SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA

KNOWLEDGE AND PERCEPTION OF THE RISKS OF MALARIA DURING PREGNANCY AMONG WOMEN IN AMASAMAN SUB MUNICIPALITY

BY
AMA AKOMAA BOHULU
(10050142)

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JULY, 2016
DECLARATION

I do hereby declare that, except for reference to the people’s work, which have been duly acknowledged, this dissertation is the result of my own research work carried out in the school of public health, college of health sciences, University of Ghana, under the supervision of Professor Philip Baba Adongo. I therefore stand liable for any errors and omissions thereof.

AMA AKOMAA BOHULU
(STUDENT)

DATE

PROFESSOR PHILIP BABA ADONGO
(SUPERVISOR)

DATE
DEDICATION

This work is dedicated to God the Father, God the son and God the Holy Spirit. I am what I am because of their awesome plan for my life. I owe all I am and what I have to the Triune God.
ACKNOWLEDGEMENT

I would like to express my sincere thanks to God for seeing me through thick and thin during my stay in the School of Public Health.

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To my husband, and my children: Kwame, Maame and Sakyiwa (my last baby), and Akwasi I do appreciate you. To my brothers: Yaw and Kwame and my Sister Hannah I thank you for being there for me.

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My heartfelt thanks go to my friend and Sister Mrs. Charlotte Morgan-Aseidu, I love you. I am most thankful to you Dr Ahorlu of Noguchi; I will forever be thankful to you.

To Dennis, who took pains to print my work for me, I do appreciate you.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ANC</td>
<td>Antenatal care</td>
</tr>
<tr>
<td>CHPS</td>
<td>Community-Based Health Plan Service</td>
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<td>CI</td>
<td>Confidence Interval</td>
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<td>DHS</td>
<td>Demographic Health Survey</td>
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<tr>
<td>ELISA</td>
<td>Enzyme-linked Immunosorbent Assay</td>
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<td>FGDs</td>
<td>Focus Group Discussions</td>
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<td>GNA</td>
<td>Ghana News Agency</td>
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<td>IDIs</td>
<td>In-depth Interviews</td>
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<td>IPT</td>
<td>Intermittent Preventive Therapy</td>
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<tr>
<td>IPTp</td>
<td>Intermittent Preventive Treatment during pregnancy</td>
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<tr>
<td>ITN</td>
<td>Insecticide Treated Net</td>
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<tr>
<td>IUGR</td>
<td>Intrauterine Growth Retardation</td>
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<tr>
<td>LBW</td>
<td>Low Birth Weight</td>
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<tr>
<td>LLINs</td>
<td>Long Lasting Insecticide Nets</td>
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<tr>
<td>MRI</td>
<td>Magnetic Resonance imaging</td>
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<tr>
<td>NMCP</td>
<td>National Malaria Control Program</td>
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<td>PAM</td>
<td>Pregnancy Associated Malaria</td>
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<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<td>MIP</td>
<td>Malaria in Pregnancy</td>
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<tr>
<td>SP</td>
<td>Sulfadiazine Pyrimethamine</td>
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<td>WHO</td>
<td>World Health Organization</td>
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ABSTRACT

Introduction
Malaria in pregnancy is of public health importance. Malaria in pregnancy is associated with several negative health outcomes such as premature delivery, threatened abortion, and miscarriage, among others. The study sought to find out the level of knowledge and perception of women regarding the risks associated with malaria during pregnancy in GA West Municipality, Amasaman.

Methods
Qualitative research technique was employed in the research. The focus group discussions (FGDs) and in-depth interviews (IDIs) were the tools used to collect data. Forty-four respondents participated in the research. Purposive sampling method was employed to select the respondents. Five FGDs and two IDIs were done to solicit for information.

The sample frame consisted of the women who have delivered children who are under one year; pregnant women, and women who have delivered before but are past childbearing. The respondents were drawn from the urban, peri-urban, and rural communities of Amasaman sub-municipality, and grouped according to their places of residence. Interview guide was used. The IDIs and the FGDs were recorded using tape recorder and later transcribed verbatim, typed in word and imported into Nvivo software and analysed using thematic content analysis.

Results
Majority of the respondents have knowledge of causes of malaria, however, some of them have misconceptions about the causes of malaria. The respondents are acutely aware that malaria in pregnancy is deadly if early attention is not paid to it and majority of them sought healthcare from biomedical facilities.
Conclusion

The women knew that malaria can kill all categories of people. In addition, the women were aware that malaria during pregnancy can cause threatened abortion, premature delivery, or the death of both the foetus and the mother.
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CHAPTER ONE

BACKGROUND

1.0 Introduction

An estimated number of 3.5 billion people of the world’s population is at risk of being infected with the deadly disease – malaria annually (WHO, 2015). Malaria cases worldwide were 198 million in 2013 out of which 584,000 people died (WHO, 2015). Malaria is unique among diseases because its roots lie so deep within human communities (Heggenhougen, et al., 2003). Malaria beliefs and practices are often related to culture, and can influence the effectiveness of control strategies (Adera, 2003) thus, local knowledge and practice related to malaria is important for the implementation of culturally appropriate, sustainable, and effective interventions (Vijayakumar, 2009).

Malaria is no doubt a burden both in funds and in human resources to Ghana in particular and the world as a whole. A research conducted by Asante, et al., (2003), the active people who get ill with malaria lost nine working days economically and five working days by their caretaker (Asante, et al., 2003)

Though the National Malaria Control Program and partners have conducted programmes to educate the populace on various preventive interventions on malaria, there are still gaps between knowledge and attitude to malaria prevention. According to Demographic and Housing Survey, (2008), despite the advantages of Insecticide Treated Net (ITN) use, patronage is very low because of the poor attitude and perceptions among certain Ghanaians (DHS, 2008).

Malaria is said to be a disease which affects the poor and under-developed, probably because Africa records the highest malaria cases (WHO, 2009). The main causative agent
of malaria infection in Africa is the Plasmodium falciparum, which is endemic in Sub Saharan Africa.

The serious consequences of malaria in pregnancy are attributed to the sequestration of malaria parasites in the placenta, leading to impeded trans-placental nutrient transport (Mbonye, et al., 2005). Pregnant women are particularly susceptible to malaria, which elevates the risk of poor health outcomes for mothers and children alike (Guyatt & Snow, 2004; Lindsay et al., 2000; Steketee, et al., 2001). Placental parasitemia can cause maternal anaemia (Guyatt & Snow, 2001) and low birth weight (Guyatt & Snow, 2004; Kabanywanyi, et al., 2008), both of which are risk factors for neo-natal mortality (Guyatt & Snow, 2001; Marchant, et al., 2004). As much as 50% of low birth weight (LBW) among primigravidae has been attributed to malaria in some malaria endemic areas (Mutingwa, et al., 2005). Malaria kills a child every 30 seconds (Alnwick, 2000). In addition, pregnant women are at immense risk of malaria due to natural immune depression in pregnancy (Doolan, Dobano & Baird, 2009). As millions of pregnancies occur every year in malaria endemic countries such as Ghana, the scope and severity of the potential adverse health outcomes make prevention of malaria in pregnant women an important priority. According to Schantz-Dunn, (2009), malaria in pregnant women is asymptomatic and the effects are usually fatal ranging from miscarriages to neonates and maternal deaths (Schantz-Dunn, 2009).

Brabin, et al., (2004), revealed that malaria in pregnancy has been reported to cause high rate of infant and maternal mortality, low-birth weight, school absenteeism, low productivity in farming and other vocations (Brabin, et al., 2004). According to Abubakar, et al., (2014), it is more frequent and severe in primigravidae, both during pregnancy and at the time of delivery. Anaemia during pregnancy is a global problem, and
in malaria endemic areas it is usually most severe in the second trimester of gestation, following a period of acute malaria infection in the first trimester. (Abubakar, et al., 2014). According to some researchers severe anaemia in pregnancy is an important contributor to maternal and pre-natal morbidity and mortality, and that it contributes to low-birth weight, iron and foliate deficiency especially in first pregnancies which is one of the main risk factors for infant mortality. (Obse, et al., 2013)

Steketee, et al., 2001 also agreed that malaria infection in pregnancy is associated with anaemia, low birth weight (LBW) premature delivery, threatening abortion, etc. (Steketee, et al., 2001). Whitty & Schantz-Dunn, (2005) commented that in most cases malaria infection in non immune women are often under-estimated because the parasites are in most cases not seen in the blood film, (Schantz-Dunn, 2009).

In Ghana, Ofori, et al., (2009) revealed that the leading cause of illness and death is malaria infections and primigravidae and secundigravidae in rural Ghana are mostly affected by malaria infections mainly during first and second trimesters, (Ofori, et al., 2009). The National Malaria Control Programme, 2009 also revealed that malaria disease contributes to high maternal death in the Ghana which amounts 11% in mortality in pregnant women. Malaria contributes to the highest cause of morbidity and mortality thus; 38% of Out-Patient Department attendance, 36% of all admissions and 33.4% of all mortality in under-fives. Pregnant women formed 20% of total mortality, (Adjei, 2009). Wilson, et al., (2011) is of the opinion that malaria contributes high maternal death in Ghana. (Wilson, et al., 2011). In conclusion it can be said that malaria is preventable but it is killing so many people all over the world though there are interventions to take advantage of.
1.1 Problem Statement

Pregnant women are twice as likely to become infected with P. falciparum malaria as non-pregnant women living under the same conditions (Lindsay et al., 2000). It is estimated that over 30 million women living in malaria-endemic parts of Africa become pregnant every year. In Ghana, a study has put the overall prevalence of malaria parasitaemia during pregnancy as 47%. Also, NMCP (2012) has it that the risks associated with malaria in pregnancy include: low birth weight threatened abortion, miscarriage, prematurity (NMCP, 2012).

Extracts from the 2014 Health Report of the Amasaman Sub-Municipality, shows that 10,719 women had malaria compared with 8,295 in 2013, reflecting an increase of 29%. There is an increasing trend in malaria cases among women in the Amasaman Sub-Municipality, regardless of the many ongoing malaria control interventions, such as the use of Insecticide treated nets (ITNs), Intermittent preventive treatment (IPT), and Indoor residual spraying (IRS). This shows the extent of the great risk faced by pregnant women and their foetuses in the municipality.

A study of the knowledge and perception of the risks of malaria during pregnancy among women in Amasaman Sub Municipal in Ga West Municipality is, therefore, necessary to ascertain the cause of the increasing trend in Malaria cases despite the interventions.
1.1.1 Narration of the conceptual Framework

The narration shows the relationship between the dependable variable and the independent variables:

A pregnant woman who does not have any source of income may not be able to attend Ante Natal Clinic to learn about the risk of malaria during pregnancy. Such a woman may have negative perceptions about the risk of malaria during pregnancy. Some cultural practices have it that pregnant women do not have to attend ANC; rather they always have
to go to the herbalist. Such beliefs can prevent pregnant women from knowing anything about the risk of malaria during pregnancy.

Depending on the geographical location, a pregnant woman may have to travel long distances to the ANC centre, a factor which may prevent her from even making the attempt to attend ANC. Such a woman may not gain any knowledge about the risk of malaria during pregnancy and, consequently, may have negative perceptions of the risk associated with malaria in pregnancy.

Demographic factors, such as age, may also affect knowledge and perception of the risk of malaria during pregnancy. If a teenager, for instance, becomes pregnant she may be reluctant to attend ANC out of shame of stigmatisation, so she may not have any education on malaria in pregnancy, and this would affect the phenomenon under pinned.

The knowledge and perception of malaria in pregnancy also depends on the knowledge of healthcare staff. If healthcare staffs fail to provide quality health education to pregnant women, their knowledge of the risk of malaria in pregnancy may be negatively affected.

1.2 Main Objective
The study would investigate the knowledge and perception of women in the Ga West Sub Municipality (specifically Amasaman sub municipality) towards the risks associated with malaria during pregnancy.

1.3 Specific Objectives

1) To find out the level of knowledge of women regarding risks associated with malaria during pregnancy.
2) To assess the perceptions of the women regarding risks associated with Malaria during pregnancy.

3) To assess the health seeking practices of women for malaria during pregnancy.

1.4 Research Questions

1. What is the level of knowledge of women about the risks associated with malaria during pregnancy?

2. What is the perception of the women regarding risks associated with malaria during pregnancy?

3. What influence the health seeking behaviour of women during pregnancy?
CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

Many topics have been put up to discuss the issue of malaria. Although the literature covers a wide variety of topics, this review will concentrate on nine major topics. These topics are; epidemiology of malaria and transmission, knowledge and perception of malaria, clinical aspects of malaria, social and cultural aspects of malaria, perception of women about the risks of malaria during pregnancy, prevalence and burden of malaria, prevention of malaria in pregnancy and knowledge on malaria prevention and ITN use.

2.1 Epidemiology of malaria and transmission

In an area of intense and highly seasonal malaria transmission in the Northern Region of Ghana, the average parasite in the entire age cohort was 58% when pregnant women were examined.

Ofori, et al., (2009) observed 294 women passively and actively on weekly and monthly intervals until delivery. Haemoglobin levels and HB electrophoresis were conducted from peripheral blood samples and placenta smears at delivery were examined for malaria parasites.

It emerged that the prevalence of peripheral blood of P. falciparum at enrolment was 19.7% and related to parity. Secondly, incidence rate of parasitaemia was 0.06 infections/person/month. Symptomatic infections rose sharply from the first to last trimester. The prevalence of malaria in the placenta was 35.5%. Incidence of low- birth weight (LBW) infants was 17.7%), most common among those with placental infection were significantly lower than in those without infections. Maternal haemoglobin levels were lower at
enrolment among women who subsequently had placental P. falciparum infection than among those who did not have placental infection at delivery.

It was thought that primigravidae, secundigravidae were significantly at risk of pregnancy associated malaria (PAM) and low haemoglobin during pregnancy is a clinical indicator of placental P. falciparum infection.

Abol, Lagoro & Garimo, in their study of 3642 women of all gravid with gestational age of 18-36 studied for 2 years in a displaced persons’ camp, reported that the overall level of parasitaemia was 47%. Blood samples were examined for parasitaemia, obstetric history, including information on their past and present state of health and use of nets. It was realised that the level of parasitaemia was highest in pregnant women in their third trimester, followed by women with multi-gravidae, and older pregnant women in that order.

Basommi, (2011)’s risk map in the Amanse-West District of Ghana, showed areas at risk especially the central portions of the capital. It also revealed a yearly rise of 20% from 2004-2009. The disease incidence was found to be local rather than global. This gave credit to the covariates used- (rivers/streams, forest, temperature, rainfall and elevation). Areas which were 2km from the water source (river/stream) reported higher cases except for some within the 1km of the Offin and Oda rivers. There was also varied effect of elevation with the disease prevalence when a Bayesian regression analysis was carried out. The high disease trend ranged between 1-3km away from a covariate such as the forest. Rainfall had an influence on the yearly disease rate, but had no relation, where temperature was concerned. An ethnographic study where the data collection methods (free listing and rating, participatory mapping, focus group discussions, key informant in-depth interview) were employed saw malaria as the most common disease (Ahorlu, Koram
Weiss, 2007). Indeed mosquitoes were seen as a major cause of malaria and convulsions. The need for regular re-evaluation of community experiences, meanings and behaviour were identified to inform the implementation and effectiveness of control programmes. (Clerk, et al., 2009)

Malaria was the leading illness in the community, which affects children and pregnant women more than other social groups in a study conducted by Ahorlu, (2012). It was observed that home treatment such as herbal and biomedical medications were frequently the option for malaria-related illnesses. The hospital was used as place for the diagnosis of MRI and convulsions. But most patients arrive late. They linked convulsions with malaria-related illness and linked mosquito bites and febrile malaria as main causes of MRI with convulsions. In spite of the obvious scientific links made, locals still associated spirituality with convulsions by alluding that the spirits the malaria illness as a mode to exacerbate matters. Thus local healers played a complementary role in the healing process as well. The healers were also deemed to protect children from convulsions (Ahorlu, 2012). It appears that epidemiology of malaria is linked to the geographical and environmental conditions (seasons and spacing). The various researches reviewed espouse descriptions of various areas and environmental conditions that saw corresponding malaria disease intensity. It does show how important the geography of the land as well as the environment in which people dwell has on the incidence of malaria and how that ought to be factored in the projection of the prevalence of malaria and modes of intervention to mitigate the disease.

2.2 Knowledge and perception of malaria

In Nigeria, a study was conducted on 200 participants using a descriptive design and a systematic sampling method. The objective was to assess women’s knowledge on the risks
associated with malaria during pregnancy, 83.9% of people had knowledge of the risks of malaria during pregnancy.

In another study conducted in Nigeria to ascertain the women’s knowledge on the risks of malaria and preventive measures, 403 women participated, the results were that preventive measures were 71.5%. Factor(s) that mediated their knowledge was educational status, as there was a significant association between knowledge of the risks of malaria during pregnancy and educational status (Akaba, et al, 2013).

In another study, individuals had sound knowledge of the causes and symptoms of malaria, (Esse, et al., 2008). Similarly, Mazingo, et al., (2010), reported reasonable knowledge of malaria transmission, prevention and treatment in the population they sampled (Mazingo, et al., 2010).

Akinyele & Ajaye (2011) found more factors that influenced knowledge. These were occupation, education, months at first appearance at antenatal clinic and transportation cost (Akinyele & Ajaye, 2011).

There is the need to improve availability of information through proper community channels. Special attention should be given to illiterate community members (Mazingo, et al., 2010). Nonetheless, knowledge per se or admitting that one has knowledge does not mean, the right kind of knowledge. The knowledge thus needs to be authenticated. When the level of knowledge of malaria pregnant women was assessed by Sabin, et al., (2010), it was discovered that there was a partially correct understanding of malaria transmission and prevention among antenatal attendants. It was strongly advised that policy makers focus on improving knowledge and availability of effective malaria control strategies among that population (Sabin, et al., 2010).
Similarly, when a cross-sectional survey was carried out among 209 pregnant women, knowledge of malaria was found in 79.9% of participants. Nonetheless, of the 52.2% who had heard of intermittent preventive measures, 55.9% of participants had good knowledge whilst 44.1% had poor knowledge. Of those who had knowledge (68.9%) on ITN’s, 66% had good knowledge on ITN’s (Akinyele & Ajaye, 2011). Subsequently, when a descriptive cross-sectional study pregnant women and caregivers of under-five children. Using a semi-structured questionnaire, 57.7% had poor knowledge of malaria prevention (Adebayo, Akyinyemi & Cadmus, 2015). Thus, it is important not only to test whether pregnant women have knowledge on malaria, but to rate the degree of knowledge (i.e. right or wrong) as pregnant women could indicate that they have knowledge on malaria, but the knowledge they possess might be wrong. Since there is a propensity for wrong knowledge to be held as true, there is the need to differentiate.

### 2.3 Clinical aspects of malaria

Malaria may range in severity of symptoms from mild headache to serious complications leading to death. The protean and no-specific nature of malaria leads to wrong diagnosis sometimes for example influenza during the epidemic times. Although malaria is not a clinical diagnosis, it must be excluded by performing microscopic examination of blood films. Due to the propensity for fatality, malaria must be treated early. Other parasites (P. vivax and P. knowlesi) aside P. malariae have been discovered to have similar fatality rate (Bartoloni & Zarmmachi, 2012).

### 2.4 Social and cultural aspects of malaria

Malaria was identified in central Cote d’ivoire by a local name as ‘djèkouadjo’ in a cross-sectional household study. Although people were aware of the malaria- related symptoms
and their association with mosquitoes, folk perceptions were common. Esse, et al., (2008). A meta-analysis on 37 studies in all, 14 concentrated on malaria in pregnancy (MiP), whilst others focused on malaria prevention and treatment, antenatal care, anaemia during pregnancy or reproductive loss. Factors such as health-worker client interactions, household decision-making, gender relations, cost and distance, lack of health infrastructure limited access to MiP and interventions (Esse, et al., 2008).

Socio-cultural variables such as health-worker client interactions, household decision-making, gender relations, cost and distance, lack of health infrastructure should be assessed to determine their effects on access to malarial interventions in Ghana.

### 2.5 Perception of women about the risks of malaria during pregnancy

When concepts of malaria and risk in pregnancy, attitudes towards interventions, structural factors affecting delivery, and uptake and perceptions of ANC, it was stated that malaria in women was considered less disease-specific. That is the number of pregnant women infected with malaria was high. This meant that pregnant women recognise that malaria is a disease which is rife and cannot be easily ignored.

Malaria in pregnancy (MiP) was also more interpreted into locally defined categories, probably according to their understanding of what it signified to them, even though people had knowledge of the malaria-related symptoms and their association with mosquitoes (Esse, et al., 2008). For instance, Ahorlu, (2012), in a research on malaria among pregnant women reported that respondents linked the incidence of clinical malaria episodes with the heat from the sun. This brings to the fore the need to investigate the reasons for the deviation between knowledge and attitude towards the risks of malaria.
Dako-Gyeke and Kofie, (2015) discovered there was no significant relationship between religious beliefs of participants and their malaria prevention and control practices. On the contrary, ethnicity, income earning, employment status and other socio-cultural conditions had a significant relationship with malaria prevention. The findings suggest the need to consider and integrate factors, such as poverty and poor living conditions in malaria prevention and control strategies. Enquiry into the disease-specificity of malaria at the moment in Ghana should be carried out, in order to know the current status.

Previous researchers have reported that ITN’s are poorly used by pregnant women. Dako-Gyeke and Kofie, (2015), in their study on malaria preventive methods, showed that the application of preventive methods by pregnant women is strongly affected by ethnicity and other socio-cultural factors. It is necessary, therefore, to find out the reasons for this, and identify ways to encourage pregnant women to use ITN’s.

Perceived causes of malaria were linked to the socio-economic status of households, with wealthier individuals reporting malaria more frequently than poorer households (Esse, et al., 2008). Similarly, Mazingo, et al., (2010), discovered that 56% of respondents associated the disease with mosquito bites, with a significant difference between educational level and knowledge of transmission. Knowledge of mosquito breeding areas was also associated with mosquito bites (literate, 22%; illiterate, 57%). High acceptance of indoor residual spraying and high level of bed net ownership should be taken as an advantage to improve malaria control (Mazingo, et al., 2010). People with sound knowledge of malaria still utilised traditional treatments. Only a few slept under treated nets.

Folk beliefs however did not translate into disuse of formal medication. Perceived causes of malaria were linked to household socio-economic status. Wealthier households reported
malaria more frequently than poorer households. Bed nets were used in wealthier households, whilst poor ones contended with cheaper protective measures. It was advised that resources to help community members prevent and treat malaria should be equitably distributed. There was also the need for community based approaches that matched services with that of the needs of the poor (Pell, et al., 2013).

2.6 Health seeking behaviour of women during pregnancy

Often times, though persons are aware of the risks or dangers of a threat, it does not necessarily translate into the right attitude towards the threat. For instance, 85% of pregnant women in a study were aware of the use of insecticide-treated nets (ITN’s), as a tool for malaria prevention. Nonetheless, as high as 60% of them had poor attitude towards the use of the ITNs (Adebayo, Akyinyemi&Cadmus, 2015).

Sabin, et al., (2010), in a survey using in-depth interviews, and focus group discussions involving pregnant women in urban, semi-urban and rural locations, reported that untreated bed nets were being used as a preventive method against malaria. Subsequent research threw light on the reasons why the women resort to unproven prevention and treatment methods. Sixty-eight percent of 1400 pregnant women used herbal concoctions for malaria treatment due to its suitability and effectiveness and not due to its cost or accessibility in the antenatal clinic. Only thirty-two percent used antimalarial. Sulphadoxine Pyrimethamine was the preferred choice for 2nd and 3rd trimesters. In contrast, Artemether-Lumefantrine was the most common anti-malarial therapy used throughout pregnancy (Sabin, et al., 2010). In a study by Mazingo, et al., (2010), only 15% of respondents used ITN’s, while 77% used nylon nets at their windows to ward off mosquitoes (Mazingo, et al., 2010). Health education to traditional birth attendants (TBAs) was the recommendation. Women who were seen by TBA’s were encouraged to
attend orthodox antenatal clinics (Sabin, et al., 2010). Similarly, ITN ownership was 42.6%, however its usage declined from 28.5 to 24.6% before and during pregnancy (Akaba, et al., 2013). Similarly, wide arrays of modern and traditional remedies were employed, often in combination. Individuals continued to use traditional treatments and only a few slept under treated nets in spite of sound knowledge of the causes and symptoms of malaria, whereas folk beliefs did not necessarily translate into refusal of modern treatments. Bed nets were more frequently used in wealthier social strata, whereas other protective measures- perceived to be cheaper- were more prominent among the poorest (Esse, et al., 2008). Health facilities were the first option for treatment by 43.7%. The perception of women regarding the risks associated with malaria during pregnancy, two to three days after illness onset, although they viewed malaria as the most common disease, which could be dangerous, knowledge of risks of malaria in pregnancy also influenced uptake to ITN’s (Akinyele& Ajaye, 2011).

There was significant relationship between knowledge and practice of malaria prevention when the calculated r-value 0.62 was compared to the tabulated r-value of 0.138. It was advised that midwives carry proper awareness campaign on malaria prevention in pregnancy. It was advised that ITN and intermittent preventive treatment drugs should be given to pregnant women at antenatal clinics and women be encouraged to comply with malaria preventive pregnancy throughout pregnancy (Ojong, et al., 2013).

2.7 Prevalence and Burden of Malaria in pregnant women

Malaria still remains a preventable condition of public health interest with high annual morbidity and mortality. Pregnant women are twice as likely to become infected with P. falciparum malaria as non-pregnant women living under the same conditions (Lindsay, et al., 2000). It is estimated that over 30 million women living in malaria-endemic parts of
Africa become pregnant every year. A study conducted in Kassena- Nakana has put the overall prevalence of malaria parasitaemia during pregnancy as 47%. Older age, multigravidaity and third trimester of pregnancy were reported to be associated with a decreased risk of parasitaemia (Clerk, et al., 2009). Another study in Ghana revealed that adolescent pregnant girls were more likely to have malaria infection than the adult pregnant women (Orish, et al., 2012). In the same study it was found that adolescent pregnant girls had higher odds of anaemia than their adult pregnant women equivalent (43.9% versus 33.2%).

In sub-Saharan Africa, where the burden of malaria during pregnancy is the greatest, malaria transmission is predominantly stable. Characteristic of malaria infection during pregnancy in stable transmission areas is that it is often asymptomatic due to the pre-existing immunity that had been acquired through frequent exposure to \textit{P. falciparum} malaria infections since childhood. The absence of clinical symptoms such as fever makes it difficult to recognize the disease which therefore often remains untreated until it causes complications.

One study that investigated the level of malaria parasites among pregnant women reports a 59.9% prevalence of parasitaemia with the highest prevalence occurring in the first trimester [84.1%]. Among the positive cases, mild parasitaemia was recorded in 47.2% moderate parasitaemia in 37.4% while severe parasitaemia was recorded in 15.3% of cases (Ogbodo, et al., 2009). However, the majority of these people remain asymptomatic. The effect of malaria in pregnancy is therefore compounded by this asymptomatic nature at initial stages until complications set in. A study has showed that severe anaemia resulting from \textit{P. falciparum} infection is responsible for approximately 10,000 maternal deaths every year in Africa. There are however differences in the burden of malaria in pregnancy
Malaria in pregnancy has been reported to be responsible for 11% of maternal deaths in Nigeria. The effects of malaria during pregnancy are also devastating for the newborn infant. It has been reported that in areas where malaria is endemic, 20–40% of all babies born may have LBW (Kabanywanyi, et al., 2008). About 20% of this low birth weight (LBW defined as birth weight below 2500g) deliveries attributable to the direct consequence of malaria during pregnancy. LBW is also associated with poor infant development and survival, and contributes to around 100,000 infant deaths: 11.4% of neonatal deaths and 5.7% of all infant deaths or 17 deaths per 1000 live births according to another estimate (Desai, et al., 2007; Menendez, et al., 2000; WHO, 2004). In addition, malaria during pregnancy is estimated to be responsible for about 70% of intrauterine growth retardation cases (IUGR) and 36% of preterm deliveries. Placental malaria also increases the risk of stillbirth particularly during the third trimester of pregnancy (Desai et al., 2007). In Ghana, a study showed that incidence of LBW infants was 17.7%, most common among those with placental Plasmodium falciparum infection with corresponding to a relative risk of 2.8 [1.4 to 5.2]. Median infant birth weight in those with placental infection was significantly lower than in those without infections (Ofori, et al., 2009). This further demonstrates the effect of malaria in pregnancy on birth weight of children.

In summary, malaria during pregnancy is a major public health problem; it increases the risk of low birth weight (LBW) (<2500 g) and child morbidity and mortality during the first year of life by inducing intrauterine growth retardation, prematurity, infant anaemia, and maternal anaemia (Adefioye, et al., 2007; Menendez, et al., 2000).
2.8 Prevention of Malaria in Pregnancy

Malaria infection in a pregnant woman is associated with poor pregnancy outcome and an increased risk of complications which necessitates the adoption of preventive strategies. The first approach adopted by WHO was to recommend a full anti-malarial treatment during the first ANC visit followed by weekly chemoprophylaxis for all pregnant women in malaria endemic areas. The WHO recommends that all pregnant women should be provided with at least two preventive treatment doses of an effective single-dose antimalarial drug during routine ANC visits, the first dose to be given after quickening. Currently Sulphadoxine Pyrimethamine (SP) is the most effective drug for intermittent preventive treatment during pregnancy (IPTp) despite the increasing resistance of SP to *Plasmodium falciparum* (WHO, 2002).

The second and current approach recommended by the WHO in areas of stable *P. falciparum* transmission, is a three-pronged approach that includes Intermittent Preventive Treatment (IPT), Insecticide Treated Nets (ITNs) or Long Lasting Insecticide Treated Nets (LLINs), and prompt case management agreed upon in the Abuja Declaration. The Roll Back Malaria Partnership aims to ensure that all pregnant women receive IPTp and at least 80% of people at risk from malaria areas of high-intensity transmission use ITNs by 2010 and 100% for both interventions by 2015. These strategies have been adopted by 35 of the 45 African endemic countries including Ghana, and are being delivered through collaboration between reproductive health systems and malaria control programs, during the four target antenatal care (ANC) visits throughout the pregnancy as recommended by WHO, (RBM, 2009).
2.9 Knowledge on Malaria Prevention and ITN Use in pregnancy

Since 1997, the WHO has been recommending an integrative strategy to combat malaria including new medicines, vaccines, improvements of health care systems and insecticide-treated nets (ITNs). Knowledge on the prevention of malaria using ITNs is therefore important in determining the use of ITNs to prevent malaria.

The understanding of the possible causes, modes of transmission, and individual preference and decision-making about the adoption of preventive and control measures have been reported to vary from community to community and among individual households in Ghana. In a study in Tanzania, it was reported that most respondents linked malaria to mosquitoes (76%) and already used mosquito nets (52%) as a preventive strategy. In a comparative study in Ghana, Kenya and Malawi among pregnant women, ITNs use were reported to be generally recognized as important for malaria prevention (Pell, et al., 2013). A study in Nigeria also showed that respondents, who knew that sleeping under ITN prevents malaria, were 3.2 times more likely to sleep under net. Those who listened to the radio are also about 1.6 times more likely to use ITN, while respondents who had heard of a specific sponsored radio campaign on ITN are 1.53 times more likely to use a bed net, (Ankomah, et al., 2014).

Contrary to this finding, an earlier study by Adongo, Kirkwood, & Kendall, (2005) in Northern Ghana discovered that people used ITNs to only to prevent the irritating sound made by the mosquito, rather for malaria prevention (Adongo, Kirkwood, & Kendall, 2005)

A study in Cameroun reported that overall, 99% of the respondents had heard about insecticide treated nets (ITNs); 99% perceived ITNs as a good means to prevent malaria. Also most respondents (57%) stated they used ITNs mainly for protection against
mosquito bites while 48% used them for protection against malaria. Another study in Central Africa Republic showed a relatively high rate of ownership of insecticide-treated nets (72.1%), nonetheless, community perception of these nets as a preventive measure against mosquito bites was reported to be very low (6.5%).

In summary, it could be said that various studies on knowledge and perception of the risks of malaria during pregnancy had found that women had knowledge on the risks but they did not adhere to malaria prevention health education. The research would therefore like to find out whether knowledge corresponds to attitude in GA West Municipality, Amasaman.
CHAPTER THREE
METHODOLOGY

3.0 Introduction

This chapter gives a detailed description of the study site and considered the methods that were employed for the study. It spelt out the processes and the reasons for the adoption of the methods and their importance to the study. The study employed qualitative method of data collection. The reason is that it enabled the researcher to investigate the level of knowledge and described the level of perception of the women on the risk associated with malaria during pregnancy. It further gave detailed accounts of data collection procedures and the ethical considerations involved in the study and the methodological rigour, data analysis and interpretation procedures were also described.

3.1 Study Area

Figure 2: Ga West Municipal Profile

Source: Ga West Municipal Assembly Planning Office, Amasaman.
The Ga West Municipality is one of the newly created Municipalities in Greater Accra Region. It lies within latitude 0°48’ North 5°39’ North and longitude 0°12’ West and 0°22’ West. The Municipality shares common boundaries with Ga East and Accra Metropolitan Assembly to the East, Akuapem South to the North, Ga South to the South. It is about 25km west of Accra, the National Capital, and have access to all its facilities such as the sea and airport. It occupies a land area of approximately 305.4 sq km with about 181 communities.

There are two major rivers namely; the Densu and Nsaki in the Municipality. The larger of the two is the Densu which runs down from the Eastern Region through the western portions of the Municipality to Weija where it enters the sea. It is the main source of water supply to over half the entire population of the Accra Metropolis. Other water bodies mostly tributaries of the Densu are the Adaiso, Doblo and Ntafrafra.

The GA West Municipality is divided into three sub municipalities namely; Amasaman, Pokuase and Ofankor Sub municipalities. Amasaman Sub municipality has a total population of 115,212 million people and is categorised into urban, peri-urban and rural. The communities that were selected for the study were done with the above categorise in mind with Amasaman from the urban Nsakina from peri-urban and Kojo Ashong being rural.

3.2 Health Facilities

The Amasaman sub municipality has the following health facilities in the communities below; One Hospital - Amasaman, one Health Centre – Oduman, two Community Clinics in Kojo Ashong and Amamole. In addition, Nsakina, Domesarpaman and Akramaman
have Community-Based Health Plan Services (CHPS) Compound each. The natives of the sub municipal are Ga, however, twi is widely spoken.

3.3 Demographic Characteristics

2000 National Population and Housing Census put it that the population of GA West District was estimated at 348,926 with growth rate of 3.4%, males made up of 50.1 %. The population is highly concentrated along the peri-urban areas of the Municipality particularly on the border with the Accra Metropolitan Assembly and Ga East District. 2010 District report indicated that the proportion of population under 15yrs at (34.8%) is a reflection of high fertility.

3.4 Economic Activities

Agriculture, industry and commerce are identified as the three major economic sectors in the Municipality. About 95% of the farmers are small scale holders with 5% being large-scale holders. Approximately, 70% of those in the rural areas depend entirely on agriculture and agricultural related activities for their livelihood conversely rainfall is insufficient and erratic and irrigation infrastructure is almost non-existent due to high cost.(SOURCE: GA West Municipal Assembly, Amasaman)

3.5 Study Design and Study Population

The study employed qualitative design and cross-sectional study. The study was descriptive in content and cross-sectional with respect to time. The study was designed to explore in-depth factors influencing knowledge and perception of women about the risks associated with Malaria during Pregnancy. The study population consisted of women who had gotten pregnant before, have delivered before and pregnant women. The target population was chosen because they were the centre of the study.
3.6 Selection of Study Participants and Inclusion Criteria

The respondents consisted of; Women of child bearing age from 15-49 years. Three of the focus group discussions had eight participants, one group had nine and the other had ten. The in-depth interview comprised of the Municipal disease control Officer who acted as Municipal malaria control Coordinator at the time of the study and a community health Nurse in a Community-Based Health Plan Service (CHPS) compound.

A purposive sampling procedure was adopted to select the participants because the study involved selection of cases that sought to achieve the study objectives. The selected communities in the sub municipal were visited and established rapport with the Women Leaders and to explain the study objectives and importance to them using information sheet (Appendix I), another meetings were organised with the women groups in the selected communities and the study objectives and importance were explained to them also using the same information sheet as well (Appendix I) questions asked were answered for clarity and their consent.

Those who voluntarily gave their consent opted to participate in the study were purposively sampled and grouped according to the researcher’s judgement, then based on the groups’ discretion their preferred dates, times and sites for the study were given to the researcher. At the appointed time their Leaders organised them for the study.

All women who had ever been pregnant, pregnant at the time of the research and women whose babies were under one year were qualified to participate in the study. Purposive sampling method was used to select samples from the selected communities for reasons of limited logistics and time. For the purposes of comparison, FGDs and IDIs were conducted among the samples. The aim of this data collection method was to obtain better and collective perspective of the factors influencing the perceptions and knowledge and
the health seeking behaviour of the women regarding the risks of malaria during Pregnancy.

3.7 Ethical Issues and Confidentiality

Ethical clearance was sought for and approval was given from the Ghana Health Services for the study. Participants were given code such as (A1 B1, C1, D1, E1) to assure them that in no way would they be identified by that code apart from the researcher and the field assistants.

3.8 Data Collection Tools and Technique

Data collection tools that were used in the study were in-depth interviews with individuals and focus group discussions because they complemented one another. Again, the aim of the FGDs was to make use of the participants’ feelings, opinions and perceptions or to hear silenced voices (Mthethwo-Sommers & Kisiara, 2015). Five FGDs were carried out such that the researcher would satisfy her objectives and obtain the larger picture of the interview. The interview guide was designed in English. The FGDs were done in twi as requested by the participants. The FGDs were done in the communities; the seats were arranged in semi-circle to give comfort to participants, to enable the researcher to have full view of each participant and to make use of each participant’s facial expressions. However, the IDIs were done in the offices of the health facilities also for comfort and relaxation of the interviewees. The FGDs were done for 10 -25 minutes maximum while the IDIs 10-15minutes which was the time the participants were willing to spend with the researcher. However, per the preference of the interviewees twi language was used to interview the Community health Nurse while English for the malaria control Coordinator.
A tape recorder was used to record the discussions and the interviews. The recorded interviews and the discussions were later transcribed verbatim.

3.9 Pre-Test

Pre-test of the study was done in Abokobi with one pregnant woman, one woman who had delivered before and a mother with a baby under one year. It was meant to help the researcher to test her instrument and the guide whether the guide is cleared, (Burns & Groves, 2009). After the IDI, it was realised that the tape recorder was not working, so it helped the researcher to look for an efficient one.

3.10 Analysis of Data

The focus group discussions and in-depth interviews were recorded, translated verbatim, typed in word and imported into Nvivo software and analyzed using thematic content analysis. According to Burns & Grove (2003) the purpose of the data analysis is to organize the data and make meaning out of the situation/phenomenon, (Burns & Grove 2003). On the other hand Fink (2000) viewed data analysis as movement from particular situation to general (Fink, 2000).

3.11 Limitations of the Methodology

The foremost limitation of the methodology was the time frame. In one aspect, the researcher had very little time to access the contact person to the sample groups. Again, the researcher being a student worker and a family woman was hard pressed for time to conduct the whole research. At some point, she had to shorten the probing of the answers supply by the respondents. Submission of draft reports of the work was to meet a deadline. This worsened her time pressure in conducting the research.
A second limitation worth noting was the translation from Twi to Ga and vice versa. The researcher had to make do with the respondents display of fair understanding of the questions posed.

Financially, the researcher was short-chained as to how much to be given to the field assistants as incentive and refreshments for participants. She therefore suspected the apathy displayed by both field assistants and respondents.

All these limitations were at the back of the mind of the researcher in analyzing and drawing conclusions from the study.
CHAPTER FOUR
RESULTS

4.0 Socio-demographic data of respondents

In all, 44 respondents took part in the FGDs in the entire study. The age range of participants was between 19 to 43 years. The highest educational attainment of participants was tertiary education (University or Polytechnic), however, many of the participants had only attained secondary education. The participants adhered to two main religious affiliations: Christianity (43 participants) and Islam (1 participant). Some of the respondents were married (36 participants) whilst others were single (7 participants), and one participant had lost the partner. Regarding ethnicity, 17 participants were Akans, 16 were Gas, 8 were Ewes and the remaining belongs to other ethnic groups.

4.1 Knowledge on causes of malaria

The study generally showed that both pregnant women and women with children under one year had knowledge about the causes of malaria. Respondents were able to identify that malaria was caused by a bite of mosquitoes and some respondents were even able to mention the name of the specific type of mosquito that could transmit malaria. The results of the study also showed that participants were able to identify that mosquitoes breed in stagnant waters. The following responses for support these views:

“...It is a sickness caused by mosquitoes especially when more and more breed of mosquitoes introduced into the environment through stagnant waters” (FGD, woman with child under 1 year-4, Amasaman)

“...It is a disease caused by mosquitoes, precisely the female anopheles mosquitoes. If you do not protect yourself from them and you get bitten then you stand a greater chance of being infected with the disease” (FGD, Pregnant woman 2, Kojo Ashong)

In addition, participants in the study were able to mention some of the signs and symptoms of malaria. The common signs and symptoms that were identified by the study participants
were high temperature, feeling weak, loss of appetite, vomiting and general feeling of unwellness. Almost all participants in this study could mention some signs and symptoms of malaria. The following illustrative quotes from participants support these views:

“...I know that malaria is a sickness that when you are infected, generally you will feel weak and lose your appetite” (FGD, woman with child under 1 year-3, Amasaman)

“...High body temperature and vomiting are other symptoms of malaria” (FGD, woman with child under 1 year-1, Nsakina)

“...Malaria is sickness you get when you are bitten by mosquitoes. You get weak, cold and hot and you cannot do anything” (FGD, pregnant woman-3, Kojo Ashong)

Respondents mentioned varied sources of information on malaria. Some of the sources that emerged in the study were radio, health education provided by health workers and personal experience of the condition as illustrated.

“... I have heard on radio, television and others that malaria can kill” (FGD, woman with child under 1 year 3, Nsakina)

“...We had health education on malaria at the hospital and we were told to take our drugs to protect us and our baby against malaria” (FGD, pregnant woman 3, Amasaman)

“...I have suffered from malaria before; I was very weak and vomiting. So I know the signs and symptoms very well” (FGD, woman who ever delivered)

During in-depth interviews with health workers, it emerged that health education on malaria is a common activity they embark on because malaria was common in the area. Health education on all aspects of malaria including the causes, signs and symptoms, the vulnerability and the effects of malaria in general and during pregnancy as illustrated:

“...Malaria is a sickness that has its causative agent as the female anopheles mosquitoes. The disease is spread by a mosquito bite and the blood suck from its victims which contains the malaria parasites from one infected person to another. Pregnant women and children under 5 years stand the greater risks dying of malaria” (in-depth interview, Community Health Nurse, Nsakina)

“...we informed them of the risks such as the unborn baby could be born prematurely; they will be anaemic and experience general body weakness” (Malaria Control Coordinator)
Despite the fact that many respondents were able to identify the causes of malaria, some respondents held some misconception about cause of malaria. To some malaria is not only caused by the bite of mosquito but also when a mosquito settles on foodstuff and are eaten by person. Another misconception about malaria was that the eating of oily food could also cause malaria as illustrated:

“...When mosquitoes bite me as well as settle on my foodstuffs, then I might get infected with the malaria disease” (FGD, woman with child under 1 year-4, Nsakina)

“...Mosquitoes and the refuse at the back of our houses are the main causes of malaria. If you eat oily foods too, you might get malaria” (FGD, woman with child under 1 year-2, Amasaman)

4.2 Perception of risk of malaria

The study showed that respondents were unanimous on the risk of malaria. All respondents believed that malaria could be deadly if prompt intervention was not sought. Some of the effects mentioned in this study were weakness, your eyes becoming yellow and anaemia and where intervention are not sought, respondents believed death may occur as illustrated:

“...because in most malaria prolonged cases, then you become anaemic, weak and sometimes may die” (FGD; woman ever delivered 3)

“...During my adolescent ages, I suffered from severe malaria and if not for timely intervention from my mother I would have been dead. I experienced general body weakness and pains, loss of appetite and was frequently vomiting” (FGD, woman with child under 1 year-6, Nsakina)

4.3 Knowledge on risks associated with malaria during pregnancy

The study also showed that respondents believed pregnant women have a higher risk of developing malaria. They were also able to identify the risk of malaria during pregnancy. Respondents mentioned that malaria during pregnancy could lead to anaemia, slow in the
growth of the unborn baby, premature birth and giving birth to a child with low weight. Respondents also mentioned that malaria during pregnancy can result in the termination of the pregnancy and in worse cases result in the death of both the unborn child and the mother. The following quotes illustrate these points:

“...when one gets malaria you feel weak, vomiting, anaemic and sometimes you may even die if it is not treated” (FGD, woman who has ever delivered, Kojo Ashong)

“...Information reaching me through the radio and other sources says malaria kills people. Personally, I have not suffered from severe malaria so I doubt if it can kill me” (FGD, pregnant woman-6, Amasaman)

“...The unborn baby could suffer from ill-growth and will look small in size” (FGD, pregnant woman-3, Amasaman)

“...It leads to premature childbirth mostly within the time frame of seven to eight months of pregnancy” (FGD, pregnant woman 7, Amasaman)

Furthermore, the results of the study showed that respondents were generally aware of the need to seek early treatment for malaria. To the respondents delay in seeking treatment results in some complication that may have deleterious effects on both the pregnant woman and the baby. Some respondents shared their personal experience on how they suffered from the complications of malaria because of delays in seeking care as illustrated by the following quotes:

“...the eyes look yellowish and in the cases of pregnant women suffering from malaria, poor or late visit to the hospital for antenatal care could lead to increased chances of death” (FGD, pregnant woman 5, Amasaman)

“...I could have been a victim of that. I nearly died. I was very ill, anaemic and admitted at the hospital” (FGD, woman with child under 1 year-3, Nsakina)

### 4.4 Health seeking practices for malaria during pregnancy

The study revealed that multiple sources of health care were sought when a pregnant woman is perceived to have malaria. Some respondents who had experienced malaria during pregnancy mentioned that they visited the hospital. In the hospital, many of the
respondents indicated that some tests were conducted on them to arrive at the decision that they were actually suffering from malaria before treatments were given to them as illustrated:

“...I went to the hospital, some laboratory tests were run to examine me and it was later confirmed I had malaria. I was given some drugs after that” (FGD, woman with child under 1 year, Amasaman)

“...I went to the hospital. Sample of my blood was taken to run some tests. Later, it was confirmed I had malaria and I was given some drugs” (FGD, woman with child under 1 year, Amasaman).

According to respondents who attended the hospital, they were provided with medications including Artesunate Amodiaquine. This was unanimous among respondents who sought for health at hospital as illustrated by the following respondents:

“...I went to the hospital and I was given Artesunate Amodiaquine” (FGD, pregnant woman-2 Kojo Ashong)

“...I was given Artesunate Amodiaquine from the hospital” (FGD, pregnant woman-5 Kojo Ashong)

Nonetheless, some respondents indicated they had to resort to taking some herbal medications at home when they suspected they had malaria during their pregnancy. The herbal preparations were provided to them by elderly women who claimed to have experienced malaria in the past and were relieved by taking these herbal preparations. Some respondents also indicated they took some medication on their own as illustrated by the following quote from respondents:

“...It is dangerous when I once got malaria in pregnancy it was like I was in labour and the baby was coming out a woman gave me some herbs to be taken for three days and she inspected my urine and said that it was malaria and can abort the baby” (FGD, woman ever given birth 3, Kojo Ashong)

“...I took herbal medicines at home without the assistance and supervision of health experts” (FGD, woman with child under 1 year-2, Nsakina)
Other respondents also resort to their faith in God and therefore seek spiritual assistance. Some respondents were of the view some churches do not allow their followers to go to hospital when they are unwell but to only pray for God’s healing as illustrated by this respondents:

“...When I get malaria and I am given any medication, I throw them away but by the grace of God, I get well” (FGD, pregnant woman, Kojo Ashong)

“...Some churches do not go to hospital, so they only pray when they sick. Their woman are not allowed to attend antenatal where they will be given the medicine to protect them malaria” (FGD, women ever delivered-8, Amasaman)

4.5 Prevention of Malaria

Respondents were generally able to identify the various ways of preventing malaria in the community. One of the preventive measures identified by respondents in this study was keeping the environment free from breeding ground of mosquitoes which respondents identified as the insect that can spread malaria. Some of the measures respondents mentioned were; avoiding stagnant waters, cleaning of gutters and avoiding the empty tins and bowls that can collect water to serve as breeding grounds for mosquitoes. Furthermore, respondents were mentioned that sleeping under mosquito nets could also protect one from malaria as illustrated:

“...Avoid littering stagnant waters with cans, tins and bottles so as not to promote the increased breed of mosquitoes. Also, clean our gutters, surroundings and wash our bowls and utensils” (FGD, woman ever given birth 7, Kojo Ashong)

“...Sleep in treated mosquito nets and clean our surroundings to prevent the breed of mosquitoes” (FGD, pregnant woman 3, Amasaman)

4.6 Prevention of malaria during pregnancy

Regarding prevention of malaria during pregnancy, the results of the study showed that respondents generally knew the various strategies that can be employed. Respondents
mentioned that sleeping under a mosquito net during pregnancy could prevent one from mosquito bites and therefore protect the woman against malaria. In addition, respondents mentioned that wearing of long sleeves to protect a pregnant woman against mosquito bites also offer protection against malaria.

The use of mosquito repellents was also identified by respondents in this study. Respondents were also able to identify the use of medications during pregnancy to prevent malaria. Respondent mentioned that they were given some three different tablets to take before the health worker and those tablets were meant to prevent both them and their unborn child against malaria as illustrated by the following responses:

“...Sleep in treated mosquito nets and check their diets” (FGD, pregnant woman 5, Amasaman)

“...Yes, I was given some green tablets, yellow tablets and some malaria drugs. Those three malaria tablets are taken instantly at the hospital” (FGD, pregnant woman 6, Amasaman)

“...She must sleep in treated mosquito nets, check her diet and regularly visit the hospital for antenatal care” (FGD, pregnant woman 8, Amasaman)

“...Wear long sleeves, a pair of trousers and socks to cover your body properly to avoid mosquito bites and mosquito repellents” (FGD, pregnant woman 1, Amasaman)

Nonetheless, some respondents indicated they had some unpleasant feelings on taking the medications that were meant to protect against malaria during pregnancy. Some participants in FGDs revealed that they often vomit and feel weak after taking the medication. Therefore they were not comfortable taking the medication but were compelled to take it because they were often supposed to take it in the presence of the health workers otherwise if given the opportunity to take it home, they may not take the medicine. This notwithstanding some respondents indicated they do experience any side-effects after taking the drugs to prevent them from malaria. The following quotes support these claims from respondents:
“...It protects the unborn child from malaria but me as a pregnant woman, I always vomit when I take those three tablets, I feel weak and lose my appetite, so I don’t like taking it” (FGD, pregnant woman 5, Amasaman)

“...My body reacts to the drug badly and I do not like it at all” (FGD, pregnant woman 7, Amasaman)

“...From my own personal experience, during the early stages of pregnancy I felt weak but since I started taking those three tablets I become strong and even I never spit as others did. I was able to do my work the way I should till I gave birth” (FGD, woman with child under 1 year-3, Amasaman)

Furthermore, the study showed that health workers were actually giving the malaria prophylaxis through the directly observed strategy where pregnant women are not allowed to take the medication home as required by the policy as illustrated:

“...We are always instructed to take the malaria drug at the health facility and are not allowed to take the drug home because it is believed that some pregnant women do not take the drug” (FGD, pregnant woman 4, Amasaman)

“...The nurses always say that they do not trust the pregnant women to take the medication properly at home so they insist you take it in their presence” (FGD, woman with child under 1 year 4, Nsakina)

The results of this study also showed that women were aware of the need to attend antenatal earlier so that they could receive medications to protect them against malaria. Respondents believed that going for the antenatal early also leads to monitoring of the mother and baby and can lead to early detection of malaria and prompt treatment to avert complications as illustrated:

“...Frequent and timely visit to the health facility for antenatal care and also take the right medications as prescribed to protect one against malaria” (FGD, pregnant woman 9, Amasaman)

“...When we go to antenatal earlier, we examine us and our baby and if you have malaria they will give you drugs to protect you and your baby” (FGD, pregnant woman 7, Amasaman)

“...Some of us could not go far in our education so we go to the nurses to educate us on how you and your baby can be healthy so that you would not get malaria. That is why you
have to go for antenatal care early when you get pregnant” (FGD, woman with child under 1 year-7, Amasaman)

Despite the fact respondents identified the use of mosquito net as one of the ways to prevent malaria; some respondents believed it was difficult to use the nets every night. Some of the reason cited for the non-use of mosquito nets was the belief that it generates a lot of heat making them uncomfortable in the night. Others also believed they react to the chemical that is used to treat the nets as illustrated:

“...Some of them said the mosquito nets are too hot to sleep under it” (FGD, woman with child under I year-3, Amasaman)

“...My personal experience when I once slept under it was water came out of my eyes. I think that it was because of the medicine it” (FGD, woman with child under I year-3, Amasaman)
CHAPTER FIVE
DISCUSSION

5.0 Knowledge on malaria

Knowledge on signs and symptoms of malaria was well known among respondents. They were able to identify the common signs and symptoms such as fever, headache, loss of appetite and vomiting. However, some studies have showed that during pregnancy, the signs and symptoms of malaria are delayed especially fever. The absence of clinical symptoms such as fever makes it difficult to recognize the malaria early and the diseases may often remain untreated until it causes complications (WHO, 2013). One study that investigated the level of malaria parasites among pregnant women reports a 59.9% prevalence of parasitaemia with the highest prevalence occurring in the first trimester (84.1%). Among the positive cases, mild parasitaemia was recorded in 47.2% moderate parasitaemia in 37.4% while severe parasitaemia was recorded in 15.3% of cases (Ogbodo, et al., 2009). However, majority of these people remain asymptomatic. The effect of malaria in pregnancy is therefore compounded by this asymptomatic nature at initial stages until complications set in. A study has showed that severe anaemia resulting from \textit{P. falciparum} infection is responsible for approximately 10,000 maternal deaths every year in Africa (Guyatt & Snow, 2001). There are however differences in the burden of malaria in pregnancy across Africa. Malaria in pregnancy has been reported to be responsible for 11% of maternal deaths in Nigeria (Coulibaly, \textit{et al.}, 2007). Given that the signs and symptoms of malaria may be delayed, it is important for pregnant women to be encouraged to take the Sulphadoxine Pyrimethamine prophylaxis. Clinical practitioners can also make a point to routine screen pregnant women attending antenatal for malaria to detect this condition earlier to initiate treatment before complication set in.
Despite the high knowledge on causes and signs and symptoms of malaria, some respondents held some misconceptions about malaria. This study showed that some respondents believed excessive use of oil could lead to malaria. Also, some respondents believed houseflies settling on foodstuff could cause malaria. Generally, these misconceptions may be harmless and may have some positive benefit. This is because, when it is believed that excessive fat intake could cause malaria, people with such believes will reduce the intake on fat which is known to predispose people to cardiovascular conditions (Siri-Tarino, et al., 2010; Wallström et al., 2012; Hooper, et al., 2015).

The belief that mosquitoes settling on foodstuff could also lead to malaria will result in people covering their foodstuffs. This has the potential to protect the food from houseflies which can infect food leading to food borne diseases such as diarrhoea and cholera. Cholera is common condition in Ghana and most especially in the Greater Accra region where annual outbreaks occur during the rainy seasons. Nonetheless, it is still important for people to receive correct information to disabuse these misconceptions.

5.1 Perceived Risk of malaria during pregnancy

The study found that respondents were generally aware of the high risk of malaria among pregnant women. An earlier study had showed that pregnant women were twice as likely to become infected with *P. falciparum* malaria as non-pregnant women living under the same conditions (Lindsay, et al., 2000). It is estimated that over 30 million women living in malaria-endemic parts of Africa become pregnant every year (WHO, 2013). In Ghana, a study has put the overall prevalence of malaria parasitaemia during pregnancy as 47%. Older age, multigravidity and third trimester of pregnancy were reported to be associated with a decreased risk of parasitaemia (Clerk, et al., 2009). Another study in Ghana revealed that adolescent pregnant girls were more likely to have malaria infection than the
adult pregnant women (34.6% versus 21.3%, P=.0.039), (Orish, et al., 2012). In the same study it was found that adolescent pregnant girls had higher odds of anaemia than their adult pregnant women equivalent (43.9% versus 33.2%).

5.2 Effects of malaria during pregnancy

The effects of malaria during pregnancy are also devastating for the mother and newborn infant. In this study, respondents were able to identify the effects of malaria on the unborn child during pregnancy such as premature birth, low birth weight, spontaneous abortions and death. It has been reported that in areas where malaria is endemic, 20–40% of all babies born may have low birth weight (Kabanywanyi, et al., 2008). About 20% of this LBW (LBW defined as birth weight below 2500g) deliveries attributable to the direct consequence of malaria during pregnancy (Kokwaro, 2009). LBW is also associated with poor infant development and survival, and contributes to around 100,000 infant deaths: 11.4% of neonatal deaths and 5.7% of all infant deaths or 17 deaths per 1000 live births according to another estimate (Menendez, et al., 2000; WHO, 2004; Desai et al., 2007). In addition, malaria during pregnancy is estimated to be responsible for about 70% of intrauterine growth retardation cases (IUGR) and 36% of preterm deliveries. Placental malaria also increases the risk of stillbirth particularly during the third trimester of pregnancy (Desai, et al., 2007). In Ghana, a study showed that incidence of LBW infants was 17.7% (30/170), most common among those with placental P. falciparum infection (p (chi (2)) =0.005) corresponding to a relative risk of 2.8. Median infant birth weight in those with placental infection was significantly lower than in those without infections (Ofori, et al., 2009). This further demonstrates the effect of malaria in pregnancy on birth weight of children.
5.3 Health seeking behaviour for malaria in pregnancy

Given the deadly nature of malaria, early health seeking is important to prevent complications that often result in the malaria-related mortalities. This study found that four main types of health seeking behaviour were portrayed by respondents; self-medication, use of herbal preparations, seeking care from biomedical facility and relying on the faith in God. Self-medication was reported as common and these medications are either acquired at drug stores or handed down from a previous user. This health seeking behaviour relies on what is described as the popular approach in plural medical system where health seeking is often determined and shaped by the interplay between individual, family society and community-based support systems (Dow, 2004). However, self-medication during pregnancy may have negative effects on both the mother and baby. First of all, there can be delays at home which will result in complications such as anaemia which may cause growth retardation, miscarriage, stillbirths, preterm births and in worst case scenario death of both mother and the baby (Walker, et al., 2007; Saleem, et al., 2011; Källén, et al., 2013).

Another effect of self-medication is that some drugs are often contraindicated during pregnancy because of potential effects on the foetus. Some of these medications can results in developmental challenges, cause neurological disorders on the foetus and may even results in miscarriage as has been reported by earlier studies (Ernst, 2003; Yates & Thomas, 2012). It is therefore important that health education to pregnant women should emphasize the potential effects of using drugs that are not prescribed to them by medical practitioner.

In Nairobi, a cross-sectional survey conducted indicated that the safety and the efficacy of the use of herbal medicine during pregnancy largely depend on the method of usage.
(Mothupi, 2014). In Malawi, it was found that use of herbs were common as about 51.4% of the pregnant women interviewed indicated they had used at least one type of herbal medicines during pregnancy. The most common herbal medicines used (63.9%) was coconut oil which was ingested during the third trimester of pregnancy only (Rahman, et al, 2008). In Nigeria, it was found that more than two-third (67.5%) of pregnant women in study had used herbal medicines either in crude forms or as pharmaceutical pre-packaged dosage forms, with the majority (74.3%) preferring self-prepared formulations (Fakeye, Adisa, & Musa, 2009). These herbal preparations may also have similar negative effects and cause developmental challenges as found in earlier studies (Yates & Thomas, 2012). Nonetheless, in a cross-national study conducted Europe, North and South America and Australia, it was reported that 1 out of 5 women stated that a physician had recommended the herbal use (Kennedy, et al., 2013) though in this current study, the use of the herbal medicine were not related to physician’s recommendation.

This study also found that the majority of the respondents sought healthcare from biomedical facility for malaria during pregnancy. The study also found that tests are conducted to confirm that the presenting signs and symptoms is actually malaria before treatment. This is commendable as it is in line with WHO guideline on managing malaria. This is important to prevent the abuse of medication that often results in drug resistance. To facilitate testing before treatment for malaria, the WHO, introduced the Rapid Diagnostic Tests (RDT) strategy and this kits have been distributed to malaria endemic countries in the world (Adjei, 2009). In addition, the study showed that first line treatment for malaria for general population was been used by pregnant women as respondents indicated, they were given Artesunate Amodiaquine therapy for malaria management. However, the recommended WHO guidelines for the prevention and treatment of malaria during pregnancy include LLINs, IPTp with sulfadoxine-pyrimethamine (sp) and
immediate diagnoses and effective treatment of malaria infections is being implemented in Ghana by the NMCP (WHO, 2016; WHO, 2010; NMCP, 2014)

Relying on one’s faith was reported as another health seeking behaviour for malaria during pregnancy. This approach is also problematic as it would lead to delays in health-seeking until complication sets in. It is therefore important to involve church leaders in this direction. It is often possible to combine the spiritual and physical approaches to managing ill-health and this should be emphasized in health education to spiritual leaders of the various churches.

5.4 Prevention of malaria

The study showed that respondents were able to identify how to prevent malaria. Respondents identified vector-based (mosquito) approaches such as clearing the surrounding of weeds and preventing stagnant waters that serve as breeding ground for malaria. Respondents were also able to mention specific preventive measures such as use of insecticide treated nets, wearing of long sleeves to prevent mosquito bites and use of Sulphadoxine Pyrimethamine during pregnancy. The WHO has recommended a full antimalarial treatment during the first ANC visit followed by weekly chemoprophylaxis for all pregnant women in malaria endemic areas (WHO, 2004; Yartey, 2006). Providing all pregnant women with at least two preventive treatment doses of an effective, preferably single-dose antimalarial drug during routine ANC visits. Currently Sulphadoxine-Pyrimethamine (SP) is the most effective drug for IPT despite the increasing resistance of SP to *P. falciparum* (WHO, 2015).

The second and current approach recommended by WHO in areas of stable *P. falciparum* transmission is a three-pronged approach that includes Intermittent Presumptive Treatment
and prompt case management agreed upon in the Abuja Declaration (Snow & Marsh, 2010). The Roll Back Malaria Partnership aims to ensure that all pregnant women receive IPTp and at least 80% of people at risk from malaria prone areas of high-intensity transmission use ITNs by 2010 and 100% for both interventions by 2015 (WHO, 2008). These strategies have been adopted by 35 of the 45 African endemic countries including Ghana, and are being delivered through collaboration between reproductive health systems and malaria control programs, during the four target antenatal care (ANC) visits throughout the pregnancy as recommended by WHO (Villar, et al., 2001; NMCP, 2014).

This study showed that Ghana was implementing these strategies as participants indicated they were given the SP at antenatal which the pregnant women take in the presence of the health worker. However, some pregnant women indicated they experienced some side-effects when they take the SP. Health workers should therefore make it a point to educate women on the possible side-effects of the drugs and ask pregnant women with severe forms to report to the health facility for management. Otherwise, this may have the potential to prevent women from going for antenatal for fear of the adverse reactions to the SP that given during this service. In Ghana, an earlier study found that some people experience some side effect after taking and this should be given attention during health education despite the fact SP is reported to be highly efficacious in preventing malaria in pregnancy (Tekete, et al., 2009; Fehintola, Balogun, & Adeoye, 2011; Tutu, et al., 2011).
CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Summary of the Key Findings

Firstly, it was found that the majority of participants sought for healthcare from biomedical facilities during pregnancy. They claimed that attending that biomedical facility during pregnancy was good because ‘they use machines to check the state of the unborn baby and also the health of the mother’. This is in conformity with the WHO guideline concerning malaria management.

Secondly, there were some participants who preferred the use of herbal medications or self-medication to the use of biomedical facilities during pregnancy. This creates some concern because the use of herbal medicines, or resorting to self-medication, may be harmful to the foetus, and may impair its developmental stages particularly during the first trimester.

Thirdly, most respondents appeared to have some knowledge of the causes and the signs and symptoms of malaria. They were also aware of the risks malaria posed to pregnant women and the unborn baby. This may imply that the health education communication that went on in Amasaman sub-municipal community were effective.

The study also indicated that a number of respondents had misconceptions on the causes of malaria. Such respondents perceived malaria as being caused by taking oily foods, or by consuming foods on which flies had settled. Such misconceptions may not be easily corrected because they might have lived with them for long.

The study indicated also that respondents perceived malaria to be deadly, and can kill if early attention is not paid to it. Respondents affirmed that malaria can kill all categories of
people. In addition, the study found that respondents were acutely aware that malaria during pregnancy can cause threatened abortion or premature delivery, and may even cause the death of both the foetus and the mother.

6.2 Conclusion

The study had it that the majority of the women in the GA West municipality knew that they had to attend ANC during pregnancy than to depend on self-medication and or herbal medicine which may have negative consequences on both the mother and the foetus.

From the study it can be said that the women were aware that; LBW, stillbirth, threaten abortion, premature delivery and or death of mother or baby are risks associated with malaria in pregnancy and for that matter they perceived that malaria in pregnancy is deadly.

As much as the majority of the women had adequate knowledge on the causes of malaria, others also had misconceptions on the causes of malaria.

Concerning the health-seeking practices, the study indicated that the majority of the women assessed healthcare from biomedical facilities when pregnant and consider that those facilities are reliable. The study however showed that a few of them resorted to the use of both herbal and orthodox medicines.

The study showed that the majority of the women of Amasaman sub municipality had appreciable knowledge and right perception of the negative consequences of malaria in pregnancy. However, the knowledge of the women in Amasaman on the risks of malaria in pregnancy had not imparted on their negative attitude.
6.3 Recommendations

1. Health promotion education to pregnant women should be done in a culturally-accepted language to change misconceptions of the causes of malaria among women. Health promoters who work with women should be knowledgeable on diverse cultures and language.

2. The Minister of Health should incorporate herbal medicines into the approved biomedical healthcare facilities to those women who prefer herbal medicine can use them under proper supervision by qualified practitioners.

6.4 Areas for Further Research

It is recommended that further studies should be carried out to determine why the incidence of malaria in pregnancy is still high in spite of the high level of knowledge and awareness of the risks associated with malaria in pregnancy.
REFERENCES


Fink, A. S.(2000). The Role of the researcher in the qualitative research process; A potential Barrier to Archiving Qualitative Data. Forum: Qualitative social research 1(3)


AFR/MAL/04/01


APPENDICES

APPENDIX I: CONSENT FORM

I…………………………..  have been thoroughly briefed on the entire methodology and
significance of the on-going research which is being conducted by AMA AKOMAA
BOHULU (Msc Applied Health Social Science). On my own accord, I hereby consent to
be part of the study based on my understanding of what the study entails.
I am doing this on condition that under no circumstances should any reference be made to
my actual identity to other persons outside this study as promised by the researcher

Respondent’s signature……………………
Date…………………………………………

Researcher’s signature……………………
Date…………………………………………

GENERAL INFORMATION ABOUT RESEARCH

You are invited to volunteer information in a research study. This information sheet is to
help you agree or not if you would like to be part in the study. Before you agree to take
part in the study, you should fully understand what is involved in case you have any
questions, which are not fully explained in this leaflet, do not hesitate to ask the
researcher. You should not agree to take part except that you are completely satisfied with
all the procedures involved in the study. The study will assess the women’s knowledge
and perception of the risks associated with malaria during pregnancy in Municipality.
You will be asked to share your experiences and opinion in the focus group discussions
(FGDs) which will be lasting about forty minutes to one hour.

The FGDs will be recorded on a voice recorder and the information will be later typed out.
The typed out copy and the recorded data will be kept for at least five years at the end of
the study. The researcher will store the typed copies, the recordings and the consent forms in a securely locked locker. The written interview will only be reviewed by the researcher and her supervisors. The results from this study may be published or presented at conferences however; your name and any other information that may identify you will be withheld.

**POSSIBLE RISKS AND DISCOMFORTS** The study procedures will involve no foreseeable physical, social and psychological risks to you as a person or your health.

**POSSIBLE BENEFITS AND CONFIDENTIALITY** You will be acknowledged in the report.

All information obtained during the course of this study will be strictly confidential. Your name will not be mentioned anywhere in the study. The study data will be coded so that it will not be linked to your name. Your identity will not be revealed while the study is being conducted or when the study is published in any Journal.

**COMPENSATION** You will be compensated in form of snack for your participation in the study at the end of the discussions.

**VOLUNTARY PARTICIPATION AND RIGHT TO LEAVE THE RESEARCH**

Your participation in this study will be voluntary. You will be under no obligation to participate and you will have the right to withdraw anytime.
APPENDIX II: INTERVIEW GUIDE

SECTION A: PARTICIPANTS DEMOGRAPHIC INFORMATION
My name is AMA AKOMAA BOHULU, pursuing Master of Science (Msc) in Applied Health in Social Science degree at the University of Ghana, in the School of Public Health. I am conducting the research entitled “Knowledge and Perception of the risks of malaria during pregnancy among women” as a part of the requirements of the MSC degree in Applied Health. I would be grateful if you could assist me achieving this aim by answering these questions.

A.

i Age

ii Current marital status

iii Level of education

iv Religious affiliation

v Ethnic origin

vi Occupation

vii Place of residence

SECTION B

1. What is malaria?

3 What are some of the signs /symptoms of malaria? How do you get infected with malaria?
4 Thank you. What can malaria do to you?

5 Have you gotten malaria before?

6 What treatment were you given the last time you got malaria?

7 Can you prevent the malaria disease?

Probe

What can you use to protect yourself from malaria?

If you say going into your room early, how early should you go into your room

8 Can you then say that malaria in pregnancy is dangerous/serious disease?

Probes

In your opinion what makes malaria in pregnancy a dangerous/serious disease?

What actually happened to you?

Have you heard/seen that malaria has killed someone before?

9 What group of people do malaria kill?

I mean old, young people or pregnant women?

10 Can pregnant woman get malaria?

11 Have you seen pregnant woman being killed by malaria before?

Probe

Can malaria in pregnancy affect the unborn baby? Can I have your individual opinion?

12 Should pregnant woman take malaria as serious sickness?

12 What should pregnant woman do when she gets malaria since you say malaria in pregnancy is serious sickness?

13 Why do pregnant woman go for ANC?

14 What do you learn in ANC?
Probe

Do you get mosquito net from ANC?

What is the mosquito net for?

15 What malaria education do you get from ANC?

Probe

What do you mean if you say keep yourself well?

16 Why do the nurses give you the three white tablets when you go for ANC?

Probe

What are they for?

17 What is the name of those tablets?

18 Do the midwives tell you the name of the tablets and their importance?

19 Do you ask the midwives questions at ANC?

Thank you for your time.
### Group A Women with children under 1 year, Nsakina

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**Group B’ Pregnant women, Kojo Ashong community**

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### Group C; Women who have ever delivered

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### Group D: Pregnant women, Amasaman

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### Group E: Women with children under 1 year, Amasaman

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GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: Hannah.Frimpong@ghsmail.org

Ama Akomaa Bohulu
University of Ghana
School of Public Health
Legon, Accra

ETHICS APPROVAL - ID NO: GHS-ERC: 94/12/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Knowledge and Perception of the Risk of Malaria during Pregnancy in Amasaman Sub-Municipal, Amasaman"

This approval requires that you submit yearly review of the protocol to the Committee and a final full review to the Ethics Review Committee (ERC) on completion of the study. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

You are also required to report all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning 11th March, 2016 to 10th March, 2017. However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED................................................
PROFESSOR MOSES AIKINS
(GHS-ERC VICE-CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra
Ref. No.: SPH/SOBS/2015.12. ………… 15th December, 2015

The Director of Health,
Ga West Municipality
Amasaman - Accra

Dear Sir/Madam,

LETTER OF INTRODUCTION
AMA AKOMAA BOHULU - 10050142

I write to introduce to you Mrs. Ama Akomaa Bohulu who is pursuing a MSc. Applied Health Social Science in the School of Public Health, College of Health Sciences, University of Ghana, Legon.

Mrs. Ama Akomaa Bohulu’s dissertation is entitled: “Knowledge and Perception of the Risks of Malaria during Pregnancy among Women in Amasaman Sub Municipal”.

Mrs. Ama Akomaa Bohulu will pay a visit to your outfit to gather data for her work. We would be grateful if you could kindly give her the necessary assistance.

Thank you and counting on your co-operation.

Yours faithfully,

Prof. Philip Baba Adongo
Head of Department

COLLEGE OF HEALTH SCIENCES

P. O. Box LG 13, Legon, Accra, Ghana.
Telephone: +233 (0) 289 109 012/3
Email: sph-soha@ug.edu.gh
Website: www.publichealth.ug.edu.gh