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**(ITNS) AMONG PREGNANT WOMEN AND CHILDREN UNDER FIVE
YEARS IN THE PREVENTION OF MALARIA IN THE NANUMBA SOUTH
DISTRICT OF THE NORTHERN REGION OF GHANA**

BY
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BUKARI MUSAH KWAKU

JULY, 2015



**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI, GHANA**

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**OWNERSHIP AND UTILIZATION OF INSECTICIDE TREATED NETS
(ITNS) AMONG PREGNANT WOMEN AND CHILDREN UNDER FIVE
YEARS IN THE PREVENTION OF MALARIA IN THE NANUMBA SOUTH
DISTRICT OF THE NORTHERN REGION OF GHANA**

BY

BUKARI MUSAH KWAKU (B.A. POPULATION AND FAMILY LIFE)

**A THESIS SUBMITTED TO DEPARTMENT OF POPULATION, FAMILY
AND REPRODUCTIVE HEALTH, COLLEGE OF HEALTH SCIENCES,
SCHOOL OF PUBLIC HEALTH, IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE DEGREE OF MASTER OF PUBLIC HEALTH
IN POPULATION AND REPRODUCTIVE HEALTH**

JULY, 2015

DECLARATION

Candidate's Declaration

I hereby declare that, this submission is my own work towards MPH in Population and Reproductive Health and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the university, except where due acknowledgement has been made in the text.

Bukari Musah Kwaku
(PG7912812)

.....
Signature

.....
Date

Certified by: Dr. Harry Tagbor
(Supervisor)

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Signature

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Date

Certified by: Mr. Emmanuel K. Nakua
(Ag. Head of Department)

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Signature

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Date

ABSTRACT

Introduction: Ghana's policy to reduce the burden of malaria in pregnancy and in children under five years advocates that, this vulnerable group always sleep under ITNs. A total of **411** pregnant women and caregivers were selected from the three sub districts for the study. **100** communities were randomly selected in a cross sectional study in August, 2013 to determine the household factors that influence the ownership and utilization of ITNs in the Nanumba South District.

Methodology: **100** communities were randomly selected from the three sub districts. Approximately four household were selected from each community using systematic random sampling. One eligible respondent was selected in each household, but in household where there were more than one eligible respondent, simple random sampling was used to select one of them through the ballot method, because two people from the same household may share similar house hold characteristics. **175** pregnant women and **236** caregivers with children under five year formed the sample size

Results and Discussion: The results from the study indicated that, ITNs ownership was 65.7% among pregnant women and 73.3% among caregivers and a general ownership of 70.3%

With 70.3% of ITNs ownership among the respondents only 34.4% consistently used their ITNs. The study further showed that, 62(21.4%) of the respondents had at least one net and majority of them 227(78.6%) had more than one net. Long lasting insecticide nets (LLINs) were the majority of the nets owned by the respondents 268(92.7%), with treated nets recording 13(4.5%) and other types of nets with 8(2.8%).

The level of education of the respondents influenced ITNs use with P-value of 0.01 this implies that there is a strong association between ITNs use and level of education. The findings also revealed that, the occupation has a positive association with ITNs usage with a p-value of 0.02. The respondents marital and religious status had weak association with ITNs use, marital status had a p-values of 0.31 and religious status with a p-value of 0.27. These finding implied that the marital and the religious status of the respondents did not influence ITNs use positively. From the study it can be seen that ITNs usage is greatly influence by the household structure. Majority of the respondents indicated that, the decision to sleep under ITNs was mostly made by men or husbands.

Conclusion, the intra-household dynamics in ITNs use in households with pregnant women children under five years is complex and influenced by various social, economic and cultural realities. The success of ITN utilization largely depends on how households are able to cope with these challenges and how policy makers and implementing organs understand these challenges. Otherwise, continuous distribution of ITNs without proper knowledge on the intra-household dynamics will continue to offer little success in prevention of malaria among the vulnerable group. This is evident in the high ITNs ownership and less usage by the household.

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LIST OF ABBREVIATIONS

BC	Before Christ
CDC	Centre for` Disease Control
CI	Confidence Interval
DHMT	District Health Management Team
DHS	Demographic and Health Survey
FGD	Focused Group Discussion
GHS	Ghana Health Service
HBM	Health Belief Model
IPT	Intermittent Preventive Treatment
ITN	Insecticide Treated net
KII	Key Informant Interview
LBW	Low Birth Weight
LLIN	Long-lasting insecticide-treated net
MCP	Malaria Control Programme
MICS	Multiple Indicator Cluster Survey
NGO	Non-Governmental Organization
OPD	Outpatient Department
RBM	Roll Back Malaria
SP	Sulfadoxine- Pyrimethamine
SPSS	Statistical Package for the Social Sciences
UNICEF	United Nations International Children`s Emergency Fund
USAID	United States Agency for International Development
WHO	World Health Organization

DEFINITION OF TERMS

Epidemic	an increase, often sudden, in the number of cases of a disease above what is normally expected.
Hyper-endemic	persistent, high levels of disease occurrence
Primigravidae	a woman who is pregnant for the first time



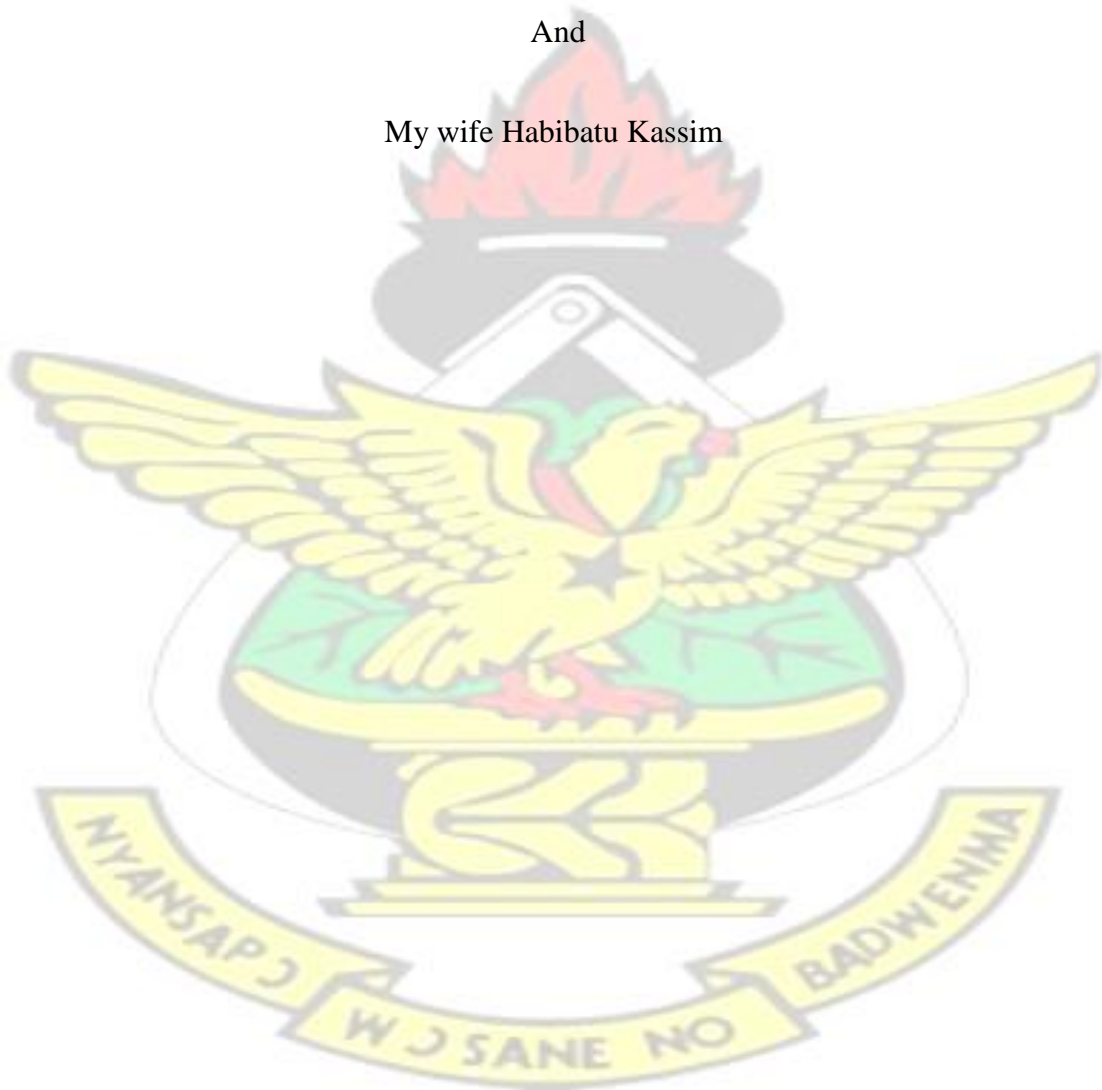
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DEDICATION

To my lovely kids Madis Mamborah, Miqdad Mandiba and Mavisha Mariba

And

My wife Habibatu Kassim



ACKNOWLEDGEMENT

A project of this nature is a considerable undertaking and would not have been successful without the guidance, protection and direction of the Almighty Allah. I have learnt much and benefited a great deal working with a lot of colleague health workers, volunteers, pregnant women and caregivers in the Nanumba South District.

I give my sincerest thanks to my supervisor and the former Head of department, Dr. Harry Tagbor for his support and constructive criticism. My heartfelt thanks also go to the staff at the Nanumba South District Health Directorate, particularly, the District Director of Health Services, Madam Alice Tang Bacheyie, and the Health Information Officer, Mr. Umar Yushaw Adam, for gladly accepting me into their offices and working with me throughout the data collection period.

Finally, I thank my able field assistants, Mr. Banyala N. Joseph , Mr. AbdulRahaman Wumbei and Mr. Mohammed Sayibu Sulemana for their due diligence in the data collection not forgetting Mr. Alagpulisa Jerry for assisting in the data entry and analysis. I cannot finish the list without mentioning Mr. Mumuni Mukaila Zankawah for his immerse support and inspiration throughout the post-graduate studies and all health workers, volunteers, pregnant women and care givers who participated in this study.

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CHAPTER ONE

INTRODUCTION

1.0 Background to the study

Malaria is one disease that has afflicted humankind for over 5,000 years. The disease dates back to as far as 2,700 BC. (Allegri et al, 2006). Alder et al (2006, p. 1) stated that malaria threatens the lives of 3.2 billion people globally and leads to over one million deaths annually. It is estimated to cause at 500 million clinical cases each year (World Bank, 2005). Plasmodium falciparum causes the majority of infections and about 18% of deaths in children less than five years of age. In any given year, nearly 10% of the global population will have the disease. Most survive after an illness of 10 to 20 days (World Malaria Report, 2009)

Malaria is one disease that persists wherever temperature and humidity are high; such conditions aid the breeding of mosquitoes (WHO, 2005). The disease is most endemic in tropical countries; Asia, Africa and Latin America (WHO, 2005). The parasite is carried by mosquitoes, whose ability to reproduce and spread the parasite is strongly influenced by climate. Infection occurs when people are bitten by mosquitoes carrying the parasite

Malaria is a leading cause of morbidity and mortality worldwide, especially in pregnant and young children, and particularly Tropical Africa where at least 90 percent of malaria deaths occur (UNICEF, 2005). More than three quarters of global malaria deaths occur in under-five children living in malarious countries in SubSaharan Africa (WHO, 2003), where 25percent of all childhood mortality below the age of five (about 800,000 young children is attributable to malaria) (WHO, 2003).

Approximately 19-24 million pregnant women are at risk of malaria and its adverse consequences ([Global Health Atlas](#), 2010). It also causes many other deaths through

synergy with other infections and leaves economic losses and disability (Animut et al, 2008).

Every year, between 75,000 and 200,000 infant deaths attributable to malaria infection in pregnancy occur globally (World Malaria Report, 2009). A study by WHO in Africa estimated that malaria may contribute to 3–5% of maternal anaemia, 8–14% of low birth weight (LBW) and 3–8% of infant mortality. The harmful impact of malaria is most apparent in the first and second pregnancies of most pregnant women living in areas of relatively stable transmission (Akinleye et al, 2009).

Neurologic effects of malaria have also been studied in subjects who have recovered from cerebral malaria. Such studies have revealed psychological as well as neurologic sequelae including learning disabilities among post-cerebral malaria subjects. A study carried out in Kenya in 2009 concluded that repeated attacks of malaria have an adverse impact on the school performance (World Malaria Report, 2010). The impact of repeated malarial episodes on the development of the child relate to mental and cognitive function. It nevertheless, could be relevant to the later potential and prosperity of the individual and the community (Bandara et al, 2003).

Malaria is hyper-endemic in all parts of Ghana, with the entire population of about 24.5 million at risk. Transmission of the parasite occurs year-round with seasonal variations during the rainy season. According to the Ghana Health Service (GHS), malaria is the number one cause of morbidity in the Country, accounting for about 38% of all outpatient illnesses, 36% of all admissions, and 33% of all deaths in children under five years. Between 3.1 and 3.5 million cases of clinical malaria are reported in public health facilities each year, of which 900,000 cases are in children under five years. The groups affected most by malaria are children under five years and pregnant women who constitute 20% and 4%, respectively, of the general population (USAID, 2010)

According to the 2008 World Malaria Report, Ghana had an estimated 7.2 million malaria cases in 2006, 3% of the total for the WHO African Region. Most cases are caused by *Plasmodium falciparum* but only 15–20% was confirmed. There was no evidence of a reduction in malaria cases in Ghana between 2001 and 2007, and reported deaths increased in 2007 (WHO, 2008, p. 72).

The malaria burden in the Nanumba South district where this study was conducted is not significantly different. According to the 2011 Annual Report of the Ghana Health Service, the condition accounted for 68.8% of all OPD morbidity in 2009, 54.5% in 2010 and 50.5% in 2011 out of 11,202, 9,825 and 11,723 OPD morbidity respectively.

Attempts to prevent the disease through anti-malarial drugs and insecticides are threatened by the emergence and spread of drug resistant malaria parasites and insecticide resistant vector mosquitoes. This together with the increasing incidence of the disease heightened the need for a more effective method of preventing the disease (Animut et al, 2008). Protection techniques against insects have been known for ages and were used long before the malaria transmission process was discovered. Among the oldest approaches to prevent mosquitoes from biting was the use of bed nets and curtains which in the Roman and Greek ancient world simply meant the spreading of gauze and muslin curtains over places. Additionally, the ancient Persians were said to have destroyed insects by using a powdered dried flower of a *Dalmatian pyrethrum* (Allegri et al, 2006).

In recent years, these two techniques have been combined into the powerful tool of ITN and curtains. Several studies have shown that bed-nets treated with insecticide are an effective method of reducing man–vector contact and child morbidity and mortality (Adongo, Kendall & Kirkwood, 2005). ITNs have an average protective efficacy against malaria episodes of approximately 50% in endemic areas of Africa and reduce

overall mortality among children by 63% in villages using impregnated nets. Bed-nets given to pregnant women have also been found to be protective to women and their children against malaria in both high and low malaria transmission areas of Kenya (Adindu et al, 2010). A 25% reduction in all-cause mortality for children who are one to nine years of age was detected during the first year of the Gambian National Bed-net Programme. In Kilifi District, Kenya, a 33% reduction in mortality and a 44% reduction in hospital admissions for severe malaria were also recorded (Doumbo et al, 2005).

According to Animut et al (2008, p.268) “ITNs are also associated with improved growth and weight gain in infants and reduced maternal and placental malaria and maternal anaemia, resulting in reduced risk of low birth weight (LBW)”. They have also been shown to be highly cost-effective and are actually one of the most affordable malaria control tools. Moreover, the successful development of longlasting ITNs avoids the regular re-treatment of ITNs every six to twelve months, which was accompanied by a notoriously low compliance. ITNs are considered one of the most important interventions of the global Roll Back Malaria programme (Allegrì et al, 2006).

There is now a strengthened commitment of the global community to scaling up ITN distribution for vulnerable groups in malaria endemic areas. Currently, WHO recommends that in malaria endemic areas, all pregnant women should receive malaria chemoprophylaxis and sleep under ITNs. Further to this recommendation, in the year 2000, African countries initiated RBM programme to control malaria in the African Continent. This recommendation increased access to chemoprophylaxis and use of ITNs by pregnant women and children less than five years (Adindu et al, 2010).

Following the above recommendations, Ghana’s policy on prevention of malaria in pregnancy recommends at least two doses of SP as IPT during the second and third

trimesters of pregnancy and the use of ITN by all pregnant women (Ajayi, Akinleye & Falade, 2009).

Despite evidence that the use of ITNs decreases malaria-related morbidity and mortality, the use of ITNs in sub-Saharan Africa remains relatively low. Estimates from Africa as a whole suggest that, in 2005, only 3% of children less than five years of age slept under ITNs, while up to ten times as many are thought to sleep under any bednet (Akogbeto et al, 2009). A study of 150 students from five boarding secondary schools in northern Nigeria revealed that though knowledge and awareness of ITN among secondary school students was high (87.3%), usage of ITN among the students was as low as 43.3% (Aliyu & Alti-Mu'azu, 2009).

The situation is not significantly different in Ghana. The results of the 2008 Ghana Demographic and Health Survey (DHS) showed relatively low rates of ITN ownership and use among pregnant women and children less than five years.

According to the report, 33% of households in Ghana have an ITN while 28% and 20% of children less than five years and pregnant women respectively sleep under an ITN (Ghana Statistical Service & Ghana Health Service, 2009).

A study involving 492 students from SHS and tertiary institutions in Ghana revealed that 93.9% of senior high school students and 86.7% of tertiary students knew that ITNs are used either to protect oneself from mosquito bites or to prevent malaria. However, 32.7% of the respondents in secondary schools and 21.9% in tertiary institutions who owned ITN did not use them (Kudom & Mensah, 2010). One of the most effective tools for malaria prevention is the insecticide treated net (ITN). Consistent use of ITNs can reduce malaria transmission by up to 90 percent (Gimming et al, 2003) and obvious as much as 44% of all causes of mortality among children under five (Lengeler, 2002). With use of ITNs, an overall reduction in child mortality of 17 percent could be

demonstrated, with six lives saved per every 1,000 children protected. There is also evidence that if more than 80 percent of households in an area sleep under an ITN, malaria transmission is significantly reduced, which can benefit people who do not use an ITN themselves (CDC, 2008).

A simple mosquito net treated with an insecticide is a proven and cost effective way to repel or kill mosquitoes carrying the parasite that causes malaria. Dipping nets in a solution of a parathyroid insecticide transforms the net from a simple physical barrier into a physical and chemical barrier that can repel or kill the female anopheles mosquito, which is responsible for transmitting malaria parasite. Parathyroid insecticides are effective for up to 12 months, after which the nets must be retreated. While the evidence based on the effectiveness of ITNs in reducing malaria transmission has grown rapidly in recent years, utilization rates for ITNs in most African countries have been very low, yet 90 percent of mortality is due to malaria (WHO, 2006).

Malaria continues to be the leading cause of morbidity and mortality among the pregnant women and children under five despite various interventions to control it. Increased national and international funds have boosted the deployment of Insecticide Treated Nets (ITNs). About half of African countries have waived taxes and tariffs on nets, netting material and insecticides. Since 2002, African countries started scaling up free of charge or highly subsidized provision of ITNs for under-5 years and pregnant women in rural areas. As a result there has been a substantial increase in mosquito net coverage in African countries (UNICEF, 2005).

In Ghana, two in a household has at least one net and about half the population of the country in 2012 have at least a net in what is known as the universal coverage.

Randomized controlled trials in Kenya, Ghana, the Gambia and Burkina Faso have demonstrated that wide scale use of ITNs can reduce child mortality by around one-fifth, saving an average of 6 lives for every 1,000 children aged 1-59 months protected each year (Lengeler C, 2002). In an area of intense perennial transmission in Western Kenya, ITN use reduced episodes of clinical malaria and anaemia in infants by greater than 60 percent (Karuiki et al, 2003) and reduced by nearly one-third the incidence of sick child visits to peripheral health facilities.

At the historic Malaria Summit hosted by Nigeria in April, 2000, African Heads of States made a declaration to halve the burden of malaria by the year 2010. One of the targets set for the first five years was to ensure that the vulnerable groups, children under five years of age and pregnant women, have access to and sleep under insecticide-treated nets (ITNs)

ITNs are highly effective in reducing childhood mortality and morbidity from malaria (Lengeler, 2004). Although ITNs are being promoted as a major tool in the fight against malaria in pregnancy, the available evidence about their effect in pregnancy appears inconsistent.

One well-known means of preventing the adverse consequences of malaria during pregnancy is sleeping under an insecticide treated net (ITN) throughout pregnancy. Despite increased access to this intervention over time, consistent ITN use during pregnancy remains relatively uncommon in Ghana and more particularly in the nanumba south district.

However, some studies have indicated low utilization of ITNs among pregnant women and the under five years. There is a wide gap between net possession and use. Whereas the targets set by governments is to ensure pregnant women and children under five years access and sleep under insecticide treated nets (WHO, 2006), ITNs use by

vulnerable groups requires that a household own a net, and that the most vulnerable groups be given priority for sleeping under the net.

Usage seems to be affected by household factors such as the level to which nets are used at all, family sleeping patterns, decision making in regard to who should sleep under an Insecticide treated Net and who actually uses the net. Given the fact that malaria in Ghana continues to be the major cause of child mortality and morbidity, yet ITNs have been made accessible to the populace, it is expected that child morbidity and mortality rates due to malaria are to decline which has not yet been realized.

Between the years 2005 and 2012, the government of Ghana and her development partners including Global Fund, WHO and UNICEF have supplied more than 70,000 pieces of ITNs for distribution in the Nanumba South District and only last year (2012) a total of 43,600 Long Lasting Insecticide Nets (LLINs) were distributed to about 17,000 households to help bring down the incidence of malaria to a safe level in the District.

The District Health Directorate (DHD) has continuously educated the public on the mode of transmission and the use of ITN as a preventive measure for the disease at every public forum.

It is upon this backdrop that this study explores the household factors that affect ownership and the utilization of ITNs among pregnant women and children under five years in the Nanumba South District of Ghana.

1.1. Problem Statement

Despite the continuous education on the mode of transmission of malaria and the emphasis on the use of ITN in the prevention of the disease by health workers including community based volunteers, the disease continues to be the number one cause of morbidity in the District. According to the 2011 Annual Report of the Ghana Health

Service, the disease accounted for 68.8% of all OPD morbidity in 2009, 54.5% in 2010 and 50.5% in 2011 out of 11,202, 9,825 and 11,723 OPD morbidity respectively (Nanumba South Districts Annual Report, 2011).

Insecticide- treated nets are the most powerful malaria control tool to be developed and as such they have been an important component of global and national malaria control policies since mid-1990s. Yet up to date, utilization is still unacceptably low: only 3 percent of African children are currently sleeping under an ITN, and about 20 percent are sleeping under any kind of net (Oresanya et al, 2008). Worse still, malaria continues to be the leading cause of child mortality and morbidity in spite of government, NGOs and the private sectors interventions to ensure that pregnant women and children under five, who are most vulnerable group access, own and sleep under ITNs.

Utilization of ITNs by pregnant women and under five year's children requires that households own nets. Whereas programmes to ensure this vulnerable group access ITNs have been vigorous, utilization rates seem not to be a mirror of ownership rates. Expanded ownership of ITNs can only make a substantial reduction in malaria mortality only if the nets are used properly by this group.

If a household owns a net, which household members are most, and least, likely to sleep under it? How many family members sleep under a net, and what are the most common groupings under a net? What happens to these patterns when the family acquires more than 1 net? There seemed to be unanswered questions which this study sought to provide. Several studies on ITNs usage among pregnant women and children under five have concentrated on effectiveness of ITNs in malaria control, accessibility, availability and ownership of ITNs: this study sought to explore the household factors that affect ownership and the utilization of ITNs among pregnant women and children under five years in the Nanumba South District

1.2. Rationale of the study

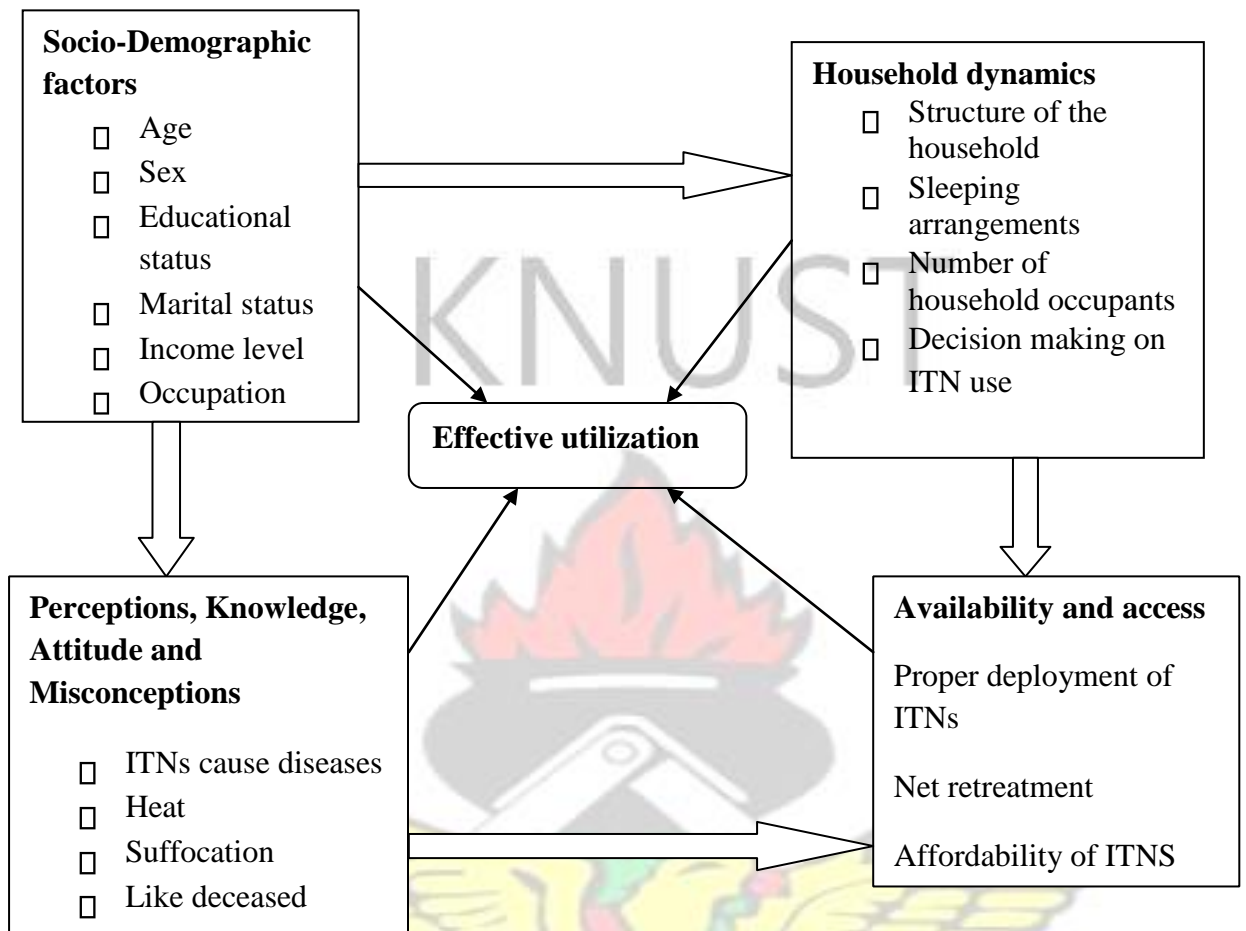
The findings of this study will contribute to the existing body of knowledge concerning the difficult nature of malaria prevention among children under five years and pregnant women and specifically the household dynamics that influence the use of ITNs among this vulnerable group. It also contributed to the understanding of household barriers that affect the use of ITNs and the challenges involved in the prevention of malaria among pregnant women and children under five years.

The findings of this study can also be a source of information to the District Health Management Team (DHMT), non- Governmental Organizations, government and private enterprises who are involved in the promotion of ITNs in the fight against malaria among pregnant women and children. The study can be useful to the policy makers, the Ministry of Health (MoH) specifically in the department of malaria control. The information obtained from the study provided useful guide for formulating appropriate policies and programs for the promotion of ITNs. The findings may also provide up to date literature for academicians and could also be used as a basis for further research on ITNs in malaria prevention. The gaps identified can be explored for further research especially in regard to coverage and effective utilization.

District Health Directorate, Policy makers and stakeholders and in the District can also use the results of this study as a baseline data to ascertain the level of access and utilization of ITNs by the target group.

Finally, the results of this study can also help the District Health Directorate to ascertain the extent to which its activities and messages on malaria control and prevention have been taken by the populace.

1.3. Conceptual framework



Source: Authors own construct 2013

Fig. 1.1: Conceptual framework

The utilization of ITNs is influenced by the socio demographic factors like age, sex, education level, occupation, income of the household and marital status that work through the household factors like structure of the household, number of household occupants, sleeping arrangements and decision making. Utilization is also influenced by perceptions towards ITNs, beliefs, attitudes, knowledge on proper use in terms of consistence in usage and re-treatment. Therefore, with the good household practices, perceptions, attitudes and misconceptions towards ITNs, utilization is possible manifested through proper deployment of ITNs, consistence on usage, net retreatment, ITNs availability and affordability. This leads to increased utilization of

ITNs within households with pregnant women and children under five years

1.4. Research questions

The research will help to answer the following questions:

1. What is the ownership of ITNs in the district?
2. To what extent do household practices influence the use of ITNs among pregnant women and children under five years?
3. How do the knowledge, attitudes, perceptions and beliefs of pregnant women and caregivers influence the usage of ITNs?
4. At what cost are pregnant women and caregivers willing and able to purchase ITN?

1.5. General Objective

The general objective of the study is to;

Determine the household factors that influence the coverage and effective utilization of ITNs among pregnant women and children under five years in the Nanumba South District.

1.6 Specific Objectives

1. To determine the household practices that influences the use of ITNs among pregnant women and the children under five years.
2. To determine the level of knowledge, attitudes, perceptions and beliefs of pregnant women and caregivers towards the usage of ITNs.
3. To determine the cost at which pregnant women and caregivers are willing and able to purchase ITNs.
4. To determine the proportion of pregnant women and the children under five years who sleep under ITNs.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section entails extensive review of theories, practices and surveys that either relate directly or indirectly to the study, or provides background understanding on other research studies that have been carried out regarding Insecticide treated nets coverage and usage in the prevention of malaria. It focuses on the accessibility of ITNs in the households by the target group; knowledge, attitudes, perceptions and beliefs of caregivers towards ITNs and to establish the cost at which pregnant women and caregivers are willing and capable to purchase ITNs as the core thematic areas. It should be noted that, a lot of research studies have been carried out on ITNs especially in regard to availability, accessibility and utilization in general, but this particular study is going to explore the household factors that affect effective utilization of ITNs in the household with pregnant women and children under five years. The purpose of this literature review is to identify gaps that are needed to be filled.

2.1. History of ITN Use

Protection techniques against insects have been known for ages and were used long before the malaria transmission process was discovered. Among the oldest approaches to prevent mosquitoes from biting was the use of bed nets and curtains which in the Roman and Greek ancient world simply meant the spreading of gauze and muslin curtains over places. Additionally, the ancient Persians were said to have destroyed insects by using a powdered dried flower of a *Dalmatian pyrethrum* (Allegrì et al, 2006).

Records on the use of mosquito nets date back to the sixth century B.C. They have been used for decades as protection against nuisance and harmful insects, to prevent dust and roof debris from falling on sleepers as well as for privacy. However, the application of insecticides to bed nets was first used by Russian troops during the Second World War (Aliyu & Alti-Mu'azu, 2009).

Before the development of ITNs as a new technology in the 1980s, people in many countries were already using nets mainly to protect themselves against biting insects and for cultural reasons (MacCormack & Snow, 1986).

For more than two decades now, insecticide-impregnated bed nets and curtains have elevated renew interest in ITNs as a tool in malaria control. "In Africa, five major trials in areas of different malaria transmission intensities have documented a reduction in all-cause mortality of young children associated with ITN protection (Alonso, Armstrong & Lindsay, 1991; Adjuik, Binka & Kubaje, 1997; D'Alessandro, Olaleye & McGuire, 1995; Nevill, Mungala & Some, 1996; Diallo, Habluetzel & Esposito, 1997). These controlled trials have shown that ITNs reduce clinical malaria episodes by 48% and protect six (6) of every 1000 children's lives in the age group of 1-59 months every year" (Lengeler, 2004, p. 48)

Additional advantages of treated nets are that they provide some protection to other people sleeping in the same room. They also kill fleas, lice, bed bugs and cockroaches and even if rolled up will still provide some protection (Webber, 2005). They have therefore become an integral part of the global malaria control strategy and the global RBM Partnership (World Bank, 1993; Nabarro & Tayler, 1998).

In 1998, Dr. Gro Harlem Brundtland, the then Director General of WHO launched a Global Roll Back Malaria Initiative against malaria (Kakkilaya, 2006).

The African Summit on RBM that took place in Abuja, Nigeria in April, 2000 set an ambitious target of at least 60% coverage of ITNs within high-risk groups, which include children, less than five years and pregnant women, by the year 2005.

Following the above recommendation, Ghana's policy on prevention of malaria in pregnancy recommends at least two doses of SP as IPT in the second and third trimesters of pregnancy for women of all parties. The policy also advocates that pregnant women should always sleep under ITNs (Adindu et al, 2010).

However, while commercial markets for ITNs can theoretically be expanded substantially, they have not done so. Even if they did, the poorest households may not be able to afford nets and insecticides at any price. Alternative methods of subsidizing or distributing ITNs are therefore needed (Jones, 2003).

2.2. Perceptions, attitudes, misconception, knowledge and beliefs of using ITNs

Insecticide treated nets (ITNs) are the mainstay in Malaria prevention. As a vector control intervention, they are effective in preventing malaria morbidity and mortality in a range of epidemiological settings. In reducing densities and infectivity of malaria vectors, they reduce overall transmission and protect all individuals within a community (WHO, 2006). ITNs have been advocated for as the most preventive tools against malaria especially in sub-Saharan Africa.

Attitude towards the use of ITNs and other malaria preventive measures have been conceptualized based on the Health Belief Model (HBM) developed by Becker. In this model, two main factors influence the likelihood that a person will adopt a recommended preventive action. First, a person must feel susceptible and threatened by the disease, with perceived serious consequences. Secondly, the person must believe that the benefits of practicing prevention measure outweigh the perceived barriers to the preventive action. Therefore, four constructs can be derived from this model, thus

perceived susceptibility, perceived severity, perceived benefits and perceived barriers are important factors that influence the attitude of people towards ITNs (Adindu et al, 2010).

In a study carried out in Mbarara on the perceptions about Malaria prevention (Nuwaha, 2002), avoiding mosquitoes was the most common method mentioned for prevention of malaria. Other preventive strategies mentioned include boiling of drinking water, improved sanitation, clearing of bushes around the compound, avoiding cold weather, good nutrition, burning mosquito coils, screening of buildings, taking anti-malarials regularly and closing windows early. While most people in this study said ITNs were efficacious both in preventing mosquito bites and malaria, they expressed ignorance of insecticide treated nets and could not tell whether a bed net was treated or not. There were some doubts about the bed net efficacy in preventing malaria. Participants mentioned that some households sleep under mosquito nets but their children die of malaria, whether mosquito nets work or not remains a myth in the minds of some people.

From the above analysis, it seemed to be clear that there are factors within the household which hinder ITN use that needed further investigation. Barriers towards use of bed nets that would negate their use include; being expensive, being difficult to keep from holes, being inconvenient by increasing heat and sweating, causing suffocation and that it is impossible to buy a net for everybody in a big family. Some people said that they use bed nets when mosquitoes are plentiful but keep them where there are no mosquitoes in the dry season.

In a study carried out in Mbarara district, western Uganda, found that mosquitoes were perceived as a cause of malaria but at the same time use of bed nets was low (26 percent). People who did not use bed nets cited discomfort due to heat and humidity;

and the high cost of ITNs as reasons for non use (Nuwaha 2002). This therefore accounted for low usage of ITNs.

In a baseline study on malaria in Uganda in districts of Mukono, Jinja, Mbarara and Arua, it was found out that 99 percent of respondents knew about malaria with a high level of knowledge that mosquitoes are the main cause of malaria. Nearly half of the urban respondents 48.3 percent observed that the use of nets was the most effective way to prevent malaria. While among rural respondents there was limited knowledge of the best method for prevention. This literature available looked at perceptions and attitudes in general. This study specifically focussed on perceptions, attitudes, knowledge, and beliefs of using ITNs in households with children under five making a difference from the previous studies.

In a study conducted to assess the distribution, knowledge and utilization of ITNs in selected malaria prone areas of Ethiopia, Animut et al (2008) indicated that 60.1% of the respondents had knowledge about nets. The most important source of information was health workers (59.1%), followed by radio, which contributed to 34.3% of the source of ITN information. Most of the respondents (91.1%) in the study agreed on general use of ITNs, 60% to prevent mosquito bite and 39% to prevent malaria. Most of the respondents also perceived the frequency of malaria infection for those sleeping under ITNs as much less as those sleeping without nets. However, about 22% of the respondents believed that they could still be infected with malaria while using ITNs. More than 97% of the households found no problems while sleeping under ITN. Problems mentioned by the remaining small percentage of respondents included nets are too hot to sleep under, time taking to tuck net every night, difficult to get up at night, mosquitoes can still bite through the net and net do not allow enough air through.

The findings from a study conducted among boarding students in Zaria, Northern Nigeria is not significantly different. The study revealed that knowledge and awareness of ITN among secondary school students was high (87.3%). The respondents were also aware of the vulnerable group that is being targeted for ITN use (Aliyu & Alti-Mu'azu, 2009).

A study conducted by Kudom & Mensah (2010) among secondary schools and tertiary institutions in Ghana revealed that 93.9% of respondents in the senior high school and 86.7% in the tertiary institutions stated that ITNs are either used to protect oneself from mosquito bites or to prevent malaria. Accordingly, 79.8% of the respondents in senior high schools and 86.9% in tertiary institutions mentioned ITN as an effective strategy for protection against mosquito bites. The findings of Kudom & Mensah suggest that most high school and tertiary students in Ghana have adequate knowledge about ITNs and its usage in the prevention of malaria.

A recent study conducted in Southern Ethiopia to assess knowledge and utilization of ITNs among freely supplied households however, showed that 62.6% of the 650 respondents indicated ITNs as the main preventive measure of malaria, followed by taking tablets (14.0%), proper disposal of waste (10.7%), use of traditional remedies (3.4%), fumigation (3.4%), use of aerosol spray (3.1%) and drainage of breeding sites (1.7%). Most (97.5%) of the respondents believed that sleeping under ITN has a benefit and only a little above five percent (5.2%) of the respondents reported problems associated with sleeping under ITN (Gashaw & Wakgari, 2008). From this finding, it is clear that not all people will use ITNs in the prevention of malaria. Some people prefer other methods of protection.

Similarly, Adindu et al (2010) indicated in their study on the perception on the use of ITNs that in all the FGDs and the KIIs conducted, participants and key informants knew

that mosquito nets were useful preventive measure against malaria and that pregnant women and children less than five (5) years are supposed to sleep under nets since they are the most vulnerable groups.

However, Doumbo et al (2005, p. 5) stated that knowledge on the prevention of the disease was more limited. Only 35.0% of the individuals in their study knew that mosquitoes transmitted malaria and less than 40% of the people knew that one could prevent malaria. In addition, 17.0% of the respondents stated that using ITNs is an important method of malaria prevention.

Information on ITNs is obtained from various sources in a community. For instance, Adindu et al (2010) asserted that the common source of information on malaria prevention is radio, followed by health workers, newspapers, pastors, meeting in the local communities and friends especially among adolescents. A few participants mentioned television as a source of information. Over three-quarters of participants in all FGDs mentioned that they trusted information from health workers because health workers are knowledgeable and can reach the people and provide face-to-face explanation.

2.3. Ownership and Utilization of ITN

Records on the use of mosquito nets date back to the sixth century B.C. They have been used for decades as protection against nuisance/harmful insects, preventing dust and roof debris from falling on sleepers as well as for privacy. However, the application of insecticides to bed nets was first used by Russian troops during the Second World War (Aliyu & Alti-Mu'azu, 2009).

Muller et al, (2002) showed that 49% (103/210) of the respondents in a survey reported at least one mosquito net in their household. Twenty-one percent (21%) owned one, 13% two and 15% more than two mosquito nets. It was reported that more urban

households (55%) compared with rural household (34%) owned mosquito nets. About two-thirds of the nets identified were rectangular, white and synthetic of various origins and sold in the local markets.

In a study on the knowledge and utilization of ITNs among freely supplied households in Ethiopia, Gashaw & Wakgari (2008) indicated that ITNs were not found in 84 (13.2%) households at the time of the survey. The reasons for absence of ITNs in these households included: lost or stolen (46.4%), used for other purpose (25.0%), thrown away as old (17.9%), gave to others (8.3%) and sold (2.4%). In addition, 13.0% of the households did not use their nets due to: housing construction problems, absence of bed, perception that ITN could not prevent malaria, fear of its toxicity, absence of mosquitoes and difficult to tuck the net. This implies that the supply of free ITNs cannot solve the problem of access. People must be educated on the need to take good care of the nets they are supplied.

In the April 2000, African heads of states met in Abuja, where they set among other targets in the Roll Back Malaria Programme, a 60% use of ITN among pregnant women and children under five years by the year 2005 (Adimora et al, 2010). More than half a decade after the target year, one would have expected that the proportion of the target group using ITNs will be appreciable. However, the 2008 Ghana Demographic and Health Survey (DHS) report showed low rates of ITN ownership and use among pregnant women and children less than five years of age. The report indicates that the proportion of households owning one or more ITNs increased from 3% in the 2003 DHS to 19% in the 2006 MICS and to 33% in the 2008 DHS. The proportion of children reported to have slept under an ITN the night before the survey was 4% in the 2003 DHS, 22% in the 2006 MICS, and 28% in the 2008 DHS. In the

2003 DHS, ITN ownership was found to vary significantly by region, with the highest rate in the Upper West Region (32%) and the lowest in the Western Region (8%). The proportion of pregnant women reported to have slept under an ITN the night before the survey was 3% in 2003 and 20% in 2008 (USAID, 2009). The places where ITNs are accessed greatly influence the cost and therefore limit accessibility by the poor in the population.

In Ghana, ITNs can be obtained at the District hospitals and Health Centres through the voucher system in five regions (Volta, Eastern, Ashanti, Brong Ahafo & Central), at the antenatal clinics (ANCs) and through commercial partners in pharmacies and shops (Ghana Malaria Action Alert, 2007). The government subsidizes ITNs that are sold at government health facilities and makes them affordable to the rural poor. However, limited quantities of ITNs are always available at these facilities. Most of the ITNs are distributed free of charge or sold at subsidized price during national immunization campaigns and they run short after these exercise. Currently, ITNs can be obtained mostly from the commercial market where the price ranges between 12-15 GH¢.

It is not only in Ghana where the price of an ITN is unaffordable for most people. Muller, Okrah, Pale, Sommerfeld & Traoe (2000) reported that the results from their study shows that most of the nets are purchased from the local markets and the shops and the price for a mosquito net ranged from 9 US\$ to 22 US\$ (mean 9.2 US\$).

At a base line interview in Mali, none of the 132 households visited were using ITNs. The most common reasons for not treating the net include were cost (59.0%), availability (23.0%) and lack of knowledge regarding the effectiveness of ITNs in preventing malaria (11.0%). However, 93.0% of the households who did not treat their nets during the main study stated cost as the main reason. As high as 96.0%

of the households in this study were using untreated bed nets and that was the most common malaria prevention method used by the respondents (Dumbo et al, 2005). In addition, Adindu et al (2010) confirmed that the cost of ITNs and mosquito repellants is an important barrier for their use.

Pearson (as cited in Adimora, Edelu, Emodi & Ikefuna, 2010) stated that recent studies in Kenya have actually shown that expanding the use of the nets to all people in targeted areas enhances coverage and enhances the protection of the vulnerable group while protecting everyone. Also in Kenya, preliminary data from 2004-2006 showed a near ten folds increase in the number of children sleeping under ITN in targeted districts, with a resulting 44% fewer deaths than among the unprotected groups of children.

A recent review on community acceptance of bed nets has shown that various factors influence the use of bed nets, including cultural, behavioural and demographic factors, ethnicity, accessibility, gender relations and seasonality of malaria. Several authors have concluded that although ITNs are effective, local perceptions, acceptance of and use of ITNs as well as use of other mosquito control methods are invaluable in malaria control programmes. It has also been established that even if ITNs are purchased and used correctly, they must be recognized and accepted. Further to this, the local acceptance of the insecticide may be influenced by its toxicity, the local terms used to translate the chemical and meaning attached to these terms (Adindu et al, 2010). These factors must therefore be considered and addressed by programmers in any malaria control programme that involves the use of ITN.

Schools and colleges including health training schools are not free from malaria. The environmental sanitation in most schools and colleges in Ghana are nothing worth

reporting. It is therefore necessary that students have access to ITN to protect themselves from malaria. A number of studies have been conducted in various countries to assess the level of access and utilization of ITNs by students. The results are however, not encouraging. For instance, Aliyu & Alti-Mu^uazu (2009) indicated in their study among boarding students in Northern Nigeria that though 87.3% of the students had knowledge about ITNs, only 43.3% were current users. Sex distribution of ITN use was 50% among females and 38.9% among males. Reasons given by nonusers included cost, non-availability of ITNs, heat and inconvenient to sleep under it.

Kudom & Mensah (2010) also reported in their study among secondary and tertiary students in Ghana that one school had a policy that made the use of ITN compulsory. Hence, there was almost 100% ownership and use of ITN in that particular school. However, 86.1% owned ITN in the remaining senior high schools but 32.7% of the respondents that owned ITN did not use them. There was a significant difference between ITN ownership and use. There was also a significant difference between respondents who had used ITNs before and those who currently use them. Similar results were obtained in tertiary institutions where there was no significant difference between the 99.0% of respondents who had seen ITN and the 83.1% who had used it before. The proportion of respondents who owned ITN (65.6%) was, however, not different from those who used them (51.3%). It was also reported that 21.9% of respondents that owned ITN in the tertiary institutions did not use them.

In a study on the potential role of the educational system in addressing the effect of inadequate knowledge of mosquitoes on use of insecticide-treated nets in Ghana, Kudom & Mensah (2010) stated that reasons given by non-ITN-users included cost, heat, and discomfort when sleeping under it. In addition, some claimed mosquitoes bite them before they went to bed so there was no need to sleep under ITN. In the tertiary

institutions, 69.7% of students in nurses training colleges, 31.8% of students in the teacher training college and 20.3% of students in one hall of residence of the university used ITN. There was a significant difference between the actual use of ITN in the nurses training colleges and the teacher training college or the university. All the nets were long-lasting insecticide nets, including Permanent, Olyset and Interceptor, which were of high quality and were fixed properly.

The use of ITNs as a preventive measure against malaria is well known by people as has been confirmed by some studies. Alder et al (2006) for instance reported in a study conducted in the Eastern and Central Regions of Ghana that sleeping under an ITN was the most commonly identified protective method against malaria. Using mosquito coils and clearing bushes around the house were also cited as protective, particularly in the Central region where such methods were identified almost as often as ITNs.

Gashaw & Wakgari (2008) asserted in their study that the determinants of ITN utilization include availability of separate room, possession of two or more ITNs by households and perception of respondents that ITNs prevent mosquito bite. Educational status of respondents, type of housing construction and ever-heard messages about ITNs were not associated with the use of ITNs by the households. Muller et al (2002) in an exploratory study in rural Burkina Faso reported that adult men are the group who reportedly use mosquito nets more often (34%), followed by mothers with young children (19%) and elderly persons (17%).

Designing a sustainable and effective strategy for the adoption and continuous use of ITNs is a difficult task because sleeping under ITN does not necessarily mean that one is completely protected from malaria (Adongo, Kendall & Kirkwood, 2005).

These authors have emphasized that several social and cultural factors influence the acceptance and use of ITNs in the community. Malaria-health seeking behavior in

Ghana and elsewhere in Africa often demonstrates the lack of association between mosquito bites and malaria. Attributing the cause of malaria to several diverse factors besides the mosquito has implications for the adoption and use of malaria control strategies, and might make it difficult to convince mothers to accept ITNs as a control measure for malaria and/or convulsion.

Bortel et al (2010) reported in Vietnam that the main motivation for buying and using ITNs depended on the nuisance level of mosquitoes. Klein et al (1995) also reported in Guatemala that high acceptance and usage of bed nets was not associated with preventing malaria but a method of protecting general insect nuisance. Another study by Louis et al (1992) in rural Cameroon found that people well perceived the benefits of ITNs in terms of protection against nuisance but not in terms of preventing malaria.

A review on community acceptance of bed nets has shown that various factors influence the use of bed nets, including cultural, behavioural and demographic factors, ethnicity, accessibility, gender relations and seasonality of malaria. Several authors have concluded that although ITNs are effective, local perceptions, acceptance and use of ITNs, as well as use of other preventive methods, are invaluable in malaria control programmes (Winch et al, 1997).

In a study carried out in Western Kenya, community reactions were assessed before the introduction of permethrin-treated bed-nets. Although malaria was found to be an important disease, ITNs were believed to be only partially beneficial because of the perception that malaria had multiple causes, and further to this, fear was expressed that chemicals used to treat ITNs were associated with use of family planning (Alaii et al, 2003). In this study, mosquito numbers, relative wealth, number of household occupants and the education level of the head of the household had no effect on

adherence. Excessive heat was often cited as a reason for not deploying the child's ITN. Other important reasons for non adherence were disruption of sleeping arrangements, indicating that ITNs were not readily redeployed in the face of shifting sleeping patterns due to visitors, funerals, house construction and other events. Lack of motivation and technical problems like room to hang child's net also affects consistency in utilization of an ITN.

In a study carried out in Mukono District, it was emphasized that the cost of ITNs followed by their non availability were constraints to their use. Similarly, over half of participants in all the 10 FGDs thought that chemicals used to treat the nets were very harmful to adults, children and pregnant women (Mbonye et al, 2005 **CHAPTER THREE**

METHODOLOGY

3.0 Introduction

This chapter describes the research design, population and the sampling procedure used. The instrument for data collection, data collection procedure, data analysis procedure, validity and reliability of the instrument are also described in detail in this part of the study.

3.1. Research Design

A descriptive cross sectional design was used for this study. The data for the study was collected between August and September, 2013 to gather information concerning household practices that influence ITNs ownership, utilization, the perception and attitude of pregnant women and care givers of children under towards ITNs usage.

3.2. Study area

The research took place in the Nanumba South District of the Northern Region of Ghana. For administrative convenience for health service delivery, the district has been demarcated into four sub-districts which are; Lungni, Nakpayili, Pudua and Wulensi. Nanumba South district has a population of 101,833 projected from 2010 population and housing census with a growth rate of 2.6%. The district have no hospital, it has three health centres, one each at Lungni, Pudua and wulensi and five community- based health planning and services (CHPS) compound.

The district shares boundaries with Nanumba North district to the north and west, Zabzugu, Tatale- Sangule districts and the Republic of Togo to the east, Nkwanta North district to the south-east, the East Gonja district to the south-west and Kpandai district to the south. It has one hundred and nineteen (119) communities with four hundred and thirteen nine (413) community- based surveillance (CBS) volunteers and Community- based agents (CBA) who assist in carrying out health activities at the community level. The district has an estimated land area of about 1.300sqkm.

The people who are mostly peasant farmers and petty traders are generally found in small settlements scattered all over the district with populations between 200-1000 people.

Distances between settlements/villages are long and difficult to reach because of poor road network and this is worse during the raining season when streams spring up almost everywhere. This negatively impacts on health delivery in the district.

The district is occupied by two major ethnic groups, namely the Nanumbas and Konkombas and a few Basares and other minority tribes with the Nanumbas forming the dominant ethnic group. Therefore major languages spoken are Nanumba and Konkomba.

The climatic condition of the area runs through two seasons; the raining and the dry harmattan seasons. The raining season stretches from May to November whilst the dry season starts from December with January and February being the peak periods. Topographically, the district is made up of low and high lands with the Oti River cutting across the eastern corridor.

3.3. Study population

The focus of the study was pregnant women and mothers of children under five years. The study engaged households in selected communities within the Nanumba South District. Respondents were drawn from one hundred communities within the district between August and September, 2013

Table 3.1: Study variables

VARIABLE (CONCEPTUAL DEFINITION)	OPERATIONAL DEFINITION (INDICATOR)	SCALE OF MEASUREMENT
Affordability of ITN	Cost of ITN	Discrete e.g. cost in cedis
Awareness of ITNs	Knowledge and understanding of ITN by pregnant women and care givers	Ordinal e.g. low, high
ITNs ownership	Proportion of pregnant women and care givers who own ITNs	Continues e.g. 40%
Rate of ITN usage	Percentage of pregnant women and care givers who use ITN	Continuous e.g. 30%
Availability of ITNs	Accessibility of ITN to pregnant women and care givers	Nominal e.g. accessible, not accessible
Compliance with ITN message	Level of pregnant women and care givers compliance with ITN message	Ordinal e.g. low, high
Acceptance of ITN	Pregnant women and care givers perception about ITN	Nominal e.g. positive, negative
Age of pregnant woman	Age of pregnant woman at last birthday	Discrete e.g. 19 years
Age of child	Age of child at last birthday	Discrete e.g. 2 years

Education of pregnant mother and care giver	Level of education of pregnant mother and care giver	Nominal e.g. JHS, SHS, Tertiary
Occupation of pregnant mother and care giver	The type of job pregnant mother and care giver does for living	Nominal e.g. farming, trading etc
Marital status of pregnant mother and care giver	Whether pregnant mother and care givers are married or not	Nominal e.g. single, married, divorced, widow
Number of children to pregnant mother	Number of children ever born including those dead by pregnant mother	Discrete e.g. 3
Religion of pregnant mother and care giver	Religious affiliation of pregnant mother and care giver	Nominal e.g. Christian, Islam etc
Malaria cases among pregnant mothers and children under five years	Whether pregnant mother and children under five years in household has ever had malaria in the last month	Nominal e.g. Yes, No

Source: Author, August, 2013

3.5. Sampling technique

A total of **411** pregnant women and caregivers were selected from the three sub districts for the study. The other sub district was not taking to be part of the study because, at the time of the data collection the sub district was completely cut off from the rest of the district and consequently the communities within that sub district were not also selected to be part of the study. **100** communities were randomly selected from the three sub districts. Approximately four household were selected from each community using systematic random sampling. One eligible respondent was selected in each household, but in household where there were more than one eligible respondent, simple random sampling was used to select one of them through the ballot method, because two people from the same household may share similar house hold characteristics. **175** pregnant women and **236** caregivers with children under five year formed the sample size

3.6 Sample size

The sample size for this study is estimated to be **411 to determine the ownership and utilization of ITNs among pregnant women and care givers with children under five years**

Formula for the sample size $n = z^2pq/d^2$.

Where n = the desired sample population size (when population is greater than 10,000).

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

p = the proportion in the target population estimated to be pregnant (4%)

q = 1.0-p

d = the degree of accuracy desired usually set at 0.05 but for this study it is set at 0.06

The sample size for this study will therefore be;

$$(1.96)^2(0.5)(0.6) / (0.06)^2 = 320$$

With a response rate of 78%, the sample size will be = $320/0.78 = \underline{411}$

3.7. Pre-testing

The data collection tool, the questionnaire was pre- tested in Nanumba North District before the actual collection of data. This tested the validity and reliability of the instruments. The pre-test was conducted on pregnant women and caregivers of children under five years in some communities in one of the non-study sub districts within the Nanumba north district. The pre-test provided an opportunity to rephrase some of the items to reduce ambiguity and replace some misplaced ones.

3.8. Data handling plan

The data was cleaned after collection daily by the principal investigator and the field assistants to ensure that no gaps or unanswered questions exist and arranged chronologically. It was also coded to make it easy for data entering

3.9. Ethical consideration

The review and approval of the study protocol was done by the Ethical Review Committee at the Committee on Human Research Publication and Ethics (CHRPE) KNUST School of Medical Sciences. Copies of an introductory letter obtained from the department of community health, school of medical sciences, KNUST were presented to the Northern Regional Director of Health Services, Nanumba South District Director of Health Services, Nanumba South District Assembly and all sub district leaders to notify them of the research and its purpose. The principal researcher met some chiefs and opinion leaders of the study communities at the beginning of the data collection exercise and sought their consent for the study.

3.1.0 Limitation of the study

The study was limited to only pregnant women and care givers of children under five years in the Nanumba South district. The study did not cover every community as well as all the study population in the district. In view of that, conclusions were based on observations made at only one point in time; typically the study aimed at understanding causal processes that occur over a period of time. The design's major problem is that "since selected respondents are not a cohort, they may not be of the same characteristics and therefore may not be comparable.

3.1.1 Assumptions

It was assumed that, all responses and information provided by the respondents were accurate and true characteristics of the study population and study area.

It was also assumed that, all pregnant women care giver have ITNs.

KNUST

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

In this chapter the results of the study are described and the analyses of the data are presented. The results of the study are presented according to the study objectives and key variables.

The results describe ITNs ownership and utilization among pregnant women and children under five years. In addition, the analysis provides house hold dynamics that influence the ownership and usage of ITNs as well as the knowledge level, perception and attitude of the respondents with regards to ITNs use.

4.2: The Socio-Demographic Characteristics of the Respondents

Table 4.1 below presents the socio-demographic characteristics of the respondents. The table indicates that 9.5% of the respondents were males while 90.5 were females. Also, majority of the respondents were within the age group of 34 – 44

years, 62.3% for pregnant women and 69.9% for care givers. Majority of the respondents were married while 1.9% were single with 0.2% each being widowed and divorced.

The table again shows that, majority of the respondents were farmers representing 82.8%, 10.7% traders with 2.7% each being civil servants and unemployed while students represent 1.5%

Regarding education level, the table reveals that majority had no formal education. Out of the remainder with formal education, 7.8% were educated up to primary level, 6.8% up to secondary level while 2.2% and 0.5% were educated up post-secondary and vocational levels respectively.

The table further reveals that 41.1% of the respondents to be Moslems. Christians were 29.7% while as high as 28% being traditionalist and 1.2% of the respondents being into other forms for worship.

Table 4.1: Socio – Demographic Characteristics of respondents

SEX	No.	%
Male	39	9.5
Female	372	90.5
Status of respondent		
Pregnant	175	42.6
Caregivers	236	57.4
Marital status		
Single	8	1.9
Married	401	97.6
Divorced	1	0.2
Widowed	1	0.2
Religious status		
Christian	122	29.7
Moslem	169	41.1
Traditionalist	115	28
Others	5	1.2
Level of education		
No education	340	82.7
Primary education	32	7.8

Secondary education	28	6.8
Post-secondary	9	2.2
Vocational	2	0.5
Occupation		
Farmer	339	82.8
Trader	44	10.7
Civil servant	11	2.7
Unemployed	11	2.7
Student	6	1.5
Age of Pregnant women		
25-34	26	15
35-44	109	62.3
45-54	37	21
55-64	3	1.7
Age of Caregivers		
25-34	10	4.2
35-44	165	69.9
45-54	50	21.2
55-64	11	4.7
n = 411		

Source: Author, August, 2013

4.3 Knowledge of Respondents on Malaria Transmission

In table 4.2 below, majority of the respondents knew that, malaria was transmitted through the bites of mosquitoes with only a few of the respondents indicating they did not know how malaria was transmitted.

Table 4.2: Knowledge of respondents on malaria transmission

Cause of malaria	Mosquito		Don't know	
	NO	%	NO	%
Pregnant Women (175)	155	88.6	20	11.4
Caregivers (236)	211	89.4	25	10.6

Total (411)	366	89.1	45	10.9
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Source: Author, August, 2013

4.4 What Respondents do to prevent themselves from Mosquito Bites

On other measures used to prevent mosquito bites, majority of them as indicated in table 4.3 below said they use mosquito coils and spray. Interestingly, some of the respondent indicated the use of orange peels.

Table 4.3: Other preventive measures respondents used

Other preventive measures	Mosquito spray		Mosquito coil		Repellents		Orange peels	
	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women	42	36.5	62	54	1	0.8	10	8.7
Caregivers	55	31.5	103	59.2	0	0	16	9.2
Total	97	33.6	165	57.1	1	0.3	26	9

Source: Author, August, 2013

4.5 Respondents Source of Information about ITN

The sources from which respondents had information about ITNs were varied, with a large numbers of the respondents both pregnant women and care givers indicating health workers as the source and a few of them stating radio and television as the source from which they had the information on ITNs

Table 4.4: Respondent's source of information about ITN

Source of Information	Radio	Television	Health worker	Friend/relative	Village Volunteer	Others
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	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
Pregnant Women (175)	9	5.1	8	4.6	138	78.9	8	4.6	9	5.1	3	1.7
Caregivers (236)	17	7.2	17	7.2	187	79.2	8	3.4	6	2.5	1	0.4
Total	26	6.3	25	6.1	325	79.1	16	3.9	15	3.6	4	1

Source: Author, August, 2013

4.6 The Mindset of Respondents on Acquisition and Use of ITNS

On the attitude of respondents towards ITN acquisition and use, majority of the respondents said that if they educate and encourage one another it will help in the usage while others indicated free acquisition of ITNs, some of them said, they did not know and the rest said purchase of ITNs as presented in table 4.5 below.

Table 4.5: The mindset of respondents on acquisition and use of ITNS

Attitudes of respondents	Educate & encourage each other on ITN use		Free acquisition of ITN		Purchase of ITN		Indifferent	
	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women (175)	75	42.9	78	44.6	10	5.7	12	6.9
Caregivers (236)	133	56	79	33.5	12	5.1	12	5.1
Total (411)	208	50.6	157	38.2	22	5.4	24	5.8

Source: Author, August, 2013

4.7 Perception of Respondents on ITNS Protection in the prevention of Malaria

The respondents' perception on the degree of protection of ITNs in the prevention of malaria, majority of them said it was very effective while a few of the respondents indicating that ITNs were less effective. This is presented in the table below

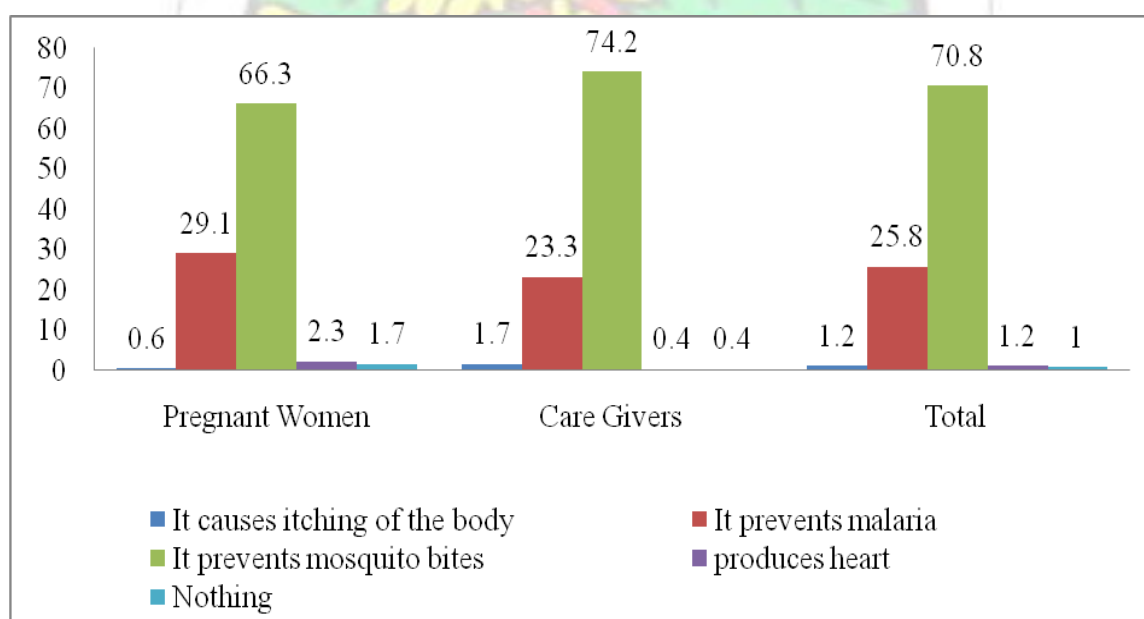
Table 4.6: Perception of respondents on ITNs protection in the prevention of malaria

Respondents perception on ITNs protection	Very Effective		Effective		Less Effective	
	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	108	93.9	5	4.3	2	1.7
Caregivers (174)	167	96	5	3	2	1
Total (289)	275	95.2	10	3.5	4	1.4

Source: Author, August, 2013

4.8 Perception of Respondents on other people's views about ITN

Perception have a strong influence in persons behaviour and hence can either influence ITNs use positively or negatively. The respondents indicated that majority of the people say ITNs prevent mosquitoes bites as well as malaria while a few of the respondents said ITNs causes body itching as presented in figure 4.1 below.



Source: Author, August, 2013

Fig. 4.1: Perception of respondents on other people’s views about ITN

4.9 Types of Material in Making Houses Respondents Lived In

The structure of the house in which the house hold is found can also greatly influence ITNs usage. Majority of the respondents lived in household with the house structure made of cement, as one of the characteristics of the study area with most of the populace always on the move chasing for their livelihood, some of the respondents lived in households with the house structure made of bricks. Some of the respondents also lived in grass thatched and mud made house made structures as presented below in table 4.7

Table 4.7: Types of material used for house structure

Type of house hold structure	Grass thatched		Made of mud		Made of bricks		Made of cement	
	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	20	17.4	22	19.1	55	31.5	78	67.8
Caregivers (236)	21	9	23	9.7	58	24.6	134	56.8
Total (411)	41	10.0	45	10.9	113	27.5	212	51.6

Source: Author, August, 2013

4.10. Sleeping Arrangements within the Household

The sleeping arrangements within the households can influence ITNs use, this is because children under five years of age need to be supervised to ensure that they are always and properly covered with the ITNs. From table 4.8 below, majority of the respondents indicated that children under five years sleep with their parents with only small percentage (3.9) of the respondents stating that children under five years sleep alone.

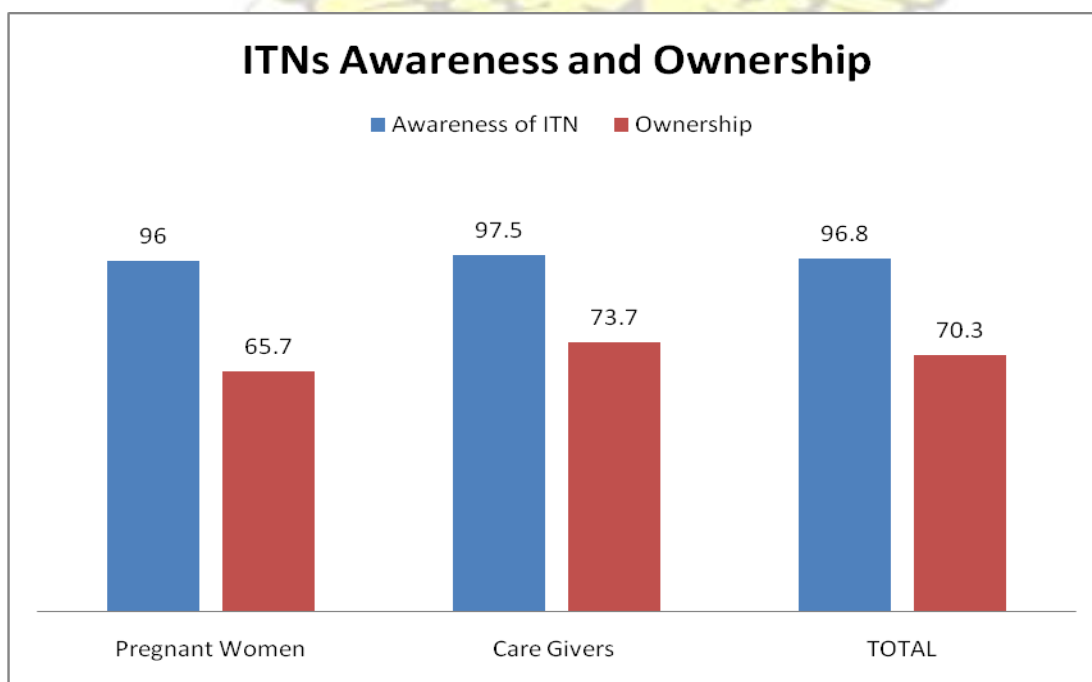
Table 4.8: Sleeping arrangements within the house hold

Types sleeping arrangements	Children under five sleep alone		Children sleep with parents		Parents sleep alone		children under five sleep with older siblings		Pregnant women sleep alone	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	20	17.4	22	19.1	55	31.5	78	67.8	78	67.8
Caregivers (236)	21	9	23	9.7	58	24.6	134	56.8	134	56.8
Total (411)	41	10.0	45	10.9	113	27.5	212	51.6	212	51.6

Source: Author, August, 2013

4.11 ITNS Awareness and Ownership among the Respondents

On the part of respondents' awareness and ownership of ITNs, majority of the respondents were aware of ITNs but it was not the same in respect with ownership as awareness was higher than ownership as shown in the figure 4.2 below.



Source: Author, August, 2013

Figure 4.2: Awareness and Ownership of ITNs among respondents

4.12 Number and Types of ITNS owned by Respondents

Ownership was high among respondents with that of care givers slightly more than that of the pregnant women. General the ITNs ownership was very high and the type of ITNs that were mainly own by the respondents were the long lasting insecticide nets (LLINs). Almost 47% of the households that had ITNs owned more than 3 ITNs as presented in table 4.9 and 4.10 below

Table 4.9 Numbers of ITNs owned by respondents

No. Of ITNs owned	More than 3 ITNs		Less than 3 ITNs	
	NO.	%	NO.	%
Pregnant Women (115)	57	49.6	58	50.4
Caregivers (174)	77	44	97	55.7
Total (289)	134	46.4	155	53.6

Source: Author, August, 2013

Table: 4.10 Types of ITNs owned by respondents

Type of nets	Ordinary nets		Insecticide treated nets		Long lasting insecticide nets (LLINs)	
	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	3	2.6	3	2.6	109	94.8
Caregivers (174)	5	2	10	5.7	159	91.4
Total (289)	8	2.8	13	4.5	268	92.7

Source: Author, August, 2013

4.13 Respondents Opinions on ITNs usage within the House Holds

Majority of the respondents indicated that every person within the house hold was supposed to sleep under ITNs, a few of the stated that, children under five years of age should sleep under ITNs while others indicated that, pregnant women were to sleep under ITNs as indicated in table 4.11 below.

Table 4.11 persons that should sleep under ITNs

Type of nets	Children under five years		Non-pregnant women		Pregnant women		Adults males 15+		Every one	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	12	10.4	6	5.2	12	10.4	3	2.6	85	71.3
Caregivers (174)	43	25	11	6.3	6	3.5	3	1.7	111	63.8
Total (289)	55	19.0	17	5.9	18	6.2	6	2.1	193	66.8

Source: Author, August, 2013

4.13 Consistency of ITNs usage among House holds

On consistency of ITNs usage, majority of the respondents indicated they use ITNs throughout the night during the season for mosquitoes, 34.3% said they use ITNs all year round, few said some part of the night and others stating most part of the night as stated in table: 4.12 below

Table: 4.12 Consistency of ITNs use

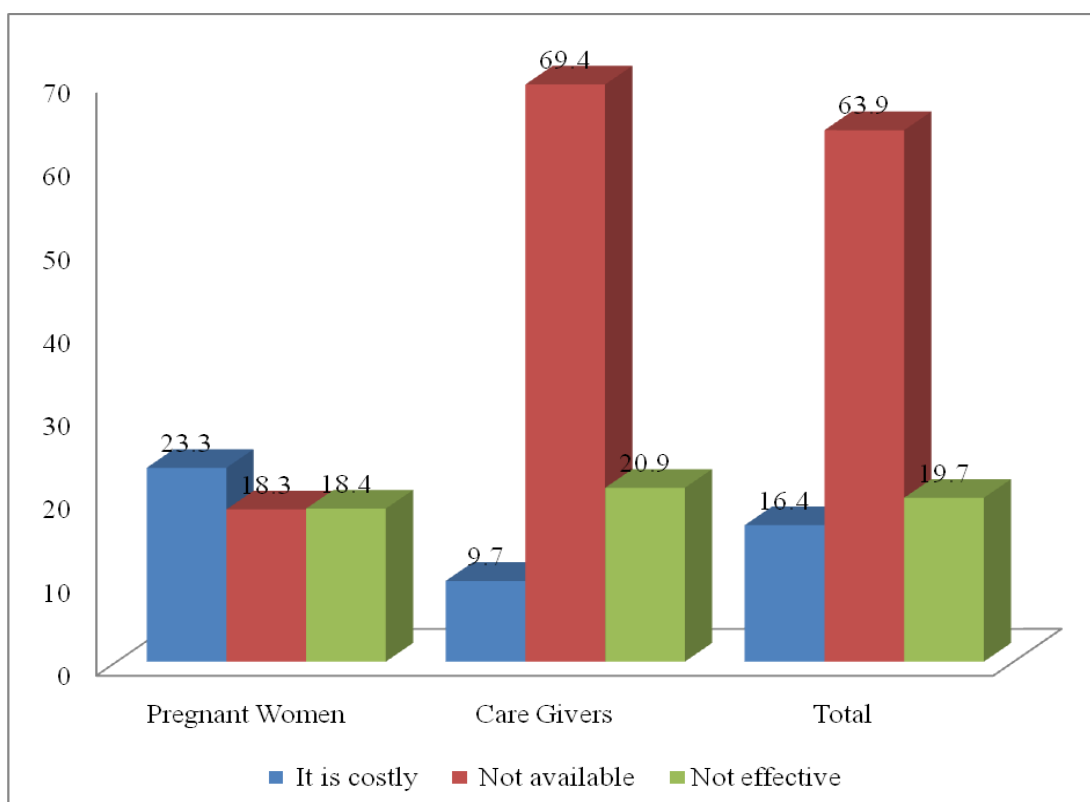
Consistency of ITNs use	Throughout the night during raining season		All year round		Most parts of the night		Some part of the night	
	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	53	46.1	50	43.5	5	4.3	7	6.1
Caregivers (174)	117	67	49	28.2	3	1.7	5	2.9
Total (289)	170	58.8	99	34.3	8	2.8	12	4.2

Source: Author, August, 2013

4.14 The reasons some respondents gave for not having ITN

Having an ITN can influence its usage, the following are the reasons the respondents who were not having ITNs gave; majority of them indicated ITNs were not available with the rest stating the cost and not effective nature of ITNs as their reasons as presented in figure 4.3 below





Source: Author, August, 2013

Fig. 4.3 Respondents' reasons for not having ITNs

4.15 Reasons for which Respondents used ITNs

The reasons for which respondent used ITNs were varied, majority of the respondents stated to prevent malaria, others said to prevent nuisance from mosquitoes, prevent insect bite and sleep comfortably. This is presented in table 4.11 below

Table 4.13 Reasons for which respondents used ITNs

Reasons for using ITNs	Prevent insect bites		Prevent mosquito nuisance		Sleep comfortably		Prevent malaria	
	NO.	%	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	21	18.3	13	11.3	2	1.7	79	68.7
Caregivers (174)	25	14.4	14	8.0	1	0.6	134	77
Total (289)	46	16.0	27	9.3	3	1.0	213	73.7

Source: Author, August, 2013

4.16: Decision makers on ITNs use at the Household Level

Decision at the household level on the use of ITNs can eventually influence their usage and as presented in table 4.14 below, majority of the respondent indicated that their husbands were responsible in making decision as to who in the household will use the ITN. Some also stated they made decisions themselves

Table 4.14 Decision makers on ITNs use at the household level

Persons in the house hold that makes decision on ITNS use	Husband		elf		Grandmother	
	NO.	%	NO.	%	NO.	%
Pregnant Women (115)	73	63.5	42	36.5	0	0
Caregivers (174)	127	73.0	46	26.4	1	0.6
Total (289)	200	69.2	88	30.4	1	0.3

Source: Author, August, 2013

4.17 Sources from which respondents acquired ITNS

Majority of the respondents indicated health workers as the source from which they acquired the ITNs they were currently using while just a few stating they bought their ITNs from the market as presented in table 4.13 below.

Table 4.15 Sources from which respondents acquired ITNs

Source of ITN	Free from health workers		Bought from the market	
	NO.	%	NO.	%
Pregnant Women (115)	110	95.7	5	4.3
Caregivers (174)	171	98.3	3	1.7
Total (289)	281	97.2	8	2.8

Source: Author, August, 2013

4.18 Awareness of respondents on the cost of ITNs

When the respondents were asked on the cost of ITNs, majority of them stated they did not know the cost of ITNs with some stating 1 and 2 cedis as the cost of ITNs. This is a clear indication as seen on the previous table, only 2.8% of the ITNs owned by respondents were bought from the market.

Table 4.16 Awareness of respondents on the cost of ITNs

How much is the cost of an ITN?	Pregnant Women N =115		Caregivers N =174		TOTAL	
	No.	%	No.	%	No.	%
Do not know	173	98.9	233	98.7	408	98.8
1 cedi	1	0.6	0	0	1	0.2
2 cedi	1	0.6	1	0.4	2	0.5
3 cedi	0	0	2	0.8	2	0.5

Source: Author, August, 2013

4.19 Cost at which respondents were willing to purchase ITNs

Respondents stated the cost at which they were willing to pay for ITNs, as presented below, with majority of them indicating they will pay between 1 and 2 cedis with others stating they could not tell. This has to also do with the importance some individuals attach to their health and the varied health seeking behaviour of the populace.

Table 4.17 Cost at which respondents are willing to purchase ITNS

Amount at which	1 cedi	2 cedi	3 cedi	4 cedi	5 cedi	Cannot tell

respondents are willing to pay for ITNs	NO	%	NO	%	NO	%	NO	%	NO	%	NO.	%
Pregnant Women (175)	68	38.9	21	12	2	1.1	1	0.6	3	1.7	80	75.7
Caregivers (236)	92	30.0	22	9.3	2	0.8	5	2.1	4	1.7	111	47
Total (411)	160	38.9	43	10.5	4	1.0	6	1.5	7	1.7	191	46.5

Source: Author, August, 2013

4.20 Selected demographic characteristics against ITNs usage

The level of education of the respondents influenced ITNs use with P- value of 0.01 this implies that there is a strong association between ITNs use and level of education. The findings also revealed that, the occupation has a positive association with ITNs usage with a p- value of 0.02. The respondents marital and religious status had weak association with ITNs use, marital status had a p-values of 0.31 and religious status with a p-value of 0.27

Table 4.18: Some Demographic Characteristics against ITNs usage

Marital status	No.	%	P -value
Single	8	1.9	0.31
Married	401	97.6	
Divorced	1	0.2	
Widowed	1	0.2	
Religious status	No.	%	P - value
Christian	122	29.7	0.27
Moslem	169	41.1	
Traditionalist	115	28	

Others	5	1.2	
Level of education	No.	%	P -value
No education	340	82.7	0.01
Primary education	32	7.8	
Secondary education	28	6.8	
Post-secondary	9	2.2	
Vocational	2	0.5	
Occupation	No	%	P -value
Farmer	339	82.8	0.02
Trader	44	10.7	
Civil servant	11	2.7	
Unemployed	11	2.7	
Student	6	1.5	
Materials used for house structure	No.	%	p-value
Grass thatched	41	10	0.03
made of mud	45	10.9	
Made of bricks	113	27.5	
Made of cement	212	51.6	

Source: Author, August, 2013

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter discusses the findings of the study which was aimed at establishing the household factors that influence the ownership and utilization of ITNs among pregnant women and children under five year in the Nanumba South District, Ghana.

The study was a cross sectional household survey and specifically looked at the ITNs coverage and utilization in the district, to establish whether there is an association between ITNs ownership and utilization, marital status, educational level of women, sleeping arrangement, nature of house structure and knowledge level of respondents on ITNs, the causes of malaria and other control measures.

A random sample of 411 households from hundred communities selected randomly yielded 411 respondents whose information was used for the study.

The persons included in the study were pregnant women and care givers of children under the age of five years. The findings are discussed following the order of the research questions of the study in chapter one.

5.2 ITNs ownership

The study shows a high rate of ITNs ownership. This is comparable to others studies in other African countries. Out of 411 respondents sampled in the study, the result showed that ITNs ownership in the district was high. The general ownership was 70.3%. 116(65.7%) of pregnant women had ITNs and 174(73.3%) of care givers owned ITNs. This is comparable to studies in other parts of Africa.

In 1998, Dr. Gro Harlem Brundtland, the then Director General of WHO launched a Global Roll Back Malaria Initiative against malaria (Kakkilaya, 2006). The African Summit on RBM that took place in Abuja, Nigeria in April 2000 set an ambitious target of at least 60% coverage of ITNs within high-risk groups, which include children, less than five years and pregnant women, by the year 2005.

Following the above recommendation, Ghana's policy on prevention of malaria in pregnancy recommends at least two doses of SP as IPT in the second and third trimesters of pregnancy for women of all parties. The policy also advocates that

pregnant women should always sleep under ITNs (Adindu et al, 2010). The 70.3% ITNs ownership for the district exceeds the Abuja target of 60%

The study showed that 62(21.4%) of the respondents had at least one net and majority of them 227(78.6%) had more than one net. This result is similar to a study by Muller et al, (2002) which showed that 49% (103/210) of the respondents in a survey reported at least one mosquito net in their household. Twenty-one percent (21%) owned one, 13% two and 15% more than two mosquito nets.

Majority of the respondents 193(66.8%) stated that everyone is supposed to sleep under ITNs, 55(19%) said children under five year while 18(6.2%) indicating pregnant women are to sleep under ITNs which is similar to Muller et al (2002) in an exploratory study in rural Burkina Faso that reported adult men are the group who reportedly use mosquito nets more often (34%), followed by mothers with young children (19%) and elderly persons (17%).

5.3 Households dynamics and utilization of ITNs

In the household, there are factors that determine net ownership and usage by members sleeping within the household. These factors affect effective utilization of ITNs by household members including pregnant women and children under five. Even when the ITN is available in the household, the children under five may not be able to use it properly and consistently due to other household dynamics. This section presents findings and discussion on the intra-household factors that impact on utilization of ITNs within the household. It looks at the type of household structure, number of people sleeping in the household, sleeping arrangements in place, and the persons that makes the decision on who to sleep under ITNs.

5.3.1 Household structure

On the part of the house structure of the respondents, 41(10%) were leaving in grass thatched houses, 44(10.9%) in mud house and 212(51.6) leaving in permanent houses. The different kinds of household structures may favour or deter the use of mosquito nets especially hanging nets. From the study it can be seen that ITNs usage is greatly influence by the household structure

A cross tabulation of ITNs usage, occupation, marital status, education and religion was performed and the following are the results. The level of education of the respondents influenced ITNs use with P- value of 0.01; this implies that there is a strong association between ITNs use and level of education. The findings also revealed that, the occupation of the respondents has a positive association with ITNs usage with a p-value of 0.02. The respondents marital and religious status had weak association with ITNs use, marital status had a p-values of 0.31 and religious status with a p-value of 0.27). These finding implied that the marital and the religious status of the respondents did not influence ITNs use positively

5.3.2 Sleeping arrangements in the household

Sleeping groups within the household determine whether or not pregnant women and children under five are able to sleep under Insecticide Treated Nets. In the study carried out in Ethiopia, Ghana, Mali, Nigeria, Senegal and Zambia on Intrahousehold mosquito net use by Baume at al 2008, it was found out that most common sleeping groups in both countries was a woman of reproductive age and a child under five under 1 net, often along with another child or spouse. The findings of this study are not very much similar, in that 374(91%) of the respondents indicated that children under five years and their parents sleep together. 10(2.4%) of the respondents said parent sleep alone and 5(1.2%) of the pregnant women declared that they sleep

alone. The statistics from the finding has a p – value of 0.05 which means that, there is a weak association between ITNs use and sleeping arrangements within the household structure.

5.3.3 Decision on ITNs use

Decision making within the household in regard to who should sleep under the mosquito net lies between the mother and father. It impacts on the availability and accessibility of ITNs within the household. In the study community, it was found out that largely, its husband or men who decide who should sleep under the ITNs. And the findings on the decision to use the ITNs in the households, 199(69%) of the respondents stated that the husband was responsible in making that decision, 81(28%) makes the decision to use ITNs by themselves. Therefore, the intra-household gender relations shape the way ITNs are utilized by household members in terms of who should sleep under an ITN. While women were responsible for child care through ensuring that children sleep well, they do not have enough resources at their disposal to enable them buy the ITNs even if the ITNs are available. Men are expected to provide such financial support to the pregnant women and female caregivers which results into men dominating the decision making process on who should sleep under the net.

5.3.4 Consistency of ITNs use

On consistency of ITNs usage, 170(58.8%) of all the respondents indicated they used ITNs throughout the night during the season for mosquitoes, 99(34.4%) said they use ITNs all year round, 12(4.2%) said some part of the night and 8(2.8%) stating most part of the night. It can be stated that, despite the fact that 70.3% of the respondents owned ITNs, only 34.4% used their nets consistently.

A number of studies have been conducted in various countries to assess the level of access and utilization of ITNs by students. The results are however, not encouraging just as in this study too. For instance, Aliyu & Alti-Mu'azu (2009) indicated in their study among boarding students in Northern Nigeria that though 87.3% of the students had knowledge about ITNs, only 43.3% were current users. Sex distribution of ITN use was 50% among females and 38.9% among males. Reasons given by non-users included cost, non-availability of ITNs, heat and inconvenient to sleep under it.

5.4 Knowledge, attitude and perception about ITNs

One of the objectives of the study was to determine the knowledge, attitudes, and perceptions of pregnant women and caregivers of under five children towards the usage of ITNs. This was to assess the knowledge, attitudes, perceptions and beliefs about ITNs in the households. Whereas ITNs are the mainstay in malaria prevention, their effectiveness largely depends on the knowledge and perceptions of the people in the household who directly use them.

5.4.1 Knowledge on malaria

155 representing 88.6% of pregnant women and 211(89.4%) of care givers indicated that mosquitoes were the cause of malaria with 10.3% of pregnant women and 9.2% of care givers saying they did not know what causes malaria while 1.1% and 2.1% of pregnant women and care givers indicating stagnant water as the cause of malaria.

5.4.2 Knowledge on ITN

168 (96%) of pregnant women said they had knowledge of ITNs and 230 (96.8%) of care giver also indicating they had knowledge of ITNs with as little as 3.2% of all the respondent saying they had no knowledge of ITNs.

From the study, the following were the reason respondents gave for using ITNs, 213(73.7%) of the respondents said the reason for using ITNs was to prevent malaria,

46(16%) said their reason was to prevent insect bites with 27(9.3%) stating their reason as preventing the nuisance of mosquitoes. This is comparable to similar studies done in other parts of Africa, a recent study conducted in Southern Ethiopia to assess knowledge and utilization of ITNs among freely supplied households however, showed that 62.6% of the 650 respondents indicated ITNs as the main preventive measure of malaria, followed by taking tablets (14.0%), proper disposal of waste (10.7%), use of traditional remedies (3.4%), fumigation (3.4%), use of aerosol spray (3.1%) and drainage of breeding sites (1.7%). Most (97.5%) of the respondents believed that sleeping under ITN has a benefit and only a little above five percent (5.2%) of the respondents reported problems associated with sleeping under ITN (Gashaw & Wakgari, 2008). From this finding, it is clear that not all people will use ITNs in the prevention of malaria. Some people prefer other methods of protection. Respondent in this study were also asked what other preventive measures they used and these were their responses; 26(9%) said they use orange pills, 97(33.6%) said mosquito spray, 165(57.1%) indicating mosquito coils, while 1(0.3%) stating that they use others repellents

5.4.3 Perception of respondents on ITNs

For more than two decades now, insecticide-impregnated bed nets and curtains have elevated renew interest in ITNs as a tool in malaria control. “In Africa, five major trials in areas of different malaria transmission intensities have documented a reduction in all-cause mortality of young children associated with ITN protection (Alonso, Armstrong & Lindsay, 1991; Adjuik, Binka & Kubaje, 1997; D’Alessandro, Olaleye & McGuire, 1995; Nevill, Mungala & Some, 1996; Diallo, Habluetzel & Esposito, 1997). These controlled trials have shown that ITNs reduce clinical malaria episodes by 48% and protect six (6) of every 1000 children’s lives in the age group of

1-59 months every year” (Lengeler, 2004, p. 48)

On the level of protection of ITNs, 275(95.1%) of the respondents registered that ITNs were very effective, 10(3.5%) said ITNs were effective and 4(1.4%) stating that ITNs were less effective. This analysis can also be seen as the reason why on 34.4% of the respondents used ITNs regularly.

The study respondents were asked about what other people say about ITNs, 297(71%) of the respondents stated that ITNs prevents mosquito bites, 106(25.8%) said ITNs prevents malaria while 1.2% indicated they produces heat and 1% saying ITNs causes body itching and is comparable to a study carried out in Mbarara on the perceptions about Malaria prevention (Nuwaha, 2002), avoiding mosquitoes was the most common method mentioned for prevention of malaria

5.4.4 Attitude

Respondents were asked what could be done in the House hold to ensure that every child under five years and pregnant women sleep under ITNs, 280 (50.6%) said education and encouragement with 157(38.2%) saying free distribution while only 55(5.4) indicating the purchase of the ITNS

5.4.5 Source of information on ITNs

On the part of source of information on ITNs 325 (79.1%) indicated the health workers as the source from which they had their information while 6.3% said radio, with 6.1% stating ratio as the source. These findings are similar to a study conducted to assess the distribution, knowledge and utilization of ITNs in selected malaria prone areas of Ethiopia, Animut et al (2008) indicated that 60.1% of the respondents had knowledge about nets. The most important source of information was health workers (59.1%), followed by radio, which contributed to 34.3% of the source of ITN information.

5.5 Accessibility and Affordability

The study as tried to find out the reasons why respondent were not having ITNs. These are some of the responses the respondents gave for not owning ITNs; 20(16.4%) stated the cost of the ITN, 24(19.7%) also said, the ITNs were not effective and 78(63.9) stating non availability as the reason. This is similar to a base line interview in Mali, none of the 132 households visited were using ITNs. The most common reasons for not treating the net include were cost (59.0%), availability (23.0%) and lack of knowledge regarding the effectiveness of ITNs in preventing malaria (11.0%). However, 93.0% of the households who did not treat their nets during the main study stated cost as the main reason. As high as 96.0% of the households in this study were using untreated bed nets and that was the most common malaria prevention method used by the respondents (Doumbo et al, 2005). In addition, Adindu et al (2010) confirmed that the cost of ITNs and mosquito repellants is an important barrier for their use.

Place from which respondents could obtain ITNs, 187(45.5%) of the respondents indicated they have places they can get ITNs, while the remaining 224(54.5%) stating they had no place to go and obtain ITNs, this is a clear indication that accessibility is a challenge in the district.

When respondents were asked how much an ITN could cost, almost all the respondents 406(98.8%) said they did not know the cost, with remaining 1.2% stating 1cedi, 2 cedi and 3 cedi respectively. This is not surprising because as high as 281(97.2%) of the all the respondent indicated that, they were given the ITNs free and only 8(2.8%) stating they bought their ITNs in the market.

Respondents were asked how much they were willing to pay for ITNs and the responses are as follows; 160(38.9%) 1 cedi, 43(10.5%) 2 cedi, 4(1%) 3 cedi, 6(1.5%) 4 cedi, 7(1.7%) 5 cedi and 191(46.5) stating they cannot tell. Most of the ITNs are distributed

free of charge or sold at subsidized price during national immunization campaigns and they run short after these exercise. Currently, ITNs can be obtained mostly from the commercial market where the price ranges between 12-15 GH¢. It is not only in Ghana where the price of an ITN is unaffordable for most people. Muller, Okrah, Pale, Sommerfeld & Traoe (2000) reported that the results from their study shows that most of the nets are purchased from the local markets and the shops and the price for a mosquito net ranged from 9 US\$ to 22 US\$ (mean 9.2 US\$).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

Four hundred and eleven respondents from 411 households selected randomly from one hundred randomly selected communities in three sub districts were interviewed to generate information for the study of the household factors that influence the ownership and utilization of ITNs among pregnant women and children under five years of age in the Nanumba South District of the Northern Region, Ghana, in August, 2013. The conclusions and recommendations from the result of the study are presented in this chapter.

6.1 Conclusion

The study showed that, ITNs ownership was 65.7% of pregnant women and 73.3% among caregivers and a general ownership of 70.3% amongst all respondents

Notwithstanding the high ownership of ITNs, only 34.4% consistently use their ITNs. The study also revealed that, ownership of ITNs influences their usage

The study showed that 62(21.4%) of the respondents had at least one net and majority of them 227(78.6%) had more than one net. Long lasting insecticide nets were the majority of the nets owned by the respondents 268(92.7%), with treated nets recording 13(4.5%) and other types of nets with 8(2.8%)

The level of education of the respondents influenced ITNs use with P- value of 0.01, this implies that there is a strong association between ITNs use and level of education. The findings also showed that, occupation has a positive association with ITNs usage with a p- value of 0.02. The respondent's marital and religious status had weak association with ITNs use, marital status had a p-values of 0.31 and religious status with a p-value of 0.27. These finding implied that the marital and the religious status of the respondents did not influence ITNs use positively

To conclude, the intra-household dynamics in ITNs use in households with pregnant women and children under five years is complex and influenced by various social, economic and cultural realities. The success of ITN utilization largely depends on how households are able to cope with these realities and how policy makers and implementing organizations understand these realities. Otherwise, continuous distribution of ITNs without proper knowledge on the intra-household dynamics will continue to offer little success in prevention of malaria among pregnant women and children under five year.

Demonstration and constant education on the preparation of the ITNs before usage and the cost benefits and using ITNs as compared with the economic importance of malaria using audio visuals.

6.2 Recommendation

Pregnant women and caregivers should be continuously sensitised during ANC and Child Welfare Clinics about the consequences of malaria in pregnancy and the benefits of ITNs for them as well as their unborn babies.

The DHMT must ensure, through proper planning and lobbying of the relevant NGOs, for the continuous supply of ITNS to the health facilities and some vantage point within the communities where ITNS could be accessed.

Conscious efforts must be made to ensure that, the universal coverage rule is achieved and hence every two persons in a household must have an ITN.

The DHMT should therefore consider using a community delivery approach in which TBAs and volunteers will be trained to distribute and promote ITNs use at the community level to help increase access and use and so far as ITNs access directly influence usage.

The District Assembly should allocate some percentage of its common fund to assist the District Health Directorate in the fight against malaria since it is the leading cause of morbidity in the district depriving it of great human work force an invaluable working hours. This could be done by targeting the pregnant mothers and the children under 5 in the district since they are the most vulnerable to the malaria disease.

The Assembly should through the assemblymen and women sensitize and encourage the communities in the use ITNs. This can be realised through advocacy, community sensitization and stakeholder's engagement.

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APPENDICES

Appendix I

HOUSEHOLD QUESTIONNAIRE FOR PREGNANT WOMEN AND CAREGIVERS ABOUT OWNERSHIP AND UTILIZATION OF INSECTICIDE TREATED NETS (ITNS) IN HOUSEHOLDS WITH PREGNANT WOMEN AND CHILDREN UNDER 5 YEARS IN THE NANUMBA SOUTH DISTRICT OF THE NORTHERN REGION OF GHANA
IDENTIFICATION

Sub district

Community

Name of household head.....

Date of interview

Time of Interview

Date: _____/_____/_____

To all respondents: All your answers will be kept strictly confidential. They will be put together with over 399 other people we are going to talk to, to get an overall picture. It will be impossible to pick you out from what you say, so please feel free to speak to me honestly. (*Proceed with interview only if answer is positive*).

SECTION A: SOCIO- DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT

1. Age of:

Pregnant woman in complete years.....

Caregiver in complete years

Under five years in months.....

2. Gender

a. Male []

b. Female []

3. Status of respondent

a. Pregnant []

b. Caregiver []

4. Marital status

a. Single []

b. Married []

c. Divorced []

d. Widowed []

5. Religious status
- a. Christian []
 - b. Moslem []
 - c. Traditionalist []
 - d. Others (specify).....

6. What is your level of education?
- a. No education []
 - b. Primary education []
 - c. Secondary education []
 - d. Post-secondary education []
 - e. Vocational education []

7. What is your occupation?
- a. Farmer []
 - b. Trader []
 - c. Civil servant []
 - d. Unemployed []
 - e. Student []

SECTION B: KNOWLEDGE, ATTITUDES, PERCEPTIONS, AND BELIEFS

8. What is the cause of malaria?
.....

9. Do you know what ITNs are?
- a. Yes []
 - b. No []

10. How did you come to know about ITN?
- a. Radio []
 - b. Television []
 - c. Health worker []
 - d. Friend/relative []
 - e. Village volunteers []
 - Other (specify).....

11. What do other people say about ITNs?

.....
.....
.....

12. What could be done in the household to make sure that every child under five years and pregnant women uses ITNs?

.....
.....

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SECTION B: HOUSEHOLD DYNAMICS AND UTILIZATION OF ITNs

13. What kind of house structure do you stay in?
- a. Grass thatched []
 - b. made of mud []
 - c. Semi-permanent []
 - d. Permanent []

14. How many households are in this house?

15. How many people are in this household?

16. How many children under five years are in this household?

17. How are they related to you?
- a. Own children []
 - b. Niece/Nephew []
 - c. Grand children []

18. How many sleeping places are in this household?

19. What sleeping arrangements do you have in place?
- a. Children under five sleep alone []
 - b. Children sleep with parents []
 - c. Parents sleep alone []
 - d. Children under five years with older siblings []
 - e. Pregnant women sleep alone 20. []

- Do you have ITNs in this household?
- a. Yes []
 - b. No []

- c. if No skip
to section
D

21. What type do you have? []
- d. Ordinary nets []
 - e. Ever treated net []
 - f. Baby net []
 - g. Insecticide treated mosquito net []
 - h. Long lasting insecticide net []

22. How many mosquito nets do you have in this household?
- a. More than 3 nets []
 - b. 3 nets []
 - c. 2 nets []
 - d. 1 net []

23. Which people sleep under a mosquito net in your household?
- a. Children under five years []
 - b. Non pregnant women []
 - c. Pregnant women []
 - d. Adult males 15+ []
 - e. Everyone []

24. What is the **main** reason for using ITN?
- a. Prevent insect bite []
 - b. Prevent mosquito nuisance []
 - c. Sleep comfortably []
 - d. Prevent malaria []
 - e. Others (specify)..... []

25. What is the level of ITNs protection in terms of preventing malaria among pregnant women and the under-fives?
- a. Very effective []
 - b. Effective []
 - c. Average []

- d. Less effective []
- e. Not effective at all []
26. Did your children under five years sleep under a net last night?
- a. Yes []
- b. No []
27. Did you sleep under ITN last night?
- a. Yes []
if yes skip to qtn 29
- b. No []
28. Why didn't you sleep under ITN last night?
- a. Don't feel comfortable in it []
- b. Weather is warm []
- c. Not effective []
- d. Side effects []
- e. Other (specify)..... []
29. How consistent do children under five years and pregnant women sleep under ITN?
- a. Throughout the night during the season for mosquitoes []
- b. All year round []
- c. Most part of the night []
- d. Some part of the night []
30. Who decides who should sleep under the mosquito net?
- a. Husband []
- b. Self []
- c. Caregiver []
- d. Grandmother []
- e. Father []
- f. Mother []
31. Where did you obtain the ITN you are currently using?
- a. Bought from Health Facility []

- b. Given free by Health Workers []
- c. Bought from Chemical Shop []
- d. Given free by village volunteer []
- e. From a friend/relative []
- f. Others (specify).....

32. How did you acquire the ITN you are currently using?

33. What other things do you use to prevent malaria?
- a. Mosquito spray []
 - b. Mosquito coil []
 - c. Repellents []
 - d. Orange pills []
 - e. Other (specify).....

SECTION D: AFFORDABILITY

34. Why don't you own a bed net?
- a. It is costly []
 - b. Not available []
 - c. Not effective []
 - d. Side effects []
 - e. Others (specify).....

35. Do you have any where you can obtain an ITN?
- a. Yes []
 - b. No []

36. How much is the cost of an ITN?
.....

37. How much are you willing to pay for an ITN?
.....

THANK YOU VERY MUCH FOR YOUR TIME

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Appendix II

