KNOWLEDGE, PERCEPTION AND UTILIZATION OF INSECTICIDE TREATED NET FOR THE PREVENTION OF MALARIA AMONG MOTHERS OF UNDER-FIVE IN AGBEDE-ADODO COMMUNITY, IBADAN

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CERTIFICATION

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DEDICATION

This work is dedicated to the Glory of the Almighty God, the Alpha and Omega. The All Sufficient God without whom I am nothing.

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The successful completion of this work is exclusively the work of grace; this grace however is manifested through the help of humanity.

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ABSTRACT

Nigeria with other malaria endemic nations joined the RBM partnership to support the Millennium Development Goal 6 which was aimed at halting and reversing incidence of malaria and other childhood diseases by 2015. Therefore, free distribution of nets in communities in Nigeria through ante-natal and stand- alone programs kicked off to reduce malaria episodes among mothers and under-five children which was supported by Oyo State government in collaboration with some non-governmental organizations to distribute ITNs freely in every house-hold. However, assessment of community perception and adequate follow-up of ITNs utilization were lacking. Therefore, the knowledge, perception, and utilization of insecticide treated nets for the prevention of malaria among mothers of under-5 in Agbede-Adodo community were investigated.

A community-based cross-sectional study was conducted in Agbede-Adodo, Ibadan among 385 randomly selected women. A validated questionnaire which contained 50-point knowledge and 18-point perception scales was used for data collection in categories of good, fair and poor knowledge and favourable, borderhalf and unfavourable perception. Data were analysed using descriptive statistics; Chi square analysis was carried out to show the degree of association between knowledge and education variables at 5% level of significance and 95% confidence interval.

Respondents' mean age was 28.7±7.2 and 77.1% were married with 46.2% having one under-five child while 51.9% were Muslims and 35.3% completed secondary school education. However, there was no statistical significant relationship between educational level of respondents and knowledge of malaria and ITNs. The mean knowledge score was 36.7± 7.4. Analysis of "causes of malaria" showed that 53.2%, 78.4%, 87.5%, 51.2%, 38.2% and 87.0% of the respondents believed malaria was caused by eating too much oily food, walking in excessive sun, living near stagnant water, drinking unboiled water, eating starchy food and mosquito bites, respectively. While 46.0%, 44.9% and 40.0% mentioned that malaria was transmitted through the bites of infected female anopheles mosquito, sleeping beside someone who had malaria and all mosquitos' bites, respectively with respondents having good knowledge of symptoms of complicated and uncomplicated malaria. Respondents mean perception score was 11.6± 4.6 with 71.9% having favourable perception towards ITNs. Majority (85.7%) of the respondents

received ITNs while 64.4% reportedly slept under the nets the night before the interview with 25.1% claiming they preferred to hang the nets without use. Analysis of the barrier to ITNs utilization showed that 47.8%, 42.9%, and 34.5% of the respondents respectively claimed that the nets were too hot in the dry season, they did not allow in enough air and tucking them in at night was burdensome. On the other hand, 90.9%, 87.8%, and 83.4% of the respondents claimed that the benefits in ITNs included not getting malaria often, not being bothered by insects and not being bitten by mosquito.

Promotion and education are keys to making progress to achieving a malaria free community. Public enlightenment efforts should be intensified and focused on areas like causes and mode of transmission of malaria and positively positioning ITNs as a major tool in malaria prevention.

Keywords: Malaria, Insecticide treated nets, Knowledge, Perception, Utilization.

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ABBREVIATIONS

BCC- Behavioural Change Communication

CDC- Center for Disease Control

FMoH- Federal Ministry of Health

IEC- Information Education Communication

IMPAC – Insecticide Treated Net Massive Promotion and Awareness Campaign

ITN- Insecticide Treated Nets

LGA – Local Government Area

LLINs – Long Lasting Insecticide Treated Nets

MDGs – Millennium Development Goal

MNM - Malaria No More

NDHS – Nigeria Demographic and Health Survey

NMCP – National Malaria Control Program

NMCSP – National Malaria Control Strategic Plan

PMI – President Malaria Initiative

RBM – Roll Back Malaria

UNICEF – United Nations Children Emergency Fund

WHO - World Health Organization

WHO/GMP - World Health Organization Global Malaria Program

WHOPES – World Health Organization Pesticide Evaluation Scheme

CHAPTER ONE

INTRODUCTION

1.1 Malaria and Insecticide Treated Nets

Malaria was defined as an infectious disease caused by protozoan parasites from the plasmodium family that can be transmitted by the bite of the Anopheles mosquito or by a contaminated needle or transfusion. It is any group of disease usually intermittent or remittent, characterized by attacks of chills, fever and sweating: formerly supposed to be due to swamp exhalations but now known to be caused by the parasite which is transferred to the blood stream by a mosquito of the genus Anopheles which occupies and destroys red blood cells (Infectious Disease Centre, 2013).

"Malaria is a major public health issue in Nigeria where it accounts for more cases and deaths than any other country in the world. About 97 percent of Nigeria's population is at risk of the disease. The remaining 3 percent of the population live in the malaria free highlands. There are an estimated 100 million malaria cases with over 300,000 deaths per year in Nigeria. Malaria also contributes to an estimated 11 percent of maternal mortality. Malaria accounts for 60% of outpatient visits and 30% of hospitalizations among children under five years of age in Nigeria with the greatest prevalence close to 50% in children aged 6-59 months in the South West, North Central, and North West regions." (United States Embassy in Nigeria, 2011).

Malaria control still remains a challenge in Africa where forty-five countries including Nigeria are endemic to malaria with about 588 million people at risk. World Health organization, (2011) reported that Nigeria accounted for a quarter of all malaria cases in the malaria-endemic regions. Also, Nigeria is among the countries with the highest under-fives mortality rate at 157 per 1000 live births and maternal mortality rate of 545 per 100,000 live births (NDHS) 2008 (NPC/ICF International 2009).

Vector-borne diseases remain a significant public health problem throughout sub-Saharan African. In Nigeria, Vector-borne diseases have continued to remain endemic in most communities (FMoH, 2009). Vector control is the main way to reduce malaria transmission at the community level. It is the only intervention that can reduce malaria transmission from

very high levels to close to zero. Personal protection against mosquito bites represents the first line of defense for malaria prevention (Lengeler, 2009).

According to WHO, (2013) the specific populations at risk of malaria and in whom the disease is particularly seen includes the following: young children in stable transmission areas who have not yet developed protective immunity against the most severe forms of the disease; Non-immune and semi-immune pregnant women in areas of high transmission; Semi-immune HIV-infected pregnant women in stable transmission areas. The others are: People with HIV/AIDS; International travellers from non-endemic areas because they lack immunity.

Long-lasting insecticidal nets (LLINs) are the preferred form of ITNs for public health distribution programs. WHO recommends coverage for all at-risk persons. The most cost effective way to achieve this is through provision of free ITNs, so that everyone sleeps under ITNs every night (WHO, 2013).

"The Oyo State Government announced the commencement of a fight against malaria in partnership with the United States Agency for International Development (USAID) and the World Health Organization (WHO). The State Government, under the Malaria Action Program (MAP) for the state said it had distributed a total of 893,000 mosquito nets donated by USAID to a total of 2,232,500 beneficiaries at a cost of #107million in 13 local government areas" (Gbadegesin, 2014).

1.2 Statement of the Problem

Malaria is endemic throughout Nigeria and constitutes a major public health problem. Up to 97% of the country's 149.2 million persons are estimated to be at risk of the disease (FMoH, 2009). Globally, in 2012, malaria caused an estimated 627,000 deaths and about 207 million cases of malaria (United States Embassy in Nigeria, 2011). "Malaria currently accounts for nearly 130 million clinically diagnosed cases per year, 60 percent of out- patient visit, and 30 percent hospitalization. An estimated 300,000 children die of malaria each year. It is also believed to contribute up to 11percent of maternal mortality, 25 percent of infant mortality, and 35 percent of under-five mortality. In addition to the direct health impact of malaria,

there are also severe social and economic burdens on communities and the country as a whole, with about 132 billion naira lost to malaria annually in form of treatment costs, prevention, and loss of work time " (NDHS) 2008 (NPC/ICF International 2009).

The use of insecticide-treated nets is currently considered as the most cost effective method of malaria prevention in highly endemic areas; and the goal is for at least 80 percent of the targeted population to use appropriate preventive measures by year 2020. One of the core technical strategies is to expand universal access to insecticide-treated materials. This will involve sustained mass distribution of long-lasting insecticidal nets (FMoH, 2009).

The 2013 NDHS reported only 17 percent and 16 percent of children and women aged 15-49 slept under an ITN, with a slight increase when compared with 2008 NDHS reports of only 4 percent. Although this was a non-negligible achievement considering the baseline situation of 0%, this progress is too slow if the target set for 2020 is to be achieved. Agbede-Adodo is one of the communities in Ibadan that has benefitted from free ITNs distribution; so far little is known about the knowledge, perception and utilization of ITNs among mother of under-fives in the community. The investigation of like issues constitutes the focus of this study.

1.3 Justification

Insecticide-Treated Nets have proven to be highly effective in preventing malaria. Consistent use of insecticide-treated nets can reduce malaria transmission by up to 90 percent and avert as much as 44 percent of all cases of mortality among under-5 children as well as lowering/ reducing the prevalence of malaria infection among pregnant women (WHO, 2014).

Therefore, it was important to investigate and understand people's knowledge, perception and utilization of insecticide treated nets in malaria prevention and why insecticide treated nets already given freely are not used in the households.

Availability of the net alone cannot produce the expected result which is to reduce malaria mortality and morbidity in the country as a whole but, what makes the difference is the utilization of the distributed nets. The pertinent questions are: Who are making use of these freely available insecticide- treated nets and who are not making use of them? These questions remain unanswered.

Understanding all the listed factors is essential for refining Insecticide Treated Nets distribution programme in Oyo State and for developing effective Information, Education and Communication/ Behavioural Change Communication (IEC/BCC) activities for maximizing the impact of insecticide-treated nets in reducing malaria morbidity and mortality in the State and Nigeria as a whole.

1.4 Research Questions

The study answered the following research questions:

1. What is the knowledge of mothers of under-five in Agbede- Adodo community about insecticide treated net as preventive measures against malaria?
2. What are mother's perceptions about insecticide treated nets usage and its ability to reduce malaria episodes?
3. What is the utilisation pattern of insecticide-treated nets in the community?
4. What are the facilitating/ barrier factors related to the use of insecticide-treated nets in the community?

1.5 Broad Objective

The broad objective of this study was to:

Investigate the knowledge, perception, and utilization of insecticide treated nets for the prevention of malaria among mothers of under-5 in Agbede-Adodo community.

1.6 Specific Objectives

The specific objectives were to:

1. Assess the level of knowledge of mothers about insecticide treated nets in malaria prevention.
2. Determine mother's perception on the use of insecticide treated nets as a preventive measure against Malaria.
3. Determine the pattern of utilization of insecticide treated nets among mothers of under-five in the community.
4. Identify facilitating factors and barriers related to the use of insecticide treated nets among mothers of under-five in the community.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of the evolution of mosquito nets and insecticide treated nets

"Mosquito nets were first used in prehistoric times, and it is said that Cleopatra (Queen of Egypt) used mosquito netting (Murray, 2011).

Mosquito nets have been used for centuries as a protective measure against nuisance of insects in many countries in Africa, south of the Sahara. The treatment of nets with insecticide is a relatively new innovation, first tried in 1930 and during World War II, Russian, German and US armies used treated mosquito nets to protect soldiers against vector borne diseases (mainly malaria and leishmaniasis) (FMoH, 2009). Mosquito nets were widely used during construction of the Suez Canal in 1959 when malaria was killing the Universal Suez Ship Canal Company workers (Murray, 2011). Therefore, in the late 1970s, entomologists started using synthetic pyrethroids on nets. Their high insecticidal activity and low mammalian toxicity made them ideal for this purpose (FMoH, 2009).

Insecticide treated nets (ITNs) were also used in the 1980s to fight malaria during malaria fever wars. ITNs are twice as effective as the untreated nets. Mosquito netting is usually treated with pyrethroid insecticides. The ideal mosquito net will allow air to circulate while keeping mosquitoes out. The recommended mesh size for effective malaria prevention is 120 to 200 holes per square inch. Polyester or polyamides are lightweight and long-lasting materials for mosquito nets". (Murray, 2011)

"An insecticide- treated net is a mosquito net that repels, disables and / or kills mosquitoes coming in contact with insecticides on the netting material. There are two categories of ITNs: conventionally treated nets and long-lasting insecticide nets.

A conventionally treated net has been treated by dipping in a WHO recommended insecticide to ensure its continued insecticide effect, and the net should be retreated after three washes or at least once a year.

A long-lasting insecticidal net is a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fabrics. The net must retain its effective biological activity without re-treatment for at least twenty (20) WHO standard

washes under laboratory conditions and three years of recommended use under field conditions" (Murray, 2011) .

The position statement from the World Health Organization Global Malaria Program (WHO/GMP) describes a shift in the guidance on malaria prevention through the use of insecticide- treated nets (WHO/GMP, 2007).

Roll Back Malaria program was initiated in 1998 after the Harare Declaration of 1997 and the main purpose of the program was to reduce the burden of malaria in endemic countries. To achieve this goal, Insecticide treated nets (ITNs) were introduced in 2001 with some laid down targets (Guerrant, Walker and Weller, 2006).

Insecticide treated nets (ITNs) provide personal protection that has been shown to reduce malaria illness, severe diseases and death due to malaria in endemic regions. Bed nets form a protective barrier around people sleeping under them. However, bed nets treated with insecticide are much more protective than untreated nets. The insecticides that are used for treating bed nets kill mosquitos as well as other insects. The insecticides also repel mosquito, reducing the number that enter the house to feed on people inside.

Nets may vary by size, shape, colour, and material or insecticide treatment status. Most nets are made of polyester, polyethylene, or polypropylene. Only parathyroid insecticide is approved for use on insecticide treated nets. This insecticide has been shown to pose very low health risk to humans and other mammals but is toxic to insects and knocks them down (kills them), even at very low doses. Parathyroid does not rapidly break down unless washed or exposed to sunlight. Previously, nets had to be retreated every 6 to 12 months even more frequently if the nets were washed. Nets were retreated by simply dipping them in a mixture of water and insecticides and allowing them to dry in a shady place. The need for frequent retreatment was a major barrier to the wide spread use of insecticide treated nets in endemic countries.

The critical breakthrough that made ITN widely used for malaria prevention came with the development of long-lasting insecticidal nets (LLINs). The principle of LLINs is as follows. A high dose of insecticide is applied to the net, so that a small portion of insecticide is present on the surface while the remainder is kept in a "reservoir" either within or on the netting yarn. As the surface insecticide is used, washed away, rubbed off or otherwise lost, it is replenished from this reservoir. Such protection lasts at least three years, often longer. The first LLIN

(Olyset®) received a recommendation for public health use by the WHO Pesticide Evaluation Scheme (WHOPES) in 2009. By 2012, three LLIN products had full WHOPES recommendations and an additional nine had interim recommendations (WHO, 2012).

In Nigeria, the promotion of ITNs started as a pilot project in Nsukka in 1992. The project examined the efficacy of permethrin impregnated bed-nets and curtains and showed that when properly used, ITNs can reduce rates of malaria fever and subsequent infant and child mortality. The success of this project gave rise to the initiation of the ITNs promotion in some states in Nigerian (FMoH, 2009).

Long lasting treated nets have been associated with sharp decreases in malaria in countries where malaria programs have achieved high long lasting treated nets coverage. World Health Organization (WHO) now recommends that long lasting treated nets be distributed and used by all people (universal coverage) in malarious areas not just by the most vulnerable groups, pregnant women and children under 5 years. Long lasting treated nets are most commonly distributed through mass campaigns. Approximately every three years between 2008 and 2010 a total off 294millon nets were distributed in sub- Sahara African (WHO, 2012).

No.	Description	Requirement (Polyester)	Requirement (Polyethylene)
1	Net Shape	Rectangular	Rectangular
2	Colour	White, or blue or Green	White, or blue or Green
3	**Size of Net**		
3.1	Height inclusive of Border but excluding loop.	150cm or 160cm	150cm or 160cm
3.2	Length	180cm	180cm
3.3	Width	190cm	190cm

Table 2.1: Design Criteria for Rectangular ITNs / LLINs by FMoH

2.2 Causes, Mode of Transmission and Prevention of Malaria

Causes

Malaria, a mosquito-borne, protozoal disease, is older than recorded history, and probably plagued prehistoric man (Cahill, 2004).

Malaria is a parasitic disease; it is caused by a parasite, a tiny organism that lives in or on another organism called a host. The parasite is from the genus plasmodium and the host is a female mosquito of the Anopheles genus. The parasite is transferred to a potential victim when he or she is bitten by a mosquito (Jayashree, 2011).

The anopheles mosquito transmits the malaria in humans. In the adult, its common symptoms are headache, weakness, fever, aches and pains, high body temperature (chills and rigors) and bitterness of the mouth and loss of appetite. While in children, in addition to the above mentioned symptoms, it may also manifest in more than normal sleeping, nausea and vomiting. It is a serious disease affecting children and adults but its consequences are graver among children and pregnant women. The parasites are spread to people through the bites of infected *Anopheles* mosquitoes, called "malaria vectors", which bite mainly between dusk and dawn (WHO, 2014).

Mode of Transmission of Malaria

Malaria is transmitted exclusively through the bites of *Anopheles* mosquitoes. Malaria can be transmitted by blood and blood products. The intensity of transmission depends upon a complex interplay namely: Host (humans), Vector (mosquito) and the environment/ malarial parasite (Cohen and Powderly, 2004).

For effective transmission of malaria within a population, various epidemiological determinants must interact together. These determinants are the agents (plasmodium parasite), hosts (man), and the environment (vectors, climate factors). All these determinants must interact together for malaria to be transmitted from one person to another in a conducive condition for the causative agent responsible for malaria. This network is referred to as epidemiological triad of malaria (Cahill, 2004).

The parasite: plasmodium

The malaria parasite has a complex, multi-stage life cycle occurring within two living beings, the vector mosquitoes and the vertebrate hosts (Kakkilaya, 2011). Malaria in man is caused by four different species of the malaria parasite -

- *Plasmodium falciparum*
- *Plasmodium vivax*
- *Plasmodium malariae*
- *Plasmodium ovale.*

Plasmodium falciparum is found globally but is commonest in Africa. Plasmodium falciparum is the plasmodium species responsible for 85% of the malaria cases. Other plasmodium species are less common and less dangerous in malaria transmission in the world. Recently, a fifth type, plasmodium knowlesi, has been causing malaria in some parts of Africa. To understand the challenges researchers face in combating malaria, it is essential to understand the basic life cycle of this parasite. Plasmodium parasites are protozoa of the phylum Apicomplexa (often referred to as sporozoans). These are animal parasites which exist in two hosts, have sexual and asexual stages, alternate between haploid and diploid phases and must be able to survive inside both hosts (Cahill, 2004).

The infection starts, when the female mosquito injects (in her saliva) “sporozoite” into human skin while taking a blood meal. A sporozoite travels (in the bloodstream) into the liver where it invades a liver cell. It matures into a “schizont” which produces 30000- 40000 “merozoites” within six days. The merozoites burst out and invade red blood cells. Within two days one merozoite transforms into a trophozoite, then into a schizont and finally 8- 24 new merozoites burst out from the schizont and the red cell ruptures. Then the merozoites invade new red cells. P. falciparum can prevent an infected red cell from going to the spleen (the organ where old and damaged red cells are destroyed by sending adhesive proteins to the cell membrane of the red cell. The proteins make the red cell to stick to small blood vessel walls. This poses a threat for the human host since the clustered red cells might create a blockage in the circulation system. This cycle is called endogenous phase, asexual cycle or schizogony.

A merozoite can also develop into a "gametocyte" which is the stage that can infect a mosquito. There are two kinds of gametocytes: the male (microgametes) and the female macrogametes). They get ingested by a mosquito, when it sucks infected blood. Inside the mosquito's midgut male and female gametocytes merge into "zygotes" which then develop into "ookinetes". The motile ookinetes penetrate the midgut wall and develop into "oocysts". The cysts eventually release sporozoites which migrate into the salivary glands where they get injected into humans. The development inside a mosquito takes about two weeks and only after that time can the mosquito transmit the disease. The second part of the cycle is called exogenous phase, sexual cycle or sporogony (Guerra, Snow and Hay, 2005).

(See Figure 2.2 for details)

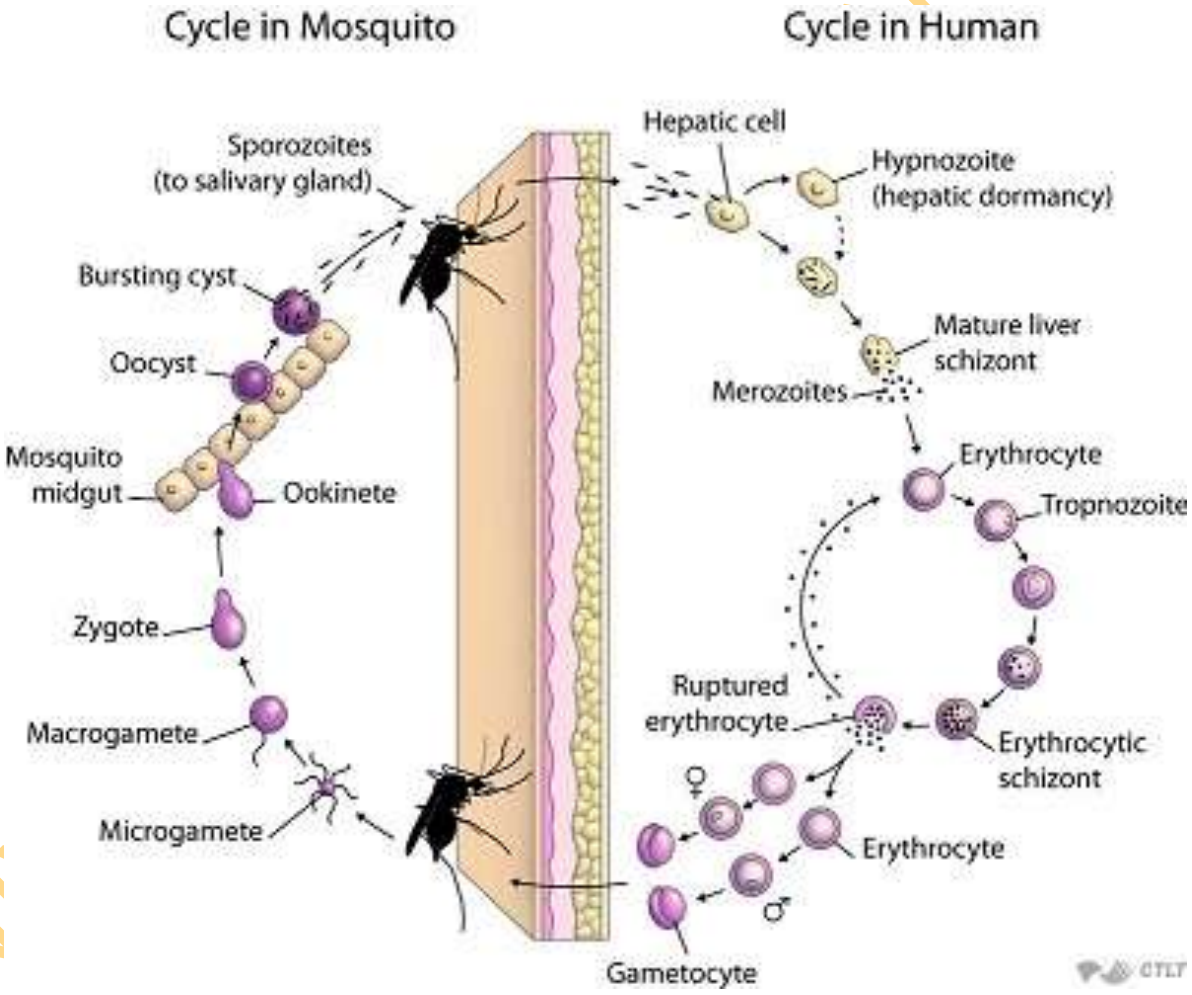

Figure 2.2: The Life Cycle of Malaria Parasite

Source: http://ocw.jhsph.edu/ (2011).

The Mosquito: Anopheles

Over sixty species of the anopheles mosquitoes transmit malaria (Budiansky, 2002). In Africa, the Anopheles gambiae, Anopheles arabiensis and the Anopheles funestus transmit most of the malaria. Anopheles gambiae is the primary malaria vector; this can be attributed, to its relatively long life, stong anthropophily and endophily that is; the tendency to target humans for blood meal and the tendency to enter and rest inside of houses respectively (Besansky and Costantini, 2004). Adult mosquitoes rest normally during the day inside human habitats and emerge to feed at night. Their larva tends to develop in temporary bodies of water, such as those typically found near agricultural sites, flooded hoof prints, drainages, bushes e.t.c. All of these characteristics combine to make P. falciparum a successful parasite. Anopheles mosquito allows exogenous phase and asexual life cycle of plasmodium species. This cycle is called the sporogony. Anopheles mosquitoes must live for at least 10-12 days after an infective blood meal and must be present in adequate density in or near human habitations for effective malaria infection (Parks, 2009).

The Environment: Transmission also depends on climatic conditions that may affect the number and survival of mosquitoes, such as rainfall patterns, temperature and humidity. In many places, transmission is seasonal, with the peak during and just after the rainy season. Malaria epidemics can occur when climate and other conditions suddenly favour transmission in areas where people have little or no immunity to malaria. They can also occur when people with low immunity move into areas with intense malaria transmission, for instance to find work, or as refugees (WHO, 2013).

Host: Man

Man plays a vital role in the transmission of malaria. It is the third variable in the epidemiological triad of malaria. Endogenous phase and asexual life of malaria parasite take place in humans. The parasites transferred to humans go first to the person's liver where they grow, divide and then re-enter the bloodstream where they invade red blood cells causing periodic fevers. Human immunity is another important factor, especially among adults in areas of moderate or intense transmission conditions. Partial immunity is developed over years of exposure, and while it never provides complete protection, it does reduce the risk that malaria infection will cause severe disease. For this reason, most malaria deaths in

Africa occur in young children, whereas in areas with less transmission and low immunity, all age groups are at risk.

The symptoms of Malaria are an acute febrile illness. In a non-immune individual, symptoms appear seven days or more (usually 10–15 days) after the infective mosquito bite. The first symptoms – fever, headache, chills and vomiting – may be mild and difficult to recognize as malaria. If not treated within 24 hours, *P. falciparum* malaria can progress to severe illness often leading to death. Children with severe malaria frequently develop one or more of the following symptoms: severe anemia, respiratory distress in relation to metabolic acidosis, or cerebral malaria. In adults, multi-organ involvement is also frequent. In malaria endemic areas, persons may develop partial immunity, allowing asymptomatic infections to occur (WHO, 2013).

Prevention of Malaria

Malaria imposes an enormous cost on already stretched public health service and economies, yet it is entirely preventable and treatable with a combination of available tools and sustained financing (Malaria Consortium, 2014). A comprehensive approach to malaria control includes the following:

Malaria prevention consists of a combination of Mosquito Avoidance and Chemoprophylaxis. Although very efficacious, none of the recommended interventions is 100 percent effective. Contact with mosquito can be reduced by remaining in a well screened area and by using mosquito bed nets (preferably Insecticide Treated Nets).

The Nigerian Government is committed to free Nigerians from the burden of malaria, a long continued endemic, particularly to upkeep the goal of Millennium Development Goal 4 on health. The primary goal of National Malaria Control Program is to reduce by half the social and economic burden of malaria by 2010 (The African Summit on Roll Back Malaria, 2000). The National Malaria Control Program of Nigeria is put in place to ensure a massive up scale of vector control intervention for the at risk population with a strong focus on preventive approach against the disease.

The federal government policy on malaria control in Nigeria focuses on the following main strategies:

1 Management of cases

2. Prevention of malaria with insecticide treated nets (ITN)

3. Use of Intermittent Preventive Treatment (IPT) during pregnancy

(Guha and Mazumdar, 2007).

The United States Presidents Malaria Initiative (PMI) supports four (4) scientifically proven key interventions to prevent and treat malaria. They are as follows:

1. Promotion of insecticide treated nets (ITN) otherwise called integrated vector management system. The process is designed to ensure that 80 percent of the population at risk of malaria sleeps under insecticide treated nets.
2. Indoor residual spraying (IRS): used in areas of susceptible to very high prevalence of malaria throughout the year.
3. Intermittent prevention treatment for pregnant women(IPT)
4. Diagnosis and treatment.

Prevention programs in Nigeria focus on the distribution and use of bed nets, called Long-lasting Insecticide Treated Nets (LLINs), including evidence based health communication programs on the mode of malaria transmission and the importance of sleeping under Insecticide Treated Nets. Malaria is a global crisis which affects about 300million people each year, resulting in 1million deaths, with more than 90 percent of all cases occurring in African countries. Today the disease is a public health challenge with more than 100 countries at risk (United States Embassy in Nigeria, 2011).

International agencies, governments and non-governmental organizations (NGOs), community groups, foundations, Research and Academic institutions are engaged in a number of efforts to prevent and control malaria. Examples are highlighted below:

- Bill and Melinda Gates Foundations Partnership
- Roll Back Malaria Partnership (RBMP)
- President Malaria Initiatives (PMI)

- Malaria No More (MNM)
- Insecticide treated nets Massive Promotion and Awareness Campaign (IMPAC).
- Malaria Action Program (MAP)
- National Malaria Control Strategic Plan (NMCP)
- Non-Governmental Agencies.

2.3 Malaria in Children Under-five

Children under five years of age are one of the most vulnerable groups affected by malaria. There was an estimated 660,000 malaria deaths around the world in 2010 of which approximately 86% were in children under-five years of age.

In high transmission areas, partial immunity of the disease is acquired during childhood. In such settings, the majority of malaria disease cases which are particularly severe with rapid progression to death occurs in young children without acquired immunity. Severe anaemia, hypoglycemia and cerebral malaria are features of severe malaria more commonly seen in children than in adults (WHO, 2014). In 2013 there were 97 countries that had some degree of malaria transmission. The toll on children under five has been expectedly devastating, accounting for 77% of all malaria deaths (Malaria Consortium, 2014).

Malaria contributes to the death of children in three main pathways:

(1) Through an acute infection which may end up in a coma (cerebral malaria), and sometimes lead to instantaneous death.

(2) Chronic and repeated infection could lead to severe malaria which is usually characterized by an anemic condition, thus, furthering high risk of death due to susceptibility to other forms of illnesses.

(3) Low birth weight that results from malaria infection in pregnancy and represents the major risk factor for death in the first month of birth (WHO and UNICEF Malaria Report, 2003).

Therefore WHO recommends the following package of interventions for the prevention and treatment of malaria in children.

- Use of long-lasting insecticide treated net (LLINs)
- In areas with highly seasonal transmission, of Sahel sub-region of Africa, seasonal malaria chemoprevention (SMC) for children aged between 3 and 59 months.

- In areas of moderate-to-high transmission in sub-Sahara Africa, intermittent preventive therapy for infants (IPTi), except in areas where WHO recommends admission of SMC.
- Prompt diagnoses and effective treatment of malaria infections (WHO, 2014).

2.4 Awareness, Knowledge and Perception related to use of Insecticide treated nets among mothers of under-fives

The word awareness connotes having knowledge or discernment of something, understanding of a subject, issue or situation that is: to be aware of ones thought concerning an issue or being cognizant / being aware of danger inherent in something. Aware also implies knowledge gained through one's own perceptions or by means of outside information while knowledge connotes facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject.

Despite the fact that several factors have direct or indirect influence on the correct knowledge and use of insecticide bed nets, the main challenge is how to subdue the negative influences, foster positive factors and generally motivate the promotion of bed nets use, especially as a long term prevention tool for malaria (Nwana, 2011).

Several studies have been done on awareness, knowledge and perception related to insecticide treated nets among various groups of people.

Fawole and Onadeko, 2001 found a statistical significant difference in the malaria "knowledge score" (based on a series of questions about the cause, transmission, symptoms and prevention of malaria) of mothers of different ages, educational attainment and occupation. Knowledge was higher among those who were skilled or professionals than among the unemployed or unskilled category.

In a study conducted among mothers of children attending out- patient clinic at UNTH, Enugu; the result showed that awareness of ITNs was found in 80% of the 230 mothers interviewed, while only 26.1% used ITNs for their children. There was also statistical significant difference in terms of ITNs awareness between the highly educated mothers and

those with lower educational qualification but in terms of ITNs usage, there was no significant difference between the two groups (Edelu, Ikefuna, Emodi and Adimora, 2010).

Another study in south-western Nigeria, among 246 health workers showed that 93.5% were aware of ITN, but 20.9% had correct knowledge and only 22.5% were using insecticide-treated nets in their homes (Iyaniwura, Ariba and Runsewe- Abiodun, 2012).

Furthermore, a study on awareness, possession and use of ITNs for the prevention of malaria in children under-five in Abeokuta, Nigeria revealed that malaria was considered dangerous by almost all respondents 98.5%; the level of awareness of Insecticide-treated nets as a malaria preventive tool was 75.1% while possession was 45% and that awareness and possession of ITN were positively influenced by high educational qualification of mothers. Then, concluded that method of bridging ITN possession and use need to be developed (Idowu, Wobo, Oluwole and Adeniran, 2010).

A study on malaria-related perception and practices of women with children under the age of five in rural Ethiopia showed that mosquito is perceived to be the main cause of malaria. However, the use of prevention measure was low while most mothers were familiar with the main signs and symptoms of mild malaria (Deressa and Ali, 2009).

In a study titled "Gains in awareness, ownership and use of ITNs in Nigeria, Senegal, Uganda and Zambia" it was revealed that in year 2000, treated nets were just being introduced to the public, but four to six years later the awareness of ITNs was nearly universal in all countries but Nigeria, where awareness increased from 7% to 60% (Baume and Marin, 2008).

It has been acknowledged that success of malaria control in children and pregnant women depends on the understanding of the local socio-cultural factors affecting women's perception of causes and modes of malaria transmission and practices of malaria prevention measures because the prevalence of malaria is high among vulnerable groups including children from 0-59 months and women. Malaria is more prominent in women because of various stages or phases of life they undergo e.g. pregnancy and child bearing which reduce their immunity and under-five children with low immunity that makes them susceptible to the disease.
The current malaria related annual deaths of children under-five years of age are estimated at around 300,000 and it also contributes to an estimated 11% of maternal mortality (United States Embassy in Nigeria, 2011).

This study, investigated the knowledge, perception and utilization of insecticide treated nets for the prevention of malaria among mothers of under-fives.

2.5 Relative effectiveness of insecticide treated nets and other strategies for prevention and control of malaria

Insecticide-treated nets (ITNs) are the most prominent malaria preventive measure for large scale deployment in highly endemic areas. It is the most powerful tool to be developed since the advent of Indoor Residual Spraying (IRS) and chloroquine in the 1940s and as such they have been an important component of global and National Malaria Control Policies since mid-1990s. (ITNs) are highly effective in reducing childhood mortality and morbidity from malaria. Widespread use of (ITNs) can reduce overall mortality by fifth in Africa: for every 1000 children protected, on average about 5.5 lives can be saved in children aged 1 to 59 months every year and full coverage of ITNs could prevent 370,000 child deaths per year (Lengeler, 2009). Insecticide-treated nets have been shown to be the most cost effective measures in the prevention of malaria (WHO, 2008). ITNs have been shown to reduce malaria mortality by 17% in children below the age five. The effectiveness of ITNs has been demonstrated in the reduction of the number of febrile episodes in children, decreased level of malaria parasitaemia and mosquito density (Nwankwo and Okafor, 2009). The evidence for the efficacy of insecticide treated net (ITNs) in preventing malaria infection and its consequences in general is strong, (Lengeler, 2009). The evidence showed a strong correlation between the use of ITNs and reduction in stillbirths, improvements in birth weights of babies and a reduction in the prevalence of parasitaemia and anaemia in pregnant women. In view of the effectiveness of ITNs, the Roll Back Malaria Partnership (RBM) targets to protect 80% of children and pregnant women at risk for malaria with ITNs by 2015 (Auta, 2012). Nigeria, has also established policy guidelines for the implementation and scaling-up use of ITNs in accordance with the provision of Abuja Declaration and its national strategic plan. The Malaria prevention programme in Nigeria was expected to provide about 60 million ITNs by the end of 2010. Consistent use of these nets is important in the prevention of malaria. Other strategies for the prevention and control of malaria include:

- Indoor Residual Spraying (IRS) which involves the coordinated, timely spraying of the interior walls of the homes with insecticides that kill mosquitoes.

- Intermittent Preventive Treatment for pregnant women (IPTp): This is an effective means of reducing the effect of malaria in both the pregnant woman and her unborn child by giving at least two doses of the drug Sulfadoxine-pyrimethamine (SP).
- Prompt parasitological confirmation by microscopy or Rapid Diagnostic Test (RDT):- These are recommended for all patients with suspected malaria before treatment begins.
- Artemisinin-based combination therapy (ACT) which has become the standard treatment of uncomplicated malaria (United States Embassy in Nigeria, 2011).

2.6 Patterns of Utilization of Insecticide-treated nets for the prevention of Malaria among mothers of under-five children

Insecticide treated bed nets (ITNs) were introduced in Nigeria as an effective means of preventing mosquito bites and malaria transmission following the meeting of African Heads of States in Abuja, Nigeria in the year 2000 (RBM, 2000). They also declared that 60% of children under-five years and pregnant women in Africa should sleep under (ITNs). By the year 2005, over a five year period, Nigeria succeeded in achieving only 2.8% of the 60% expected coverage for under-five children with insecticide treated nets (Oresanya, Hoshen and Sofola, 2008). This declaration was adopted into the National Malaria Control Strategic Plan (NMCSP) and by the end of 2005, the Strategic Plan was reviewed and the target was raised to 80% to be achieved by the year 2010 which was later shifted towards achieving universal coverage by 2013 (FMoH, 2009).

The 2013 NDHS reports only a slight increase in ITNs utilization when compared with 2008 NDHS reports of only 4% ITNs utilization among mothers. This is rather on a slow pace. The 2013 NDHS also reported only 17 percent of children slept under an ITN and only 16 percent of women aged 15-49 slept under an ITN. This connotes there is still more to be done in improving ITNs utilization among the vulnerable groups in our societies.

Possessing a net and its eventual utilization are two aspects which usually contradict when assessing the impact of ITN distribution programs. Although cost and other cultural beliefs have been identified to impair possession, utilization has been found to be influenced by different seasons of the year, ethnicity, gender, alongside some demographic characteristics

such as age, education, size of household which also add to the difficulties in satisfaction with the nets by virtue of its size, vividness and form.

According to Nigeria Demographic Health Survey (NDHS 2013) in Nigeria, 55 percent of households own at least one mosquito net (any type), and 50 percent of households at least one insecticide treated net (ITN). Twenty-four percent of the household population in households with at least one ITN slept under an ITN the night before the survey, and 18 percent of children under 5 slept under a mosquito net. ITNs ownership percentage has increased drastically in the past five years due to community wide distribution strategy employed by the federal and state governments.

Many lives could be saved if all children under –five and pregnant women slept under Long-lasting insecticide treated mosquito nets (LLINs). It is that simple and cost-effective (NMCP, 2009- 2013).

Oyo State government, under the Malaria Action Program for the state said it had distributed a total of 893,000 mosquito nets donated by USAID to a total of 2,232,500 at a cost of #107million to the beneficiaries in 13 local government areas, Agbede- Adodo inclusive. The question is; Among those given the insecticide treated nets at a zero cost, who is and who is not using the net?

Oyo State government, under Insecticide treated nets Massive Awareness Campaign (IMPAC) system in Nigeria also implemented a community-wide, routine insecticide distribution through health facilities and by numbering houses in communities both rural and urban settings to reduce malaria episodes in the country. Utilization of the nets is not guaranteed. This study assessed the knowledge, perception and utilization pattern of insecticide treated nets in malaria prevention in Agbede-adodo community. It also enabled us to know the rate of utilization of the net vis-à-vis the number of insecticide treated net distributed in the community and the efficacy of the use of the net in the community.

2.7 Factors that influence the Utilization of Insecticide-treated nets among mothers of under-fives

Ownership and use of insecticide treated net vary widely in sub-Sahara Africa and this is greatly influenced by several factors like: Level of education, wealth index, family size, religion and residence (Daboer, Chingle and Ogbonna, 2010)

Utilization of insecticide treated net has also been found to vary with seasons of the year and acceptability of the nets in terms of size, colour and shape. In the study, 99% of the respondents were found to use the nets during the rainy season; only 20% used the nets during the dry season. (Oresanya, Hoshen and Sofola, 2008). Also Ganiyu, Rabiu and Omotosho, (2009) in a study conducted among women in Northern Nigeria reported that 68% of the respondents would not use the nets during the hot weather.

In a recent study on insecticide treated net to prevent malaria in Cameroon by Nwana, (2011) some factors were identified as barriers to the utilization of insecticide treated nets. They are as follows: Housing structure / residence, weather or climate change, size of the household, fear of not getting another net, educational level or status, type of sleeping material e.g. mat, ethnicity, beliefs and income of the household.

Binka and Adongo, (1997) also identified some demographic characteristics that influence the use of ITNs among mothers as age, education, size of house hold and ethnicity.
This study is aimed at identifying barrier factors associated with the use of ITNs among mothers of under-5 in Agbede-Adodo community in Ibadan North-west local Government Area, Oyo State, Ibadan.

2.8 The Theoretical Frame work (HBM)

Theories are used to facilitate the conduct of research as it helps to predict human behaviour and how it can be modified under certain conditions.

Health Believe Model (HBM) developed in 1950s draws on Kurt Lewin's force field theory (reinforcing and restraining factors), value expectancies inherent in benefits and constraint analysis. It theorized the people's belief about whether or not they were susceptible to disease and their perception.

Health Belief is useful when thinking about information needed to be collected about a target population before the program is developed. It argued that people were ready to act if they applied the (6) tenets of the theory (construct of health belief model).

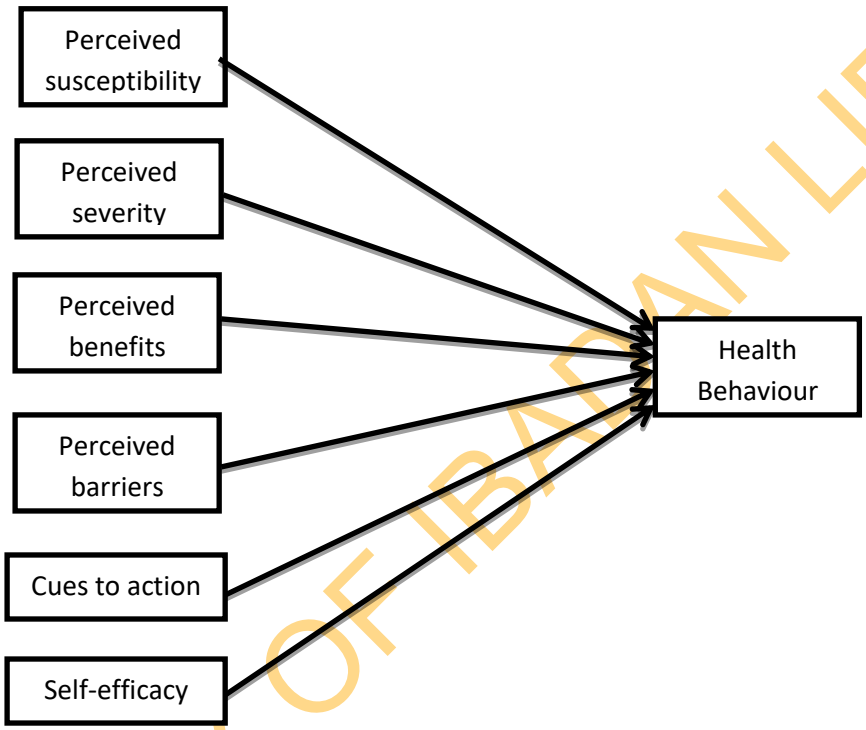

Figure 2.8A: Health Belief Model (Source: Sharma and Romas, 2012)

1. The first construct: **Perceive susceptibility** refers to the subjective belief that a person has with regard to acquiring a disease or reaching a harmful state as a result of indulging in a particular behaviour. It has a strong cognitive component and is partly dependent on knowledge (Sharma and Romas, 2012).

2. The second construct: **Perceived severity** refers to a person's subjective belief in the extent of harm that can result from the disease or harmful state as a result of a particular behaviour. This perception varies from person to person. One person might

perceive disease from purely medical perspective and thus have concerns with signs, symptoms, and limitation arising out of the condition, the temporary or permanent nature of the condition, whereas another individual might look at the disease from a broader perspective, such as the adverse effects it might have on his or her family, job and relationships and it also has strong cognitive component, which is dependent on knowledge (Sharma and Romas, 2012).

3. The third construct: **Perceived benefit** refers to belief in the advantages of the methods suggested for reducing the risk or the seriousness of the disease or the harmful state resulting from a particular behaviour. The relative effectiveness of the known available alternatives plays a major role in shaping actions. An alternative is likely to be seen as beneficial if it reduces the perceived susceptibility or the perceived severity of the disease (Sharma and Romas, 2012).

4. The fourth construct: **Perceived barrier** refers to beliefs concerning the actual and imagined costs of something, following the new behaviour. An individual may believe that a new action is effective in reducing perceived susceptibility and perceived severity of a disease but may consider the action to be expensive, inconvenient, unpleasant, painful or upsetting (Sharma and Romas, 2012).

5. The fifth construct: **Cue to action** refers to the precipitating forces that make a person feel the need to take action. Such cue may be internal e.g. perception of the bodily state or external e.g. interpersonal interaction, media communication, or receiving a postcard from a doctor for follow-up examination. If the perceived susceptibility or perceived severity is low, then a very intense stimulus is needed for cue to action. When the perceived susceptibility or perceived severity is high, then a slight stimulus is adequate (Sharma and Romas, 2012).

6. The sixth construct: **Self-efficacy** is the confidence that a person has in his or her ability to pursue a behaviour. It is behaviour specific and is in the present (Manoj Sharma and John Romas, 2012).

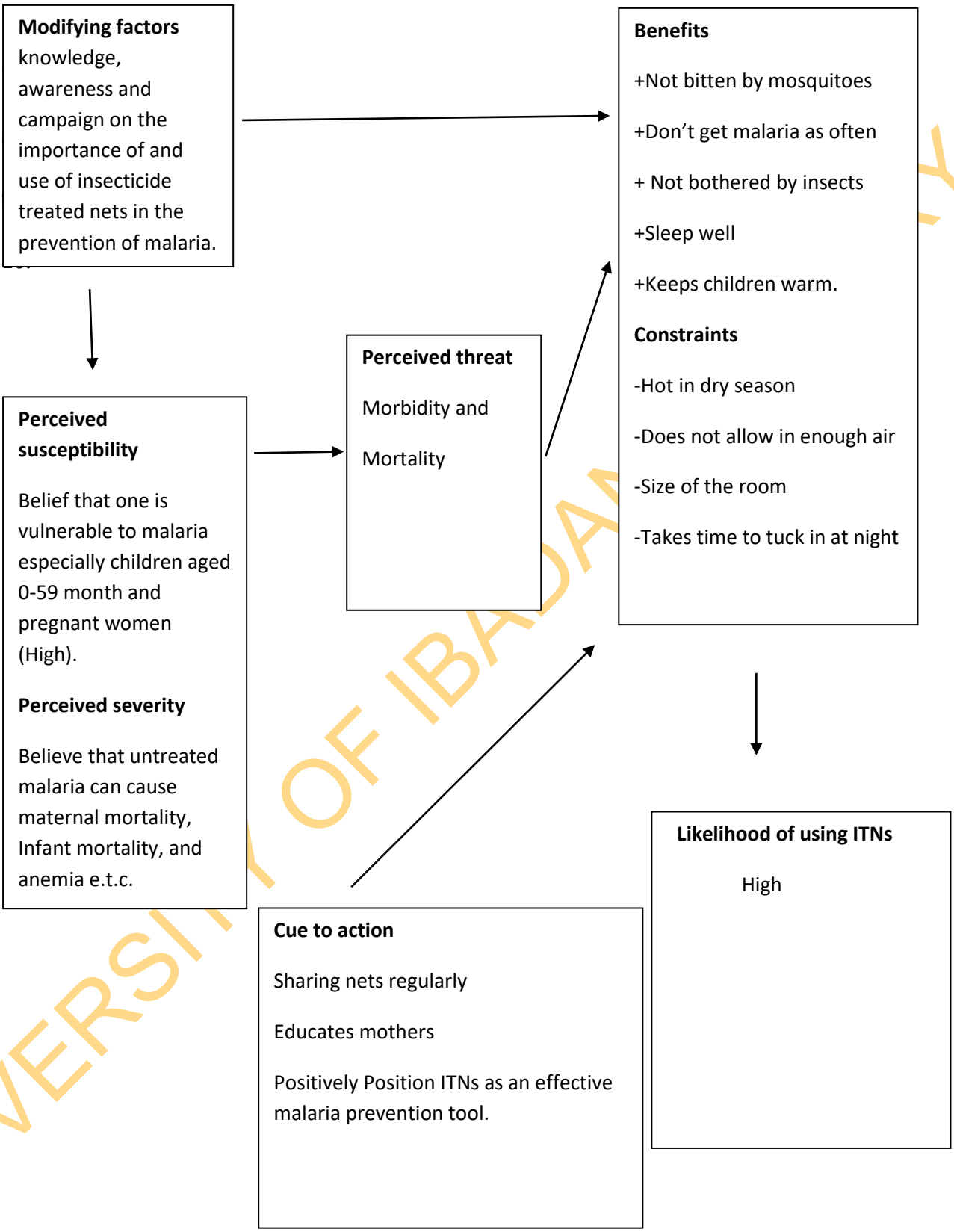

Figure 2.8B: Application of Health Belief Model

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study design and scope

The research was a descriptive cross sectional survey which involved the collection of data through the use of a structured questionnaire to interview randomly selected women in their reproductive age (15-49 years) who were given insecticide treated nets in Agbede-Adodo community, Ibadan North-west Local Government Area, Ward two (2),Oyo State. This was supplemented with observation of hanging technique.

3.2 Description of study setting

Agbede-Adodo is a community in the heart of Ibadan, the capital city of Oyo State in Ibadan North-West Local Government Area (LGA). The LGA in which Agbede-Adodo is located is one of the eleven (11) LGAs that constitute Ibadan metropolitan area. Ibadan North West Local Government was created in 1991 by then military Head of State, Major Gen. Ibrahim Gbadamosi Babangida (RTD). The Local Government covers a large area of land with a population of about 152, 834 according to 2006 National population census.

There are two main seasons, the raining season from April to October and the dry season lasts from November to March. The people belong to the Yoruba ethnic group and have a rich cultural heritage.

Ibadan North-West Local Government Area is predominantly urban area spanning over Onireke (headquarters), Sapati, Agbede Adodo, Beere, Mokola, Ayeye, Dugbe, Inalende, Eleyele, Ologuneru to mention a few. The Local Government area has eleven (11) wards. Agbede Adodo together with other areas like Galaxy Oke Are, Asukuna, Oopo Iye Osa, Idi Oro, Adagbada and Ori Gbegi belong to Ward 2. The population of the Local government is presently 286,000 according to 2006 National population census.

In a Key Informant Interview (KII) with Agbede-Adodo community head (Mogaji), “The first settlers in the community were warriors from Oyo, Ogbomoso, and Erin. Agbede-Adodo, Beere and Oopo Iye Osa were the first places to be inhabited by humans in Ibadan. At that time, majority of the people were warriors, hunters, farmers and blacksmiths. The

community was established according to history by conquest. Most of the lands they have were forcefully acquired by war. The community is the real lbadan and one of the toughest regions in lbadan. The community was named after the first blacksmithing center located within it. Early men of Agbede Adodo were farmers and dyemakers while their women were traders. Compounds in the community include; Ile Agbede, Agbede-Adodo Ile Akinlagun, Ile Ataa, Ile Adanla, Ile Idi-oro, Ile Olooka, Ile Fantola, Ile Opa, Ile Tooki, Ile Adekunloye, Ile Araba, Ile Abinuworo, Ile Ori-gbegi, Ile Santola, Ile Iye-osa, Ile Akanmole, Ile Asukunna to mention a few".

Presently, majority of the residents of the community are artisans; (Blacksmithing, tailoring, hair dressing, sculptors etc). Some of them, especially the women are petty traders while few are government officials.

Agbede-Adodo, community cut across three areas namely; Agbede- Adodo, Asukunna and Ori Gbegi. According to 2006 population census results, the three areas had a total population of 7,640 people: Agbede- Adodo 4,870, Asukunna 1,850 and Ori Gbegi 920. The topography of the area is hilly and rocky.

3.3 Study population

The study population is women in their reproductive age (15-49years).

3.4 Sample size determination and the sampling procedure

The sample size for the study was estimated using the estimation formula.

$$n = \frac{Z^2 P(1-p)}{d^2}$$ (Lwanga and Lemeshow Formula, 1991)

n= minimum sample size

z= the standard normal deviate usually set at 1.96 which corresponds to the 95% confidence level.

p= proportion estimated to be obtainable in the target population 50.3% = 0.503 (Prevalence of malaria among south-west under-five children, NDHS, 2013).

1-p= proportion that does not have the characteristics that will be investigated

=1- 0.503 = 0.497

d= precision for the study which is set at 5%

$$N = \frac{(1.96)^2 \times 0.503 \times 0.497}{0.05^2} = 384$$

The sampling procedure

Sampling means selecting a group of individuals to represent a community or population. In this study, the respondents were selected using multi stage sampling technique.

A multi-stage sampling is a sampling method in which the population is divided into a number of groups or primary stages from which samples are drawn; these are then divided into groups or secondary stages from which samples are drawn.

Stage one: Proportionate sampling technique was to know the number of women that were selected from each area within the community Agbede-Adodo.

The total number of women in their reproductive age in the community Agbede-Adodo was 3290 which comprised of; Agbede (2170), Asukunna (800) and Origbegi (320) (National Population Commission, Ibadan North-West Local Government Area, Onireke, 2006)

Proportionate sampling technique was used to select numbers of women in their reproductive age in each area as shown below.

$$\text{Agbede} = \frac{2170}{3290} \times \frac{422}{1} = 278$$

$$\text{Asukunna} = \frac{800}{3290} \times \frac{422}{1} = 103$$

$$\text{Origbegi} = \frac{320}{3290} \times \frac{422}{1} = 41$$

Stage two: World Health Organization / Expanded Progamme on Immunization (WHO/EPI) technique was used to select households in the community. World Health Organization / Expanded Progamme on Immunization (WHO/EPI) technique involves selecting directions at random in a community to eliminate bias and also gives all participants equal chances of participating in a study. Directions were selected by spinning a bottle at the centre of the community and houses in the chosen direction were selected by picking every second house for the interview. Households were then chosen in each house and every woman in their reproductive ages, who voluntarily gave her consent, was interviewed.

This procedure gave every woman in their reproductive ages in each household equal chances of participating in the study.

3.5 Inclusion and exclusion criteria

Criteria for inclusion in the study are:

1. Women in their reproductive age (15-49 years).
2. Women who are living in Agbede-Adodo community, Ibadan, Oyo State.
3. Women who were given Insecticide Treated Net (ITN) at zero cost (freely) at one time prior to the survey.
4. Women who gave their consent to participate in the study.

Criteria for exclusion from the study are:

1. Women above their reproductive age (Age above 50 years)
2. Women that do not reside within the community of study (Agbede-Adodo)
3. Women who do not give their consent to participate in the study.

3.6 Method and instrument for data collection

Data were collected using an interviewer administered questionnaire of randomly selected women in their reproductive age (15-49 years), who were given insecticide treated nets in Agbede-Adodo community, Ibadan North-west Local Government Area, Ward two (2), Oyo State. This was supplemented with observation of hanging technique and the utilization pattern of insecticide treated nets in households in the community.

A structured questionnaire based on thematic areas which was pre-tested in a similar community was used to elicit information from participants. The instrument was divided into

five sections. Section 1 focused on the socio-demographic information of the respondents; Section 2 assessed the knowledge of respondents on ITN and malaria; Section 3 assessed the respondent's perception on the use of ITNs as preventive measures against malaria; Section 4 examined the utilization pattern of ITN in the community; and section 5 explored the facilitating and barrier factors related to the use of ITNs in the community (See Appendix 2).

3.7 Recruitment of research assistants

Four female research assistants who are literate, who can read and communicate fluently in English and Yoruba, mature and have had previous experiences on data collection were recruited and trained for two days. Interviewers / research assistants were selected based on their understanding of English and Yoruba (local language).

Interviewers were trained to understand and appropriately apply all aspects of the questionnaire and interview process. They helped in administering the questionnaires in Agbede-Adodo community, Ibadan North-west LGA. The contents of the training included purpose of the study, interpersonal communication and data collection procedures.

3.8 Validity of the study

Validity refers to what extent the test accurately measures that which it purports / intends to measure (Parks, 2011). The draft instrument was developed and perfected by consulting literatures, peer and expert reviews especially, experts in the field of public health and under competent supervision and tutelage.

3.9 Reliability of the study

Reliability is concerned with the ability of an instrument to measure consistently (Tavakol, 2011). Reliability of the study was ensured through the use of Cronbach Alpha statistical test tool which is considered to be a measure of scale reliability / a co-efficient of reliability (consistency). Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. The reliability of the instruments was secured by conducting a pre-test among thirty-eight (10% of minimum sample size) women in their reproductive age who have under-five children and had received ITN with a draft of the

questionnaire in a similar location (Idi-Ope Odo-Oba, in Ibadan South-East Local Government Area) which had similar characteristics with the study area to determine the instrument's consistency. The result of the reliability test was .853, suggesting that the items had relatively high internal consistency. Revision was made to the questionnaire based on the observation in the field during the pre-test. For example revision was made on questions that were similar and questions that were not clear to the participants.

3.10 Data collection process

Four female research assistants, who were literate, fluent in English and Yoruba (local language), mature and have had previous experiences on data collection were recruited and trained for two days and were sent into the community to collect data for one week. Directions were selected by spinning a bottle at the centre of the community and houses in the chosen direction were selected by picking every second house for the interviews. Verbal inform consent was obtained from the respondents that is, mothers of under-fives in their reproductive age and only those who gave their consent were interviewed. The questionnaire was interviewer administered which required research assistants to read in the language the participants understood before giving their responses.

3.11 Data management analysis and presentation

The data collected were checked for completeness and accuracy in the field. Serial numbers were assigned to each questionnaire for easy identification and for correct data entry and analysis. The results generated were analyzed using software IBM Statistical Package for Social Sciences (SPSS) version 16.0, for the calculation of frequencies and percentages.

Data on knowledge was analyzed by assigning 1point to each correct answer while zero point for both incorrect and don't know answers provided by the respondents. This method resulted in a 50-point ITN knowledge score, with 0 being the lowest and 50 the highest points. Respondents with < 25 points were regarded as having poor knowledge, 25-39 (fair) while 40-50 were regarded as good knowledge of ITNs.

Data on perception were analyzed by assigning 1point to each correct answer while zero point was awarded for incorrect answers provided by the respondents. This method resulted in 18-point perception score scale, with 0 being the lowest and 18 the highest points.

Respondents with < 9 points were regarded as having unfavourable perception, 9 point were regarded as border-half while 10-18 point were regarded as favourable perception.

3.12 Ethical Consideration

All ethical principles were observed in the course of this study. On entering the research site, permission to carry out the study and verbal informed consent was first obtained from the Mogaji of the community. The nature, purpose and process of the study were explained to the respondents in language they understood after which verbal informed consent were obtained from them voluntarily. Confidentiality, privacy and anonymity of information provided by the respondents were ensured by not asking for respondents' names and keeping data sources in a secured place. Respondents were continuously reminded of their right to withdraw from the study at any time during the course of the interview.

3.13 Limitation of the Study

The scope of the study was limited to a community in the heart of Ibadan, the capital city of Oyo State in Ibadan North-West Local Government Area (LGA). Some of the participants (mothers of under-five) refused to participate in the study even after explanation, persuasion and assurance of confidentiality complaining; the questions are too many and that they are busy. These were over come through patience, respect and good human relationship / interpersonal communication established by the research assistants with the respondents.

CHAPTER FOUR

RESULTS

The results are presented in this chapter .It consists of five sections

- Socio –demographic characteristics
- General knowledge on malaria and Insecticide treated nets
- Perception on the use of Insecticide treated nets as a preventive measure against malaria
- Utilization pattern of ITNs
- Facilitating and barrier factors which have potentials for influencing or limiting ITNs use.

4.1 Respondents' Socio-demographic Characteristics

Table 4.1 shows the basic socio- demographic characteristics of the respondents. All the 385 respondents were mothers in their reproductive age. Majority (77.1%) of the respondents were married, few (10.1%) were single while the remaining respondents, separated (5.2%), widowed (4.4%) and divorced (3.1%). The numbers of under-fives the respondents' had ranged from 1-5 with (46.2%) of the respondents having only 1 child while (40.3%) had two children, (11.9%) had three children, (1.3%) had four children and only one of the respondents had five under-five children which is (0.3%). Over half of the respondents (51.9%) practiced Islam as religion, (45.2%) were Christians with the remaining (2.9%) respondents practising traditional African religion. The ages of the respondents ranged from 16-49 years with a mean age of 28.7±7.2 years. Of the total number of respondents, three hundred and eighty-five (385), one hundred and forty (36.4%) were between 23-29 years of age, followed by (26.5%) of the respondents within the age group 30-36 which was also followed by (20.8%) of the respondents in the age group 16-22, (13.8%) of the respondents were within the age group 37-43 and of course followed by respondents that were in the age group 44-50 years of age as (2.6%). (See figure 4.1). Almost all (88.3%) respondents were

Yorubas, while (7.3%) of the respondents were Igbos, Hausas (1.8%), Edos (1.6%) and Egu (1.0%).

Highest educational qualification of majority of the respondents was Secondary school completed, with (35.5%) proportion, followed by Primary school completed (22.9%), Some secondary school (13.0%), No formal education and OND had the same proportion which was (6.5%) respectively, NCE (5.7%), Some primary school (5.5%), Bachelor degree (2.9%), HND (1.6%) and Masters (.3%).

Majority of the respondents were petty traders (60.3%), the unemployed were (12.7%), Civil servants and fashion designers (8.8%) respectively, Hairdressers (3.6%), Teachers (2.6%), Self-employed (2.1%), Students and Lawyers having the same proportion of (0.5%) respectively. Almost half (49.1%) of the respondents live in face-me-I – face you apartment, while (17.7%), (14.5%), (12.5%) and (6.2%) live in two room apartment, one room apartment, family house and three bedroom apartment respectively.

The percentage of one child that slept with their mothers was (36.9%), while (32.2%) of respondents slept with two children in the same room, (19.0%) slept with three children in their room, (8.8%) of the respondents slept in the same room with four children, (2.9%) slept with five children and only (0.3%) of the respondents slept with six children in the same room. While (54.8%) of the respondents slept with one child on the same bed, (36.4%) slept with two children on the same bed, (7.0%) slept with three children on the same bed, (1.3%) shared their bed with four children, only (0.3%) of respondents slept with five and six children on the same bed.

Table 4.1 Respondents' Socio-demographic Characteristics

N = 385 (100%)

Socio-demographic Variables	Frequency (n)	Percentage (%)
Marital Status		
Married	297	77.1
Single	39	10.1
Separated	20	5.2
Widowed	17	4.4
Divorced	12	3.1
Number of under-five children		
1	178	46.2
2	155	40.3
3	46	11.9
4	5	1.3
5	1	.3
Religion		
Islam	200	51.9
Christianity	174	45.2
Traditional African religion	11	2.9
Ethnic Group		
Yoruba	340	91.0
Igbo	28	7.3
Hausa	7	1.8
Edo	6	1.6
Egu	4	1.0
Highest education qualification		
No formal education	25	6.5
Some primary school	21	5.5
Primary completed	88	22.9
Some secondary school	50	13.0
Secondary school completed	136	35.3
NCE	22	5.7
OND	25	6.5
Bachelor degree	11	2.9
HND	6	1.6
Masters	1	.3

Occupation		
Unemployed	49	12.7
Petty trader	232	60.3
Civil servant	34	8.8
Fashion designer	34	8.8
Self employed	8	2.1
Lawyer	2	.5
Student	2	.5
Hair dresser	14	3.6
Teacher	10	2.6
Type of house		
One room apartment	56	14.5
Two rooms apartment	68	17.7
Face – me – I – face you	189	49.1
Three bedroom flat	24	6.2
Family house	48	12.5
How many children sleep with you in the room?		
1	142	36.9
2	124	32.2
3	73	19.0
4	34	8.8
5	11	2.9
6	1	.3
How many children sleep with you on the same bed?		
1	211	54.8
2	140	36.4
3	27	7.0
4	5	1.3
5	1	.3
6	1	.3

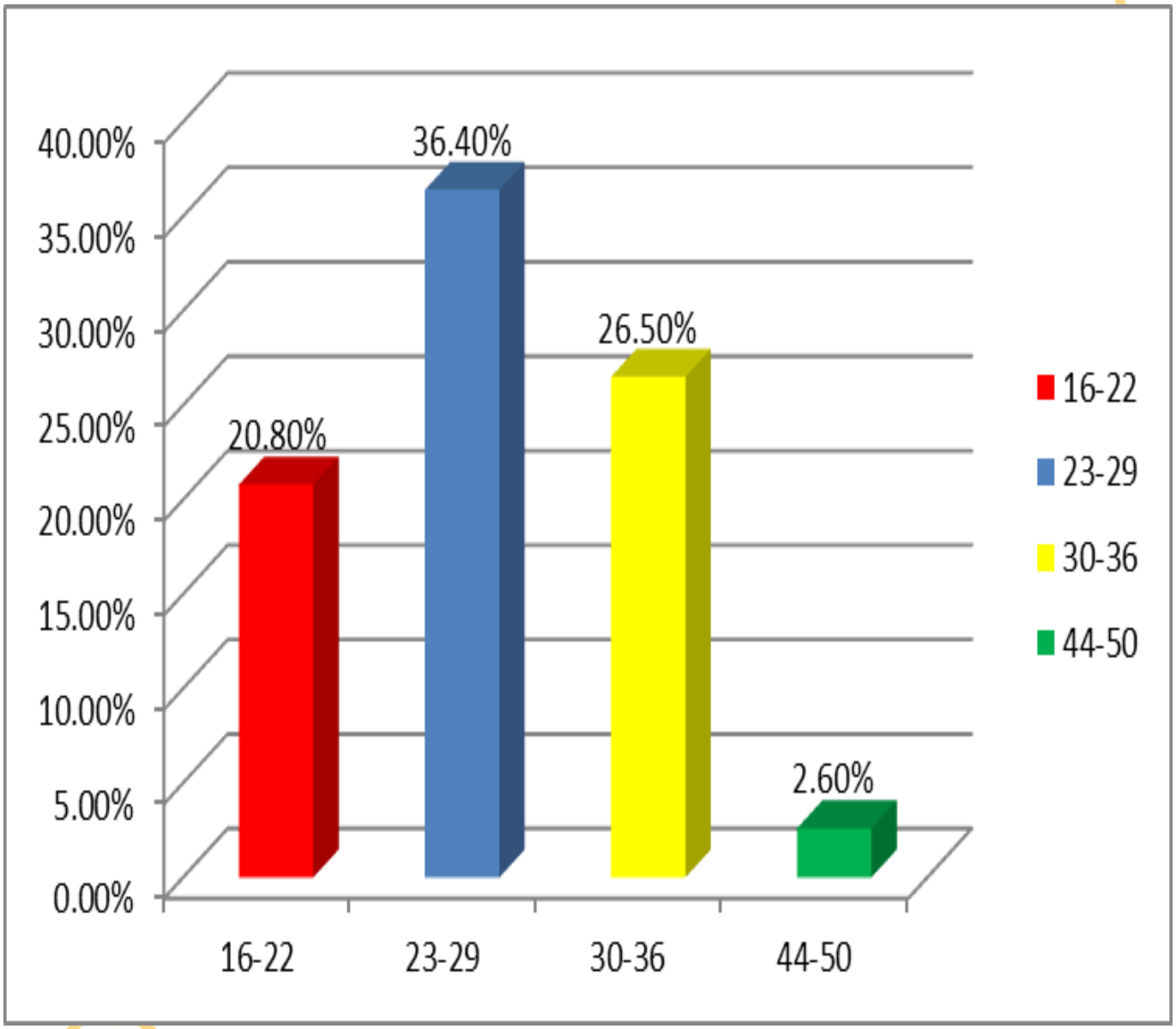

Figure 4.1 – Respondents (mothers of under-fives) age as at last birthday.

***Mean age of the respondents in years** = 28.7± 7.2

SECTION B: - RESPONDENTS' KNOWLEDGE RELATING TO MALARIA AND ITNs

Table 4.2: Presents the result of an open-ended question on causes of malaria in under-five children. Majority (76.1%) of the respondents had correct knowledge of the causes of malaria in under-five children as mosquito bite.

Other responses were Sun (10.1%) , dirty environment (7.5%), Germs and parasites (2.1), high body temperature and starchy food (1.0%) respectively, teething (0.8%), while only (0.5%) of the respondents indicated that it was too much palm oil in the body that caused malaria in under-five children.

(See Table 4.2 for details).

Table 4.2: Respondents' knowledge on the causes of malaria in under-five children

N = 385

Perceived causes	Number	%
Mosquito bite	293	*76.1*
Sun	39	10.1
High body temperature	4	1.0
Germs and parasites	8	2.1
Too much palm oil	2	.5
Teething	3	.8
Dirty environment	29	7.5
Starchy food	4	1.0
No response	3	.8

***Multiple responses given**

Table 4.3: Presents results of an open-ended question unfolding respondents' knowledge on how malaria spreads among under-five children. Over two-thirds of the respondents (69.4%) had correct knowledge of how malaria spread among under five children: through mosquito bites.

The proportion of respondents that stated that malaria could be transmitted when children played and slept together with another child that had the disease was (11.9%). Other responses were Sun (9.1%), Dirty environment (3.9%), Cough / catarrh (2.3%), during heat or dry season (1.3%), lack of care of children and sharing of blade and other sharp objects had (0.8%) respectively.

(See Table 4.3 for details).

Table 4.3: Respondents' knowledge on how malaria spread among under-five children

N = 385

Mode of spread of malaria among children age <5	**Number**	**%**
Through Mosquito bite	267	*69.4*
Sun	35	9.1
Cough and catarrh	9	2.3
when people sleep / play together	46	11.9
Through dirty foods	2	.5
Lack of care for the children	3	.8
During heat or dry season	5	1.3
Dirty environment	15	3.9
Sharing of blade and other shape objects	3	.8

***Multiple responses were allowed**

Table 4.4: Shows respondents' knowledge on symptoms for recognizing that under-five has Malaria.

Majority of the respondents (82.1%) said high body temperature was a major symptom for recognizing that an under-five had malaria, while (8.6%) said loss of appetite, followed by convulsion (4.2%), cough (3.9%), and vomiting (1.3%).

(See Table 4.4 for details).

Table 4.4: Respondents' knowledge relating to Symptoms for recognizing that under-five has malaria **N385**

Pattern of responses among respondents	Number	%
High body temperature	316	*82.1*
Convulsion	16	4.2
Cough	15	3.9
Loss of appetite	33	8.6
Vomiting	5	1.3

***Multiple responses were allowed**

Table 4.5: Presents result relating to respondents' knowledge of the group of people most susceptible to malaria. Over half of the respondents (54.3%) said under-fives were the group of people that readily got malaria, followed by sickle cell anemia persons with (16.6%), pregnant women (10.4%), adults aged 25 years and above having (9.1%), fair skinned individuals were mentioned by respondents as group that readily got malaria because of their fairness having (6.5%), and lastly young persons aged 15- 24 were identified as people susceptible to malaria with the lowest proportion (3.1%).

(See Table 4.5 for details).

Table 4.5: Respondents' knowledge of group of people that readily get malaria

N = 385

Pattern of responses among respondents	Number	%
Under-five children	209	*54.3*
Sickle cell anemia persons	64	16.6
Pregnant women	40	*10.4*
Young persons aged 15-24 years	12	3.1
Adults aged 25 years and above	35	9.1
Fair skinned individuals	25	6.5

***Multiple responses were allowed**

Table 4.6:- Presents results of an open-ended question unfolding respondent's knowledge of what insecticide treated net is / actually stands for.

Almost all the respondents (99.2%) had the knowledge that ITNs served as a protection against mosquito bite.

(See Table 4.6 for details).

Table 4.6: Respondents' knowledge of the definition of Insecticide treated net

	N385	
Definition of Insecticide treated net	**Number**	**%**
Protective barrier against mosquito bite	382	*99.2*
No response	3	. 8

Table 4.7:- Shows results of an open-ended question recounting respondent's knowledge on the length of time insecticide treated nets can stay effective before it will need to be retreated with insecticides.

The respondents' knowledge on retreating was low: (11.4%) of the respondents indicated nets should be retreated within one month and three months of use, respectively, followed by six months (10.4%), one year (19.2%), two years (7.0%), three years (5.7%), four years (6.8%), and five years (4.9%).

(See Table 4.7 for details).

Table 4.7: Length of time insecticides treated net can stay effective before retreating

N385

Duration	Number	%
One month	44	11.4
Three months	44	11.4
Six months	40	10.4
One year	74	19.2
Two years	27	7.0
Three years	22	*5.7*
Four years	26	*6.8*
Five years	19	4.9
Don't know / Not sure	85	22.1
No response	4	1.0

Table 4.8:- Presents results that test respondents' knowledge relating to malaria and insecticide treated nets. Majority of the respondents (86.2%) stated correctly that Malaria was a major cause of death among the under-fives. Almost all respondents (93.5%) stated that Malaria was especially dangerous for children under-five years of age.

Eighty-six point eight percent (86.8%) confirmed that consistent use of insecticide treated nets could prevent malaria occurrences. (84.4%) of the respondents stated that ITNs were very safe for people to use while over half (58.4%) of the respondents mentioned that ITNs could be washed up to 5 times in a year. Almost all respondents (82.9%) confirmed that ITNs could prevent children from having malaria.

(See Figure 4.8 for details).

Table 4.8: Respondents' knowledge relating to malaria and insecticide treated nets

N = 385

Variables	True (%)	False (%)	Not Sure (%)	Total
Malaria is a major cause of death among the under-fives	*332(86.2)*	17 (4.4)	36 (9.4)	385
Malaria is especially dangerous for children under-five years of age.	*360(93.5)*	9 (2.3)	16 (4.2)	385
Consistent use of insecticide treated nets can prevent malaria occurrences.	*334(86.8)*	21 (5.5)	30 (7.8)	385
Malaria is not a serious health problem among pregnant women.	169 (43.9)	*160(41.6)*	56 (14.5)	385
ITNs are very safe for people to use.	*325(84.4)*	22(5.7)	38 (9.9)	385
ITNs can be washed up to 5 times in a year.	*225(58.4)*	71(18.4)	89 (23.1)	385
ITNs can prevent children from having malaria.	*319(82.9)*	20(5.2)	46 (11.9)	385
The new ITNs do not need retreating with insecticide.	*181(47.0)*	89(23.1)	115(29.9)	385
ITNs should never be washed.	69(17.9)	*243(63.1)*	73 (19.0)	385

Table 4.9: Presents respondents' knowledge on causes of malaria.

Majority of the respondents (46.2%) stated correctly that Malaria was caused by a parasite called plasmodium. Almost all the respondents (87.5%) stated that living near stagnant water could cause malaria. (78.7%) respondents ascertained that Malaria could be caused by presence of waste / exposure to environmental conditions while (87.0%) of the respondents reported that mosquitoes caused malaria.

The incorrect responses were; Eating too much oily food (53.2%), Walking in the sun/ excessive heat (78.4), Eating cold foods (34.3%), Sleeping in overcrowded room (68.1), Drinking unboiled water (51.2%), and Eating starchy food (38.2%).

(See Table 4.9 for details).

Table 4.9: Respondents' knowledge relating to the causes of malaria

N = 385

Perceived Causes	True (%)	False (%)	Not Sure (%)	Total
Malaria is caused by a parasite called plasmodium	*178(46.2)*	56 (14.5)	151(39.2)	385
Eating too much oily food can cause malaria	205(53.2)	*121(31.4)*	59 (15.3)	385
Walking in the sun/ excessive heat can cause malaria	302 (78.4)	*55 (14.3)*	28 (7.3)	385
Malaria can be caused by eating cold foods	132 (34.3)	*182(47.3)*	71 (18.4)	385
Sleeping in overcrowded rooms can cause malaria.	262 (68.1)	*82 (21.3)*	41 (10.6)	385
Living near stagnant water can cause malaria	*337(87.5)*	27 (7.0)	21 (5.5)	385
Malaria can be caused by drinking unboiled water.	197 (51.2)	*138(35.8)*	50 (13.0)	385
Malaria can be caused by presence of waste / exposure to environmental conditions.	*303(78.7)*	49 (12.7)	33 (8.6)	385
Malaria is caused by poor diet.	171 (44.4)	*161(41.8)*	53 (13.8)	385
Eating starchy food causes malaria	147 (38.2)	*174(45.2)*	64 (16.6)	385
It is mosquitoes that cause malaria	*335(87.0)*	26 (6.8)	24 (6.2)	385

Table 4.10: Presents respondents' knowledge on the mode of malaria transmission.

Less than half of the respondents (46.0%) correctly stated that Malaria can be transmitted through the bite of infected female anopheles mosquito while (30.1%) also stated that there are other mosquitoes that bite but do not spread malaria.

There were several gaps in knowledge among respondents relating to the mode of transmission of malaria; these include responses that Malaria can be contracted by sleeping beside someone who has malaria (44.9%), malaria cannot be transmitted from man to man (48.8%) and that malaria can be transmitted through shaking of hands (9.4%).

(See Figure 4.10 for details).

Table 4.10: Respondents' knowledge relating to the mode of transmission of malaria

N = 385

Perceived Mode of transmission of malaria	True (%)	False (%)	Not Sure (%)	Total
Malaria can be transmitted through the bite of infected female anopheles mosquito	*177(46.0)*	62 (16.1)	146(37.9)	385
Malaria cannot be transmitted from man to man.	188 (48.8)	*153(39.7)*	44(11.4)	385
Malaria can be contracted by sleeping beside someone who has malaria.	173 (44.9)	*163(42.3)*	49(12.7)	385
There are other mosquitoes that bite but do not spread malaria.	*116(30.1)*	154(40.0)	115(29.9)	385
Malaria can be contracted through shaking of hands	36 (9.4)	*298(77.4)*	51(13.2)	385

Table 4.11:- Presents results of responses of respondent's knowledge on major symptoms of uncomplicated malaria.

The correct major symptoms of uncomplicated malaria listed by the respondents included: Fever i.e. high body temperature, (92.2%), Chills (81.6%), General body ache / headache (92.2%), Nausea (69.9%), and Vomiting (81.0%).

(See Figure 4.11 for details).

Table 4.11: Respondents' knowledge relating to the Major symptoms of uncomplicated malaria

N = 385

Major symptoms of uncomplicated malaria	Yes (%)	No (%)	Not Sure (%)	Total
Diarrhoea	201(52.2)	*133(34.5)*	51(13.2)	385
Chills	*314(81.6)*	34 (8.8)	37 (9.6)	385
Nausea	*269(69.9)*	64 (16.6)	52 (13.5)	385
Vomiting	*312(81.0)*	43 (11.2)	30 (7.8)	385
Fever i.e. high body temperature	*355(92.2)*	17 (4.4)	13 (3.4)	385
Weight loss	285(74.0)	*57 (14.8)*	43 (11.2)	385
Loss of appetite.	344(89.4)	*17 (4.4)*	24 (6.2)	385
General body ache / headache	*355(92.2)*	14 (3.6)	16 (4.2)	385
Inability to work and perform daily house chores	325(84.4)	*36 (9.4)*	24 (6.2)	385
Change in the colour of eyes	267(69.4)	*65 (16.9)*	53 (13.8)	385
Perspiration	215(55.8)	*85 (22.1)*	85 (22.1)	385
Loss of kidney function	123(31.9)	*129(33.5)*	133(34.5)	385

Table 4.12:- Presents results of respondents' knowledge of symptoms of complicated / severe malaria.

The correct major symptoms of complicated / severe malaria listed by the respondents included: High body temperature (91.4%), Convulsion (72.5%), General body aches (81.3%), Diminished urine / dark or coloured urine (81.3%), Yellowish eyes (77.9%), Perspiration (64.4%) and Loss of kidney function (47.3%).

Similarly, respondent's incorrect responses were: gaining more weight (27.5%), and eating too much (31.9%).

(See Table 4.12 for details).

Table 4.12: Respondents' knowledge relating to Major symptoms of complicated/severe malaria

N = 385

Major symptoms of complicated malaria	Yes (%)	No (%)	Not Sure (%)	Total
High body temperature	*352(91.4)*	14(3.6)	19(4.9)	385
Diarrhea	263(68.3)	*69(17.9)*	53(13.8)	385
Nausea	270(70.1)	*56(14.5)*	59(15.3)	385
Convulsion	*279(72.5)*	63(16.4)	43(11.8)	385
Drowsiness	*258(67.0)*	73(19.0)	54(14.0)	385
Gaining more weight	106(27.5)	*225(58.4)*	54(14.0)	385
Eating too much.	123(31.9)	*215(55.8)*	47(12.2)	385
General body ache	*313(81.3)*	39(10.1)	33(8.6)	385
Diminished urine / dark or coloured urine	*313(81.3)*	35(9.1)	37(9.6)	385
Yellowish eyes	*300(77.9)*	46(11.9)	39(10.1)	385
Perspiration	*248(64.4)*	65(16.9)	72(18.7)	385
Loss of kidney function	*182(47.3)*	85(22.1)	118(30.6)	385

Table 4.13:- Presents results of respondent's knowledge on malaria prevention.

Majority of the respondents (86.4%) correctly stated that Malaria can be prevented with the use of insecticide treated nets. Similarly, majority of the respondents (85.2%) ascertained that Malaria can be prevented by avoiding being bitten by mosquito, while (84.9%) stated that Malaria can be prevented by keeping the house surrounding free of anything that can hold water. Majority (80.0%) said using insecticide spray can reduce mosquito bites and finally, (86.8%) of the respondents ascertained that one of the best ways to protect under-five children from malaria is to use insecticide treated net at night.

(See Table 4.13 for details).

Table 4.13: Respondents' knowledge relating to ways of preventing and controlling malaria

N = 385

Prevention and control of malaria	Yes (%)	No (%)	Not Sure (%)	Total
Malaria can be prevented with the use of insecticide treated nets	*334(86.4)*	23(6.0)	28(7.3)	385
Malaria can be prevented by avoiding being bitten by mosquito.	*328(85.2)*	34(8.8)	23(6.0)	385
Malaria can be prevented by vaccine alone	177(46.0)	*162(42.1)*	46(11.9)	385
Taking preventive medicine can prevent malaria	276(71.7)	*69(17.9)*	40(10.4)	385
Malaria can be prevented by keeping the house surrounding free of anything that can hold water.	*327(84.9)*	26(6.8)	32(8.3)	385
Use of mosquito coils can prevent mosquito breeding.	250(64.9)	*86(22.3)*	49(12.7)	385
Using insecticide spray can reduce mosquito bites.	*308(80.0)*	43(11.2)	34(8.8)	385
One of the best ways to protect under-five children from malaria is to use insecticide treated net at night.	*334(86.8)*	15(3.9)	36(9.4)	385

Table 4.14: Presents result of an open ended question on other ways of preventing malaria. Majority (27.0%) stated that other ways of preventing malaria is by cleaning our surroundings while (24.9%) stated that malaria can be prevented with the use of herbs and roots and (15.6%) of the respondents were of the view that malaria can be prevented when stagnant water is removed from where we live.

(See Table 4.14 for details).

Table 4.14: Respondents' knowledge relating to other ways of preventing malaria

N385

Other ways of preventing malaria	**Number**	**%**
Herbs and roots	96	24.9
Removing stagnant water	60	15.6
Avoid walking in too much sun	34	8.8
Don't expose children	14	3.6
Eating well	23	6.0
By closing our doors and windows always	21	5.5
Cleaning our surrounding and environment	104	27.0
By putting nets on windows and doors	20	5.2
Avoid taking too much palm oil	11	2.9
Drinking plenty of water	2	.5

Table 4.15: Shows respondents' responses relating to the Physical and socio-economic consequences of untreated malaria among under-five children and mothers.

Table revealed the correct adverse physical and socio-economic consequences of untreated malaria. The adverse physical effects correctly mentioned by the respondents included: low birth weight in new born (62.1%), febrile convulsion (68.1%), cerebral malaria in children (59.2%), infants' deaths (83.9%) and maternal death (72.7%).

The correctly listed socio-economic effects of malaria included: wastage of money meant for essential things of life to treat the disease (86.2%) and wastage of time in the hospital (82.6%).

(See Table 4.15 for details).

Table 4.15: Respondents' knowledge relating to the physical and socio-economic consequences of untreated malaria among under-five children and mothers

N = 385

Physical and Socio-economic consequences of malaria	True (%)	False (%)	Don't Know (%)	Total
Malaria results in low birth weight in new born.	*239(62.1)*	61 (15.8)	85 (22.1)	385
Malaria can cause febrile convulsion in under-five children	*262(68.1)*	56 (14.5)	67 (17.4)	385
Untreated malaria can result to cerebral malaria in children.	*228(59.2)*	50 (13.0)	107 (27.8)	385
Untreated malaria can lead to infants' death.	*323(83.9)*	25 (6.5)	37 (9.6)	385
Untreated malaria is one of the leading causes of maternal death.	*280(72.7)*	42 (10.9)	63 (16.4)	385
Malaria results to spending money meant for other things on treatment.	*332(86.2)*	19 (4.9)	34 (8.8)	385
Untreated malaria can cause severe anemia in children	*302(78.4)*	32 (8.3)	51 (13.2)	385
Malaria can lead to wastage of time in the hospital	*318(82.6)*	38 (9.9)	29 (7.5)	385

Table 4.16: Highlights the distribution of respondents' knowledge scores. About half (50.4%) of respondents had fair knowledge. The proportion of those with good knowledge was (43.4%).

(See Table 4.16 for details).

Table 4.16: Distribution of respondents' knowledge scores

		N385
Category of knowledge score	**Number**	**(%)**
Good knowledge (40-50) points	167	(43.4)
Fair knowledge (25-39) points	194	(50.4)
Poor knowledge (<25) points	24	(6.2)

Table 4.17: Level of Respondents' knowledge in points by Educational qualification

Educational qualification	Level of respondents' knowledge in points				df	X	P-value
	Good Knowledge (40-50)	Fair Knowledge (25-39)	Poor Knowledge (<25)	Total			
No formal education	7(1.8%)	15(3.9%)	3(0.8%)	25(6.5%)	18	.408	>0.05
Some primary school	10(2.6%)	11(2.9%)	0(0.0%)	21(5.5%)			
Primary completed	48(12.5%)	35(9.1%)	5(1.3%)	88(22.9%)			
Some secondary school	19(4.9%)	28(7.3%)	3(0.8%)	50(13.0%)			
Secondary school Completed	57(14.8%)	69(17.9%)	10(2.6%)	136(35.3%)			
NCE	8(2.1%)	14(3.6%)	0(0.0%)	22(5.7%)			
OND	9(2.3%)	14(3.6%)	2(0.5%)	25(6.5%)			
Bachelor degree	4(1.0%)	7(1.8%)	0(0.0%)	11(2.9%)			
HND	4(1.0%)	1(0.3%)	1(0.3%)	6(1.6%)			
Masters	1(0.3%)	0(0.0%)	0(0.0%)	1(0.3%)			

P- Value is greater than 0.05. Therefore there is no significant association between respondents' level of education and knowledge of malaria and insecticide treated nets.

SECTION C: - RESPONDENTS' PERCEPTION RELATING TO ITNs AND MALARIA

Table 4.18: Presents respondents' perception relating to insecticide treated nets.

More than a quarter (27.3%) of the respondents are of the view that malaria is not a serious disease. Similarly, (27.0%) of the respondents perceived that ITNs is just a material which cannot stop mosquito bite. Over half (57.1%) of the respondents also perceived that the use of ITNs is the most cost effective way of malaria prevention. Also, majority (66.8%) of the respondents are of the view that ITNs are easy to use.

Furthermore, (34.8%) of the respondents perceived that if a child licks or sucks ITNs, it will harm him / her and finally, almost half of the respondents (46.8%) reported that ITNs generate heat; so sleeping under a net makes people sweat.

(See Table 4.18 for details).

Table 4.18: Respondents' perception relating to insecticide treated nets.

N = 385

Respondents' perception	Agree (%)	Undecided (%)	Disagree (%)	Total
Malaria is not a serious disease	105(27.3)	42 (10.9)	238(61.8)	385
Non treated nets are better than treated nets	43(11.2)	48 (12.5)	294 (76.4)	385
ITN is just a material which cannot stop mosquito bite	104(27.0)	35(9.1)	246(63.9)	385
Use of ITNs is the most cost effective way of malaria prevention	220(57.1)	43(11.2)	122(31.7)	385
ITNs work better as window screens	157 (40.8)	63(16.4)	165(42.9)	385
ITNs are difficult to use	86(22.3)	47(12.2)	252(65.5)	385
ITNs are easy to use	257(66.8)	38(9.9)	90(23.4)	385
ITNs are useful for preventing mosquitoes only during the rainy season	93(24.2)	35(9.1)	257(66.8)	385
Bed size prevents one from using insecticide treated nets.	107(27.8)	45(11.7)	233(60.5)	385
Insecticide used in the ITNs is not safe for people; it gives people catarrh	93(24.2)	65(16.9)	227(59.0)	385
Malaria is a mild disease which does not require the use of ITNs use to prevent it	63(16.4)	46(11.9)	276(71.7)	385
Sleeping under ITNs is too dangerous / toxic for human health	60(15.6)	52(13.5)	273(70.9)	385
Mosquito nets can suffocate	68(17.7)	58(15.1)	259(67.3)	385

I am afraid of using bed nets because it resembles a structure put over dead bodies during burial.	59(15.3)	40(10.4)	286(74.3)	385
If a child licks or sucks ITNs, it will harm him/ her	134(34.8)	65(16.9)	186(48.3)	385
Sleeping under mosquito net is a waste of time	66(17.1)	48 (12.5)	271 (70.4)	385
Excessive ITNs use has side effects	70(18.2)	72 (18.7)	243 (63.1)	385
ITNs generate heat; so sleeping under a net makes people sweat.	180(46.8)	53 (13.8)	152 (39.5)	385

Table 4.19: Highlights of respondents' categories of perception

A majority (71.9%) of the respondents had favourable perception of insecticide treated net.

The perception of (24.9%) was unfavourable.

(See Table 4.19 for details)

Table 4.19: Distribution of respondents' perception scores

		N385
Category of perception score	**Number**	**(%)**
Favourable perception (10-18) points	277	(71.9)
Border half (9) points	12	(3.1)
Unfavourable perception (<9) points	96	(24.9)

SECTION D: - RESPONDENTS' PATTERN OF UTILIZATION OF ITNs

Table 4.20: Presents respondents' pattern of utilization of insecticide treated nets.

A majority (85.7%) of the respondents indicated that they own an insecticide treated net and the proportion of those who had ever used an insecticide treated net was (70.1%). The proportion of the respondents that spread their nets under a shade for 24 hours before hanging and using the nets was (72.2%).

A majority (67.0%) stated that they usually enjoy sleeping under an insecticide treated net. Similarly, the proportion of the respondents that sleep under ITNs every time though it produces heat was (61.3%) and a majority (69.9%) washed and mended the nets when necessary.

(See Table 4.20 for details)

Table 4.20: Respondents' utilization pattern of ITNs **N=385**

Characteristics	Yes (%)	No (%)	Not Sure (%)	Total
I own an insecticide treated net	330(85.7)	38 (9.9)	17 (4.4)	385
Ever use ITNs?	270(70.1)	89 (23.1)	26 (6.8)	385
Currently use ITNs?	248(64.4)	107(27.8)	30 (7.8)	385
ITNs in the house are only used by under-five children.	97 (25.2)	258(67.0)	30 (7.8)	385
I spread the nets under a shade for 24 hours before hanging	278(72.2)	84 (21.8)	23 (6.0)	385
I hang the net over the sleeping area by tying each string to something on the ceiling or the wall.	304(79.0)	60 (15.6)	21 (5.5)	385
Tucking the bottom edges of the nets under sleeping material will prevent mosquitoes from getting inside.	296(76.9)	61 (15.8)	28 (7.3)	385
I sleep under insecticide treated nets only during rainy season	120(31.2)	238(61.8)	27 (7.0)	385
I enjoy sleeping under ITNs every night.	258(67.0)	98 (25.5)	29 (7.5)	385
I prefer to hang the net without use	99 (25.7)	257(66.8)	29 (7.5)	385
I sleep under ITNs only when I have a guest	64 (16.6)	292(75.8)	29 (7.5)	385
I roll up the net during the day to prevent tearing and damage.	263(68.3)	97 (25.2)	25 (6.5)	385
I sleep under insecticide treated net every time though it produces heat	236(61.3)	120(31.2)	29 (7.5)	385
I washed and mended the net when necessary	269(69.9)	74 (19.2)	42 (10.9)	385

Table 4.21: Presents result on the type of mosquito net respondents had.

Majority of the respondents (71.7%) used mosquito net treated with chemical and can stay for 3-4 years before it is retreated.

Respondents who owned mosquito net which are not treated with chemicals and can be washed five times a year constituted (13.8%).

(See Table 4.21 for details)

Table 4.21: Type of mosquito net respondents were having

N385

Pattern of responses among respondents	Frequency	%
Mosquito net not treated with chemical	11	2.9
Mosquito net not treated with chemicals and can be washed 5 times a year	53	13.8
Mosquito net treated with chemical and can stay for 3-4 years before it is retreated	276	71.7
Not sure	45	11.7

Table 4.22: Presents respondents' suggestion regarding what should be done to improve ITNs used by mothers of under-fives:

Majority of the respondents (27.3%) said government should give nets to mothers regularly while, (19.5%) of the respondents said mothers should be educated on ITNs issues. The suggestion of (14.3%) of the respondents was that there should be more awareness creation on the use of ITNs. Very few (8.3%) of the respondents said that ITNs manufacturing companies should make ITNs suitable for children by reducing the insecticides in the nets.

(See Table 4.22 for details)

Table 4.22: Respondents' suggestion regarding what should be done to improve ITNs Use among mothers of under-fives **N = 385**

Pattern of responses among respondents	Frequency	%
Educate mothers	75	19.5
Make ITNs that do not generate heat	24	6.2
By putting ropes and nails inside nets	22	5.7
Give net to mothers regularly	105	27.3
Create more awareness on ITNs use	55	14.3
Encourage mothers to use ITNs	27	7.0
By imposing ITNs use on mothers	12	3.1
Make the ITNs suitable for children by reducing the insecticide	32	8.3
Make provision for retreating the nets regularly	33	8.6

SECTION E: - BARRIERS AND BENEFITS TO RESPONDENTS' UTILIZATION OF ITNs

Table 4.23: Presents results on barrier factors which have potentials for influencing or limiting the use of ITNs among mothers in the community.

The barriers which have potential for influencing or limiting the use of ITNs among mothers of under-fives are shown in table 4.23. The listed barrier factors that topped the list were that; ITNs are too hot during the dry season (47.8%). This was followed by the claim that ITNs do not allow in enough air (42.9%) and that it takes quite some time to tuck in the nets each night (34.5%). The challenge involved in hanging the nets (31.9%) was another potential barrier factor.

(See Table 4.23 for details)

Table 4.23: Barrier factors which have potentials for influencing or limiting the use of ITNs among mothers

N = 385

Barrier to Utilization of ITNs	Yes (%)	No (%)	Not Sure (%)	Total
Size of the room can serve as barrier to ITNs utilization	142 (36.9)	209 (54.3)	34 (8.8)	385
Nets are too hot in the dry season	184 (47.8)	153 (39.7)	48 (12.5)	385
It is difficult to get out of nets at night	94 (24.4)	254 (66.0)	37 (9.6)	385
It takes time to tuck in the nets each night	133 (34.5)	212 (55.1)	40 (10.4)	385
Nets do not allow in enough air	165 (42.9)	184 (47.8)	36 (9.4)	385
It's difficult to hang the nets over the bed	123 (31.9)	226 (58.7)	36 (9.4)	385
Nets occupy too much space	103 (26.8)	252 (65.5)	30 (7.8)	385
I feel uncomfortable sleeping under a net	87 (22.6)	268 (69.6)	30 (7.8)	385
Mosquito can still bite through the net	67 (17.4)	282 (73.2)	36 (9.4)	385
Only children need to use the net	62 (16.1)	289 (75.1)	34 (8.8)	385
ITNs cause skin rashes on children	79 (20.5)	227 (59.0)	79 (20.5)	385
Children don't enjoy their sleep under ITNs	81 (21.0)	264 (68.6)	40 (10.4)	385

Table 4.24: Presents the benefits enjoyed by the respondents from using insecticide treated nets.

The listed benefits included that majority of the respondents were no longer getting malaria often (90.9%), protection from insects (87.8%) and reduction of occurrences of malaria in children (87.5%).

(See Table 4.24 for details)

Table 4.24: Benefits enjoyed by the respondents from using insecticide treated nets

N = 385

Benefits of Utilization of ITNs	Yes (%)	No (%)	Not Sure (%)	Total
I don't get bitten by mosquitoes	321 (83.4)	47 (12.2)	17 (4.4)	385
I don't get malaria often	350 (90.9)	16 (4.2)	19 (4.9)	385
I don't get bothered by insects anytime I use ITNs	338 (87.8)	22 (5.7)	25 (6.5)	385
I sleep better anytime I use ITNs	322 (83.6)	39 (10.1)	24 (6.2)	385
Under-five children sleep better under ITNs	314 (81.6)	37 (9.6)	34 (8.8)	385
ITNs keep children warm all through the night	298 (77.4)	40 (10.4)	47 (12.2)	385
ITNs reduce malaria occurrences in children.	337 (87.5)	18 (4.7)	30 (7.8)	385
ITNs provide protection against other childhood diseases e.g. measles.	169 (43.9)	152 (39.5)	64 (16.6)	385
ITNs beautify my bed	272 (70.6)	77 (20.0)	36 (9.4)	385

CHAPTER FIVE

DISCUSSION

This descriptive cross-sectional study was conducted to learn about the knowledge, perception and utilization of Insecticide treated nets for the prevention of malaria among mothers of under-fives in Agbede-Adodo community, Ibadan. This chapter focuses on major findings of the study. It is organized into the following subsections: socio-demographic information; knowledge relating to malaria and insecticide treated nets, knowledge of causes of malaria, mode of malaria transmission, major symptoms of complicated and uncomplicated malaria, prevention and control of malaria and physical and socio-economic consequences of untreated malaria among under-fives and mothers; respondents' perceptions of ITNs as preventive measures against malaria; utilization pattern of ITNs; and barriers that can prevent respondents from ITNs use and benefits of using ITNs. Other sub-sections are the implications of the findings for health promotion and education, conclusion, recommendations.

5.1 Socio demographic characteristics of the respondents

The mean age of the respondents was 28.7±7.2 years; with the majority aged from 23-29 years (36.4%). This is so because the community is one of the inner core areas in Ibadan metropolis and majority (77.1%) were married. The demographics profile reveals that the respondents were in their active reproductive age.

The respondents' levels of education indicated that 35.5% of the respondents stopped schooling after completing secondary education, followed by respondents who completed primary education (22.9%); others had some secondary school education as most of them stopped schooling as a result of unwanted pregnancy. Consequently, almost two-thirds (60.3%) of the respondents were petty traders, followed closely by the unemployed mothers, fashion designers / hairdressers. The occupation of the respondents seems to have reflected their level of education.

Several studies have compared educational qualifications and ITNs use among mothers. In this study, there was no significant difference between respondents' level of education and knowledge of malaria and insecticide treated nets. This result was similar to the finding of a

study conducted by Ankomah et al (2012) to determine ITNs ownership and utilization among pregnant women in Nigeria; they reported that respondent's educational level was not significantly related to ITNs use. Although, Asa, (2012) reported in a study on demographic factors associated with insecticide treated nets use among Nigerian women; he noted that the use of ITNs decreases with increasing educational level and wealth quintile and that women without formal education were 1.75 times more likely to sleep under an ITNs than those with post-secondary school education, while those of the lowest wealth quintile were 2.32 times more likely to sleep under a net than those of the highest wealth quintile but the results of both studies cannot be compared because respondents were not similar; only 14.1% of respondents in this study have post-secondary school education. Almost all the respondents (88.3%) were Yoruba and this reflects the predominance of this ethnic group in the study area.

5.2 Knowledge about malaria and insecticide treated nets.

Most (99.2%) respondents had good knowledge of the protective nature of insecticide treated nets; this was also recorded by Oladokun and Adesina, (2011) in a study conducted among pregnant and newly delivered mothers in Ibadan. This was due to awareness and distribution of ITNs to all households in the community but only (12.5%) of the respondents had good knowledge about ITNs retreatment. Also, all respondents knew that malaria infection may be because malaria is endemic in the setting; malaria is as old as man. Majority (86.2%) of the study respondents reported malaria as a major cause of death among the under-fives children and a serious disease among pregnant women; it revealed that majority had correct knowledge of the most susceptible group to malaria. Many study respondents were also knowledgeable about the major symptoms of uncomplicated and severe/ complicated malaria in under-fives. The high level of knowledge regarding the causes and symptoms of malaria as well as knowledge of persons among whom malaria is most serious is useful for the design of educational messages to promote sustained use of ITNs. Similarly, high malaria related knowledge was recorded in a study conducted among women with children under- five years in rural Ethiopia by Wakgari and Ahmed, (2009).

The result of the study also revealed that many respondents reported that malaria is not only caused by mosquito bite alone but a combination of many factors such as; eating too much

oily food, walking in the sun/ excessive heat can cause malaria, eating cold foods, living near stagnant water, drinking unboiled water, presence of waste / exposure to environmental conditions, poor diet, eating starchy foods, and sleeping in a crowded room. These responses reflect the misconceptions among the respondents relating to malaria. Studies conducted in Ghana also reported that malaria is presumed to be caused as a result excessive heat and eating oily and starchy foods. In Ethiopia, malaria is also believed to be caused by poor diet and bad environmental conditions (Wakgari and Ahmed, 2009).

On malaria transmission; results show that respondents have poor knowledge as majority gave incorrect mode of transmission. Poor knowledge of malaria transmission can adversely affect the initiation of the preventive measures or the adoption of treatment services recommended by the health care facilities.

Majority have correct knowledge of mosquito prevention with (86.8%) and (85.2%) reporting that ITNs and mosquito avoidance can prevent malaria respectively. Others use other methods like using insecticide spray, use of mosquito coil and keeping house surrounding free of anything that can hold water and some herbs and roots. This was also recorded by Olukemi et al (2011) in a study conducted to know the utilization of preventive measures during pregnancy and birth outcomes in Ibadan, which concluded that most (95.6%) mothers used one or more malaria control measures and the most commonly used vector control measures were ITNs, IPTs, insecticide spray and herbal medications. It is imperative to note that success of malaria control in children and pregnant women depends on the understanding of the local scocio-cultural factors affecting women's perceptions of causes and mode of transmission of the disease, practices of malaria prevention measures.

The study respondents were knowledgeable about the severity of malaria and the physical, socio-economic consequences of untreated malaria among under-five children and mothers; most of the respondents stated correctly that untreated malaria could lead to maternal mortality, low birth weight, infant mortality, convulsion, cerebral malaria and anaemia, wastage of time in hospital, spending money meant for other things on treatment and reduced performance at work and home in nursing mothers. WHO (2001) revealed three principal ways in which malaria can contribute to death in young children. First, an overwhelming acute infection, which frequently presents as seizures or coma (cerebral malaria), may kill a child directly and quickly. Second, repeated malaria infections contribute to the development of severe anaemia, which substantially increases the risk of death. Third, low birth weight –

frequently the consequence of malaria infection in pregnant women is the major risk factor for death in the first month of life. In addition, repeated malaria infections make young children more susceptible to other common childhood illnesses, such as diarrhoea and respiratory infections, and thus contribute indirectly to mortality. Therefore, prevention is better and cheaper than cure.

5.3 Perception of Insecticide treated nets as a preventive measure against Malaria

The perception of ITNs as a preventive measure against malaria may be as a result of the contributions of government and other charity organizations in the distribution of nets in communities in Nigeria including Agbede-Adodo to support the 6th Millennium Development Goal (MDGs). The goal is aimed at halting and reversing the incidence of malaria and other major childhood disease by 2015, or increase media attention that ITNs have received in recent times. The perception of some respondents that malaria is not a serious disease is a source of concern. This was also reported by Pulford et al, (2012) who revealed that respondents' indifference to ITNs use appeared to be rooted in lack of fear of malaria infection cultivated through life experiences.

Over half of the respondents perceived use of ITNs as the most cost effective way of malaria prevention and results show that respondents perceived ITNs as easy to use preventive measures with a little over one-third (34.8%) of the respondents expressing their fears over child licking or sucking ITNs and the harm it could cause and almost half of the respondents reported that ITNs generate heat; so sleeping under a net makes people sweat. This perception might be as a result of not counselling mothers enough by health workers and individual belief because people's perception and understanding about perceived importance / gravity of a disease will have strong implication on ITNs utilization.

5.4. Pattern of Utilization of ITNs

The study revealed that almost all respondents (85.7%) had an insecticide treated net but only (64.4%) reportedly slept under ITNs night before the interview and 25.7% confirmed that they prefer to hang the net without using it. This implies that ITNs use lagged well behind ITNs ownership; this was similar to the findings of the study conducted by Ankomah et al,

(2012) which similarly revealed that ITNs use lagged behind ITNs ownership. In a quantitative study investigating the reasons why some Papua New Guineans who own ITNs choose not to use them by (Pulford et al, 2012) where multiple impediments to regular ITNs use were identified and grouped into interrelated categories of net- environment- human factors and indifference emerged as the most influential impediments towards regular net use presenting as a general attitudinal context.

Majority of the respondents had correct knowledge of what to do before using the nets and nets maintenance; such as: spreading the net under a shade for 24 hours before use, rolling up the nets during the day to prevent tearing and damage and washing and mending the nets when necessary. The pattern of utilization of ITNs can change only when people are made to understand that many lives could be saved if all children under –five and pregnant women slept under Long-lasting insecticide treated mosquito nets (LLINs). It is that simple and cost-effective (NMCP 2009- 2013).

5.5. Barriers and Benefits to ITN utilization.

The study revealed some of the factors which hindered respondents from using ITNs. One of these is the perception that ITNs are too hot to use during the dry season, another is the perception that the net does not allow in enough air, and the third is that the size of a room could be a factor. Other impediments are; it takes time to tuck in nets and difficulty experienced in hanging the nets. This may be as a result of habits formed over time and because houses in the community are not well structured, spaced and poorly ventilated.

The study also revealed some benefits derived by majority of the respondents from using ITNs as follows; (83.5%) and (87.8%) reported that they don't get bitten / bothered by mosquitoes respectively and (90.9%) reported they don't get malaria as often. Other benefits derived by respondents include: reduction in malaria occurrences in children sleeping better under ITNs, and ITNs keep the family warm all through the night. Maybe if community members take it upon themselves to spread the news of ITNs effectiveness, utilization rate might change thereby improving the health of the people. It is believed that if respondents are properly informed and could weigh the barrier and benefit of ITNs they will likely settle for ITNs use but the main impediments are attitudinal and lack of fear of malaria (Pulford et al, 2012).

5.6: Implication for Health Promotion and Education

The findings of this study may provide basis for educating healthcare workers, nursing mothers, and government policy makers on areas they need to work on to ensure people take charge over and improve their health.

It may provide useful data for government and other stakeholders in developing more effective Information Education Communication / Behavioural Change Communication (IEC/BCC) strategy designed to channel appropriate information to appropriate target audience to change some community misconception relating to causes of malaria and mode of malaria transmission to increase ITNs utilization among mothers of under-fives in all communities in Nigeria.

Health promotion as defined by Ottawa charter as the process of enabling people to increase their health and three basic strategies for advancing health promotion include the following: Advocacy for health; combine individual and social actions designed to gain political commitment and policy support; enabling all people to achieve their full potential and mediating between different interests in society in pursuit of health.

It is concerned with reinforcement and change of knowledge, attitude and behaviour of people through effective communication of fact based information, with the intention of helping them to ensure an optimum wellness. Health education is therefore an avenue for which the gap between general knowledge of causes, mode of transmission, prevention and control of malaria, perception of ITNs effectiveness in malaria prevention and utilization of ITNs could be bridged in communities.

The use of mass media in the dissemination of information cannot be over emphasized. Mass media such as Newspaper, Magazine, Television, Radio and Billboards adverts, Hand bills with malaria education can be used to reach the mothers of under-fives and intending mothers on causes, mode of transmission, prevention and control of malaria, recognizing signs and symptoms of malaria in under-five children, consequences of untreated malaria, cost effectiveness of ITNs as one of malaria prevention method and to change perception that malaria is not a serious disease.

5.7 Conclusion

In conclusion, malaria is caused by a parasite called plasmodium, which is transmitted via bites of infected female anopheles mosquito. Malaria is a public health problem in Nigeria where it accounts for more cases and death than any other country in the world. Malaria is a risk for 97% of Nigerian population. The most susceptible groups to malaria are: children from age 0-59 months and pregnant women because of insufficient or reduced immunity. Roll back malaria was initiated in1998 and the main purpose of the program was to reduce the burden of malaria in endemic countries. To achieve this goal, Insecticide treated nets were introduced in 2001 with some laid down targets. An insecticide treated net is a mosquito net that repels, disables and kills mosquitoes coming in contact with insecticides on the netting material. ITNs have become one of the major tools in the global fight against the burden of malaria. ITNs reduce the number of clinical malaria episodes by roughly 50% and improve child survival by nearly a fifth (Lengeler, 2000).

This study has identified key issues constituting impediments in the cogwheels of progress of ITNs utilization in the community which are; poor knowledge of causes of malaria and its mode of transmission, belief that nets are too hot to use during the dry season and that nets do not allow in enough air. Therefore, it is imperative to note that success of malaria control in children and pregnant women depends on the understanding of the local socio-cultural factors affecting women's perceptions of causes and mode of transmission of the disease, practices of malaria prevention measures.

Finally ITNs use lagged behind ITNs ownership and this seems to suggest that the current mass distribution and stand-alone program of ITNs at antenatal facilities and community levels may not necessarily lead to use unless it is accompanied by behaviour change interventions that address the community level perception, misconception and positively position ITNs as an effective prevention device to prevent malaria since prevention is better and cheaper than cure.

5.8 Recommendations

The following recommendations are made based on the results of the study.

1. Training should be conducted in communities to educate mothers on the causes, mode of transmission, prevention and control of malaria.

2. Nets should be distributed constantly in communities by the government, and non-governmental organizations to ensure universal access, replace old and worn out nets, and also encourage net use among mothers.

3. Training on ITNs implementation should be conducted in communities for mothers to educate them on proper usage of ITNs. These should cover areas like: how to handle the net before use, hanging the net and net maintenance which includes; washing and mending the nets when necessary to maintain the insecticide embedded in the net for effectiveness.

4. Developing Information Education Communication material (IEC), Awareness campaign on mass media e.g. television, jingles on radio which focus more on correcting wrong perceptions about ITNs and positioning ITNs as the most cost effective malaria preventive measure will increase ITNs use in communities.

5. Proper monitoring of ITNs utilization should be put in place in communities' e.g. periodic house – to –house visit to ensure adherence to ITNs use and reduce malaria among vulnerable groups in our society.

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QUESTIONNAIRE

KNOWLEDGE, PERCEPTION AND UTILIZATION OF INSECTICIDE TREATED NET FOR THE PREVENTION OF MALARIA AMONG MOTHERS OF UNDER-FIVE IN AGBEDE-ADODO COMMUNITY, IBADAN.

Dear respondents,

I am Mrs. Olufade a post graduate student of the department of Health Promotion and Education, Faculty of Public Health, University of Ibadan. You have been selected to partake in the research on Knowledge, Perception and Utilization of Insecticide treated nets (ITNs)for the prevention of Malaria among Mothers of under-five in Agbede-adodo community, Ibadan. Your consent to participate and give full, honest and correct information will be appreciated and kept confidential.

Thanks for your cooperation

Date……..Registration number ……

SECTION A: SOCIO-DEMOGRAPHIC VARIABLES

Instruction:

For most of the questions in this section, please tick (√) the appropriate alternative response(s); in some cases however simply supply the needed information in the blank spaces provided

1. **Marital Status:** 1. Single ☐ 2. Married ☐ 3. Divorced ☐
   4. Widowed ☐ 5. Separated ☐
2. **How many under-five children do you have**?
   ……
3. **Religion**: 1. Christianity ☐ 2. Islam 3. Traditional African Religion ☐ 4. Others (specify) …….
4. **Your Age as at last birthday (in years)**…….
5. **Ethnic group**: 1. Yoruba ☐ 2. Igbo ☐ 3. Hausa ☐
   4. Others (specify) ……..

6. **Highest educational qualification:** 1. No formal education ☐ 2. Some Primary School ☐ 3. Primary Completed 4. Some Secondary school ☐ 5. Secondary School Completed ☐ 6. NCE ☐ 7. OND ☐ 8. Bachelor degree ☐ 9. HND ☐ 10. Masters ☐ 11. PhD ☐
7. **Occupation**: 1. Unemployed ☐ 2. Petty trader/ business ☐ 3. Civil Servant ☐ 4. Others (specify) ……
8. **Type of housing**: 1. One- room apartment ☐ 2. Two- room apartment ☐ 3.face- me- I- face you apartment ☐ 4.Three bedroom flat ☐ 5. Family house ☐ 6. Others Specify……
9. How many children sleep with you in the same room (specify)……
10. How many children sleep with you on the same bed (specify).....

SECTION B: Knowledge related to malaria and Insecticide treated nets.

11. What causes malaria in under-five children? List as many options as possible…… ……
12. How does malaria spread among under-five children?..... .....
13. What are the symptoms for knowing that an under-five child could be having malaria?
    1. High body temperature ☐ 2. Convulsion ☐ 3. Cough ☐
    4. Chills (Cold / Shivering) ☐ 5.Others specify ……
14. Which of the following groups of people readily get malaria? 1. Under-five children ☐ 2. Sickle cell anaemia persons ☐ 3. Pregnant women ☐ 4. Young persons aged 15-24 years ☐ 5. Adults aged 25 years and above. ☐

15. What is an insecticide treated net?

……

……

16. How long can an insecticide treated net stay effective before retreating?

……

17. **Instruction:** Table 1 contains ITNs and Malaria related questions. For each, tick (√) **"True" or "False"**. If not certain, please tick (√) **"Not Sure"**.

Table 1

S/N	**Knowledge related to Malaria and Insecticide Treated Nets**	**Tick (√) as appropriately**		
		True	**False**	**Not Sure**
17.1	Malaria is a major cause of death among the under-fives			
17.2	Malaria is especially dangerous for children under five years of age.			
17.3	Consistent use of Insecticide treated nets can prevent malaria occurrences			
17.4	Malaria is not a serious health problem among pregnant women.			
17.5	ITNs are very safe for people to use.			
17.6	ITNs can be washed up to 5 times in a year.			
17.7	ITNs can prevent children from having malaria			
17.8	The new ITNs do not need retreating with insecticides.			
17.9	ITNs should never be washed.			

18. **Instruction**: Table 2 contains list of causes of Malaria. For each, tick whether (√) **"True" or "False"** if not certain tick (√) **"Not Sure"**.

Table 2

S/N	**Causes of Malaria**	**Tick (√) whether it can cause malaria or not**		
		True	**False**	**Not Sure**
18.1	Malaria is caused by a parasite called Plasmodium			

18.2	Eating too much oily food can cause malaria			
18.3	Walking in the sun / excessive heat can cause malaria			
18.4	Malaria can be caused by eating cold foods			
18.5	Sleeping in overcrowded rooms can cause malaria			
18.6	Living near stagnant water can cause malaria.			
18.7	Malaria can be caused by drinking unboiled water			
18.8	Malaria can be caused by presence of waste/exposure to environmental conditions.			
18.9	Malaria is caused by poor diet			
18.10	Eating starchy food causes malaria.			
18.11	It is mosquitobite that really causes malaria.			

19. **Instruction**: Table 3 contains list of ways by which malaria can be transmitted. For each way,tick whether (√) **"True" or "False"**whether it can facilitate the transmission of malaria or not. If not certain, please tick (√)**"Not Sure"**.

Table 3

S/N	Mode of Malaria Transmission	True	False	Not Sure
19.1	Malaria can only be transmitted through the bite of infected female anopheles mosquito			
19.2	Malaria cannot be transmitted from man to man			
19.3	Malaria can be contracted by sleeping beside someone who has malaria.			
19.4	There are other mosquitoes that bite but do not spread malaria			
19.5	Malaria can be contracted through shaking of hands			

20. **Instruction**: Table 4 contains list of symptoms. For each, tick (√) **"YES"** if it is a major symptom of uncomplicated malaria, tick(√) "**NO**" if it is not a major symptom. If not certain, tick(√) **"Not Sure"**.

Table 4

S/N	**Major Symptoms of Uncomplicated Malaria**	**Yes**	**No**	**Not Sure**
20.1	Diarrhea			
20.2	Chills			
20.3	Nausea			
20.4	Vomiting			
20.5	Fever i.e. High body temperature			
20.6	Weight loss			
20.7	Loss of appetite			
20.8	General body ache/ Headache.			
20.9	Inability to work and perform daily house chores			
20.10	Change in the colour of eyes			
20.11	Perspiration			
20.12	Loss of kidney functions			

21. **Instruction:** Table 5 contains list of symptoms. For each, tick (√) **"YES"** if it is a major symptom of severe or complicated malaria, tick (√) **"NO"** if it is not a major symptom. If not certain, tick (√) **"Not Sure"**.

Table 5

S/N	**Major Symptomsof Severe or Complicated Malaria**	**Yes**	**No**	**Not Sure**
21.1	High body temperature			
21.2	Diarrhea			
21.3	Nausea			
21.4	Convulsion			
21.5	Drowsiness			
21.6	Gaining more weight			
21.7	Eating too much			
21.8	General body ache			

21.9	Diminished urine output/ dark or coloured urine			
21.10	Yellowish of the eyes			
21.11	Perspiration			
21.12	Loss of kidney functions			

22. **Instruction**: Table 6 contains various ways of prevention and control of malaria. For each ways, tick (√) **"Yes" or "No"**in respect of whether it can help prevent the transmission of malaria or not; if not certain tick (√) **"Not Sure"**.

Table 6

S/N	**Prevention and control of malaria**	**Yes**	**No**	**Not Sure**
22.1	Malaria can be prevented with the use of insecticide treated net			
22.2	Malaria can be prevented by avoiding being bitten by mosquito			
22.3	Malaria can be prevented by vaccine alone			
22.4	Taking preventive medicine can prevent malaria			
22.5	Malaria can be prevented by keeping the house surrounding free of anything that can hold water.			
22.6	Use of mosquito coils can prevent mosquito breeding.			
22.7	Using insecticide spray can reduce the numbersof mosquito in the house.			
22.8	One of the best ways to protect under-five children from malaria is to use insecticidal treated net at night			

23. What are the other ways of preventing malaria?

……

……

……

24. **Instruction:** Table 7 contains list of physical and socio-economic consequences of untreated malaria among under- five (5) children and mothers. For each, tick (√) **"True" or "False"** if not certain tick (√) **"Don't know"**.

Table 7

S/N	**Physical and socio-economic consequences of Untreated malaria among Under Five Children and Mothers**	**True**	**False**	**Don't know**
24.1	Malaria can result in low birth weight in new born			
24.2	Malaria can cause Febrile convulsion in under-five children.			
24.3	Untreated malaria can affects children brain (cerebral malaria)			
24.4	Untreated malaria can lead to death of infants			
24.5	Untreated malaria is a leading cause of maternal death			
24.6	Malaria result in spending money meant for other things on treatment			
24.7	Untreated malaria can cause severe anemia in children.			
24.8	Malaria can lead to wastage of time in the hospital			
24.9	Malaria leads to reduced performance at work and home in nursing mothers			

SECTION C: Perception on the use of ITNs as preventive measures against malaria

25. **Instruction:** Table 8 contains a list of statements related to ITN use as a preventive measure against Malaria. For each statement, please tick in the appropriate box the extent to which it is in line with your opinion or belief. Agree **(A)**, Undecided/mind not made up **(UD)**, Disagree **(D)**.

Table 8

S/N	**Perception related statements**	**Tick (√)**		
		A	**UD**	**D**
25.1	Malaria is not a serious disease			
25.2	Non treated nets are better than treated nets			
25.3	ITN cannot stop mosquito bite.			
25.4	Use of ITNs is the most cost effective way of malaria prevention.			
25.5	ITNs work better as window screens.			
25.6	ITNs are difficult to use			
25.7	ITNs are easy to use.			
25.8	ITNs are useful for preventing mosquitoes only during the rainy season.			
25.9	Bed size prevents one from using insecticide treated nets.			
25.10	Insecticide used in the ITNs is not safe for people; it gives people catarrh.			
25.11	Malaria is a mild disease which does not require the use of ITNs use to prevent it.			
25.12	Sleeping under ITNs is too dangerous / toxic for human health.			
25.13	Mosquito nets can suffocate.			
25.14	I am afraid of using bed nets because it resembles a structure put over dead bodies during burial.			
25.15	If a child licks or sucks ITNs, it will not harm him / her.			

25.16	Sleeping under mosquito net is a waste of time.			
25.17	Excessive ITNs use has side effects.			
25.18	ITNs generate heat; so sleeping under a net makes people sweat.			

SECTION D: - Pattern of utilization of ITNs

26. **Instruction:** Table 9 contains pattern of utilization of ITNs. For each tick the appropriate option. Tick (√) "**Yes" or tick (√) "No"**. If not certain, tick (√) **"Not Sure"**.

Table 9

S/N	Utilization patterns	Tick (√)		
		Yes	**No**	**Not Sure**
26.1	I own an insecticide treated net			
26.2	Ever use ITNs?			
26.3	Currently use ITNs?			
26.4	ITNs in the house are only used by under-five children.			
26.5	I spread the nets under a shade for 24 hours before hanging			
26.6	I hang the net over the sleeping area by tying each string to something on the ceiling or the wall.			
26.7	Tucking the bottom edges of the nets under sleeping material will prevent mosquitoes from getting inside.			
26.8	I sleep under insecticide treated nets only during rainy season			
26.9	I enjoy sleeping under ITNs every night.			
26.10	I prefer to hang the net without use			
26.11	I sleep under ITNs only when I have a guest			
26.12	I roll up the nets during the day to prevent tearing and damage.			

26.13	I sleep under insecticide treated net every time though it produces heat			
26.14	I washed and mend the nets when necessary			

27. Which of the following type of mosquito net do you have?
    (a) Mosquito net not treated with chemical ☐
    (b) Mosquito net not treatedwith chemicals and can be washed 5 times a year. ☐
    (c) Mosquito net treated with chemical and can stay for 3-4 years before it is retreated. ☐

28. From your point of view what do you think can be done to improve ITNs utilization among mothers of under-fives? (Provide as many options as possible).

……
……
……
……

SECTION E: - Barrierfactors which have potentials for influencing or limiting the use of ITNs among mothers in the community.

29. Table 10 contains list ofbarrier factors. For each, tick (√) **"Yes" or "No"** in respect of barriers that prevents you from using ITNs. If not certain, tick (√) **"Not Sure"**

Table 10

S/N	**Barrier to Utilization of ITNs**	Tick (√)		
		Yes	**No**	**Not Sure**
29.1	Size of a room can serve as a barrier to ITNs utilization.			
29.2	Nets are too hot in dry season			
29.3	It is difficult to get out of net at night			
29.4	It takes time to tuck in the nets each night			
29.5	Nets does not allow in enough air			

29.6	It's difficult to hang the nets over the bed			
29.7	Nets occupies too much space			
29.8	I feel uncomfortable sleeping under a net			
29.9	Mosquito can still bite through the net			
29.10	Only children needs to use net			
29.11	ITNs causes skin rashes on children			
29.12	Children don t enjoy their sleep under ITNs.			

30a.Instruction: Table 11 contains benefits in utilization of insecticide treated nets.Which of the benefit in table 11 do you enjoy by using ITNs For each, tick (√) "**Yes" or "No"** whether it is perceived as benefit or not; if not certain tick (√) **"Not Sure"**.

Table 11

S/N	**Benefits of Utilization of ITNs**	**Yes**	**No**	**Not Sure**
30.1	I don't get bitten by mosquitoes			
30.2	I don't get malaria as often			
30.3	I don't get bothered by insects anytime I use ITNs			
30.4	I sleep better anytime I use ITNs			
30.5	Under-five children sleep better under ITNs			
30.6	ITNs keeps children warm all through the night			
30.7	ITNs reduce malaria occurrences in children.			
30.8	ITNs is protection against other childhood disease e.g. measles.			
30.9	ITNs beautifies my bed			

30b. Others (specify)

……

THANK YOU VERY MUCH FOR ANSWERING THE QUESTIONS PATIENTLY