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ASSESSING THE USE OF LONG LASTING INSECTICIDE TREATED NETS AMONG PREGNANT WOMEN IN GA EAST MUNICIPALITY OF THE GREATER ACCRA REGION

BY

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DECLARATION

I hereby declare that apart from references to other people's work which I have duly acknowledged, this work is my own independent work. I further declare that this work has not been submitted in-part or fully for the award of any degree in this institution or any other institution elsewhere.

…….. ……

Charity Twumasi Date

(Student)

…….. ……

Prof. Philip Baba Adongo Date

(Supervisor)

DEDICATION

I dedicate this work to the Almighty God for granting me grace and giving me good health, strength, knowledge, wisdom and all the resources that enabled me to accomplish this work successfully.

I also dedicate it to my Pastors, family, friends, and church for their prayers, support and immense help they gave me.

I also dedicate my work to my honourable supervisor, who is also my Head of Department (Social and Behavioural Sciences), Professor Philip Baba Adongo for his guidance and support.

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ABSTRACT

Background: Malaria is a disease which is caused by the plasmodium parasites in the blood or tissues of humans. In 2012, government of Ghana distributed bednets to pregnant women in order to reduce the transmission of malaria. Though there was a massive distribution all over the country, the consistent use of the LLIN is low. Thus this study was done to find out the use of LLIN among pregnant women in the Ga-East Municipality and find out the factors that influence the use of the bednets in the municipality.

Methods: The study used a cross-sectional quantitative method. The data was collected using structured questionnaires. A simple random sampling method was used in the selection of 206 participants for the study. SPSS and Microsoft Excel were used to analyze the data.

Results: The pregnant women 97.1% (200) in the Municipality had knowledge about transmission of malaria. More than half of them 53.9% (111) had very good knowledge about LLIN use and that was significant. Some of the participants 61.7% (127) had misconceptions about the use of LLIN. Despite their high level of knowledge about malaria transmission and use of LLIN, the level of usage of LLIN among the pregnant in the two sub-municipalities (Abokobi and Haatso) in the Ga East Municipality was low 43.2%. Usage of LLIN here means that, the pregnant women who slept under the LLIN the night before the day of data collection for the study. The use of LLIN was related to educational level, occupation and marital status though not statistically significant.

Conclusion: It is recommended that behaviour change messages should be geared towards consistent use of LLIN among pregnant women. Community Health workers should educate pregnant women on the efficacy of the LLIN to demystify the misconceptions about LLIN use.

Key words: Pregnant women, Long Lasting Insecticide Treated Nets, Malaria.

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LIST OF ABBREVIATIONS

ANC	Antenatal Clinic
CHPS	Community- Based Health Planning and Services
DHMT	District Health Management Team
GAR-HD	Greater Accra Regional Health Directorate
GDHS	Ghana Demographic Health Survey
GHS	Ghana Health Services
ITN	Insecticide Treated Nets.
JHS	Junior High School
LLIN	Long Lasting Insecticide Treated Nets
MDG	Millennium Development Goal
NMCP	National Malaria Control Programme
SHS	Senior High School
WHO	World Health Organization

DEFINITION OF TERMS

Long Lasting Insecticide Treated Nets: Is a factory – treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibers.

Insecticide Treated Nets (ITNs): Insecticide treated nets are at times used in place of LLINs in the study since both of them are treated insecticide bednets.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Malaria is a completely preventable and treatable mosquito-endured illness. In 2013, 97 countries had ongoing malaria transmission (WHO, 2013). An estimated 3.4 billion people are at risk of malaria, of which 1.2 billion are at high risk. In areas where the risk is, more than one malaria case occurs per 1000 population. (WHO, 2013). In 2012, there were estimated 207 million malaria cases and an estimated 627,000 deaths. Ninety percent of all malaria deaths occur in sub –Sahara Africa (WHO, 2013).Despite the decrease in malaria incidences, a large proportion (57%) of Africa's population is still vulnerable to infection (KEMRI, 2014).

In Ghana, 11.3 million cases of malaria were reported at the Out Patient Department and about 30,300 of such cases were seen each day. Pregnant women accounted for 1.9% of malaria cases at the OPD. The malaria burden is not felt only in the health sector, but in every aspect of our social and economic life (NMCP, 2014).

Malaria infection during pregnancy is very crucial Public Health problem with high risk for the pregnant woman, her foetus and the new born child. Malaria accounts for maternal illness like anaemia and low birth weight of the new born which mostly occurs in Africa (WHO, 2014).

Malaria infection affects the placenta which compromises foetal nutrition causing intrauterine foetal growth retardation and low birth weight (Brabin *et al,* 2004). The effect of malaria on the placenta are worse in first time pregnancies than subsequent ones (Brabin, 1983).

In Africa, over 100,000 infant deaths occur as a result of malaria which causes low birth weight yearly (Guyatt & Snow, 2001).

Malaria causes a great economic burden on affected countries and causes great loss on economic and social development. As a result of this, WHO at a meeting came to a consensus that there should be emphasis on the preventive measures, both at the community and at the individual level (WHO, 1993). That was when the most promising measure was mentioned, the insecticide treated net, as one of the four main strategies to reduce morbidity and mortality from malaria (WHO, 2003), with a target set by Heads of State in Africa to protect 60% of all pregnant women by 2005.

History has it that, during World War II, armies from Russia, Germany and the USA protected themselves with insecticide treated nets against vector-borne diseases like malaria (Curtis, 1991).

To fight and reduce malaria related mortality among pregnant women, Ghana embarked on door to door hang-up of long lasting insecticide treated nets (LLIN) exercise. These LLINs have been impregnated with insecticides such as permethrin or deltamethrin making it more effective in the prevention of malaria (Takken *et al*, 1978). Apart from being effective, it is also cost-effective (Hanson *et al*, 2003). It does not need to be retreated if handled with care. It has been made with durable netting material that has insecticide incorporated within and has a life span of three years or can last 20 washing (Guillet *et al*, 2001). The entire population of Ghana which is 24 million is at risk of malaria disease because it is endemic in all parts of the country. All year round, transmission of malaria persists and most especially during the rainy season.

In 2008, in Ghana, malaria accounted for about 38% of all out patient illnesses and 36% of all admissions. Between 3.1 and 3.5 million cases of clinical malaria are reported in public health facilities annually (WHO, 2013).Thus making malaria the number one cause of morbidity.

As a result of that, policy makers in the health sector; the Ministry of Health and its agency, the Ghana Health Service, asked the National Malaria Control Programme (NMCP) to lead in the national effort of reducing the malaria burden in Ghana. NMCP therefore made it a point to make prevention and treatment strategies available nationwide. The distribution of insecticide treated nets (ITNs) through measles campaigns to pregnant women led to an improvement in net coverage which made the percentage of pregnant women sleeping under ITN rise from 4% in 2003 to 28% in 2008 (GSS , 2008).

However, the coverage levelled off after 5 years of the strategy of that promotion at about 20% of pregnant women (Harvey, 2010). In order to increase the coverage and usage, NMCP in 2010 changed the strategy to mass distribution which began with pregnant women in the Northern Region which started in May 2010. More than half a million LLINs were distributed by NMCP with the assistance of various local and international partners. That was when the door- to- door hang up exercise was carried out to recipients households by paid volunteers. It was then extended to other parts of the country and was defined as one LLIN for every two people in every household. The main objective being that malaria will be eradicated instead of just decreasing morbidity.

The use of LLINs is to halt the process of transmission by eliminating the human reservoir of parasites (Harvey, 2010). Thus, nations place high premium on the

effective control of malaria in pregnancy in order to reduce maternal and infant mortality.

1.2 PROBLEM STATEMENT

Effective and continuous usage of LLINs among pregnant women, will reduce the mortality and morbidity rates of malaria in the country, as they are among the most vulnerable when it comes to the disease of malaria. Ghana distributed approximately 12.5 million long lasting insecticide treated nets through a universal mass distribution campaign between May 2010 and October 2012 through hang-up activities to encourage high use, (Paintain *et al*, 2014), in order to reduce malaria cases in the country especially among the vulnerable groups. Yet, it is noted that the malaria cases reported at the health facilities are still on the increase instead of going down. (Paintain *et al*, 2014).

Millions of LLINs have been distributed to pregnant women during measles campaigns, many have been hanged during the door-to-door hang-up programme in dwelling places of pregnant women and a lot more have been distributed to pregnant women at antenatal clinics. All these were done by GHS, MOH and NMCP in an effort to achieve the ROLL BACK MALARIA target of 60% usage of LLIN. This means that lots of pregnant women possess LLINs. However, the usage of LLIN among pregnant women is still below the target. In a survey conducted by Ghana Demographic Health Survey in 2008, 19.9% of pregnant women who possess LLIN slept under their LLIN the night before the survey. Thus, there is a gap between possession and usage of LLIN among pregnant women. This is seen in some studies which report gaps between bednet ownership and use although there has been increase in the coverage of LLINs. (Grietens *et al*, 2013).

Pregnant women are still getting infected with malaria and the morbidity and mortality rate caused by malaria as well as its complications among them is still high. Malaria cases recorded among pregnant women at OPD in 2013 nationwide was 20% of pregnant women's attendance at the OPD (NMCP, 2013). This shows that the malaria situation in the Ga East Municipality is not different from other parts of the country and so there is the need to assess the pregnant women's knowledge about malaria and its transmission, knowledge about LLIN and the factors that affect the use of LLIN among the pregnant women. The result of this research will help the Municipality and the Health Directorate come out with strategies to reduce the malaria burden in the Municipality, especially among pregnant women.

1.2.1 Research Questions

1. What is the level of knowledge of pregnant women about the transmission of malaria?

2. What are the perceptions of pregnant women about LLIN?

3. What are the factors that influence LLIN use among pregnant women?

1.3. Objectives.

1. 3. 1. General Objective.

To assess the effective use of long lasting insecticide treated nets among pregnant women in Ga – East Municipality in the Greater Accra Region.

1.3. 2. Specific Objectives.

1. To assess the level of knowledge of pregnant women about malaria and its transmission.
2. To find out the perception of pregnant women about LLIN.

3. To assess factors that influence consistent use of LLINs among pregnant women

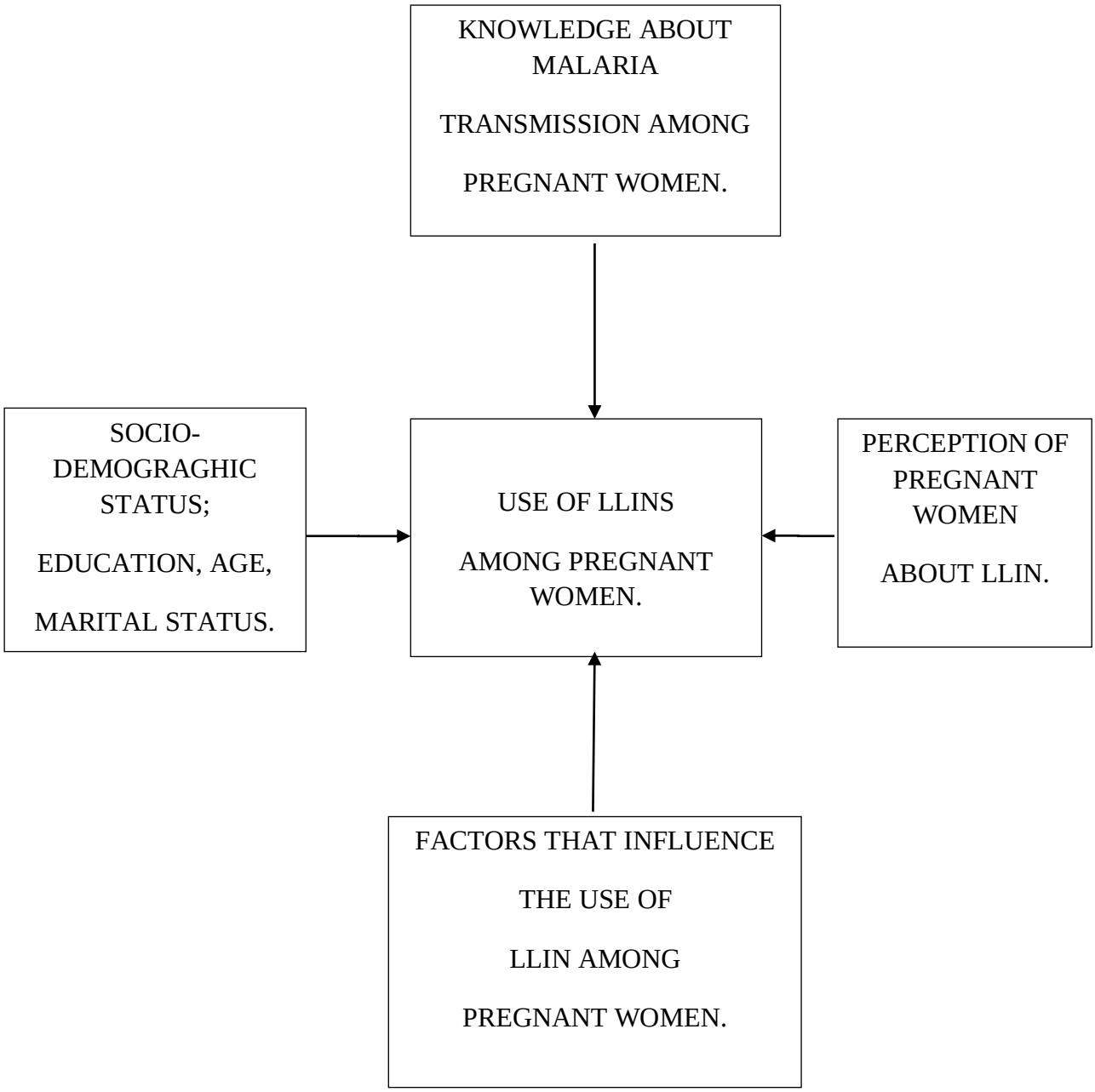
1.4. Conceptual Framework

The relationship between independent variables- (knowledge about malaria and perception of the use of LLINs) and the main dependent variable – use of LLINs among the pregnant women is described in Figure 1. From the diagram, it can be deduced that the variables are inter related. For example, socio-culture factors like local perception and decision making status affects the use of LLINs as well as the pregnant woman's acceptance.

Similarly, a pregnant woman's level of education influences her perception of risk of malaria in pregnancy. The same variable, level of education, affects the acceptance of the use of LLINs. Some go for drinking of herbal concoctions, the use of various insecticide sprays, burning of mosquito repellent coils, sleeping under non-treated bednets, and the use of nylon screening on windows and doors.

A household's income level influences their ability to pay for health care services and will also influence the pregnant woman's ANC attendance. It is expected that, availability of treated bednets at the distribution centres would influence their use by the pregnant women.

The pregnant woman's knowledge about malaria is influenced by area of residence (either rural or urban), her educational level and her access to health information. These same variables affect the pregnant woman's perception of LLIN use.



Author's own construct.

Figure 1. Diagrammatic Representation of Conceptual Framework.

1.5. JUSTIFICATION

After two years of the LLINs hang-up exercise that was done nationwide, effort is made to assess the extent to which the LLINs are used among a vulnerable group (pregnant women) and then help to develop strategies to solve them.

This study is being done to find out the knowledge of pregnant women about the transmission of the malaria parasite, their perception about LLINs and also what factors hinder them from using the LLINs. Their responses will aid policy makers in the health sector, (Nationally, Regionally and at the District level), develop strategic messages and educational materials that will bring out understandable information to the general public and encourage them to consistently use the LLINs for effective results.

Thus, cases of malaria reported at the health facilities especially at Ga East Municipality will be reduced among pregnant women.

CHAPTER TWO

2.0 LITERATURE REVIEW

Introduction

Various factors contribute to behaviours in response to health promotion programmes, as in the case of the use of LLINs among pregnant women other than accessibility and availability of services.

2.1 Malaria

Malaria diagnosis involves identifying malaria parasites or antigens in patient's blood. Malaria is a potential medical emergency and should be treated accordingly. Delays in diagnosis and treatment are leading causes of death in many countries (Tangpukdee *et al*, 2009).

About 0.6 to 1.2 million people are killed by malaria, which is transmitted by mosquitoes each year, especially in low income countries (Charles & Godfrey, 2013).

Most malaria vector mosquitoes in Africa preferably feed on humans, making them to sustain extremely higher levels of transmission than other places thus making Africans more vulnerable to the disease (Lyimo *et al*, 2013).

In persons without previous immunity, malaria shows up severely and causes anaemia in pregnant women. Malaria also causes dysfunction in some organs of the body, example is the kidney. When someone is exposed to the disease repeatedly, the person acquires a considerable degree of clinical immunity but this is not stable and disappears after a year away from the endemic-disease environment. However, when the person returns to the endemic-disease zone, the immunity reappears after some malarial infections (Nchinda, 1998; Bloland, 2001) .

Malaria cases recorded at the out-patient- department (OPD) among pregnant women in 2013 were 217,000 representing 20% of pregnant women in attendance at the OPD (NMCP, 2013).

During the 1950s, Ghana made an effort to reduce the malaria disease burden till it becomes no more a Public health issue by strategically introducing the insecticide treated nets which later became the long lasting insecticide treated nets as an intervention. However, malaria continued to be the leading cause of illness in the country (GHS, 2014). This is partly due to several factors such as; poor living conditions, increase in drug resistance, climate and environmental change and insufficient interventions and control strategies (Adams, Darko & Accorsi, 2014). In order to reduce malaria cases in pregnancy, WHO recommends three approaches: providing prompt access to effective treatment; use of insecticide treated nets (ITNs); and intermittent preventive treatment (IPT) with sulpadoxine- pyrimethamine (WHO, 2004).

2.2 Use of Long Lasting Insecticide Treated Nets.

LLINs are impregnated with an insecticide which is effective for three to five years or twenty washes, thus making it more effective than the untreated nets. The insecticide repels and most often kills the mosquitoes or has knock-down effect so that the parasite can no longer be transmitted even to those not covered by the nets (WHO, 2004). Malaria transmission usually occurs from evening till dawn so if the LLINs are used effectively and maintained the transmission will be stopped and prevalence of malaria will be reduced (WHO, 2004). Many randomized control trails have shown that use of LLINs consistently during pregnancy has produced very good outcomes in the lives of the mothers and their infants (Gamble, Ekwaru &Kuile, 2006).

The consistent use of LLINs is among the most effective tools for the prevention of malaria. LLINs can reduce malaria transmission by up to 90% and prevent about 44% of all-cause maternal anaemia (Baume & Marin, 2008).

Countries which are prone to malaria did some combination of education, demand creation, reduction of taxes and tariff on LLIN, commercial LLIN market development and programmes to reach the most vulnerable populations with subsidized LLINs after the Roll Back Malaria summit at Abuja on April 25, 2000 in order to have 60% of the two most vulnerable groups, which pregnant women is one of them, to use LLINs (Willey *et al*, 2012).

Ghana was part of the Roll Back Malaria initiative of the WHO that targeted at halving the malaria burden by 2010 and so Ghana embarked on the distribution of LLINs in order to prevent the transmission of malaria. This came as a response to the US President's Malaria initiative to support malaria-control programmes in Africa (Buabeng, 2010). After the distribution, the question is are people especially pregnant women using LLINs for the purpose for which it was given to them? In 2008, the Nigerian Demographic and Health Survey reported that the rate of the use of LLINs is below 10 % which has consistently been low (NPC & DHS, 2008). It was also shown in other studies that several countries in malaria endemic sub-Sahara Africa had very low utilization rate of the LLIN (van Eijk *et al*, 2011).

2.3 Knowledge on Malaria and LLIN Use.

There are several factors that influence the use of LLIN by pregnant women which include education, place of residence and access to antenatal care services (Eisele, Keating, Littrell, Larsen, & Macintyre, 2009). It is also known that care seeking behaviour is positively influenced by educational level. For instance, in Ethiopia, it

was revealed that higher educational attainment and residence in urban location among pregnant women were noticeable predictors of LLIN use in pregnancy (Chukwuocha *et al*, 2010). In another study, two key knowledge based predictors of the use of LLIN during pregnancy identified that those who knew that LLINs prevent the transmission of malaria were three times more likely to use bednets compared with those who did not. In a similar manner, women without misconceptions about malaria prevention used the LLINs more than those with misconceptions.(Ankomah *et al.*, 2012)

It has been found in a study that when LLIN ownership is compared with its use, pregnant women in rural areas were more likely to own LLINs, just for the fact that they were distributed freely to them, but when it comes to use, pregnant women in urban areas are almost twice as likely to use the LLINs (Ankomah *et al.*, 2012). Above all, having the knowledge that LLINs prevent malaria transmission is the only indicator that stands strong in explaining both LLIN ownership and use (Ankomah *et al.*, 2012). There is, therefore the need to intensify educational programmes on the transmission of malaria and its prevention at the community levels and the antenatal clinics so that the pregnant women will understand the reason behind the mass distribution of the LLINs and use them appropriately to enhance behavioural change which will be beneficial to them and their unborn babies and the whole nation as well.

2.4. Socio –Cultural Beliefs Affecting Use of LLINs.

Many researches have revealed that there are lots of misconceptions about the knowledge of the causes of malaria (Ahorlu *et al*, 1997; Abate, Degarege, & Erko, 2013). In Ghana for instance, malaria was seen as an environmentally related disease

caused by excessive contact with external heat which disturbs the blood equilibrium (Agyepong, 1992).

In Tanzania, a study showed that although the majority of women slept under an untreated bednet while pregnant, the use of subsidized ITNs during pregnancy was low despite widespread knowledge of the scheme (Tami *et al*, 2006). However, when the baby is born, the parents decide to purchase the subsidized ITNs and use them but not during pregnancy. This was as a result of the women thinking that the treated nets are meant for the unborn child rather than for the pregnant woman and the foetus (Tami *et al*, 2006). In Uganda, although malaria is perceived as a dangerous illness among pregnant women and children and there is high awareness on the benefits of LLINs, yet few people use them. This is because of its high cost and the perception that the chemicals that are used in treating them have adverse effects on pregnancy and the foetus (Mbonye *et al*, 2006). A study conducted in the Kassena Nankana district in Ghana revealed that net use by pregnant women varied from 42 percent in primigravidae to 63 percent in multigravidae, although the treated nets were distributed freely. (Brown *et al*, 2001). Their reason for not using the nets was mainly as a result of the warm weather and the perceived absence of mosquito biting. (Brown *et al*, 2001). Based on the foregoing, it means that the refusal to sleep under LLINs is not as a result of the high cost of the product but because of wrong perceptions of the dangers of the malaria disease.

In Lagos state Nigeria, the majority of the pregnant women who became ill with malaria believed that mosquito bites accompanied by stress were responsible for their illness. Only 21.8 percent of the women did not associate mosquitoes with malaria. Though the women knew the symptoms of malaria but did not see it as a dangerous disease that could lead to death. Moreover, most of them used nets but they were not

treated (Omolade, 2003). In studies conducted in the Gambia and Malawi, researchers revealed that respondents attributed multiple causes for fever, which included exposure to heat from the sun or fire, eating oily or starchy food, unhygienic surroundings and mosquitoes ,although not supernatural causes (Aikins, 1993; Helitzer- Allen *et al*, 1993; Okrah, Traore, Pale, Sommerfeld, & Muller, 2002). Similar patterns of inadequate knowledge of the disease have been reported in other studies among rural populations (Aikins, 1993; Vijayakumar, Gunasekaran, Sahu, & Jambulingam, 2009).

Thus, with misconceptions, pregnant women act in a way that seems best in their own best interest. Therefore, there is the need for pregnant women and the community they live in to understand and recognize malaria as a health problem and make great effort towards preventing it (Ruebush, 1993; Parks & Bryan, 2001).

2.5 Socio-Economic Factors and LLIN Use.

Socio-economic factors as well as perceptions about malaria affect the use of ITN. Factors that influence attitude towards prevention and treatment of the illness include; experience of the illness, prevalence in the community, frequency of infection of household members, past histories of episodes of illness in the affected individual, familiarity with and access to different treatment methods, various social and economic factors (Jayewardene, 1993; Helitzer-Allen, 1993; Russell, 2001).

Some cultural and behavioural factors also affect bednet acceptance and use by pregnant women. Rural versus urban residency differences also have a part to play. In Ghana, studies reveal that there is a higher rate of LLIN acceptance and usage in the rural than in the urban areas. This is a result of the fact that rural dwellers want to avoid the nuisance of mosquitoes while sleeping at night because prevalence of nylon

screening on windows and doors is lower in the rural areas than in the urban settings (Agyepong & Manderson, 1999; GSS, 2003).

Due to the fact that many women from wealthy households and urban dwellers stay in houses with mosquito screening on windows and doors, they are unwilling to use mosquito nets. Thus in Ghana, use of nets by pregnant women reveals that women in the highest wealth quartile are less likely than women in the lowest wealth quartile to sleep under any net (GSS, 2003).

The acceptance and usage of ITN are influenced by ethnicity. In the Gambia, studies carried out reveals that a marked difference in bednet use based upon ethnic differences. Mandinka, Wolof, Fula, Joli and Serahuli were the primary ethnic groups in the use of bednets was independently associated with each group because of different economic activities based on ethnicity (Aikins, 1993; MacCormack, 1984; Kazembe, Appleton, & Kleinschmidt, 2007)

A study has also shown that rural households are likely to own any kind of net; either treated or untreated (24%) compared to urban households (10%) (GSS, 2003). Thus, use of LLINs among pregnant women depends on the individual's knowledge of malaria (Nganda, 2004). Therefore preventive measures must be aimed at creating awareness of malaria, its causes and perception of risk to pregnant women and also the consequences and the strategies available.

The use of LLINs by pregnant women are also affected by low utilization of antenatal care, husband's lack of interest in malaria prevention and the perception that adolescent girls and primigravidae are at low risk of getting malaria. All these make it impossible for them to access health services as they should (Mbonye, 2006).

Studies carried out in the Caribbean and in Ghana showed a higher risk for malaria infection among women, mostly pregnant women than men, which was due to gendered division of labour (Vlassoff &Bonilla,1994; Wiseman, Scott, McElroy, Conteh & Stevens , 2007). It was also seen that though women carried the major share of the household responsibility for the household in Benin, which was not matched by autonomy in decisions or having access to needed resources like insecticide treated nets (Tanner & Vlassoff, 1998).

From the above, it can be said that decision-making processes for health care in households and different societies depend solely on who is the bread winner in the house.

2.6 Roll Back Malaria Programme

In 1998, the RBM programme was introduced in order to halve mortality as a result of malaria by the year 2010. In order for this to come into reality, multilateral, bilateral, non-governmental and private organizations were brought together so that they can all work at it. Most of the deaths which happen globally, about 90% which occur yearly as a result of malaria happen in Africa. This is largely among children and pregnant women. As a result of that, Africa heads of States approved of the RBM at a summit at Abuja, Nigeria, in the year 2000 so that the vision of RBM will be carried out in their states to improve the health of the people.

One of the key instruments that was proposed to reduce the malaria burden was the use of bednets to prevent transmission of malaria. To make this effective, then the bednets should be made available especially to the remotest parts of the countries where it is found that people cannot afford for the nets (Yamey, 2004).

Roll Back Malaria was brought to birth in order to strengthen health systems in the third world countries so that the poor people in these countries will get access to effective treatment and preventive measures towards reduction in mortality and morbidity caused by malaria so that the economic burden of malaria will be improved.

WHO realized that with the coming together of international organizations who are interested in research and disease control such as public and private sectors, national governments, international organizations and development banks, malaria burden will be reduced (Nabarro & Tayler, 1998; Narasimhan & Attaran, 2003).

The RBM came about purposely to easily detect and render treatment quickly to malaria cases, reduce epidemics, decrease the number of the vectors by the use of bednets which have been treated with insecticide. Also, to prevent and treat malaria in pregnancy. (Yamey, 2001).

However, there seemed to be impediment which is not allowing the implementation of these strategies. It was found out that money was the main obstacle and that, RBM must be able to persuade donors so that they donate one billion dollars every year to support them. They should be able to convince the donors that the donations will be put to good use and also assist in further progress in the gross domestic product of the affected countries. (Yamey, 2001).

Apart from this the countries involved had a great challenge as to how to reduce malaria mortality very fast with the tools of the RBM they have which included the use of insecticide treated nets and effective drugs to be available to their target groups (Yamey, 2001). The following interventions had been proposed;

- Distribution and use of LLIN

- Rapid first-line treatment of all suspected malaria cases
- Routine intermittent presumptive malaria treatment of all pregnant women

These strategies have being in existence for a long time but they have not been implemented on large scale in most malaria endemic regions, hence, there has not been any reduction in the malaria burden although these intervention are very cost effective (Alnwick, 2000).

The intermittent preventive treatment (IPT) administered to pregnant women and the use of LLIN among pregnant women are strategies which are used to reduce and prevent malaria among pregnant women. With the IPT, it is suggested that every " pregnant woman in malaria endemic areas take three tablets single dose of sulfadoxine pyrimethamine (SP) at least twice during the second and third trimesters of pregnancy at the antenatal clinics where they go for services" (Mubyazi, *et.al* 2005).

2.7 Roll Back Malaria Programme – Ghana.

Since the 1950's Ghana has being making every effort to decrease the malaria burden in the country. So, the RBM Abuja Summit came to bring an end to the deadly disease and also reduce poverty and increase productivity (GHS / NMCP, 2006).

Therefore after participating in the summit which was initiated in 1999, Ghana also made a strategic framework in order to put into action what was discussed at the summit in Ghana's context. In order for Ghana to decrease the malaria burden of high mortality and morbidity rate, Ghana set a goal that by 2010, the morbidity and mortality rate will be reduced by 50%. (GHS / NMCP, 2006).

So Ghana set four main strategies to achieve that aim. The strategies were as follows;

- Promote multiple prevention which includes promotion of treated bednets usage; chemoprophylaxis in pregnancy and environmental management.
- Improve malaria case management at all levels from household to health facility.
- Encourage evidenced-based research to come up with effective interventions
- Improve partnership with all partners at all levels.

Despite the fact that Ghana embarked on the set strategies there was still much to be done. So a new malaria control programme was set up to decrease mortality and morbidity as a result of malaria disease by 75% by the year 2015 which was also in accordance with the Millennium Development Goals (MDGs).

The aims of the new programme were;

- "To be achieved through overall health sector development,
- Improved strategic investments in malaria control
- Increased coverage towards universal access to malaria treatment and prevention interventions". (NMCP, GHS 2006).

Ghana then targeted that "one hundred percent (100%) of households will own at least one LLIN, 80% of the general population will sleep under LLINs, increase the number of children under five and pregnant women sleeping under treated net from current levels to 85% and also 100% of pregnant women shall be on appropriate intermittent preventive treatment to reduce the prevalence of malaria in the country (GHS, NMCP 2006; RBM, 1999).

As a result of the fact that Ghana was implementing the strategies of the RBM, outpatient malaria cases reduced from 3,552,836 in 2003 to 3,045,949 in 2006. Also,

admissions resulting from malaria cases decreased from 39,497 in 2003 to 19,149 in 2006. Malaria in children in twenty (20) selected Global Fund districts also decreased from 3.26 to 2.29 from 2003 to 2005. Though Ghana made these improvements, yet there was much work to be done to improve upon the malaria situation in the country. (GHS, NMCP, MOH 2006).

2.8 Financing LLIN In Malaria Control Programme.

The funding for malaria control has kept on increasing each year as the commodities used in the process (LLIN and drugs) have to be given out free or at a highly subsidized prize to the consumers. Donations to the malaria endemic countries from the international world have gone up annually from not less than one hundred million dollars (US$ 100 million) in the year 2000 to US$1.71 billion in 2010 and up to US$1.84 billion in 2012.

Most of the expenses made in malaria programmes are spent on LLINs and other vector control interventions. Every two (2) to three (3) years, the LLINs need to be changed thus the LLINs which were distributed in 2010 need to be changed in 2013 and that will need lots of money. If this is not done, then the effects to control malaria will be weakened and the disease will be on the increase.

The Global Funds contributes the highest amount of funds in the malaria control programme which was 39% in 2001 and 40% in 2012 (WHO, 2012). Domestically, NMCPs in the various countries also contributed about US $ 625 million in 2011 to the financing of malaria control. Meanwhile, the amount needed to control malaria disease is about US$ 1.66 billion. Therefore the difference needed to be paid for has to be from private out –of-pocket expenditure (WHO, 2010).

Mosquitos transmit malaria which is a deadly disease and it affects mostly children under five years and pregnant women. The use of the LLIN is a cost effective way of preventing the infection of malaria by repelling or killing the vector that carries the malaria parasites. This then reduces the spread of malaria and consequently reduces morbidity and mortality rate caused by malaria mostly among children under five years and pregnant women. In order to achieve this, there should be availability of LLIN. Also, LLIN users should have knowledge about the transmission of malaria so that they can appreciate this means of prevention of malaria by consistently using the LLIN.

CHAPTER THREE

3.0 METHODS

Introduction

This chapter discusses the research methods used for the study with emphasis on the sampling technique, data collection methods, data processing and analysis.

3.1 Type of study

A cross- sectional study was carried out. The study was done in Abokobi and Haatso sub-districts in the Ga East municipality of the greater Accra Region. Data was collected from pregnant women who were randomly sampled at the ANC clinics and voluntarily consented to participate in the study

3.2. Study location / area.

Area of the study was the Ga East Municipality of the Greater Accra Region. It is geographically a small district, which lies in the north-eastern part of the region. The district is bounded by Akwapim south in the north, La Nkwantanang Madina District in the east, Ga west in the west and Accra metropolis in the south. The municipality has a total land size of 166sq/km.

3.2.1. Population for Ga-East.

Ga-East has a total population of one hundred and sixty-five thousand, two hundred and seventy-five (165,275) people. The sub-districts which are Abokobi, Dome, Taifa and Haatso have the following percentages of the population; 20%, 30%, 31% and 19% respectively.

3.2.2. Settlement

There are eighty – three communities comprising of mixed settlements ie. Urban, Peri-urban and rural areas. The district falls in the trains-Saharan belt of the region with two seasonal changes (ie. Dry and rainy seasons). The atmospheric condition across the district varies directly with the seasonal changes. Thus the atmosphere is mostly hazy in the dry season and misty with humid air in the rainy season. The district cannot boast of any forest due to the hilly and gravel-like nature of the land.

3.2.3. Demographic characteristics/socioeconomic activities.

Although as a grain in a tea-cup geographically, it is the third densely populated district in the Greater Accra Region, with a projected population of 165,275 for 2014 and a growth rate of 4.5% annually.

3.2.4. Economic Activities and Traditional Values.

Fair view of the district reveals Public Services and trading as dominant in its occupation scene, followed by farming and craftsmanship. Besides, sizeable proportion of the working force in the district are unemployed reflecting the high poverty level. Two major festivals, namely Dokobi which is celebrated by Sessemi inhabitants and Homowo celebrated by Boi, Teiman and the other communities in conjunction with Teshi and La inhabitants.

3.2.5. Health System and Infrastructure.

There are seventeen health facilities in the municipality; one health centre, one polyclinic, one quasi-government and fourteen private centres. There are also seventeen CHPS zones. These CHPS zones currently are without CHPS compounds. All the public Health facilities provide only out-patient services. More serious cases are referred to hospitals outside the district therefore information on mortality is not

available. Deaths, which occur in the communities, go unreported. The DHMT has prepared a programme to collaborate with Private Health Care providers to share information in this and other areas.

3.2.6. Sanitation

Over half the district population has either inadequate means of waste disposal or in some cases no facilities at all. Both liquid and solid wastes are often disposes of in drainage channels, underdeveloped lands, and other unauthorized locations.

The situation is relatively better in the peri-urban part of the district where the majority of households have either water closet facilities or depend on few existing public places of convenience in the rural communities, however, a limited number of households and communities are provided with KVIPs, and Pit latrines.

3.3 Variables

Dependent variables

- Use of LLINS among pregnant women.

Independent variables

- Knowledge of pregnant women on the transmission of malaria
- knowledge of pregnant women on the use of LLINs
- Perception of the pregnant women about LLINs.

3.4 Study Population

The study population was made up of pregnant women who attended antenatal care clinics in the Ga- East Municipality.

3.4.1 Sample Population

The respondents selected were expectant mothers who attended antenatal care clinics at the selected health facilities, during the process, using specified inclusion criteria.

3.5 Sampling

3.5.1 Sample size calculation

The sample size was estimated as 206 as shown below.

$n=Z^2pq/d^2$ or Z^2pq/e^2

n= desired sample size

Z= standard deviation set at α= 0.05 base on a 95% confidence interval

P= the proportion of the sample (ie. The proportion of the sample that was assumed to be using LLINs = (50% or 0.5).

q= 1-p

e or d =allowable margin of error =0.07

$n = (1.96)^2\ 0.5 * 0.5/ (0.07)^2 = 196$

Therefore a minimum of 206 pregnant women were selected.

3.5.2 Sampling Procedure/ Method

3.5.2.1. Inclusion Criteria:

All pregnant women who attended antenatal care clinic in the sub-districts who were selected during the period of the field work and were selected by the simple random sampling method.

Ga-East Municipality has four (4) sub-districts and they are all the same socio-economically, therefore, any two of them were selected , (Abokobi and Haatso), and simple randomly selected one hundred and three (103) pregnant women from each one of them for data collection. This was done by getting the ANC registers of the

pregnant women from the facilities in these two sub-districts which are Abokobi Health centre, Ghana Atomic Energy Commission Clinic and Ashongman Community Hospital. Pregnant women referred to here were all pregnant women no matter their gestational age; whether the person was in the first or second or third trimester, if only she met the inclusion criteria, and accepted to participate, she was included. In each sub-district that was selected, we compiled a list of all the pregnant women who have registered and then simple randomly selected 103 pregnant women from each sub-district. Numbers were assigned to their names and randomly selected them one after the other without replacement till the 103 (one hundred and three) was achieved at each sub-district that was selected.

3.5.2.2. Sampling Design

On each survey day of the study the pregnant women who came to the selected ANC centres, who qualified by the inclusion criteria and consented to participate in the study were interviewed. Data was collected to know their knowledge about the transmission of malaria, to assess their knowledge about LLIN and factors that influence the use of LLINs among pregnant women in the Ga-East Municipality.

3.5.2.3. Sampling Process

Using the lottery method, four static ANC centres were selected. Names of all static ANC centres were written on pieces of paper and put in a box and after shaking the box, four (4) of them were selected randomly. The number of pregnant women who were interviewed at each selected RCH centre was calculated by the probability proportional size calculation; using the projected population of each sub-district and the Women in Fertility Age (WIFA).

3.6 Data Collection Technique/Methods and Tools.

The study involved the collection of one type of data; quantitative data.

Quantitative data:

This was the interview of pregnant women using structured questionnaire seeking the knowledge of pregnant women about the transmission of malaria, the perception of LLIN among pregnant women and also the factors that influence the use of LLIN among pregnant women.

Full consent was sought from participants before they were selected into the study.

Four research assistants were recruited for questionnaire administration to the pregnant women. They were trained on how to enter and record the data.

3.7 Ethical Consideration

Approval was sought from the MOH/GHS Ethical Review Committee through the School of Public Health Authorities. Afterwards, consultations were held with the following individuals; Municipal Director of Health Services, the District Director of Nursing Services, the Municipal Chief Executive, Chiefs and Community Leaders and the Assembly men of the selected sub-districts. Permission was sought from respondents before the start of the data collection. Respondents who freely consented were included into the study. Participants were assured of confidentiality, privacy and anonymity. Then each participant was made to either sign or thumb print a consent form. Thus, that formed the community or in this case the facility entry as the study was done in the health facilities where pregnant women accessed ante natal care services in the selected sub-districts. Good rapport was established before asking

sensitive question. Participants were informed that the overall information from the study will be disseminated**.**

3.7.1 Quality Control

There was thorough screening of the research assistants. The research assistants were trained for two days. During the main field work, completed questionnaire were checked daily for accuracy, consistency and correctness of responses. The researcher monitored the research assistants during data collection to ensure that they recorded the opinions of the respondents and not theirs.

3.8 Data Processing and Analysis

Before sending questionnaire out, responses were coded and entered in a statistical software ie. SPSS 16.0 version. After the collection of data, the data was entered and analyzed with SPSS 16.0 version.

Measures were taken to keep the information collected safe and confidential by keeping them in my email and on an external drive.

Variables were tabulated and frequency tables drawn. Since proportions were compared, the chi square test was used to compare with the appropriate p-values.

3.9. Pre-test or Pilot Study

A pre-test or pilot study was conducted at Dome which was not one of the study sites, but in the Ga-East Municipality for about ten participants. This made it possible for any mistake in the questionnaire to be detected and corrections were made before the main administration of the questionnaire for the study.

CHAPTER FOUR

4.0 RESULTS

Introduction

This chapter reports the results of the study and examines the following sub-themes;

- Pregnant women's knowledge about how malaria is transmitted and the effect of malaria on the pregnant woman and the unborn baby,
- The perception of the pregnant women about the use of LLIN during pregnancy, and
- Factors that affect the use of LLIN among pregnant women.

4 .1 Background characteristics of the respondents.

The study findings revealed 53.9% (111) of the respondents were from Abokobi and those from Haatso constituted 46.1% (95). The pregnant women in the study who used the LLIN the night before the study was 43.2% (89). The study showed that majority of the respondents 55.3% (114) were of the ages 26-35 years. Those who were above 35 years old were 9.2% (19). The mean age was 25.4 years with a standard deviation of 0.63. The majority of the respondents 87.4% (180) were Christians. With regards to educational attainment, the majority 40.8% (84) attended school up to JHS and 15% (31) attained tertiary educational level. The majority of the pregnant women were traders 37.4% (77) and 1.9% (4) were housewives. A lot of the pregnant women 60.7% (125) were married and 50% (103) lived in single rooms.

Table 4.1 Provides a description of the demographic variation of the respondents.

Table 4.1: **Background Characteristics of the Respondents (N=206)**

Characteristics	Number	%
Age group		
17-25	73	35.4
26-35	114	55.3
36-45	18	8.7
46 above	1	0.5
Religion		
Christian	180	87.4
Muslim	23	11.2
Traditional	1	0.5
Others	2	1
Educational level		
No education	14	6.8
Primary school	20	9.7
JHS	84	40.8
SHS	57	27.7
Tertiary education	31	15
Occupation		
Civil servants	25	12.1
Unemployed	41	19.9
House wife	4	1.9
Trader	77	37.4
Self employed	59	28.6
Marital status		
Single	59	28.6
Married	125	60.7
Divorced	1	0.5
Widowed	1	0.5
Co-habiting	20	9.7
Ethnic group		
Akan	98	47.6
Dangme/Ga	16	7.8
Ewe	56	27.2
Northern	35	17
Others	1	0.5

4.2 Association between Socio-Demographic Characteristics and Use of LLIN.

In order to ascertain the statistical association between the socio-demographic characteristics and LLIN usage, the Chi-squared test was used. A p-value less than 0.05 was considered significant as shown in Table 4.2.

Among the clients, the proportion aged 17-25 years who use LLIN was 36.6% (32), those aged 26-35years who use LLIN was 56.2% (50) and that of those above the age of 35 years who use the LLIN was 7.9% (7). Age has no statistical significant association with LLIN usage. ($\chi^2 = 0.93$; $p = 0.818$).

The findings in the study revealed that among the different religious groups, LLIN usage was higher 85.4% (76) among Christians as compared to Muslims 13.5% (12) and others 1.1% (1). However, religion has no statistical significant association with the use of LLIN. ($\chi^2 = 1.623$; $p = 0.654$).

The use of LLIN among pregnant women who had some level of education was 84 (94.3%) and those with no education was 5.6% (5). LLIN usage was higher among those with senior high education 34.8% (31) than the others. Level of education of pregnant women has no statistical significant association with LLIN use. ($\chi^2 = 5.220$; $p = 0.266$).

Among pregnant women who were working, the use of LLIN was 73.1% (65) which was higher than those who were either unemployed or housewives which was 26.9% (24). However, there is no statistical significant association between occupation and the use of LLIN. ($\chi^2 = 2.83$; $p = 0.586$).

The use of LLIN among pregnant women who are married and co-habiting was higher 77.5% (69) than those who are single 21.3% (19). However, marital status has no statistical significant association with the LLIN usage. ($\chi^2 = 6.18$; $p = 0.186$).

Among the pregnant women the use of LLIN was higher among those who live in one bedroom 57.3% (57.3) than those who live in two or more bedroom houses 42.7% (38). But the number of bedrooms that a pregnant woman has does not have statistical significant association with LLIN usage. ($\chi^2 = 9.34$; $p = 0.053$).

Among the pregnant women, the use of LLIN was higher among those who have previously had children 82.0% (73) than those who did not have children 18.0% (16). This showed that pregnant women who have had children before has no statistical significant association with the use of LLIN. ($\chi^2 = 9.87$; $p = 0.079$).

LLIN usage was higher among pregnant women of the Akan tribe 46.1% (41) than the other tribes. However there is no statistical significant association between the ethnic groups of the pregnant women and the use of LLIN. ($\chi^2 = 1.65$; $p = 0.800$).

The use of LLIN among pregnant women who started their antenatal clinic during their first trimester of their pregnancy 67.4% (60) was higher than those who started their antenatal in their second and third trimesters. However, the stage of pregnancy the women started going for their antenatal care did not have any statistical significant association with the use of LLIN. ($\chi^2 = 0.13$; $p = 0.938$).

Table 4.2. Describes distribution of respondents by use of LLIN.

Table 4.3. Describes association between household factors and use of LLIN.

Table 4.2: **Distribution of Respondents by Use of LLIN.**

Characteristics	Total Respondents	LLIN Use	LLIN Non Use	χ^2	p - Value
Age					
17-25	73(35.4%	32(36.6%)	41(35.0%)	0.93	0.818
26-35	114(55.3%)	50(56.2%)	64(54.7%)		
36-45	18(8.7%)	7(7.9%)	11(9.4%)		
46 above	1(0.5%)	0(0.0%)	1(9.0%)		
Religion					
Christian	180(87.4%)	76(85.4%)	104(88.9%)	1.62	0.654
Muslim	23(11.2%)	12(13.5%)	11(9.4%)		
Traditional	1(0.5%)	0(0.0%)	1(9.0%)		
Others	2(1.0%)	1(1.1%)	1(9.0%)		
Educational level					
No education	14(6.8%)	5(5.6%)	9(7.7%	5.22	0.266
Primary	20(9.7%)	9(10.1%)	11(9.4%)		
JHS	84(40.8%)	30(33.7%)	54(46.2%)		
SHS	57(27.7%)	31(34.8%)	26(22.2%)		
Tertiary	31(15.0%)	14(15.7%)	17(14.5%)		
Occupation					
Civil servant	25(12.1%)	11(12.4%)	14(12.0%)	2.83	0.586
Unemployed	41(19.9%)	22(24.7%)	19(16.2%)		
House wife	4(1.9%)	2(2.2%)	2(1.7%)		
Trader	77(37.4%)	32(36%)	45(38.5%)		
Self employed	59(28.6%)	22(24.7%)	37(31.6%)		
Marital status					
Single	59(28.6%)	19(21.3%)	40(34.2%)	6.18	0.186
Married	125(60.7%)	59(66.3%)	66(56.4%)		
Divorced	1(0.5%)	1(1.1%)	0(0.0%)		
Widowed	1(0.5%)	0(0.0%)	1(0.9%)		
Co-habit.	20(9.7%)	10(11.2%)	10(8.5%)		
Ethnic group					
Akan	98(47.6%)	41(46.1%)	57(48.7%)	1.65	0.800
Dangme/Ga	16(7.8%)	8(9.0%)	8(6.8%)		
Ewe	56(27.2%)	23(25.8%)	33(28.2%)		
Northern	35(17.0%)	17(19.1%)	18(15.4%)		
Others	1(0.5%)	0(0.0%)	1(0.9%)		

$p < 0.05$ is considered significant.

Table 4.3: **Association between Household Factors and LLIN Use**

Characteristics	Ever Use				Current Use			
	Number	%	χ^2	P-Value	Number	%	χ^2	p-Value
No. of bedrooms								
One	84	52.2	8.03	0.091	51	57.3	9.34	0.053
Two	48	29.8			20	22.5		
Three	14	8.7			12	13.5		
Four	4	2.5			2	2.2		
Five and more	11	6.8			4	4.5		
No. of children								
One	63	39.1	15.66	0.008	37	41.6	9.87	0.079
Two	40	24.8			22	24.7		
Three	15	9.3			8	9		
Four	6	3.7			5	5.6		
Five or more	3	1.9			1	1.1		
None	34	21.1			16	18		
Preg. stage								
1st trimester	113	70.2	1.04	0.596	60	67.4	0.13	0.938
2nd trimester	45	28			27	30.3		
3rd trimester	3	1.9			2	2.2		

4.3 Pregnant women's knowledge about malaria transmission.

The study revealed that 97.1% (200) pregnant women had the knowledge that mosquitoes transmit malaria. Out of this, 98.9% (88) use LLIN but there is no statistical significant association. ($\chi^2 = 1.77$; $p = 0.183$).

The study also showed that 111(53.9%) of the respondents knew that malaria causes anaemia in pregnancy. The study showed that 19.4% (40) knew that malaria causes miscarriage in pregnancy. The study revealed that 10.7% (22) of the pregnant women knew that malaria causes premature birth. However, 16.0% (33) of the clients said that they did not know any effect of malaria on pregnancy. Among those who knew that malaria causes anaemia in pregnancy, 56.2% (50) use LLIN and out of those who did not know the effect of malaria on pregnancy, 10.1% (9) of them use LLIN. There is statistical significant association between the knowledge of the effect of malaria on pregnancy and the use of LLIN. ($\chi^2 = 9.691$; $p = 0.021$).

Findings from the study showed that 44.2% (91) of the respondents knew that malaria causes anaemia in the unborn baby. The study also showed that 10.7% (22) of the respondents knew that malaria causes growth retardation in the unborn baby. The findings also revealed 3.9 % (8) of the pregnant women mentioned that malaria causes prematurity of the unborn baby. Also, 8.3 %(17) of the pregnant women knew that malaria causes still birth. However, 17.5 %(36) of the respondents said that they do not know the effect of malaria on the unborn baby. Out of the proportion of women who knew that malaria causes anaemia in the unborn baby, 47.2% (42) use LLIN. While, those who said they do not know the effect of malaria on the unborn baby, 12.4% (11) of them use LLIN. There is statistical significant association between the knowledge on the effect of malaria on the unborn baby and the use of LLIN. (χ^2 = 15.25; p = 0.009).

The study seeks to solicit views on how malaria is transmitted and knowledge about the signs and symptoms of malaria. From the findings, it is known that all the pregnant women have heard about malaria. The majority of the respondents 49% (101) received their knowledge from radio broadcast, followed by 23.8% (49) who heard it from television broadcast. Then, 21.8% (45) who heard it from health workers. Others 2.4% (5) heard from friends, 1.5% (3) heard it from family members and 1% (2) heard it from community meetings. While 0.5% (1) heard it from other sources. There is no statistical association. (χ^2 = 9.29; p = 0.158).

The study showed that the majority of the pregnant women 76.7% (158) knew the malaria health message that everybody is at risk of malaria. The study also revealed that 12.1 % (25) knew that malaria infection is dangerous for pregnant women. The findings showed that7.8% (16) of the respondents said that pregnant women must sleep under LLIN, while 2.9% (6) of the respondents said that pregnant women must

take malaria prevention tablets in the presence of health workers. Malaria health messages remembered by pregnant women has no statistical significant association with the use of LLIN. ($\chi^2 = 3.53$; $p = 0.474$).

The findings of the study revealed that 97.1 % (200) of the respondents knew that mosquitoes transmit malaria and of those with this knowledge 98.9 % (88) use LLIN. There is no statistical association. ($\chi^2 = 1.77$; $p = 0.183$).

Findings from the study shows that pregnant women were aware of the symptoms of malaria including the following; bodily pains 8.3% (17), frequent stools 3.9% (8), headache and chills was 22.8% (47), high temperature 25.2% (52), 17.5% (36) knew about loss of appetite, 5.3%(11) of them knew of loss energy , 0.5% (1) mentioned mental agitation, 14.6% (30) knew about vomiting and 1.9% (4) mentioned waist pains.

However, there was no statistical significant association between pregnant women's knowledge about symptoms of malaria and the use of LLIN ($\chi^2 = 5.07$; $p = 0.750$).

4.4 Source of information about LLIN

From the study, 1.9% (4) of the pregnant women saw or heard of LLIN from friends and 1.9% (4) of them also heard from family members. Also, 2.4% (5) of the respondents heard about LLIN from community meetings. Moreover, 16.5% (34) of pregnant women heard about LLIN from radio broadcast and 36.4% (75) of them heard about LLIN from television broadcast. A few of the respondents 0.5% (1) read about LLIN from the newspapers. Meanwhile, 39.3% (81) of the pregnant women heard about LLIN from health workers. There is statistical association ($\chi^2 = 25.07$; $p = 0.001$).

Findings from the study reveals that, 85.4% (176) of the pregnant women have heard that LLIN is safe to use for the whole family. Also, 4.9% (10) of the respondents have heard that pregnant women must sleep under LLIN everyday, while 8.7% (18) of the participants have heard that the use of LLIN protect against malaria infection. Only 1.0% (2) of the participants did not remember anything about LLIN health messages. There is statistical association ($\chi^2 = 10.71$; $p = 0.013$).

The study findings revealed that 98.1% (202) of the respondents knew that it is necessary for pregnant women to always sleep under LLIN. Also, 95.6% (197) of the participants knew that LLIN prevent malaria transmission. There is statistical significant association between pregnant women's knowledge about LLIN and how it prevents malaria and the use of LLIN. ($\chi^2 = 7.16$; $p = 0.028$).

Table 4.4: **Knowledge about Malaria Transmission**

Characteristics	**Number**	**%**
Mode of transmission		
Mosquito bite	200	97.1
Others	6	2.9
Effect of Malaria on Pregnancy		
Anaemia	111	53.9
Premature birth	22	10.7
Miscarriage	40	19.4
Don't know	33	16
Effect of Malaria on Unborn Baby		
Anaemia	91	44.2
Growth retardation	22	10.7
Low birth weight	32	15.5
Prematurity	8	3.9
Still birth	17	8.3
Don't know	36	17.5

Table 4.5: **Association between knowledge about Malaria Transmission and LLIN Use**

Characteristics	N=206	Usage	Non Usage	χ^2	p -Value
Malaria transmission and LLIN Use					
Mosquito bite	200(97.1%)	88(98.9%)	112(95.7%)	1.78	0.183
Others	6(2.9%)	1(1.1%)	5(4.3%)		
Effect of Malaria on pregnancy and LLIN Use					
Anaemia	111(53.9%)	50(56.2%)	61(52.1%)	9.69	0.021
Premature birth	22(10.7%)	15(16.9%)	7(6.0%)		
Miscarriage	40(19.4%)	15(16.9%)	25(21.4%)		
Don't know	33(16.0%)	9(10.1%)	24(20.5%)		
Effect of Malaria on Unborn Baby and LLIN Use					
Anaemia	91(44.2%)	42(47.2%)	49(41.9%)	15.25	0.009
Growth retardation	22(10.7%)	14(15.7%)	8(6.8%)		
Low birth weight	32(15.5%)	7(7.9%)	25(21.4%)		
Prematurity	8(3.9%)	5(5.60%)	3(2.6%)		
Still birth	17(8.3%)	10(11.2%)	7(6.0%)		
Don't know	36(17.5%)	11(12.4%)	25(21.4%)		

The findings from the study reveals that 56.3% (116) of pregnant women who have very good knowledge about LLIN, 76.4% (68) of them use LLIN. The study showed that 28.2% (58) of respondents have good knowledge about LLIN and 18.0% (16) of them use LLIN. Those who have low knowledge about LLIN was 15.5% (32) and 5.6% (5) of them use LLIN. Pregnant women's knowledge about LLIN and the use of LLIN had a relationship. (χ^2= 26.92; $p < 0.001$).

The study showed that the more knowledge pregnant women have about the appropriate use of the LLIN, the more they use LLIN. From the outcome of the study, 56.3% (111) of the pregnant women who have very good knowledge about appropriate use of LLIN, 84.3% (75) of them use LLIN. There is a relationship between knowledge of appropriate use of LLIN and the use of LLIN. (χ^2 = 62.4; $p < 0.001$).

Table 4.6: **Knowledge about LLIN and Knowledge about Appropriate Use of LLIN.**

Characteristics	Total Respondents	LLIN Use	Did not use	χ^2	p-Value
Knowledge about LLIN					
Very good	116(56.3%)	68(76.4%)	48(41.0%)	26.92	< 0.001
Good	58(28.2%)	16(18.0%)	42(35.9%)		
Low	32(15.5%)	5(5.6%)	27(23.1%)		
Knowledge about LLIN Usage					
Very good	111(53.9%)	75(84.3%)	36(30.8%)	63.18	<0.001
Good	45(21.8%)	12(13.5%)	33(28.2%)		
Low	50(24.3%)	2(2.2%)	48(41.0%)		

4.5 Association btn. some factors that influence use of LLIN and the Use of LLIN

The study findings revealed that, 8.3% (17) of the respondents considered LLIN to be expensive. Out of these, 3.4% (3) use LLIN. This has statistical significant association with the use of LLIN. ($\chi^2 = 4.93$; $p = 0.022$).

The results of the study showed that, the majority of the pregnant women 61.7% (127) perceived LLIN to be harmful to a woman during pregnancy. However, out of those who said LLIN is harmful to pregnant women, 49.4% (44) use LLIN. The perception that LLIN is harmful to pregnant women has statistical significant association with the use of LLIN. ($\chi^2 = 9.89$; $p = 0.001$).

Table 4.7: **Some Factors that Influence Use of LLIN by Pregnant Women.**

Characteristics	Total	Usage	Non Usage	χ^2	P-value
Perception that LLIN is expensive	17(8.3%)	3(3.4%)	14(12.0%)	4.93	0.022
Perception that LLIN is Harmful in Pregnancy	127(61.7%)	44(49.4%)	83(70.9%)	9.89	0.001

CHAPTER FIVE

5.0 DISCUSSION

Introduction

In this chapter the results obtained from the data analysis of the study are related to other findings in other works. Data was obtained from 206 pregnant women in two sub-districts; namely Abokobi and Haatso, in the Ga- East Municipality of the Greater Accra Region.

5.1 Socio- Demographic Characteristics and Use of LLIN.

The study revealed that 51.7% (46) of respondents who owned LLIN from Abokobi sub-municipality slept under the LLIN the night before the survey. The study also showed that 48.3% (43) of pregnant women who owned LLIN in Haatso slept under LLIN the night before the study. The total usage of the LLIN by the participants was 43.2% (89).

The study results showed that pregnant women aged 17-25 years who use LLIN is 36.0% (32), those aged 26-35 years who use LLIN is 56.2% (50). The pregnant women above the age of 35 years who use LLIN is 7.9% (7).

The study revealed that, the pregnant women who had some form of education and were using LLIN was 94.3% (84) and those with no education who use LLIN was 5.6% (5). Though this has no statistical significance it reveals that when a person has some level of education they make the choice of using LLIN. This is also seen in a study that was done in Ethiopia that showed that those who have some kind of educational level use LLIN than those without education. (Graves, *et al*, 2011). The study showed that Christians 85.4% (76) who use LLIN was higher than Muslims 13.5% (12) and there was no statistical association with LLIN use among the various

Religious groups (p = 0.794). The use of LLIN among pregnant women who were working was higher 73.1% (65) than those who were unemployed or were housewives 26.9% (24). There was no statistical association between pregnant women's employment and the use of LLIN (p = 0.837). Marital status did not have statistical association with LLIN use (p = 0.186). The use of LLIN was higher among pregnant women of the Akan tribe than the other tribes but there was no statistical association. The findings in the study support a study which was done in the Gambia which revealed that some ethnic groups can afford the bednets because of their socio-economic status and the area that they live. (Wiseman, *et al*, 2007). So if the occupations of some ethnic groups do not yield high income, then their ability to purchase commodities for prevention of malaria will not be there or will be low. Thus, ethnicity and area of residence are factors that influence LLIN use (Wiseman, *et al*, 2007). The findings in the study again support a study which was done across 15 countries to assess ITN use among children and pregnant women. That study revealed that a mother's education, socio-economic status, sex of child, urban/rural residence and ethnicity were not significantly associated with ITN use (Eisele, *et al*, 2009). In another study which was done in Kenya, it revealed that the use of bednets was low (34%) and the possession of ITNs was significantly related with the mother's education, occupation and knowledge (Goesch, 2008).

The analysis of the study revealed that the use of LLIN was higher among pregnant women who live in single rooms 57.3% (51) than pregnant women who live in two or more bedroom house and had comfortable lives. However, there is no statistical association between number of bedrooms pregnant women live in to the use of LLIN. The presence and breeding of mosquitoes is mostly found in poorer neighbourhoods usually found in suburban or rural areas. Often, the houses in these areas have

windows without netting which leads to a much greater nuisance and bites of insects. That is the reason why the individuals living in such areas are prone to use bednets to protect them during their sleep. On the other hand, it was seen that people who stay in comfortable houses under good conditions leave just a little space for mosquitoes to enter their houses as they possess and use ventilators and air conditioners which protect them from mosquito bites and so do not consider using the bednets. This was seen in a similar study which was done in Ghana which also revealed that bednets use was higher among people in rural are than those in the urban areas (Goesch, *et al,* 2008).

5.2 Knowledge about malaria transmission.

The results of the study showed that 97.1% (200) of the respondents had the knowledge that mosquitoes transmit malaria and 98.9% (88) of them use LLIN. A few of the respondents said malaria is caused by dirt in the environment. This supports a study which was done in Northern Ghana which indicated that the participant perceived that malaria was caused by eating sweet foods, standing too long in the sun or "something" that you are born with. The study also mentioned that severe complications of malaria like severe anaemia and febrile convulsion come about as a result of other illness and not malaria (Binka & Adongo, 1997). The findings in the study showed that 111(53.9%) of the respondents had the knowledge that malaria causes anaemia and 19.4% (40) knew that malaria causes miscarriage in pregnancy. Also, the study showed that 10.7% (22) of pregnant women knew that malaria causes premature birth, while 16.0% (33) said they do not know the effect of malaria on pregnancy. The pregnant women who knew that malaria causes anaemia in pregnancy, 56.2% (50) of them use LIN to prevent malaria. This shows that the more knowledge a pregnant woman has about malaria and the how it is transmitted the

higher chances of using the LLIN to prevent infection in order to protect herself and the unborn baby. This supports a study which was done in Ghana that revealed that a woman's educational level and high level knowledge about mosquitoes transmitting malaria made them to use the bednets. (Buame &Franca-Koh, 2011).

The study shows that the majority of the respondents 49% (101) received malaria messages from radio broadcast and 23.8% (49) also heard from television advertisement. Out of these, 51.7% (46) and 18% (16) who heard malaria messages from radio and television respectively use LLIN. This is shown in a study which was done in Ghana from the 2011 MICS which supposes that women who stay in the large cities of Ghana have more exposure to information, education and communication (IEC) messages about how to enhance the control of malaria. This is really seen in television advertisements about the promotion of ACTs (GSS, GLSS, GHS. 2008).

5.3 Perception of Pregnant women about LLIN.

This study revealed that the more knowledge pregnant women have about LLIN, the more they use the LLIN. Though, the pregnant women had perceptions such as the LLIN causes heat and it is not comfortable to use it. The study showed that 56.3% (116) of the respondents have very good knowledge of LLIN and 76.4% (68) of them use the LLIN. This supports a study done in Imo State in Nigeria that the perceptions of the use of LLIN influenced the level of use of the LLIN (Babalola, 2013).

Another study which was done at Nigeria showed that the pregnant women who knew about LLIN's efficacy to prevent malaria were nearly four times more likely to use the bednet than those who had low knowledge. (Ankomah, *et al*, 2012).

5.4 Factors that influence the use of LLIN among Pregnant women.

The results of the study showed that 61.7% (127) pregnant women perceived LLIN as harmful to pregnant women because it causes heat and it is not comfortable to sleep under the bednet. Also, 8.3 % (17) of the respondents said that LLIN was expensive. This confirms a study which was carried out in Northern Ghana which revealed that people perceived bednets as costly and so preferred to use other modern anti-mosquito methods like mosquito coils and insecticide spray. Others preferred to use traditional means to control mosquitoes from biting them (Binka & Adongo, 1997).

In a study that was carried out in Solomon Islands, mosquito nuisance and the threat of malaria were factors that influenced the use of LLIN. Thus, when the weather became favourable and the mosquito nuisance reduced, the use of LLIN also reduced (Atkinson, *et al*, 2009).

5.5 Study Limitations.

The study had some limitations. The study should have looked at other possible factors that hinder LLIN usage. Some of these factors include the number of nets that were hanged. Also to find out how difficult it is for people to hang or fix the nets in their rooms and also what the condition of their nets were apart from the holes in them, whether the nets are clean and not having offensive odour.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

Introduction

This is a cross-sectional study which assessed the knowledge of pregnant women about malaria transmission and their perceptions about LLIN. Also to find out the factors which affect the use of LLIN in the Ga- East Municipality in the Greater Accra Region.

The study revealed that 81% (167) of the participants possessed LLIN but the total usage was 43.2% (89). Also, 97.1% (200) of the pregnant women had the knowledge that mosquitoes transmit malaria but only 44% (88) of them used the LLIN. This shows that possession of LLIN and having knowledge about transmission of malaria does not necessarily translate into the consistent use of LLIN.

6.1 CONCLUSION

Findings from this study revealed that the majority of the participants 81% (167) in the study possess LLIN but only 43.2% (89) of them slept under LLIN the night before the study. This showed that pregnant women are not using the bed net consistently and so the goal that was set at the Abuja Summit in the year 2000 by the Africa Heads of States to distribute LLIN in their countries, especially to pregnant women and children under five years for them to use so that the morbidity and mortality caused by malaria among these groups will be reduced, was not achieved.

The study showed that 97.1% (200) of the pregnant women knew that mosquitoes transmit malaria but only 98.9% (88) of them use LLIN. From the study 53.9% (111) knew that malaria causes anaemia in pregnancy. Also, 19.4% (40) knew that malaria

causes premature birth. However, 16% (33) of the pregnant women did not know the effect of malaria on pregnancy. Only 56.2% (50) of those who knew that malaria causes anaemia in pregnancy used the LLIN and 10.1% (9) of those who did not know anything about the effect of malaria on pregnancy also used the LLIN. Though the pregnant women had adequate knowledge about the transmission of malaria and the use of LLINs but that did not translate into the consistent use of the LLINs in order to have a positive impact on their health.

6.2 RECOMMENDATIONS

For an intervention to yield a successful outcome, an effective client education on the importance of the product should be done in order to achieve desirable results.

1. In this case, NMCP, GHS, MOH, District Health Directorates and Health providers at the health facilities should gear their education towards the effectiveness of the LLIN and how it prevents the vector which transmits malaria from biting them if they use the bednets consistently.
2. The behaviour change messages from NMCP, GHS, and MOH should also educate the pregnant women on the effect of malaria on the pregnant woman and the unborn baby.

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APPENDICES

APPENDIX 1: INFORMED CONSENT FORM

TOPIC

Assessing the use of Long Lasting Insecticide Treated Nets among pregnant women in the Ga East Municipality.

Institutional Affiliation

Master of Public Health; School of Public Health,

College of Health Sciences, University of Ghana

Background

Dear Participant, my name is Charity Twumasi. I am a student of the School of Public Health, University of Ghana. The purpose of the study is to assess the use of LLINs among pregnant women.

Information about the Research

This study seeks to assess the use of LLIN among pregnant women which is one of the strategies which will assist to minimize malaria in pregnancy to a minimal and appreciable level leading to a reduction in the maternal morbidity and mortality. Thus meeting the MDG 5. Data is needed in order to make decisions in the implementation of LLIN programmes by policy makers at every level.

Description of Risks

This study will involve answering questions from a questionnaire for academic work only.

The procedure will be non-invasive and will not cause any discomfort to the participants. Some of the questions may prove embarrassing. Trained interviewers will administer the questionnaires in order to collect data. Time taken may cause a little discomfort to the respondents as it will take about 30 minutes or even less to complete.

Description of Burden

Since one is a participant of the study, she will be asked to fill questionnaire that will take about 30 minutes to complete.

Measures to Reduce Risks

In order to reduce the risks as mentioned above, the researcher and the interpreter will explain the items on the questionnaire one after the other to the understanding of the participants.

Possible Benefits

There will not be any material or financial benefit to the respondent.

The results of the study will be used by the Ga East Municipality and Health Directorate to intensify the education of the use of LLINs and plan programmes towards that. This will help to improve maternal health in the district and Ghana as a whole**.**

Confidentiality and Data Security.

Please note that any information given to us during this study will be kept strictly confidential and used for the purpose of the study only. You will not suffer any adverse effect as a result of your responses. Also, questionnaires and consent informed forms will be saved in the SPSS software for analysis by the researcher and the research assistants. They will also be saved in my email and external drive.

Compensation

There will not be any compensation for you as a participant in the study.

Right to Refuse

Participation is voluntary and you can choose to answer any individual question or all the questions. You are at liberty to withdraw from the study at any time. However, I will encourage you to fully participate since your opinion is important.

Contacts for Additional Information about the Study.

You can contact the following people when you have any further question concerning the study after the interview:

1. Charity Twumasi – Principal Investigator – 0244603859
2. Ms. Hannah Frimpong – Administrator; Ghana Health Service Ethics Review Committee - 0243235225 / 0507041223

Before Taking Consent

Do you have any questions you wish to ask about this study? Yes No

(If yes, question should be noted below).

Consent

I declare that the purpose, procedures as well as risks and benefits of the study title (Use of Long Lasting Insecticide Treated Bednets (LLINs) Among Pregnant Women in The Ga East Municipality of The Greater Accra Region) have been thoroughly explained to me in English (or Akan) language and I have understood. I hereby agree to answer the questionnaire. I also have the right to withdraw from the study at any time without any effects.

Signature/mark of Participant----------

Date ----------.

Interviewer's Statement

I, the undersigned, have explained this consent form to the participant in the language that she understands, the purpose of the study, procedures to be followed as well as risks and benefits involved. The participant has freely agreed to participate in the study.

Signature of Interviewer----------

Date ----------
-

Address

Charity Twumasi

School of Public Health

University of Ghana

Legon .

APPENDIX II : QUESTIONNAIRE

TITLE: ASSESSING THE USE OF LONG LASTING INSECTICIDE TREATED NETS AMONG PREGNANT WOMEN IN THE GA-EAST MUNICIPALITY OF THE GREATER ACCRA REGION.

Date: …… ID……

Dear Respondent,

This questionnaire is designed to solicit your views about the use of Long Lasting Insecticide Treated Bed Net (LLIN) in the Ga East Municipality, you have been identified and your assistance is being sought to participate in this exercise by completing this questionnaire as objectively as possible. Note that information obtained will contribute immensely to the purpose of the study. Your responses will be treated with utmost confidentiality. Thank you very much for your support and co-operation.

Participant signature / Thumb print----------

Instruction: Please tick (□) where appropriate and provide your own answers where required in the spaces provided.

SECTION I: Socio-Demographic Characteristics

1. Place of residence

a) Abokobi b) Dome

2. What is your age? .....

3. What is your religion?

a) Christian b) Moslem c) Traditional d) others , please specify----------
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4. What is the highest level of school you attended?

a) No education b) Primary School c) Junior High

d) Senior High e) Tertiary Education

5. What is your main occupation?

a) Civil servant b) Unemployed c) Farmer d) House wife e) Trader f) Self employed

6. What is your marital status?

a) Single b) Married c) Divorced d) Separated e) Widowed f) Co-habiting

7. What is the number of bed rooms in your household?

a) one b) two c) three d) four e) five and more

8. What is the total number of your children?

a) one b) two c) three d) four e) five or more

9. What ethnic group do you belong to?

a) Akan b) Dangme/Ga c) Ewe d) Northern

Others please specify:……..

10. At which stage did you start your Antenatal Care for your pregnancy?

a) First trimester b) Second trimester c) Third trimester

SECTION II: THE EXTENT OF PREGNANT WOMEN'S KNOWLEDGE ABOUT TRANSMISION AND PREVENTION OF MALARIA

12. Have you heard about malaria? a) Yes b) No

13. If (Yes) to question 12 above, where or how did you hear about malaria? (Tick where appropriate)

a) Friends b) Family members c) Community meetings d) Radio e) Television f) Posters/pamphlets g) Newspapers h) Health facility/community health workers/personnel from NMCP i) Others (specify):……..

14. What do you remember best about malaria health message?

a) Everybody is at risk of malaria b) Malaria infection is dangerous for pregnant women c)Pregnant women must sleep under LLIN d) Pregnant women must take malaria prevention tablets in the presence of health worker e) I don‟t remember anything f) Any other (Please specify)…….

15. What transmits malaria? (You may choose more than one response) a) Evil spirit b)Fatigue c) Mosquito bite d) Prolong stay under the sun e) Other (please specify)……..

16. What does malaria do to a pregnant woman? (you may choose more than one response) a)Anaemia b) Premature birth c) Miscarriage d) Don't know e) Others (specify)…….

17. What does malaria do to the unborn baby? (you may choose more than one response) a)Anaemia b) Growth retardation c) Low birth weight d) Prematurity e) Still birth f) Don't know g) Others (specify)…….

18. What do you think are the most common signs and symptoms in malaria infection in pregnancy? (you may choose more than one response) a) Bodily pains b) Frequent stools c) Headache and chill d) High temperature e) Loss of appetite

f) Loss of energy g) Mental agitation h) vomiting i) Waist pains j) Other (specify)……..

19. Where or how would you like this information on malaria communicated to you? (Means of communication?) a) Friends b) Family members c) Community meetings d) Radio e) Television f) Posters g) Newspapers h) Health facility/Community Health Workers/Personnel from NMCP i) Any other (please specify)…….....

20. Who are at risk of malaria in your household? (you may choose more than one options) a)Adults b) Old age c) Pregnant women d) Under five

21. Who should be given priority in malaria prevention in the household? (you may choose more than one options)

a) Under five b) Adult c) old age d) pregnant women.

SECTION III: THE EXTENT OF PREGNANT WOMEN'S KNOWLEDGE ABOUT LLIN AND WHETHER THEY KNOW IT CAN PREVENT MALARIA.

22. Where did you first hear about or see LLIN?

a) Friends b) Family members

c) Community meetings d) Radio

e) Television f) Posters

g) Newspapers

h) Health facility/Community Health Workers/Personnel from NMCP

i) Any other (please specify)……..

23. What do you remember best about LLIN health message?

a. LLIN is safe to use for the whole family

b. Pregnant women must sleep under LLIN everyday

c. Use of LLIN protect against malaria infection

d. I do not remember anything

24. Is it necessary for pregnant women to always sleep under LLIN?

a) Yes b) No c) don't know

25. Does Long Lasting Insecticide Bed Net prevent malaria transmission?

a) Yes b) No c) don't know .

26. Do you think you have enough information about LLIN?

a)Yes b)No c) don't know.

27. If no to question 26, what information would you like to get about LLIN?

a). How to use it b). Where to get it c). Importance of using it d). Any other (please specify)……...

28. Where or how will you like this information communicated to you?

a) Friends b) Family members c) Community meetings d) Radio e) Television f) Posters/pamphlets g)Newspapers h) Health facility/community health workers/personnel from NMCP i) Others (specify):……

29. Do you know that you have to wash your LLIN with only bar soap and it requires no re-treatment or dipping into insecticide solution after washing?

a) Yes b) No c) don't know

30. Do you know the difference between LLIN and a non treated net?

a) Yes b) No

31. Do you know that effectiveness of Long Lasting Insecticide Bed Net (LLIN) can last for twenty washes after which it expires?

a) Yes b) No c) don't know

SECTION IV: KNOWLEDGE ABOUT THE APPROPRIATE USE OF LLIN BY PREGNANT WOMEN

32. Have you ever used LLIN?

a) Yes b) No

33. If yes to question 32, when did you start using LLIN?

a) one year b) six months c) three months d) other specify

34. If no to question 32, would you consider using it every day if it is readily available?

a) Yes b) No

35. Did you sleep under Long Lasting Insecticide Bed Net (LLIN) last night?

a) Yes b) No

36. Do you know that before you first use LLIN you have to air inside for twenty four hours before sleeping under it to reduce any side effect? a) Yes b) No

37. Where do you normally dry long lasting insecticide bed net (LLIN) after washing?

a) Under the sun b) under a shade c) Any other (please specify)----------

38. What do you do to LLIN if holes develop in it?

a) Close holes by stitching b) do not use it again c) Sleep under it with the holes d) Any other (please specify)

39. When should one use LLIN?

a) Always b) During rainy season c) When one sees mosquitoes d) Sometimes

40. Do you make sure LLIN is low enough to touch the ground or is tucked under your mattress for maximum protection when sleeping under it? a) Yes b) No

SECTION V: BARRIERS TO THE USE OF LLIN AMONG PREGNANT WOMEN

41. Do you have LLIN? a) Yes b) No

42. If yes to question 40 above how many LLINs do you have in your household?

a) One b) Two c) Three g) Four and above

43. If No to question 41 above, why don't you have one?

a) It is not necessary b) It is too expensive, I can't afford it. c) I just haven't thought of it d) Others (specify)……

44. Do you consider LLIN expensive? a) Yes b) No

45. If yes, how much will you be willing to pay for it?

a) less than Gh¢1 b) between Gh¢1 and Gh¢2 c) between Gh¢2 and Gh¢3 d) above Gh¢ 3 e) LLIN should be free

46. Where do you think you can obtain LLIN?

a) health facility b) drug store c) market d) other please specify

47. Where did you obtain the LLIN you are currently using or having in your household?

a) health facility b) drug store c) market d) other please specify

48. Did you have to travel a long distance before getting the LLIN? a) Yes b) No

49. Do you perceive LLIN as harmful to a woman during pregnancy? a) Yes b) No

50. If yes to the question 49 above, what is/are the major perceived problem(s)?

a) No Comfort b) Causes heat c) Air hunger d) Any other (please specify)……

(Thank You Very Much For Your Time and Bye)