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**COLLEGE OF HEALTH SCIENCES**

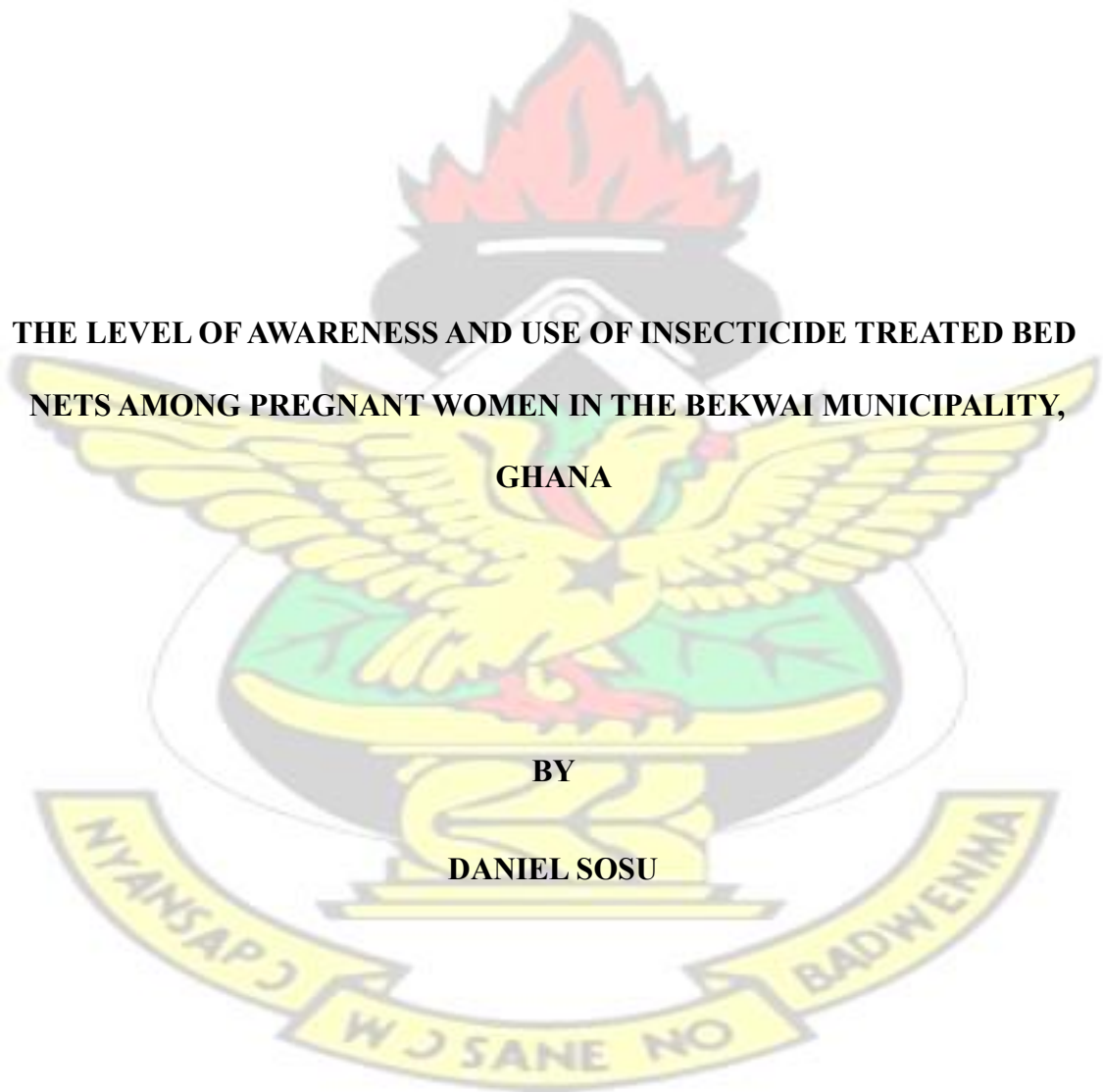
**SCHOOL OF PUBLIC HEALTH**

**DEPARTMENT OF HEALTH POLICY, MANAGEMENT AND ECONOMICS**

**THE LEVEL OF AWARENESS AND USE OF INSECTICIDE TREATED BED  
NETS AMONG PREGNANT WOMEN IN THE BEKWAI MUNICIPALITY,  
GHANA**

**BY**

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**NOVEMBER, 2015**

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**DEPARTMENT OF HEALTH POLICY, MANAGEMENT AND ECONOMICS**

The level of awareness and use of Insecticide Treated Bed Nets among pregnant women  
in the Bekwai Municipality, Ghana

A Thesis submitted to the Department of Community Health, School of Medical  
Sciences, College of Health Sciences, Kwame Nkrumah University of Science and  
Technology, in partial fulfillment of the requirements for the degree of  
Master of Public Health (Health Services Planning and Management)

By

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**NOVEMBER, 2015**

## DECLARATION

I hereby declare that this submission is my own work towards the award of Master of Public Health (Health Services Planning and Management) and that, to the best of my knowledge, it contains no previously published work 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.

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## DEDICATION

I dedicate this thesis to my beloved wife, Mrs Gifty Sosu and children Gloria Sosu, Sandra Sosu, Daniel Sosu Junior, Alex Collins Sosu as well as my brothers and sisters.

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## ABSTRACT

Malaria constitutes one of the leading causes of morbidity and mortality and accounts for nearly 3 million deaths globally each year with an estimate of 90% occurring in Sub Sahara Africa. Global efforts have therefore targeted halving the malaria burden by 2015 and also achieving 80% Insecticide Treated Bed Nets (ITNs) use among susceptible groups like pregnant women and children less than five years of age. This study sought to assess the level of awareness and use of ITNs among pregnant women in the Bekwai Municipality of the Ashanti Region.

A descriptive cross-sectional study with quantitative methods was conducted with 384 pregnant women attending Anti Natal-Care Clinics (ANC) at four (4) selected health facilities in the Bekwai Municipality. A simple random sampling was used to select the respondents. A semi-structured questionnaire comprising open and closed-ended questions was administered to respondents. Data was analysed using descriptive and analytical statistics at 95% confidence interval using STATA (version 12).

The average age of the respondents were 29 years with a standard deviation of 6.19, about 41.7% were JHS graduates while most respondents (27%) were unemployed. The awareness of ITN was high among pregnant women; 95.8% were aware and 96.5% understood ITN as a protection against mosquito bites. About 53.1% of respondents own ITN such that 83% of those who own slept under it. The age, marital status and education level had significant relationship with possession of ITN among pregnant women ( $p=0.03$ ,  $p=0.005$  and  $p=0.04$ ). The results revealed positive perception of ITN among pregnant women; 95.7% believe ITN is a strategy to prevent malaria.

The study concludes on high awareness and positive perception of ITN among pregnant women and recommends ways of making it accessible to improve its usage.

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## LIST OF ABBREVIATIONS AND ACRONYMS

ACT	Artemisinin Combined Therapy
CBSV	Community-based Surveillance Volunteer
CHAG	Christian Health Association of Ghana
CHPS	Community-based Health Planning and Services
CHW	Community Health Worker
DDT	Dichlorodiphenyltrichloroethane
MHD	Municipal Health Directorate
MHMT	Municipal Health Management Team
FGD	Focus Group Discussion
GHS	Ghana Health Service
GMR	Global Malaria Report
GTMMM	Ghana Training Manual for Malaria Management
IAEG	Inter-Agency and Expert Group
IE&C	Information Education and Communication
IPT	Intermittent Preventive Treatment
IRS	Insecticide Residual Spraying
ITN	Insecticide Treated Net
LI	Legislative Instrument
MDG	Millennium Development Goals
NGO	Non-Governmental Organization
NHRC	Navrongo Health Research Centre
NMCP	National Malaria Control Programme
NMIMR	Noguchi Memorial Institute for Medical Research
RBM	Roll Back Malaria

SPSS	Statistical Package for Social Scientists
SWASA	Social Work and Social Administration
UN	United Nations
WHO	World Health Organization
WHO/TDR	World Health Organization/Tropical Disease Research

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## DEFINITION OF TERMS

Affordability	The ability to pay for an important need without having to worry about it.
Availability	The state of something was being able to be obtained.
Awareness	the ability to perceive, to feel, or to be conscious of events, objects, thoughts, emotions, or sensory patterns
Households	People who live in the same house, flat or room, and who eat from one pot and are also considered as a single unit
Insecticide Treated Bed Net	A net that has been treated with insecticide for the purposes of covering bed and sleeping in it, with the capacity of killing or repelling insects especially mosquitoes.
Ownership	The state of something belonging to a particular person.
Use	To obtain benefit for yourself from something that is available to you.

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## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information of the Study

Malaria is a mosquito-borne infectious disease of humans and other animals caused by a parasite called *Plasmodium*. The disease is widespread in tropical and subtropical regions of the world, including much of Sub-Saharan Africa (SSA), Asia, and the Americas. Research has shown that Malaria is the leading cause of morbidity and mortality causing 3 million deaths globally each year. It is estimated that 90% of such death occur in SSA especially among pregnant women and children under the age of five years (Rugemalila *et al.*, 2006, Steketee *et al.*, 2001, Brabin, 1983, Jobin(2012), Jobin(2014), ).

According to the World malaria report (2013) there were 216 million cases of malaria and an estimated 655 000 deaths in 2010. Malaria mortality rates have fallen by more than 25% globally since 2000 and by 33% in the WHO African Region. Most deaths occur among children living in Africa where a child dies every minute of malaria and the disease accounts for approximately 22% of all childhood deaths.

A report by the National Malaria Control Programme, NMCP (2013) said that Ghana recorded about 11 million cases of out-patient malaria cases. The 2013 and 2014 editions of the Bekwai Municipal Annual Health reports showed that out of 138060 for 2013 and 196866 for 2014 OPD cases, 63.1% and 56.3% were diagnosed of malaria in 2009 and 2010 respectively (Morten and Duncan, 2012, UNICEF, WHO, World Bank and UN(2013).

Malaria in humans is caused by a protozoon of the genus, *Plasmodium* of four sub species, *P. ovale*, *P. vivax*, *P. malariae*, and *P. falciparum*. *P. falciparum* causes severe morbidity

and mortality. Fever, chills, sweats, respiratory distress and headache are among the commonest symptoms (Nchinda, 1998)

Brabin (1991) and Menendez (1995) reported that *Plasmodium falciparum* infection in pregnancy is associated with an increased risk of maternal and foetal complications including maternal anaemia and low birth weight. It has further been documented in other studies that among other consequences, malaria in pregnancy in Africa can cause severe anaemia, stillbirths, spontaneous abortion, neonatal mortality, low child birth-weight, child's brain damage and inter-uterine growth retardation (Mutabingwa *et al.*, 1992, Luxemburger *et al.*, 2001, Vallely *et al.*, 2007, Akachi and Atun 2011, Jobin 2012). Malaria may also be transmitted by injection or transfusion of blood from an infected person, by the use of contaminated needles and syringes and rarely congenitally from infected mother to her unborn child.

The provision of ITNs was one of the strategies adopted at the Abuja Summit (Teklehaimanot and Snow, 2002, Oresanya *et al.*, 2008). Building on that work, the 2007 United Nations Secretary-General's report included indicators to monitor progress towards new targets as recommended by the Inter-Agency and Expert Group on MDG Indicators (IAEG). The objective was to achieve 80% usage of ITN among all people's especially pregnant women and children less than five years of age (UN Report, 2007, WHO 2013, Jobin 2014).

In Ghana, the use of ITNs has been found to reduce overall childhood mortality by 17 percent (Binka *et al.*, 1997). The government of Ghana in collaboration with other global partners has embarked on numerous interventions to increase ITN use, especially among vulnerable groups of people of which pregnant women and children under-five years are of no exception. This study therefore sought to assess the level of awareness and consistent

usage of Insecticide Treated Nets (ITNs) among Pregnant Women in Bekwai – Municipal area of the Ashanti Region.

## 1.2 Problem Statement

Due to the adverse effects of malaria on the mother and neonatal mortality, low birthweight and even brain damage in the child, the National Malaria Control Programme (NMCP) of Ghana in June 2008, led the development of a revised National Strategic Plan, which called for a reduction in malaria disease burden (morbidity and mortality) by 75% before the year 2015 (using 2006 as the baseline). This is expected to increase the number of pregnant women sleeping under an ITN to 85% by 2015 (NMCP, March 2009). A study conducted in 1997 by Asenso-Okyere and colleagues on household cost of seeking malaria care revealed that ITN's usage helps in the prevention of the spread of malaria among pregnant women and children (Asenso-Okyere and Dzator, 1997). Other studies have also shown that if used effectively, ITNs have proven to offer one of the best malaria preventive measures available (Ahorlu, 2006, Guyatt et al., 2002, WHO, 2013).

Due to the positive impact of ITN usage on the prevention of malaria, most regional, subregional and national agencies recommend the use of ITN's in the prevention of the spread of malaria among pregnant women and children (WHO, 2008). Lengeler (2004) found that over 20 studies in Africa and Asia demonstrated that users of ITN have more than 50% protection against malaria episodes. Binka *et al.* (1997) estimated that the cost per impregnated bed net per year was US\$2.4 and cost per person protected was US\$1.20 as compared to the average cost of treating malaria episodes (including indirect cost and the costs of travel) of US\$8.67 or 3.7 days of male output and 4.7 days of female output.

Although Ghana has made major progress of ITN usage over the last few years, (35.7% as at 2013), ITN usage still falls short of the Abuja Conference target of 60% which should

have been reached by 2005. This therefore raises concern as to the realization of the vision 2015 target of 80% usage (WHO, 2007, WHO 2013) in Africa and therefore the Bekwai municipality, Ashanti Region and Ghana at large. Although the Bekwai municipal has had fair share of the campaign to encourage the use of ITN's in the prevention of malaria, it is still not registering significant pregnant women accounted for improvement in the fight against the disease especially in pregnant women: registering 18.00%, 24.37% and 19.75% of cases of malaria in 2008, 2009 and 2010 respectively (Municipal Health Directorate, Bekwai, 2015). These statistics may suggest that pregnant women in the Bekwai Municipality may still not be aware of the campaign against malaria by using ITN's or they may be aware of the campaign but may not own ITN due to some reasons. The same data may also suggest that pregnant women in the Bekwai Municipal may be aware of the campaign and as such may own the ITN's but may not be using them well to prevent the bite of mosquitoes. This study therefore sought to assess the level of awareness and use of ITN's by pregnant women in the Bekwai municipality.

### **1.3 Research Questions**

The research sought to answer the following questions;

1. What is the level of awareness on ITNs? among pregnant women
2. What is the level of knowledge of malaria?
3. What is the proportionate ownership of ITNs?
4. What is the level of ITN usage?
5. What is the perception of pregnant women on the use of ITN?

### **1.4 General Objective**

The general objective of the study was to assess the level of awareness and use of ITNs among pregnant women in the Bekwai Municipality of the Ashanti Region.

### **1.4.1 Specific Objectives**

1. To determine the level of awareness on insecticide treated bed net among pregnant women in the Bekwai Municipality in the prevention of malaria.
2. To estimate the proportion of pregnant women who own insecticide treated bed net in the Bekwai Municipality.
3. To assess the level of insecticide treated bed net usage among pregnant women in the Bekwai Municipality.
4. To assess the knowledge among pregnant women, in the Bekwai Municipality, on the effects of malaria on pregnancy.
5. To describe the perception of pregnant women in the Bekwai Municipality on ITN

### **1.5 Significance of the Study**

Global efforts at halving the malaria burden by 2015 and also achieving 80% ITN use among susceptible groups (pregnant women and children under five) indicate that, indepth understanding of some skills involved in malaria prevention is imperative. Again, as Ghana, striving to achieve the Millennium Development Goals 5 (to reduce maternal and child mortality as important components), cost saving strategies and interventions such as ITN usage will go a long way to help.

A high level of awareness and consistent use of ITN among vulnerable groups not only will prevent malaria, but also improve health and promote socio-economic development of individuals and the community at large. Findings of this study could also enable the Bekwai Municipal Health Directorate device strategies towards scaling up ITN awareness and usage among pregnant women. Findings could also be adopted as baseline data for future evaluation exercise on the level of ITN awareness and use among pregnant women.

The directorate could also use findings of the study to strategize Behaviour Change Communication (BCC) campaign to educate the general population on malaria and ITNs.

### **1.7 Organization of the Thesis**

The study consist of six chapters, and sections on dedication of the work, acknowledgement, table of content, list of tables and figures, acronyms, definition of key words and abstract. Chapter one introduces the whole concept of the study with background information of subject matter, research problem, justification of questions and objectives of the study. The same chapter also highlights on the conceptual framework of the study as well as profile of the study area.

Chapter two reviews the study literature. This chapter was relevant as reviewed literature guided the researcher to compare and contrast findings of this study with existing knowledge.

Chapter three was devoted to methodology employed in conducting the study. In this chapter, the researcher was keen on study design, population of study, sample size and sampling technique as well as data collection methods and analysis. Issues of ethical concern, limitations as well as assumptions were all attended to in chapter three.

Chapter four comprised summary of results while chapter five discussed these findings. Chapter six encompasses conclusions and recommendations of the study. All literature used in the study have been duly acknowledged in the body text and list of references.

The appendices contain questionnaires, map of study area and official introductory letters.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

The chapter presents the literature review of the study. The literature review is centered on topics related to malaria around the world. It is therefore structured per the objectives of the study. The chapter is divided into the following sections:

1. Conceptualization of Malaria and ITNs
2. Knowledge of Pregnant Women on effect of Malaria on Pregnancy
3. Availability, Affordability, Ownership and Use of ITNs
4. Perception of Pregnant Women on ITN Use

#### 2.1 Conceptualization of Malaria and ITNs

##### 2.1.1 Definition and History of Malaria

Malaria has been around since prehistoric times. The term —malarial was coined in the sixteenth century by the Italians who insisted that —bad air (malaria) from marshy areas was the cause of the disease. Approximately one hundred years ago, the British physician Ronald Ross proved that malaria is carried not by air or water, but by mosquitoes – a discovery for which Ross was awarded the Noble Prize for medicine (Ghana Training Manual for Malaria Management, 2004).

##### 2.1.2 Causes of Malaria

Malaria in humans is caused by a protozoon of the genus *Plasmodium* of which there are four subspecies, *Plasmodium ovale*, *Plasmodium vivax*, *Plasmodium malariae*, and *Plasmodium falciparum*, with the latter causing the greatest illness and death in Africa.

Fever, chills, sweats, respiratory distress and headache are the main symptom of malaria (Nchinda, 1998, Akachi and Atun 2011, Jobin 2012).

Caulfield *et al.* (2004), reported that malnutrition (iron, zinc and protein-calories deficits ) leading to low immunity is responsible for a considerable amount of malaria-related mortality and morbidity, and indicate that 57.3 percent of deaths of underweight children under five years are attributable to nutritional deficiencies. Breman (2001) and WHO (2013) also noted that the determinants of malaria and of risk factors for patients and communities relate to intrinsic (human, parasite, and vector) and extrinsic (environmental control and socio-economic) factors.

### **2.1.3 Malaria Transmission**

Discussion of malaria transmission has always looked complex due to the vector-parasite association. Nchinda (1998) writes that the disease is transmitted by the bites of mosquitoes of the genus *Anopheles*, of which the *Anopheles gambiae* complex (the most efficient) is responsible for the transmission of disease in Africa.

According to Chin (2000), Morten and Duncan (2012), UNICEF, WHO, World Bank and UN (2013), and WHO(2013), most species feed on human blood at dusk and during early night hours. He further stressed that some important vectors have biting peaks around midnight or early hours of the morning. The study further added that malaria is transmitted by the bite of an infective female *Anopheles* mosquito, however, it may also be transmitted by injection or transfusion of blood from infected persons or by the use of contaminated needles and syringes, as by injecting drug users with a quick note that congenital transmission occurs rarely, but stillbirth from infected mothers is more frequent.

Djimdé *et al.* (2004), Jobin (2012), Jobin (2014), Martin, Grant and Agostino (2012) described malaria transmission as that human infection begins when the malaria vector, a

female *Anopheles* (mosquito, inoculates plasmodial sporozoites from its salivary gland into humans during a blood meal. The sporozoites mature in the liver and are released into the bloodstream as merozoites. These invade the red blood cells, causing malaria fevers. Some forms of the parasites (gametocytes) are ingested by *Anopheline* mosquitoes during feeding and develop into sporozoites, restarting the cycle.

#### **2.1.4 The Use of ITNs as a Malaria Prevention Strategy**

Treating and preventing malaria are now firmly on the international public health and global poverty reduction agenda. The focus of WHO and RBM Partnership Strategy and Goals for 2010 was to halve the burden of malaria. Global resources are now geared towards a four-pronged intervention strategy namely; (a) prompt access to effective treatment, (b) provision of ITNs, (c) prevention and control of malaria in pregnant women, and (d) epidemic and emergency response (WHO, 2008, WHO 2013)

As part of the millennium declaration, countries have enjoined themselves to halt and began to reverse the incidence of malaria and other diseases by 2015. (WHO/RMB Malaria Report, 2008, WHO, 2013). Hung et al. (2002) confirmed this assertion that in Vietnam and the KwaZulu-Natal Province of South Africa, *P. falciparum* malaria incidence and mortality rates fell when effective treatment policies (Artesunate and ACT) replaced failing mono-therapies.

In 1998, the National Malaria Control Programme (NMCP), Ghana in collaboration with the Noguchi Memorial Institute for Medical Research (NMIMR) initiated a study on the responses of *Plasmodium falciparum* to Chloroquine in the treatment of uncomplicated malaria. Findings of the study led to the discontinuation of Chloroquine as the first line medicine for malaria treatment in Ghana. Artemether with Lumefantrine and Artesunate Amodiaquine therefore became the first line of choice as the current most cost-effective

compared to all the other alternatives for treating uncomplicated malaria (Ghana Training Manual for Malaria Management, (2004), Akachi and Atun (2011), Jobin (2012).

With respect to ITNs as an effective public health tool against malaria, one large-scale rural study in Tanzania found that ITNs and untreated nets reduced mortality of children one month to four years, with protective efficacies of 27 and 19 percent respectively (Schellenberg *et al.*, 2001). However, more operational experience is required to inform national initiatives to scale up ITN usage (Lengeler and Sharp, 2003, WHO 2013).

### **2.1.5 The Role of Knowledge of Malaria and ITN in the Fight against Malaria**

Health education is a major tool in malaria control and prevention. The provision of information to households on ways to prevent malaria is needed in all endemic communities. It should cover the importance of early treatment and where to access it, the use of referral services, and the significance of full compliance with treatment and other interventions. The necessary information can be provided by community voluntary health workers. These persons are an extension of the health system and work under the direct supervision of health facility staff or non-governmental organization and in conformity with standards and norms established by the national government (Gilles, 2002, WHO 2012, WHO 2013).

The past experience of the researcher in malaria management has shown that prevention is better and cheaper than cure; however, the practice of malaria preventive measures has been related to the knowledge and belief of people (Erhun *etal.*, 2005). Malaria-related knowledge, attitudes and practices have been examined in many rural and partly urban multi-ethnic populations in Africa. A study has indicated that lack of community awareness of malaria could contribute to the spread of the disease in part, hinder control strategy and increase the risk of exposure to the disease (Deressa *et al.*, 2005).

Mansfield et al. (2006) put it that it is important health-care providers know well the health problems against which the services are provided. These include knowledge on the causes, signs, symptoms, management and prevention of such problems (including diseases like malaria), which is essential for their own motivation and confidence in managing or giving advice to their clients.

Njoroge et al. (2009), conducted a study into the use of insecticide treated bed nets among pregnant women in Kilifi District, Kenya, using descriptive cross-sectional study. Among their findings, knowledge on malaria and ITN's was high with majority of pregnant women having adequate level of knowledge (86.9%). There was a statistically significant association between level of education and knowledge (P-value = 0.010). Good attitude on ITN's use was low. There was no association between good attitude and any of the socio-demographic variables. The majority of pregnant women attending ANC owned ITN's (75.4%). ITNs usage was high (70.5%). There was significant association between religion and good practice (p-value = 0.050). Although adequate level of knowledge on malaria and protective role of ITN's was high, there was no association between knowledge and attitude. The study considers the role of knowledge of Malaria and ITN in the fight against Malaria.

## **2.2 Awareness of ITNs**

In a study, Musa *et al.* (2009) found out that about one-third 164 (36%) of the respondents in Senegal were aware of insecticide bed net in malaria prevention. In some countries such as Senegal untreated nets made from various fabrics had long been used; in other countries such as Zambia few families had ever used any kind of bed net. As the indicator for "awareness", respondents were asked if they had ever heard of mosquito nets that had been dipped or soaked in insecticide to kill or repel mosquitoes. Only 7% of Nigerians had even

heard of treated nets in 2000. In Uganda 23% had, in Zambia 51%, and in Senegal 70% had. By 2004–2006, awareness of ITNs was nearly universal in all countries except Nigeria, though awareness there was very low to start with; it jumped from 7% to 60% between 2000 and 2004.

### **2.3 Availability, Affordability, Ownership and Use of ITNs**

In Ghana, the use of ITNs has been tested in the Navrongo Health Research Centre (NHRC) and found to reduce overall childhood mortality by 17 percent (Binka *et al.*, 1996). The cost per impregnated bednet per year was US\$2.4 and cost per person protected was US\$1.2 (Binka and Adongo, 1997, WHO 2012, WHO 2013). This compares with the average cost of treating malaria episode (including indirect cost and the costs of travel) of US\$8.67 or 3.7 days of male output and 4.7 days of female output (Asenso-Okyere *et al.*, 1998). The difference between treating a person suffering Malaria and preventing an individual from mosquito bite is US\$5.07 (that is US\$8.67-US\$3.6). The study recommended that promotion for the use of ITNs should be part of a package of high priority interventions for children and pregnant women. During the period of 2006-2008, household surveys showed that insecticide-treated net (ITN) ownership increased from 19 to 33 percent and ITN use in children under five went from 22 to 28 percent. In addition, between 2003 and 2008, ITN use in pregnant women increased from 3 to 20 percent nationwide (USAID, 2010, Martin, Grant and Agostino, 2012, Morten and Duncan 2012).

Ahorlu (2006) stated that although studies in Ghana have shown that insecticide treated nets (ITNs) are effective, this has not yet translated into an increased supply and use of ITNs across the country. Findings from the study revealed that low use of ITNs in Ghana cannot be blamed on whether or not a community accepts their usefulness. Availability,

affordability and the match between products offered and cultural factors like local sleeping arrangements influence households' purchasing of ITNs.

According to Noor *et al.* (2009), bed net use increases faster in countries that distribute them free of charge compared to countries that make people to pay for them. From their study, usage rises to an average of 25% when they are given free, but is much lower at 4% when people have to pay for them. They continue that —making poor people pay the full costs of life-saving interventions like treated nets doesn't increase coverage. Cost should not be a barrier to making insecticide-treated nets available to all young children and pregnant women in need.

Thwing *et al.* (2008) conducted an evaluation exercise to assess —insecticide treated net ownership and usage in Niger, following a national integrated campaign in Niger which included free distribution of ITNs. The results were that the first survey showed that ITN ownership in all households was 6.3% prior to the campaign, increasing to 65.1% after the campaign in the second survey. The second survey also showed that 73.4% of households with children <5 received a long lasting treated bed net and that 97.7% of households that received  $\geq$  one long lasting treated bed net retained it.

In conclusion to their findings, Thwing *et al.* (2008) indicated that free distribution during the integrated campaign rapidly increased ITN ownership and decreased inequities between those in the highest and lowest wealth quintiles. Retention of ITNs was very high, and usage was high during malaria transmission season. However, ITN ownership and usage by vulnerable groups continues to fall short of RBM targets, and additional strategies are needed to increase ownership and usage.

According to Williams and Jones (2004) current strategies to control malaria include getting people to sleep under insecticide treated nets (ITNs) and increasing access to fast and

effective treatment of malaria cases. They continued that these strategies depend on individuals, households and communities' understanding of malaria, its treatment and prevention.

Baume and Marin (2007) used data from 9-large-scale household surveys conducted in 6 African countries from 2000 to 2004 that enumerated all household members and nets owned, analyzing only net-owning households. Across countries, women of reproductive age and children fewer than 5 (without gender bias) were most likely to use the net; least likely were children of age 5-14 and adult males. Nets commonly covered 2-3 people. If a baby net was used, fewer people used the family net. Pregnant women were more likely to use a net in 2004 than in 2000. In several countries, a sizable minority of nets owned were not used. They continued that understanding intra-household net-use patterns helps malaria control programs more effectively direct their efforts to increase their public health impact. Understanding intra-household net use pattern can identify vulnerable population who demand much attention to ITN protection. Eisele *et al.* (2009) stated that the impact of ITNs on preventing malaria may be reduced if they are not used by vulnerable populations. Their study revealed that within ITN-owning households, many children and pregnant women are still not using them. Between-country analysis with linear regression showed child ITN use increases as intra-household access to ITNs increases ( $P = 0.020$ ,  $R^2 = 0.404$ ), after controlling for season and survey year. Results from within-country logistic regression analyses were consistent with between-country analysis showing intrahousehold access to ITNs is the strongest and most consistent determinant of use among children. The gaps in ITN use and possession will likely persist in the absence of achieving a ratio of no more than two people per ITN.

The use of ITNs among pregnant women has been found to be increasing in many malaria endemic parts of Africa, particularly in areas where the Roll Back Malaria campaign and Global Fund are active. In Ghana in 2000, 29% of nursing mothers/pregnant women reported sleeping under an ITN the night before the survey, this increased to 58% in 2003 (Owusu-Agyei *et al.*, 2007).

In a community survey of six African countries, use of ITNs in 2004 by pregnant women of reproductive age varied from a low of 32% to a high of 69% (Baume and Marin, 2007, Akachi and Atun (2011), Jobin (2012), Jobin(2014), Martin, Grant & Agostino(2012). In another survey in Burkina Faso where pregnant women were interviewed in ANC clinics and Delivery Units, 58% of women reported owning an ITN in 2004 (Sirima *et al.*, 2006). The study in the same way deals with availability, affordability, ownership and use of ITNs.

#### **2.4 Perception of Pregnant Women on ITN Use**

In their research to describe the use of insecticide treated nets (ITNs) among pregnant women and examine factors associated with its access and use, Belay and Deressa (2008) conducted a community-based cross-sectional study of 815 pregnant women in eight malarious kebeles in northern Ethiopia based on two-stage cluster design from May to June 2006. Their findings reported that knowledge about the cause, transmission and preventive measures of malaria was relatively good as 90.2% associated malaria with mosquito. Ownership of LLL type of ITNs was 59% in rural and 505% in urban areas. Less than a third, 27% had the perception that nets could not prevent malaria and this explains why reasons for non-ownership of nets.

Over half of pregnant women, 58.4% of 481 owned and slept under ITNs during the previous night with majority coming from the urban areas ( $P = 0.001$ ). Higher educational attainment was an important predictor of ITNs use ( $OR = 3.1$ , 95%  $CI = 2.1, 4.6$ ). However,

the gap between ownership and use remains high. The situation in Ghana appears slightly different, it appears both ownership and use of ITNs are low

It has been found by Pettifor *et al.* (2008) in their study into bed net ownership, use and perceptions among women seeking antenatal care in Kinshasa; opportunities for improved maternal and child health in the Democratic Republic of Congo (DRC). From their findings while only 25% reported sleeping under a net, over 98% of participants were worried about getting malaria, believed it is important and beneficial to sleep under a mosquito net every night, and believed sleeping under a mosquito net is a good way to protect themselves from malaria. In terms of perceptions of free and bought nets, only 5% of participants felt that nets that one had to buy were more effective in preventing malaria compared to free nets and 14% reported they would prefer to use a net that they had bought themselves compared to one given to them for free. Over 80% of the women reported thinking that most people in their neighborhood would buy other things for their home if they had extra money, rather than buying a mosquito net. As Ghana through the NMCP distributes free nets to households, it is important to know what people perceive such distribution to mean and its implication on use.

Chukwuocha *et al.* (2010) found in their the perception study into use of Insecticide Treated Nets in Parts of the Imo River Basin, Nigeria, that mosquito nets were useful preventive measure against malaria, and that pregnant women and children were supposed to sleep under nets since they are the most vulnerable groups. However, the availability and use of the nets in this area was found to be very low.

The factors associated with ITNs use were found to be cost perceived harmful chemicals used to treat the nets and non-availability. Like Ghana, the difference between treated and

non-treated net was also not known. This is very important to address to improve the effective use of bednets.

People believed that all nets were treated with a chemical. Over half of the participants in all FGDs seemed to believe that I6TNs are treated with chemicals which affect pregnant women, especially their breathing, and that if the chemicals can kill mosquitoes instantly, they can also kill people. The study explored whether this perception was held mainly by non-users, although users also believed it in addition to reporting the feeling of excessive heat and suffocation at night due to use of ITNs. The quote below summarizes the fear of chemicals used to treat nets: *“We fear we may die because these chemicals are poisonous” (35-year-old woman at Nguru in Aboh Mbaise LGA).*

Another constraint mentioned by over three-quarters of women participants in all FGDs was uncaring husbands. Men were expected to care for their spouses in all aspects, including helping them to seek treatment and prevention for malaria, such as paying for ITNs. In this regard, the expressions below show men's perceptions on their vulnerability to malaria and how this may influence their attitude towards malaria treatment and prevention: *“We leave them (nets) to women and children because as we told you, men are resistant, we have strong blood” (35-year-old man at Ogbe in Ahiazu Mbaise LGA)* *“Malaria nets are not a priority to people in this area, people (mainly the men) would rather use the money to buy alcohols to drink” (32-year-old non-pregnant woman Lude in Ahiazu Mbaise LGA).*

Despite the above expression from a male participant, over three quarters of women in all FGDs complained that men did not care about the health of their wives and their children. Men were reported not to prioritize the issue of health, as the latter quote above shows. Women thought that men use their money on items like alcohol and forget about buying

nutritious foods and providing health care to their families. Women participants at Ezinihitte Mbaise LGA said that they fear to buy mosquito nets because their husband would question them about the source of the money. This is because women in this community are not expected to have money, the husbands feel obliged to know its source. More than half of women participants in all the FGDs expressed fear that if a woman bought a net, the husband would suspect that she got the money from another man.

In addition to the fear of the chemicals used to treat ITNs and the cost of purchasing them, the few respondents who used ITNs complained of too much heat and discomfort experienced while sleeping under the nets.

From the study findings, it was reported that very many households in the study area use mosquito repellents although mainly targeted at mosquito nuisance and not malaria. The study explored perceptions related to their use, especially by pregnant women. The common household mosquito repellents were known by their trade (brand) names as Raid, Shelltox and Mobil. In all FGDs conducted, participants said that these repellents have a bad smell that makes pregnant women vomit. This belief was expressed by women who had been pregnant before and had experienced the bad smell. Over two-thirds of the female participants in all FGDs expressed fear that the chemicals in the mosquito repellents could be harmful to pregnant women's health and foetus. If she breathed them the foetus in the womb would die. On further exploration, it was found that this fear was not based on evidence of severe outcomes due to use of mosquito repellents. It was also noted that burning of mosquito coils causes difficulty in breathing. The experience was expressed by eight respondents in two of the 10 FGDs conducted. However, a majority of key informants (over two-thirds) did not express this fear, indicating a difference in awareness among respondents regarding this preventive measure.

This work seeks to study the perception in the use of ITNs among pregnant women in the prevention of Malaria at Bekwai- Municipality.

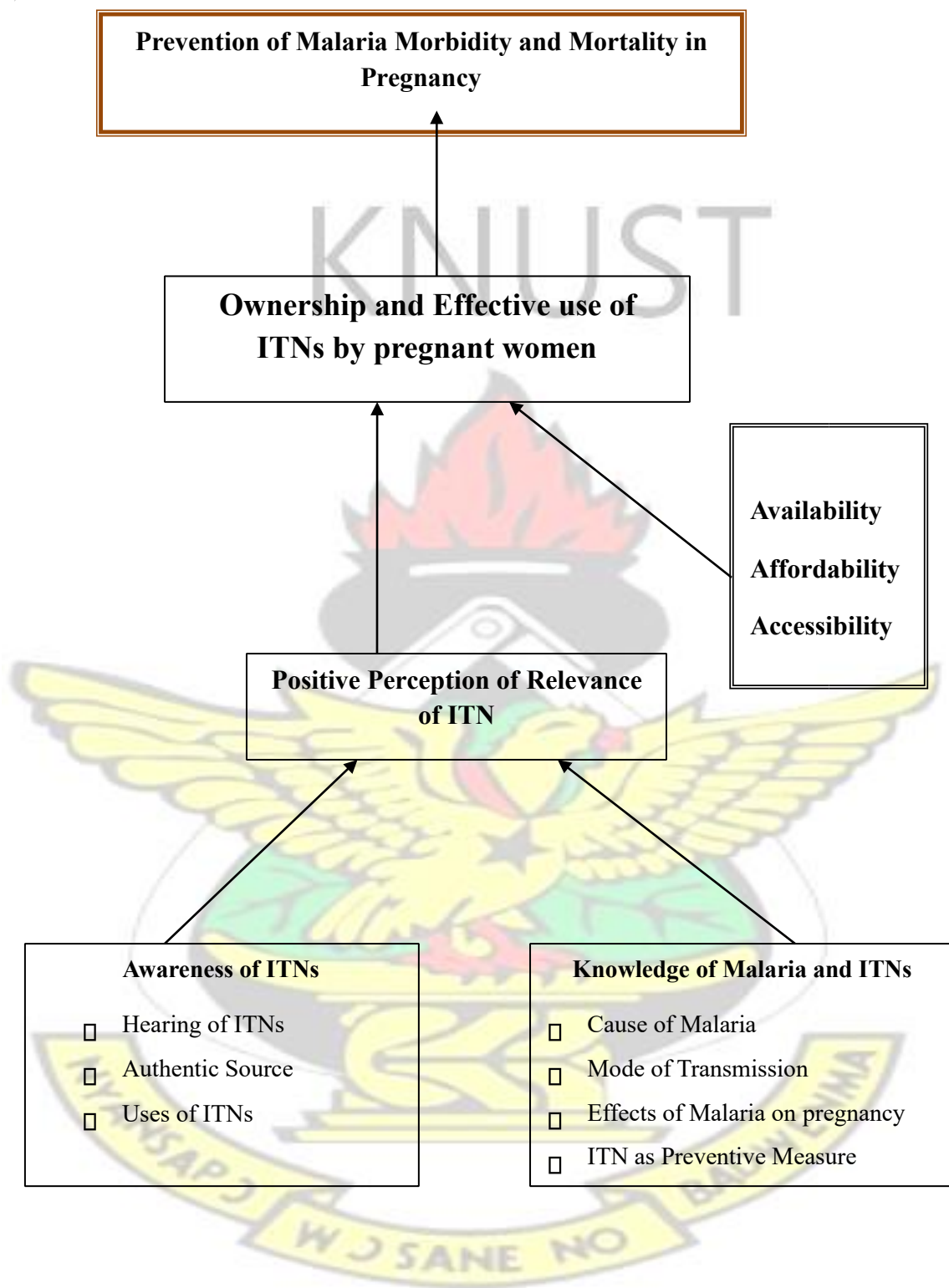
## **2.5 Conceptual Framework**

The concept adopted in this study displays the level of awareness and knowledge of malaria and ITNs as the basic foundation improving the health status of pregnant women. Awareness of ITNs comprises hearing from authentic source that there is a preventive measure capable of avoiding mosquito bites. Knowing that malaria is caused by the bite of an infective female anopheles mosquito is good in preempting a decision to avoid the bite.

The mode of transmission of malaria provides information as to how to interrupt the pathway of transmission. The effects of malaria in pregnancy on both the mother and the foetus are enormous in alerting every pregnant woman to secure preventive measures against malaria infection. Knowledge of the fact that ITNs have been proven to provide protection from mosquito bites is relevant in informing pregnant women about the importance of using ITNs and using them properly and effectively.

With this fundamental information about malaria and ITNs, there would be positive perception of the relevance of ITNs which could also lead to ownership and effective use of ITNs as a preventive measure against malaria infection. Malaria morbidity and mortality among pregnant women would greatly be reduced if there is positive perception of the use of ITNs, including its availability, affordability, accessibility of ITNS and good knowledge of malaria, and ITNs as a preventive measure. In the end , the health status of pregnant women could improve in order to ensure safe pregnancy term.

**Figure 1.1: Conceptual Framework of Improved Health Status of Pregnant Women**



## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This chapter presents the methods that were used in the study. The chapter is sub-divided into sections that deals with the study design, study area, study population, sampling techniques and sample size, data collection techniques, data analysis and ethical issues.

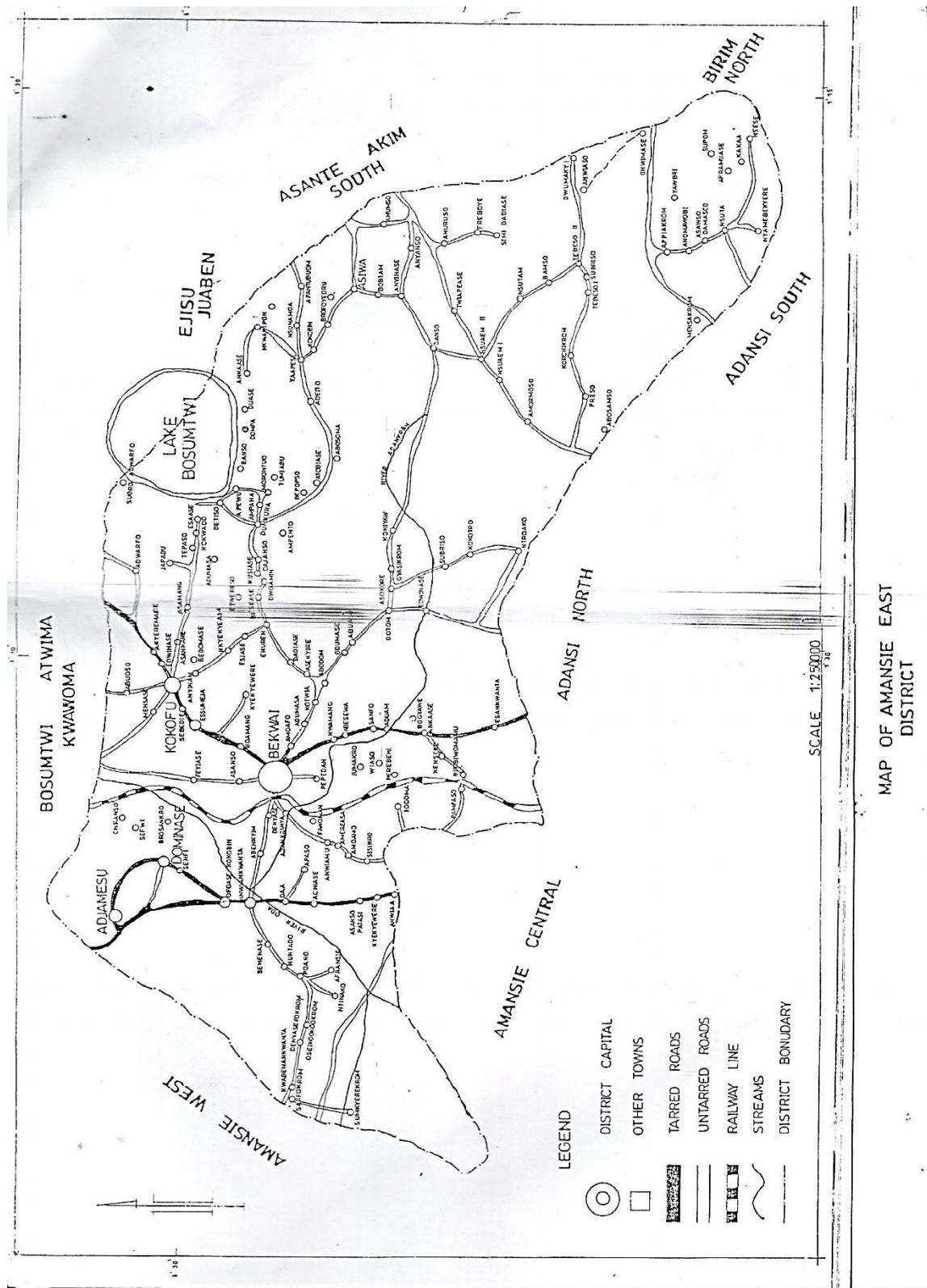
#### **3.1 Study Design and Methods**

A cross-sectional method was employed for the study. This was to enable the investigator to conduct the assessment and also recommend at the same time. The study utilized quantitative techniques to obtain data for analysis.

#### **3.2 Study Population**

The study population included pregnant women attending ANC at the selected four (4) health facilities; Bekwai municipal hospital, Ahmadiya Hospital, Kotwiaa Seventh Day Adventist hospital and Domenase SDA hospital in the Bekwai Municipality.

### 3.3 Profile of the study area



### 3.4 Study Variables

The study variables included some background characteristics of respondents such as age, marital status, level of education, occupation and religion. These background variables served as independent variables based on which some dependent variables such as level of awareness of ITNs and level of knowledge of malaria and ITNs were studied. Other dependent variables under study included ownership of ITNs, effective use of ITNs and perception of pregnant women on the use of ITNs.

### 3.5 Sample Size Determination

In all, 384 respondents participated in the study based on the sample size formulae which was calculated as follows; using Wayan's formula.

$$n = \frac{z^2 p (1-p)}{d^2}$$

Where:

n = Estimated sample size

Z = Reliability coefficient = 1.96

P = Population of women owning ITNs = 48%

q = 1-p = 1-0.48 = 0.52 d = Width of variation  
= 0.05

$$\frac{1.96^2 \cdot 0.48 \cdot 0.52}{0.0025} = 0.95886 \div 0.0025 = 383.5 \text{ rounded up to } 384$$

### **3.6 Sampling Technique**

The study used a simple random sampling technique to select pregnant women who attended the Bekwai Municipal Hospital, Ahmadiya Hospital, Kotwiaa Seventh Day Adventist Hospital and Domenase SDA hospital in the Bekwai Municipality. A simple random sampling is a technique that gives individuals in the population an independent and equal chance of being selected from the sampling frame in the study population (Onwuegbuzie and Collins, 2007). This sampling technique ensured that all pregnant women who attended the ANC had equal chance of being selected to enrol in this study. Pregnant women who attended the facility were made to pick from a box with papers written on them —Yes and —No. All pregnant women who picked —Yes in all the facilities and consented to participate in the study were enrolled. This was repeated in all the selected facilities to obtain the required sample size. Also, the study used a purposive sampling to select health officials at the facilities and municipal health directorate to elicit information from them about malaria and ITN situation in the Bekwai Municipality.

### **3.7 Tools for Data Collection**

A structured questionnaire comprising of open-ended and a closed questions was used to interview respondents of the study after they have been pretested. Questionnaires were administered by trained research assistants. Pregnant women entering the antenatal clinic were selected and interviewed after going through informed consent process. Pregnant women who agreed to take part in the study signed consent forms after a brief introduction and explanation of the study to them. For the purposes of recording the current malaria and ITN situation in the municipality, some health professionals comprising nurses, midwives, pharmacists and medical officers and public health officials who were considered as key informants were interviewed using key informant interview guide. From these key

informants, relevant details were obtained which enabled the researcher to substantiate some issues as given by the pregnant women respondents.

### **3.8 Data Handling and Analysis**

The completed questionnaires were verified and edited to avoid errors. SPSS software version 20 was used for data analysis to churn out univariate and bivariate analysis in finding out the possible associations among variables of study. ‘Awareness level’ and ‘use of ITNs (bednets)’ were measured by the number of times or proportion of respondents who ticked ‘yes’ option as against ‘no’ in the questions on the questionnaire. Data were presented and described in tables and graphs for easy interpretation and understanding. Descriptive statistics like frequencies, percentages, mean, standard deviations, minimum and maximum were used to present most of the results. Chi-square tests were also used to test for significance of associations between the independents and outcome variables. All significance was set at p-value of less than 0.05.

### **3.9 Ethical Consideration**

Committee for Human Research Publication and Ethics at Kwame Nkrumah University of Science and Technology (KNUST) reviewed and approved the study protocols prior to the implementation of the study. The Municipal Director of Health Services in the Bekwai Municipal was given an introductory letter from the department of Community Health, KNUST to formally introduce the principal investigator to undertake this study. The directorate in turn introduced the researcher to the Municipal Assembly and explained the mission and relevance of this research to the authorities. The directorate further introduced the researcher to all the health facilities in the municipality so that the researcher could be accorded the necessary hands when needed. For all respondents who participated in the study, the mission and objectives of the research was explained to them. They were assured

of high level of privacy and confidentiality of any detail information provided. They were assured that information provided was for academic purposes.

### **3.10 Limitations**

Researcher gave two Ghana Cedis to each participant as Transportation fare to compensate them for the delay in their service delivery. Roads linking the villages and the municipal hospitals have not been tarred, this hindered easy access to municipal hospitals by the pregnant women. The researcher therefore needed to spend much time in the hospitals in order to meet the few pregnant women who visited the Bekwai Municipal hospitals weekly for ANC services. There has not been any external sponsorship therefore the researcher had to sponsor the study with his own funds. However, this situation did not deter the researcher from successfully getting the sample size for the study.



## **CHAPTER FOUR**

### **4.0 RESULTS**

#### **4.1 Introduction**

The chapter presents the results from questionnaires administered to pregnant women and key informants in the Bekwai Municipality. Results illustrated in frequencies and percentages in Tables and Figures. The analysis also presented association between the dependant and independent variables. The chapter is structured into sub-sections based on the objectives of the study.

#### **4.2 Socio-demographic information**

The socio-demographic information of pregnant women enrolled in the study is presented in Table 4.1. The mean age of the pregnant women was 29 years (SD=6.19) and 51.6% of the respondents were between the ages 26 - 35 years. Only one pregnant woman representing 0.3% was above 46 years and 31.8% were 25 years or below. Most (69.8%) pregnant women were married and 15.9% were co-habituating. However, 13.0% were single with only 2 respondents representing 0.5% as divorced. The highest educational attainment of the participants was tertiary education (7.6%) while the lowest was primary education (18.8%); many of them completed Junior High School (41.7%) and 15.6% completed Senior High School (15.6%). However, 16.4% had no education. In terms of occupation, the majority of pregnant women were unemployed (28.9%) while the remaining were engaged in various occupations such as farming (27.3%), trading (21.6%), hairdressing (12.0%) and public service (9.1%). The majority (90.9%) of pregnant women were Christians, 8.6% were Islam with only 0.5% disclosing other religion.

**Table 4.1: Socio-demographic information**

<i>Variables</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Age		
16 – 25	122	31.8
26 – 35	198	51.6
36 – 45	63	16.4
46 and above	1	0.3
<b>Mean(SD); Min/Max</b>	<b>29 (6.19); 16/47</b>	
Marital Status Co-habitation		
Married	61	15.9
Single	268	69.8
Divorced	50	13.0
Widow	2	0.5
	3	0.8
Level of Education		
No education	63	16.4
Primary	72	18.8
JHS	160	41.7
SHS	60	15.6
Tertiary	29	7.6
Occupation Unemployed		
Farming	111	28.9
Trading	105	27.3
Hairdressing/Seamstress	83	21.6
Public Worker	46	12.0
Other	35	9.1
	4	1.0
Religion		
Islams	33	8.6
Christian	349	90.9
Other	2	0.5

**Source: Field Survey, 2014**

#### **4.3 Level of awareness on ITNs among pregnant women**

Table 2.4 presents the responses from respondents on the level of awareness on ITN among pregnant women in the Bekwai Municipality. Results indicated that most (95.8%) pregnant women were aware of the ITN while only 4.2% reported they were unaware. Among respondents who were aware of ITN, the majority (96.5%) disclosed its uses as protection against mosquito bites while 0.8% indicated it affords good sleep. However, 2.4% reported other uses characterized by suffocation and nightmare when one sleeps in it. As shown in

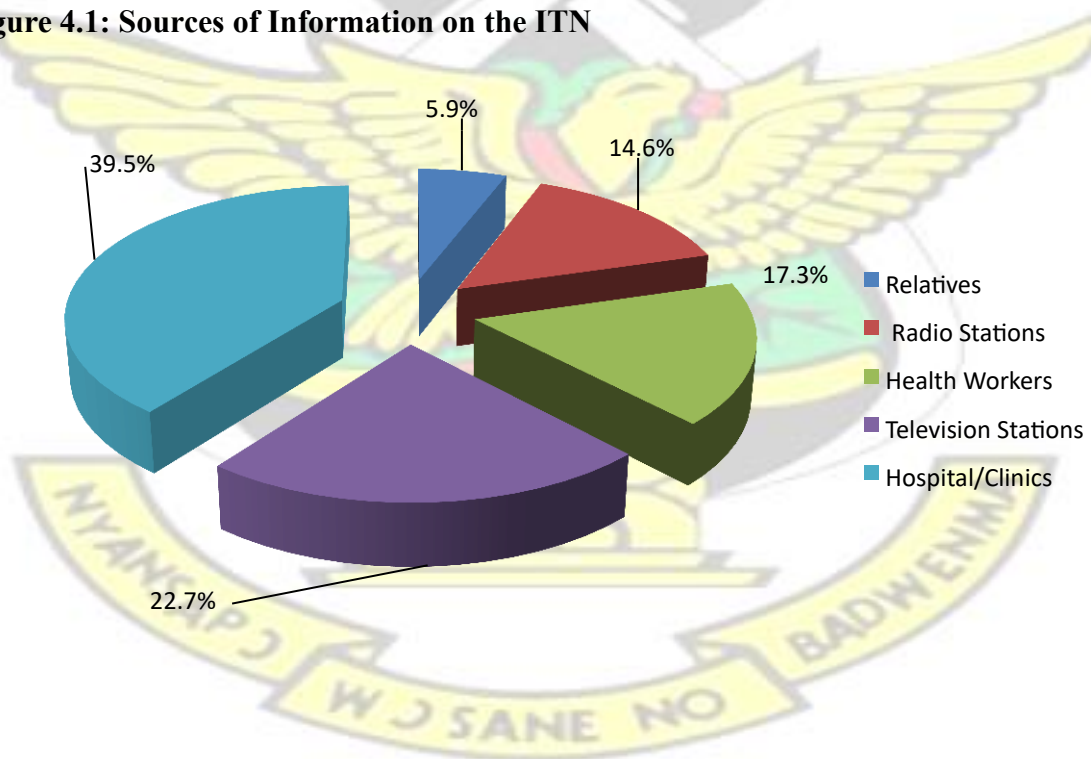
Figure 4.1, the sources of information on ITN among respondents were the hospitals/Clinics (39%), television stations (22.7%), health workers (17.3%), radio stations (14.6%) and through relatives (5.9%).

**Table4.2: Level of awareness on ITN among pregnant women**

<i>Variables</i>	<i>Frequency</i>	<i>Percentage (%)</i>
<b>Awareness of ITN (384)</b>		
Yes	368	95.8
No	16	4.2
<b>Uses of ITN among respondents who have heard it about ITN (n=369)</b>		
Room decoration	1	0.3
Protection against mosquito bites	92.7	96.5
Affording good sleep	3	0.8
Others	15	2.4

*Source: Field Survey, 2014*

**Figure 4.1: Sources of Information on the ITN**



*Source: Field Survey, 2014*

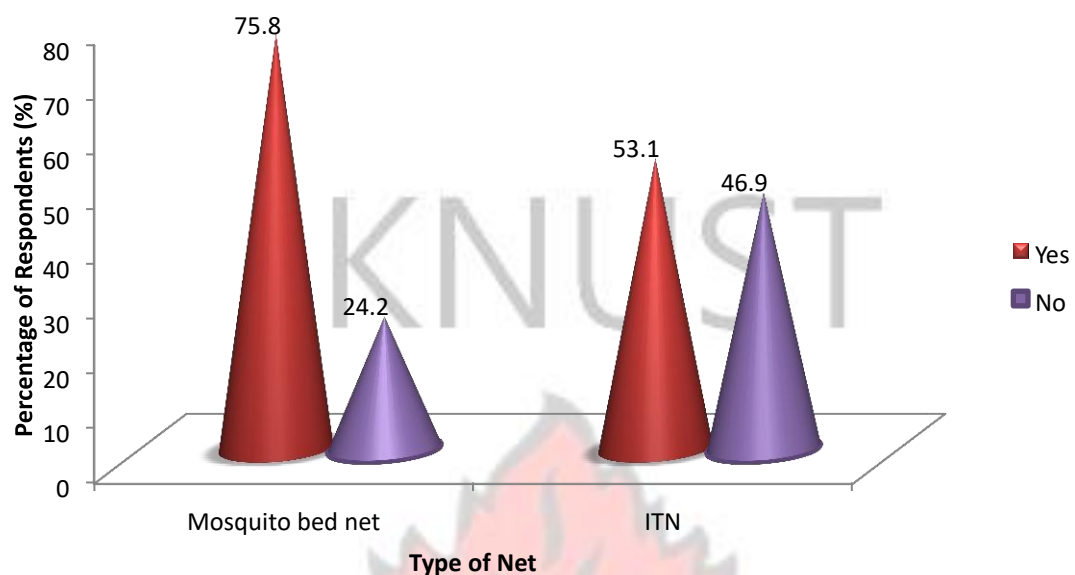
#### 4.4 Proportion of pregnant women who own ITN in the Bekwai Municipality

Figure 4.2 and 4.3 presents information on the proportion of pregnant women who own ITN in the Bekwai Municipality. As shown in Figure 4.2, the majority (75.8%) of pregnant women reported they possess mosquito bed net while 24.2% indicated none. Similarly, slightly more than half (53.1%) of pregnant women indicated their possession of ITN while 46.9% admitted they do not have it.

The study further elicited information on the number of ITN and Mosquito nets owned by pregnant women. While most (78.3%) pregnant women disclosed they own one (1) mosquito net, 12.1% reported they had one (1) ITN. On the contrary, while 50.3% had two ITN, only 16% had two(2) mosquito nets in their households. Also, the trend followed that while 26.1% own three (3) ITNs, only 5.7% indicated they possess three (3) own mosquito nets. The results again indicated that only 11.5% had 4 – 6 ITN while no pregnant woman had such number of mosquito nets.

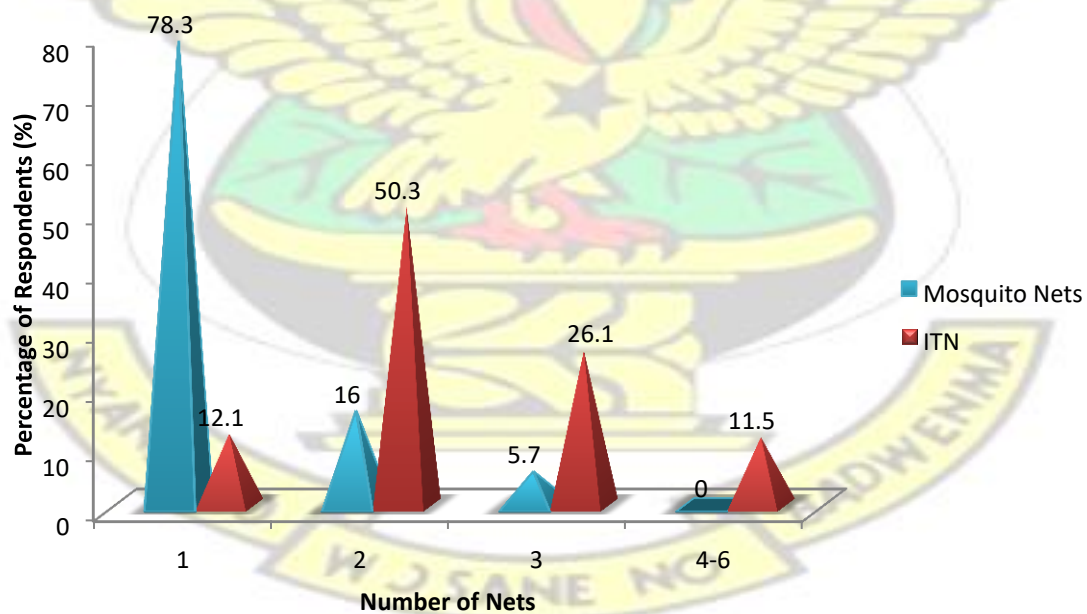
As shown in Table 4.3, socio-demographic factors such as age, marital status and level of education had significant relationship with possession of ITN among pregnant women ( $p=0.03$ ,  $p=0.005$  and  $p=0.04$ ). Pregnant women who were married were more likely (75.8%) to own ITN than others. However, occupation and religion had no statistical relationship with ownership of ITN among pregnant women ( $p>0.05$ ).

**Figure 4.2: Possession of Mosquito bed net and ITN among pregnant women**



*Source: Field Survey, 2014*

**Figure 4.3: Number of ITN and Mosquito Nets own by pregnant women**



*Source: Field Survey, 2014*

**Table 4.3: Association between various socio-demographic group and ownership of**

**ITN**

<i>Socio-demographic Variables</i>	<i>Ownership of ITN</i>		<i>Chisquare</i>	<i>p-value</i>
	<i>Yes N (%)</i>	<i>No N (%)</i>		
Age			<b>8.37</b>	<b>0.03</b>
16 – 25	35 (22.9)	51 (37.8)		
26 – 35	91 (59.5)	64 (47.4)		
36 – 45	26 (17.0)	20 (14.8)		
46 and above	1 (0.7)	-		
Marital Status Co-habitation			<b>14.92</b>	<b>0.005</b>
Married	12 (7.8)	30 (22.2)		
Single	116 (75.8)	90 (66.7)		
Divorced	21 (13.7)	15 (11.1)		
Widow	2 (1.3)	-		
	2 (1.3)	-		
Level of Education			<b>9.74</b>	<b>0.045</b>
No education	28 (18.3)	16 (11.9)		
Primary	19 (12.4)	34 (25.2)		
JHS	63 (41.2)	56 (41.5)		
SHS	26 (17.0)	19 (14.1)		
Tertiary	17 (11.1)	10 (7.4)		
Occupation			<b>7.88</b>	<b>0.162</b>
Unemployed	38 (24.8)	37 (27.4)		
Farming	41 (26.8)	28 (20.7)		
Trading	29 (19.0)	38 (28.1)		
Hairdressing/Seamstress	24 (15.7)	18 (13.3)		
Public Worker	21 (13.7)	12 (8.9)		
Other	-	2 (1.5)		
Religion			<b>0.51</b>	<b>0.29</b>
Islamic	14 (9.2)	9 (6.7)		
Christian	139 (90.8)	126 (93.3)		

**Source: Field Survey, 2014**

#### **4.5 Level of ITN use among pregnant women**

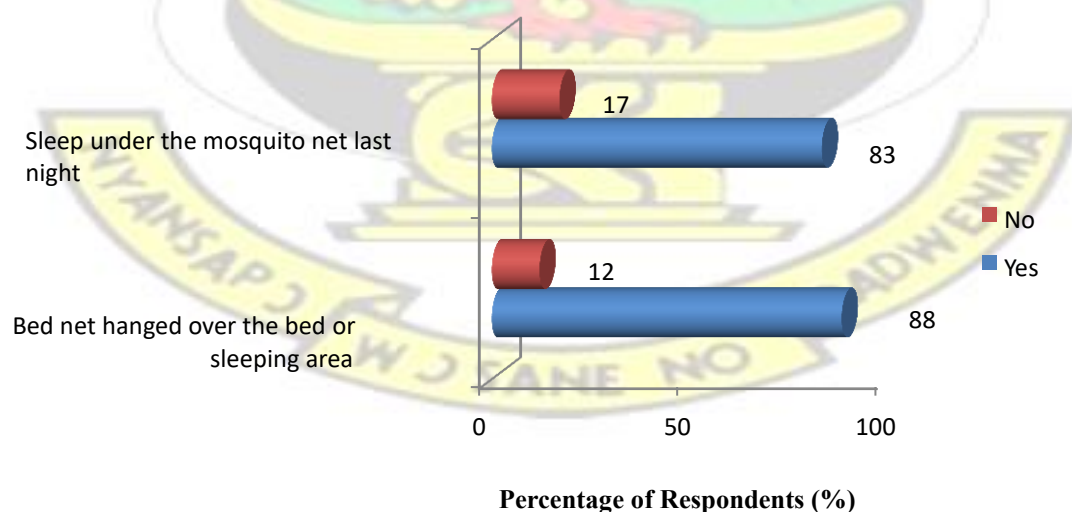
Table 4.4 and Figure 4.4 present results on the level of insecticide treated bed net use among pregnant women in the Bekwai Municipality. As shown in Figure 4.4, most (83%) pregnant women admitted that they slept under the mosquito net during the night before the interview 17% indicated they did not. Most respondents (88%) again indicated that the bed net was hanged over the bed or sleeping area while only 12% reported they did not hang the net.

Among respondents who did not hang their net over the bed, the majority (43.8%) disclosed it was inside their bag, 21.9% reported on the bed, 15.6% disclosed there was no space to hang and 9.4% cited their net were under the bed.

Similarly, among respondents who were not sleeping under the mosquito net, the majority (57.4%) indicated they feel hot inside the net while 31.9% said there was no space to hang the nets. Only 10.6% reported other reasons including irritations on their bodies and also have frightening dreams.

The study further elicited information on period when pregnant women used their net. Most pregnant women (81.8%) indicated all year round, 14% indicated during the rainy season and 1.6% reported during the dry season. Other 2.7% reported period such as any time they found mosquito in their room. The reasons for using net during a particular period among most (97.3%) pregnant women were to prevent malaria. Also, the majority of pregnant women reported benefits of using ITN to prevent mosquito bite while 2.9% believe it helps to sleep soundly.

**Figure 4.4 How Mosquito net is used**



*Source: Field Survey, 2014*

**Table 4.4: Level of ITN use among pregnant women**

<i>Variable</i>	<i>Frequency</i>	<i>Percentage (%)</i>
<b>Place where bed net is placed if not hanged over the bed (n=32)</b>		
Inside the bag	14	43.8
No space to hang	5	15.6
Under the bed	3	9.4
On the bed	7	21.9
Other	3	9.4
<b>Time pregnant women go to bed (n=268)</b>		
6 – 7 pm	20	7.5
8 pm	130	48.5
9 pm	88	32.8
10pm and above	30	11.2
<b>Reason for not sleeping under the mosquito net (n=47)</b>		
Feels hot inside	27	57.4
No space to hang	15	31.9
Others	5	10.6
<b>Period where pregnant women used net (n=258)</b>		
All years around	211	81.8
During the rainy season	36	14.0
During the dry season	4	1.6
Other	7	2.7
<b>Reasons for using net during a particular period (n=258)</b>		
To prevent malaria	251	97.3
For warmth	4	1.6
Others	3	1.2
<b>Benefits of using ITN (n=276)</b>		
To prevent mosquito bite	246	89.1
To sleep soundly	8	2.9
To prevent warmth	2	0.7
To prevent insect bites	6	2.2
Others	14	5.1

*Source: Field Survey, 2014*

#### **4.6 Knowledge on the effects of malaria on pregnancy**

The knowledge of pregnant women on the effects of malaria on pregnancy is presented in Table 4.5. Most pregnant women (89.5%) disclosed that malaria has a negative effect on pregnancy while 10.5% believe it has no effect on pregnancy. Respondents further

mentioned the effect of malaria on pregnancy to include miscarriage (38.1%), premature delivery (15.2%), maternal mortality (13.2%), still birth (12.3%), low birth weight (10.3%) and anaemia (9.1%).

The study again asked respondents about how malaria is spread. Most (92.1%) respondents believe malaria is spread through mosquito bite while 3.4% disclosed it can be spread through exposure to sun/heat. As shown in Figure 4.5, the study asked respondents about the symptoms of malaria among pregnant women in the Bekwai Municipality.

The most common symptoms disclosed by respondents were Headache (26.5%), Vomiting (22.8%), Chills (16.9%), High temperature (13.8%), Shivering (5.3%), Yellow eyes (5.3%), Weakness (4.2%) and Mouth bitterness (3.7%).

As shown in Table 4.6, socio-demographic factors such as marital status and occupation of pregnant women had significant association with the knowledge that malaria has negative effect on pregnancy ( $p=0.004$  and  $p=0.000$  respectively).

<i>Variable</i>	<i><u>Frequency</u></i>	<i><u>Percentage (%)</u></i>
<b>Knowledge level of pregnant women on Malaria as having negative effect on pregnancy (n=380)</b>		
Yes	340	89.5
No	40	10.5
<b>Effect of malaria on pregnancy (n=341)</b>		
Premature delivery	52	15.2
Still birth	42	12.3
Low birth weight	35	10.3
Anaemia	31	9.1
Miscarriage	130	38.1
Maternal mortality	45	13.2
Others	6	1.8
<b>How malaria is spread (n=354)</b>		
Exposure to sun/heat	12	3.4
Mosquito bite	326	92.1
Malnutrition	2	0.6

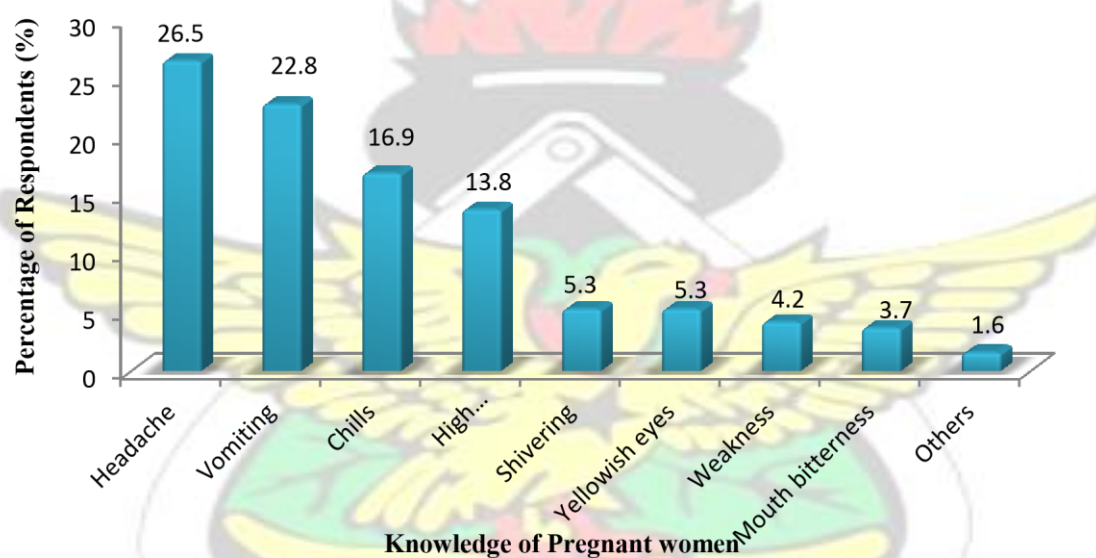
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**Table 4.5: Knowledge of pregnant women on the effects of malaria on pregnancy**


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*Source: Field Survey, 2014*

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**Figure 4.5: Knowledge of pregnant women on the symptoms of Malaria**


*Source: Field Survey, 2014*

**Table 4.6: Socio-demographic characteristics and knowledge of pregnant women on the effects of malaria on pregnancy**

<i>Socio-demographic Variables</i>	<i>Malaria have negative on pregnancy</i>		<i>Chi-square</i>	<i>p-value effect</i>
	<i>Yes</i>	<i>No</i>		
	<i>N (%)</i>	<i>N (%)</i>		

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Age			2.33	0.50
16 – 25	105 (30.9)	17 (42.5)		
26 – 35	177 (52.1)	17 (42.5)		
36 – 45	57 (16.8)	6 (15.0)		
46 and above	1 (0.3)	-		
Marital Status Co-habitation			15.26	<b>0.004</b>
Married	53 (15.6)	6 (15.0)		
Single	245 (72.1)	21 (52.5)		
Divorced	37 (10.9)	13 (35.2)		
Widow	2 (0.6)	-		
	3 (0.9)	-		
Level of Education			3.67	0.451
No education	57 (16.8)	6 (15.0)		
Primary	60 (17.6)	12 (30.0)		
JHS	145 (42.6)	15 (37.5)		
SHS	53 (15.6)	5 (12.5)		
Tertiary	25 (7.4)	2 (5.0)		
Occupation			22.30	<b>0.000</b>
Unemployed	92 (27.1)	19 (47.5)		
Farming	91 (26.8)	14 (35.0)		
Trading	81 (23.8)	2 (5.0)		
Hairdressing/Seamstress	43 (12.6)	1 (2.5)		
Public Worker	31 (9.1)	2 (5.0)		
Other	2 (0.6)	2 (5.0)		
Religion Christian			0.327	0.849
Islamic	309 (90.9)	36 (90.0)		
Other	29 (8.5)	4 (10.0)		
	2 (0.6)	-		

#### 4.7The perception of pregnant women on ITN use

Table 4.7 present results of the perception of pregnant women in the Bekwai Municipality on ITN use. The majority (95.7%) of pregnant women disclosed that the ITN is used to prevent malaria while only 4.3% had a contrary view. Among those who believe it is used to prevent malaria, 54.5% cited reasons that the net prevent mosquito from getting contact with the body while 24.6% believed it can kill the mosquitoes.

Again, 18.1% attributed their reasons to the fact that ITN repels the mosquito. Among the few who believe ITN is not a way to prevent malaria, the majority (75.0%) believe that the mosquito can bite you before going to bed.

**Table 4.7: The perception of pregnant women on ITN use**

<i>Variable</i>	<i>Frequency</i>	<i>Percentage</i>
<b>ITN use as a way to prevent malaria (n=371)</b>		
Yes	355	95.7
No	16	4.3
<b>If yes, (n=354)</b>		
Because it repels the mosquitoes	64	18.1
Because it can kill the mosquitoes	87	24.6
The net prevent mosquito from getting contact with the body Others	193	54.5
	10	2.8
<b>If no, (n=16)</b>		
Because malaria can be contracted from breathing in bad air	2	12.5
Mosquito can bite you before going to bed Others	12	75.0
	2	12.5

**Source: Field Survey, 2014**

#### **4.8 Key Informant Interview with Health Staff**

The coverage and use of ITN depends on the awareness, availability and supply of the nets to the residents within the municipality. The key informant interview (KII) was basically to understand management practices regarding awareness and supply of ITN to target groups by the Municipal Health Directorate. The KII indicated that they indeed educate pregnant women on the use of ITN. While most KII revealed they educate pregnant women every day on the ITN use once they come to the facility, some KII also indicated the education is on weekly bases. The KII again revealed that the facilities within the Bekwai municipality have records of pregnant women who have ITN. The records are recorded in the ANC register at the facility and into the clients' maternal record books.

The KII further revealed that the facilities within the municipality monitor the pregnant women to see whether they use the ITN through home and community visit as well as asking the pregnant women during ANC visits. The KII further indicated that the facility educate pregnant women on the effect of malaria on their pregnancy through a discussion during ANC.



## **CHAPTER FIVE**

### **5.0 DISCUSSION**

#### **5.1 Introduction**

The study was undertaken to assess the level of awareness and use of ITNs among pregnant women in the Bekwai Municipality of the Ashanti Region, Ghana. This chapter presents discussions of the findings from the study with other published literature. The discussion is presented per the objective of the study.

#### **5.2 Socio-demographic characteristics of pregnant women**

Malaria is of great public health concern as a result of the huge burden it imposes on the individual, healthcare system and a nation's economy at large. Malaria is the leading cause of morbidity and mortality causing an approximate 3 million deaths globally each year. Nearly 90% of such deaths occur in SSA, especially among pregnant women and children under the age of five years. This study was conducted to assess the use and awareness of ITN among pregnant women.

Results revealed that most (51.6%) of the pregnant women enrolled in the study were between the ages 26 – 35 years with an average age of 29 years. This finding has the implication that most women are capable of giving birth within this age group. The pregnant women were mostly married to their couples. The highest education among the pregnant women were tertiary level, however, they were mostly JHS graduates with the lowest being primary education. In terms of occupation, 28.9% of pregnant women were unemployed with 27.3% as farmers, 21.6% traders and 9.1% in public service. Christianity was the dominant religion among the pregnant women in this study. This finding corroborated the findings by the Ghana Statistical Service (GSS) which found Christianity as the dominant

religion in Ghana. Specifically, the GSS report demonstrated that most residents in the Bekwai Municipality were Christians.

### **5.3 Level of awareness on insecticide treated bed net among pregnant women**

The prevention of Malaria in Africa has received attention toward achieving better living for the poorest and vulnerable groups (Noor *et al.*, 2007). There is no doubt that ITNs represent one of the most significant public health tools for Africa's considerable burden of malaria which is captured in the Millennium Development Goals (MDG). Although the health benefits of ITNs have been conclusively confirmed under experimental conditions, the most appropriate approaches for their effective delivery and usage remain uncertain (Guyatt *et al.*, 2002). This translate that level of awareness of the ITN would motivate individuals including pregnant women towards its usage.

Finding of this study suggested that 95.8% of the pregnant women were aware of ITN such that the sources of information on ITN were mostly through the hospitals/clinics, television stations and health workers. The finding is a significant step that the health system is leading the crusade on educating pregnant women on ITN as a malaria control and preventive measure. The groups creating awareness on ITN among pregnant women like hospitals/clinics and health workers imply a direct supervision by the authorities of the health facilities and municipal health directorate and suggest conformity with standards and norms established by the Ghana Government. This finding corroborated with previous studies in Nigeria which found that pregnant women attending Anti-Natal Care (ANC) were aware of ITN (Musa *et al.*, 2009, Akinleye *et al.*, 2009, Iwu *et al.*, 2010). The findings again confirmed previous studies in other African countries like Senegal, Ethiopia, Zambia and Uganda which concluded a universal awareness of ITN among pregnant women (Baume and Marin, 2008, Belay and Deressa, 2008). Finding again indicated that

an impressive 96.5% understood ITN as protection against mosquito bites. The level of awareness and understanding of ITN would motivate and provides confidence in achieving the benefits associated with ITN. The finding concurs with a previous study in Kenya by Njoroge et al. (2009) which indicated that pregnant women understood ITN as a protective measure against mosquito bite and malaria was high.

Consistently, a similar study in Kinshasa, Democratic Republic of Congo found that over 98% of participants were worried about getting malaria, believed it is important and beneficial to sleep under a mosquito net every night, and believed sleeping under a mosquito net is a good way to protect themselves from mosquito bite and malaria (Pettifor *et al.*, 2008).

#### **5.4 Proportion of pregnant women who owns ITN**

This specific objective estimated the proportion of pregnant women who owns ITN in the Bekwai Municipality. Finding of the study revealed that while 75.8% of pregnant women indicated that they had mosquito nets, 53.1% revealed they own ITN. This suggests that the process of obtaining the mosquito net may be more flexible than how to own ITN. The finding corroborated with previous study in Ethiopia which found that 59% of pregnant women surveyed owned at least one non-long lasting or long-lasting ITN (Belay and Deressa, 2008). The finding again concur with earlier observation by Ahorlu, (2006) who stated that although studies in Ghana have shown that ITNs are effective, this has not yet translated into an increased supply of ITNs across the country. This problem could be attributed to the fact that the ITN is scarce and cost higher than the ordinary mosquito nets. According to USAID household surveys (2010), ITN ownership increased from 19 to 33% during the period of 2006-2008. Specifically, between 2003 and 2008, ITN use in pregnant women increased from 3 to 20% nationwide (USAID, 2010).

The finding that 53.1% rate of ITN ownership again falls below the targeted rate of 80% by the MDGs by 2015. This implies an integrated effort by policy makers to ensure that pregnant women own the ITN more than the ordinary mosquito nets considering the importance of the ITN. In a related study, Thwing *et al.*, (2006) found that the rate of ownership of ITN in Niger was 6.3% prior to a campaign but increased to 65.1% after a campaign was introduced. The free distribution during the integrated campaign rapidly increased ITN ownership and decreased inequities between those in the highest and lowest wealth quintiles.

Finding further suggested that while 78.3% of pregnant women own one mosquito net, only 12.1% had one of ITN. However, as 50.3% of pregnant women own two, those possessing mosquito net dropped drastically to 16%. The finding has the implication that the pregnant women were willing to increase the number of ITN once they have decided to use them. The finding can further be attributed to the fact that pregnant women value the ITN for its benefits than any other mosquito net.

The study again demonstrated that socio-demographic factors such as age, marital status and level of education had significant relationship with possession of ITN among pregnant women ( $p < 0.05$ ), Table 4.3. The association revealed that pregnant women who were married had the likelihood of possessing ITN than Singles ( $p = 0.005$ ). Education among pregnant women was also found to influence the ownership of ITN among pregnant women. This finding confirms a similar study in Ethiopia which established a statistically significant relationship between education level and ITNs ownership and use (Belay and Deressa, 2008). On the contrary, socio-demographic factors like employment and religion had no influence on ITN ownership among pregnant women.

### 5.5 Level of ITN use among pregnant women

In Sub Sahara-African countries, recent studies have demonstrated an increased public awareness and access to ITNs, however, getting the population particularly vulnerable groups to correctly and consistently use ITNs has proven difficulties (Toé *et al.*, 2009, Noor *et al.*, 2007). However, the impact on preventing malaria morbidity and malariarelated mortality may not be achieved if ITNs are not consistently and properly used by vulnerable populations including pregnant women(Eisele *et al.*, 2009, Binka and Adongo, 1997). This specific objective focused on the level of ITN use among pregnant women in the Bekwai Municipality.

The finding suggested that 83% of pregnant women slept under ITN the night prior to the interview. Most pregnant women further indicated that their bed net was hanged over the bed or sleeping area. This finding implies that the use of ITN was encouraging among pregnant women in the Bekwai Municipality and reflects their awareness of ITN. With 83% sleeping under bed nets, it contradicts with previous findings by Eisele *et al.* (2009) which found that many children and pregnant women were not using the nets. The study by Eisele *et al* suggested that in 4 out of 14 countries, less than one half of the pregnant women were using ITNs. Previous studies have also established that the use of bed net increases faster in countries that distribute them free of charge compared to countries that make people to pay for them(Cohen and Dupas, 2007, Noor, 2008).

The study further revealed that 81.8% of pregnant women use ITN all year round such that the most impressive reason among 97.3% of them was to prevent malaria. The finding that ITN was used by most pregnant women all year round fails to corroborate previous study in Northern region of Ghana where 99% of pregnant women use their net during the rainy season (Binka and Adongo, 1997). The present study contradicted previous observation that

the rate of use of ITN declines at the beginning of the dry season (Eisele *et al.*, 2009, Toé *et al.*, 2009). Finding from the study again revealed that most pregnant women believe the benefit of using ITN was to prevent mosquito bite as reported by previous study in Kinshasa, Democratic Republic of Congo (Pettifor *et al.*, 2008).

### **5.6 Knowledge of pregnant women on the effects of malaria on pregnancy**

Finding of the study indicated that 92.1% pregnant women understood the spread of Malaria through mosquito bite. This finding indeed implies an overall good understanding of the cause of malaria among pregnant women. The finding could be attributed to the fact that various social networks including health workers as well as the media had been educating and organizing programmes in the malaria control strategies as confirmed in the previous discussion above. The finding corresponds to previous study in Kenya which found that the knowledge on malaria and ITN's was high with majority of pregnant women(86.9%) having adequate level of knowledge Njoroge *et al.* (2009). In a related study in Tanzania, Mubyazi *et al.* (2005) found that the Knowledge of pregnant women on malaria risks during pregnancy was high. Although most pregnant women had knowledge about the spread of malaria, however, 3.4% believe that malaria could be spread through exposure to sun or heat.

The finding again indicated that the most common symptoms of malaria known to pregnant women were headache, vomiting, chills and high temperature with their respective percentages as 26.5%, 22.8%, 16.9% and 13.8%. Results demonstrated that 89.5% of pregnant women believe malaria could have negative effect on pregnancy. Again, most of the pregnant women further revealed some of the effects of malaria on pregnancy which included Miscarriage, premature, Maternal Mortality, Still birth and Anaemia. The effect reported by pregnant women in Bekwai municipality correspond to a qualitative study

conducted in North East Tanzania which revealed some of the Malaria risks during pregnancy to include stillbirths, Maternal Mortality as well as too much bleeding during and after delivery (Mubyazi *et al.*, 2005).

### **5.7 The perception of pregnant women on ITN use**

Finding from the study demonstrated that 95.7% of pregnant women perceived ITN use as a strategy to prevent malaria. Most of the pregnant women believed that the net prevents mosquito from getting contact with the body whiles 24.6% attributed it kills the mosquitoes. Indeed, in most previous studies, researchers have established the primary objective of ITN as a way to prevent malaria (Eisele *et al.*, 2009, Guyatt *et al.*, 2004, Baume and Marin, 2008). The finding implies that pregnant women in Bekwai Municipality had good perception about the uses of ITN. This finding corresponds to the perception of pregnant women seeking antenatal care in Kinshasa as reported by Pettifor *et al.* (2008). From their finding while only 25% reported sleeping under a net, over 98% of participants were worried about getting malaria, believed it is important and beneficial to sleep under a mosquito net every night, and believed sleeping under a mosquito net is a good way to protect themselves from malaria. The finding again confirms the study carried out at Imo River Basin of Nigeria by Chukwuocha *et al.* (2010). In their study, participants and key informants knew that mosquito nets were a useful preventive measure against malaria, and that pregnant women and children were supposed to sleep under nets since they are the most vulnerable groups. Contrary to the present study result, Belay and Deressa (2008) found that most pregnant women in eight malarious kebele in northern Ethiopia had perception that nets could not prevent malaria and influenced them not to own nets.

## **CHAPTER SIX**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **6.0 Introduction**

This chapter presents the conclusions and recommendations based on the results and discussions made in the previous chapters. The first section presents the conclusions which are structured per the objectives followed by the recommendations for policy planners.

#### **6.1 Conclusions**

##### **6.1.1 Socio-demographic Information of Respondents**

The pregnant women enrolled in the study were mostly (51.6%) between 26 – 35 years with an average age of 29 years. The highest education level were tertiary, however, they were mostly JHS graduates with the lowest being primary education. The study further concluded that 28.9% of pregnant women were unemployed with 27.3% as Farmers, 21.6% Traders and 9.1% in Public service. Christianity was the dominant religion among the majority (90.9%) of pregnant women.

##### **6.1.2 Level of awareness on Insecticide Treated Bed Net among pregnant women**

Conclusion from the study can be made that level of awareness of malaria and ITN were high among pregnant women in the Bekwai Municipality such that 95.8% of respondents were aware of it. The sources of obtaining information about ITN among pregnant women in the municipality were mostly through the hospitals/Clinics, Television stations and Health workers. It can further be concluded that 96.5% of pregnant women understood ITN as a protection against mosquito bites.

### **6.1.3 Proportion of pregnant women who own ITN**

The ownership of mosquito nets (untreated) was higher than that of the ITN among pregnant women in the Bekwai Municipality. Most pregnant women (75.8%) own mosquito nets (untreated) while 53.1% own ITN. Although pregnant women possess Mosquito nets than ITN, however, those who own more than one of the ITN was higher than those who own more than two of the mosquito nets. The study also concluded that the age, marital status, and level of education had significant relationship with the ownership of ITN among pregnant women in the Bekwai Municipality.

### **6.1.4 Level of ITN use among pregnant women**

The study concluded from the discussion that among respondents who own ITN, 83% slept under it during the night prior to the interview. The study further conclude that the majority (81.8%) of pregnant women who own ITN use it all year round such that the most suggested reason among 97.3% of pregnant women were to prevent malaria.

### **6.1.5 Knowledge of pregnant women on the effects of malaria on pregnancy**

The knowledge of pregnant women on malaria was very high as 92.1% of pregnant women understood the spread of malaria through mosquito bite. The study further concluded that 89.5% of pregnant women believe malaria could have negative effect on pregnancy and was able to mention some effects such as Miscarriage, premature birth, Maternal Mortality, Still birth, Low birth and Anaemia.

### **6.1.6 The perception of pregnant women on ITN use**

The study concluded that the perception on the use of ITN among pregnant women in the Bekwai Municipality was positive as 95.7% believe it is a strategy to prevent malaria.

Most pregnant women perceived the net to prevent mosquito from getting contact with the body and 24.6% also believe it kills the mosquito.

## **6.2 Recommendations**

The following are the recommendations made from the findings of the study to the Government, the municipal health providers and management, pregnant women at the community level and NGOs.

### **The Government/Ministries**

- Based on the findings of the study, it is therefore recommended that the municipal health directorate in consultation with the National Malaria Control Programme should institute measures to make available adequate ITNs to the pregnant women in the Bekwai Municipality. This could be achieved by providing such ITN at a subsidized price that could be purchased by all socio-economic groups of pregnant women.
- Also, efforts should be channelled at developing a strategic plan to secure ITNs and distribute them free of charge to the pregnant women who are vulnerable in the society.

### **Municipal health providers and management**

- Although there is high awareness and positive perception on ITN use among pregnant women in the Bekwai Municipality, efforts to continue strengthening the education on malaria and ITNs, especially among all pregnant women should be the topmost priority of the municipal health directorate. This will further improve pregnant women's understanding about the need to prevent malaria

during pregnancy, using the identified sources of information in this study.

- The Health Directorate should strengthen efforts to acquire more KO-Tabs so that old nets could be re-treated for effective use.

#### **NGOs and other stakeholders**

International or Local Donors focusing on malaria programmes should target pregnant women who are vulnerable to supplement the efforts of the Government and health professionals in the Bekwai Municipality. The effort of NGOs could be achieved through education and promotion of community-based educators on the effect of malaria on pregnancy and the effectiveness of ITN use. The NGOs should again assist to purchase ITN for pregnant women either through full payment or provision of subsidy.

#### **Recommendation for further research**

Further research should be conducted into economic effectiveness of free distribution of ITNs to vulnerable groups like pregnant women and children under five.

#### **6.3 Concluding remarks**

The novelty of the study is seen from the fact that there is high awareness level but low usage of treated bednets. The study has thus demonstrated that the fact that consumers are aware of a product, in this case treated bed nets, does not mean they would use it. The study found wide disparity between awareness level and use of ITNs which suggests that the limited resources invested in the ITNs distribution is achieving the expected results of high usage. Therefore effort should target at bridging awareness usage gap to improve effective use of treated bed nets.

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## APPENDICES

### APPENDIX 1a: Copy of Questionnaire for Pregnant Women

#### QUESTIONNAIRE FOR PREGNANT WOMEN

Please tick [☐] where appropriate or write down the appropriate response to each item as the question/statement may indicate.

#### SECTION A

##### SOCIO-DEMOGRAPHIC DATA

1. AGE;
2. Where do you stay.....
3. Marital status: Married [☐] Single [☐] widow [☐] Co-habitation [☐] Divorced [☐]
4. Level of education (last level attained): No education [☐] Primary [☐] JHS/Middle School [☐] Secondary [☐] Tertiary [☐] others specify.....
5. Occupation: Farming [☐] Trading [☐] Public Worker [☐] Unemployed [☐]  
Hairdressing/Seamstress [☐] Others Specify .....
6. Which religion do you belong to? Christian [☐] Islam [☐] Traditionalist [☐]  
Others specify .....

#### SECTION B

##### AWARENESS OF ITN

7. Have you heard about ITN? Yes [☐] No [☐] If no, skip to section C.
8. If Yes, What is it used for? Room decoration [☐] Protection against mosquito bites [☐]  
Affording good sleep [☐] others specify.....
9. Where did you hear-about the ITN? Television [☐] Radio Station [☐] Health Workers [☐]  
Hospital/Clinic [☐] Relative/Peers [☐] others specify .....

#### SECTION C

## POSSESSION/OWNERSHIP OF ITN

10. Do you have any mosquito bed net? Yes [ ] No [ ] If No, skip to section E

11. How many mosquito nets do you have?

12. Does any of your household have ITN? Yes [ ] No [ ]

13. How many ITN do you have in the house?

## SECTION D

### USE OF ITN

14. Is the bed net hanged over the bed or sleeping area? Yes [ ] No [ ]

15. If No, where is it placed? Inside the bag [ ] No space to hang [ ] under the bed [ ]

On the bed [ ] others specify.....

16. What time do you go to bed?

17. Did you sleep under the mosquito net last night? Yes [ ] No [ ]

If No, Why? Feels hot inside [ ] Looks like a burial shroud [ ] No space to hang [ ]

Others specify.....

18. Which period do you use the net? All years around [ ] during rainy season [ ] during

dry season [ ] Others specify.....

19. Why do you use the net during that period? To prevent malaria [ ] for warmth [ ] as a

partition in the room [ ] others  
specify.....

20. What are the benefits of ITN uses? To prevent mosquito bite [ ] to sleep soundly [ ] To

prevent warmth [ ] To prevent insect bites [ ] Others  
specify.....

## SECTION E

## KNOWLEDGE OF MALARIA

21. How do you know if someone has malaria? Chills ☐ headache ☐ vomiting ☐  
Shivering ☐ Weakness ☐ Yellowish eyes ☐ Mouth bitterness ☐ high temperature ☐  
]

Others specify.....

22. Do you know malaria can have negative effect on your pregnancy? Yes ☐ No ☐

If yes, what are the effects? Premature delivery ☐ Still birth ☐ Low birth weight ☐

Anemia ☐ Miscarriage ☐ Maternal mortality ☐ Others specify.....

23. How is malaria spread? Exposure to sun/heat ☐ Witchcraft ☐ Mosquito bite ☐

Overwork ☐ Malnutrition ☐ other specify.....

## SECTION F

### PERCEPTION OF PREGNANT WOMEN ON THE USE OF ITN

24. Do you think ITN use can prevent you from getting malaria? Yes ☐ No ☐

25. If Yes how? Because it repels the mosquitoes ☐ because it can kill the mosquitoes ☐

The net prevent the mosquito from getting contact with your body ☐ Others specify.....

26. If no why? Because malaria can be contracted from breathing in bad air ☐ Mosquito

can bite you before going to bed ☐ Others specify.....

### APPENDIX 1 b: Copy of Questionnaire for Health Workers

#### QUESTIONNAIRE FOR HEALTH WORKERS

Good day, I am **Daniel Sosu**, an MPH Student at the KNUST and I am researching into the topic Awareness and use of insecticides Treated Nets(ITN) among Pregnant Women in the prevention of Malaria in the Bekwai Municipality. I will appreciate it if you will respond to the question being asked.

You are assured of anonymity and confidentiality of information provided. Please note that your answers will be used for the purpose of this research only. Your contributions will help in solving some of the problems of Pregnant Women unwillingness to use the ITN in the prevention of Malaria which is one of the Public Health concern in Ghana.

1. Name of Facility:.....
- 2 .Age (years):.....
3. Sex: Male ☐ Female ☐
4. Profession: Nurse ☐ Medical Officer ☐ Administrator [/Midwife ☐ others specify.....
5. Rank/Role:.....
6. Have you being educating women on the use of ITN? Yes ☐ No ☐
7. If yes, how frequent do you/the facility give the education?
8. If no, why?.....
9. Does the facility have records of pregnant women who have ITN? Yes ☐ No ☐
10. If yes, how is it done?.....
11. If no, why?.....
12. Does the facility monitor the pregnant women to see whether they use the ITN?  
Yes ☐ No ☐
- 13.If yes, how is it done?.....
- 14.If no, why?.....
15. Does the facility educate the pregnant women on the effect of malaria on their pregnancy?.....
- 16.If yes, how is it done?.....
- 17.If no, why?.....

18. How often does the facility educate pregnant women on the use of ITN? Tick as many as you think it is appropriate.

- a) Not at all ☐
- b) Once a year ☐
- c) Not frequent ☐
- d) Once in every month ☐
- e) Every week ☐
- f) Everyday ☐

### **PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM**

#### **Title of Research:**

The title of my research is; awareness and use of ITN in prevention of malaria among pregnant women at Bekwai- Municipal in Ashanti Region- Ghana

#### **Name(s) and Affiliations of Researcher(s)**

My name is Daniel Sosu, I am MPH; (Health Service Planning and Management) student of Kwame Nkrumah University of Science and Technology and I am conducting this study.

**Background:** The background of my study is that, although Ghana has made major progress in creation of awareness and use of insecticide Treated Net (ITN) over the last few years. ITN usage still falls short of the Abuja conference target of 60% which should have been reached by 2005. This therefore raises concern as to the realization of the vision 2015 target of 80% usage by the Millennium Development Goal (MDG) (UN Report, 2007) in Africa, Ghana and the Bekwai- Municipality as well.

Although the Bekwai- Municipality which is of no exception, has her fair share of the campaign to encourage the use of ITN in the prevention of malaria, it is still not registering much improvement in the fight against the disease especially among you the pregnant women; registering 18.00%, 24.37% and 19.75% of malaria in pregnant women in 2008, 2009 and 2010 respectively.

**Purpose of Research:**

The purpose of this research is to assess the level of awareness and use of ITN among you the pregnant women at Bekwai- Municipality.

**Procedure of the research**, what shall be required of each of you the participants and appropriate total number of you that would be involved in the research;

I will use random sampling or lottery method to select you the participants. Each of you the pregnant woman at the Bekwai- Municipality will be given the equal chance of being selected into the study. Those of you who will be selected will be required to sign consent form after explaining the benefits and risks of study to you.

Each of you the participants enrolled will be given questionnaires to answer in the Antenatal clinic.

In total, I expect to recruit 384 of you the pregnant women into this study throughout Bekwai- Municipality.

**Risk:**

For your information, there are minimal risks associated with this study such as; delay in health care delivery, discomfort and inconvenience to you.

**Benefit(s):**

This study will benefit you in the following ways; it will remind those of you who have the ITN that you must use it; it will also create awareness in those who do not have ITN to own one and use it. This will prevent Malaria and its complications among you the pregnant women.

**Confidentiality:**

I want to give the assurance that, any information collected from you will be coded with numbers. No name will be written or recorded. I will not link data collected from you to any one of you. But as part of my responsibility to carry out research properly, I may allow officials from KNUST and ethics committee to have access to your records. The officials will also not cause any harm to you after receiving your information.

**Voluntariness:**

Please, I want to inform you that participation in this study should be from your own free will. You are not obliged to take part in this study. The research is completely voluntary.

**Alternatives to participation:**

If you decide that, you will not participate in this study, it will not affect your treatment or management in Bekwai- Hospital or any health institution in the Bekwai- Municipality.

**Withdrawal from the research**

You have every right to withdraw from the research at any given time without any reason or explanation or any notice.

Again, you may decide to keep answers to yourself if you find any question uncomfortable or private.

**Consequence of Withdrawal:**

There will be no consequence, loss of benefit or care to you if you decide to withdraw from the study.

But I am humbly informing you that some of the information obtained from you earlier before your withdrawal will reflect in my analysis report and probably publication in a modified way. The information you gave earlier cannot be removed anymore.

**Cost/ Compensation:**

Please take this token of GH¢2.00 as compensation for your time spent, transportation and inconvenience the study might have caused you.

**Contacts:**

Please, if you have any question or clarification concerning this study, do not fail to contact Mr. Daniel Sosu [Name of Researcher or Principal Investigator (PI)] on 0244447935

In addition, if you have any issues or concern about the way the study is conducted, you have every right as a research participant to contact the office of the chairman, Research and Publication Ethics, Kumasi on Tel: 03220 63248 or 020 5453785

I appreciate your effort, time spent during the research. Therefore i say a big thank you.

## CONSENT FORM

### Statement of person obtaining informed consent:

I have fully explained this research to \_\_\_\_\_ and have given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant make an informed decision to or not to participate.

DATE: \_\_\_\_\_ NAME: \_\_\_\_\_

### Statement of person giving consent:

I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction.

I understand that my participation is voluntary (not compulsory).

I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it.

I understand that I may freely stop being part of this study at any time without having to explain myself.

I have received a copy of this information leaflet and consent form to keep for myself.

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_ SIGNATURE/THUMB PRINT: \_\_\_\_\_

### Statement of person witnessing consent (Process for Non-Literate Participants):

I \_\_\_\_\_ (Name of Witness) certify that information given to (Name of Participant), in the local language, is a true reflection of what I have read from the study Participant Information Leaflet, attached. WITNESS' SIGNATURE (maintain if participant is non-literate): \_\_\_\_\_

MOTHER'S SIGNATURE (maintain if participant is under 18 years): \_\_\_\_\_

MOTHER'S NAME: \_\_\_\_\_

FATHER'S SIGNATURE (maintain if participant is under 18 years): \_\_\_\_\_

FATHER'S NAME: \_\_\_\_\_

# KNUST

