

# Knowledge of Malaria Preventive Strategies among Pregnant Women in Tamale Metropolis, Ghana

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## ABSTRACT

Malaria is a problem during pregnancy in Ghana. It is associated with maternal anemia, premature delivery, intrauterine growth retardation and low birth weight. Ghana adopted the World Health Organization (WHO) recommendation, which states that, all pregnant women living in sub-Saharan Africa countries with stable malaria transmission to receive Intermittent Preventive Treatment during pregnancy (IPTp) using two doses of *Sulphadoxine Pyrimethamine*, Insecticide treated bed nets (ITNs) and effective case management. However, there is low patronage of prevention tools like ITNs in Ghana. This study aims at determining knowledge of malaria preventive strategies among pregnant women in Tamale Metropolis, Ghana. A cross-sectional hospital based study was conducted between February-May 2011, where a pretested questionnaire was administered to 100 pregnant women at Tamale west Hospital who were purposely sampled. 100 pregnant women were studied, 93% were knowledgeable about malaria preventive strategies. Giving the health impact of malaria in pregnancy, there is a need to intensify efforts to provide health education on malaria and preventive measures as well as to encourage preventive practices among pregnant women in the global world.

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## Introduction

Pregnant women are more susceptible to malaria than the general population. They are more likely to become infected, suffer a recurrence disease, develop severe complications and die from the disease. According to CDC (2004), malaria contributes very significantly to maternal and fetal mortality rate and at least 10,000 maternal deaths per annum are attributable to Sub-Saharan Africa. Regardless of symptoms, the presence of plasmodia parasites in a pregnant woman's body will have a negative impact on her and her fetus' health. Nosten et al., (2007), asserted that restricting treatment to symptomatic presentation in pregnant women is an inadequate strategy to reduce the morbidity and mortality associated with malaria. Malaria in pregnancy is different to the disease in a non-pregnant woman. The severity of malaria in pregnancy is thought to be due to general impaired immunity plus a reduction of acquired immunity to malaria in endemic areas. Placental malaria occurs where *P. falciparum*-infected erythrocytes accumulate in the intervillous space of the placenta but may be rare or absent in the peripheral circulation. Diagnosis by light microscopy of blood films is more difficult.

Ward et al., (2007) discuss the implication on treatment, which they said can be more difficult due to restrictions on antimalarial agents. Most treatments are unlicensed in pregnancy due to lack of clinical trials involving this important population and for the fears of damaging the fetus. There is frequently a lack of good post-marketing surveillance where these drugs are routinely used in pregnancy. The situation is worse when considering chemoprophylaxis.

Concurrent HIV infection worsens this scenario significantly: HIV increases susceptibility to malarial infection, and the presence of malaria causes an increase in HIV viral load.

## Epidemiology

Producing good estimates of the global burden of malaria is difficult due to poor numerator (number of women affected by malaria in pregnancy) and denominator (population at risk) data. However in Sub-Saharan Africa, the area most burdened by malaria, the disease is thought to cause 400,000 cases of severe maternal anaemia and between 75,000-200,000 infant deaths annually, as proposed by CDC (2000). Desai et al., (2007) also said that 25 million pregnant women are believed to be at risk of *P. falciparum* infection per annum in this region and 25% have evidence of placental infection at the time of delivery. And that; Malaria makes a large but unquantifiable contribution to low birth weight in infants in the developing world, a major cause of morbidity and mortality in infants and children.

Preventing malaria in pregnant low gravid women: reduces severe maternal anaemia by 38%, reduces low birth weight by 43%, reduces perinatal mortality by 27% (Nosten et al., 2007). Preventing and treating malaria in pregnancy can be a key intervention to improving maternal, fetal and child health globally and is linked to 3 of the Millennium Development Goals (MDG-3 Maternal Health, MDG-4 Child Health, MDG-5 Combating Infectious Disease). Pregnant women with one previous birth are also at higher risk. The effect of gravida status on complication risk is

negated by concurrent HIV infection, as identified by (Herrero et al., 2007)

### Presentation

Atypical presentation of malaria is common in pregnancy, particularly in the second and third trimesters, so a high index of suspicion should be maintained in susceptible pregnant mothers.

### Management

If malaria is suspected in a pregnant patient, it should be referred immediately to secondary/tertiary care where infectious disease, obstetric and neonatal care is on hand and intensive care facilities are available. Orton and Omani (2008) stated that drugs should be used at adequate doses and according to clinical condition and local resistance patterns. A recent Cochrane review pointed to the lack of quality data, particularly as regards to drug safety in pregnancy.

### Maternal and fetal complications

In endemic/high-transmission areas for malaria, baseline immunity to malaria is decreased by pregnancy. Sufferers are more likely to experience severe anaemia. A non-immune pregnant woman (or one with low immunity from a low-transmission area) is likely to develop a severe form of the illness and complications such as Hypoglycaemia, Disseminated intravascular coagulation, among fetal complication is Spontaneous abortion and Low birth weight.

### Prognosis

It is difficult to estimate exact morbidity and mortality rates due to the heterogeneity of severity but with non-immune patients there is a high risk of acute, severe complications and death if the illness is not diagnosed and treated quickly.

### Statement of the Problem

For a long time, malaria in pregnancy has been associated with a range of deleterious effects in women and their offspring. It has been recognized as a public health priority since the beginning of the 1980s. According to WHO (2004) it is estimated that each year more than 25 million women become pregnant in malaria endemic areas – mostly in sub-Saharan Africa – and 75,000 to 200,000 infant deaths are attributable to malaria infection in pregnancy.

The severity of clinical manifestations is determined by the level of immunity before pregnancy, which depends on the intensity and stability of malaria transmission. In low and/or unstable transmission areas, the degree of acquired immunity of women prior to pregnancy is low, and both the mother and her foetus are at risk for the most severe consequences of the infection. Malaria infections are symptomatic. The current strategy is to treat malaria suspected cases effectively. In contrast, in areas of high malaria transmission (as in sub-Saharan Africa), women have acquired a protective immunity prior to pregnancy and malaria infections are generally asymptomatic and the strategy is based on the prevention of infections. Since the early 2000's, prevention of malaria in pregnancy has been based on intermittent preventive treatments (IPTs) and Insecticide Treated Nets (ITNs) which is still not adequate.

### Consequences of Malaria in Pregnancy

In high transmission areas, malaria is associated with maternal anaemia – potentially responsible for maternal death when severe – and low birth weight (LBW) due to both prematurity and intrauterine growth retardation. LBW is a high risk factor for perinatal death and it is also correlated with morbidity and mortality during infancy. A study conducted by Steketee et al., (2001) estimated that malaria

may contribute to 3–5% of maternal anaemia, 8–14% of LBW, and 3–8% of infant mortality. Malaria consequences are particularly deleterious in women co-infected with HIV.

The introduction of IPTs was a turning point in the prevention of malaria during pregnancy in high transmission areas. This study is aimed to critically review available data on the awareness level and the use of malaria preventive strategies in pregnant women who visited Tamale West Hospital.

### General Objective of the Study

1. To assess awareness level and use of malaria preventive strategies among pregnant women who visited Tamale West Hospital.

### Specific Objectives

1. To determine the knowledge level of pregnant women on the cause of malaria in pregnancy
2. To assess the perception level of pregnant women on the effects of malaria parasites on them and their unborn children.
3. To investigate the awareness level and use of the malaria preventive strategies that exists.
4. To identify the attitude or behavior of pregnant women towards the malaria preventive strategies.
5. To suggest recommendation to improve the malaria preventive strategies for the pregnant women.

### Significant of the Study

The results of this study is expected to contribute to knowledge in the area of maternal and child health in Ghana. This study will serve as reference for any future research by GHS and MOH, UNICEF, WHO and other Sister organizations, on the way forward in setting policies and also enforcing the already existing policies that will help in controlling; malaria and pregnancy which have being mutually co-existing for a long time know.

### Scope of the Study

The coverage of this study focuses on assessing the level of awareness and the use of malaria preventive strategies amongst pregnant women who visited Tamale West Hospital, Zogbeli, Northern Region. The study was conducted from February-May 2011. The study includes only women who visited Tamale West Hospital at the time of the research.

### Definition of Terms and Concepts

1. Strategies: - a carefully devised plan of action to achieve a goal, or the art of developing or carrying out such a plan.
2. Attitude: -an opinion or general feeling about something.
3. IPTs :- Intermittent Preventive Treatments
4. ITNs :- Insecticide Treatment Nets

### Literature review

This chapter contains relevant information regarding malaria in pregnancy. The data was obtained from text books, research based publications, annual reports, policy documents, internet and other relevant sources. The purpose of this literature review was to obtain relevant information that would serve as basis for in-depth discussion of the findings emanating from this current study. For the purpose of being explicit, the literatures obtained have been presented under major headings carved out of the major objectives of the study.

### Knowledge about Malaria in Pregnancy

The pathophysiology of malaria in pregnancy is greatly due to the altered immunity and availability of a new organ called *placenta* in pregnancy. A dramatic breakdown of acquired immunity occurs in pregnancy, especially in primigravidae. (Paradoxically, fully effective antimalarial immunity is transferred to the child!) Various hypotheses have

been put forth to explain the pathophysiology of malaria in pregnancy. Placenta is a new organ in the primigravidae and allows the parasites to by-pass the existing host immunity or allows placenta specific phenotypes of *P. falciparum* to multiply. Development of placenta specific immunity may thus explain the decreased susceptibility in multigravidae.

Recently, it has been discovered that multigravid women can form strain-independent antibodies against CSA-specific parasites, and they demonstrate greatly diminished parasite load. The unique susceptibility of primigravids to placental infection can be explained by their immune inexperience with the parasite subpopulation. *P. falciparum* has the unique ability of cytoadhesion and adhesion molecules such as CD36 and intercellular adhesion molecule-1 may be involved in the development of severe malaria in children and non-pregnant adults. Chondroitin sulfate A and hyaluronic acid have been identified as the adhesion molecules for parasite attachment to placental cells. The putative ligand expressed by the parasite is PfCSA-L and it has been found to be antigenically conserved among global cases of maternal malaria, suggesting a unique subpopulation of *P. falciparum* that do not bind to CD36. The parasites sequester along the surface of the placental membrane, specifically the trophoblastic villi, extravillous trophoblasts, and syncytial bridges. Intervillous spaces are filled with parasites and macrophages, interfering with oxygen and nutrient transport to the foetus. Villous hypertrophy and fibrinoid necrosis of villi (complete or partial) have been observed. All the placental tissues exhibit malarial pigments (with or even without parasites).

These changes impede oxygen-nutrient transfer and can cause general hemorrhaging. These changes contribute to the complications experienced by both mother and child (Brunner and Suddarth, 2008)

#### Effects of Malaria in Pregnancy

According to Ward et al., (2007), in Africa, 30 million women living in malaria-endemic areas become pregnant each year. For these women, malaria is a threat both to themselves and to their babies, with up to 200,000 newborn deaths each year as a result of malaria in pregnancy.

Pregnant women are particularly vulnerable to malaria as pregnancy reduces a woman's immunity to malaria, making her more susceptible to malaria infection and increasing the risk of illness, severe anaemia and death. For the unborn child, maternal malaria increases the risk of spontaneous abortion, stillbirth, premature delivery and low birth weight - a leading cause of child mortality.

The problem has long been neglected, but new approaches and commitment offer hope for reducing the burden of malaria in pregnancy and improving the health of mothers and newborns.

#### Preventive Strategies

Based on available evidence, WHO recommends a three-pronged approach to the prevention and management of malaria during pregnancy:

- Insecticide-treated nets (ITNs)
- Intermittent preventive treatment
- Effective case management of malarial illness.

Sleeping under ITNs remains an important strategy for protecting pregnant women and their newborns from malaria-carrying mosquitoes. In addition, in areas of high and moderate transmission of *Plasmodium falciparum* malaria (the most prevalent type of malaria in Africa), intermittent treatment with an antimalarial drug is a cost-effective means of preventing malaria in pregnancy. The current

recommendation is to give at least two doses of a safe and effective antimalarial (currently, sulphadoxine-pyrimethamine) to all pregnant women living in these areas. The pregnant woman can as well use mosquito repellent mildly on the skin to prevent bite.

In areas of low or unstable malaria transmission, pregnant women have low immunity to malaria and a two- to threefold higher risk of severe malarial illness than non-pregnant women. In these areas, use of ITNs and prompt case management of pregnant women with fever and malaria illness are the main strategies for malaria prevention and treatment.

#### Delivering Malaria Interventions through Antenatal Care

About two thirds of pregnant women in sub-Saharan Africa attend antenatal clinics at least once during pregnancy, presenting a major opportunity to prevent and treat malaria. The aim is to deliver this package - especially intermittent preventive treatment - to pregnant women as part of their routine antenatal care, using and strengthening the existing antenatal care infrastructure. This strategy is now an integral part of WHO's "Making Pregnancy Safer" initiative, which aims to strengthen antenatal services and provide preventive measures, treatment, care and counseling to improve all aspects of health in pregnant women and their newborns.

#### Overcoming Challenges

At the first African Summit on Malaria in Abuja, Nigeria, 2000, African heads of state committed to providing effective malaria interventions to at least 60% of pregnant women by 2005. To achieve this goal, several challenges must be overcome:

- Delivery of malaria interventions through antenatal clinics in Africa needs to be widespread. This approach is currently the exception rather than the rule. However, large-scale programmes are now being developed, and several African countries are reviewing their policies in light of the WHO recommendations. A few have already adopted the strategy as policy.
- Major issues of concern still have to be addressed. These include drug resistance and the safe and appropriate use of different antimalarial drugs during pregnancy. As resistance to antimalarial drugs increases, the challenges of treatment and prevention of malaria among pregnant women become greater. Research in this area is therefore a high priority. There is also a need for research to develop prevention strategies for women residing in areas of low or unstable transmission, and in areas where the *Plasmodium vivax* type of malaria is a problem in pregnancy.

- Pregnant women who do not attend antenatal clinics or who attend only for the first visit or too late during pregnancy need to be reached. New strategies will be required to encourage these women to attend antenatal care early and consistently.

Within the Roll Back Malaria Global Partnership, WHO works with governmental, nongovernmental, bilateral and donor agencies to overcome challenges, meet the Abuja goal and reduce the burden of malaria in pregnancy. The availability of insecticide-treated nets, effective intermittent preventive treatment and a means of delivery through antenatal clinics, provides a unique opportunity that must be taken to protect the millions of African women who become pregnant each year, and their babies.

Professor Feikoter Kuile, MiP Consortium leader and co author said: "Ten years after the Abuja declaration, it is encouraging that the majority of malaria endemic countries in SSA have now adopted ITNs and IPTs and the number of

countries with nationally representative coverage data has increased to 40 out of 47. However, very few countries have reached either the Abuja targets or their own policy ambition, and countries are even further away from the more recent RBM targets set for 2010 (WHO, 2009).

### Recommendation

Coverage is lowest in areas with high malaria transmission, where the need is greatest. Nnaji et al., (2006) said "In general, low coverage with IPTs and ITNs contrasts with correspondingly high ANC attendance, indicating that there are missed opportunities for coverage and the attainment and maintenance of high coverage of ITNs which remains challenging", hence the need to increase coverage of IPTs and ITNs in the high malaria transmission zone throughout-reach programmers' and seeking for funds from the government for the constructions of CHPS (community base health and planning services) Zones in these areas.

In summary, whilst most countries have adopted national policies aimed at reducing and controlling malaria in pregnancy, it is clear that, with some notable exceptions, not enough progress has been made towards the new Roll Back Malaria (RBM) goals or the policy ambitions of each country, hence there is a need to intensify efforts to provide health education on malaria and preventive measures as well as to encourage preventive practices among pregnant women in the global world in order to meet the goals of Roll Back Malaria. (WHO, 2009).

With only four years in which to meet the Millennium Development Goals it is sobering that in countries with a national policy for IPTs and/or ITNs, an estimated 23 million pregnancies remain unprotected by ITNs and 19 million remain unprotected by IPTs. Greater effort to fully understand the reasons why coverage is so low and to develop strategies to combat this is urgently needed to protect the tens of millions of pregnancies in sub-Saharan Africa threatened by malaria every year" (WHO, 2010)

### Methodology

This chapter deals with the research methods, it outlines among other things: the study designed, population and sample size, sampling techniques, instrumentation and data analytical procedures among others. This chapter has been systematically presented as;

#### Study area

Tamale West Hospital is located at Zogbeli: which is bounded to the south by lamashagu, west by Nyohini, East by Sabonjida and North by the forest areas.

#### Study Design

The type of design adopted in this study is quantitative study, with a cross-sectional survey approach. This appropriate was used for the study because of the time limitation and also as it is for practical learning experience.

According to Best and Khan (1989), survey research involves the gathering of relevant information from a relatively large area within a relatively shorter period and instrument such as questionnaires and interviews guide are often used for data collection. The instrument used for gathering the data was a self-administered questionnaire.

#### Study Population

Pregnant women who visited the Tamale West Hospital as at 2010 were 47,460 people and those who tested positive for malaria parasites were 2995 people out of the total patient attendance (Tamale West Hospital; Statistical Department, 2010).

### Delimitation of the Study

The study was limited to only pregnant women of all ages so as to answer the questionnaire effectively.

### Sample Size and Its Determination

Sample size was calculated using the formula:  $nh = \frac{N}{1 + N(e)^2}$

Where;

nh = sample size

N = population size (2995)

e = margin of error (10%)

$$nh = \frac{2995}{1 + 2995(0.10)^2} = \frac{2995}{30.95}$$

$$nh = 96.769$$

### Instrumentation

A self-administered questionnaire was used for the collection of data. These questionnaires were answered within three months, 100 respondents were captured. In designing the instrument (questionnaire) the main objectives guiding the study were revised, gaps realized during literature review on the content of the study serves as a rich source of identifying items to be included in the questionnaire. The systematic procedure of composing the instrument was through;

a) Composition of item pool through brainstorming to elicit any thought that could be necessary in addressing the objectives of the study. These were written down in the form of questions and statements. As many items as possible were written down.

b) The item pool was subjected to scrutiny; as such items that were judged to be inappropriate to this study were eliminated.

c) The items of the instruments were subjected to critiquing by colleagues and other research experts as basis for establishing validity and reliability.

### Ethical Consideration

Ethical permission for the study was obtained from the ethical committees/ boards (Administration of Tamale West Hospital) and consent of the patients.

### Validity and Reliability

Validity refers to the truthfulness of a study while reliability denotes the consistency of a study. According to Best and Khan (1998), Validity is the degree to which an instrument measures what it is intended to measure and Reliability, according to Brain (1994), is the extent of agreement between repeated measures. In making the study valid, clear and realistic objectives were set, well organized literature review compiled, the item of the instrument reflects on the objectives as well as appropriate responses made to the questions by respondents. For reliability, concepts in the instrument were clearly clarified so as not to bring misunderstanding. The questionnaires were also subjected to critique by colleagues and tutors as a basis for establishing validity and reliability. Also for easy understanding, the right information was gathered in a systematic methodology.

### Sampling Procedure

An accidental (convenient) type of non-probability sampling was used. Here the questionnaires were handed to pregnant women who could read and write for them to answer the questions and those who could not read and write were supervise in answering the questionnaire. Although this method of sampling has inherent disadvantage, it was seen to be the most appropriate due to time and logistical constraints.

### Data Collection Procedure

Data was collected from the sample size chosen; by way of going to the hospital and giving them the questionnaires. Potential respondents were identified for the purpose of the

study from Tamale West Hospital Antenatal Department, Outpatients department (OPD) and the Female Ward. At the appropriate time, respondents were approached individually at their own time of convenience and explained to them the purpose of the study. After allaying their anxiety with careful explanations, the questionnaires were then given out to them. A total of three (3) months was used in collecting the data so as to provide enough time for accurate information. After the allowed time, the questionnaires were collected from the respondents and the information got was compiled immediately to avoid distortion and data loss.

#### Data Analytical Procedure

It was important that data collected from the field of study be analyzed. The data was analyzed in relation to the objectives of the study. Both Quantitative data (numerical and close ended items) and Qualitative data (non numeric and open ended items) was entered into Microsoft excel 2007 spread sheet and imported to SPSS Version 16 for analysis. Results were presented with simple statistical tools such as frequency tables, percentages and graphs.

#### Organization of the Study

The study is organized into six chapters. Chapter one is the introduction and background of the study, statement of problem, purpose of the study, objectives of the study, significance of the study and operational definition of terms and concepts. Literature related to the study is presented in chapter two to serve as basis for in depth discussion of findings in subsequent chapters. Chapter three is the research methodology; it involves the study design, population under study, delimitation of the study, sample size, among others. Chapter four is the presentation of the analyzed data from the study. Chapter five is discussion of findings, where the findings of this study are compared to the literature review in chapter two. Chapter six is the last chapter that presents summary of findings, conclusions, limitation and recommendations.

#### Results

This chapter deals with presentation of results. Narrative summaries, frequency table, charts and graph have been found useful in ensuring clarity and systematic in the data presentation.

The presentation of the results has been made to cover five headings and these reflect personal data of the respondent and thematic area of the research.

#### Socio-Demographic Data of Respondents

It was found expedient to explore the personal data of the respondents to serve as the basis for descriptive cross tabulation against variables of the major part of the research.

**Table 4.1 Frequency distribution of the respondents by age**

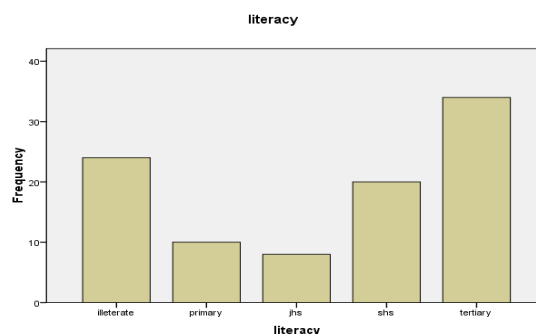
	Age	Frequency	Percentage (%)
Valid	<18	15	15
	18-35	60	60
	above 35	24	24
	Total	99	99
Missing	System	1	1
Total		100	100

From table 4.1 above, most of respondents were between the ages of 18-35 years, but this was not surprising to see, since people of this age falls among the highly fertile reproductive age.

**Table 4.2 Frequency distribution of respondents by locality**

Area		Frequency	Percentage (%)
	Zogbeli	77	77
	Others	23	23
	Total	100	100

From table 4.2 above, most of the respondents (above 70%) were from Zogbeli, but this is not surprising to see, since the research was carried out at West Hospital which is located in Zogbeli, a suburb of Tamale. Although the Hospital is located there, people from it periphery who patronized the hospital, also were included in the questionnaire. The periphery areas included; Lamashiegu, Nyohini, Sabonjida and the Forest areas.



**Figure 1**

The bar chart above (figure 1) shows the educational level of the respondent, the modal class were the highly literates in the tertiary group with about 37%, overwhelming majority were also Illiterate with almost 26% as shown in the graph.

**Table 4.3 Frequency distribution of respondent by marital status**

Marital status	Frequency	Percentage (%)
Single	16	16
Married	80	80
Divorce	3	3
Widow	1	1
Total	100	100

Table 4.3 shows the distribution of respondents by marital status, the modal were married with about 80% who made up the group, the rest were single (16%), divorced (3%) and widowed (1%) respondents.

**Table 4.4 Frequency distribution of respondents by occupation**

Occupation		Frequency	Percentage (%)
	House wife	16	16
	Trader	29	29
	Clerical	37	37
	Others	18	18
	Total	100	100

On the basis of occupation, the value gotten was a fair distribution, since clerical workers like the teacher, secretary, lawyers and nurses made up over 30%, traders above 20%, housewives fall among the least group with less than 10%.

### Knowledge on the Causes of Malaria in Pregnancy

**Table 4.5 Knowledge on the Cause of Malaria in Pregnancy**

	Frequency	Percentage (%)
Yes	93	93
No	7	7
Total	100	100

From the table above, over 90% of the respondents were knowledgeable about the cause of malaria in pregnancy, less than 10% had no knowledge.

**Table 4.6 Frequency distribution of respondents by Source of Information**

Source of Information	Frequency	Percentage (%)
Mass media	39	39
Print Media	18	18
Others	43	43
Total	100	100

From table 4.6, less than 20% of the respondents had the knowledge from the print media, more than 30% from mass media, other source was form Friends, Anti natal clinics, Classroom etc.

**Table 4.7 Frequency distribution of respondents by Causes of Malaria in Pregnancy**

Causes of Malaria	Frequency	Percentage (%)
Contaminated water and food	2	2
Bite from Mosquito	79	79
Others	19	19
Total	100	100

From table 4.7, about 2% believed that contaminated water and food is the cause of malaria in pregnancy, above 70% said is caused as a result of bite from mosquitoes, about 19% said stagnated water bodies and bushes around the house the cause of it.

### Effects of Malaria in Pregnancy

**Table 4.8 Perception of the effects of Malaria on the Pregnant Woman**

Effect of malaria	Frequency	Percentage (%)
Fatigue	4	4
Fever and Headache	19	19
Cold and Shivering	4	4
Weakness	3	3
Others	70	70
Total	100	100

The respondents were asked to give their opinion about the effects malaria on the woman their responses are as in table 4.8 above, with overwhelming 68% saying that it can cause anaemia, muscle and joint pain, and palpitations.

**Table 4.9 Effects of Malaria in Pregnancy on the Unborn Baby**

Effects on the unborn baby	Frequency	Percentage
Still birth and Abortion	47	47
Others	53	53
Total	100	100

They were asked about the effects of malaria on the unborn baby, 47% said it can cause still birth and abortion, about 53% opinion ranged from fever, placental insufficiency, anemia, premature birth, and fetal distress.

**Table 4.10 Effects of Malaria in Pregnancy on the Community and the Nation**

	Frequency	Percentage (%)
Low Productivity and Financial Loss	49	49
Others	51	51
Total	100	100

The respondents were asked about the effects of malaria in pregnancy on the family, community and the nation as a whole? And their responds is above in table 4.10 above 40% said it can cause low productivity and financial losses, where as 50% above said it can cause high maternal and fetal death.

### Preventive Strategies of Malaria

**Table 4.11 Showing awareness level of the Preventive strategies**

Response	Frequency	Percentage (%)
Yes	95	95
No	5	5
Total	100	100

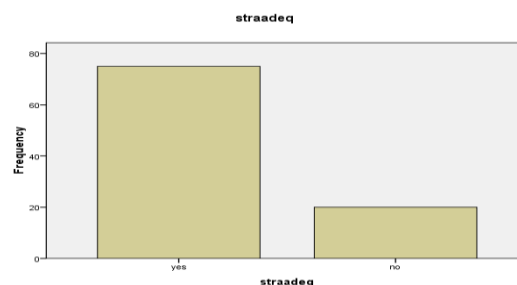
The above table shows the percentage of the level of awareness of the preventive strategies that exist among the respondents. Over 90% of the respondents are aware of the preventive strategies that exist, less than 5% were not sure if they are aware of the preventive strategies in place.

**Table 4.12 Showing the Types of preventive strategies**

Types of Preventive strategy	Frequency	Percentage (%)
ANC	8	8
IPTs	7	7
Management of malaria	2	2
ITNs	36	36
Others	47	47
Total	100	100

The above table shows the types of preventive strategies that were stated by the respondents, overwhelming knew about the insecticide treated nets (almost 40%), over 40% also believed other ways included robbing of mosquito repellants, spraying of the rooms, wearing of long sleeves and trousers in the night so as not to expose the body to the mosquito bites.

From diagram 2, the respondents who agreed the adequacy of the strategies in place to prevent pregnant women from getting malaria were over 70%, about 20% also believed that the strategies are not adequate enough to stop the devastating effects of malaria in pregnancy.



**Figure 2**

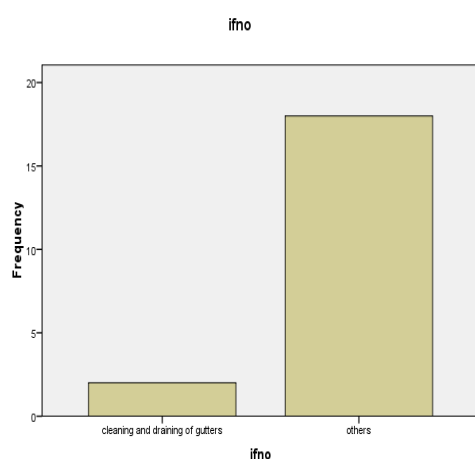


## Recommendations

**Table 4.13 Showing how the preventive strategies can be improved.**

	Frequency	Percentage (%)
Increasing awareness	43	43
Integration with other Programmes	8	8
Approved TBAs should be added	49	49
Total	100	100

The table above shows how the preventive strategies mentioned in the previous table can be improved. Almost 50% of the respondents believed that approved traditional birth attendance should be included in the spreading of the message about malaria in pregnancy.



**Figure 3**

Showing the frequency distribution of respondent who believes the strategies is inadequate. About 5% of the respondents stated that cleaning and draining of gutters, preventing water from stagnating can help, where as about 20% believed that the mosquito's should be made infertile so as to prevent them from reproducing.

## Discussion

### Socio-demographic

Most of the respondents were between the age group of 18 – 35 years, both literates and illiterates were included in the questionnaire, with the illiterates been assisted in the filling of the question so as to limit bias in the research. Most parents in the community who are currently married are about 79%, with a sizeable number being singled, widowed or divorced

### Knowledge of Pregnant Women on Cause of Malaria in Pregnancy

The finding of this study reveals that, majority all the pregnant women know something about malaria in pregnancy. In the literature reviewed in chapter two (2) the findings of WHO (2004) was affirmed by the overwhelming majority of the people who said that malaria in pregnancy is caused by the bite of mosquito which breeds in stagnant waters and waters left standing without closing it.

### The Effects of Malaria

The responses gotten from the respondents affirmed some of study of Steketel et al (2001) that malaria can cause fever headache, vomiting, maternal anaemia, splenomegaly, hypoglycemia, cerebral malaria, jaundice, placenta insufficiency, spontaneous abortion, premature births, fetal

distress, and infant mortality. They also believe that the effects of malaria in pregnancy in the family, community and the nation as a whole can lead to financial losses, fetal and maternal mortality.

### Malaria Preventive Strategies

When respondents were asked whether they are aware of any preventive strategy, about 97% responded “Yes” while the remaining 3% said “No” which reveals that, over whelming majority of the respondents in one way or the other affirms the findings of WHO (2004), three pronged approach to the prevention and management of malaria during pregnancy which is as follows; insecticide-treated nets (ITNs), Intermittent preventive treatments, effective case management of malaria illness.

The respondents also mentioned application of mosquito repellant, the use of mosquito coil and sprays, the used of netted doors and windows to prevent mosquito from entering the room etc. as preventive strategies of malaria in general not only in pregnancy.

### Attitude, Believes About the Preventive Strategies

About 45% believe that, although effective insecticide treated nets (ITNs) can sometimes be uncomfortable to sleep under because of the heat it generates which makes them sweat; some also believed that the Intermittent Preventive Treatments (IPTs) is good and since the introduction of the free maternal care, they need not worry about the cost of treatment.

Some pregnant women complained of drug resistance since they said they sometime end up with malaria any way after taking the (SP). Some respondents also laid their concern about inaccessibility of some of the clinics so the need for outreach antenatal programmes for this to reach those areas.

### Summary of Findings

From the study, certain vital issues have emerged and the observations were that;

Over whelming majority had some kind of knowledge on what causes malaria in pregnancy. This was evidenced by the research conducted as the respondents mentioned some causes like mosquito bite as a result of the mosquitoes breeding in stagnant water or standing water around our houses and homes.

The study showed that majority of respondents had some kind of knowledge on the consequences of malaria in pregnancy. Malaria can affect both the mother and the unborn baby. It can cause anaemia, headache, fever, cerebral malaria, jaundice on the unborn baby, fetal anaemia, congenital malaria, still birth, abortion etc. They believed that since the women contributes to the upkeep of the family when the woman is down with malaria, it can have devastating effects on the community and the nation as a whole resulting in low productivity and financial lost to the state.

Majority of the respondents agreed that some of the malaria preventive strategies included, insecticide treated nets (ITNs), intermittent preventive treatment which is been shared to the pregnant women at the antenatal clinics and early screening, detection and management of malaria patients so as to prevent complications to both the mother and unborn baby.

Majority of the respondents agreed that in other to help reduce the devastating effects of malaria in pregnancy, the pregnant women must be ready to make conscious effort of following the preventive strategies stated. Mass education should be used because, it will help educate the people on the risks involved when the preventive strategies are not followed adequately, thus this will enhance the awareness level and use

of malaria preventive strategies among the pregnant women. Relatives, friends and health workers should also be ready to provide support and refrain from neglecting the pregnant women.

#### Limitation

Due to time factors, financial constraints and in-experience on the part of the researcher, a small sample size was used which may not be representative of the target population. It is limited to only pregnant women especially those who attend antenatal clinic at the Tamale West Hospital. The boundaries also limit pregnant women who are not within the area of study from taking part in responding to the questionnaires. They were all observed as setbacks to this study.

#### Conclusion

The findings of the study reveal that, majority of the people are aware of the health hazards of not adhering to the malaria preventive strategies; like anaemia, fever, headache, still births, abortions etc. but not much is done to change behaviors that may lead to avoidance of malaria in pregnancy. There is a need to intensify efforts to provide health education on malaria and preventive measures as well as to encourage preventive practices among pregnant women in the global world.

#### Recommendation

Based on the findings of this study and conclusions emerging, the following recommendations have been made, these recommendations have been succinctly presented and direct the attention of health managers, political leaders and religious body, to include the following; Integration of malaria control tools with other health programmes targeted for women with pregnancy. For the hard to reach areas, outreach programmes should be conducted for them and also approved traditional birth attendance should be included in the spreading of the campaign to help curb this problem.

Awareness of the problems associated with malaria should be intensified through education and counseling in antenatal visits. There should be mass campaign of the effects of not adhering to the preventive strategies adequately, on the media, TV, radio, graphic, journals and through the staging of dramas. The government should help to subsidize the cost of the Nets and malaria drugs given to the pregnant women.

The government should further source funding from the World Bank and other international agencies to ensure that the role back malaria campaign reaches every community.

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