2. NO	
10.	If YES, how did you hear about it?	1. relatives 2. friends	multiple answer allowed



		3. health facility 4. radio 5. TV 6. Newspaper 7. others, specify.....			
11.	What is the most important cause of malaria?	1. punishment from God/gods 2. Spiritual attack 3. excessive heat 4. mosquito bites 5. dirty environment 6. poor nutrition 7. Plasmodium parasite 8. others, specify.....			
	If yes, please tick one of the options →	Strongly agree	Agreed	Uncertain	disagree
					Strongly disagree
12.	Mosquito bite can cause malaria				
13.	Children who don't sleep under insecticide treated net (ITN) will have malaria				
14.	Malaria can kill if not treated				
15.	Symptoms of malaria include fever, headache, cough, catarrh, vomiting, loss of appetite, inability to play, weakness of the body.				
16.	The effects of untreated childhood malaria are prolonged ill-health, disability, can lead to other types of illnesses, death.				
17.	Seeking prompt medical care in childhood malaria can prevent complications and even death due to malaria				
18.	How often do any of your under five children experience malaria?	1. monthly 2. quarterly 3. every six months 4. once a year 5. rarely 6. other, specify.....			
19.	How long does it take before your under-five child is treated for malaria?				
<b>SECTION C: CAUSES OF CHILDHOOD MALARIA</b>					
20.	Where do you empty your refuse bin most times?	1. bushes 2. stagnant water 3. dump site 4. gutter 5. by burning 6. other, specify.....			
21.	What is your house wall made of?	1. Mud all through 2. Mud covered with cement 3. concrete block 4. wooden/plank wall 5. other, specify.....			
22.	What type of roof is in your house?	1. Zinc without ceiling 2. Zinc with ceiling 3. Concrete roof/decked 4. other, specify.....			



23.	Do you have any of the following in your residential area?	1.bushes 2.stagnant water 3.dump site 4.gutter 5. other, specify.....	multiple answer allowed
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**SECTION D: PREVENTION OF MALARIA IN CHILDREN**

24.	Do you think malaria can be prevented?	1.Yes 2.No	
25.	If yes how?	.....	
26.	What childhood malaria prevention strategies are you aware of?	1.use repellants/sprays 2.use bed net 3.close windows and doors regularly 4. wear protective cloths 5. use of preventive drugs 6. others, specify.....	multiple answer allowed
27.	Have you ever put in place measures for preventing malaria in your household?	1. YES 2. NO	
28.	Which of these strategies do you use most often?		
29.	Does your profession affect your access to information on malaria?	1. YES 2. NO	
30.	If YES, specify how.....	.....	
31.	What personal measures do you use to guard against malaria infection on your children?		
32.	What is the average number of persons per room, in your apartment?	.....	
33.	Are your doors and windows netted?	1. YES 2. NO	
34.	If NO, state the reason(s).....		
35.	How often are your gutters and surroundings cleaned in a month?	1. none 2. daily 3. weekly 4. bi- weekly 5. once a month 6. other, specify.....	

**SECTION E: ECONOMIC FACTORS IN CHILDHOOD MALARIA**

36.	What is your estimated average monthly income? (Including salary or profit, and Financial support)	1. <40,000 2. >40,000 3. <100,000 4. > 100,000 5. more than 150,000	
37.	Does your household have the following items which are in good working order:		
	Electricity?	1. Yes      2. No	
	A radio?	1. Yes      2. No	
	A television?	1. Yes      2. No	
	A mobile telephone?	1. Yes      2. No	
	A non-mobile telephone?	1. Yes      2. No	
	A refrigerator?	1. Yes      2. No	
	A cable TV?	1. Yes      2. No	



	A generating set? Air conditioner? A computer? Electric iron? A fan?	1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No	
38.	What area of Ibadan do you reside?	.....	
39.	What type of accommodation do you live in?	1. duplex 2. bungalow 3. flat 4. one room apartment 5. other, specify.....	
<b>SECTION G: TREATMENT SEEKING OPTION</b>			
40.	Where do you take your child/children for treatment if you notice symptoms of malaria? (can choose more than one)  <i>Give reason(s) for using the facility.....</i> .....	1. hospital 2. traditional healer 3. self/home treatment 4. pharmacy/chemist shop 5. health centre 6. other, specify.....	
41.	Which of the above options in 40 do you prefer most?		
42.	Why do you prefer the option above others?		
43.	What factors could hinder you from using your preferred treatment option?	1. It is not cheap 2. Not readily available 3. Perceived poor expertise among healthcare providers 4. Other, specify.....	
44.	Have you heard about Artemisinin-based Combination Therapy (ACT)?	1. YES 2. NO	
45.	If YES what is ACT used for?	a. used for treatment of malaria 1. Yes 2. No b. used for preventing malaria 1. Yes 2. No c. used for preventing mosquito bites 1. Yes 2. No	
46.	Have you ever used any ACT for treatment of your child?	1. YES 2. NO	
47.	If YES to 44, please state the one you use most often.	1. Chloroquine 2. Fansidar 3. Amalar 4. Cortem 5. Other, specify.....	
48.	If NO, why?		
49.	Did any of your under-five children have malaria in the last two weeks?	1. YES 2. NO	
50.	If YES, what was the first treatment given to the child?	.....	
51.	If drug was given, name of the drug	.....	
52.	Did your child get better with the first treatment?	1. YES 2. NO	
53.	If NO, what was the second action taken?	.....	
54.	Why did you take the second action?	.....	
55.	Who takes decision on health matters regarding your	a) father alone (b) mother alone (c) both parents	



	under-five?		
56.	Who pays for the treatment of your under-five children?	(d) Other, specify.....	
		a) father alone (b) mother alone (c) both parents	
		(d) Other, specify.....	

Thank you.

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## APPENDIX 2

### **INFORMED CONSENT FORM**

IRB Research approval number:

This approval will elapse on:        /    / 2012

#### **Title of the research:**

Differentials in childhood malaria among children of civil servants and market women in Ibadan-North Local Government Area

#### **Name of researcher:**

This study is going to be conducted by \_\_\_\_\_ of faculty of Public Health, College of Medicine University of Ibadan.

#### **Purpose(s) of research:**

The purpose of this research is to reduce childhood mortality arising from malaria which could be avoided with adequate understanding of the etiology, symptoms and treatment options. This study is significant for several reasons; in particular, it will contribute in bridging gaps in literature on a recurring phenomenon such as malaria among children.

#### **Procedure of the research:**

Questionnaire will be used to carry out the survey. Study of differentials in childhood malaria among children of civil servants and market women in Ibadan –North Local government Area. Bodija market will be used to study the children of market women while *Agodi* Secretariat will be used to study civil servants children. Participants will comprise women who currently have a child or children age five years and below. Total population Sample will be used at Bodija market and *Agodi* Secretariat, to access every consenting woman with a least one under-five child. The reason for adopting the Total Population Sample (TPS) is that other methods will not guarantee access to the proposed number of respondents for the study. An estimated number of 420 participants will be used for the two groups in carrying out the study.

#### **Expected duration of research and of participant(s) involvement:**

You should not be interviewed more than 7 minutes.

#### **Risk(s):**

The study will not in any way pose risks to the participants.

#### **Costs to the participants:**

Participating in this research will not cost you anything.

#### **Benefit(s):**

Participants will benefit in the body of knowledge of childhood malaria preventive strategies and treatment options adopted for malaria in under- five children. Its recommendations may engender policies that could impact positively on prevention and treatment options of participants and communities

#### **Confidentiality:**

Confidentiality of the participant s will be fully guaranteed to the extent that information cannot be linked to any of them.



**Voluntariness:**

Your participation in this research is totally voluntary.

**Alternative to participation:**

If you choose not to participate in this research, this will not affect you or your career in any way.

**Due inducement(s):**

You will not be compensated for participating in this research and you will not pay to participate.

**Statement of person obtaining informed consent:**

I have fully explained this research to \_\_\_\_\_

And have given sufficient information, including about risks and benefits, to make an informed decision.

DATE: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_

NAME \_\_\_\_\_

**Statement of person giving consent:**

I have read the description of the research or have had it translated into language I understand. I understand that my participation is voluntary. I know enough about the purpose, method, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Witness signature (if applicable): \_\_\_\_\_

Witness Name (if applicable): \_\_\_\_\_

**Detailed contact information:**

This research has been approved by the ethics committee of the University of Ibadan and the chairman of this committee can be contacted at Biode building room T10, 2<sup>nd</sup> floor, Institute for Advanced Medical Research and Training, College of Medicine, University of Ibadan, telephone: 08032397993, email: [uiuchirc@yahoo.com](mailto:uiuchirc@yahoo.com). In addition, if you have any question about your participation in this research, you can contact the principal investigation, of the Department of Epidemiology, Medical statistics and Environmental Health (EMSEH) faculty of public health, College of Medicine University of Ibadan. Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

PLEASE KEEP A COPY OF THE INFORMED CONSENT FORM.



# IGBAYONDA LATI KOPA (INFORMED CONSENT FORM – YORUBA VERSION)

IRB Nooba ibowolu iwadi: \_\_\_\_\_

Iwe ibowolu yo pari ni:     /     / 2012

## **Iyato ninu Aisan iba laarin awon Omode Onise ijoba ati Iyaloja ni Agbegbe ijoba Ibile Ariwa Ibadan**

**Oruko Olu gbeyewo:** Oruko eni ti yo se iwadi yi ni LILIAN NDIDI, CHILEKE, akeko ni ile eko giga yunifasiti ti Ile Ibadan (Department of EMS, Faculty of Public Health, College of Medicine).

**Idi agbeyewo:** Idi patatki fun iwadi yii ni lati din iku omode ti aarun iba n fa ku, Iyi ti o se dinku pelu imo ti o kun nipa ohun tionfaiba, apeere iba ati itoju ti o wa fun iba. Iwadi yii se Pataki fun opolopo idi, o maa se iranwo lati mu awon kudie towa ninu awon litreso nipa papajulo yodasi didiala to wanipa imotowa lori aisan ibalarin awon omode.

### **Eto Iwadi:**

Ibeere ti a ko sinu beba ni a fi se agbeyewo yii. Iwadii yio wo iyato laaron aarun iba taarin awon omo alakowe ati awon omo obinrin to n ta oja ni Bodija Ibadan –North Local Government. Oja bodija ni a o lo lati wadi laarin awon obinrin ti o n ta oja, ti a o si lo sekiteriati Agodi fun awon omo alakowe. Awon olukopa yio je obinrin ti o ni omo ti ojo ori ko ju omo odun nrirun wa siile lo. Akojopo awon eniyan ti afelo ninu iwadi ni a olo laarin oja Bodija ati sekiteriati Agodi lati ye gbogbo obinrin ti o bagba lati kops, ti o sini o kere ju omo kan ti ojo ori re to odun marun. Idi ti a ti lo akojopo awon eniyan ti afelo ninu iwadi nipe awon ona miran lo le fi wa ni idaniloju kiti ri iye olukopa ti afelo.

**Akoko ti iwadi yi le gba lati pari ati ohun ti o le na awon olukopa**

Iwadi yi ko ni gba akopa kookan ju iseju meje.

**Ipanilara:**



Ko si ipanilara, ewu abi ijamba kan kan fun olukopa nini iwadi yii ati wipe kikopa je ati inu wa.

### **Owo nina lati kopa**

Ko si oro owo nina lati je olukopa ninu iwadi yii, ni ibere titi di ipari iwadi.

### **Anfaani**

Awon olukopa yio je anfaani lati imo ti o kun nipa aisan iba laarin omode, awon ona ti ale gba lati maje ki omode ni iba ati awon ona ti ale gba wo aaran iba san laarin awonomode ojo ori odun maarun.

Imoran ti owa leyin abajade esi le mo eto ti oma nipa lori itoju m awujowa.

### **Ainiledanimo**

**Afefe dayin loju pe kikopa yin ninu iwada yi yio je ipamo tiko si nit a ere si yin.**

### **Kikopa la ti Okan wa**

Kikopa ninu iwadi yi je a ti okan wa.

### **Ifipa mu ni lati ko pa ninu ayewo vi:**

Kikopa ninu ise iwadi yi kise dandan. Eni ti o ba nife lati kopa nikan lo le kopa ninu ise yi. Igba ku gba ti o ba fe ni olufesi le dekun ati kopa ninu ise yi.

### **Gba ku ise:**

A ki yio san owo fun eniken ti o ba kopa ninu ise iwadi yi. A ko se ileri wipe awa yio fun eniken ni ebun kankan fun kikopa ninu ise yi.

### **Oro eni ti on gba ase lati ma ba ise yi lo lowo olukopa:**

Mo ti ka gbogbo ohun ti o romo ise yi ati wipe mo ti se alaye kikun lori ewu, ijamba, tabi anfani tabi ire ti o wa ninu kikopa ninu iwadi yi



fun \_\_\_\_\_  
lati le pinu pelu imo to peye lati kopa ninu ise yi.

Ojo \_\_\_\_\_ Iteka/ifowo si Iwe \_\_\_\_\_

Oruko mi: \_\_\_\_\_

**Oro eni ti on funni lase lati se ibere lori ikopa yi:**

Mo ti ka nipa ise iwadi yi/nwon ti se alaye kikun fun mi nipa ise iwadi yi ni ede ti o ye mi yekeyeke ati ni ona to te mi lorun. Imo mi lori idi ti n'won fe fi se ise yi, ewu ti o le wa nipa kikopa ninu ise yi, ona tin won fe gba lati se ise yi ati bi kikopa mi ki is ti ipa sugbon lati okan mi wa. Nwon fi ye mi emi na si ti gba wipe igbakugba ti mo ba fe ni mo le dawo ati kopa ninu ise yi duro. Mo si ti gba eda iwe yi ti mo fi owo si lati kopa ninu ise yi.

Ojo \_\_\_\_\_ Iteka/ifowo si Iwe: \_\_\_\_\_  
\_\_\_\_\_

Oruko \_\_\_\_\_ mi:  
\_\_\_\_\_

Ifowo si Iwe/Iteka eleri: \_\_\_\_\_

Oruko eleri: \_\_\_\_\_

**Adiresi lekunrere:**

Iwadi yi ni ajo ti o n ri si eto iwadi ti ile eko giga Ibadan ti fi onte lu, e le kan si alaga ajo na ni Ile Biode, Yara T10, Aaja keji, Institute for Advanced Medical Research and Training, College of Medicine, University of Ibadan, Ero ibanisoro: 08032397993, E-mail: [uiuchirc@yahoo.com](mailto:uiuchirc@yahoo.com). Ni afikun, ti a ba ni ibeere nipa kikopa ninu iwadi yi, e le kan si Oniwadi agba, LILIAN NDIDI, CHILEKE ti Department of Epidemiology, Medical Statistics and Environmental Health (EMSEH) Faculty of Public Health, College of



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mail:liliannwokocha@yahoo.com.

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### APPENDIX 3

Iyàtò nínú Àisàn Ibà láàrín àwon Omodé Onísé Ijoba ati Iyalójà ní Agbègbè Ijoba Ibílè Ariwá Ibádàn Olùdáhùn olùfè,

Orúkọ mi ni Lilian CHILEKE, akẹ̀kọ̀b(M.Sc) ti ẹ̀ka Epidemiology, Medical Statistics and Environment Health (EMSEH), Faculty of Public Health ní ilé ẹ̀kọ̀sẹ̀ isègùn unifasiti tí ilú ibádàn. Àwon ibèèrè yí ní láti nǹ ímò lórí àisàn ibà ní àárín àwon omodé ní ilú Ibádàn, fún idí ikéko nìkan. Adúpé fún àwon idáhùn yín. Ẹ̀ mọ̀ dájú wípé gbogbo idáhùn yín ni a ó mú bí àsírí.

Ejòwó, emọ̀ dájú wípé ẹnì ǻfàní láti ma lèsiwájú nínú iwádí yí bí ẹ̀ bá rí wípé ó ẹ̀ Patakì ní igbàkugbà, fún idí kan tàbí òmíràn.

Ma fi tókàntokùn gbà láti nípa nínú iwádí yí: Ifowòsí ..... ojó.....

IPELE A: IPEYE TI ENI		
S/N	IBERE	IDÁHŪN TÓ LÈ JÉ
1.	Ojo ori iyá	
2.	Ipò igbeyawó	1. Ẹ̀ni tí kò tí ẹ̀ igbeyawó 2. Ẹ̀ni tó tí ẹ̀ igbeyawó 3. ikosilẹ̀ 4. opó 5. Bí bá ara ẹnì gbé papọ̀ 6. omíràn, tó ka sí.....
3.	Esin	1. omoléhìn jésù 2. musulúmi 3. esin abáláyé 4. imíràn, tó ka sí.....
4.	Ẹ̀yá	1. Yorubá 2. Igbò 3. Hausa 4. Omíràn, tó ka sí.....
5.	Ipele iwé kíkà tó ga jù lọ tí a ní	1. kò sí lílò ilé ẹ̀kó rárá 2. Ilé ẹ̀kó alákoberè 3. Ilé ẹ̀kó agbà 4. Ilé ẹ̀kó giga 5. Omíràn, tó ka sí.....
6.	isẹ̀	1. onísòwò 2. osisẹ̀ oba 3. omíràn.....
7.	Ẹ̀so iye omo tí ẹ̀ tí bí	.....
8.	Dárúko iye omo odún máhí ún sí isàlẹ̀ tí ẹ̀ ní tàbí tí ẹ̀ nítójú?	.....
IPELE B: OYE LÓRÍ AYEWỌ AISAN IBA		
9.	Njé ẹ̀ tí gbọ̀ nípa aisan iba?	1. BÈENI 2. BÈEKÓ
10.	Tí ó bá jé bèeni, bá wò ní ẹ̀ ẹ̀ gbọ̀?	1. Ebí 2. Ọ̀rẹ̀ 3. Ilé iwòsan 4. Ẹ̀ro asòrò magbesi 5. amòhùnmáwdrán 6. iwé iròyin 7. omíràn.....
		A gba idahun pupo



11.	Kí ni ohun tó nfa àisàn ibà jù ló?	1. Ijiya lati oḍo polorun/ polorun kékéké 2. Idojúko ti èmí 3. òpòlopò oru 4. Èfon 5. Agbègbè tí kò mó 6. Àimajẹ ohun tó tó 7. Kòkòrò tí on 8. òmíràn, to ka sí.....			
	Bí ó bá jẹ bēni, ẹ fa ilà sí ìkan nínú àwon idáhùn wòn yí	Mo gbà gidigidi	Mo gbà	Kò dá mi lójú	Mí kò gbà rára
12.	Tí èfon bá jẹ eniyan ó lè fa àisàn ibà				
13.	Àwon omo tí kò bú sunabé nètí tí pa kòkòrò nà ni àisàn ibà				
14.	Àisàn ibà lè pà eniyan tí kò bú sí lójú				
15.	Àwon apere àisàn ibà ní bi ibà, orífífo, ikó, kàlá, eebi, Ipádánù okun,				
16.	Ipa aima tójú àisàn ibà laarin omode lè fa àilera, abo ara, ati àisàn níràn tabí ikú.				
17.	Wíwú itójú tó tó lásikò fún ibà laarin àwon omode lee dèna wahalà tabí ikú dájì				
18.	Nígbà méjé ni àwon omo yín bí oḍún mórùn sí isàlè nà ni àisàn ibà?	1. ní gbogbo oṣu 2. ní oṣu méta méta 3. ní gbogbo idají oḍún 4. ní èkan lóḍún 5. nipa 6. òmíràn, tó ka sí.....			
19.	Bawo lo se ina pèsè fú omo yín láti gba itójú àisàn ibà?				
<b>IPELE C: OHUN TÓ FA ÀISÀN IBÀ LAIRÍN OMODE</b>					
20.	Níbo ni ẹ maa fida ilẹ yín sí?	1. igbó 2. omi adágún 3. ibi idalẹsí 4. kòtò agbàrà 5. nipa sisu ún ná 6. òmíràn, tó ka sí.....			
21.	Kí ni a fi se ogiri ilẹ e yín?	1. ilẹ alámo lá ti òkè dé isàlẹ 2. ilẹ alámo tí a fi símentì bọ lójú 3. ilẹ oní bilókù 4. ara ogiri oní pákó 5. òmíràn, tó ka sí.....			
22.	Irú orulé wo ni ení ní iléyín?	1. páàndù láisí ajà 2. páàndù pẹlú ajà 3. orulé onílé kékéré 4. òmíràn, tó ka sí.....			
23.	Njé ení àwon nkan bayi ní agbègbè tí è ngbé?	1. igbó 2. adágú omi 3. orí àtàn 4. kòtò agbàrà 5. òmíràn, tó ka sí.....			A gba idáhùn púpọ
<b>IPELE D: DÍDÈNÀ ÀISÀN IBÀ LAARÍN ÀWON OMODE</b>					
24.	Njé o lérò pé a le dínà de àisàn ibà?	1. Bèèni 2. Bèèkó			



25.	Bí ó bà je béèni, bawo?	.....	
26.	Ònà wo ni e nro nípa dídèná àìsàn ibà láàrín àwon omodé?	1. lílò ohun tí pa kòkòrò 2. lílò àwon èfon 3. nípa líti fèrèsé àti ilèkù ní gbogbo ìgbà 4. wí wo aṣo tó bo ara 5. nípa lílò dògùn, 6. òmíràn, tó ka sí.....	A gba ìdáhùn púpò
27.	Ñjé eti fi àwon ònà láti dèná àìsàn ibà ní iléyín	1. Béèni 2. Bèèkó	
28.	Èwo nínu àwon ònà yí ni e ma lò?		
29.	Nje ise yin di yin lowo lati mo nkan lori aisan iba?	1. BÈÈNI 2. BÈÈKÓ	
30.	Bí bẹni, e tó ka sí bawo.....	.....	
31.	Ìgbésè tí yín wo ni e ma gbé líti da àbò bòà wọn omoyín kúrò?		
32.	Àwon méìdò ní ó ngbé iyàrá kan, ní bí tí é ngbè?	.....	
33.	Ñjé e fi àwon èfon sí ojú fèrèsé àti çnu ònayín?	1. BENI 2. BEKO	
34.	Bí bèkó, esò idí.....		
35.	Èmèlò ni e má ún mojutó mímó agbègbè àti kòtò àgbàrá yín ní oṣù?	1. kòsí 2. ojojómó 3. òsèsè 4. oṣe méjì méjì 5. èkan ní oṣù 6. òmíràn, tó ka sí.....	
<b>IPELE E: ETÒ ÒRÒ ÀTI ÀÌSÀN ÌBÀ LÁÌRÍN ÀWỌN OMODÉ</b>			
36.	Kíni ìsírò iye owó tí e ún gbà ní oṣù	1. ókérésí egbèrún ogójì 2. ópòjù egbèrún ogójì 3. ókérésí egbèrún mewa 4. ópòjù egbèrún mewa 5. ópòjù egbèrún lónà aádòjò	
37.	Ñjé ení àwon ñkan wònyí, tí ó sì nsíse daradara:  Iná ìjoba? Èro àsòrò mágbèsì? amóhùn máwòrán? Èro ìbánisòrò alágbèká? Èyí tí kì sè èro ìbánisò alágbèká? Èro amú ñkan tutù? Amóhùn woran oní okùn? Èro tó fúnì ní iná? Èro tó fé atégù? Èro computer? Èro iloso? Èro tó ní è atégùn	1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó 1. Béèni      2. Bèèkó	



38.	Ní bo ní ilú Ibàdàn ní è nǵbé ?	.....	
39.	Irú ilé wo ni è nǵbé?	1. ilé alájà 2. ilé onilé 3. fulati 4. ilé oní iyàrá kan 5. Òmíràn.....	
<b>IPELE G: ITÓJÚ WIWÁ LÓRÍSIRÍSI QNÀ</b>			
40.	Ní bo ni e má mú omọ tàbí àwon omo yin lo fú itójú tí e bá kófírí àisàn ibà ? (e le mú ju cyokàn lo) <i>E si idi fi lílò ohun èlò ví.....</i>	1. iléwòsàn 2. oníwòsàn ìbílè 3. itójú ara eni 4. isò onísègú eyinbó 5. lbi lleru 6. omíràn, to ka.....	
41.	Èwo ni e fèràn jùlo nínú àwon ìdáhùn ní nomba tókè (40)?		
42.	Kíni ìdí tí e se fèràn rẹ ju iyókù lo?		
43.	Kíni ó le di yin lówọ láti ní ohun tí e fèràn	1. owó nà kò kéré 2. kò kí wà ní arówoto 3. onilera osise ti ko ku ojo osuwon 4. Omiran, to ka.....	
44.	Ñjé e ti gbó nípa òdògùn tí à npè ní Artemisinin - based Combination Therapy (ACT)?	1. BÈÈNI 2. BÈÈKO	
45.	Bí bèèni, kí ni emá nìdè ACT fún?	a. fú itójú àisàn ibà 1. beni 2. beko b. fú láti le díwọ àisàn ibà 1. beni 2. beko c. fú láti le díwọ fón yomuyómú 1. beni 2. beko	
46.	Ñjé eti lo ìkan nínú àwon ACT rí fún itójú omoyín?	1. BÈÈNI 2. BÈÈKO	
47.	Bí ó bá jé bèèni, eso eyí tí e ma sáà ló.	1. Chloroquine 2. Fansidar 3. Amalar 4. Cortem 5. Omiran, to ka.....	
48.	Bí bèèkó, kí ni ìdí?		
49.	Ñjé ìkan nínú àwon omoyín odún marun sisalè ní àisàn ìbà láti dè mèni sí rí?	1. BÈÈNI 2. BÈÈKO	
50.	Bí bèèni, kí ni iwòsàn alákokó tí e fún omọ na ?	.....	

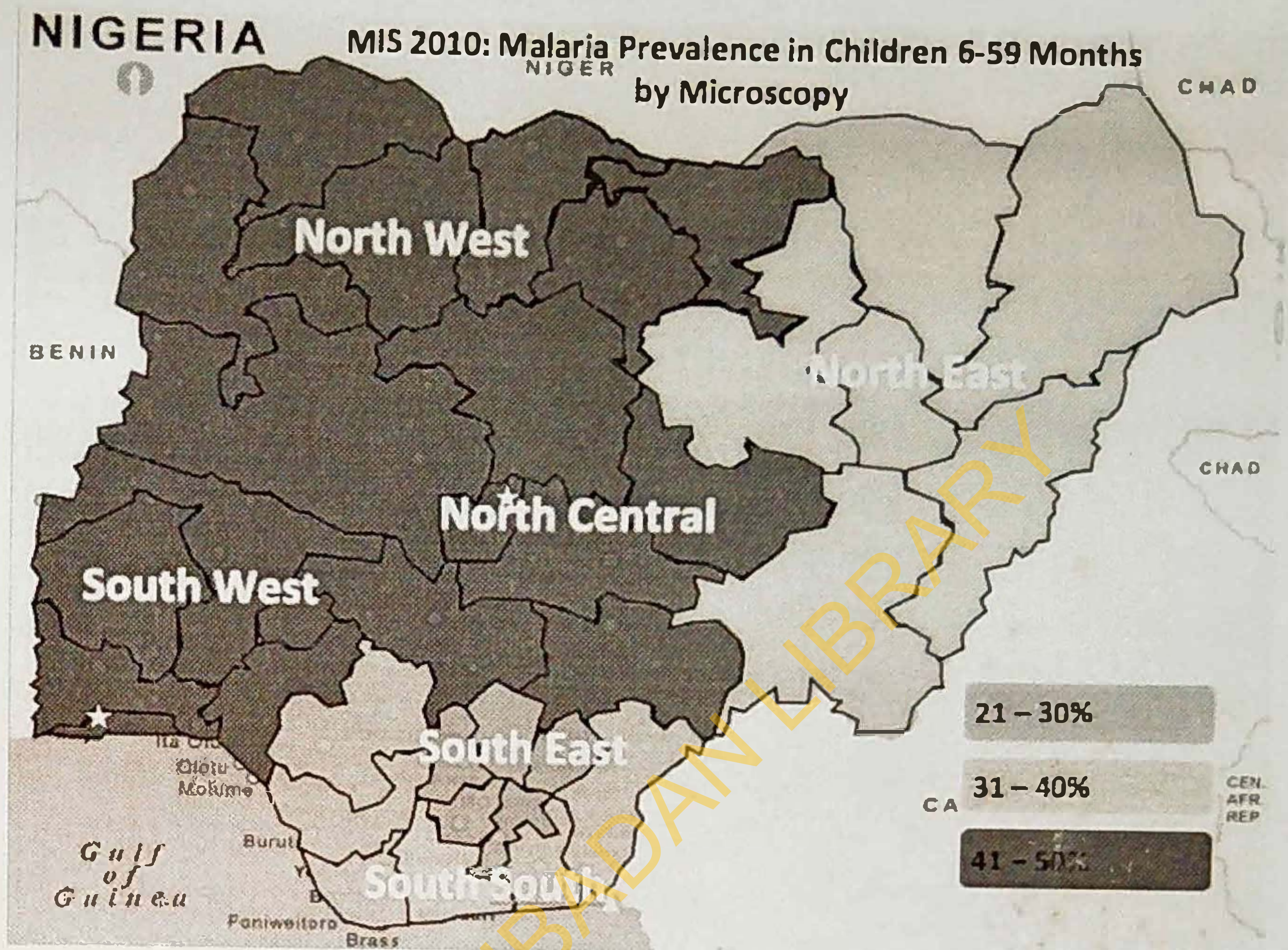


52.	̀Njẹ ara ọmọ yín yà si lẹ̀hìn ìtọ́jú alakoko?	1. BÉÈNI 2. BÉÈKÓ	
53.	Bí bẹ̀kọ́, kí ni ìgbésè kejì tí ẹ̀ gbé?	.....	
54.	Kí ni ódé tí ẹ̀ fí gbé ìgbésè kejì?	.....	
55.	Tani ó nmá se ìpinnu lórí òrò ìlera tí ọmọ ọdún marun sí Ìsàlẹ̀ yín?	a) bàbá nìkan (b) ìyá nìkan (c) òbí méjèjì (d) Òmíràn.....	
56.	Ta ni ó má nsan owó ìtọ́jú ọmọ yín ọdún marun sí Ìsàlẹ̀?	a) bàbá nìkan (b) ìyá nìkan (c) òbí mejeji (d) Òmíràn.....	
E. se.			

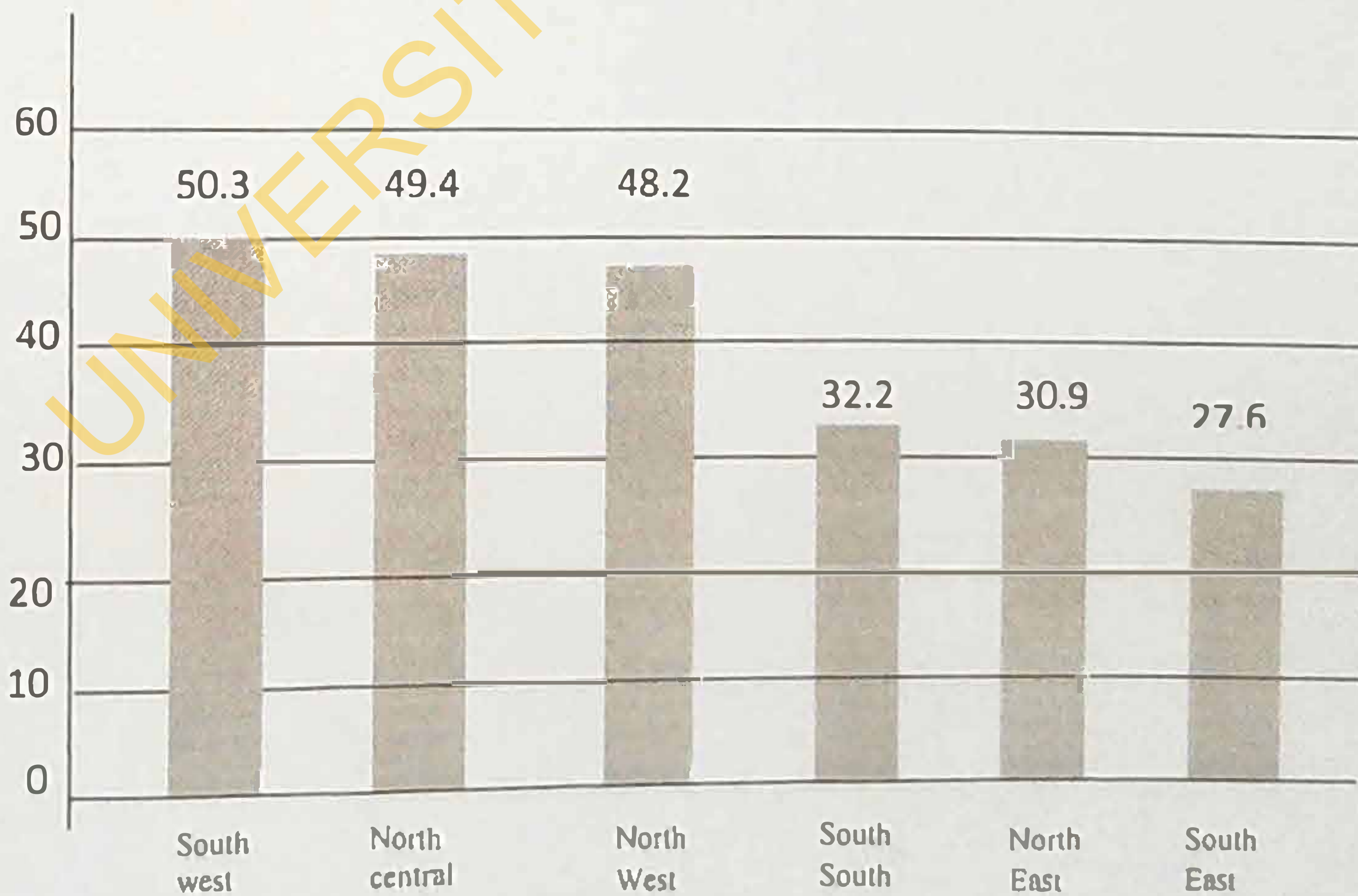
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Appendix 4

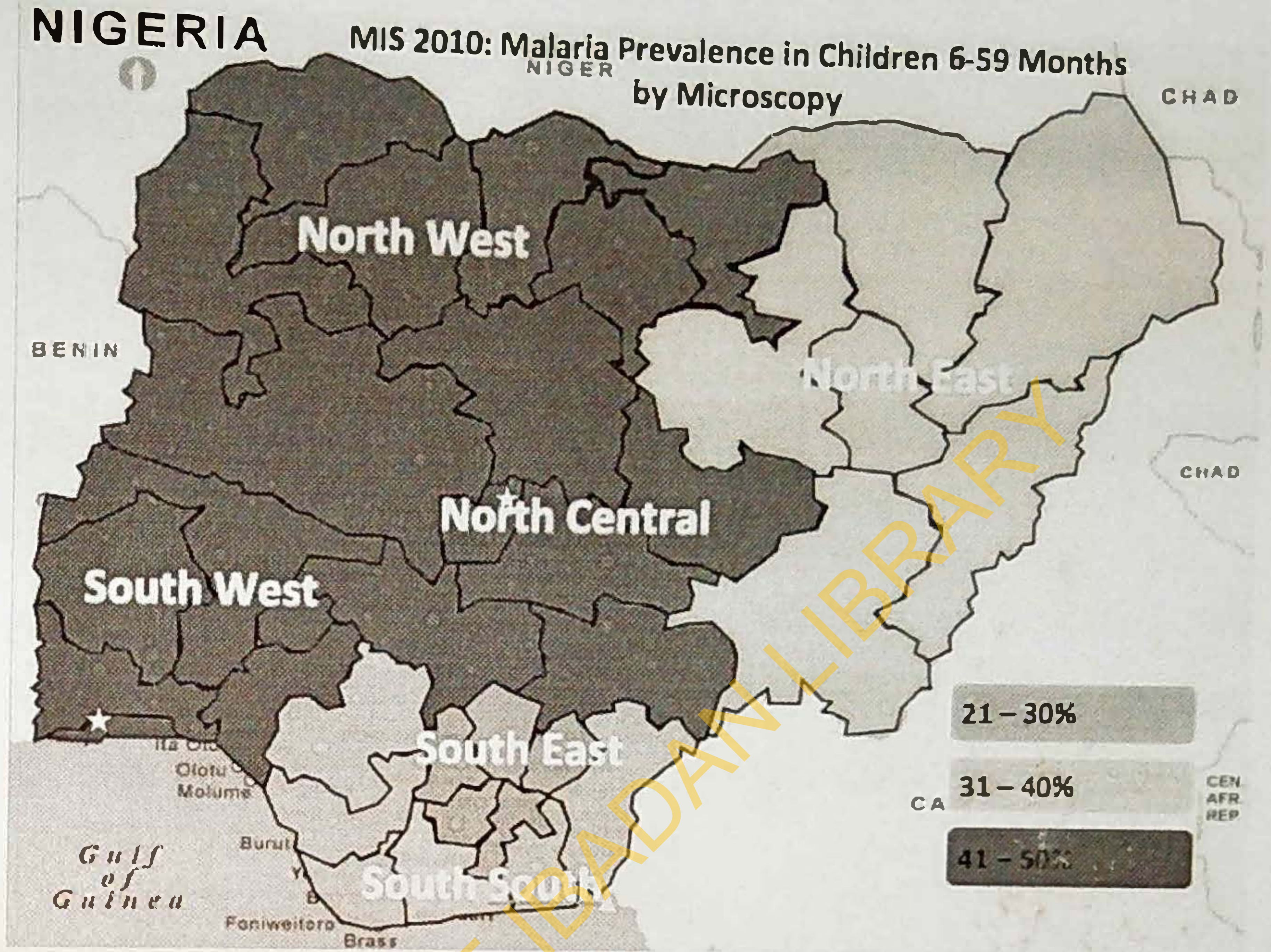


Source: Nigeria Malaria Fact Sheet, 2011





Appendix 4



Source: Nigeria Malaria Fact Sheet, 2011

