KNOWLEDGE, PERCEPTION, EXPERIENCES AND PRACTICES RELATING TO MALARIA AND INSECTICIDE-TREATED NETS AMONG PREGNANT WOMEN IN BADAGRY LOCAL GOVERNMENT AREA, LAGOS STATE, NIGERIA

BY

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A DISSERTATION SUBMITTED TO THE DEPARTMENT OF HEALTH PROMOTION AND EDUCATION, FACULTY OF PUBLIC HEALTH, COLLEGE OF MEDICINE, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

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DEDICATION

I dedicate this work to the Almighty God, the creator of heaven and earth, it is also dedicated to my wife Mrs. Olubunmi Juliana Balogun, for believing so much in me, and to my parents Pa Chief Asoji- Balogun and Mrs. Wedowe Balogun, for their day to day prayers for me.

ACKNOWLEDGEMENT

The pathway to success is always known to be "rugged" it is how one sees or looks upon life that makes the difference. I give glory to God Almighty for His grace and journey mercies over me. I am much grateful to my supervisor, Dr. Frederick Oshinaike, who despite his busy schedule, had time to look through my work and made useful amendments, offered constructive suggestions and provided support and excellent goal oriented assistance to make this research a reality.

I am immensely grateful to Dr E.O. Oyewole my "mentor" for his encouragement, constant monitoring and advise which assisted me in the completion of the research work. I cannot but remember my other lecturers, Dr. Femi Dipeolu and Dr M. A. Titiloye for their encouragement. My gratitude goes to all members of the MPH (Health Education &Promotion) class of 2011/2012 set. The commitment and dyoamism among this set cannot be over-estimated, I appreciate them all. I also appreciate the support and words of encouragement I received from all my colleagues at College of Health Technology, Yaba, Lagos.

My immense gratitude goes to my dear wife Mrs. Olubunmi Julianah Balogun who often reminded me that it is better to do something imperfectly than not doing anything at all. I thank her for being there for me. I also say a big thank you to my children: Dr. Senami Balogun, Ayodeji Balogun, Sola Olabanjo, Sewedo and Sewenu Balogun for their support. I acknowledge the support provided by the following friends, Mr. Solomon Hunwi, Mr. Izang, my roommate, Toriola Yusuf, Samuel Adanu, Tosin Agborume and Ben Adagba.

Mr. Mumuni Adejumo who took his time to work on the statistical aspects of the research, I am highly indebted to him. I registered my gratitude to Mr. Lanre Quadri, for his wonderful secretarial / word processing assistance.

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ABSTRACT

Malaria remains a major public health problem among Pregnant Women (PW) in Sub-Sahara Africa. Prevention of the disease will reduce the disease burden with improved quality of life. Insecticide Treated Net (ITN) has been successfully used in homes to prevent mosquito bite which leads to malaria. However, its uptake by pregnant women will depend on their knowledge of malaria and perception of efficacy of ITN to prevent the illness. This study was therefore, designed to investigate malaria related knowledge and ITN use among PW in Badagry Local Government Area (LGA), Lagos State, Nigeria

The study was a descriptive cross-sectional survey, which involved the use of a two-stage sampling technique to select 412 PW attending Primary Health Care Facilities (PHCF) in the LGA. All the 11 PHCF in the LGA, which provide ANC services were purposively selected. Proportionate method was then used to determine the number of respondents selected from the facilities based on ratio of patient load. Systematic random sampling was used to select consenting respondents in each facility using registers of clinic attendees as sampling frames. Data were collected using a validated semi-structured interviewer-administered questionnaire. The content of the instrument included questions on respondents' socio- demographic characteristics, 23-point malaria and ITN knowledge scale, ITN use, ITN-related perception and malaria illness experiences. Knowledge scores ≤12 and >12 were categorized as poor and good, respectively. Descriptive statistics and students't-test were used for data analysis at α 0.05.

Respondents' age was 29.3±5.0 years, 95.1% were married and 41.9% had tertiary education. Respondents' knowledge of malaria and ITN was 10.2±2.9 and 78.6% had poor knowledge. Only 3.3% could correctly list plasmodium as the causative agent of malaria. The correctly mentioned consequences of malaria in pregnancy included low birth weight (82.0%), abortion (50.1%), and anaemia (17.7%). Malaria was perceived by 85.4% to be a serious illness, while "agbo" (an herbal concoction) was perceived by 11.7% PW to be a better medication to prevent malaria compared to ITN. Some (10.4%) perceived ITN to have a chocking effect. Majority (81.8%) owned ITN at the time of the survey. However, regular ITN users consituted 56.6%, while 53.9% used it during the night preceding the study. Majority (76.0%) experienced malaria at least once during the current pregnancy. Knowledge score among respondents with no formal education was

with formal education. Knowledge score of respondents who owned ITN (11.1± 3.0) was significantly higher than the score (9.9±3.4) obtained by those who had none.

Knowledge of malaria and uptakeof Insecticide treated nets among the pregnant women in Badagry were poor. The main factor which influenced the use of insecticide treated net among them was ownership of insecticide treated net. Public enlightenment, clinic based patient education, availability of nets to pregnant women and counseling services are recommended to tackle these challenges.

Keywords: Malaria in pregnancy, Malaria- related knowledge, Insecticide-treated net, Perceived malaria vulnerability

Word count: 474

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CERTIFICATION

I certify that this project was carried out by BALOGUN, Theophilus Semako in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan under my supervision.

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IPT	-	Intermittent Preventive Therapy
ITN	-	Insecticide Treated Net
BLGA	-	Badagry Local Government Area
SMCP	-	State Malaria Control Programme
MDG	-	Millennium Development Goal
WHO	-	World Health Organisation
ANC	-	Antenatal Clinic
PHC	-	Primary Health Centre
RBM	-	Roll Back Malaria
IVM	-	Integrated Vector Management
VBD	-	Vector Borne Diseases
ITC	-	Insecticide Treated Curtains
ITS	-	Insecticide Treated Screening
MOH	-	Ministry of Health
PHCF	-	Primary Health Care Facilities
NMCP	-	National Malaria Control Programme
UNICEF	-	United Nations Children Emergency Fund
HBM	-	Health Believe Model
PW	-	Pregnant Women
NDHS	-	National Demographic Health System
FMOH	-	Federal Ministry of Health
NFLV	-	Nigerian French Language Village
ASCON	-	Administrative Staff College of Nigeria
NPC	-	National Population Commission
IRS	-	Indoor Residual Spray

OPERATIONAL DEFINITIONS OF TERMS

Pregnant Women: This refers to women between 18-45 years carrying unborn foetus at any gestational age.

Knowledge: Is the ability of the pregnant women to have understanding about detailed information on malaria and insecticide treated net

Health Care Facility: This refers to a place where skilled attendants and professional medical personnel provide medical and related services aimed at maintaining good health.

Maternal Morality: This is the death of a women between 18 – 45 years in pregnancy or within 42 days after termination of pregnancy.

Morbidity Rate: This is the sickness rate of a woman in a gestational period.

Ante Natal Care: This is a service or care given to mother and partner during pregnancy.

Perception: This refers to conscious understanding relating to malaria and ITN in the study.

Practices: In this study, it refers to an activity to improve skill.

CHAPTER ONE

INTRODUCTION

Background of the Study

Malaria in pregnancy leads to a variety of adverse health effects in pregnant women; this include the risk of adverse pregnancy outcome for the mother (WHO, 2012). It also adversely affects the foetus and the new born (Gross,Alba, Schellenberg, Kessy, Mayumana and Obirist; 2011). The specific adverse effects of malaria include maternal anaemia, still birth, low weight and intra-uterine growth restriction (Dessai, Kuile, Koster, Mc Gready, Asamba, Brabil, and Newman 2011). It has been revealed that in Nigeria, malaria is responsible for 30% childhood mortality, 11% maternal mortality and over 60% out-patient visits to health facilities (FMOH/NMCP, 2012).The World Health Organizationhas recommendedthe use of Insecticide Treated Nets (ITNs) as a measure for reducing the adverse effects of malaria in pregnancy (WHO, 2012) while the Abuja declaration of African Heads of states in 2000 aimed at providing at least 80% of pregnant women with ITNs by the year 2005. It has been reported that in Nigeria 5% of pregnant women were using ITN as at 2009 (NPC, 2009).

The factors which indirectly affect ITN use include, poor knowledge of the technology(Singh, Desai and Eiselle 2013), poor knowledge of the link between malaria and mosquito net and poor knowledge of its use (Fuge, Samuel, Ayanto, Fischa, and Gurmamo 2015). Insecticide treated net is a key prevention tool that has been found to reduce malaria cases and malaria induced death among pregnant women.

Household ownership of insecticide treated nets has increased greatly however there are some factors that influence its maximum utilization (Fuge, Samuel, Ayanto, Fischa and Gurmamo 2015).

In Lagos state, the main delivery system of ITN is through Ante – Natalcare (ANC) facilities; pregnant women who attend ANC facilities; are given nets free of charge. However free distribution of nets may not translate to use. Over 4.2 million ITN were distributed in Lagos State in May 2011. Out of this, Badagry Local Government Area had over 359, 000 nets. Insecticide treated nets coverage of about 99.4% was recorded (SMCP, 2012), in the State. The ITN use promotion targeted household all over the LGA. The pattern of use of the distributed nets in Badagry LGA are yet to be systematically investigated. Many reasons are

often given by people including pregnant women for non-use or poor use of ITNs. These reasons include fear of sleeping under it (Pulford, Hatzel, Bryant, Siba and Mueller, 2011), the heat it generates (Pulford et al; 2011), the inconveniences associated with the use of ITN (Kareera, 2015) and the skill for hanging an Insecticide Treated Net (Pulford et al 2012); (Laura, Sangare, Weiss, Paula, Brentlinger, Barbra and Richardson, 2012). There is a recognized need to scale up coverage of ITNs and other proven effective intervention in order to reach the Millennium Development Goal (MDG)of reducing child mortality by 50% by 2015 and beyond (Bryce, Lines and Rolland 2003). A recent review of community acceptance of bed nets has shown that various factors influence the use of bed nets and these include cultural, behavioral and demographic factors, accessibility, gender relations and seasonality of malaria (Luknian, Omokanye, Rakiya, Abdul, and Olatinwo, 2012). The other specific factors include education, household, income, socio-economic status, malaria and ITN knowledge and urban residence.The use of ITNs is very effective in the control of malaria in pregnancy, and it is estimated to be twice as effective as the untreated nets (Ugwu et al; 2015). Some researchers have noted that women who used ITNs had significantly fewer deliveryproblems associated with malariaand babies with higher mean birth weight than women who did not use ITNs.

Despite the associated benefits of ITN use, same community practices remain significant obstacles to achieving optimal net coverage. For example, a study in Kenya reviewed that the youngest children in a household were given the lowest priority for bed net use despite being a higher risk population. (Widmar, 2009). In Nigeria, a study revealed that female education has been identified as an important child survival strategy and is probably the single most important factor that determines the acceptance and utilization of health practices in low resource settings (Runsewe, Iyaniwura, and Sotimchin, 2012), including the adoption of technologies such ITN. Previous studies conducted in Lagos State by National Malaria Control Programme, Abuja relating to ITN use among pregnant women, showed that despite the free distribution of ITNs in the state in 2011,the utilization rate was still 37% among pregnant women (FMOH/NMCP; 2015). The adoption of an innovation is influenced by several factors including knowledge, perception and previous experiences. This also applies to the adoption and sustained use of ITNs. However, the extent to which these predisposing factors influence the utilization of ITN use are yet to be well investigated in Badagry Local Government Area. The need to do this constitutes the major focus of this study.

Statement of the Problem

Malaria is a major problem in the tropical world including Nigeria which is responsible for many cases of mortality and morbidity among people of different socio - economic classes. It accounts for 40% of public health problems, 30 – 50% in patient admission and up to 50% of out patients visits in areas with high malaria transmission like Nigeria (FMOH / NMCP 2010).

In the absence of an effective vaccine for preventing malaria in pregnancy, prevention with the use of ITN remains the most viable strategy for protecting pregnant women against the disease. A number of studiesconducted in Nigeria among pregnant women attending primary health centres have shown that some misconceptions and inappropriate perceptions exist among pregnant women relating to insecticide treated net use (Runsewe et al; 2012) and (Ugwu, Eze Chukwu, Obi, Ugwu and Okeke, 2015); this factors could be due to inadequate knowledge of ITN. The pattern of ITN use among pregnant women can be determined from two main settings:Many pregnant women patronize Primary Health Centres in Badagry LGA because these facilities constitute the main first point of call and easy access to ANC services. They also constitute a more appropriate setting for studing pregnant women as a captive audience.It is thus easier to reach more pregnant women to study as a captive audience the communitythey live in and the primary health care facilities which they use. In Badagry LGAs, the knowledge,perception, ownership and utilization of ITN among ANC attendees are yet to be fully investigated. This study was, therefore designed to focus on the utilization of ITN among pregnant women attending PHCs in Badagry Local Government Area, Lagos State Nigeria.

Justification

For over a decade, maternal morbidity and mortality have been of concern worldwide especially in the developing world. Through the Roll Back malaria initiative, malaria prevention is fast taking the center stage in most African countries and one of the suggested interventions is the use of Insecticide Treated Net.NMCP 1998.

It has been reported that till date over sixteen million Insecticide Treated Net have been deployed/distributed in Nigeria (WHO 2001).However, one of the challenges still remains the very low level of use of the nets in the country.

In order to tackle this problem 31 African Heads of Statesresolved at the Abuja Roll Back Malaria Submit to provide effective malaria intervention to 60% of women by the year 2005.

One of the identified interventions to limit the adverse effects of malaria in pregnancy is the use of insecticide treated net (ITN) by pregnant women. The efficiency of ITN can only be fully realized if pregnant women comply with its use.

However, there is death of information relating to the use of ITN. The use of insecticide treated net among pregnant women therefore needs to be explored so as to identify factors inhibiting the utilization of ITN. The result from the study have potential for serving as base line information for the design of appropriate health education interventions and at promoting ITN use among pregnant women. The result can also be used for formulating polices relating to the promotion of uptake of ITN among study population.

Research Questions

The research questions framed to guide the study are as follow:

1. What is the level of awareness and knowledge of pregnant women relating to malaria and insecticide treated nets?
2. What are the perceptions of pregnant women relating to insecticide treated nets?
3. What is the ITN ownership status among the pregnant women?
4. What is the pattern of use of insecticide treated net among pregnant women?
5. What are the barriers and facilitating factors relating to ITN use among pregnant women?

Broad Objective

The broad objective of the study was to investigate the knowledge, perception, ownership and factors that influence the utilization of insecticide treated net among pregnant women who attend PHC facilities in Bodagay LGA.

The specific objectives were to:

1. Assess the level of awareness and knowledge of pregnant women relating to malaria and insecticide treated nets.
2. Assess the perception of pregnant women relating to insecticide treated nets.
3. Determine the level of ownership of insecticide treated net among the pregnant women.
4. Determine respondents' pattern of use of insecticide treated nets among the pregnant women
5. Identify the barriers and facilitating factors experienced among pregnant women relatingto use of insecticide treated nets.

CHAPTER TWO

LITERATURE REVIEW

2.1 Epidemiology of Malaria

Malaria in humans is caused by five*Plasmodium* parasites: *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae*, *Plasmodium ovale* and *Plasmodium knowlesi*. The current distribution of human-pathogenic *Plasmodium* species shows preponderance of *Plasmodium falciparum* in tropical Africa, while *Plasmodium vivax* prevails over *Plasmodium falciparum* in South America. Both *Plasmodium falciparum* and *Plasmodium vivax* are prevalent in south-eastern Asia and western Pacific. Although *Plasmodium malariae* may occur in all malarious areas, its prevalence is generally low. In tropical Africa, *Plasmodium falciparum* and *Plasmodium malariae* co-infection is sometimes encountered. *Plasmodium ovale* is widespread principally in tropical Africa whereas *Plasmodium knowlesi* infection occurs only in certain forested areas of South-East Asia. (Mandal, 2014)

Malaria burden is hard to estimate, particularly in low income countries where data collection and reporting quality is poor (Anstey et al; 2009). Incomplete and discontinuous reports from single health facilities may alter final global malaria prevalence. Malaria cases are often under-diagnosed in hyper endemic countries, where mild symptoms of chronic malaria may possibly lead to misdiagnosis. On the contrary, overdiagnosis may also occur. In fact, not all reported malaria cases are confirmed by microscopy or others assay, such as rapid diagnostic tests (RDTs). Furthermore, in hyper endemic areas febrile illnesses from different causes might be misdiagnosed with malaria (Anstey et al; 2009). The WHO guidelines recommends that microscopy or RDTs should be used to confirm all malaria cases. (Anstey et al; 2009)

Another issue is the lack of population denominator that makes the real incidence of malaria difficult to assess. Data emerging from WHO reports just estimate malaria incidence and mortality, reporting malarial cases and malarial death from the different WHO regions, collected by Ministries of Health of different countries. These data do not reflect the real incidence in the general population. Nevertheless, they are good indicators to assess malarial control programmes and to estimate the impact of malaria infection in health systems.

The term *endemicity* is a proxy to indicate disease prevalence (Herrera et al; 2007). Areas presenting the same level of endemicity often have similar characteristics of disease

distribution, guiding malaria experts to design, implement and monitor control and prevention activities (Herrera et al; 2007).

Malaria endemicity is a very complex issue, that is influenced by factors related to the man-host interactions (agricultural activities, nocturnal activities, migration movements, wars, limited resources), to the parasite (different species, sporogonic cycle length, drug susceptibility), to the vector (density, larvae breeding sites, temperature, receptivity, feeding pattern, longevity, insecticide susceptibility) and to the environment (physical – biological – socio-economic).

Different methods to classify malaria endemicity in a population exist. These methods includes (i) proportion of individuals in a population with a palpable enlargement of spleen (*spleen rate* [SR]), (ii) proportion of individuals in a population with a laboratory-confirmed parasite infection (*parasite rate* [PR]), (iii) number of infective bites per person (*entomological inoculation rate* [EIR]) and (iv) number of microscopically confirmed malaria cases detected during one year per unit population (*annual parasite incidence* [API]) (Wipasa et al; 2002).

Proportion of individuals with splenomegaly (SR) in a given population was the first method used to assess malaria endemicity during a malariometric survey in 1848 in India, where spleen dimension was assessed in selected population age groups. Thus, malariometry attention was focused on clinical manifestations of malaria. On the basis of splenomegaly prevalence rates in children from 2 to 9 years old, 4 different endemicity areas can be distinguished: *holo-endemic areas*, where proportion of people with splenomegaly is above 75%; *hyper-endemic areas*, where splenomegaly prevalence is between 51 and 75%; *meso-endemic areas*, with prevalence between 50 and 11%; *hypo-endemic areas*, where prevalence is below 11% (Wipasa et al; 2002).

Parasite rates (PR) assesses the proportion of individuals with microscopically confirmed presence of asexual parasites in peripheral blood. It's a technique that requires expert laboratory technicians and suffers of malaria seasonal variation (Wipasa et al; 2002).Spleen and parasite rate are actually less used, whereas entomological inoculation rate (EIR) and annual parasite incidence (API) are utilized to prepare epidemiologic malaria maps that show malaria distribution in the world. Where data are unavailable, a model is required to predict malaria endemicity (Chelimo et al; 2011). Many recent studies investigated a predictive

framework known as model-based geostatistics (MBG) to asses malaria endemicity and the prevalence of other vector-borne and intermediate host borne diseases(Valizomdeh et al; 2013).

Malaria Endemic Areas

Different malaria endemic areas have different epidemiological situations and also the feasible targets may differ. According to WHO, the following terminology should be adopted when referring to malaria endemic status: *Malaria control*: reducing the malaria disease burden to a level at which it is no longer a public health problem (Michon et al; 2000).*Malaria elimination*: The interruption of local mosquito-borne malaria transmission; reduction to zero of the incidence of infection caused by human malaria parasites in a defined geographical area as a result of deliberate efforts; continued measures to prevent reestablishment of transmission are required.

Malaria eradication: Permanent reduction to zero of the worldwide incidence of infection caused by a particular malaria parasite species. Intervention measures are no longer needed once eradication has been achieved.

Most malaria cases and deaths occur in the *African Region*(Michon et al; 2000). As a consequence of implementation programs, high burden countries of African Region, such as Madagascar, Sao Tome and Principe, Eritrea, Rwanda and Zambia, showed a decrease in malaria cases up to 50% between 2000 and 2009 (Michon et al; 2000). According to (Michon et al; 2000) Rwanda showed a decrease by 74% of confirmed malarial cases between 2005 and 2010 and slide positivity rate decreased from 35% to 9%. Moreover, number of malaria hospital admissions and malaria deaths showed a decrease of 65% and 55% respectively. Zanzibar, belonging to United Republic of Tanzania, showed a dramatic decrease of malaria admissions and deaths due not only to the efficacy of control strategies, but also to favourable geographic position. In low-transmission countries of African Region control strategies have also been performed. As a result of the faithful implementation of these strategies, Algeria is in the malaria elimination phase while Cape Verde in pre-elimination phase (Autino et al; 2012).

In 15 countries of the WHO *Region of the Americas*, where *P. vivax* is the most prevalent species, reductions of more than 50% in the number of the reported cases were observed. During 2010, malaria transmission occurred in 21 countries, of which 17 are in the control

stage and 4 are in the pre-elimination stage. Bahamas and Jamaica are in the prevention of reintroduction phase. In Ecuador, malaria cases dropped from 105 000 in 2000 to 4.120 in 2009, a reduction of 96% due to IRS, LLINs distribution, strengthening of malaria diagnosis and treatment and also due to Global Found, UNICEF, USAID and government funds invested in malaria control (Autino et al; 2012).

Plasmodium falciparum

Plasmodium falciparum is widespread in nearly all malaria endemic countries (Cheng et al; 2014). A study identified 2.37 billion people at risk of *Plasmodium falciparum* transmission worldwide, 26% located in the African region and 62% in South East Asian and Western Pacific regions (Cheng et al; 2014). In Africa, many epidemiological studies suggest that *Plasmodium falciparum* is the most prevalent malarial species. Blood samples were collected between 1998 and 2006 from nine different African countries and analyzed by PCR for the presence of each of the four human malaria parasites (Rhee et al; 2001). Out of 2.588 samples, 1.737 were positive for *Plasmodium* species and 1.711 (98.5%) were positive for *Plasmodium falciparum* considering both mono and mixed infection (Rhee et al; 2001). Another study performed in 4 villages in Mulanda sub-county, in eastern Uganda, showed a prevalence of *Plasmodium falciparum* infection of 94% during rainy season, from July to December, 2002 using thin film diagnosis (Malaguamera et al; 2002). A study performed in metropolitan Lagos, Nigeria, showed a microscopic prevalence of *Plasmodium falciparum* species of 88.5% in pregnant women attending antenatal care clinic, during one observation year (Zeyrek et al; 2006).

Anopheles Vectors

Malaria is transmitted exclusively through the bites of *Anopheles* mosquitoes. There are 512 *Anopheles* species recognized worldwide and 50 only provisionally designated and awaiting description (Nebic et al; 2009). Seventy *Anopheles* species are able to transmit *Plasmodium* parasite to human hosts (Rhee et al; 2001).*Anopheles* mosquitoes breed in water and each species has its own breeding preference. Transmission is more intense in places where mosquito lifespan is longer (parasite has time to complete its development inside the mosquito) and where anthropophilic mosquitoes prevail. Forty-one of the 512 *Anopheles* species are defined by experts "Dominant Vector Species" (DVS). DVS are the most important malarial vector worldwide, providing the majority of human malaria cases.

Characteristics of dominant vector species are their propensity for humans feeding, longevity, abundance and elevate vectorial capacity (Riley et al; 1993).

Economic burden of malaria

Along with direct health cost there is a severe economic burden of the disease in terms of lost days of work. In fact malaria is thought to take off 1.3% from the economic growth of some African countries. In some of the most severely affected countries, it accounts for 40% of public health expenditure, 30-50% of inpatient admissions, and 50% of outpatient visits. It affects developing countries in more ways than one including detriment of tourism (Rhee et al: 2001).

There were an estimated 219 million cases of malaria (154-289 million) and 660 000 deaths (range 610 000-971 000) in 2010. Of total numbers 80% of estimated malaria deaths occur in just 14 countries and approximately 80% of estimated cases occur in 17 countries (WHO, 2015).The Democratic Republic of the Congo and Nigeria account for over 40% of the estimated total of malaria deaths globally. The Democratic Republic of the Congo, India and Nigeria account for 40% of estimated malaria cases.

Estimated malarin mortality rates are highest in countries with a lower GNI per capita. Countries with higher proportions of their population living in poverty (less than US$ 1.25 per person per day) have higher mortality rates from malaria (WHO, 2015).

Of the deaths a large proportion was young children in sub-Saharan Africa. This is the most vulnerable group affected with the condition. In areas with high transmission, the most vulnerable groups are young children. These children are vulnerable because they have not developed enough immunity to malaria yet. Pregnant women are also at risk because their immunity has been decreased by pregnancy (WHO, 2015).

Malaria affects mainly poor tropical and subtropical areas of the world. Where the disease is endemic it is the leading cause of illness and death (WHO, 2008).

Africa has several factors that make it high risk for malaria. Some of these include very efficient mosquito (Anopheles gambiae) responsible for transmission, predominant parasite species is Plasmodium falciparum that leads to more severe malaria, warm and humid climate that allows transmission to occur year round as well as lack of resources and poor socio-

primaquine is both effective in blocking transmission and unlikely to cause serious toxicity in individuals with any of the G6PD-deficiency variants.

2.3 Malaria Control/Prevention Programmes

World Health Organisation is collaborating with the Roll Back Malaria (RBM) Partnership to support malaria-endemic countries in conducting systematic national malaria programme reviews. World Health Organisation has released a trial edition of a manual to guide the conduct of malaria programme reviews in 2010 - and facilitated reviews in over 25 countries during 2011 and 2012. The lessons learned from these processes are being used to simplify the review process with a view to optimizing resource allocation, effectiveness and costs (WHO, 2012).

Malaria programme reviews, abbreviated as MPRs, are periodic, joint evaluations of national control programmes within national strategic planning and programming cycles, to further improve evidence-based, effective and efficient programme management. Malaria programmes reviews are led and owned by endemic countries themselves, and are built around the principle of capacity-building at country level, allowing national stakeholders to perform an independent self-assessment.

There are key objectives which guide comprehensive programme reviews. These include the following:

- Review malaria epidemiology and update stratification and mapping;
- Review progress towards national, regional and global targets;
- Review policy and strategic frameworks for planning, programming, management, implementation and timely reporting;
- Review performance of malaria services delivery systems by thematic areas and at different levels of delivery; and
- Re-define the future policies, strategies and support programme transformation to sustain high program performance.

National Malaria Elimination Programme

Sustainable National Malaria Programme worked with the Nigerian government's National Malaria Elimination Programme (NMEP) to harmonise donor efforts and funding agencies around agreed national policies and plans for malaria control and elimination (Guerra et al; 2008).

Sustainable National Malaria Programme has improved national, state and local government level capacity for policy development, planning and coordination, in addition to working with those agencies to improve population coverage of effective measures for the prevention of malaria and access to the population to effective treatment for malaria (Guerra et al; 2008).

The programme's work was set within the context of current NMEP objectives and targets. The main goal of the NMEP is to reduce the malaria burden to pre-elimination levels and bring malaria-related mortality to zero. The programme worked with the NMEP towards the achievement of its vision of a malaria-free Nigeria and in tandem with its mission to provide equitable, comprehensive, cost effective, efficient and quality malaria control services ensuring transparency, accountability, client satisfaction, community ownership and partnership (Guerra et al; 2008).

The major national target as outline in the National Malaria Strategic Plan (NMSP) 2014-2020 (WHO, 2012) are as follows:

- At least 80 percent of targeted populations utilize preventive measures by 2020.
- To ensure that all persons with suspected malaria who seek care are tested with RDTs or microscopy by 2020.
- All persons with malaria seen in private, public health facilities or community agents receive prompt treatment with an effective anti-malarial drug by 2020.
- At least 80 percent of the population practice appropriate malaria prevention and management by 2020.
- Put in place a system for timely availability of appropriate antimalarial medicines and commodities required for prevention, diagnosis and treatment of malaria in Nigeria by 2018.
- At least 80 percent of health facilities in all LGAs report routinely on malaria by 2020, progress is measured and evidence is used for programme improvement.

- To strengthen governance and coordination of all stakeholders for effective programme implementation towards an 'A' rating by 2017 that is sustained through to 2020 on a standardized scorecard.

2.4 *Pregnancy and malaria and the associated burden*

Pregnancy is a normal physiological process but presents with physiological and anatomical challenges. This is more so because when a woman becomes pregnant, a lot of changes take place in her. The pregnancy related changes could be accompanied by some early symptoms which include nausea, vomiting, chest burn or stomach ache and frequent urination (Fuge et al; 2015). Health challenges which may be associated with pregnancy may also include swelling feet, piles, low back pain, malnutrition, anaemia and constipation. Some of these symptoms are similar to the symptoms of malaria. Hence, most women especially those pregnant for the first time, find it difficult to differentiate early pregnancy symptoms from malaria (Fuge et al; 2015).

The consequences of malaria in pregnancy include anaemia, stillbirth and low birth weight (Ejik et al; 2013). Anaemia in pregnancy can be defined as low haemoglobin level in pregnancy while stillbirth is the delivery which occurs after viability of the baby at 24 weeks. Low birth weight is a birth weight which is less than 2.5kg. (Widman et al. 2012). During pregnancy, a woman's immunity become lower as a result of this, she becomes vulnerable to infection such as malaria (Ejik et al; 2012). In view of the lowered immunity of woman during pregnancy and the fact that malaria in pregnancy compromises the health of both expectant mother and the foetus, it is necessary to embark on measures aimed at preventing pregnant women from malaria infection. It has been reported that women in their first and second pregnancy are particularly at high risk of malaria (Nwandama et al; 2015).

Research findings have shown that babies born to mothers with malaria-infected placentas are mostly at high risk of low-birth weight (Runsewe Abiodun et al; 2012), dehydration, seizure, and rupturing of the spleen. High malaria parasite infection density of the placenta in association with the membrane may cause the consumption of the glucose and oxygen that would have been transported to the foetus thus leading to intrauterine retardation and premature delivery (Runsewe Abiodun et al; 2012).

In Nigeria, malaria during pregnancy contributes to maternal mortality and infant mortality (WHO, 2013). Malaria directly accounts for about 11% maternal deaths and a leading cause

of anaemia in pregnancy (Ugwu et al; 2015). Placenta infection by malaria parasites can compromise foetal nutrition which can in turn lead to intra-uterine foetal growth retardation and low birth weight (Ugwu et al; 2015). This explains why national efforts to reduce the high maternal and infant mortality place high premium on effective control of malaria in pregnancy (Omotosho et al; 2009). In line with the seriousness of malaria in pregnancy and its health importance. the Nigerian National Strategy for malaria control in pregnancy focuses on the use of three strategies: providing prompt access to effective treatment, use of ITNs and Intermittent Preventive Treatments (IPTs) with Sulfadoxine-Pyrimethamine (Nwandama et al; 2015). Consistent use of ITNs in pregnancy has been shown by several randomized controlled trials to produce beneficial maternal and infant outcomes (Singh et al; 2013, Ugwu et al; 2015, Nwandama et al; 2015).

Nigeria has promoted ITN use in pregnancy along with other evidence-based interventions for malaria control since the Abuja Malaria Summit which took place in 2005. However, the level of ITN utilization by pregnant women and other vulnerable populations have remained low. According to Ankomah et al. (2011), the results of the most recent National Demographic and Health Survey conducted in the country has revealed utilization rate below 10%.A recent synthesis of data from national malaria control programmes from NMCP has also shown that the levels of utilization of ITN by pregnant women in many sub-Saharan African countries remain far below national and global strategic targets. The use of ITNs in Nigeria is very low even by sub-Saharan African standards.The proportion of children under 5 years in Nigeria who slept under ITNs increased only minimally from 3.3% in 2004 to 6% in 2008. There have been recent efforts to increase access to ITNs through mass distribution programmes but there are concerns that ITN utilization may still lag behind access as has been severally reported. Several community level studies have identified poor perceptions of, and low use of ITNs in several African countries including Ghana, Tanzania and Nigeria.There is the need to study factors capable of influencing consistent utilization of ITN especially by vulnerable populations like under-five (5) children and pregnant women in various settings.

The studies on bed nets utilization in Nigeria are mostly limited to caregivers of children below five years of age and pregnant women have often not been the focus of study (Awosan et al; 2013, Omotosho et al; 2009, Runsewe et al; 2012). Nigerian studies that have specifically focused on ITN use by pregnant women have been mostly facility-based and involved relatively small samples. A notable example is the survey conducted in Oshogbo in

southwest Nigeria which reported low ITN use in a sample of 328 pregnant women but did not explore possible determinants. (Aukomah et al; 2011).

The World Health Organization's world malaria report shows the enormity of the burden of malaria. with 216 million cases and 655, 000 deaths attributable to the mosquito-transmitted parasite in 2010 alone (WHO, 2011). The burden is largely borne by Africa where 91% of deaths occurred, with pregnant women and children under five years of age most at risk of infection and adverse outcomes. (Megha Singh et al; 2013).

Each year, an estimated 25million pregnancies in Sub-Saharan Africa are at risk of malaria.The associated adverse consequences can be serious for both mother and foetus in terms of morbidity and mortality (Singh et al; 2013). The sequelaeof malaria in pregnancy include maternal anaemia, stillbirths, low birth weight and intra-uterine growth restrictions(Desai M et al;2007). The main malaria prevention strategies duringpregnancy include the use of Intermittent Preventive Treatment (IPT) with anti-malaria medications, as well as the regular and timely use of Insecticide Treated Nets (ITN). The WHO and Roll Back Malaria (RBM) partnership now recommend that distribution of ITNs be free or heavily subsidized to achieve greater equity of coverage, and that a variety of distribution systems be used to achieve universal access, including targeted campaigns to deliver nets to most-at-risk populations. which include pregnant women and children under five years of age. The investment into this simple yet effective intervention has been substantial. In 2010, there were enough ITNs, primarily ITN, procured on the African continent to cover 73% of the at-risk population, yet achieving equitable distribution and providing ongoing supply remain a challenge (WHO, 2011).

The evidence for the efficacy of ITNs in preventing malaria infection and its consequences in pregnancy is strong, as reported in a Cochrane review in 2009, and in a more recent meta-analysis, which examined malaria prevention in pregnancy datasets from different African nations. 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. A communal protective effect of ITNs and reduction in overall vector density has also been observed in some settings. (Killeen, 2011).

Despite the wide-spread roll out of policies, and substantial financial investments in ITN distribution, coverage remains suboptimal in many regions particularly with respect to pregnant women. (Megha Singh et al; 2013). The vast majority of malaria deaths occur in Africa, where malaria also presents major obstacles to social and economic development.

Malaria has been estimated to cost Africa more than 12 billion US dollars every year (Akande et al; 2005). There are at least 300million acute cases of malaria each year globally, resulting in more than a million deaths.

About 90% of these deaths occurs in Africa and mostly in young children. Malaria is Africa's leading cause of under five mortality and constitutes 10% of the continent's overall disease burden.

Malaria accounts for 40% of public health expenditure, 30-50% of in-patient admission and up to 50% of outpatient visits in areas with high malaria transmission like Nigeria.

In Nigeria, malaria has remained a major contributor to high morbidity and mortality accounting for 25% of infant and 30% childhood mortality and it is associated with 11% maternal mortality. It is estimated that 50% of the population could have at least one episode of malaria each year (WHO, 2007). With a total population of 120 million, this translates to 60million people suffering from attacks of malaria yearly.

It is estimated that children under the age of 5 years have 2 to 4 attacks every year, while prevalence rate among pregnant women is 47.6% (Omotosho et al; 2009). This makes malaria the most deadly cause of deaths and disability in children under five in the country. Among pregnant women, malaria is responsible for more than one out of every ten deaths and accounts for a considerable population of low birth weight babies born by these mothers.

One of the major breakthroughs in the recent years is the realization that mosquito net treated with insecticide gives a much higher degree of protection against malaria. When properly used, insecticides treated net can reduce malaria transmission by at least 60% and child deaths by 20%. (WHO/UNICEF, 2003)

Malaria in pregnancy contributes to significant prenatal morbidity and mortality. As funding increases to combat both malaria and maternal mortality, understanding and how malaria specifically affects pregnant women is crucial in our effects to reduce matemal and prenatal deaths and curb the spread of this preventable infectious disease (WHO, 2012).

Pregnant women remain the main vulnerable group to malaria infection (particularly falciparum infection) among the adult population. The infection is mainly responsible for anaemia during pregnancy and delivery of low-birth weight babies. To reducethe burden of malaria in pregnancy, the Ministry of Health in Lagos State in accordance with Abuja declaration of Africa Heads of States (April, 2000) advocated for the use of insecticide treated nets (ITNs) by pregnant women, especially in epidemic pronecareas. Pregnant women

are particularly vulnerable to malaria as pregnancy reduces a woman's immunity to malaria, making her more susceptible to malaria infection and increasing the risk of illness, severe anaemia and death.

For the unborn child, maternal malaria increases the risk of spontaneous abortion, still birth, premature delivery and low birth weight.In areas of Africa with stable malaria transmission, plasmodium falciparum infection during pregnancy is estimated to cause as many as 10,000 maternal deaths each year, 8 to 14% low birth weight babies and 3 to 8% of all infants deaths (Awosan, et al; 2013).

Transmission of malaria disease is very high in Nigeria with an annual incidence of 13,913 per 100,000 populations (WHO, 2013). It is the leading cause of death in children aged under 5 years accounting for 20% of deaths among this group, closely followed by pneumonia and diarrhea diseases that accounted for 17 and 11% of deaths respectively. Among adults, it is the second leading cause of mortalitywith a cause specific mortality rate of 131 deaths per 100,000 populations compared to 13 deaths per 100,000 population from (HIV/AIDS) (WHO ,2013).In the absence of effective vaccines for malaria prevention and development of unacceptable levels of resistance to one drug after another by the malaria parasite coupled with the development of resistance to insecticides by mosquitoes that transmit the disease; prevention of mosquitoes bite through the use of ITNs remains very important strategy for malaria control (Awosan et al; 2013).

Constant use of malaria preventive measures during pregnancy in Nigeria has been found to be low despite the burden of the disease in the country (NPC Mamo; 2009). Review on community acceptance of bed nets in other places has shown that various factors influence the use of bed nets;these including, cultural, behavioral and demographic factors, ethnicity, accessibility, gender relations and seasonality of malaria (Heggen et al; 2003).

Several key assumptions about deployment (or hanging) and use of ITNs by those who own nets underline the recent and rapid distribution of ITNs in Africa. The intervention was assumed to be a known and popular one, so that fast and near universal uptake would arise because (1) the intervention is known to work (protect from malaria) (2) ITNs are virtually side-effect free (3) ITNs are relatively cheap/free (4) ITNs are easy to use (i.e. to hang and to sleep under and (5) ITNs not only protect against disease but also provide relief from nuisance-biting mosquitoes, (Macintyre et al; 2011). To benefit from ITNs for prevention of malaria at either the individuals or the community level requires not only household

ownership but also use or at least deployment. While there is evidence that behavioral change related to the uptake of ITNs use is occurring, it is not yet universal (Haggen et al; 2003). According to (Macintyre et al;2011) 13 of the 35 highest burden countries reported at least 50% of households in malaria endemic areas owned an ITN, although there is evidence that ownership does not translate into use at the same time.

According to WHO (WHO. 2008), many people who received ITNs did not sleep under them, resold them, reduced their efficiency through inappropriate washing practices or failed to replace them when they become damaged or torn.There are few data to back these statements, this question of non-use continues to challenge malaria practitioners in Africa (Macintyre et al; 2011).

Recent analysis according to (Macintyre et al; 2011) of national data of ITN use found that intra-household access to ITNs (i.e. ITN to occupant ratio) was one of the main drivers for ITN use, and that the lower the rate the higher the non-use among occupants (Eisele et al; 2009). Other than ownership, primary barriers to ITN use include; insufficient knowledge of uses or the link between mosquito bites and malaria; lack of knowledge of ITN use as a preventive measure against malaria; and lack of knowledge as to who should be the main users of nets. Some studies also reports poverty as a barrier to use, in that poor households have immediate needs including food, water and medical care and therefore sell nets to meet their basic needs. (Macintyre et al; 2011).Other believe recent illness or death may increase usage and proximity of a household to a health service delivery point may increase the likelihood of having messages related to the importance of net use.

There is a perception that the delivery mechanism (i.e. whether the net is free at point of access or not, or where the net comes from is important to acceptance and use of an item in the household (Macintyre et al; 2011).The sources of ITN (e.g. Ministry of Health, the market, a non-governmental organization e.t.c.) or even the brand of net, may affect the level of trust that the community places in that product. The agent who introduced, the ITN (the community health worker (CHW), a friend, nurse or merchant) may also influence net use (Macintyre et al; 2011).It should be noted that net characteristics as pointed out by previous studies, such as brand, colour, size may also influence uptake and use. Many caretakers support that children get too hot or fear sleeping under the net.There are some evidences that

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pregnant women, who have to get out of bed frequently in the middle of the night to ease themselves, find hung nets inconvenient.

This sense of inconvenience may also affect use by children. If nets become damaged or caretakers think the nets make children hot and disturb their sleep, they may decide to let children sleep without a net. (Kate Macintyre et al; 2011).Pregnant women are more susceptible than the general population to malaria: they are more likely to become infected, have a recurrence, develop severe complications and to die of the disease. Malaria contributes very significantly to maternal and foetal mortality.Regardless of symptoms, the presence of plasmodia parasites in a pregnant woman's body will have a negative impact on her own health and that of her foetus. Restricting treatment to symptomatic pregnant women is an inadequate strategy to reduce the morbidity and mortality associated with malaria (NICE CKS, 2012). Subclinical infection is common in areas where natural immunity is high (e.g. Sub-Saharan Africa), whereas, as symptomatic cases are common in areas with low immunity (e.g. the Asia-Pacific region, and South Africa) (WHO 2012).

Malaria during pregnancy is different from the disease in the non-pregnant state. The severity of malaria in pregnancy is thought to be due to general impaired immunity plus a diminution of acquired immunity to malaria in endemic areas. Placental malaria occurs where plasmodium falciparum infected erythrocytes accumulate in the intervillous space of the placenta but may be rare or absent in the peripheral circulation. Diagnosis by light microscopy of blood films is more difficult (Dhiman, 2012).

Treatment can be more difficult due to restrictions on anti-malaria agents. There is frequently a lack of good post-marketing surveillance where these drugs are routinely used in pregnancy. However, data support the safety of artemisinin-combined drugs (ACDs) and their advent had provided a useful therapeutic option. With regard to chemoprophylaxis record, World Health Organisation (WHO) recommendations and a large meta-analysis support the use of intermittent prophylactic treatment during the second and third trimester. (Avery et al; 2012).

Producing good estimates of the global burden of malaria is difficult due to poor numerator (number of women affected by malaria in pregnancy) and denomination (population at risk) data However, globally, 125 million women are at the risk of malaria every year

In Sub-Saharan Africa, the area most burdened by malaria, the disease is thought to cause as many as 10,000 cases of malaria related deaths in pregnancy, mainly due to severe maternal malaria.

Between 75,000 and 200,000 infants (under the age of 12months) are estimated to die annually as a result of malaria infection during pregnancy..Approximately 11% (100,000) of neonatal deaths are due to low birth weight resulting from plasmodium falciparum infection in pregnancy.Use of intermittent preventive treatment in pregnancy and use of nets resulted in an estimated 94,000 newborn deaths being averted between 2009 and 2012 in 25 African countries. If these interventions had been applied to 80% of the at-risk population, it is estimated that 300,000 deaths could have been prevented.Preventing malaria in pregnant women reduces severe maternal anaemia by 38%, reduces low birth weight by 43%, reduces prenatal mortality (deaths of infants within 12months) by 27%.Scaling up coverage and access to preventive measures is clearly the way forward (WHO ,2012).

A review of studies carried out in Sub-Saharan Africa between 2000 and 2011 reveal that prevalence of malaria in pregnant women attending antenatal clinics was 29.5% in East and Southern Africa and 35.1% in West and Central Africa (Dhiman et al; 2012).

Preventing and treating malaria in pregnancy can be a key intervention to improving maternal, foetal and child health globally and can also be linked to three of the Millennium Development Goals (MDG-3 Maternal Health, MDG-4 Child Health, MDG-5, Combating Infectious Disease. (Kayentao et al; 2013).

Pregnantmothers with non-immunity or low immunity from a low-transmission areas are likely to develop forms of illnesses and complications like, Anaemia; Acute pulmonary oedema; disseminated intravascular copulation and death while common problems for the foetus include, spontaneous abortion, premature delivery, stillbirth intrauterine growth restriction, low birth weight and intra uterine foetal death. Malaria infection during pregnancy is a significant public health problem with substantial risks for the pregnant woman, her foetus, and her new born child. Malaria-associated maternal illness and low birth weight are mostly the result of plasmodium falciparum infection and occurs predominantly in Africa (Dhiman et al; 2012).

The symptoms and complications of malaria in pregnancy vary according to malaria transmission intensity in the given geographical area, and the individual's level of acquired

immunity. In high transmission settings, where levels of acquired immunity tend to be high, plasmodium falciparum infection is usually asymptomatic in pregnancy. Yet, parasites may be present in the placenta and contribute to maternal anaemia even in the absence of documented peripheral parasitaemia. Both maternal anaemia and placental parasitaemia can lead to low birth weight, which is an important contributor to infant mortality. In high transmission settings, the adverse effects of plasmodium falciparum infection in pregnancy are most pronounced for women in their first pregnancies.

In low transmission setting,where women of reproductive age have relatively little acquired immunity to malaria, malaria in pregnancy is associated with anaemia, an increased risk of severe malaria, and it may lead to spontaneous abortion, stillbirth prematurity and low birth. In the United Kingdom, the prevalence of imported malaria in pregnancy is unknown. A review of the burden of malaria in pregnancy estimated that about one in four women in Sub-Saharan Africa in areas of stable transmission had malaria at the time of birth (Dondorp et al; 2007). Malaria in pregnancy is detrimental to the woman and her foetus and collective data demonstrate that the risk of adverse effects from untreated malaria in pregnancy outweigh those of treatment (Jelinek, 2016).

The protozoan parasites Plasmodium faliparum, plasmodium vivax, plasmodium malariae and plasmodium ovale (Nosten, et al; 2007) are transmitted by the bite of a sporozoite-bearing female anopheles mosquito. After a period of pre-erythrocyte development in the liver, the blood stage infection, which causes the disease begins. Parasitic invasion of the erythrocyte consume haemoglobin and alters the red cell membrane. This allows plasmodium falciparum infected erythrocytes to stick inside the small blood vessels of brain, kidneys and other affected organs. Plasmodium falciparum causes greater morbidity (maternal and foetal), principally low birth weight, anaemia and mortality than non-falciparum infections (Jelinek, 2016) but there is mounting evidence that plasmodium vivax is not as benign as had been previously thought (Jelinek, 2016). Response to antimalarial treatment is multifactorial but is associated with the degree of prior immunity acquired from repeated exposures in childhood and the background level of drug resistance. The higher the transmission of malaria, the greater the degree of prior immunity and the more likely the woman will respond favourably to a drug treatment. (Phillip-Howard et al; 2016).

It is estimated to affect between 350 to 500 million people annually and accounts for 1 to 3 million deaths per year (the global fund authors 2009). (WHO web site authors 2009). Sub-Saharan Africa has the largest burden of malaria disease, with over 90% of the world's malaria related deaths occurring in this region. Twenty five million (25,000,000) pregnant women are currently at the risks of malaria, and according to World Health Organization (WHO), malaria accounts for over 10,000 maternal and 200,000 neonatal death per year (WHO, 2009).

These figures may under estimate the impact malaria has in maternal morbidity and mortality. A recent study from Mozambique that investigated cause of maternal death via autopsy found that up to 10% of maternal deaths were directly attributed to malarial infection and 13% were secondary to human immunodeficiency virus HIV/AIDS, which can be exacerbated by coexisting malarial infection (Menendez, 2008). This suggests that in parts of the world where malaria is endemic, it may directly contribute to almost 25% of all maternal deaths. Malaria in pregnancy also contributes to significant prenatal and mortality and mobility. Infection is known to cause higher rates of miscarriage, intrauterine, demise, premature delivery, low birth weight neonates, and neonatal deaths. As funding increases to combat both malaria and maternal mortality, understanding how malaria specifically affects pregnant women is crucial in our efforts to improve maternal and prenatal health and curb the spread of this preventable infectious diseases.

2.5 *Pregnant Womens' Knowledge with Respect to Malaria and Insecticide Treated Net.*

Common principles used to measure knowledge about malaria include questions about transmission and intervention. Gestational malaria is recognized as a leading contributor to the high maternal mortality ratio quoted in the region. The study conducted in Ogun State among pregnant women attending secondary Health facilities by (Runsewe Abiodun et al;2012) concluded that the low awareness and poor knowledge about insecticide treated net (ITN) among the pregnant women reflect their level of exposure to adequate information and may be continuously sensitized through social marketing, radio, jingles and community participation to ensure acceptance and utilization of the new protective methods. Health care providers who are the main source of health information to the pregnant women in the various health facilities, may need further training and retraining on malaria control and prevention as it has been seen to be inadequate.

In the Tanzania study (Manchent 2012) wide knowledge gap existed between those that had antenatal case (ANC) and those who did not as they are more likely to be more exposed to some information during the usual health promotion activities in the clinic. The educational level of the study participants was found to be significantly associated with awareness and even knowledge. This may also explain the higher level awareness recorded in this study when compared with Onjekwes Net mark survey. Even at the net mark survey still noted Nigeria had the lowest level of awareness in the sub region in 2004. Back 2011 till date the in-depth knowledge about ITN by pregnant women has been fair in those that are aware. The fact that the majority of those that know about ITNs got their information from the hospital was probably because the Nigeria Government uses the public Health care system as its means of creating awareness and distribution at the outset of the programme. Although the place of public health care system cannot be over emphasized in the quest to increase awareness, other means were obviously less utilized and this may have been contributed to the low level of awareness that was found in most of the studies.

(Runsewe-Abiodun et al; 2010) reported in the study conducted in Ogun-State among pregnant women that gestational malaria is recognized as a leading contributor to the high maternal mortality ratio-quoted in the region. The study further showed that the low awareness and poor knowledge about ITNs amongst the pregnant women reflect their level of exposure to adequate information and may be continually sensitized through social marketing, radio jingles and community participation to ensure acceptance and utilization of new protective methods.

Also in a study conducted in Tanzania (Gross et al; 2011), a wide knowledge gap existed between those that had ANC and those who did not as they are likely to be more exposed to some information during the usual health promotion activities in the clinic. Nigeria has promoted ITNs use in pregnancy along with other evidence-based interventions for malaria control since the Abuja malaria summit, but levels ofITN utilization by pregnant women and other vulnerable population groups have remained low.

Though malaria prevention through the use of ITNs is a recommended component of routine antenatal care (ANC) in Nigeria (FMOH, 2012)only 27.6% mentioned the hospital as their source of information about ITN. Even though it appeared as if the information disseminated

were not comprehensive enough. Studies have revealed that many health workers themselves lack the conviction about the unique benefits of (ITN) insecticide treated net. they are inadequately informed about them and are therefore unlikely to convey enough information to the general public. (Guyyat. 2012; Iyaniwura et al; 2011). In addition, the low report of the hospital as source of information about ITN may be due to other various reasons however, health workers may not promote ITN if the nets are not available in the clinic, or if the facilities are under tagged and workers overworked, underpaid and demotivated as is the case in many government health outlets.

2.6 *Pregnant Womens' Perception of Malaria and Insecticide Treated Net.*

The use of insecticide treated net is very effective in the control of malaria and it is estimated to be twice as effective as the untreated nets. Some researchers have noted that women who used ITNs had significantly fewer preterm deliveries and babies with higher mean birth weight than women who did not use ITN. Nevertheless, the use of ITNs is still limited mainly because of its unavailability and cost and partly because of the discomfort associated with the nets and the women's fear of possible effect of the impropriated chemicals on them and their unborn babies (Ugwu and Ezechukwe. 2015).

Studies indicated that respondents who thought that it was not good to sleep under ITNs gave the following reasons: ITNs being hot at night, and they got malaria despite sleeping under ITNs. A study by (Binka et al;1997) showed that the most common perception for non-use of net were mosquitoes nets could suffocate one when sleeping under it, it made one to sweat because it generated heat and so on. While a study conducted in Mbarara district in Uganda in 2013 indicated that there were doubts about bed net efficacy in preventing malaria.
Still contributing factor to low coverage rates is the impact of local customs on net usage. A study also conducted in Kenya found that the youngest children in a household were given the lowest priority for bed net use, despite being a higher-risk population. (Okech BA, Mwobobia IK: 2012) 3: e 4050). This was also buttressed by another study in Burkina Faso which showed decreased use of bed nets during dry season due to a perceived lower risk of mosquito bites and the practice of sleeping outdoors (Frey, Traore, De Allegri, 2012). Another study in Kenya showed that villagers were using their nets for fishing rather than malaria prevention (Minakawa Disa,2011)

A study (International Journal of Tropical Disease Health that 4 (6) 645: 660. 2014) stated that respondents perceived that ITNs were hot at night, they were not being aware whether ITNs are good and that they got malaria despite sleeping under ITNs. These were their reasons for not using the insecticide treated nets.

Malaria is a re-emerging infections contributing to more deaths in present body than in decades, (Breman et al; 2004). Insecticide Treated Bed Net (ITNs) remain a highly effective tool in the fight against malaria (Grabonsky et al; 2007) when used correctly (Baume et al; 2008).

Use of ITNs hinges on factors of knowledge including the following. causes of malaria, symptoms used to classify malaria, acknowledgement of a causal link between mosquitoes and malaria, traditional mosquito prevention practices, reservations about use of insecticide and cost of net (Belay et al; 2008). Studies show levels of awareness and understanding of ITNs to greatly vary, as well as within countries. Accordingly, local knowledge and current practices should be accounted for when creating and tailoring an intervention so maximum awareness in any community can be achieved.

In general, awarcness surrounding malaria is problematic and so community level educational components are neccssary to address those deficits. Studies revealed that despite efforts to create awarcness of the causal link between mosquitoes and malaria, significant doubt remains. These doubts were not entirely unfounded as some were based on practical experiences, though others were based on traditional medicine and superstitions (Belay et al; 2008). Mosquitoes need to be recognized as the sole cause of malaria prompting a belief that ITNs are a complete defense against transmission and disease. Despite awarcness in some areas, low rates of ownership prevailed due to many people believing that ITNs cannot protect against malaria (Baley et al; 2008). Given these inconsistencies, it is imperative that any and all misconceptions be rectified through proper education and awarcness campaigns. Through this knowledge and awarcness, a culture of bed net use and eventually ITN use, can be created

2.7 Ownership and Use of Insecticide Treated Net among Pregnant Women

A fundamental determinant of ITN use is household possession of ITNs. If you do not have one, you cannot use one. In sub-Saharan Africa, considerable effort has been made on increasing the number of households possessing ITNs; there has been an impressive

distribution effort by malaria control programmes, with significant government and donor support over the past few years. Many countries including Nigeria have increased household coverage to a point where average household coverage with at least two ITNs to a household (WHO, 2011).

To achieve and maintain this universal insecticide treated net coverage (UTC) Rwanda and other countries (in Sub-Saharan Africa) including Nigeria, adopted the WHO's recommendations for high malaria burdens countries of using multiple distribution channels, including free universal insecticide treated net coverage through programmes such as antenatal care (ANC), immunization services for children and pregnant women respectively (Kateera et al: 2015, Malar. 2015).A study in Rwanda, in (2015) showed that a key determinant of ITN impact is bed net use, with disparities between bed net ownership and use(Malar. 2015). One such determinant of bed net use is seasonality. While higher net use has been reported more in the rainy season due to the associated high mosquito density, lower net use has been associated with hot dry months due to heat-related discomfort. Other previously reported determinants of net use include number of nets owned per household, sex, with women more likely to use, sex, age, head of household, educational level, disruptive sleeping arrangements and net misuse such as bed nets being used for activities in agriculture and fishing. Hitherto, studies on bed net use have mostly focused on children <5years and pregnant women, two groups preferentially targeted for net coverage in the past because of their high malaria vulnerability.

The evidence for the efficacy of ITNs in preventing malaria infection and its consequences in pregnancy is strong as reported in a Cochrane review in (2009) and in a more recent meta-analysis which examined malaria prevention in pregnancy datasets from different African nations. The evidence showed a strong correlation between the use of ITNs and reduction in still birth, improvements in birth weights of babies and a reduction in the prevalence of parasitaemia and anaemia in pregnant women. A communal protective effect of ITNs and reduction in overall vector density has also been observed in some setting (Malar 2013).Despite the wide spread roll out of policies, and substantial financial investments in ITN distribution, coverage remains suboptimal in many regions, particularly with respect to pregnant women. Recently published data from sub-Saharan Africa found that although 96% of countries surveyed had a policy for ITN coverage, reported coverage for pregnant women with ITNs was only 17%(Bennett, et al; 2013). The main delivery system for ITNs was

through antenatal clinics (ANCs) using free distribution or a voucher system. Interestingly, attendance at an ANC was not found to be major factor in limiting coverage. Supply has been identified by the WHO as the primary barrier to achieving optimal coverage. with the latest world malaria report suggesting that in general population there is a high correlation between ownership and use of ITN (Malar.2013).

It is generally known that relationship between ITN ownership and use has been explored by few authors and largely neglected when it concerns pregnant women.A 2011 qualitative systematic review of the uptake of malaria prevention interventions in pregnancy in Africa found that relationships with health workers, cost and distance to health facilities, knowledge of antenatal care and local contextual factors influenced women's uptake of intervention (Deresse, 2011).It is so clear and obvious that the provision of ITNs and education are both instrumental for attaining high bed net use and coverage. Still, community specific behaviours remain significant obstacles to achieving optimal results. One must therefore say that combining free distribution of ITN with novel educational model targeting the unique beliefs and behaviours of bed nets receiving communities at large (Maria Widmar et al).

Studies also showed that having awareness and knowledge merely does not guarantee practice of intervention methods. The main causes for the low use of ITNs were low ownership due to inaccessibility and lack of regular use because of its exhaustion as well as lack of awareness about its importance in some of the cases.

Previous studies have found that free distribution of ITNs has resulted in substantial increase in net coverage compared to subsidies. Sigh et al (2014) also sussed that increase in awareness about ITNs and its benefits as a result of sensitization by teachers and health care providers may likely influence the possession of ITNs of those who had formal education than those who do not have. Other studies showed that provision of ITN through incentives to encourage pregnant women to attend antenatal services and routine free distribution to women at their first antenatal visit increased the reported use of bed nets.

(Pullford et al; 2011), also conducted a review regarding the reported reasons for not using a bed net when one is available in the general population and found that reasons such as discomfort and perceived low mosquito density were the most common reason for non-use. As per the analysis of (Van Ejik et al; 2011) the purest performing countries at a national level, in terms of overall coverage (ITN use at night prior), were Swaziland 1%, Nigeria 5%,

Zimbabwe 6%, while the best performing countries or regions were Zanzibar 51%, Tanzania 26%, Kenya 49% and Madagascar 46%.

Between 2000 and 2004, there was a reported decline in ITN use from 58 to 46% in Nigeria, despite an increase in ownership rates (statistical significance of this difference was not calculated) representing a large increase in unused bed nets.The last five years have seen significant gains made in sub-Saharan Africa in terms of scaling up coverage of ITNs in pregnancy, especially in light of supportive policies and financial investments from national governments, but there remains a wide range in the coverage rates at both national and subnational levels.Studies have highlighted the disappointing discrepancy between ownership and use of ITNs amongst pregnant women in many settings, representing a missed opportunity for distribution programmes to address the reasons for this trend. Bed nets use cannot be simply assumed in households receiving and owning ITNs. Available ITN use by pregnant women was as high as 82% in Kenya, and as low as 29% in Zimbabwe, in national data sets. Cited reasons for the discrepancy include non-modifiable factors, such as discomfort and inconvenience.but interestingly, issues of knowledge and perceived vulnerability to malaria were also frequently mentioned.

Concerning ITN ownership and acquisition during pregnancy, it was reported in the study conducted in Uganda that 72% of women reported that they owned ITN at the very start of their most recently pregnancy: all of the women who acquired the net during pregnancy reported always sleeping under it for the remainder of their pregnancy. These determinants after critical study of the usage of ITN among pregnant women are cost of purchase, unbearable heat while sleeping under nets, feeling of suffocation, chemical smell, inconvenience, family structure i.e. inadequate space etc. (Laura et al; 2011). The Global Malaria Programme (WHO/GMP) describes a shift in guidance on malaria prevention through the use of insecticide treated nets (ITNs).

The WHO/GMP calls upon the national malaria control programme and their patients involved in long lasting insecticide treated net intervention to purchase only insecticide treated nets. These are designed to maintain their biological efficiency against vector mosquitoes for at least three years in the field under recommended conditions of use, obviating the need for regular insecticide treatment. (Binka et al; 2005) American Journal of Tropical Medicine Hygiene.In order for their full potential to be realized, ITNs should be

deployed as a vector control intervention. WHO/GMP, therefore recommends full coverage of all people at the risk of malaria in areas targeted for malaria prevention with ITNs The way in which full coverage should be achieved may vary with particular epidemiological and operational situations. Where young children and pregnant women are most vulnerable groups, their protection is the immediate priority while progress is made towards achieving full coverage. In areas of low transmission where all age groups are vulnerable, national programmes should establish priorities on the basis of the geographical distribution of the malaria burden In most high burden countries, ITN coverage is still below agreed targets. The best opportunity for rapidly scaling up malaria prevention is the free highly subsidized distribution of ITNs through existing public health services (both routine and campaigns. Resolution (WHO. 2005) Geneva.

ITNs should be considered a public need for populations living in malaria endemic areas. Distribution of ITNs should be systematically accompanied by provision of information on how to hang. use and maintain them properly. The Global Malaria Programme position does not exclude other approaches that have been successfully developed and implemented in specific contexts. Focusing on the role of national health services in ITN implementation does not exclude the important roles of other partners now and in future in implementing this intervention.

All mosquito nets act as a physical barrier, preventing access by vector mosquitoes and thus providing personal protection against malaria to the individuals using the nets. Pyrethroid insecticides, which are used to treat nets, have an excite-repellent effect that adds a chemical barrier to the physical one, further reducing human vector contact and increasing the protective efficiency of the mosquito nets. Most commonly, the insecticide kills the mosquito vectors that come into contact with ITN. By reducing the vector population in this way, ITNs, when used by a majority of the target population, provide protection for all people in the community, including those who do not themselves sleep under nets (Hawley et al; 2003). A recent study has shown that relatively modest coverage around 60% of all adults and children can achieve equitable community wide benefits. ITNs then work in this case as a vector control intervention for reducing malaria transmission (Killean et al; 2001).

In "real life" situation, the protective efficacy of treated net is significantly compromised by their poor physical conditions. Currently mosquito nets are made of ipo lester and rarely last

longer than 2-3 years under field situations. However, new technologies and materials such as Polyethylene have been developed to produce nets that are stronger and longer lasting

Indoor residual spraying, accompanied by larviciding, active and passive case detection have been the main malaria control activities in practice. Geographical locations, tropical climate and socio-economic conditions make appropriate condition for occurrence and persistent transmission of malaria in areas like Badagry LGA under study.In areas where access to health services is limited and medications often inappropriate, insecticide-treated mosquitoes nets (ITNs) present an attractive option that can effectively complement the main malaria control strategy based on early diagnosis and prompt treatment (WILL et al; 2010). The study conducted in various parts of the world proved that the use of nets treated with insecticides is an effective tool against mosquito bites and in reducing morbidity and mortality due to malaria (Lengeler, 2007).

Currently, the use of long lasting insecticide treated net is one of the main strategies advocated by the WHO to combat the threat of Malaria (Binka et al; 2005).Use of ITN is one of the most cost effective interventions against malaria. According to (Yukish et al; 2010), the cost of five ITNs and two Indoor Residual Spraying (IRS) programmes in Africa. ITN were found to be significantly cheaper to use than conventionally treated nets. In high transmission areas where most of the malaria burden occurs in children under the age of 3 years and assuming that this population group can be effectively targeted with ITNs that use of ITN is 4-5 times cheaper than IRS, which cannot be targeted to children only.

2.8 *Factors That Influence Use of Insecticide Treated Net among Pregnant Women (Facilitating and Barrier Factors)*

Insecticide Treated Net (ITNs) are an effective tool to prevent malaria morbidity and mortality among children and pregnant women in plasmodium falciparum malaria transmission setting (Lengder, 2011). In 2007, the World Health Organisation (WHO) recommended that countries in Africa provide ITNs for all age groups at the risk of malaria. Implicit in the promotion of universal coverage as a goal is the recognition that ITNs, even if underused in some households can still have a knock down effect on mosquito densities, resulting in a community level protective effect. (WHO, 2013)).To benefit from ITNs for

prevention of malaria, at either the individual or the community level, requires not only household ownership but also use.

It also revealed the benefits of preventing mosquito bites that quite often are irritating and above all prevent one from catching malaria and bites from other insects bed bugs, cockroaches and other crawling insects) and provide warmth during cold weathers.The study in Uganda also made one to know that the respondents knew that their ITNs were factory treated nets with chemical that could kill or repel mosquitoes. This high level of awareness was quite good for public health intervention. This could probably explained why majority of those who owned ITNs had high compliance of sleeping under it in the week prior to the survey.The World Health Organisation (WHO) promotes the use of Integrated Vector Management (IVM) to control vector borne diseases (VBDs). World Health Organisation Report on malaria, 2013) Geneva WHO.

Integrated Vector Management involves the use of a range of proven vector control tools used either alone or in combination selected based on knowledge of the local vector ecology and epidemiological situation. Integrated Vector Management can involve use of multiple vector control tools against a single disease or alternatively a single tool against multiple diseases. This is particularly the base where vector control interventions are active against more than one disease and vector borne diseases overlap in their distribution.Integrated Vector Management is a WHO policy for effective and sustainable vector control. In order to exploit synergies between vector borne diseases and make vector control move cost effective, integrated vector management advocates for the use of shared interventions across diseases. However, in order to be able to do this, it is important to first know whether interventions are effective against multiple diseases.Insecticide Treated Nets (ITNs) form the mainstay of malaria vector control in many endemic areas World Health Organization WHO,2013). ITNs are estimated to reduce all causes of child mortality by 17% and uncomplicated malaria. plasmodium falciparum episodes in areas of stable transmission by 50% compared to no nets (Cochare, 2011). ITNs have been rolled out in malaria endemic regions on a large scale, particularly in sub-Saharan Africa. Between 2004 and 2010, the number of ITNs delivered by manufacturers to malaria endemic countries in Sub-Saharan Africa increased from 6million to 145million (WHO, 2012).

The percentage of households owning at least one ITN inSub Sahara Africa (SSA) is estimated to have risen from 3% in 2000 to 56% in 2012, but declined to 54% in 2013. More work is needed to reach ITN coverage targets set by Roll Back Malaria of 80% use of ITN by individuals in populations at risk (Tusting et al; 2013).More recently conventional ITNs have been replaced by Long Lasting Insecticide Treated Net (LLINs) that maintain effective levels of insecticide for at least three years meaning that retreatment with insecticide is not necessary.Insecticide Treated Nets (ITNs) are likely to be effective against multiple vectors and vector borne diseases since a substantial proportion of transmission occurs indoors, but this has not been systematically assessed. ITNs as well as insecticide-treated curtains (ITC) and insecticide screening are likely to function in the same way. Disease vectors are attracted to host odours emanating either from people sleeping under ITNs or from people within houses in the case of ITC and ITS. Vectors then coming into contact with these materials are deterred or killed and thus it can be said that the ITNs and house are acting as "baited traps". They may also be working to some extent to prevent vectors from entering houses (household level protection) rather than personal protection in the case of ITNs.

Matoru and colleagues (Mathanga, 2009) assert that knowledge (or lack thereof) and overall beliefs about ITNs are a considerable barrier to ITN use. During a focus group theparticipants stated: "When you look at us and the clothes we are wearing, would you really think we cannot buy bed net? For me I think we don't have good knowledge about those things and how important they are in fighting malaria." Lack of value attached to ITNs plays a large role, without proper knowledge; populations are made unable to connect malaria prevention and ITNs (Njau, 2009).Thus, it is necessary not to stop at the fact that ITNs solely prevent malaria, but also to illuminate the direct benefits of ITN use in terms of financial costs averted through less hospital visits.Distance and accessibility to ITNs distribution points also serves as barriers to ownership as access to distribution posts still remains scarce in many countries and communities (Eisele, 2009). The likehood of ITN purchase is inversely related to the distance from an ITN distribution point (Njau, 2009). This inverse relationship is largely responsible for the drastically lower rates of ownership in rural communities. Without reasonable access, let alone equitable access, populations removed from more urban/commercial centres will largely never encounter ITN ownership opportunities.It is evident that the public and commercial sectors are significantly intervened as neither can elicit high ITN coverage rates without the other (Gu et al; 2009). Accordingly, these sectors must work together to booster ITNs demand, supply and availability. Factors that will ultimately enable this kind of scenario include eradication of taxation on ITNs, quality

control between ITN producers and suppliers, and equity in accessibility of ITNs (Gu et al; 2009).

It must also be included that programmes that heavily rely on sole donors greatly hinder any possible sustainability. This is due to the changing financial climate which does not allow for long term financial commitments (Manthanga et al; 2009). An example of the need for programmic sustainability and reduced reliance on donors occurred in Kenya during late 2005 to early 2006. Free ITN distribution took place through twenty-eight ANCs distributing 17,893 ITNs across the country. However, distribution came to a prolonged halt when one donor revoked commitment.Distribution was not resumed until another donor and subsequent funding was secured (Eisele et al; 2009) Programme stability aims to avoid and eradicate situations such as this. Instead, a mixed approach should be employed when possible to ensure longevity and effectiveness (Eisele et al; 2009).

Conceptual Framework

The utilization of Insecticide Treated Net by Pregnant women can further be explained by using Health Belief Model.

The Health Belief Model (HBM) was developed in the early 1950s and formally formulated by social scientists Rosenstock (1974) at the U.S Public Health service in order to understand the reason why people failed to adopt disease prevention strategies or screening texts for the early detection of disease. The HBM suggests that a person's belief in a personal threat of an illness or disease together with a person's belief in the effectiveness of the recommended health behaviour or action will predict the likelihood the person will adopt the behaviour.
There are six constructs to the HBM. They are: perceived susceptibility; perceived severity; perceived benefits; perceived barrier; cue to action and self efficacy.The application of the Health Belief Model to utilization of Insecticide Treated Net.

The Health Belief Model has been applied to a broad range of health behaviours and subject populations. Three broad areas can be identified (comer Morman, 1996) (1) preventive health behaviours, which include health promotion (for example use of ITN for prevention of mosquito bite) and health risk (e.g sleeping without any protection from the mosquito bite) (2) sick role behaviours, which refer to compliance with recommended medical regime (e.g

adherence to net use) usually following professional diagnosis of illness and (3) clinic use which includes physician visits for variety of reasons (e.g follow-ups).

Concept	Net Use	Malaria test (RDT/Microscopic screening for malaria)
1. Perceived susceptibility	Pregnant women believe they can be infected with malaria	Pregnant women believe they may have been exposed to malaria
2. Perceived severity	Pregnant women believe that the consequences of getting malaria is significant enough to avoid not using net	The pregnant women believe the consequences of getting malaria through mosquito bite without the knowledge and treatment of malaria are significant enough.
3. Perceived benefits	Pregnant women believe that the recommended action of using ITN would protect them from having malaria and the psychological cost	Pregnant women having their nets and sleep under them every nights. Hence this prevent them from mosquito bites and finally from having malaria
4. Perceived barrier	Pregnant women identify their personal barriers to using net. (e.g fear of itching. not comfortable in the process of getting in and out	Pregnant women identify their personal barriers to getting tested with RDT/microscopy (e.g ability to get to the clinic. For necessary actions; costs, accessibility to net. Etc.
5. Cues to action	Reminder actions in form of net distribution, creating awareness towards net use, hanging and maintenance. Health talks and distribution of posters	Pregnant women receive full information about net use and malaria prevention strategies.

6. Self-efficacy	Pregnant women are able to have their net confidently and consistent in usage	Adequate guidance is provided (e.g. where to get net/tested and treated if suspected and infected.

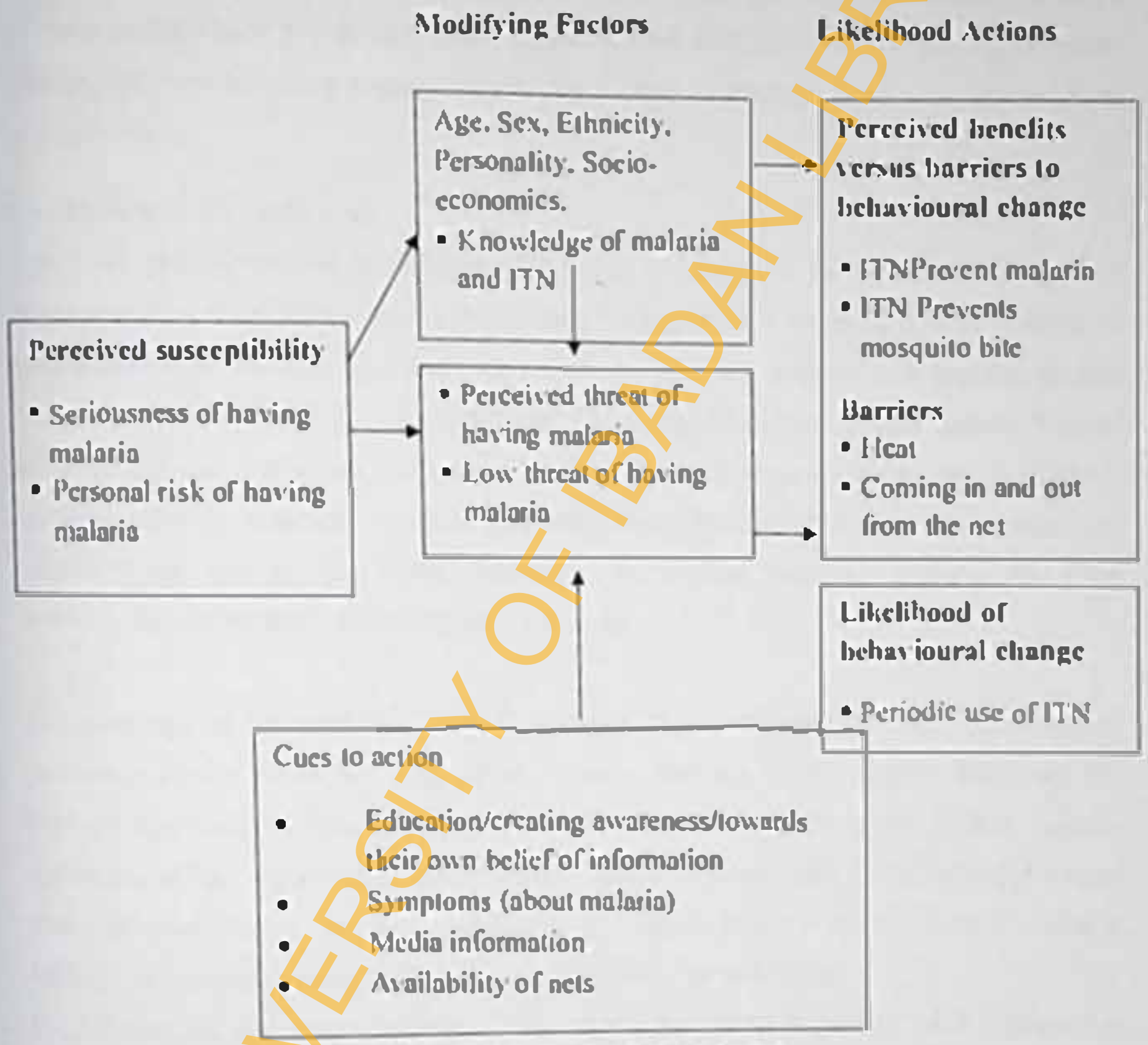

Figure 2.1 Health Belief Model

Adapted to study pregnant women's knowledge, perception, experiences and practices relating to Malaria and ITN

CHAPTER THREE

METHODOLOGY

Study Design and Scope

This study was a cross-sectional survey which focused on pregnant women's knowledge, perception and utilization of Insecticide Treated Nets (ITN). The study was limited in scope to the investigationof the factors which influenced the utilization of ITN among pregnant women who were attending primary Health Care Centres in Badagry Local Government Area of Lagos State.

Description of the study area

The study was carried out in Badagry LGA,which is located in the South-western part of Nigeria; it is a border town between Nigeria and the Republic of Benin. The LGA is about 57 kilometres by road from Lagos and runs parralled to the sea. Badagry was founded around 1425AD; (Mesewaku,2001) ; (Avosch,1938).The occupation of the people include fishing, farming, arts and crafts, salt making and trading. Badagry hosts a thriving museum which contains valuable historical antifacts especially those relating to slavery. The people are hospitable and they practice Islam, Christianity and African traditional religion. The town consists of residents from different parts of Nigeria.

The language of the people is "Ogu". Badagry LGA comprises different communities, prominent among which are Apa, Ajido, Kweme, Ilercko, Iworo, Ilogbo, Ikoga and the fourteen Ajara communities namely: Topa, Vetho, Agamathen, Isalu, Iyalin, Toriko, Agelaso Agbovipe, Itohun, Agadangba, Doko, Toriko, Panko and Zinvie-seje. In the course of history and particularly being the first community in Nigeria to have contact with Europeans, Badagry has recorded many firsts in the annals of the Nigeria history.
For instance, the first storey building in Nigeria was built there in the year 1845, slave relics, statue of the venue where Christianity was first preached in Nigeria, the first primary school in Nigeria (St. Thomas Primary School) and the early missionaries cemetery are all located in Badagry LGA. It is regarded as the cradle of western civilization in Nigeria.

Temperature is high throughout the year at about 80°C with a small range of temperature Avoseh (1939). The humidity is also high most of the time except during the dry season when it falls at about 60%. (Mesewaku, 1999). The LGA has two institutions of higher

leaming;these institutions are, the Administrative Staff College of Nigeria (ASCON) and NigeriaFrench Language Village.

There is a General Hospital, 19 Primary Health Centres and 23 Private Health facilities. There are 56 Public Primary Schools. 312 Private Primary Schools. 14 Public Secondary Schools and 26 Private Secondary Schools. Malaria is endemic in Badagry Local Government. The most vulnerable groups to malaria infection are mainly. children and pregnant women. The existing 19 primary health centres in the LGA are responsible for treating malaria cases (See Table 1), while 11 of the PHCs renders in addition ANC services (See table 2)

It is to be noted that from January to December 2015, 3450 under five and 5135 persons above five years were treated for malaria.From January to June 2016, 2942 under five and 5592 persons above five were also treated for malaria in the LGA.(M & E, BLG2015: 2016). The LGA routinely distributes ITN during ANC first visits to pregnant women and this is with effect from 2011. The ITNs are mostly supplied by the Global funds through NMCP in collaboration with the Lagos State Ministry of Health. Other stakeholders that are involved in the ITN distribution in the LGA are the Rotary Clubs, youth organizations in the state and sometimes the serving Youth Corps Members.

Study variables

The major independent variables included the following socio-demographic characteristics: age: religion; level of education and marital status. The dependent variables were the following: pregnancy and fertility history; awareness and knowledge relating to malaria; insecticide treated net; perception relating to ITN; perceived seriousness and vulnerability to malaria; malaria related experiences; treatment and prevention related issues; ownership and use of ITN; practices relating to use of ITN; barriers and facilitating factors relating to the use of ITN.

Table 3.1 Health facilities in Badagry Local Government Area

S/N	Name and location of facility	Whether provide ANC services	
		Yes	No
1	Marina PHC, Marina-Badagry	✓	
2	Ajara PHC, Mangoro, Ajara	✓	
3	Pota PHC, Ikoga Rd. Pota Badagry	✓	
4	Ajido PHC, Whispering Palms Rd, Iworo- Ajido	✓	
5	Topo/Idale PHC, Idale-Badagry		✓
6	Gbaresu PHC, Gbaresu Sea-beach		✓
7	Iragbo-Iragon PHC, Iragbo, Badagry		✓
8	Topa Health-post, Ajara-topa, Badagry		✓
9	Ilado PHC, Iworo-ajido Rd. Ilado	✓	
10	Ibereko PHC, Ibereko, Badagry	✓	
11	Ilogbo PHC, Ilogbo, Badagry	✓	
12	Mowo LPHC, Ikoga Rd. Mowo-Badagry		✓
13	Morogbo PHC, Morogbo, Badagry	✓	
14	Apa PHC, Along Owode Rd. Apa	✓	
15	Igbogbele PHC, Igbogbele, Badagry	✓	
16	Farasime PHC, Farasime Vill, Badagry		✓
17	Aseri Min Clinic, Owode-Market Aseri		✓
18	Sapo PHC, Along Badagry Seme exp. way Sapo		✓
19	Seme PHC, Seme border, Badagry	✓	

Sample Size determination

The determination of the sample size for this research was calculated by using the following sample size formula:

$$N = \frac{Z^2 apq}{d^2} \text{ (Leslie Kish Formula)}$$

Z = a variable with a critical value of (i.e 95% confidence level)

p = prevalence of utilization of ITNs among pregnant women (22%) WHO, 2010

d = desired precision

Where $Z^2 = 1.96^2$

p = 0.22 thus q = 1 – q = 0.78

d = 0.04

$N = 1.96^2 \times 0.22 \times 0.78 \div 0.0016$

Then, $N = \frac{1.96 \times 0.22 \times 0.78}{0.04^2} = 412$

Sampling Procedure

The procedure involved the stages thus:

- **Stage One:** All the eleven (11) PHCF rendering ANC services were purposively selected out of the total number of PHCF in Badagry Local Government Area.
- **Stage Two:** Taking the prevalence of utilization of ITN among pregnant women to be 22% (WHO, 2010). The sample size was calculated by using the sample size formular

$N = \frac{Z^2 apq}{d^2}$ (Leslie Kish Formula) to arrive at 412

- **Stage Three:** Systematic random sampling was used to select respondents in each facility with the aid of their ANC register. From the Ante-natal attendance register, the weekly attendance for each PHC was collected. The register showed that the total weekly ANC visits to the eleven (11) PHCF was 139.

(See table 2.3 for details)

A formular was derived to account for the proportionate ANC visits to each of the health care facility,

the formular was as follow:

$\frac{X}{Y} \times 412$; where X-represented the weekly attendance to each PHC; while Y-

represented the total weekly attendance to all the eleven (11) PHC rendering 24hrs.

For instance the proportionate sample for AJARA PHC was calculated as: $\frac{25}{139} \times 412$ which resulted in 72. The proportionate sample sizes for the remaining 10 PHC facilities were similarly calculated this way. (See table 3.2 for details).

In each PHC facility, the proportionate sample size was selected consecutively on an ANC clinic day.

Instrument for Data Collection

Data collection involved the use of a semi-structured questionnaire. The questionnaire comprised the following content elements: socio-demographic characteristic of the respondent; pregnancy and facility related history; awareness and knowledge relating to malaria and ITN; treatment and prevention related issues; ownership and use of ITN; practices relating to use of ITN; barrier factors relating to the use of ITN; and facilitating factors relating to use on Insecticide Treated Nets among pregnant women.

Validity and Reliability

Validity of the instrument

The validity of the questionnaire was ensured in several ways. The instrument was designed after the review of related literature. The drafted questionnaire was then given to my supervisor for his input. The drafted questionnaire was also given to other experts in community medicine, epidemiology and Health Promotion and Education for comments. Their comments were used to improve the quality of the instrument.

Reliability of the study instrument

Reliability was ensured by pretesting the questionnaire among a group of pregnant women in Oto-Ijanikin, PHC in Oto-Awori LGA. Forty-two (42) copies of the questionnaire were administered among pregnant women in Oto-Ijanikin Primary Health Care Centre.

The copies of the questionnaire were edited, coded and fed into a computer. The data were analysed using descriptive statistics and the alpha coefficient was calculated to determine the reliability of the questionnaire. The result obtained was 0.73 indicating that the instrument was valid.

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Training of Research Assistants (RA)

A one day training was conducted for five recruited Research Assistants (RA) who helped in data collection under the supervision of the investigator. The Research Assistants that participated in the pre-test exercise were practicing community Health Officers in the Local Government Area.

The training curriculum focused on issues which include the following: how to establish rapport with interviewees; explanation of the procedure for data collection to respondents; ways of securing consent from the respondents and interviewing skills. The training methods used included, brief lecture, discussion, role play and field trials.

Data Collection Process

An intinery for visiting the eleven (11) Primary Health Centres for data collection was drawn up. Two health care facilities were visited twice in a week before the proportionate sample size could be interviewed.

At each health centre, having introduced the process to the pregnant women by the health care provider giving health talk, each research assistant was assigned to each respondent. First rapport wasestablished between the RA and the respondent. This was followed by the securing of informed consent from the respondent. Only the respondent who consented to parcitipate i n the study was interviewed.

Data Analysis

The steps involved in data analysis included the following:

1. Serial Numbers were written on copies of the questionnaires for easy identification and recall of any instrument with problems. This was done before administering the questionnaire to the participants.
2. A coding guide was developed to enter the data
3. Data from the questionnaire survey were coded and entered into the computer using SPSS version 15.0. Data were later cleaned.
4. Data analysis was done using descriptive statistics T-test And ANOVA.
5. The findings are presented in chapter 4

Ethical consideration

Ethical approval was received from the Oyo state Ministry of Health. Permission was sought from the authorities of the Local Government used for the study. Consent of the participants

were sought after intimating them with the purpose of the study, its importance and benefit to their health.

Limitation of the study

The limitation encountered during the study was mainly the inability of the respondents to spend enough time with the research assistants. Many respondents were in a haste to leave Persuation and provision of brief information on the importance of the study were used to overcome the challenge or reduce it to the bearest minimum.

Table 3.2: Total weekly attendance at each PHC and the total sample size of each PHC

S/N	Health facility	Total weekly attendance	Calculated total proportionate sample size
1	Ajara PHC	25	74
2	Marina PHC	20	59
3	Pota PHC	18	53
4	Ajido PHC	15	44
5	Apa PHC	5	15
6	Ilogbo PHC	10	30
7	Ilado PHC	15	44
8	Seme PHC	4	12
9	Ibereko PHC	5	15
10	Morogbo PHC	10	30
11	Igbogbele PHC	12	36
	TOTAL	139	412

CHAPTER FOUR

RESULTS

4.1: Awareness and Knowledge Relating to Malaria and Insecticide Treated Nets

Respondents' knowledge on the cause of malaria is highlighted in Table 4.1. The table shows that majority (82.0%) of the respondents stated erroneously that malaria is caused by the mosquito, while only 3.3% correctly stated that malaria is caused by plasmodium. Other causes mentioned are shown in the table under reference. The symptoms of malaria are also shown in Table 4.1. About a quarter (24.5%) of the respondents correctly listed fever as one of the major symptoms of malaria. This was followed distantly by mention of general body pains (4.4%). The other details relating to the responses of the respondents are contained in the Table 4.1.

Respondents' knowledge on the possible health effects of untreated malaria among pregnant women is presented in table 4.2. The table shows that 19.2% of the respondents mentioned weakness of the body, while anaemia, loss of pregnancy, death, low birth weight and still birth were correctly listed as possible adverse effects of malaria in pregnancy by 17.7%, 16.5%, 9.0%, 1.2% and 0.7% respectively. Respondents' knowledge on the health effects of untreated malaria on unborn children is shown in figure 2. The figure shows that 39.8% erroneously stated that jaundice could be one of the health effects while Intra-uterine death and low birth weight were correctly listed by 23.4% and 17.8% of the respondents as possible health effects of untreated malaria on unborn children.

Table 4.3 reveals respondents' knowledge relating to whether pregnant women can pass malaria to their unborn babies. The table shows that majority (87.4%) of the respondents correctly stated that it was true that malaria can be transmitted from mothers to their unborn babies in-utero while 6.0% said they did not know. The table also highlighted the categories of people that readily get malaria. Majority (72.8%) correctly stated that under five children could readily get malaria. Other categories of respondents that are highly vulnerable to malaria were correctly mentioned as children with sickle cell (7.0%) pregnant women (9.7%) and visitors from non-endemic areas (1.0%).

Respondents were asked whether they had ever heard of insecticide treated net. Their responses are presented in table 4.4. Most (97.3%) respondents stated that they had heard of

insecticide treated nets. The table also revealed that majority of the respondents (87.4%) had heard about long lasting insecticide treated net. Table 4.5 shows the knowledge of the respondents relating to the benefits of insecticide treated nets. It was noted that more than one quarter of the pregnant women (41.9%) correctly stated that the technology can be used to prevent malaria. The proportion of respondents who correctly stated that it helps reduce malaria related mortality in under-five was 2.3%.

Respondents' knowledge relating to the consequences of malaria is presented in table 4.6. Slightly over half (50.5%) incorrectly stated that malaria can not lead to abortion while 15.5% said that they were not aware of the abortion as a consequence of the disease. The proportion of the respondents who stated correctly that malaria could lead to shortage of blood was 67.2%; some (22.8%) erroneously stated that the disease cannot lead to shortage of blood. Majority (82.0%) of the respondents correctly stated that pregnant women's exposure to malaria can lead to the birth of a baby with low birth weight.

Well over half (57.3%) of the respondents correctly stated that malaria can lead to miscarriage. Some (26.7%) of the respondents erroneously reported that the disease cannot in anyway lead to miscarriage. Only 12.9% of the respondents were knowledgeable about the fact that malaria can lead to febrile convulsion. Majority (71.8%) erroneously stated that the disease cannot in anyway lead to febrile convulsion.

The proportion of respondents who stated wrongly that malaria cannot lead to a reduction in productivity was 24.8%. A higher proportion (64.8%) correctly disclosed that malaria can lead to a reduction in the amount of work which one does. The other details relating to the respondents' knowledge of the consequences of malaria are shown in the table under reference. Figure 1 presents the categories of respondents' knowledge scores. The figure shows that less than half (44.7%) of the respondents had good knowledge. More than half (55.3%) respondents had poor knowledge.

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Table 4.1: Awareness and Knowledge Relating to Malaria and Insecticide Treated Nets: Cause and Symptoms

N=412

Knowledge	No	%
Respondents' knowledge on cause of malaria		
Mosquito	338	82.0
Dirty environment	36	8.7
Plasmodium parasite*	13	3.3
Staying in the sun	6	1.5
Heat	5	1.2
Stress	3	0.7
Too much of red oil	1	0.2
Vomiting	1	0.2
Non response	9	2.2
Major symptoms of malaria		
Headache	158	38.4
Fever*	101	24.5
General body pains*	18	4.4
Others**	127	30.8

+ There were multiple responses

* Correct response

** – Loss of appetite (1.2%), Weakness of the body (6.8%), Bitter taste (4.9%). Vomiting (9.2%), Dark Urine (1.5%), Spitting saliva (0.5%), Convulsion (0.2%),Cough and Catarrh (3.8%), Anaemia (0.2%), Diarrhoea (1.0%), Yellowness of the eyes (0.7%), Death (0.2%), Abdominal pains (0.2%), Sweating (0.2%), Thirst (0.2%)

Table 4.2: Respondents' knowledge on possible health effects of untreated malaria among pregnant women

N=362

Possible Health Effects (Dangers) of Untreated Malaria in a Pregnant Woman**	No	%
Weakness of the body	79	19.2
Anaemia*	73	17.7
Loss of pregnancy*	68	16.5
Death*	37	9.0
Yellowness of the eyes of the mother	29	7.0
Convulsion/Coma/Fever	24	5.8
Headache	15	3.6
Difficulty in breathing	13	3.2
Insomnia	7	1.7
Anorexia	6	1.5
Low birth weight*	5	1.2
Stillbirth*	3	0.7
No idea/I do not know	3	0.7

* Correct responses

** There were multiple responses.

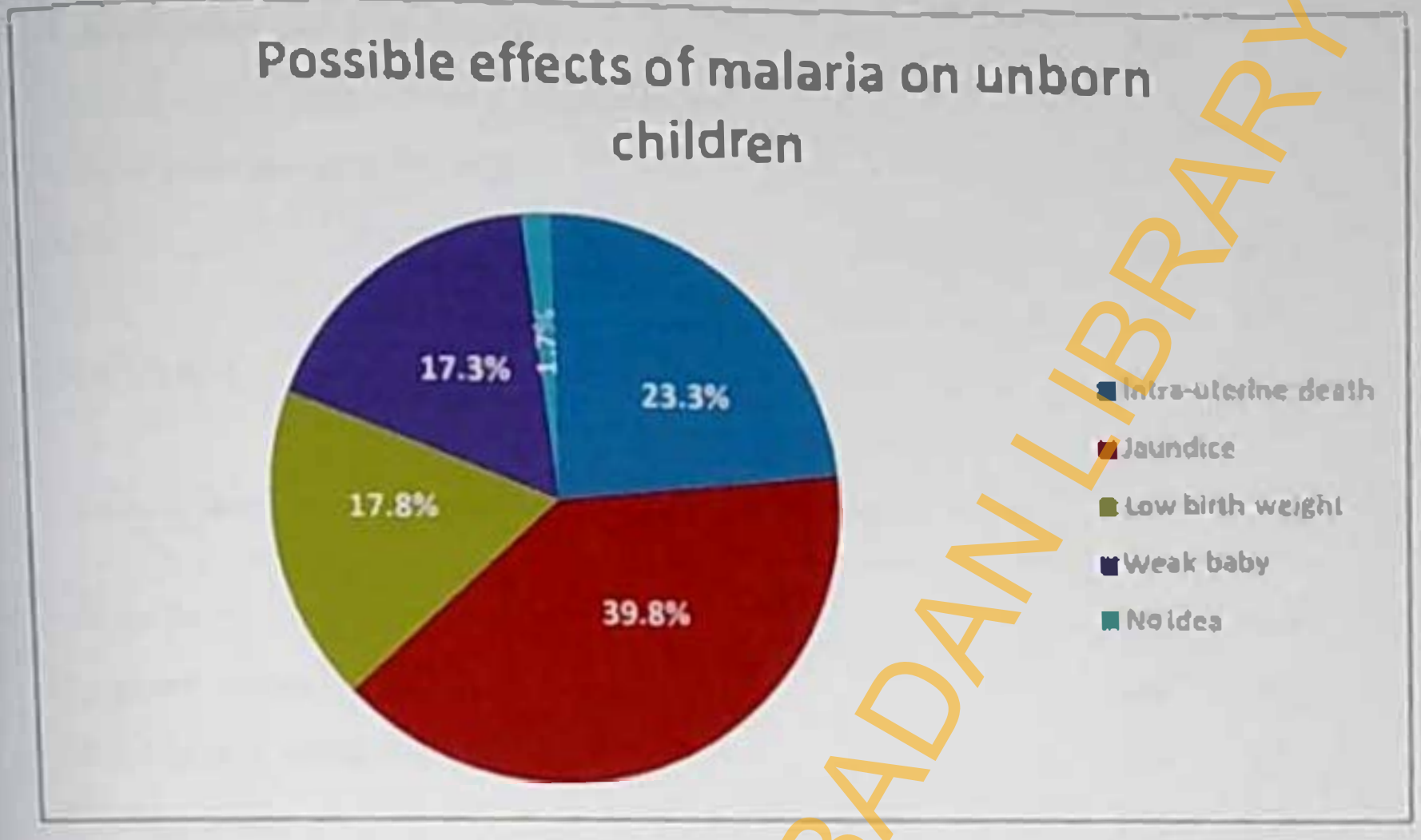

Fig 4.2: Respondents' knowledge on the health effects of untreated malaria in unborn children

Table 4.3: Respondents' knowledge relating to transmission of malaria in-utero and groups of persons that readily vulnerable to malaria

(N= 412)

Transmission and Vulnerability	No	%
Malaria can be passed from a mother to her unborn baby in-utero(N= 412)		
True*	360	87.4
False	27	6.6
Don't Know	25	6.0
Group of people that can readily get malaria (N=396)		
Under five*	300	75.8
Pregnant women*	40	10.1
Children with sickle cell*	29	7.3
Young persons	11	2.7
All adults	6	1.5
People that live beside rivers	6	1.5
Visitors from USA/ non endemic areas*	4	1.0

* Correct responses

Table 4.4: Respondents' awareness relating to insecticide treated nets and long lasting insecticide treated nets

N=412

Awareness	No	%
Ever heard of insecticide treated net		
Yes	401	97.3
No	11	2.7
Ever heard about long lasting insecticide treated net		
Yes	360	87.4
No	52	12.6

Table 4.5: Respondents' knowledge relating to the benefits of Insecticide Treated Net

N=394

Benefits	No	%
It prevents malaria+	165	41.9
It kills mosquitoes	150	38.0
It prevents other diseases apart from malaria	33	8.4
It helps to sleep well	32	8.2
It reduces malaria mortality in children under five+	9	2.3
Don't know	4	1.0
It withstands multiple wash	1	0.6

+ Correct responses

Table 4.6: Respondents' Knowledge Relating to the Consequences of Malaria

N=412

Statements	Responses		
	True (%)	False (%)	Don't Know (%)
Malaria cannot lead to abortion	140(34.0)	208(50.5)*	64(15.5)
Malaria cannot in any way lead to shortage of blood	94(22.8)	277(67.2)*	41(10.0)
Experiencing repeated exposure of malaria can lead to birth of a baby with low birth weight	338(82.0)*	35(8.5)	39(9.5)
Malaria cannot in anyway lead to miscarriage	110(26.7)	236(57.3)*	66(16.0)
Malaria cannot in anyway lead to febrile convulsion	296(71.8)	53(12.9)*	63(15.3)
Malaria cannot lead to a reduction in the amount of work which one usually does	102(24.8)	267(64.8)*	43(10.4)

*Correct Reponses

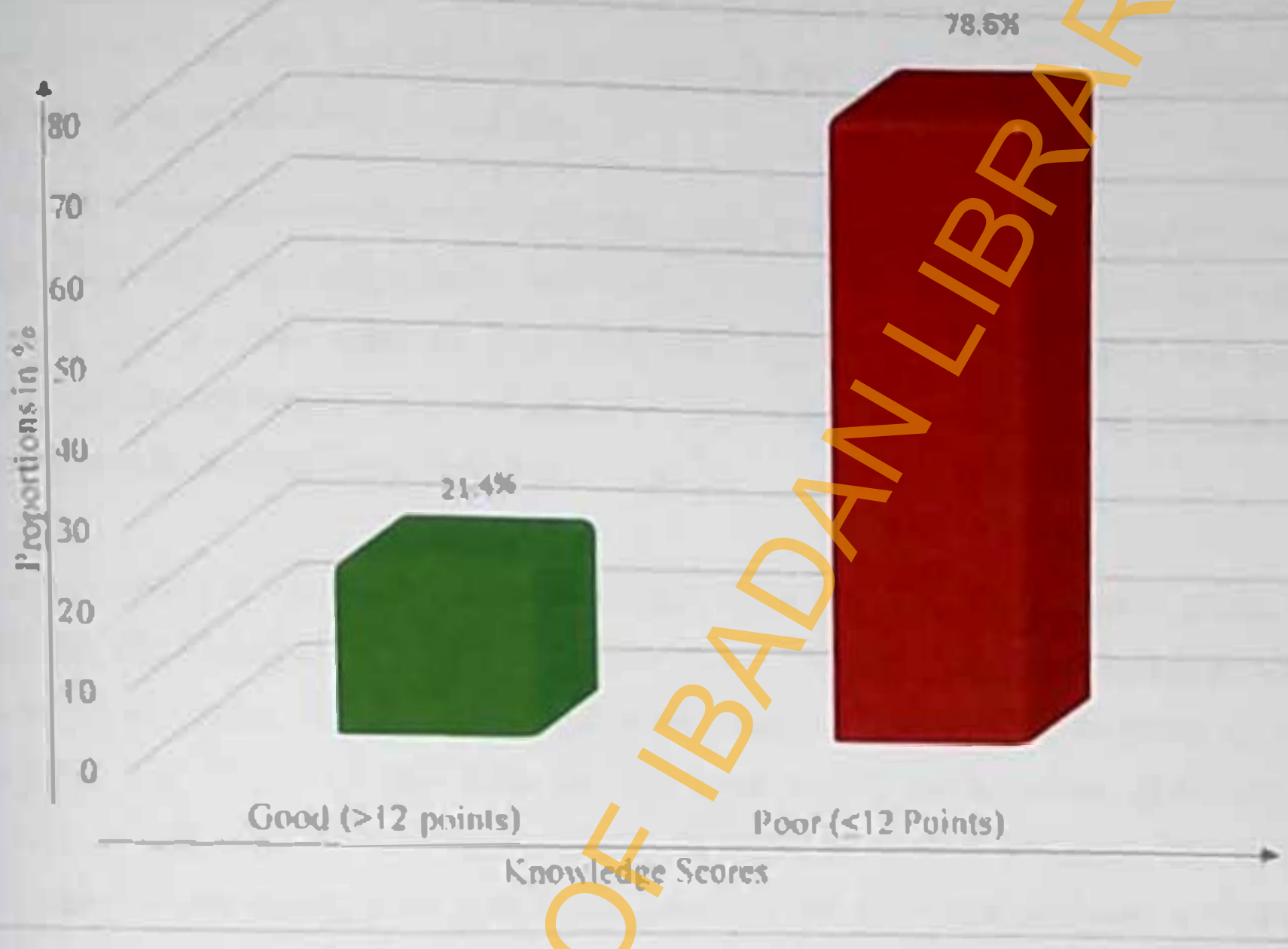

Figure 4.3: Categories of knowledge scores among the respondents

4.2: Comparison of respondents mean knowledge scores

The comparison of respondents' mean knowledge scores by age is shown in table 4.7 Respondents aged ≥41 years had the highest mean knowledge score of 13.3 ± 3.1. This is followed closely by respondents aged <21 years with a mean score of 12.2 ± 2.5. The other mean scores by age are depicted in the table. Overall, there was a significant difference in respondents mean knowledge score by age.

Table 4.8 presents the comparison of respondents' mean knowledge scores by marital status. Respondents who were single had a mean score of 11.2 ± 3.8 followed by those who were married with a mean score of 10.9 ± 3.1.The score among respondents who were divorced/separated was 10.7 ± 3.1. Overall, there wasno significant difference in respondents mean scores by married status (See table for details).

The comparison of respondents mean knowledge scores by level of education is shown in table 4.9. The highest mean knowledge score of 12.2 ± 3.2 was obtained by respondents with no formal education. The mean knowledge score among respondents with secondary school education was 11.2 ± 3.2 (See table for other mean scores). On the whole, there was a significant difference between respondents mean scores by level of education. The mean knowledge scores among those with formal education and non-formal education were also compared (see table 4.10). The mean knowledge scores of 12.2 ± 3.2 obtained by respondents with no formal education was noted to be significantly higher than the 10.8 ± 3.1 scored by respondents with formal education.

Table 4.11 reveals the comparison of respondents' mean knowledge scores by ownership of an ITN. The mean knowledge score of 11.1 ± 3.0 obtained by respondents with ITN was significantly higher than the mean score of 9.9 ± 3.6 obtained by respondents who had no ITN. Similarly, the mean knowledge scores of the respondents who ever used an ITN and those who had never used were compared and the results are presented in table 12. The mean knowledge score of respondents who had ever used an ITN was 11.1 ± 3.0 while among those who had never used one the mean score was 10.1 ± 3.5. The difference was found to be significant.

Table 4.7 Comparison of respondents' mean knowledge scores by age

N=412

Age in years	No	Knowledge Scores		F	Level of Significance
		$\bar{X}$	SD		
<21	12	12.2	2.5	2.662	0.048*
21 – 30	249	10.6	3.0		
31 – 40	145	11.1	3.3		
≥41	6	13.3	3.1		

*Significant at 0.05

Table 4.8: Comparison of respondents' mean knowledge scores by marital status

N=412

Marital Status	No	Knowledge Scores		F	Level of Significance
		$\bar{X}$	SD		
Single	12	11.2	3.8	0.056	0.945*
Married	392	10.9	3.1		
Divorced/Separated	8	10.7	3.1		

*Not significant at 0.05

Table 4.9: Comparison of respondents' mean knowledge scores by level of education

N=112

Level of education	No	Knowledge Scores		F	Level of Significance
		$\bar{X}$	SD		
No formal education	20	12.2	3.2	3.453	0.017*
Primary school	62	11.0	3.2		
Secondary school	157	11.2	2.8		
Post secondary** (NCE, HND, 1st degree, Masters)	173	10.4	3.4		
Total	412	10.8	3.1		

*Significant at 0.05

Table 4.16: Comparison of respondents' mean knowledge scores by receipt of formal and Non-formal education

N=412

Level of Education received	No	Knowledge Scores		F	Level of Significance
		$\bar{X}$	SD		
No formal education	20	12.2	3.2	1.997	0.046*
Formal education	392	10.8	3.1		

*Significant at 0.05

**This indicate NCE, HND, First Degree, Masters.

Table 4.11: Comparison of respondents' mean knowledge scores by ownership of ITN

N=412

Net ownership	No	Knowledge Scores		T	Level of Significance
		$\bar{X}$	SD		
Own net	337	11.1	3.0	2.706	0.007*
Don't own a net	69	9.9	3.6		

*Significant at 0.05

Table 4.12: Comparison of respondents' mean by ever use of an ITN

N=412

History of used	No	Knowledge Scores		T	Level of Significance
		$\bar{X}$	SD		
Ever used	304	11.1	3.0	2.899	0.004*
Never used	99	10.1	3.5		

*Significant at 0.05

4_3: Respondents' perception relating to insecticide treated net

The perception of the respondents relating to insecticide treated net is shown in table 4.13. Majority (89.1%) of respondents were undecidedin respect of whether insecticide treated net (ITN) can stop mosquito from getting access to someone. Only 8.7% were of the perception that insecticide treated net cannot stop mosquito from biting someone. This is not a reflection of reality if nets are used appropriately. The perception of 9.0% was that insecticide treated nets are only useful for preventing mosquitoes during raining season; this is an inappropriate perception. Very few (10.4%) of the respondents had inappropriate perception that ITN can sufficate users. A majority (85.0%) did not share this perception.

The table under reference also revealed that 85.7% were undecided in aspect of whether pregnant women should only use insecticide treated net when they are in third trimester. A majority (82.3%) were also undecided in terms of whether ITN can not prevent malaria.

The results of respondents, perception relating to seriousness and vulnerability to malaria are presented in Table 4.14. Majority (85.4%) of the respondents were undecided that malaria was a serious disease for a pregnant woman. Majority (81.6%) did, however, also were undecided with the view that malaria is not more serious in pregnant women than women who are not pregnant. The proportion of respondents who were of the perception that they could get malaria but that the disease cannot affect their babies in the womb was 19.7%. Slightly over half (54.4%) of the respondents were of the opinion that their chance of getting malaria in pregnancy was high.

Table 4.13: Respondents' perception relating to insecticide treated net

N=412

Perception related statements	Responses		
	Agree (%)	Undecided (%)	Disagree (%)
Mosquito net not treated with insecticide are safer than those with insecticides	30(7.3)	372(90.3)	10(2.4)
Insecticide treated net cannot stop mosquito from biting someone	36(8.7)	367(89.1)	9(2.2)
Taking *agbo* or herbal medicine regularly protects people from malaria than using an insecticide treated nets	48(11.7)	313(76.0)	51(12.3)
Insecticide treated nets are only useful for preventing mosquitoes during the rainy season	37(9.0)	369(89.6)	6(1.4)
One cannot use a mosquito net if one's bed is bigger or larger	23(5.6)	376(91.3)	13(3.1)
Mosquito net can suffocate one when sleeping under it	43(10.4)	19(4.6)	350(85.0)
Sleeping under mosquito net does not allow one to sleep well	32(7.8)	370(89.8)	10(2.4)
Use of insecticide treated net throughout pregnancy can harm	29(7.0)	371(90.1)	12(2.9)
Sleeping under mosquito net makes one sweat because it generates heat	29(48.8)	371(46.1)	21(5.1)
Pregnant women should only use insecticide treated net when they are in their third trimester	35(8.5)	353(85.7)	24(5.8)
Insecticide treated net cannot prevent malaria	47(11.4)	339(82.3)	26(6.3)

Table 4.14: Respondents' Perception relating to Seriousness and Vulnerability to Malaria

N=412

Perception statements relating to seriousness and vulnerability	Responses		
	Agree (%)	Undecided (%)	Disagree (%)
Malaria is not a serious disease for a pregnant woman	32(7.8)	352(85.4)	28(6.8)
Malaria is not more serious in pregnant women than women who are not pregnant	42(11.4)	336(81.6)	29(7.0)
Malaria is a mild disease	58(14.1)	335(81.3)	19(4.6)
I believe you can never get malaria	36(8.7)	350(85.0)	26(6.3)
Malaria is not a major problem which pregnant women should worry themselves about.	53(12.9)	34(82.5)	19(4.6)
Malaria is very common in the area where I live, so I am afraid of getting it	159(38.6)	212(51.5)	41(9.9)
I can get malaria but it won't affect the baby in my womb	81(19.7)	300(72.8)	31(7.5)
The chance of getting malaria in pregnancy is high	224(54.4)	148(35.9)	40(9.7)

4.4: Malaria-related Experiences

Respondents' history of experience of malaria is presented in Figure.4. The figure shows that majority (76.2%) had ever experienced malaria.This table also reveals that 30.1% respondents had 2-4 episodes of malaria within the last six months preceding the study. Only 16.0% said they had more than four episodes of malaria. The mean number of episodes of malaria within the last six months preceding study was 2.4±1.7.The figure under reference also reveals that 47.6% had experienced malaria once during current pregnancy while 27.9% had experienced the disease with 2-4 times during the current pregnancy. The mean number of episodes of malaria experienced during current pregnancy among the respondents was 1.8±1.2.

Table 4.15 shows the malaria related preventive practices among respondents. Use of ITN (47.4%) topped the list of the technologies or materials use by respondents to prevent malaria. This was followed by use of drugs (32.9%) which were not specified. Use of herbs was mentioned by 3.9% (See details in table).

A question was asked to probe into whether respondents had ever been told about what pregnant woman can use to prevent malaria. The resource are presented in table 4.16. The response of majority (85.4%) was in the affirmative and what they were reportedly told to be using included the following; ITN (65.5%); IPT/malaria drugs (9.7%) environmental sanitation (5%); and insecticide (1.8%).

Table 4.17 reveals respondents' sources of information on malaria preventive actions for pregnant women. Health care/facility (80.3%) topped the list followed by mass media (radio/television) (11.7%), religious homes (mosques/churches) (2.7%). Others sources of information are shown in the table under reference.

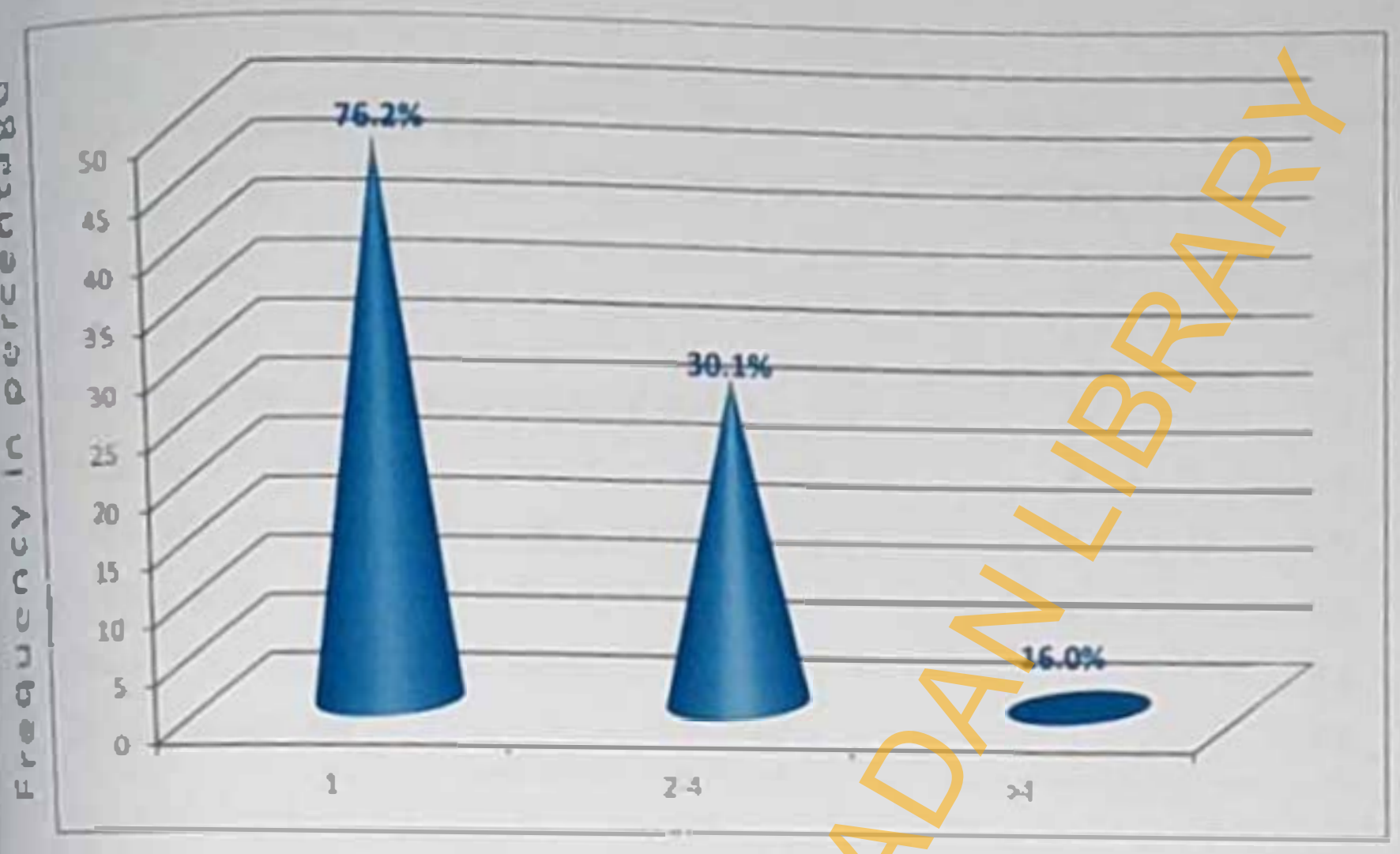

Fig.4.4: Malaria Related Experiences among the Respondents

Table 4.15: Malaria Preventive Practices among Respondents

N=376

Malaria preventive practices	No	%
Use of net/ITN	195	47.4
Use of drugs	135	32.9
Use of herbs	16	3.9
Cleaning of the environment/cutting of grasses	10	2.4
Spraying of insecticides	8	1.9
Use of IPT (Intermittent Preventive Treatment)	8	1.9
Nothing at all	2	0.5
Prayer	1	0.2
Taking enough rest	1	0.2

Table 4.16: Responded Awareness of malaria prevention methods.

Awareness variables	No	%
Ever been told about what pregnant women can use to prevent malaria (N=396)		
Yes	352	85.4
No	44	10.7
What respondents were told to be using to prevent malaria (N=376)		
Net/ITN	270	65.5
IPT/Malaria drugs	40	9.7
Insecticides	7	1.8
Environmental Sanitation	20	5.0
Report of case of malaria to health worker	1	0.2
Taking fruits	1	0.2
Non response	43	17.7

Table4.17: Respondents' sources of information on malaria preventive actions for pregnant women

N = 264

Sources of information on malaria preventive actions	No	%
Health care facility	212	80.3
Mass media/radio/television	31	11.8
Religious homes/mosques/churches	7	2.7
Parents	4	1.5
Instructional materials/posters	4	1.5
Chemists	3	1.1
Friends/neighbours	3	1.1

4.5: Ownership and Use of Insecticide Treated Net among Respondents

Table 4.18: highlights respondents' ownership and use of insecticide treated nets. Majority (88.3%) of the respondents had ever owned an insecticide treated netand 81.8% were having one at the time of study. The proportion of respondents who used a net within the last one month preceding the study was 67.0%. Slightly over half (53.9%) reported that they slept under treated net during the night preceding the study. The sources of ITN among respondents are shown in table 4.19. Majority (84.5%) of the respondents got their nets from Health Centres/Health facilities. Very few (3.7%) obtained nets from markets while 2.4% reported pharmacy/chemist as their source.

Respondents' practices relating to the use of ITN are shown in table 4.20. Majority (74.9%) of the respondents used ITN all the time. This is followed distantly by use of ITN when the weather is not hot (12.8%). Only 5.3% used ITN during the raining season.The frequency of use of ITN among the respondents is also presented in the table under reference. Over half (56.6%) used ITN every day, while 29.6% used ITN occasionally. The period of the day when respondents used ITN is also highlighted. A majority (88.6%) used their nets when sleeping at night while just 7.5% reported that they use ITN anytime they want to sleep.

Table 4.18: Ownership and Use of Insecticide Treated Net among Respondents

	N=412		
Ownership and Use	Response		
	Yes (%)	No (%)	NR* (%)
Whether ever owned an insecticide treated net	364(88.3)	44(10.7)	4(1.0)
Whether currently owned an insecticide treated net	337(81.8)	69(16.8)	6(1.4)
Ever used insecticide treated net in pregnancy	304(73.8)	94(24.0)	9(2.2)
Whether used insecticide treated net during your last pregnancy	287(69.7)	117(28.4)	8(1.9)
Whether use insecticide treated net within the last one month	278(67.5)	124(31.3)	7(1.7)
Whether slept under the insecticide treated net during the night preceding the study	222(53.9)	181(43.9)	9(2.3)

*Non response

Table 4.19: Sources of Insecticide Treated Net ever owned by respondents

Sources of net	N=412	
	No	%
Health centre/ Health facility	348	84.5
Market	16	3.7
Phonnacy/chemist	10	2.4
Others*	38	9.4

* Street hawkers 26(6.3%). Friends 12 (2.9%)

Table 4.20: Practices relating to use of Insecticide Treated Nets among Respondents

N=412

Practices	No	%
Time/ period when respondents sleep under net		
All the time	308	74.9
When weather is not hot	53	12.8
During the rainy season	22	5.3
During harmattan only	12	2.9
Hot period of the year	8	1.9
No response	9	2.2
Frequency of use of insecticide treated net		
Every day	233	56.6
Occasionally	122	29.6
Rarely	28	6.8
Never use it	29	7.0
Period of the day when usually use insecticide treated net		
When sleeping during the daytime	16	3.9
When sleeping at night	365	88.6
Anytime I want to sleep	31	7.5

4.6: Barrier Factors Relating to the Use of Insecticide Treated Net among Respondents

Table 21 highlights barrier factors relating to the use of insecticide treated net amongrespondents.The barrier that topped the list was that ITN generates a lot of heat (51.7%). This was followed distantly by the disclosure that ITN are not readily available in the market (26.5%).

The problem of getting in and out of the net during use prevents some respondents (24.2%) from using ITN in the night. Lack of skills relating to the hanging of ITN constituted a barrier to 20.4% of the respondents (See the table under reference for details).

Table 4.22 shows the factors which facilitate the use of insecticide treated net among the respondents. Provision of ITN free of charge was a facilitating factor to most (93.7%) respondents. Prevention of mosquitoes bite was a facilitating factor to use of ITN by 96.1% respondents. The other facilitating factors are presented in the table under reference.

Table 4.21: Barrier Factors Relating to the Use of Insecticide Treated Net among Respondents

N=412

Barrier related factors	Yes (%)	No (%)
Cost of purchasing mosquito net prevents respondents from using it.	60(14.6)	352(85.4)
Insecticide treated net are not readily available in the market.	109(26.5)	303(73.5)
Insecticide treated net generates a lot of heat	213(51.7)	199(48.3)
Sharing a bed with two or more persons prevents one from using a mosquito net.	64(15.5)	348(84.5)
My sleeping room is full of many items so nowhere to hang mosquito net.	41(10.0)	371(90.0)
Lack of skills in hanging the net prevents people from using the insecticide treated net.	84(20.4)	328(79.6)
Problems of getting in and out of the net prevents pregnant women from using insecticide treated net	100(24.2)	308(75.8)

Table 4.22: Facilitating factors relating to the use of insecticide treated net listed by respondents

N=412

Facilitating Factors	Responses	
	Yes (%)	No (%)
Insecticide treated net are usually given to pregnant women free of charge	386(93.7)	26(6.3)
Insecticide treated nets are given to pregnant women at an affordable price	113(27.4)	299(72.6)
I can hang the net on my own	361(87.6)	51(12.4)
Insecticide treated net protects you from mosquito bite	396 (96.1)	16(3.9)
Insecticide treated net makes one sleep well	366(88.8)	46(11.2)
Insecticide treated net keeps you warm when it is cold	381(92.5)	31(7.5)
Insecticide treated net prevents you from having malaria	388(94.2)	24(5.8)
Husband always encourages you to use insecticide treated net	368(89.3)	44(10.7)
Healthcare workers always advise you to use insecticide treated net	397(96.4)	15(3.6)
Relatives advise you to use insecticide treated net	346(84.0)	66(16.0)

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Awareness and Knowledge Relating to Malaria and Insecticide Treated Nets

Majority of the respondents stated erroneously that malaria is caused by mosquito. This is in contrast to the study conducted by Fuge, Ayoola, Gumnno (2015) and Nwele, Ibiam, Onwe, Azi, Eze; Obi (2014). (Fuge et al; 2015) for instance conducted their study on the knowledge, attitude and practice relating to malaria and ITNs utilisation among pregnant women in Shashogo district in Southern Ethiopia. Nwele et al, on the other hand, conducted their study in a General Hospital at Ezza-North LGA, Ebonyi State among mothers relating to malaria transmission. The two studies (Fuge et al; 2015) and (Nwele et al; 2014) revealed that respondents linked transmission of malaria to the mosquito and not that mosquito is a cause. The common belief among people in Bndngry LGA relating to malaria is that the disease is caused by mosquitoes.

About a quarter of the respondents correctly listed fever as one of the major symptoms of malaria this was followed distantly by mention of general body pains. Those findings are similar to what Abayomi (2015) noted in his study. Abayomi's study focused on the assessment of Malawian mothers' malaria knowledge, healthcare preference and timelines of seeking fever treatments for under-fivechildren. This study showed that more respondents identified fever and body ache as some of the symptoms of malaria. These similarities might be because most people have experienced malaria at one point or the other and as such know the major symptoms of malaria to be fever. It is to be noted that the disease is endemic in many part of Africa South of the Saharan and most people in malaria endemic regions of Africa experience attack of the disease at least once a year .The result that Intra-uterine death and low birth weight are possible health effects of untreated malaria on unborn children is similar to what has been reported in the literature from areas of high transmission of malaria (Chigozie and Uneke 2007); (Kalanda, Van Buwzen, Verhoeff; Barbin, 2005). It is not surprising that respondents correctly reported intra-uterine death and low birth weight as possible adverse effects of malaria. The effect of malaria on foetal growth and outcomes constitute vital outcomes of malaria in pregnant women in Africa (Guyatt; Snow, 2004)

Majority of the respondents correctly stated that it was true that malaria can be transmitted from mothers to their unborn babies in-utero. This agrees with a lot of studies that have shown that transmission of malaria to unborn babies or congenital malaria exists in sub-Saharan Africa in general and Nigeria in particular (Fischer, 1997; Pengsaa, 2007; Wagner, Koram, McGuiness, Bennet, Nkrumah and Riley: 1998; Lesi, Mukhtar, Iroha, Egri-Okwaji, 2010). The reason for this might be because patients are thoroughly well aware of the effects of the disease on infants. This may be as a result of effective patient education in the health facility or the various media campaigns embarked upon by health related organisations in Nigeria with respect to the adverse effects of malaria on pregnant women and children.

Most respondents stated that they had heard of insecticide treated nets. It was also revealed that all the respondents had heard about long lasting insecticide treated nets. These findings are not very different from what Ukibe, Mbanugo, Ukibe and Ikeakor, (2013) found in a study which focused on the level of awareness and use of ITNs among pregnant women attending antenatal clinics in Anambra state Nigeria. Ukibe et al; (2013) revealed 93% of the respondents were aware of ITN.The similarity between this study and that of Ukibe et al could be that both studies were conducted in health care facilities where the use of ITN are always encouraged and promoted by health workers.

One of the results of this study showed that less than half of the respondents correctly stated that the ITN can be used to prevent malaria. This is slightly different from the findings of the study conducted by Emmanuel, Joseph, Kopdima, Mba; Abubakar, (2016). Emmanuel et al; (2016) noted in their study on Malaria prevention among pregnant women in Bauchi State, Nigeria, that majority of the respondents agreed that ITN is a useful tool in prevention of malaria. The difference might be due to the quality of facility-based health education services rendered in the health facilities used. The health facility used in the study by Emmanuel et al; (2016) is a General Hospital which is higher level health facility compared to the Primary Health Care centres used in this study. Therefore it is expected that the quality of Health education provided at the general hospital will be significantly better than that of PHCs.

It was noted in the study that less than half of the respondents had good knowledge of malaria and ITN. This is at variance with findings of studies conducted by Adebayo et al: (2015) and Runsewe-Abiodun et al; (2012) which showed that majority of respondents had good knowledge of these concepts. The study by Adebayo et al; (2015) was community based

while the study by Ruiseve-Abiodun et al (2012) was conducted in secondary health facilities respectively. It could be that the respondents in the two studies had access to better information about malaria compared to the respondents in this study.

5.2 Respondents' perception

The perception of most respondents was that insecticide treated net (ITN) can prevent mosquito from getting access to an individual. This notion does not necessarily applies that they believe in the efficacy of ITN in the prevention of malaria. In a study conducted inZewdneh, Tadesse and Dawit, (2011)in Ethiopia, it was reported that most respondents believe in the efficacy of ITN in the prevention of malaria. This could be as a result of the several interventions directed towards the reduction of malaria by different bodies in both countries.

Majority of the participants did not hold the view that ITNs are only useful during the raining season. This is an appropriate perception,it is a perception that can facilitate the adoption of ITN. However, majority of the respondents had the appropriate perception that ITN should be used by pregnant women whenever they go to bed irrespective of season. This shows that the respondents understand the vital need for the use of ITN every time. This is a real indicator of their favourable perception of ITN and their perceived susceptibility to disease.

Majority of the respondents in this study were of the view that malaria was a serious disease for a pregnant woman. This is a perception that is inline with the scientific view.The qualitative study conducted by Mbonye, Neema and Magnussen, (2005) in Uganda similarly revealed that participants were of the view that malaria is a leading cause of ill health among children and pregnant women. In this study majority shared the view that malaria is not more serious in pregnant woman than women who are not pregnant. This is an erroneous perception which is at variance with the scientific view. The study by Mbonye et al (2005) revealed that participant were of the view that the fever caused by mosquito was perceived as the leading cause of ill health among children and pregnant women

The proportion of respondents who were of the perception that they could get malaria but that the disease cannot affect their babies in the womb was 19.7%. This perception is not favourable in that it deviates from scientific view. Several studies such as those of Fischer (1997); Pengsaa (2007); Wagner, Koram, McGuiness, Bennet, Nkrumah and Riley (1998); Lesi, Mukhtar, Iroha, Egri-Okwaji, (2010) have shown that malaria can adversely affect the

baby in-utero. Malaria infnct can lead to abortion Runsewe et al (2012) low birth weight Mwandama et nl;(2015).

5.3 Malaria-related Experience of respondents

The result of this study shows that majority of the respondents had ever experienced malaria.More respondents had 2-4 episodes of malaria within the last six months preceding the study. This is slightly contrary to the study conducted by Omotosho Ibrahim Musa et al; (2009). Musa et al (2009) who conducted their study among women attending antenatal clinic in Northern Nigeria, noted that their respondents had experienced at least one episode of malaria in the months preceding the study. More respondents studied by Musa et al however had 2-4 episodes in the months preceding the study. Studies have shown that in endemic areas people experience at least two episodes of malaria in a year Ugwu et al; (2015). The slight difference in the number that had ever experienced malaria might be because the burden of malaria is higher in the southwest where this study was conducted. The similarities in the two studies that more respondents had 2-4 episodes of Malaria attest to the fact that the burden of Malaria is endermic in most part of Nigeria and not that pregnant women are particularly vulnerable.

The ITN was the technology used by most respondents in this study for preventing malaria. This was followed by the use of drugs which were not specified. Alabi. Oluwole,(2012) had a similar finding in the study designed to study the determinants of uptake of ITN among pregnant women in Ado-Odo/Ota LGA of Ogun state. Alabi et al(2012) noted that ITN was used by majority of the respondents. The similarity could not be unconnected with the fact that respondents in both studies were receiving antenatal care from health facilities. The patient education received in the health facilities could have positively influenced their reported use of (ITN) Insecticide Treated Nets.The intermittent preventive therapy (IPT) malaria drugs, environmental sanitation and insecticide were the other methods respondents said they had been told to use for preventing occurrence of malaria.

In this study, more respondents got their information on the prevention of malaria from health care facilities followed by mass-media (radio/television) and religious homes (mosques/churches). This is in congruence with the findings of Fuge et al (2015). Fuge et al (2015) also noted that more respondents got their information from health facilities. This similarity might be connected with the fact that respondents in the two studies were pregnant

women who receive patient education on a variety of health-related issues during antenatal care.

5.4: Ownership and Use of Insecticide Treated Nets among Respondents

Majority of the respondents had ever owned an insecticide treated net. Similarly, most of the respondents had a net at the time of study. This is similar to the study by Sangare, et al (2012) which revealed that 72% of the women in the study owned an ITN. This may be because respondents in both studies were conscious of their vulnerable state of being pregnant. The motherly instinct to protect the transmission of the disease to the baby might also be a factor. Slightly over half reported that they slept under treated net during the night preceding the study. This is higher compared to the figure reported in the Multiple Indicator Cluster Survey for Nigeria (National Bureau of Statistics (NBS. 2011) and the National Demographic Health Survey, (NPC. 2014); the figures obtained from these two surveys were below half. The reason for the disparity might be due to the nature of the surveys that this study is been compared with. The latter were national surveys while this study focused on a particular location (Local Government Area). It might also be that this study was recently conducted compared to the other surveys and as such the figures might have improved.

Majority of the respondents got their nets from health centre/health facilities. Very few obtained nets from markets and pharmacies. Health centres have always been utilised as the vehicle for the dissemination of important health innovations such as those relating to ITN. The reason for this is that some of these innovations are more affordable through the health care centres because most times it is subsidised to encourage ownership and usage. Majority of the respondents used ITN all the time. Over half use it everyday and majority use their net when sleeping at night while very few reported that they use ITN anytime they want to sleep. These findings are contrary to the findings of obtained by Fuge et al (2015) which showed that more than half of the respondents who owned ITN used them poorly. The pattern of use of ITN by the respondents needs to be improved upon. What is desirable is universal adoption and regular use of ITN by pregnant women.

5.5 Factors Relating to the Use of Insecticide Treated Net among Respondents

The major barrier factor relating to the use of ITN among respondents in this study was identified to be heat.Previous studies have shown that the factors which militate against regular use of ITN include heat Kareem et al (2015) and Awosan et al (2013)

A study conducted by Sangare, Weiss, Brentlinger, Richardson, Staedke, Kiwuwa; Stergachis, (2012) in Jinja Uganda similarly revealed that heat was a reported barrier to the use of the technology. Sangare et al (2012) conducted their study on determinants of use of ITNs for the prevention of malaria in pregnancy among women who had ever been pregnant. The reason for this similarity may not be unrelated to the fact that the weather in Africa is genetally hot compared to other continents and it has always been noted that the ITN adds to the existing heat during usage. It was also noted in this study that the problem of getting in and out of the net during use prevents some respondents from using ITN in the night. This amounts to inconvenience which bas also been documented as a factor by Sangare et al (2012)

The major factor which promotes the use of ITN among the respondents was provision of product free of charge. This is similar to the findings obtained by Grabowsky, Nobiya Selanikio (2007) who conducted an intervention relating to the coverage of ITN in Ghana. It was noted by them that mass distribution of ITNs and routine provision of the product or subsidized vouchers for ITNs to pregnant women increased ownership and usage in intervention areas. Similar studies by Agha, Van Rossem, Stallworthy; Kusanthan (2007), Maxwell, Rwegoshora, Magesaand Curtis (2006) and Pettifor, Taylor, Nku, Duvall, Tabala et al (2008) have also shown that provision of ITN and other related preventive materials facilitate usage among the public.

5.6 Implications of the results for Health Promotion and Education

There are several health implications of the findings of this study for health promotion and education. The identified gapsin knowledge can corrected through educational interventions. Health promotion and education is concerned with the adoption of innovations aimed at promoting, protecting and maintaining people's health. Heahh education principles and strategies that can been used in promoting good health include, effective communication or public enlightenment, community organization/development, social marketmg, partnership, policy formulation and implementation, use of multiple interventions, use of local resources, conduct of evidence-based interventions, social support, training and advocacy. The major gap in knowledge identied in this study was the inadequate knowledge of malaria among respondents. The identified health promotion strategies that could be used to address the challenges noted in this study are training and public enlightenment. These strategies are succinctly discussed as follow starting with training.

Training

Training can be inform of a workshop or a seminar/a conference. A proper training curriculum could be developed to help facilitate the educational process. Training could be initiated by the Government in all Primary Health Centres like the one in which this study was conducted. An andragogical approach is most preferred as the target population consists of adults. A proper set of measurable objectives should be formulated to facilitate the design and evaluation of the training intervention. Experience has shown that training can be effectively used to facilitate the adoption of ITN. Runsewe et al(2012) and Megha et al (2013). It is a strategy which has great potential in upgrading the study population's knowledge relating to malaria and ITN and enhance their capacity to adopt the appropriate preventive majors including use of ITN.

Public Enlightenment

Public Enlightenment is a useful strategy for facilitating the diffusion of innovations. Public enlightenment could involve the use of behavioural change communication materials like posters radio and television to disseminate information relating to the advantages of using ITN among pregnant women. Pubic enlightenment can also be used to tackle the misconception associated with the use of ITN. The messages to be passed across should be designed to appeal to the characteristics of the target population. Well trained public health professionals particularly in the field of health promotion and education could be engaged to design these messages. Educational materials such as well-designed pamphlets designed in both English and Yoruba language could also be made available to pregnant women to take home and read. This is more so because a sizeable proportion of the study population is literate. The messages conveyed by the pamphlets can be deseminated to persons with no formal education through the radio and television using the Yoruba language that is predominantly spoken in the study area.

5.7. Conclusion

Knowledge of malaria was poor among majority of respondents.There were misconceptions among the study participants relating to malaria especially in terms of the causative agent for the disease. However their level of awareness about ITN and LLIN was high among majority

of the respondents. Respondents had favourable perceptions of malaria in terms of vulnerability and seriousness of the disease. Most respondents had experienced episodes of malaria prior to the conduct of the study. Insecticide treated nets ranked first among the methods used by the participants to prevent the occurrence of malaria. Heat was, however, cited as a key factor that serves as a disincentive to the use of ITN.

Health promotion strategies such as training and public enlightenment can be used to address the identified gaps in knowledge and misconceptions among pregnant women relating to malaria and the ITN. This will particularly promote the adoption of ITN and the initiation of other malaria related prevention measure.

5.8 Recommendations

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

1. Patient education provided during ANC in the study facilities should include upgrading expectant mothers with knowledge of plasmodium as the actual pathogen that causes malaria while the mosquito merely serves as the agent that helps transmit the pathogen from person to person.
2. The hanging and use of ITN should be taught as part of the routine ANC services for expectant mothers using active training methods such as demonstration and return demonstration.
3. Health workers should continue to reinforce health education message during ANC services relating to importance of ITNs to pregnant women.
4. The concerns raised by the study participants relating to the heat and inconveniences associated with the use of ITN, should be noted for possible product modification by technologist/innovators.

5.9 REFERENCES

Adebayo, A.M. Akinyemi.O.O. and Cadmus, E.O.(2015). Knowledge of malaria and prevention among pregnant women and female caregivers of under-five children in rural south west Nigeria. Peer J.3: E792.attending antenatal clinics in a rural local government area in southern Nigeria.

Adeyemo, M.O.A. Oluwatosin .O.A. Amodu O.K., Taofeeq, Y.O. (2014). Home management and prevention of malaria among under-five children: Experiences of Mother in a Nigerian Local Government Area. Afr.J.Biomed. Res.73:83-91.

Agha, S. Rossem, V.R. Stallworthy, G. And Kusanthan, T. 2007.The impact of hybrid social marketing intervention on inequities in access, ownership and use of insecticide treated nets. Malaria Journal. 6:13

Akande T.M.; Musa I.O. Epidemiology of Malaria in Africa. Afri J Clin experiment 2005:9; 107-11

Akinyele S.O; Ajayi I.O. (2012) knowledge of malaria and preventive measures among pregnant

Ambrose E. (2011); Knowledge, attitudes and practices regarding malaria and mosquitonet use among women seeking antenatal care in Iringa, South-western Tanzania

Anna M van Eijk, Jenny Hill, Sue Povall, Alison Reynold, Helen Wong, and Feiku O Ter Kuile. (2012) the malaria in pregnancy library: a bibliometric review: malaria journal 2012; 11:362

Anstey NM, Russell B, Yeo TW, Price RN. The pathophysiology of vivax malaria.Trends Parasitol 2009;25:220–7. doi: 10.1016/j.pt.2009.02.003.

Arery JW, Smith GM, Owino SO, (2012) Maternal malariareduces a procoagulant and antifibrinolytic state (2012) journal pone.

Augustine Ankomah, Samson B. Adebayo (2012), BMC Public Health (2012) Determinants of Insecticide Treated Net ownership and utilizationamong pregnant women in Nigeria.

Awose T. Ola (1938); A short history of Badagry. Ife Olu Press (1938)

Awosan, K. J., Ibrahim, M. T. O., Alayande, M. O., Isah, B. A., Yunusa, E.and Mahmud, M. B.(2013). Prevalence and barriers to the use of insecticide treated nets among pregnant women attending ante-natal clinic at Specialist Hospital Sokoto, Nigeria. Journal of Public Health and Epidemiology. 5(10): 416-420.

Baume CA, Marin MC (2008): Ganis in awareness, ownership and useof insecticide treated nets in Nigeria, Senegal, Uganda.and Zambia (2008): Pub. Med. Centre view Article Pub Med Google scholar.

Belay M, Deressa W (2008): Use of insecticide treated nets by pregnant women and associated factors in a pre-dominantly rural population of northern Ethiopia Trop. Med. Int. Health 2008.

Bennth A, Smith SS (2012), Ownership and use of Insecticide treated nets in pregnancy.

Beroejo A; Vecken H. (2010) Insecticide impregnated bed nets for malaria control: A review of the field trials.

Binka FN, Adongo P (1997). Acceptability and use of insecticidcimpregnated bednets in northern Ghana. Trop med. Int. Health 1997:2(5)499-507

Breman JG, Alilio MS, Mills A (2004): Conquering the intolerable burden of malaria: what's newwhat's needed: a summary. Am J Trop. Med. Hyg 2004.

Cheng Y, Shin EH, Lu F, Wang B, Choe J, Tsuboi T, et al. Antigenicity studies in human and immunogenicity studies in mice: an MSP1P subdomain as a candidate for malaria vaccine development. Microbes infect. 2014;16:419.28. Doi: 10.1016/j.micinf.2014.02.002. [PubMed][Cross Ref]

Chigozie J. Uneke. (2007) Impact of Placental *Plasmodium falciparum* malaria on pregnancyand perinatal outcome in Sub-Saharan Africa. Yale J Biol Med 80: 39-50.

Deresse W, Fentie G, Guima S. Ringer (2011); Ownership and use of insecticide treated nets inpregnancy.

Desai M, ter Kuile FO, Koster F, Mc Gready R, Asamba K, Brabin B, Newman RD (2007)

Dhiman S, Yadark, Goswami D, (2012); Epidemiology and RiskAnalysis of malaria among pregnant women Iran J. Public Health. 2012: 11.

Dyson Mwandama, Julie Gutman, Adam Wollon, Madalitso Luka (2015) the use of intermittent preventive treatment in pregnancy and insecticide treated bed nets for malaria prevention by women of child bearing age in eight district in Malawi.

Egwu E.O., PC Ezechukwu, SN Obi, A. O Ugwu, TC Okeke (2015):Utilization of insecticide treated nets among pregnant women in Enugu, South Eastern Nigeria.

Eisele TP; Keating J, Littrell M.1. Arsen D. Macintyre K (2009); Assessmeot of insecticide treated bednet use among children and pregnant women across 15 countries using standardized national surveys; Am J. Trop. Med Hyg (2009).

Emmanuel, A., Joseph, M., Kopdima, G., Mba, C. and Abubakar, Z. (2016). Malaria Prevention among Pregnant Women in Bauchi state, Nigeria: Knowledge and Utilisation of Insecticide-Treated Nets.Open Science Journal of Clinical Medicine. 4(1): 1-4

Epidemiology and burden of malaria in pregnancy: Laucet infect Dis 7:93-104.

Fredrick Kateera, Chanta M. Ingabire, Emmanuel Hakizimana, Alexis (2015: Long Lasting Insecticide net source, ownership and use in the context of universal coverage: a household survey in eastem Rwanda.

Fuge G., Samuel Y, Ayanto, Fischa L, Gurmamo (2015) Assessment of knowledge, attitude and practice about malaria and Insecticide treated nets utilization among pregnant women in ShashogoDistrict, southern Ethiopia.

Getting PW, Casey DC, Weirs DS, et al. Mapping Plasmodium falciparum morality in Africa between 1990 and 2015. N Engl J med2016; 375: 2435

Deresse W, Fentie G, Guima S. Ringer (2011); Ownership and use of insecticide treated nets inpregnancy.

Desai M, ter Kuile FO, Koster F, Mc Gready R, Asamba K, Brabin B, Newman RD (2007)

Dhiman S, Yadark, Goswami D, (2012); Epidemiology and RiskAnalysis of malaria among pregnant women Iran J. Public Health. 2012; 41.

Dyson Mwandama, Julie Gutman, Adam Wolkon, Madalitso Luka (2015) the use of intermittent preventive treatment in pregnancy and insecticide treated bed nets for malaria prevention by women of child bearing age in eight district in Malawi.

Egwu E.O., PC Ezechukwu, SN Obi, A. O Ugwu, TC Okeke (2015):Utilization of insecticide treated nets among pregnant women in Enugu, South Eastern Nigeria.

Eisele TP; Keating J, Littrell M.I. Arsen D. Macintyre K (2009); Assessment of insecticide treated bednet use antong children and pregnant women across 15 countries using standardized national surveys; Am J. Trop. Med Hyg (2009).

Emmanuel, A., Joseph, M., Kopdima, G., Niba, C. and Abubakar, Z. (2016). Malaria Prevention among Pregnant Women in Bauchi state, Nigeria: Knowledge and Utilisation of Insecticide-Treated Nets.Open Science Journal of Clinical Medicine. 4(1): 1-4

Epidemiology and burden of malaria in pregnancy: Laucet infect Dis 7:93-104.

Fredrick Katcera, Chanta M, Ingabire, Emmanuel Hakizimana, Alexis (2015: Long Lasting Insecticide net source, ownership and use in the context of universal coverage: a household survey in eastern Rwanda.

Fuge G., Samuel Y, Ayanto, Fiseha L, Gurmamo (2015) Assessment of knowledge, attitude and practice about malaria and Insecticide treated nets utilization among pregnant women in ShashogoDistrict, southern Ethiopia.

Getting PW, Casey DC, Weiss DS, et al. Mapping Plasmodium Falciparum mortality in Africa between 1990 and 2015. N Engl J med2016; 375: 2435

Guerra CA. Gikandi PW, Tatem AJ, et al. The limits and interesting of plasmodium falciparum transmission implications for malaria control and elimination worldwide. Plos Med. 2008; 5: e 38.

Glunt Katey D. Ana Paula Abilio, Quique Bassat, Heldez Bulo: (2015) Long Lastinginsecticidal nets no longer effectively kill the highly resistant Anopheles funestus of southern Mozambique.

Gross, K., Alba, S., Schellenberg, J., Kessy, F., Mayumana, I. and Obrist, B. (2011). The combined effect of determinants on coverage of intermittent preventive treatment of malaria during pregnancy in the Kilombero valley, Tanzania. *Malaria Journal*. 10: 140.

Gu W, Nerak RT. (2009) Predicting the impact of insecticidetreated bed nets on malaria transmission:

Guyatt HL and Snow RW (2004) Impact of Malaria during Pregnancy on Low Birthweight inSub-Saharan Africa. Clinical Microbiology Reviews 17: 760-769.

Hawley WA. ter Kuille FO, Steketee RS, Nahlen BC Terlouw DJ, Gming JE, et al; Implications

Heggerhongen HK, Hackenthral V, Vivek P (2003) Bednets usage and it acceptance at thelocal level. The bahaviour and socialaspect of malaria control: an intiOduction and anmotated biography Geneva: Special Programme for Research and training in Tropical Disease (TDR) World Health Org. 3 (1) 97-106

Herrera S, Corradin G, Arevalo-Herrera M. An uplate on the search for a *plasmodium vivax* vaccine. Trends Parasitol.2007.23,1228. doi: 10.10.1016/j pt.2007.01.008. [PubMed][Cross Ref]

Higgins JPT, Green S (2011). Handbook forsystematic Review of Intervention (version 510) the Cochrane collaboration (2011) Part 3: Special Topics

Hill J Lines J. Rowland M (2006). Insecticide treated nets advances. Parasitol 2006: 61:77-128

Jelinek T (2005). Intravenous-atesunate for treatment of patientswith severe malaria: position statement of Trop. Net Europe, Berlin. (2005) Institute of tropical medicine.

Kalanda. B F. van Buuren, S. Verhoeff, F H. Brabin, B J. (2005) Anthropometry of fetal growthin rural Malawi in relation to matemal malaria and HIV status. Archives of Disease in Childhood Fetal & Neonatal Edition 90:F161-F165.

Kate Macintyre (2011): Determinants of hangingand use of ITNs in the context of near universal coverage in Zambia

Kateeza (2015); Long Lasting insecticidal net source, ownership and use in the context of universal coverage: a household survey in eastern Rwanda.

Kayentao K. Gerner P. van Eijk AM. (2013); Intermittent preventive therapy for malaria during pregnancy (2013) systematic review and meta-analysis

Killeen G.F., Smith, T.A, Ferguson, H.M, Mshinda, H; Abdulla S, Lengeler, C. and Kachur, S.P. (2001) preventing childhood malaria in Africa by protecting adults from mosquitoes with insecticide-treated nets. PLos Medicine 4 (7): 1246-1258

Laura R. Sangare Noels, Weiss, Paula E., Brentlinger, Barbra A., Richardson (2012) Determinants of the use of insecticide treated netsfor the prevention of malaria in pregnancy. Jinja Uganda.

Lengeler C, de savigny D (2007). Programme diversity is key to the success ofInsecticide treated bednets. Lancet 2007; 370 (95 92): 1009-10

Lukman O. Omokanye; Rakiyo Saidu; Abdul Waheed O. Olatinwo; (2012) The determinants of utilization of insecticide treated nets among pregnant women anending antenatalClinic at University of Ilorin Teaching Hospital Ilorin

Malar J (2013); Ownership and use of insecticide treated nets during pregnancy insub-saharan Africa. 12:268.

Mandal S Epidomiology aspects of vivax and falciparum malaria: global spectrum. Asia Pacific J Trop Dis. 2014;4:S13-26. Doi:10.1016/S2222-1808(14)60410-2 [Cross Ref]

Manthanga DP, Luman ET, Campbell CH, Silwimba,Malenga G. (2009) Integration of insecticide treated net distribution into routine immunization services in malaria: a pilot study. Tropical Med. Int. Health (2009) 14:792-801

Maria Widmar courtney J Nagel., Deborah Y. Ho., Peter W. Benziger and Nils Hennig (2009): Determining and addressing obstacles to the effective use of long-lasting insecticide-impregnated nets in rural Tanzania.

Megha Singh, Graham Brown, and Stephen J. Rogerson (2013); Ownership and use of Insecticide treated nets during pregnancy in Sub-Saharan Africa.

MeseWakuBabatunde Olaide. (2001). Badagry District: 1863-1999, published by John West

Michon P, Fraser T, Adams JH. Naturally acquired and vaccine-elicited antibodies block erythrocyte cytoadherence of the *plasmodium vivax* Duffy binding protein. Infect Immun. 2000;68:3164-71. doi: 10.1128/IAI.68.6.3164-3171.2000. [PMC free article][PubMed][Cross Ref]

Mussa Solaimani Alunadi, Hassan Vutan doost, Mansoreh Shaeghi, Alunad Raeisi, Farshid Abedi (2011): Effect of Educational intervention on ITN,use in a malarious area, Southern Iran.

Mwandama and Malar J (2015) 14:316; The use of intermittent preventive treatment in pregnancy and insecticide treated bed nets for malaria prevention by women of child bearing age in eight districts in Malawi.

Napoleon R P (2011): Preventing malaria during pregnancy: factor determining the use of insecticide treated bed nets and intermittent preventive therapy in Juba: Southern Sudan medical journal 2011, 4:33-35

National Malaria Control Programme (NMCP) Malawi and ICF International (2012): Malawi Malaria Indication Survey (MIS) (2012) NMCP and ICF International, Lilongwe

Nebie I, Diarra A, Ouedraogo A, Tiono AB, Konate AT, Gansane A, et al. Humoral and cell-mediated immunity to MSP3 peptides in adults immunized with MSP3 in malaria endemic area, Burkina Faso. Parasite Immunol.2009;31:474–80. doi: 10.1111/j.1365-3024.2009.01130.

NICE CKS. Malaria prophylaxis Feb (2012). UK access

Njau RJA de Savigny D, Gilson L, Mwagani E, Mosha FA (2009). Implementation of an insecticide treated netsubsidy scheme under a public privatepartnership for malaria control in Tanzania (2009): challenges in implementation.

Nosten F, McGready R, Mutabingwa T (2007): Case management of malaria in pregnancy Lancet Infections Disease

NPC. ICF Macro (2009) Nigeria Demographic and Health Survey of 2008. Abuja, Nigeria: National Population Commission and ICF Macro.

of the Western Kenya permethrin-treated bed net study for policy, program implementation, and future research. Am J Trop Med Hyg (2003), 68:168-73 (Pub. Med).

Omotosho Ibrahim (2010): Awareness and use of insecticide treated netsamong Pregnant women attending ante-natal clinics in a northern state of Nigeria.

Ordinioha B. (2012) The use and misuse of mass distributed free insecticide treated bed nets in a semi-urban community in Rivers State Nigeria. Ann Afr. Med 2012 11:163-168.

Oyekale, A.S. (2015). Assessment of Malawian mothers' Malaria Knowledge, Healthcare Preferences and Timeliness of seeking fever treatment for children under-five.Int. J. Environ. Res. Public Health 12:521-540

Phillip Howard PA, Steffen R, Kem L, Vanhauwere B,Schildknecht J, Fuchs E. (1998): safety of methoquine and other antimalarial agents in the first trimester of pregnancy.

Publications Ltd (2001).

Pullford J, Hatzel MW, Bryant M, Siba PM, Mueller I (2011). Reported reasons for not using a mosquito net when one is available: a review of the published literature. Malar J 2011:10:10

Resolution WHA 58.2 Malaria control in fifty-eight World Health Assembly, Geneva 16-25 May 2005 Resolution and decisions, Annex. Geneva World Health Organisation 2005

Rhee MS, Akanmori BD, Waterfall M, Riley EM. Changes in cytokine production associated with acquired immunity to *Plasmodium falciparum* malaria. ClinExpImmunol. 2001;126:503–10. doi:

Riley EM, Morris-Jones S, Blackman MJ, Greenwood BM, Holder AA. A longitudinal study of naturally acquired cellular and humoral immune responses to a merozoite surface protein (MSP1) of *Plasmodium falciparum* in an area of seasonal malaria transmission.ParasiteImmunol. 1993;15:513–24. doi: 10.1111/j.1365-024.1993.tb00639.x. [PubMed][Cross Ref]

Runsewe-Abiodun (2010): Awareness and knowledge about insecticide treated nets (ITNs) amongst pregnant mothers in Ogun State,western-Nigeria. Dept. of Paediatrics. Olabisi Onabanjo University Teaching hospital, OOU. Sagamu-Ogun State.

Runsewe-Abiodun, I. I., Iyaniwura, A. C. and Sotimchin, S. A. (2012). Awareness and Knowledge about Insecticide Treated Nets (ITNs) amongst pregnant mothers in Ogun State, Western-Nigeria: A descriptive Cross-sectional study. *Education Research Journal* 2(5): 138-145.

Sangare L R, (2012) Determinants of use of insecticide treated net for the prevention of malaria in pregnancy.

Singh, Desai M., Eiselle TP (2013) Malaria journal http://www.malaria journal.com/content/12/1/268.

Skarbinski J. Mwandama (2011) Impact of health facility based insecticide treated bed netdistribution in Malawi.

Sorensen Gilmour (1995) The commercial and political system of a Lagoon side community

Takem EN, D'Alessandro U; Malaria in pregnancy. Mediterr J. Hematol Infect Dis. (2013)(1): Epub 2013 Jan 2.

Thomas Mbago (2014) Factors associated with utilization of insecticide treated nets amongpregnant women in northern region Namibia

Tongo O.O; Orimadegun A.E; Akinyinka O.O. (2011); Utilization of malaria preventive measures during pregnancy and birth outcomes in Ibadan Nigeria BMC pregnancy child birth 2011, 11:60

Tusting L, Thwing J, Sinclair D, Fillinger U, Gimnig J. (2013) mosquito larva source management for controlling malaria. Cochrane Database of systematic Reviews.

Ugwu, PC Ezechukwu, SN Obi, AO Ugwu, TC Okeke (2015); utilization of insecticide treated nets among pregnant women in Enugu, South Eastern Nigeria

Ukibe, S. N., Mbanugo, J. I., Ukibe N. R. and Ikeakor, L. C. 2013. Level of awareness and use of insecticide treated bed nets among pregnant women attending antenatal clinics in Anambra State, South Eastern Nigeria. *Journal of Public Health and Epidemiology*. 5(9): 291-396

Valizadeh V, Zakeri S, Mehrizi AA, Djadid ND. Population genetics and natural selection in the gene encoding the Duffy binding protein II in Iranian *Plasmodium vivax* wild isolates. Infect Genet Evol.

Van Eijk et al; Malaria Journal (2012); The malaria in pregnancy Library: a bibliometric review.

Wipasa J, Elliott S, Xu H, Good MF. Immunity to asexual blood stage malaria and vaccine approaches. Immunol Cell Biol. 2002;80:401–14. doi: 10.1046/j.1440-1711.2002.01107.x. [PubMed][Cross Ref]

Women attending antenatal clinics in a rural local government area in southern Nigeria.

WHO World Global Malaria Control and Elimination: report of a technical review 17-18 January 2008. Geneva, PP. 1–47.

World Health Organisation (2011) Global Malaria Programme, World Malaria Report Geneva Switzerland.

World Health Organisation (2012) Handbook for Integrated vector management. Geneva: World Health Organisation.

World Health Organisation (2013) World malaria Report 2013. Geneva: WHO

World Health Organisation (WHO); Scaling up insecticide-treated netting programmes in Africa. WHO Roll Back Malaria. World Health Organisation 2007; pp6-18.

World Health Organisation/UNICEF: The Africa Malaria Report for year 2003, p9-29

World Health Organisation. World Malaria Report 2015. WHO. Geneva 2015. http.www.who.int/malaria/publications/world_malaria_report_2015/report/en/(Accessed on August 01, 2016).

APPENDIX I

QUESTIONNAIRE

UTILISATION OF INSECTICIDE TREATED NETS AMONG PREGNANT WOMEN ATTENDING PRIMARY HEALTH CENTRES IN BADAGRY LOCAL GOVERNMENT AREA, LAGOS NIGERIA

Dear respondent

I am a post-graduate student of the department of Health Promotion and Education, faculty of Public Health, University of Ibadan. You have been selected to participate in the research on Utilisation of insecticide treated nets among Pregnant Women Attending Primary Health Centre in Badagry Local Government Area. Your consent to participate and give full, honest and correct information will be appreciated and kept confidential. I will be asking you the questions and necessary explanations will be made for you to understand the questions.

Thanks for your cooperation.

Section A: Socio-Demographic Characteristics

Instruction: *Please tick (☑) which ever applies to respondents in Question 1-6 or complete the appropriate spaces as the case may be.*

1. Marital Status: 1. Single ☐ 2. Married ☐ 3. Divorced ☐
   4. Widowed ☐ 5. Separated ☐ Other (Please Specify).....
2. Religion: 1. Christianity ☐ 2. Islam 3. T☐ tional ☐
   Other (Please Specify).....
3. Your age as at last birthday (in years).....
4. What is your ethnic group? 1. Hausa ☐ oruba 3. ☐ ☐
   4. Other (Please Specify).....
5. Highest educational qualification: 1. No Fonnal Education ☐ rimary School ☐
   3. Secondary School ☐ 4. NCE ☐ OND ☐ HND ☐ B.Sc/B.A/B.ED
   8. Master ☐ 9. Other (☐ se Specify) .....
6. Occupation: 1. Unemployed ☐ 2. Petty trading ☐ 3. Civil Servant ☐
   4. Other (Please Specify).....

Section B: Pregnancy and Fertility History

Instruction: *In this section please complete the open spaces or tick (☑) the alternative responses that apply to the respondents.*

7. For how many months have you been pregnant? (Gestational age in months).....

8. How many children do you have as at today? .....

Section C: Awareness and Knowledge Relating to Malaria and Insecticide Treated Nets

Instruction: *In this section, please complete the open spaces or tick (☑) the alternative responses that apply to the respondent.*

9. What do you think is the real cause of malaria? (Mention only one)

.....

10. Please tell me 3 major symptoms of malaria.

(i).....

(ii).....

(iii).....

11. Mention three (3) possible health effects (or dangers) of untreated malaria for a pregnant woman.

(i).....

(ii).....

(iii).....

12. Mention three (3) health effects (or dangers) of malaria on the unborn child (i. e. the child in the womb).

(i).....

(ii).....

(iii).....

13. How true is it that a pregnant woman can pass on malaria to her unborn baby in the womb? 1. True ☐ 2. False ☐ 3. Cannot say ☐

14. Which of the following groups of people more readily get malaria? (Tick (✓) all you consider correct). 1. Under-five Children ☐ Children with sickle cell anaemia ☐ 3.Pregnant women ☐ Young Persons ☐ All adults 6. Visitors from America ☐ 7. People that live beside a river 8. Other (Please Specify).....

15. Have you ever heard of an insecticide treated net? 1. Yes ☐ 2. No ☐

16. Have you ever heard about long lasting insecticide treated net? 1. Yes ☐ 2. No ☐

17. Mention two (2) benefits of using an insecticide treated net.

(a).....

(b).....

18. Malaria cannot lead to abortion. 1. True ☐ 2. False ☐ 3. Don't Know ☐

19. Malaria cannot in any way lead to shortage of blood. 1. True ☐ 2. False ☐ 3. Don't Know ☐

20. Experiencing repeated episodes of malaria can lead to the birth of a baby with low birth weight. 1. True ☐ 2.False ☐ 3. Don't Know ☐

21. Malaria cannot in any way lead to miscarriage. 1. True ☐ 2.False ☐ 3. Don't Know ☐

22. Malaria can lead to febrile convulsion. 1. True ☐ 2. False ☐ 3. Don't Know ☐

23. Malaria cannot lead to a reduction in the amount of work which one usually do. 1. True ☐ 2. False ☐ 3. Don't Know ☐

Section D: Perception relating to Insecticide Treated Net

24. The table below contains a list of statements relating to perception relating to use of insecticide treated net. For each statement, please tell me whether you agree with it or not. If you are not sure about the statement please tick (✓) undecided/no opinion

S/N	Statement	Agree	Undecided/no Opinion	Disagree
24.1	Mosquito nets not treated with insecticideare safer than those with insecticides			
24.2	Insecticide treated net cannot stop mosquitoes from biting someone			
24.3	Taking '*agbo*' or herbal medicines regularly protect people from malaria than using an insecticide treated net			
24.4	Insecticide treated nets are only useful for preventing mosquitoes during the raining season.			
24.5	One cannot use a mosquito net if ones bed is bigger or large.			

24.6	Mosquito net can suffocate one when sleeping under it.			
24.7	Sleeping under mosquito net does not allow one to sleep well.			
24.8	Use of insecticide treated net throughout pregnancy can harm a pregnant woman.			
24.9	Sleeping under mosquito net makes one to sweat because it generates heat.			
24.10	Pregnant women should only use insecticide treated net when they are in their 3rd trimester.			

25. Insecticide treated net cannot prevent malaria. Please tick (✓) any one

1. Agree ☐
2. Disagree ☐
3. Undecided ☐
4. No response ☐

Section E: Perceived Seriousness and Vulnerability to Malaria

26. The table below contains a list of statements relating to vulnerability, seriousness of malaria and insecticide treated net use. For each statement, tell me whether you agree with it or you disagree with it. If you are not sure about it please tick (✓) undecided/no opinion

S/No	Statement	Agree	Undecided/ no opinion	Disagree
26.1	Malaria is not a serious disease for pregnant women			
26.2	Malaria is not more serious in pregnant women than women who are not pregnant			
26.3	Malaria is a mild disease			
26.4	I believe I can never get malaria			
26.5	Malaria is not major problem which pregnant women should worry			

	themselves about			
26.6	Malaria is very common in the area where I live so I am afraid of getting it			
26.7	I can get malaria but it won't affect the baby in my womb			
26.8	The chance of getting malaria is high			

Section F: Malaria-related Experiences

Instruction: *In this section please complete the open spaces or tick (☑) the alternative responses that apply to the respondent*

27. Have you ever experienced malaria? 1. Yes ☐ 2. No ☐
    3. No response ☐
28. As far as you can re-collect how many episodes of malaria did you experience within the last six months? .....
29. How many cases of malaria have you ever experienced during this present pregnancy?
    .....
30. What do you commonly use to prevent yourself from having malaria (mention as many as possible)
    .....
    .....
    .....

SECTION G: Treatment and Prevention-related Issues

Instruction: *In this section, please complete the open spaces or tick (☑) the alternative responses that apply to the respondent.*

31. Have you ever been told about what pregnant woman should be using to prevent malaria? 1. Yes ☐ 2. No ☐ (If No, go to 34a)
32. If yes to Question 31, what were you told pregnant woman can use to prevent malaria?
    .....
    .....

33. What are your sources of information about what pregnant woman should be using to prevent malaria?

.....

.....

.....

Section II: Ownership and use of Insecticide Treated Nets.

34a. The table below contains questions relating to insecticide treated nets. For each tick (✓) Yes or No as it applies to the respondent

S/No	Statement	Yes	No
34a.1	Have you ever owned an insecticide treated net?		
34a.2	Do you currently own an insecticide treated net?		
34a.3	Have you ever used insecticide treated net in pregnancy?		
34a.4	Did you use insecticide treated net during your last pregnancy?		
34a.5	Did you use insecticide treated net within the last one month?		
34a. 6	Did you sleep under the insecticide treated net last night?		

34b. If you have ever owned an insecticide treated net. from where did you get your supply? (Tick ☑ all that apply)

1. Health centre ☐
2. Buy from market ☐
3. Buy from pharmacy/chemist ☐
4. Others please specify .....

Section I: Practices Relating to Use of Insecticide Treated Net

Instruction: *In this section, please complete the open spaces or tick (☑) the alternative responses that apply to the respondent.*

35. When do you sleep under insecticide treated net? (Tick ☑ only one)

1. During raining season only ☐

2. During harmattan only ☐

3. Hot periods of the year ☐

4. All the time during raining. harmattan and hot periods of the year ☐

5. When weather is not hot ☐

6. I do not use it ☐

36. How often do you use an insecticide treated net? 1. Everyday ☐ 2. Occasionally 3. H☐ly 4. N☐ ☐

37. During which period of the day do you usually use insecticide treated net?

1. When sleeping during the day ☐ 2. When sleeping in the night ☐

3. Anytime I want to sleep ☐

Section J: Barrier Factors Relating to the Use of Insecticide Treated Net among Pregnant Women

Instruction: *In this section, please complete the open spaces or tick (☑) the alternative responses that apply to the respondent.*

38. The table below contains statements on barriers relating to use of insecticide treated net among pregnant women. For indicate and tick (✓) "Yes" or "No" as it affects you.

S/N	Statement	Yes	No
38.1	Cost of purchasing mosquito net prevents you from owing one		
38.2	Insecticide treated net are not readily available in the market		
38.3	Insecticide treated net generates a lot of heat		
38.4	Sharing a bed with two or more other persons prevent one from using a mosquito net		
38.5	My sleeping room is full of many items, so nowhere to hang mosquito net		
38.6	Lack of skill in hanging the net prevent people from using the insecticide treated net		
38.7	Problems of getting in and out of the net prevent pregnant women from using insecticide treated net		

39. What are the other problems which you face regarding the use of insecticide treated net? Please feel free to share them with me

.....

.....

.....

.....

Section K: Facilitating Factors relating to Use of Insecticide Treated Nets

Instruction: *In this section, please complete the open spaces or tick (☑) the alternative responses that apply to the respondent*

40. The table below contains a list of possible factors which facilitate the use insecticide treated net among pregnant women. For each tick "Yes" or "No" as it applies to respondent.

S/No	Facilitating factors relating to use of ITN	Yes	No
40.1	Insecticide treated net are usually given to pregnant women free of charge in the clinics.		
40.2	Insecticide treated nets are given to pregnant woman at an affordable price		
40.3	I can hang the net on my own		
40.4	Insecticide treated net protects one from mosquito bite		
40.5	Insecticide treated nets makes one sleep well		
40.6	Insecticide treated net keeps one warm when it is cold		
40.7	Insecticide treated net prevents you from having malaria		
40.8	Husband always encourage you to use insecticide treated net		
40.9	Healthcare workers always advice you to use insecticide treated net		
40.10	Relatives advice you to use insecticide treated net		

41. What are the other things that usually encourage or motivate pregnant women to use insecticide treated net?

.....

.....

.....

.....

Thank you for your contribution to this important study

APPENDIX II

LILO AWON EFON ELEGBOOGI LARIN AWON ALABOYUN TI O N WA FUN ITOJU NI ILE-ISE ETO ILERA AKOKO NI IJOBA IBILE AGBADARIGI NI IPINLE EKO

Oludasclo mi owon

Mo je onitesiwaju akcko ti apa clo ilosiwaju ati eko nipa ilera ni abala ilera gbogbo ni ile eko giga fasiti ti Ibadan. Mo yan yin lati da si clo iwadi lori lilo awon efon clegbogi laarin awon alaboyun to n gba itoju ni ile-isc clo ilera alakoko ni ijoba ibile Agbadarigi ni Ipinle Eko. Idahun yin ni kikun, tinutinu ati otito yoo wu mi lori lopolopo yio si je ohun asiri. N o ma bere awon incere wonyi pelu alaye kikun lati fun yin oye kikun lori awon ibeere naa.

E seun pupo fun ifowosowopo yin

ABALA A: AWON OHUN IDANIMO LAWUJO

1. Igbeyawo: 1. Apon ☐ 2. Ninu igbeyawo ☐ 3. Ni ikosile ☐ Opo 5. ☐ be loto ☐ 6. Ona miran (se alaye) .....
2. Esin: 1. Esin Kristi ☐ 2. Musulumi ☐ 3. Abalaye ☐
   4. Ohun miran (se alaye) .....
3. Ibe ojo ori ni ojo ibi to koja (Ni odun) .....
4. Kini awujo Abinibi re? 1. Awusa ☐ 2. Yoruba ☐ 3. Ibo ☐
   4. Omiran (se alaye) .....
5. Ibi ti o kawe de: 1. O ko kawe rara ☐ 2. Alakobere ☐ 3. Sekondiri ☐
   4. Ile-eko giga ti awon oluko ☐ 5. Ile-eko giga ti onikose owo ☐
   6. Akeko gboye onimo ijile ☐ 7. Akeko gboye lori asa ati ise ☐

8. Akeko gboye masita ☐ 9. Omiran (Se alaye).....

6. Ise asejeun: 1. Mi o nise ☐ 2. Oja pepepepe ☐ 3. Osise ijoba ☐

4. Omiran (Jowo salaye) .....

ABALA B: ITAN ILOYUN ATI IBISI

7. O to osu melo ti o ti wa ninu oyun bayii? (ipo iloyun ni osu kika) .....

8. Omo melo lo ni bayi? .....

ABALA C: IMO ATI ●YE NIPA ARUN IBA ATI AWON EFON ELEGBOOGI

9. Kin ni nka tabi awon ohun ti o ro pe o n fa arun iba?

i. .....

ii. .....

iii. .....

10. Jowo so amin arun iba meta fun mi

i. .....

ii. .....

iii. .....

11. So ewu meta (3) ti o ro mo ki alaboyun ni arun iba

i. .....

ii. .....

iii. .....

12. So ewu meta (3) ti arun iba le ni lori omo ti o wa ninu alaboyun

i. .....

ii. .....

iii. .....

13. Bawo ni o se je otito sipe alaboyun ti o ba ni arun iba le ko ran omo inu re?

1. Otito ni ☐ 2. Iro ni kole fun ☐ 3. Mi oleso ☐

14. Ewo ninu akojopo awon eniyan ti o wa ni isale yii lo tete man n ni arun iba julo? (fi amin si gbogbo eyi ti o mo) 1. Awon omo odun marun si isale ☐

2. Awon omo laarin aarinmoleegun ☐ 3. Awon alaboyun ☐

4. Awon omode ☐ Awon agba ☐ Awon alejo lati oke okun ☐

7. Awon ti o gbe leba odo ☐ 8. Awon miran (jowo salaye).....

15. N je o ti gbo nipa awon efon elegboogi ri? 1. Beeni ☐ 2. Rara ☐

16. N je o ti gbo nipa awon elegboogi alalope ri? 1. Beeni ☐ 2. Rara ☐

17. Jowo so anfani meji (2) ti o wa ninu lilo awon efon elegboogi

i. .....

ii. .....

18. Arun iba ko le fa ki oyun baje 1. Otito ni ☐ 2. Iro ni kole faa ☐ i o mo ☐

19. Arun iba ko le fa ki eje mato ninu ara 1. Otito ni ☐ 2. Iro ni kole faa ☐
3. Mi o mo ☐

20. Ninu arun iba lore koore le fa ki alaboyun bi omo ti ko te iwon 1. Otito ni ☐ 2. Iro ni kole faa ☐ 3. Mi o mo ☐

21. Arun iba le faa ki alaboyun bimo laipe ojo 1. Otito ni ☐ ni kole faa ☐
3. Mi o mo ☐

22. Arun giri ati iba ko nii baro won se rara 1. Otito ni ☐ 2. Iro ni kole faa ☐
3. Mi o mo ☐

23. Arun iba nikan ko le din ise ti eniyan maa n se ku 1. Otito ni ☐ o ni kolefaa 3. ☐
Mi o mo ☐

ABALA D: Ninu aye lorii bi arun iba se buru to ati lilo awon efon elegboogi gege bi idaabo bo ara eni.

24. **ATE KII Ni:** so awon oro kan lori oye wa nipa bii arun iba se buru to ati lilo awon efon elegboogi. Lori gbogbohun kookan, so fun mi boya o fara mo tabi o ko faramo. Bi o ka ba si mo nkan nipa re, jowo so.

ONKA	GBOLOHUN ORO	MO FARA MO	MI O LESO	MI O FARA MO
24.1	Awon efon ti ko ni egboogi dabobo ni ju eyi ti o ni egoogi			
24.2	Awon efon elegboogi ko le di efon lowo lati bu ni je			
24.3	Minu agbo lore koore daabo bo eniyan ju tilo awon efon elegboogi			
24.4	Nigba ojo nikan ni awon efon elegboogi wulo lati dena efon			
24.5	Eniyan ko le e lo awon efon bi ibusun re ba tobi			
24.6	Awon efon le seeemi eniti o ba sun labe re			
24.7	Sisun labe awon efon ja si ofo nitori pe eni			

	ti o ba n sun labe re si le ni arun iba			
24.7	Lilo awon efon elegboogi ni igba iloyun le se akoba fun alaboyun			
24.8	Sisun labe awon efon n fun ki eniyan longun nitori pe o maa n mu ooru			
24.9	Alaboyun nikan lo ye ki o maa sun labe awon efon			
24.10	Awon efon elegboogi le dena efon loti bu nije sugbon ko lee daabo bo ni lowo arun iba			

25. Awon efon elegboogi ko le dena aarun iba 1. Mo fara mo ☐ 2. Mi o le so ☐
3. Mi o fara ☐ 4. Ki si idahun ☐

26. **ABALA E: : Fifa ara wa sile fun arun iba**

ATE KEJI: Ipele keji da le lori bibi ara eni sile fun arun iba, bi arun iba se buru to ati bibo awon efon elegboogi. Fun alaye oro kookan, so fun mi boya o fara mo tabi o ko fara mo. Bi o ko ba si ni idaniloju lori re, jowo so.

ONKA	GBOLOHUN ORO	MO FARA MO	MI O LE SO	MI O FARA MO
26.1	Iba kii se arun ti o lewu fun alaboyun			
26.2	Arun iba ko lagbara lori alaboyun ju eniti ko loyun lo			
26.3	Aisan yepere ni iba je			
26.4	Ma gbagbe pe mi o le ni arun iba			
26.5	Aisan iba kii se isoro kan ti alaboyun le daamu le lori			
26.6	Aisan iba wopo ni agbegbe ti mo n gbe. nitori na eru n ba mi ki n ma baa ni			
26.7	Mo le ni arun iba sugbon ko le kan omo inu mi			
26.8	Aye po fun alaboyun lati ni arun iba			

ABALA F: AWON IRIRI LORI ARUN IBA

Da le lori awon ibeere lorii awon efon elegboogi. Fun ibeere kookan, fowo si bee ni tabiteeko gege bi o ti ye o si

27. Nje o ti ni arun iba ri? 1. Beeni ☐ 2. Rara ☐
28. Bi o ba le ranti, o to igba melo ti o ni aisan iba ni odun to koja? .....
29. O to igba melo ti o ti se aisan iba ninu oyun ti o wayii? .....
30. Kin ni o maa n lo lati dabobo ara re lowo iba? (so eyokan) .....

ABALA G: ITOJU ATI IDABOBO

31. N je o ti gbo nipa ohun ti alaboyun le maa lo lati deaa arun iba? 1. Beeni ☐
    2. Rara ☐ (Ti o ba je rara, lo si ipele 34a)
32. Ti idahun re si ibeere oke yii ba je beeni, kin ni o gbo pe alaboyun le maa lo lati denama arun iba? .....
33. Ti idahun re si ibeere ogbon yii ba je beeni, oibo tabi bawo ni ose gbo ohun ti alaboyun le maa lo lati dena arun iba? .....

34. a ABALA H: NINI AWON EFON ATI LILO RE

ONKA	GBOLOHUN ORO	MO FARA MO	MI O LE SO	MI O FARA MO
34a.1	N je o ti ni awon efon elegboogi?			
34a.2	Se o ni awon efon lowo lowo?			
34a.3	N je o ti lo awon efon elegboogi ninu oyun ri?			
34a.4	Se o lo awon efon elegboogi ni ninu oyun ti o ni koja?			
34a.5	Se o lo awon efon elegboobi ni osu kan seyin?			
34a.6	Se o sun abe awon efon elegboobi ni ale ana?			

34. b. Ti o ba ti mi awon efon ri, nibo ni o ti tigbea? 1. Ile iwosan ☐ 2. Ni oja ☐
    3. Lati ile egbogi ☐ 4. Awon omiran .....

ABALA I: Oye lori bi arun iba se buruto, lifi ara eni sile fun iba ati lilo awon efon elegboogi. Fun gbololiun oro kookan, so fun mi bi o ba faramo tabi o ko faramo. Bi o ko mo ahun kan nipa re jowo so.

35. Nigba wo ni o maa n sun labe awon efon elegboogi?

- ☐ Nigba ojo nikan
- ☐ Nigba oye nikan
- ☐ Awon igba oru ninu odun
- ☐ Gbogbo igba ojo. oye ati oru
- ☐ Nigba ti oju ojo ko bag bona
- ☐ Mi kiI lo

36. Bawo ni ose nlo awon efon elegboogi si? 1. Ojoojumo ☐ 2. Eko kan ☐
3. Mi kii saba lo ☐ 4. Mi o lo ri ☐

37. Ni asiko oju wo ni o maa n lo awon efon elegbaobi? 1. Ti o ba n sun loju osan ☐
2. Ti o ba sun loju lale ☐ 3. Ti gbogbo igba ti mo ba fe sun ☐

ABALA J: Awon ohun amoriya ati idena ti o je mo lilo awon efon elegboogi laarin awon alaboyun

38. ALAYE: ATE KERIN DA LE LORI AWON ORO TO JE MO IDENA. FI OWO SI BEENI TABI BEEKO GEGE BI O SE YE O SI

ONKA	GBOLOHUN ORO	MO FARA MO	MI O LE SO	MI O FARA MO
38.1	Iye owo ti won fi nta awon efon ko le je ki eniyan lo			
38.2	Awon efon elegboogi ko wopo loja			
38.3	Awon efon elegboogi inaa n moru			
38.4	Sisun lori ibusun pelu awon elomiran kii je ki eniyan lo awon efon			
38.5	Yan ibusun mi ti kun ju, ko si ibi ti mo le fi awon efon ko			
38.6	Aini oye bi a se le fi ko kii je ki awon eniyan lo awon efon elegboogi			

38.7	Wahala wiwo inu awon efon ati jijade ninu re kii je ki awon alaboyun lo awon efon elegboogi			

39. Awon isoro miran wo ni alaboyun maa n doju ko nipa lilo awon efon elegboogi??

.....

40. **ABALA K:** Ate karun da le lori awon ohun amosi ya ti o wa ninu lilo awon efon elegboogi. fi owo si beeni tabi beeko gege bi o ti ye o si.

ONKA	AWON OHUN AMORI YA TI O WA NINU LILO AWON EFON ELEGBOOGI	BEENI	BEEKO
40.1	Won maa n fun awon alaboyun ni awon efon elegboogi lofe ni awon ile-ise eto ilera		
40.2	Won ma anta awon efon fun awon alaboyun ni owo tasere		
40.3	Mo le fi awon efon ko fun ra mi		
40.4	Awon efon elegboogi maa n dabo bo eniyan lowo efon		
40.5	Awon efon elegboogi maa nje ki eniyan sun gbadun		
40.6	Awon efon elegboogi maa dabo bo eniyan ni igba otutu		
40.7	Awon efon elegboogi maa dabo bo eniyan fun arun iba		
40.8	Oko mi maa fe kin lo awon efon elegboogi		
40.9	Awon onise ilera maa ngba ni niyanju lati lo awon efon		
40.10	Awon ara ile maa ngba ni niyanju lati lo awon efon		

41. Awon ohun awuni lori tabi amoriya wo lo wa ninu ki awon alaboyun maa lo awon efon elegboogi?

.....

.....

O seun fun ifowosowupo lori iwadi pataki yi!

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honourable Commissioner quoting

Our Ref. No. AD13/479/135

20th July, 2016

The Principal Investigator,
Department of Health Promotion and Education,
Faculty of Public Health,
University of Ibadan,
Ibadan.

Attention: Balogun Theophilus

ETHICAL APPROVAL FOR THE IMPLEMENTATION OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled "Utilisation of Insecticides Treated net among Pregnant Women Attending Primary Health Care Centres in Badagry Local Government, Lagos State, Nigeria" has been reviewed by the Oyo State Ethical Review Committees.

2. The committee has noted your compliance. In the light of this I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations. In line with this the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

Wishing you all the best.

Dr. Tobas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

TELEPHONE.....

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