SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

BARRIERS AND FACILITATORS TO THE UPTAKE OF MALARIA INTERVENTIONS AMONG PREGNANT WOMEN IN YENDI MUNICIPALITY, GHANA

BY

JAMILATU ZAKARIA

THIS DISSERTATION IS SUBMITTED TO THE KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTERS OF PUBLIC HEALTH IN HEALTH EDUCATION, PROMOTION AND DISABILITY STUDIES

NOVEMBER, 2019

DECLARATION

This thesis is submitted to Kwame Nkrumah University of Science and Technology, School of Graduate Studies through the School of Public Health, Department of Health Education, Promotion and Disability studies. I hereby declare that this thesis has been composed by myself and has not been accepted in any previous application for a degree here or elsewhere. This thesis presents results of original research undertaken by me personally under the supervision of Mrs Rose Odotei- Adjei. Information taken from other works has been specially and duly acknowledged.

Jamilatu Zakaria	……	……
(20610832)	(Signature)	(Date)
Mrs Rose Odotei-Adjei	……	……
(Supervisor)	(Signature)	(Date)
Prof Anthony K. Edusei	……	……
(Head of Department)	(Signature)	(Date)

DEDICATION

This work is dedicated to the Almighty Allah for his boundless mercies and guidance in all my endeavours.

To my parents and family for their prayerful support and encouragement.

ACKNOWLEDGEMENT

My gratitude first goes to God Almighty for giving me life, strength and courage to complete this work.

I wish to express my heart felt gratitude to my academic supervisor, Mrs Rose Odotei-Adjei, School of Public Health, KNUST, for her immense support and guidance in making this work possible.

My gratitude also goes to Professor Anthony K. Edusei, Head of Department (HEPD) and all the lecturers and staff of Department of Health Education, Promotion Disability studies, School of Public Health, KNUST, for their support to my successful completion of my course.

I further extend my warmest gratitude to my research respondents for availing themselves to be interviewed.

My sincerest gratitude goes to my colleague students who supported me in one way of the other.

And last but not the least, to my family for supporting me both financially and emotionally.

ABSTRACT

Introduction

In 2012, the WHO revised its recommendations and now necessitates that in addition to LLINs, at least three doses of SP be given to all pregnant women at each scheduled antenatal care visit (ANC) beginning as early as possible in the second quarter and given at intervals of one month (Amankwah and Anto, 2019). These treatments are inexpensive and costeffective. However, access to and use of these interventions by pregnant women is extremely low. The study therefore sought to ascertain the barriers and facilitators to the uptake of malaria interventions among pregnant women in Yendi Municipality.

Methodology

This was a cross-sectional study of 394 pregnant women in communities within three subdistricts in Yendi Municipal. Structured questionnaires and Focus Group Discussions were used to collect data on pregnant women‟s socio demographics, knowledge of malaria in pregnancy and its interventions, and the barriers and facilitators to the uptake of these interventions. Thematic presentations were used for manual analysis of qualitative data. Quantitative data was analysed using STATA version 14.0. Categorical variables were presented as frequencies and associations were assessed using chi-square analysis with 95% confidence intervals.

Results

A total of 394 pregnant women at 16 weeks or more gestational age were studied. This research has shown that pregnant women are conscious of malaria, but they still lack extensive understanding of the disease. Some barriers could be attributed to supply-side problems and inadequate knowledge about the benefits of the recommended interventions, especially IPTp-SP. There were reports of side effects which affect their perception about the interventions. It was found that mothers participated in the uptake of the interventions because they were fairly knowledgeable about their benefits, especially LLINs. Also, their uptake of IPTp-SP was because SP is an ANC routine drug and is administered by DOT.

Conclusion

There is the need for concerted behavioural communication intervention to improve the knowledge of malaria regarding malaria prevention measures, causes and benefits of the uptake of recommended interventions.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The mantra of 'one million malaria fatalities' has been spoken annually by lay and scientific authors alike for over 50 years (Breman, 2001). Malaria is a huge global health issue that primarily affects young children, pregnant women and adults with little or no immunity. It is recognised in the world's tropical and subtropical regions as a severe health issue. As a result of its elevated and alarming morbidity and mortality rates, it has far-reaching medical, social and economic implications for the nations where it is endemic (Osei Tutu, 2009). The disease has a ruinous economic growth effect and continuous vicious cycles of poverty. It costs Africa US$ 10 – 12 billion in lost national product every year, even though it can be monitored for a fraction of that amount (Mba and Aboh, 2006).

Malaria is a life-threatening condition induced by the *Plasmodium falciparum* (WHO, 2010) and it is the most common malaria species in the WHO African region, representing 99.7% of estimated cases of malaria in 2017 (World Health Organization, 2018). People with malaria often experience fever, chills and flu-like diseases. If left untreated, serious complications may develop which may result in death (CDC, 2019). Malaria also manifests in a variety of disease forms. Acute infections can lead to cerebral malaria (CM), anaemia, respiratory distress, or hypoglycaemia; acute CM infections sometimes have long-term neurological consequences. Repeated infections contribute to severe anaemia (WHO, 2014).

The problem of Malaria infection among pregnant women was originally reported nearly 83 years ago. A number of descriptive research in sub-Saharan Africa from the 1950s to 1984 concentrated on infections with Plasmodium falciparum and outlined the frequency of placental diseases and specific adverse effects (Steketee *et al.*, 2001). Thirty million pregnant women

across Africa are susceptible to malaria every year (WHO 2003), and there is a risk of malaria throughout Ghana. Malaria accounted for 19% of all fatalities reported in Ghana in 2015 (World Health Organization, 2015).

The World Bank estimates that malaria during pregnancy contributes 9.0% of maternal deaths and is the single largest contributing factor to all OPD admissions among pregnant women (197,017 cases). (Odjidja *et al.*, 2018). An earlier systematic review and metaanalysis of seven studies established that malaria during pregnancy (MiP) is associated with serious maternal anaemia, low birth weight and cerebral malaria in females and that could lead to premature delivery and eventually death (Odjidja *et al.*, 2018). According to Turyakira *et al.* (2013), several studies have explored the effects of malaria on maternal health and birth-results during pregnancy. While anaemia dominates the effects of MiP on maternal health, information and mortality related to malaria are scarce. For the foetus, an enhanced risk of low birth weight is the most frequently reported adverse effect of MiP, which is a high risk factor for both impaired growth and infant mortality (Turyakira *et al.*, 2013).

1.2 Problem Statement

Malaria continues to be one of the most prominent global health issues despite huge efforts put in by both private and public sectors over the past few decades (Okeibunor *et al.*, 2011). Since 2000, malaria has cost sub-Saharan Africa $300 million annually for case management alone and is estimated to cost up to 1.3% of GDP in Africa (UNICEF, 2018). Malaria alone accounts for 28.1% of OPD attendance, 13.7% of admissions, and 9.0% of maternal fatalities among pregnant women in Ghana (Ghana Ministry of Health, 2010).

A significant percentage of individuals at risk of infection, including pregnant women and children in Africa, are not secured. The 2008 World Malaria Report shows that there is

inadequate access and use of lifesaving malaria tools and treatment (World Health Organisation, 2018).

Malaria during pregnancy has significant negative effects on mothers, foetuses as well as new-borns, but the harmful effects can be avoided. A study done by State *et al.*(2011), indicates that the inclusion of community-based programmes can substantially increase effective access to malaria prevention, and also increase access to formal health care in general. They also suggested the inclusion of antenatal care in combination with supply side interventions.

The World Health Organisation recommends a package of interventions for prevention and control of malaria during pregnancy in areas of stable *plasmodium falciparum* (Masaninga *et al.*, 2016). The detrimental effects of malaria during pregnancy can be significantly decreased using these interventions that have been in the system for over twenty years. These measures are inexpensive and cost-effective. However, access to and use of these interventions by pregnant women is extremely low, representing a failure of the public health community (Hill *et al.*, 2013).

1.3 Research Questions

1. What is the level of knowledge and perception of malaria and its prevention among pregnant women?
2. What are the facilitators to the uptake of malaria interventions among pregnant women?
3. What are the barriers to the uptake of malaria interventions among pregnant women?

1.4 Objectives of the Study

1.4.1 General Objective

The general objective of this study is to ascertain the facilitators and barriers to the uptake of malaria interventions among pregnant women in Yendi Municipal, Northern region.

1.4.2 Specific Objectives

The specific objectives of the study are;

1. To assess the knowledge and perception of malaria and its interventions among pregnant women.
2. To determine the barriers to the uptake of malaria interventions among pregnant women.
3. To determine the facilitators to the uptake of malaria interventions among pregnant women.

1.5 Significance of the Study

The researcher therefore seeks to contribute to existing literature of malaria in pregnancy by exploring the factors that affect the access and use of malaria interventions among pregnant women in Yendi Municipal. Specifically, the study will be substantial in clarifying the motivators and impediments to the uptake of malaria interventions during pregnancy.

The severity of the problem associated with malaria in pregnancy will be identified, thereby strongly raising awareness to the general public about the seriousness of malaria in pregnancy, and the importance of accessing and utilising malaria interventions. It is highly essential to identify the factors that influence the uptake of these established malaria interventions. Moreover, to unveil the level of knowledge and perceptions among these pregnant women, so as to take informed measures to clarify misconceptions and misperceptions about malaria in pregnancy and its interventions.

The realization of the above mentioned goal will contribute significantly to reaching target one of sustainable development goal three, which is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births by the year 2030.

1.6 Scope of the Study

Geographically, the study will take place in Yendi Municipal located in the Northern region of Ghana. In this regard, the study will focus on analysing the factors that influence the uptake of malaria interventions among pregnant women in communities within the Yendi Municipality. The analysis of this study will be based on a cross-sectional study in the communities.

1.7 Conceptual Framework.

The conceptual framework used for the study draws its strength from a Behavioral Model specifically the Health Belief Model (HBM). The HBM contains several primary concepts which predict why people will take action to prevent, to screen for, or to control illness conditions (Champion, 2008). The original HBM comprised of four constructs, namely: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Nonetheless, HBM scholars later improved the model‟s validity by including three new constructs, namely, cues to action, self-efficacy and modifying factors (Glanz *et al.*, 2002).

Perceived susceptibility refers to beliefs about the likelihood of getting a disease or condition. For instance, a pregnant woman will take malaria intervention if she believes that there is a possibility of her getting malaria.

Perceived severity is a belief about how serious a condition and its sequelae are. That is to specify consequences of risks and conditions of a health issue instigate a person to adopt a behaviour. For instance a pregnant woman who beliefs that malaria can lead to loss of her life and that of her unborn baby would take malaria interventions seriously.

Perceived benefits refer to belief in efficacy of the advised action to reduce risk or seriousness of impact. It describes an individual‟s opinion about the usefulness of a behaviour in decreasing the risk of contracting an infection. People tend to adopt healthier behaviours when they believe that such behaviours will decrease their chances of developing a disease. For instance a

pregnant woman needs to believe that the benefits of malaria intervention such as consistent use of LLINs or taking SP reduces her risk of getting malaria and hence experiencing its associated consequences.

Perceived barriers is belief about the tangible and psychological costs of the recommended action. It can be described as an individual‟s evaluation of potential negative aspects or obstacles to the adoption of new health behaviour. For instance, barriers like bitterness or side effects of SP may dissuade a pregnant woman from taking it. Therefore, in bid of promoting a health behaviour or intervention, it is imperative to identify and reduce perceived barriers through reassurance, correction of misinformation, incentives, assistance.

Cues to action also refers to strategies to activate "readiness" of adopting a behaviour. The concept of cues as triggering mechanisms is appealing, and can be an event, a person or merely a conscious perception of a poster. For example a relative, colleague or health personnel‟s opinion about malaria intervention can move a pregnant woman to utilize such an intervention.

Self-efficacy refers to confidence in one‟s ability to take action. Modifying factors including age, occupation, religion, marital status, education level, number of births/ children may influence knowledge and perceptions and, thus, indirectly influence health-related behaviour. For example, socio-demographic characteristics, particularly educational attainment, are believed to have an indirect effect on behaviour by influencing the perception of susceptibility, severity, benefits, and barriers (Champion, 2008).

The conceptual framework underpinning this study has been designed based on certain constructs of HBM. This is illustrated in Figure 1.1

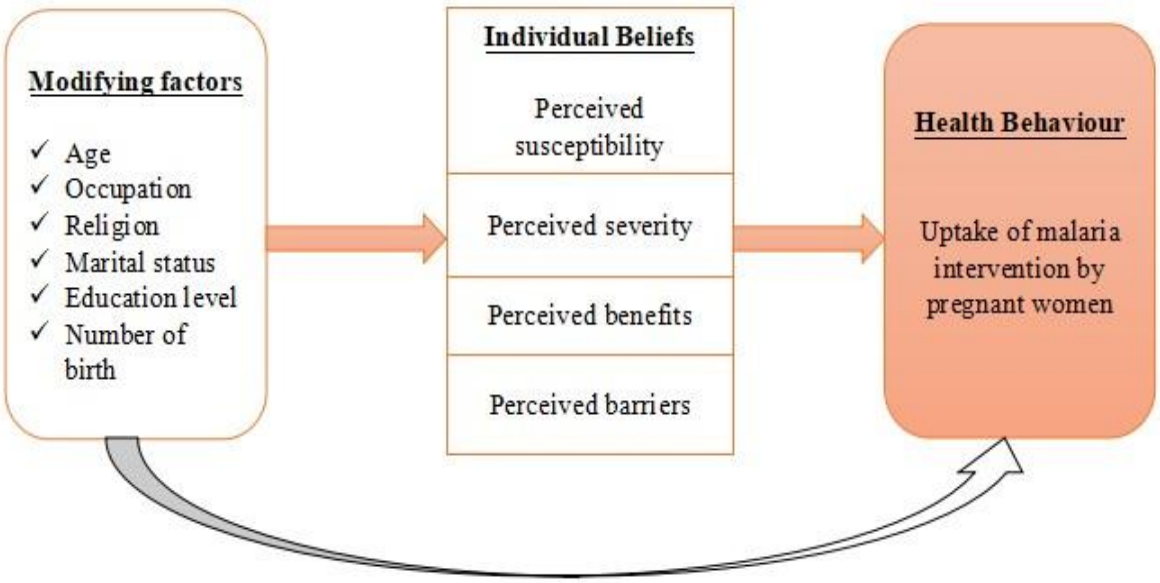

Figure 1.1 conceptual framework on health Belief Model (HBM)

(Author‟s construct, 2019).

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, literature relevant to the research is delved into for an explicit understanding of the subject matter. This chapter, therefore, captures areas including overview of Malaria in Pregnancy, MiP interventions, the knowledge and perceptions about MiP and its interventions, the barriers to the uptake of MiP interventions and the facilitators to the uptake of MiP interventions.

2.1 Malaria in Pregnancy

The global burden of malaria has declined in recent years, but more than 40% of the world's population is still at risk of infection and more than 400,000 people die each year. (Rogerson, 2017). The worldwide count of fatalities from malaria was 445 000, about the same number

reported in 2015 (World Health Organization, 2016). In 2016, a total of 216 million malaria cases were recorded by 91 countries, an increase of 5 million cases compared to the prior year.

Although the incidence of malaria has dropped worldwide since 2010, the rate of decrease has halted and even reversed in some areas since 2014. Mortality rates followed a comparable pattern (World Health Organization, 2016).

An projected 219 million malaria cases were reported worldwide in 2017 compared to 239 million in 2010 (95% CI: 219–285 million) and 217 million in 2016. Although there were an estimated 20 million fewer cases of malaria in 2017 than in 2010, data for the 2015–2017 period underlines that no significant progress has been made in this time period in reducing global cases of malaria. The World Health Organization (2016) reported that majority of cases of malaria in 2017 were in the WHO region of Africa (200 million or 92%), preceded by the WHO region of South-East Asia with 5% and the WHO region of the East Mediterranean with 2%.

Plasmodium falciparum is the most predominant malaria parasite in the African region, accounting for 99.7% of projected cases of malaria in 2017, as well as in the South East Asian (62.8%), Eastern Mediterranean (69%) and Western Pacific (71.9%) regions of the WHO.

Malaria is a major public health problem in Ghana, and one of the major causes of morbidity and mortality in children. It was responsible for 19% of all documented deaths in Ghana in 2015. Statistics report that, Malaria in Ghana accounts for 4% of the global burden in West Africa (Knowledge sharing for severe malaria, 2019).

It is caused by Plasmodium parasites, and infected female Anopheles mosquito, called „malaria vectors", spread the parasites to humans through their bites (Knowledge sharing for severe malaria, 2019). Malaria is hyper endemic in Ghana and among pregnant women, putting both

the mother and the foetus at risk of adverse effects (Gamble *et al.*, 2006). It accounts for 17.6% of OPD attendance, 13% of admissions and 3.4% of maternal deaths (Malaria in pregnancy, 2015). Maternal mortality is twice higher in pregnant women with malaria than among non-pregnant patients with severe malaria (Okafor *et al.*, 2019).

In areas with low and unstable malaria transmission, such as many regions in Asia and the Americas, women do not have significant anti-malarial immunity and are vulnerable to acute and sometimes severe malaria, and foetal and maternal death (Gamble *et al.*, 2006). In regions with constant transmission of malaria, such as most sub-Saharan Africa, Plasmodium falciparum infection during pregnancy is largely low-grade, sometimes sub-patent, persistent or recurrent parasitaemia. These often cause no acute symptoms but maternal anaemia and lead to low birth weight, which can lead to early child mortality. (Gamble *et al*., 2006).

Women in stable regions of malaria have obtained a pro-active immunity that, although partly decreased during pregnancy, remains powerful enough to avoid the onset of acute clinical symptoms in infestation (Cot *et al.*, 2002).

Pregnant women are particularly prone to infection with malaria. Severe malaria may develop without established immunity requiring emergency treatment, and loss of pregnancy is prevalent. In semi-immune females, the effects of malaria on the mother include anaemia while stillbirth, premature delivery and limitation of foetal growth inhibit the development of the foetus (Rogerson, 2017); (Amankwah and Anto, 2019).

Malaria control during pregnancy should be an essential component of maternal and perinatal morbidity and mortality reduction attempts in Africa (Agboghoroma, 2014).

After analysing 32 national cross-sectional data sets, a research carried out disclosed that prevention of malaria during pregnancy is connected with significant decreases in neonatal

mortality and Low birth weight based on the circumstances of the routine malaria control program. (Eisele *et al.,* 2012).

In 2012, the WHO revised its recommendations and now necessitates that at least three doses of SP be given to all pregnant women at each scheduled antenatal care visit (ANC) beginning as early as possible in the second quarter and given at intervals of one month (Amankwah and Anto, 2019). In addition, it also proposes the use of long-lasting insecticide-treated nets (LLINs) to prevent malaria during pregnancy (Hill and Kuile, 2018).

The WHO Global Technical Strategy for Malaria offers a technical structure for all malariaendemic nations working to control and eliminate malaria. It sets ambitious but achievable worldwide objectives for 2030, including decreasing malaria incidence by at least 90%, lowering malaria mortality rates by at least 90% in at least 35 nations, and preventing malaria from resurging in all malaria-free nations. The 2016–2030 timeline is in line with the 2030

Sustainable Development Agenda, supported in 2015 by all member countries of the United Nations (Okafor *et al.,* 2019).

2.2 Consequences of Malaria in Pregnancy

Millions of women in malaria-endemic areas are at increased risk of contracting malaria infection that threatens the outcome of pregnancy. The complication of this infection is considerable for mother and baby (Okoko *et al.,* 2003). During pregnancy, the symptoms and complications of malaria vary, based on the region's intensity of malaria transmission and the individual's level of immunity. (World Health Organisation, 2017); (Rogerson, 2017); (Deleron, 2003). P falciparum infections during pregnancy in Africa rarely lead to fever and thus stay undetected and untreated (Desai *et al.,* 2007).

Low birth weight (LBW) is a leading global risk factor for death among neonates and infants. Plasmodium falciparum infection during pregnancy is a notable cause of low birth weight (Eisele *et al*., 2012). Many studies show a significant association between placenta or peripheral blood malaria infection and haemoglobin levels, which confirms that this is a leading cause of anaemia, even if there are other factors. (Desai *et al*., 2007). A study by Singh *et al*., (1999) also indicates that cerebral malaria is one of the prevalent complications of severe falciparum malaria, with high pregnancy mortality.

Malaria can also affect the progression of antimalarial immunity during pregnancy during the first years of life. Children born to placenta-infected mothers were shown to be more probable than those born to non-infected mothers to develop a malaria infection between four and six months of life. (Briand *et al*., 2007). In addition, malaria increases sensitivity to other diseases and retards children's growth and development. (Okafor *et al*., 2019).

Malaria adversely affects the health and economy of the country, increases the cost of care and adversely affects family avenue (Taremwa *et al.,* 2017). Meta-analysis of intervention trials suggests that effective control of these infections decreases the likelihood of serious maternal anaemia by 38%, low birth rate by 43% and perinatal death by 27% among paucigravidae. The low birth weight connected with malaria during pregnancy is estimated to result in 100,000 infant deaths each year in Africa (Desai *et al.,* 2007).

2.3 Malaria in Pregnancy interventions

With more importance placed on community and individual involvement, the spectrum of malaria control is evolving globally (Oladimeji *et al.*, 2019).

The World Health Organization proposes a three-pronged approach to malaria in pregnancy control that involves the use of insecticide-treated nets (LLINs) and antimalarial drugs, either by intermittent preventive therapy (IPT) or case management (treatment) (Gamble *et al.*, 2006).

In 2012, it revised its recommendations and now requires that in addition to LLINs, at least three doses of SP be given to all pregnant women at each scheduled antenatal care visit (ANC) beginning as early as possible in the second trimester and administered at one month intervals. (Amankwah and Anto, 2019).

LLINs have a positive effect on the outcome of pregnancy in malaria-endemic African regions when used by households or by individual mothers (Gamble *et al.*, 2006). On the other hand, IPTp may have an impact on reducing the risk of placental malaria in hightransmission regions, low birth weight, severe maternal anaemia, and perinatal mortality in the first two pregnancies (Gamble *et al.*, 2006); (Gutman *et al.*, 2013).

LLINs have proved effective and should be included in policies aimed at reducing the adverse effects of malaria in pregnant women in endemic regions of the world (Gamble *et al.*, 2006). However, in this environment, IPTp presents higher difficulties to deliver via ANC than LLINs. It is estimated that there is a significant decrease in the public health effect on LBW arising from unproductive delivery of IPTp. Urgent attempts are needed to enhance this significant intervention's service delivery (Hill *et al.*, 2013).

A research conducted in Tanzania disclosed that there is scope for enhancing IPTp first and second dose coverage at domestic level within current systems by enhancing stocks at RCH and revising current rules to recommend delivery of IPTp after acceleration, rather than during a predefined antenatal visit. (Marchant *et al.*, 2008).

The Ghana National Malaria Control Program also updated its policy and now recommends a minimum of five doses of SP. Ghana's objective to achieve 55% intake of at least three doses of SP by pregnant women in 2015 was not achieved as only 41.3% received three or more doses of SP over the period (Amankwah and Anto, 2019).

Although pregnant women's coverage of intermittent preventive treatment and use of insecticide-treated nets has grown in majority of nations, coverage falls well lower than global objectives, regardless of relatively elevated attendance estimate in antenatal clinics. The outcome of implementing the WHO's 2012 policy amendment on intermittent preventive treatment, which sets to make the message more comprehensible and align preventive treatment with the targeted antenatal care plan, should be evaluated to determine if it leads to increase in coverage (Van Eijk, 2013).

A number of factors also influence the implementation and reception of suggested measures for MiP prevention and care. In conjunction to cost and accessibility problems, deterrents to LLIN use and IPTp uptake included discontent with and concerns about LLINs or retreatment of insecticides and concerns about the side effects of taking SP during pregnancy (Pell *et al.*, 2011).

In addition to their clinical efficacy, the effectiveness of these measures relies on the knowledge, attitudes and behaviours of pregnant women and the wider society which are shaped by social and cultural variables (Pell *et al.*, 2011).

2.4 Knowledge and perception

Adequate understanding of prevention of malaria can aid to reduce this increasing malaria among vulnerable groups, especially pregnant females and the under 5 children residing in endemic environments of malaria (Oladimeji *et al.*, 2019). According to Oladimeji *et al.*, (2019), indication from malaria knowledge, attitudes and practices (KAP) studies stipulates that there are still misconceptions about the spread of malaria and the risk factors with detrimental effects on activities for control of malaria. Findings from research done by Singh *et al.*, (2014) support this. However, they deduced that knowledge of prevention methods does not necessarily result in practices being improved.

Perceptions and opinions about the cause of malaria are strongly influenced by thoughts about their prevention (Adongo *et al.,* 2005). The practice of preventive measures for malaria has been linked to people's level of understanding and belief. Perceptions and opinions about the cause of malaria are strongly influenced by thoughts about their prevention (Adongo *et al.,* 2005).

Many respondents in some areas of Bulsa district attributed the underlying cause of malaria to dirty or stagnant water. In the qualitative interviews, the participants indicated that mosquitoes drank and injected the dirty water into their body, causing malaria. This implied that participants linked water, mosquitoes and malaria but the causal relationships, however, were not well established (Adongo *et al.,* 2005). Oladimeji *et al.,* (2019) also deduced that there have been gaps in knowledge about breeding sites for malaria-borne vectors, malaria symptoms and malaria prevention measures.

Some studies in Nigeria and other African countries also revealed false and misleading sources including staying long in the sun, drinking poor water, living in a filthy setting, consumption of unhygienic food, stress, among other malaria misconceptions (Oladimeji *et al*., 2019).

With regard to the signs and symptoms of malaria, (Hot body) is by far the most significant symptom used in malaria recognition. Malaria *feber* is diagnosed with a general rise in body temperature, often linked with other circumstances such as headache, loss of appetite, sour mouth, vomiting and tiredness. (Adongo *et al.,* 2005). In Northern Ghana, most individuals also recognize other minor symptoms such as chills as a symptom of malaria *feber* (Adongo *et al.,* 2005).

Obol *et al.,* (2011) from their study reported that, most pregnant females in northern Uganda have comparatively elevated understanding of transmission of malaria, signs, symptoms and

effects during pregnancy. However, most participants had misperceptions about the cause of malaria, while some had wrong or inaccurate ideas about how malaria was transmitted.

Household ownership and use of LLINs by pregnant women is progressing with present attempts to increase application of LLINs, but the gap between ownership and use remains large. (Belay and Deressa, 2008). In LLINs use surveys undertaken in Tanzania and Nigeria, only a few participants had extensive understanding of malaria, and few of the participants used LLINs. The knowledge constraints associated with the use of LLINs for malaria prevention and the presumed misconceptions and adverse attitude towards the use of ITNs as a preventive measure have resulted in the misuse of LLINs. Moreover, the attitude towards

LLIN use is affected by socio-cultural expectations, and cultural views about symptoms of malaria such as fever, back pain, nausea, loss of appetite and vomiting as indications of pregnancy, thus inhibiting women from using those LLINs. (Taremwa *et al.,* 2017).

A study by Heggenhougen *et al.* (2003) on the adoption of LLINs by the society has shown that different variables affect the use of LLINs, including cultural, behavioural and demographic factors, ethnicity, availability, gender relationships and malaria seasonality. (Mbonye *et al.,* 2005).

The knowledge of possible causes, methods of transmission and choice on preventive and control measures varies from society to society and between households (Kimbi *et al.,* 2014) and can play a significant role in the access of malaria interventions during pregnancy. A study done by Obol *et al.,* (2011) revealed that, a large proportion of participants were familiar with mosquitoes as a cause of malaria / fever though a very small percentage of the respondents were confident that malaria could be transmitted by mosquito bites from person to person (Legesse and Deressa, 2009). In addition, findings showed that nearly all research respondents

from the different communities knew that malaria was a severe disease for all age groups. (Legesse and Deressa, 2009).

A research undertaken by Singh et al. in Northern Nigeria's country side regions disclosed that while awareness of prevention of malaria procedures was substantial (90%), it was weakly mirrored in their practices. (Oladimeji *et al.,* 2019). Targeted instructional programs are needed to enhance the attempts of the populations to create desirable malaria attitudes and procedures and their involvement in malaria control (Singh *et al.,* 2014).

Good malaria practices in combination with elevated level of respondent knowledge are quite important for the sustainable implementation of malaria intervention programs. One of the techniques for malaria control that contributes to decrease in morbidity and mortality is instructional teaching on the comprehension of individual malaria awareness, attitudes and procedures (Amusan *et al.*, 2017).

The most significant problem that emerges here is that malaria health education is often presented or conveyed in a manner that makes it unacceptable to individuals. Control campaigners for malaria base their messages on premises that individuals do not recognize local understanding and malaria definition. The individuals of Kassena-Nankana and Bulsa may not have the precise local name for malaria, but everyday experience points to malaria being known as an endemic disease. (Adongo *et al.*, 2005).

While local individuals may not have a biomedical concept of malaria, they have developed local definitions and views over the years that are used to deal with malaria. Its long-term impact on understanding could lead to the synchronization of local and biomedical information that could promote the implementation and use of suitable health behaviours and LLINs (Adongo *et al.,* 2005).

In addition, a more efficient way to communicate data to individuals residing in endemic malaria regions is needed. It is not appealing to individuals to simply tell communities that mosquitoes cause malaria; health education needs to go beyond that and tell individuals why it is the mosquito that causes malaria and not other insects. The complexity of malaria transmission will involve a thorough science explanation, for example Health educators will need to communicate malaria entomology and epidemiology in a basic language to groups so that they comprehend (Adongo *et al.,* 2005).

Despite adequate understanding about malaria and its preventive measures, there is a need to enhance information availability through appropriate community channels. Particular attention should be provided to community members who are non-literate (Mazigo *et al.,* 2010)

2.5 Socio-demographic characteristics and uptake of malaria interventions

The results from a study done by Oladimeji *et al.,* (2019) show that socio-demographic variables such as marriage and educational status have a major effect on the prevention and control policies of malaria. Findings from Aregbeshola and Khan, (2018) support this.

Yaya *et al.,* (2017) also proposes that the level of education is a main factor in malaria awareness and that the likelihood of accurate malaria knowledge improves as the level of education increases. This is supported by Knowledge sharing for severe malaria (2019) as they revealed that, malaria infection rate is higher in non-literate mothers (43%) than secondary education or higher (5%).

Also, results from a reasearch conducted by Balami *et al*., (2018) discovered that there are conflicting outcomes for relationship between level of education and use of LLINs. Whereas a number of studies revealed greater use of LLIN with higher educational and revenue levels, others showed the opposite. However, their study's findings tend to be in line with the former, as its respondents also confirmed a higher use of LLIN. Moreover, there was no important

connection between age, educational level, source of income and use of LLIN, comparable with a past research within the exact area of Nigeria (Balami *et al.,* 2018).

It was also established that mothers with a greater number of preceding pregnancies have higher likelihood of sleeping under an LLIN, because they are probable to have enhanced knowledge of the threats of malaria and a higher chance of attending ANC clinics, thereby elevaing their chances of accessing LLINs (Idris, 2018).

On the other hand, Rumisha *et al.,* (2014) expressed that, though it is anticipated that marital status, education level and occupation predicts more doses of SP, it was not noted in their research. In another research conducted by Dako-Gyek and Kofie (2015), it was discovered that approximately 90% of pregnant females in south western Nigeria refused to take the drug because of their religious convictions.

2.6 Barriers to access of malaria preventive measures during pregnancy.

To decrease this burden of MIP, there is a need to reinforce Public Health (PHC) systems and address obstacles to the use of SP-IPTp and LLINs (Ameh *et al*., 2016).

A systematic review recognized several obstacles to IPTp uptake, including an absence of community awareness of the benefits of IPTp, the safety of SP use during pregnancy, the suggested IPTp dosing schedule, and whether SP can be taken on an empty stomach (Chico *et al.*, 2015). Similar to this statement, Sangaré *et al.,* (2010) also found that, the primary reasons for not completing a full 2-dose course of IPTp among women who had received only 1 dose included not being given IPTp from the ANC and lack of awareness about the 2dose schedule.

From their study, Barriers to IPTp uptake in Uganda (2015) found that, despite a number of minor issues (such as taking IPTp on an empty belly), mothers and communities are mainly positive about ANC and IPTp. IPTp's refusal levels are low and therefore, considering the

strong ANC attendance, the primary barriers to IPTp's provision are likely to be supply-side problems. In support of this, Rassi *et al.* (2016) expressed that due to the current elevated ANC participation levels in Uganda, supply side obstacles are likely to account for many missed chances to provide IPTp in Uganda.

A study found that educated women were more at risk of missed opportunities compared to those without education, which was contrary to Masaninga et al.'s study, where increased IPTp-SP uptake was associated with high school. This is probable because educated females are more likely to have a more busy schedule due to their jobs and therefore do not fully maximize the benefits of the ANC visit (Olukoya and Adebiyi, 2017).

Another significant obstacle to IPTp is the insufficient expertise of health employees about when and how to deliver IPTp. This is worsened by the inconsistent and outdated data contained in many policy documents and work aids to guide health employees (Barriers to IPTp uptake in Uganda, 2015).

Sangaré *et al.*, (2010) found that the failure to offer SP during ANC was the reason not completing the full course of IPTp-SP. These results show the significant role of health workers in providing IPTp to mothers and the need to investigate challenges in providing this treatment.

Other challenges to proper treatment include procedural problems from the demand side. COMDIS-HSD (2016) discovered that sometimes mothers are charged for what should be free treatment when visiting private facilities. Health seeking behaviour was also identified as a problem, with some interviewees only seeking medical attention during their pregnancy if they feel ill. From their study, it was observed that some mothers appeared negligent by not adhering with the recommended ANC visits or taking SP for IPTp (Mubyazi and Bloch, 2014). They were primarily concerned about psychosocial and some systemic (primarily supply-related)

factors, however, which reduced the likelihood of eligible pregnant females attending hospital and possibly taking IPTp with SP doses (Mubyazi and Bloch, 2014).

Late ANC registration by low- and high-parity mothers, lack of vital supplies such as drinking water and water cups (e.g., use of affordable disposable cups), significance of child spacing, as well as improving people's understanding of MiP and IPTp hazards in particular (Mubyazi and Bloch, 2014).

In a study conducted by Rassi *et al.* (2016), several health workers reported that they sometimes do not observe DOT, especially if their workload is high or if women ask to take the tablets home because they did not eat and do not want to take the medication on an empty stomach. Some pregnant women testified that, ANC staff sometimes allow them to swallow SP tablets at home and that gives some women room to throw away SP tablets after leaving the clinic.

Some of the causes are within the clients themselves (psychological), while others are external because they stem in their respective society and from the setting around the pregnant clients. (Mubyazi and Bloch, 2014).

Women who are pregnant may feel more comfortable if they can act freely, including when deciding whether to seek pregnancy care, where and when. Consequently, subjecting these women to take the medicine under DOT without their will may seem forceful and disrespectful of their autonomy to choose to use or not to use health care, and this is intolerable or inappropriate to some of them (Mubyazi and Bloch, 2014).

Interviewees also noted that some women would delay ANC attendance because their partners were unable or reluctant to accompany them. While this was not confirmed by any of the mothers studied, several stated that they were handled differently based on whether or not their

partners had attended with them. They stated, for instance, that females who attended with their partners were first seen, while those who attended without their partners had to wait (Rassi *et al*., 2016).

With regards to LLIN use, it was established by Singh *et al.* (2013) that some of the basis for not using LLINs included discomfort, heat or inconvenience, inadequate perceived benefit or preferential use of other preventive techniques for malaria. This is backed by a research undertaken by Aluko and Oluwatosin (2012), in which many mothers who slept under LLINs experienced at least one type of discomfort with the greatest distress being excessive heat. (Idris, 2018).

Ameh *et al*., (2016) in their study discovered that the lack of independence or freedom to receive SP-IPTp during ANC without consulting a family member, particularly the head of the household, is a barrier to using SP-IPTp. Refusal of SP during ANC visits may also be due to presumed adverse effects of SP on pregnancy as observed in Cross River State and Southwest Nigeria. Iliyasu *et al*. reported similar findings in northern Nigeria, but attributed cultural factors to pregnant women's reluctance to use SP without their husbands ' prior consent.

2.7 Facilitators to uptake of malaria interventions among pregnant women

Early initiation and frequent visits to antenatal care centres encourage the optimal use of SP doses (Amankwah and Anto, 2019).

It was found that the primary factor in determining preventive use of SP during pregnancy was being offered IPTp during an ANC visit (Sangaré *et al.,* 2010). Early first ANC is crucial in order to receive ideal doses of SP. It is presumed that a mother who visits ANC early is likely to receive more doses of SP if supported by frequent ANC visits. Also, given that SP is accessible and DOT is practiced at the facility (Hajira, 2015).

Another encouraging finding was that water, jerry cans, clean cups, and water purification tablets had been provided in sufficient quantities when SP was offered (Rassi *et al*., 2016).

Ameh *et al.,* (2016) also stated that informal health care providers such as drug vendors, traditional birth attendants and adolescent peer mobilisers are capable of increasing access to and compliance with SP-IPTp.

Health education programs are a significant requirement to prevent malaria. These programs target mothers, household heads and a broad variety of health care suppliers, and this is channelled into higher chances of MiP intervention uptake (Ameh *et al.,* 2016). In line with this statement, the results of the review by Owusu-Addo and Owusu-Addo, (2014) suggest that health education interventions are beneficial and remain a valuable resource in the prevention and control of malaria in the community. This review found reasonable indications that interventions in health education influence community-based malaria prevention and control interventions, enhance malaria awareness, and generally improve the prevalence and mortality of malaria in pregnant women.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter provides the available research methods that will be used to ensure successful execution of the study. It explains the methods that are specifically important for the purpose of the study and the data collection techniques that will be used. It is sub-divided into research setting, research design and approach, population and sampling techniques, instrument for data collection, procedure for administration of instruments, data analysis procedure, validity and reliability, and ethical issues.

3.1 Profile of study area

Yendi Municipal is one of the twenty six (26) administrative and political Districts in Northern Region. The Municipality is located in the eastern corridor of the Northern Region of the Republic of Ghana between Latitude 9º – 35º North and 0 º – 30 º West and 0 º – 15 º East. The Greenwich Meridian thus passes through a number of settlements – Yendi, Bago, Laatam, Lumpua, Gbetobu, Gbungbaliga and Nakpachei.

The population of the Municipality is about 148,650 projected from 2010 population and Housing Census and is varied in terms of ethnicity with the Dagombas constituting the majority. The other ethnic groups include Konkomba, Akan, Ewe‟s, Basare, Chokosi, Hausa and Moshie.

The centrality of the Municipality within the Eastern Corridor puts it in a better position to sap the energies of the remaining districts. This is manifested by the concentration of major development projects in the Municipality e.g. Hospital, Telecommunication facilities, Pipe borne water and banking services. The advantages inherent in the centrality of the district

notwithstanding, undue pressure are often brought to bear on the facilities mentioned above due to the large catchment area of the district.

The Municipality has 30 electoral areas but has 31 demarcated CHPS zones.

The Economy of the people is largely subsistence with Agriculture being their main occupation. Over 80% of the people depend on Agriculture for their livelihood.

Other economic activities include weaving, agro-processing (Shea butter extraction), meat processing, fish mongering, wholesale and retail of general goods, transport and many others. These activities are on a medium and small scale.

The potential of the district in Agriculture is enormous. The land is suitable for the cultivation of cereals, tubers and rearing of animals. Animals reared include cattle, sheep, goats, pigs and poultry birds for domestic and commercial purposes.

A good number of the populace is engaged in small scale manufacturing business. They include smock weavers, blacksmiths, bakers, mechanics, Shea butter and groundnut oil extraction.

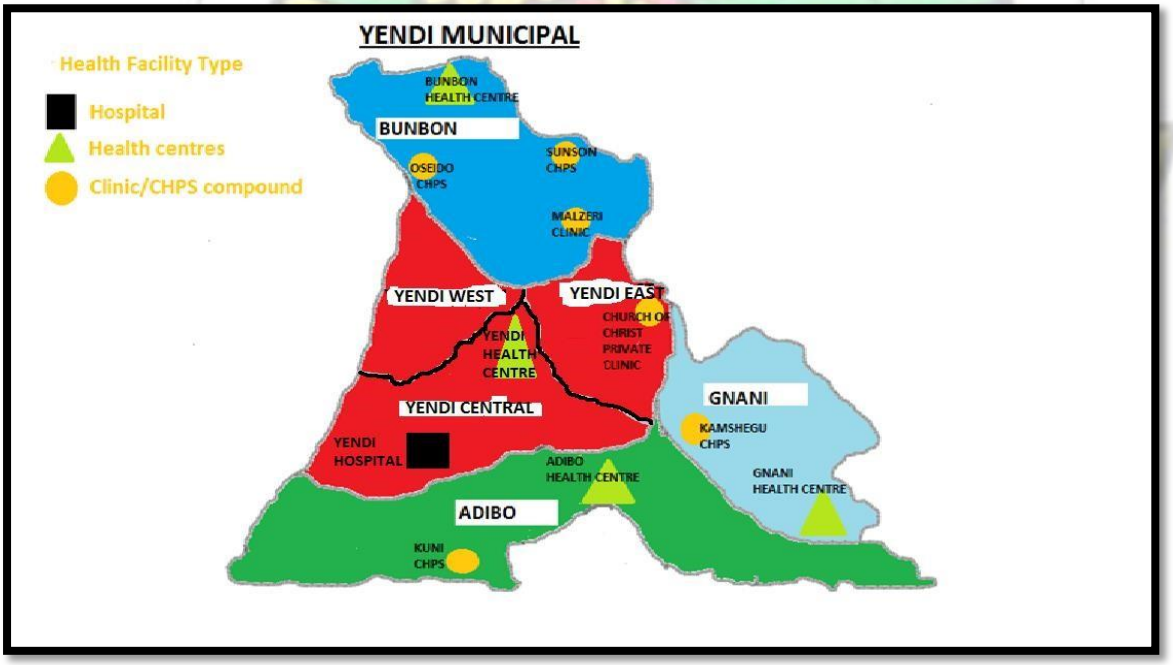

Figure 3.1 Geographical Map of Yendi Municipality

3.2 Research setting

Geographically, the study was designed to take place in communities within three (3) selected sub-districts of Yendi Municipal, Northern Region of Ghana. Specifically the study was done in Yendi central, Yendi east and Yendi west.

3.3 Research design and approach

Cross-sectional design was useful in this study. Bryman (2004) stated that cross-sectional design aims at getting data from multiple cases at a given point in time so as to analyse relationship across a number of variables of interest.

To achieve the objectives of this study, a mixed approach of quantitative and qualitative was used in the collection and analysis of data. The rationale behind the selection of the mixed method approach was for the broad purposes of breadth and depth of understanding and corroboration. This approach provides researchers with opportunities to compensate for inherent method weaknesses, on inherent method strengths, and offset inevitable method biases (Almalki *et al.*, 2016). Based on the principle of triangulation, the mixed method approach was ideal since all appropriate characteristics of this research would not be fully captured by any single technique such as interview or questionnaire

3.4 Population and sample size

In this study, the Taro Yamane formula was used to determine the required sample size. The Taro Yamane formula for calculating sample size is given as;

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the required sample

size, N is the study population, e is

the margin of error.

A report from Yendi‟s Municipal Health Directorate reviews that the number of expected pregnancies for the year 2019 is 3377. Therefore, using this figure in the Taro Yamane‟s formula, the sample size (n) was

$$n = \frac{3377}{1 + 3377(0.05)^2}$$

n = 358

Making provision for 10% non-response, 10% of 358

= 35.8

≈ 36

Therefore the total number of respondents was

= 358+36

=394

Table 3.1: Number of expected pregnancy from YMHD.

Expected Pregnancy							
	ADIBO	**BUMBONG**	**GNANI**	**YENDI CENTRAL**	**YENDI EAST**	**YENDI WEST**	**MUNICIPAL**
2014	689	944	742	1284	842	799	5301
2015	709	982	764	1321	870	810	5457

2016	732	1006	787	1335	915	842	5616
2017	757	1038	813	1375	926	870	5779
2018	780	1068	838	1412	953	895	5946
2019	795	1089	857	1486	979	912	6118

Source: Yendi Municipal Health Directorate, 2019.

Using the number of expected pregnancy from the selected sub-districts, the sample of respondents from each of these sub-districts is presented in Table 3.2 below.

Table 3.2: Sample of respondents from selected sub-districts.

Sub-district	No of expected pregnancy	Proportion (%)	Sample
Yendi central	1486	44	173
Yendi west	912	27	106
Yendi east	979	29	115
Total	3377	100	394

The target population for this study consisted of pregnant women in communities within the selected sub-districts in Yendi Municipal; Yendi central, Yendi west and Yendi east. The sample size estimate for collection of quantitative data for this study was 394 pregnant women. The study involved only women whose pregnancies are above 16 weeks, which is the recommended period for the first ANC visit and the first dose of IPTp is not given in the first trimester. This study therefore placed emphasis on pregnant women who have attended ANC

at least once in the course of their pregnancy where they have been introduced to the recommended malaria interventions.

3.5 Sampling Techniques

In order to answer the research questions, it was crucial that researcher be able to collect data from all cases. Thus, there was a need to select a sample. Since, researchers neither have time nor the resources to analysis the entire population, they apply sampling technique to reduce the number of cases (Taherdoost and Group, 2017).

The selected sub-districts were chosen through convenience sampling. The respondents, pregnant women, were also selected through simple random sampling. Two Focus Group Discussions with participants ranging between eight (8) and twelve (12) were also conducted.

The sampling techniques employed in this study have further been explained below.

i. Convenience sampling

Convenience sampling is a type of non-probability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Etikan, Musa and Alkassim, 2016).

For this study, due to geographical proximity, convenience sampling was used to select the sub-districts; Yendi central, Yendi east and Yendi west.

ii. Simple random sampling

The simple random sampling was used to select the required sample size from the population as simple random sampling method purely based on chance or equal opportunity, which is

desirable due to the unsystematic nature and the degree of uncertainty related to it, and that participants had equal chance of being selected for this study.

3.6 Instruments for data collection

Mixed method approach was used to collect data in this study. This type of research is one in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Almalki *et al.*, 2016).

For this study questionnaire was used for obtaining quantitative data from the respondents. On the other hand focus group discussions were used for obtaining the qualitative facts.

3.6.1 Primary Data

It is data collected and observed from first-hand experience. Primary data collection methods that were employed for this study included the following;

3.6.1.1 Questionnaires

According to Bird (2009), the questionnaire is a well-established tool within social science research for acquiring information on participant social characteristics, present and past behaviour, standards of behaviour or attitudes and their beliefs and reasons for action with respect to the topic under investigation.

The researcher administered questionnaires to obtain information from the respondents about the subject matter. The questionnaire included close ended questions; checklist questions. Administering the questionnaire involved the researcher asking questions and recording the answers in the questionnaire. This was used to obtain data from the respondents.

The questionnaire was first pretested with a small sample of respondents before use. The pilot checked respondents‟ understanding and ability to answer the questions, highlighted areas of confusion and looked for any routing errors, as well as provided an estimate of the average time each questionnaire was taken to complete. Any amendment highlighted by the pilot was made to the questionnaire before issuing a final version.

3.6.1.2 Focus group discussion

The focus group discussion involved gathering the pregnant women to discuss the specific topic of interest. Questions were asked about their perceptions attitudes, beliefs, opinion or ideas. In the focus group discussions, participants were free to talk with other group. Focus group discussions generally involves group interviewing in which a small group of usually 8 to 12 people (Dti, 2016). It was led by the moderator (researcher) in a loosely structured discussion of the various topics of interest.

According to Nyumba *et al.* (2018), focus group discussion is regarded as economical and an encouraging alternative in participatory study offering a platform for differing paradigms or worldviews.

3.7 Data analysis

After the data collection, the questionnaires were reviewed, responses were coded and analysed using STATA. The results obtained from the information were explicitly discussed with appropriate references to literature where necessary.

The qualitative analysis was done manually. The data (recordings) gathered from the field were transcribed and organised into themes.

3.8 Inclusion criteria

a. Respondent should be a Ghanaian who has resided in the selected sub-districts for a year or more.

b. Respondent should be pregnant for more than 16 weeks.

c. Respondent should be willing to provide an informed consent.

3.9 Exclusion criteria

a. The study will exclude all pregnant women within the selected sub-districts who have been pregnant for less than 16 weeks.

b. The study will again exclude pregnant women who are not residents of the selected sub-districts.

3.10 Ethical clearance

Ethical clearance was obtained from the Committee on Human Research Publication and Ethics, KNUST. Informed consent and permission to participate in the study was obtained from each participant. Participants also had the liberty to withdraw from the study anytime they deem necessary. Moreover, participants were at liberty to choose not to answer particular questions they are uncomfortable with. Strict confidentiality of the identity of respondents was maintained. Completed data collection tools were retained until the final work had been submitted and approved.

The knowledge and information that stemmed from the study was made available for public consumption through appropriate channels.

3.11 Study variables

The study examined the extent to which some of the independent-variables such as age, occupation and religion affected the dependent variable (barriers and facilitators towards the use of malaria interventions).

3.12 Assumptions

The assumptions below were made for the study

a. The sample size will adequately represent the population under study.
b. Some participants will not decline in answering the questions.
c. Respondents will be truthful, honest and frank with responses they give to the questions.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter entirely presents findings from the survey conducted. These findings are presented in five sections. The various sections encompass socio-demographic characteristics of respondents, level of knowledge and perceptions of respondents on malaria and its prevention among pregnant women, the facilitators to the uptake of malaria interventions among pregnant women, the barriers to the access to and use of malaria prevention measures during pregnancy.

4.1 Social demographic characteristics of respondents

A total of three hundred and ninety four (394) respondents were engaged in the study. The respondents were from communities within three selected sub-districts in Yendi Municipality namely Yendi Central, Yendi East and Yendi West.

Pertaining to age distribution, the minimum and maximum age recorded from the study were 14 years and 45 years respectively. Moreover, out of the total respondents, 39 (9.9%) were within the ages of 14 years to 19 years, 219 (55.6%) were within the ages of 20 years and 29 years, 120 (30.5%) were within 30 years and 39 years, whereas the minority, 16 (4.0%), were 40 years and above. The median age of the respondents was 26 years, with a mean age of 26.86 years. Also the standard deviation for the age of respondents involved in the study was 6.16. In

terms of occupation majority of the respondents, 148 (37.6%), engaged in the study were into trading with quite a number of them, 104 (26.4), engaged as Housewives. Others were also into farming, civil servants with the minority, 31(7.9%), engaged in other lines of work. The study also found that majority of the respondents, 383 (97.2%), were married and the remaining, 11 (2.8%), were single.

With regard to the number of children, majority of the respondents, 112 (28.4%) had just one child as at the time of the study. Only a handful of the respondents, 4 (1.0%), making the minority had eight children. The mean number of children was estimated as 1.95 with a standard deviation of 1.77. Notwithstanding that 111 (28.4%) of the respondents had attained a secondary or higher educational level, 140 (35.5%) making-up majority of the respondents had no formal education. On data collated for religion, Muslims constituted the majority, 292 (74.1%) of the total respondents. This was proceeded by 90 (22.8%) and 12 (3.1%) Christians and Traditionalists respectively. A detailed description of the socio-demographic characteristics of the respondents is presented in Table 4.1 below.

Table 4.1: Socio-demographic characteristics of the respondents

Variable	Frequency	Percentage (%)
Age		
14-19	39	9.9
20-29	219	55.6
30-39	120	30.5
40+	16	4.0
Mean ± SD= 26.86± 6.16		
Range = 14 - 45		
Median = 26		

Occupation		
Farmer	82	20.8
Trader	148	37.6
Housewife	104	26.4
Civil servant	29	7.4
Other	31	7.9
Marital status		
Married	383	97.2
Single	11	2.8
Divorced	0	0
Widowed	0	0
Number of children		
0	90	22.8
1	112	28.4
2	65	16.5
3	46	11.7
4	46	11.7
5	15	3.8
7	16	4.1
8	4	1.0
Mean ± SD = 1.95 ± 1.77		
Range = 0 – 8		
Median = 1		
Educational level		
None	140	35.5
Primary	71	18.0
Middle/JHS	70	17.8
Secondary/higher	111	28.2
Vocational	2	0.5

Religion		
Christian	90	22.8
Muslim	292	74.1
Traditionalist	12	3.1
Other	0	0

Source: Field survey, 2019.

4.2 Knowledge and perception

Most (86.8%) of these respondents were fully aware and knew that mosquito bites cause malaria. However some respondents had misconceptions about the cause of malaria. Falsely, 61 (15.8%), 26 (6.7%), 18 (4.7%) and 7 (1.8%) of the respondents associated the cause of malaria to not keeping the environment clean, eating unhygienic food, walking in the sun and working too hard respectively. Moreover, 31 (8.0%) of the respondents also associated malaria to other causes such as through unclean water, not washing hands after using the toilet and consuming too much oily foods. Furthermore, when respondents were probed about whether or not pregnant women are susceptible to malaria 95.1% indicated "Yes",
1.8% indicated "No" and 3.1% indicated "I don"t know". Virtually all the respondents, 383 (98.2%), were of the view that malaria is a grave and life-threatening disease. Response given by respondents when they were queried about the possible signs and symptoms of malaria included high temperature/fever (58.7%), headache (32.6%), weakness (32.1%), loss of appetite (30.0%), chills and rigors (24.9%), vomiting (24.4%) and looks pale (6.9%). Also 35.2%, 25.6, 18.5%, 17.6% and 14.5% of the respondents respectively indicated abortion, anaemia, still birth, premature delivery and underweight baby as some effects of malaria on pregnancy. However, 22.0% of the respondents had no knowledge about the effects of malaria in pregnancy.

The study also ascertained that 240 (64.7%) of the respondents asserted that malaria can be transferred from one person to another. Among these respondents 69.7% indicated transmission

occurs through mosquito bite from one with malaria to another whereas 17.5% also indicated that the transmission occurs as a result of sleeping together. Malaria prevention methods that were cited by respondents included use of LLINs (87.1%), use of mosquito coils (35.5%), use of mosquito repellents (24.8%), keeping gutters clean (23.8%), use of mosquito spray (16.6%) among others.

Interestingly, majority of the respondents, (94.0%), indicated that they would go to a health facility when they develop malaria. Also majority of the respondents, 350 (90.7%) were cognizant about malaria intervention for pregnant women which included LLINs (93.7%) and SP (58.0%). Side effects which respondents associated with the use of LLINs included catarrh (9.1%), inhaling too much chemicals (13.0%), body itching (42.8%) and body inflammation (2.1%). Also the side effects which respondents associated with the use of SP were found to include nausea (19.2%), dizziness (20.4%) and tiredness (10.9%). Table 4.2 illustrates respondents‟ knowledge and perception on malaria and its prevention.

Table 4.2: Respondents knowledge and perception on malaria and its prevention

Variable	Frequency	Percentage (%)
What causes malaria?*		
Mosquito bite	335	86.8
Eating unhygienic food	26	6.7
Walking in the sun	18	4.7
Working too hard	7	1.8
Not keeping the environment clean	61	15.8
Other	31	8.0
Do you think pregnant women are susceptible to malaria?		
Yes	371	95.1
No	7	1.8
Don‟t know	12	3.1

Do you think malaria is a serious and life-threatening disease?		
Yes	383	98.2
No	7	1.8
Don‟t know	0	0
How do you know a pregnant woman has malaria?*		
Looks pale	27	6.9
High temperature/ fever	229	58.7
Chills and rigors	97	24.9
Weakness	125	32.1
Loss of appetite	117	30.0
Headache	127	32.6
Vomiting	95	24.4
Other	104	26.7

What are some of the effects of Malaria in Pregnancy?*		
Anaemia	100	25.6
Still birth	72	18.5
Abortion	136	35.2
Premature delivery	68	17.6
Underweight baby	56	14.5
Don‟t know	85	22.0
Other	47	12.2
Can malaria be transferred from one person to another?		
Yes		
No	240	64.7
Don‟t know	116	31.3
	15	4.0
If yes, how?		
Sleeping together	40	17.5
Mosquito bite from one with malaria and to another	159	69.7
Other	29	12.7

How can malaria be prevented?*		
Use of repellents	95	24.8
Keep gutters clean	92	23.8
Use of LLINs	336	87.1
Use of mosquito coils	137	35.5
Malaria prophylaxis (SP)	43	11.1
Use of mosquito sprays	64	16.6
Other	89	23.1
What will you do if you develop malaria?*		
Chemical shop	23	6.0
Drug peddler	4	1.0
Health facility	363	94.0
TBA	0	0
Herbalist	4	1.0
Self-treatment	4	1.0
Do you know any malaria interventions for pregnant women?		
Yes	350	90.7
No	36	9.3
What are some of the malaria interventions for pregnant women?*		
LLINs	358	93.7
SP	222	58
What are some of the side effects? (LLINs)		
Catarrh	35	9.1
Inhaling too much chemicals	50	13.0
Body itching	165	42.8
Body inflammation	8	2.1
Other	52	13.5

What are some of the side effects? (SP)		
Nausea	74	19.2
Dizziness	78	20.4
Tiredness	42	10.9
Other	124	32.1

Source: Field survey, 2019. * Multiple response

4.3 Barriers and facilitators to uptake of malaria interventions

From table 4.1, respondents were more familiar with health facility as the source of accessing malaria intervention as compared with other sources.

From the study, 314 (90.0%) of the respondents admitted to have taken SP in their pregnancy. Reasons underpinning the intake of SP among these respondents were to prevent malaria (71.7%) and also as part of ANC routine drugs (28.3%). Moreover, reason for not taking SP by respondents in their pregnancy was shrouded under side effects (17.4%), too many drugs (11.6%), bitter tastes (5.8%) and other reasons (65.2%) such as no knowledge about SP, SP were not given during ANC, and G6PD deficiency. It was also divulged that 350 (90.7%) of the respondents used LLINs during their pregnancy. Of the 350 respondents, 95.7% used the LLINs to prevent malaria whereas the remaining 4.3% used it as part of ANC routine items. It was found that 33.3%, 22.2% and 12.5% of the respondents do not use ILLNs because they feel uncomfortable using it, its side effects as well as heat associated with its use respectively. Detailed findings on the barriers and facilitators to uptake of malaria intervention are presented in Table 4.3 below.

Table 4.3: Barriers and facilitators to uptake of malaria intervention

Variable	Frequency	Percentage (%)

Where can you access malaria interventions?*		
Chemical shop	4	1.0
Drug peddler	0	0
Health facility	366	94.8
TBA	0	0
Herbalist	0	0
Have you taken SP in this pregnancy?		
Yes	314	90.0
No	69	18.0
If yes, why?		
To prevent malaria	225	71.7
Part of ANC routine drugs	89	28.3
If no, why? Side effects	12	17.4
Too many drugs	8	11.6
Bitter taste	4	5.8
Other	45	65.2
Have you used LLINs in this pregnancy?		
Yes	350	90.7
No	36	9.3
If yes, why?		
To prevent malaria	335	95.7
Part of ANC routine items	15	4.3
If no, why?		
Side effects	8	22.2
Heat	4	12.5
Feels uncomfortable	12	33.3
Other	20	55.6

Source: Field survey, 2019.

4.6 Association between socio-demographic characteristics of respondents and knowledge on mosquito bite as a cause of malaria.

In Table 4.4 below, the association between socio-demographics characteristics of respondents and their knowledge regarding whether mosquito bite causes malaria was analyzed using chi-square test at 95% confidence interval (Significance level, α=0.05). A pvalue less than the significant level (α = 0.05) was obtained for educational level (p-value of 0.006) and number of children (p-value < 0.001) vis a vis knowledge on mosquito bite as a cause of malaria. The analysis therefore indicates that there is a statistically significant association between these variables. That is knowledge that mosquito bite causes malaria is associated with the educational level and number of children of respondents.

However, no association was found between knowledge on mosquito bite as a cause of malaria and age, occupation, marital status as well as religion of respondents. This is because their respective p-values compared with the level of significance was not statistically significant.

Table 4.4: Association between socio-demographic characteristics of respondents and knowledge on mosquito bite as a cause of malaria

Variables	Malaria is caused by mosquito bite		x^2	P value
	Yes	No		
Age				
14-19	27	8		
20-29	192	27	5.4583	0.141
30-39	100	16		
40+	16	0		

Occupation				
Farmer	67	11		
Trader	122	26		
Housewife	89	11	7.6816	0.104
Civil servant	29	0		
Other	28	3		
Marital status				
Married	324	11	1.7237	0.189
Single	51	0		
Number of children				
0	83	3		
1	94	18		
2	52	13		
3	35	11	19.8156	0.006
4	40	6		
5	15	0		
7	12	0		
8	4	0		
Educational level				
None	111	25		
Primary	62	5		
Middle/JHS	61	9	19.9570	0.001
Secondary/higher	101	10		
Vocational	0	2		
Religion				
Christian	83	7		
Muslim	244	44	4.6074	0.100
Traditionalist	8	0		

4.7 Association between socio-demographic characteristics of respondents and knowledge on malaria intervention

Moreover, the association between socio-demographics of respondents and their knowledge on malaria intervention was explored using chi-square test at 95% confidence interval (Significance level, α=0.05). A statistically significant association was found to exist between age, occupation, number of children as well a religion and knowledge on malaria intervention. The association is statistically significant because the p-value obtained for age (p-value < 0.001), occupation (p-value = 0.027), number of children (p-value < 0.001) and religion (p-value < 0.001) are all less than the level of significance (α = 0.05).

On the contrary, no statistically significant association was established between marital status and educational level against knowledge on malaria intervention since their p-value were all greater then the level of significance. This test of association is demonstrated in Table 4.5 below.

Table 4.5: Association between socio-demographic characteristics of respondents and knowledge on malaria intervention

Variables	**Do you know any malaria interventions for pregnant women?**		x^2	P value
	Yes	No		
Age				
14-19	27	8		
20-29	203	16	17.8166	0.001
30-39	112	8		
40+	8	4		

Occupation				
Farmer	64	12		
Trader	132	16	10.9984	0.027
Housewife	96	4		
Civil servant	25	4		
Other	31	0		
Marital status				
Married	339	36	1.1646	0.281
Single	11	0		
Number of children				
0	78	8		
1	100	12		
2	61	4		
3	42	4	38.6251	0.001
4	46	0		
5	15	0		
7	8	8		
Educational level				
None	120	12		
Primary	59	12		
Middle/JHS	66	4	6.7014	0.153
Secondary/higher	103	8		
Vocational	2	7		
Religion				
Christian	78	12		
Muslim	268	20	19.2911	0.001
Traditionalist	4	4		

4.8 Association between socio-demographic characteristics of respondents and uptake of SP

Table 4.6 also represents analysis of the association between socio-demographics of respondents and their uptake of SP. At the given significance level of 0.05, both occupation (p-value < 0.001) and number of children (p-value < 0.008) were ascertained to have a statistically significant association with uptake of SP. The rest including age, marital status, level of education and religion had no statistically significant association with the uptake of SP by respondents.

Table 4.6: Association between socio-demographic characteristics of respondents and uptake of SP

Variables	Did you take SP in this pregnancy?		x^2	P value
	Yes	No		
Age				
14-19	27	8		
20-29	185	34	3.5951	0.309
30-39	94	23		
40+	8	4		
Occupation				
Farmer	71	7		
Trader	109	36		
Housewife	89	11	18.9592	0.001
Civil servant	25	4		
Other	20	11		
Marital status				
Married	303	69		
Single	11	0	2.4887	0.115
Divorced	0	0		
Widowed	0	0		
Number of children				
0	64	22		
1	90	22		
2	62	3		
3	40	6	17.4003	0.008
4	34	12		
5	12	0		
7	12	4		
8	-	-		

Educational level				
None	107	22		
Primary	63	8		
Middle/JHS	56	14	4.4223	0.352
Secondary/higher	86	25		
Vocational	2	0		
Religion				
Christian	74	16		
Muslim	232	53	1.8265	0.401
Traditionalist	8	0		
Other	-	-		

4.9 Association between socio-demographic characteristics of respondents and use of LLINs

Interestingly, as presented in Table 4.7 socio-demographic characteristics of respondents including age (p-value < 0.001), occupation (p-value of 0.003), number of children (p-value of 0.007) and educational level (p-value < 0.001) were all found to have a statistically significant association with the use of LLINs. Only marital status and religion were having a p-value greater than the level of significance and hence showed no test of association with the use of LLINs.

Table 4.7: Association between socio-demographic characteristics of respondents and use of LLINs

Variables	**Have you used LLINs in this pregnancy?**		x^2	**P value**
	Yes	**No**		
Age				
14-19	35	0		
20-29	187	32	17.1655	0.001
30-39	116	4		
40+	12	0		

Occupation				
Farmer	78	0		
Trader	132	16	10.4069	0.034
Housewife	88	12		
Civil servant	25	4		
Other	27	4		
Marital status				
Married	339	36		
Single	11	0	1.1646	0.281
Divorced	-	-		
Widowed	-	-		
Number of children				
0	70	16		
1	100	12		
2	61	4		
3	42	4	17.7249	0.007
4	46	0		
5	15	0		
7	16	0		
8	-	-		

Educational level				
None	132	0		
Primary	59	12		
Middle/JHS	54	16	34.3445	0.001
Secondary/higher	103	8		
Vocational	2	0		
Religion				
Christian	86	4		
Muslim	256	32	4.4441	0.108
Traditionalist	8	0		
Other	-	-		

FOCUS GROUP DISCUSSION 1

Knowledge and perception

Participants were asked to point out their opinions about what causes malaria. However, the following responses were obtained.

"In my view I think mosquitoes cause malaria. That is to point out that when you refuse to close your door at night these insects can enter the room and bite you when you are asleep."

"I also think cold food causes malaria"

"To me malaria is caused by too much intake of oily foods."

Respondents engaged in the study agreed that malaria is a life-threatening disease and that they expressed their views;

One respondent bemoaned that;

"Malaria makes one lose appetite hence prevents one from eating well which eventually has negative effect on the foetus during pregnancy."

Another respondent noted that;

"I see it to be life threatening because it makes one feel very weak and dizzy."

A respondent also lamented that;

"The worst of malaria is that it can cause miscarriage"

"Malaria can also cause deformity to a child."

Respondents when asked whether they have any knowledge on symptoms of malaria they expressed their views as follows;

"I always suspect malaria when have high temperature, headache, cold and rigors."

Another respondent added that

"To me per the observation of an individual when sick tells that the parson has malaria."

Respondents involved in the discussion agreed to the fact that malaria cannot be transferred from one person to another.

Respondents when asked how they can prevent malaria in pregnancy they indicated the following

"In my view, to be malaria free during pregnancy is to sleep under treated mosquitoes net."

Another respondent claimed that;

"The use of mosquitoes coil and mosquito repellent can be useful in the prevention of malaria."

Another respondent also indicated that;

"Proper preservation of food and proper eating can health prevent malaria."

Respondents when asked what they will do if they realised that they have malaria, they responded as follows

"I think the hospital is the best place to report to when you suspect malaria."

"In my view, you only go to hospital when you are pregnant and you suspect that you have malaria, if not you can buy drugs from drug store."

Respondents expressed their view on the interventions for malaria as below

A respondent voiced that;

"The best intervention for malaria is to sleep under treated mosquito nets. However, intake of malaria drugs could be helpful."

Respondents expressed their view on the side effect of malaria intervention A respondent lamented that:

"There is heat when using mosquito nets and that is the only side effect I have experienced"

Some respondents claimed that:

"There is no side effect in the use of malaria intervention."

"I have no view on the side effect of mosquitoes net since I have not used it before."

"I just acquired a mosquito net but I have not used it before"

"In my view the side effects of the malaria drugs include vomiting, dizziness and weakness."

"I usually experience body itching, weakness and dizziness after intake of malaria drugs."

"I even felt dizzy after taking the malaria drug."

"I also felt very weak after talking the drug at the health facility which caused me to vomit."

Another respondent claim that;

"To me I don't even feel anything after taking the drug."

Barriers and facilitators to uptake of malaria interventions

Respondents were asked, whether they know where they can access malaria interventions

"I see the health facilities to be the best place to access malaria intervention."

"We also get free mosquitoes nets during mass distribution in our community."

Respondents were asked why they take sulphadoxin pyrimethamine during pregnancy.

A respondent stated that;

"For me, the intake of the drug during pregnancy prevents me from getting malaria."

Another respondent added that;

"To give birth to a healthy child, the intake of this drug during pregnancy stage is the best."

However, respondents agreed that sleeping under mosquitoes net helps a lot.

They agreed by saying;

"It prevents us from getting malaria because if only you sleep under it during the night you will not be bitten by the mosquitoes."

FOCUS GROUP DISCUSSION 2

Knowledge and perception

A respondent explained that;

"I can get malaria through mosquito bite because it can bite an animal and later bite me."

Another respondent expressed that;

"One can also get malaria when he/she fails to sleep under mosquitos net."

A respondent stated that;

"Open cans can serve as a breeding grounds of mosquitoes."

Also another respondent claimed that;

"Open pot with water can also breed mosquitoes when you leave it uncovered. Also, uncovered food cause malaria when contaminated."

Respondents bemoaned why they see malaria as a life-threatening disease

They lamented that;

"Malaria can lead to miscarriage when it affects a pregnant woman."

"It can also result in giving birth to unhealthy child or cause pre-mature delivery."

A respondent was of the view that;

"Feeling of pains all over the body is a symptom of malaria."

Another participant said;

"Dizziness, loss of appetite, body itching and feeling warm are symptoms of malaria."

When respondents were asked whether malaria can be transferred, a respondent explained that;

"Yes, malaria can be transferred when one fails to sleep under mosquito net and gets bitten by these insects, it can easily affect other people."

A respondent revealed that;

"Sleeping under mosquito nets prevent malaria."

Another respondent claimed that;

"Washing your hand after visiting the wash room prevent you from getting malaria."

Another participant added that;

"Taking proper care of yourselves will present you from getting malaria but refusing to sleep under the mosquito net will cause one to feel sick all the time."

Respondent when asked what they will do if they had malaria, they respond by saying the following;

"Will go to the health centre for diagnosis and if there is malaria they will give me drugs."

"You can also use local herbs to treat malaria by boiling the pawpaw leaves and then add milk."

When the respondents were asked whether they have any view with regards to intervention for malaria they explained that;

"Sleeping under treated mosquito net and intake of malaria drugs can help quit malaria at once."

However, respondents noted the side effects of the malaria intervention

"I feel body itching after sleeping under the mosquitoes net especially if I fail to hang it under the sun."

Another pregnant woman claimed that;

"I feel very uncomfortable sleeping under mosquitoes net due to the heat."

Barriers and facilitators to uptake of malaria interventions

Respondents were asked, whether they know where they can access malaria interventions

"Personally I see the health facility to be the best to treat malaria."

Respondents were asked why they take sulphadoxin pyrimethamine during pregnancy

A respondent response that;

"It prevents me and the unborn baby from getting malaria."

However, respondents agreed that sleeping under mosquito net helps a lot because they see it to be important in prevention of malaria.

With regard to what prevent them from taking sulphadoxin pyrimethamine during pregnancy. A respondent expressed that;

"For me nothing prevents me from taking the malaria drug during pregnancy."

With regard to what prevent them from sleeping under mosquito net during pregnancy. A respondent lamented that;

"Heat prevent me from sleeping under the mosquito net."

CHAPTER FIVE

DISCUSSION

5.0 Introduction

The World Health Organisation recommends a package of interventions for prevention and control of malaria during pregnancy in areas of stable plasmodium falciparum (Masaninga et

al., 2016). The detrimental effects of malaria among pregnant women will possibly be significantly decreased using these preventive measures proposed and accessible for more than twenty years. These preventive measures are economical and low-cost. However, the utilisation of these preventive measures during pregnancy is extremely low, demonstrating a failure of the public health community (Hill et al., 2013).

The present study aimed to enrich an existing database and fill gaps with findings of MiP in communities within three sub-districts in Yendi, Ghana. Therefore, this chapter discusses the results obtained based on the specific objectives of the study in relation to previous literature.

5.1 Knowledge and perception

The findings from this study indicated that though most of the respondents had adequate knowledge about the cause of malaria, there were still some misconceptions and misperceptions about MiP and its interventions.

In the case of the causes of malaria, some respondents expressed that mosquito bites were the main cause of malaria, but could not identify them as just being the vector. They also affirmed some misconceptions like eating cold food, walking in the sun, working too hard and consuming too many oily foods. This resonates with reports from research done by Singh et al., (2014) and indications by malaria knowledge, attitudes and practices (KAP) studies (Oladimeji *et al.*, 2019). An interesting finding from the study was that, some respondents associated malaria with other causes such as drinking unclean water, eating unhygienic food and not washing hands after using the toilet. From this, it is evident that, some respondents mistake malaria for diarrheal diseases like cholera and typhoid. Also, Adongo *et al.,* (2005) implied that in his study, participants linked water, mosquitoes and malaria but the causal relationships were not well established. A similar discovery was made as some participants in a Focus Group Discussion correctly attributed the cause of malaria to mosquito bites (vector)

but explained that *"I can get malaria through mosquitoes bite because it can bite an animal and later bite me".*

Results clearly showed that the respondents knew that they are susceptible to malaria and were aware that malaria is a serious and potentially fatal disease. This finding is in line with the findings from a study done by Legesse and Deressa (2009), that participants are well aware that malaria is a serious disease. With regards to the signs and symptoms of malaria, respondents exhibited high level of knowledge as they mentioned symptoms like headache, loss of appetite and high temperature. This finding correlates with outcomes from a study done by Adongo et al., (2005) as the respondents exhibited adequate knowledge.

Pertaining to the effects of MiP, a good percentage the respondents had fair knowledge, but a chunk of them had no knowledge at all regarding the subject matter. For the knowledge of malaria, once again, there were some misconceptions as some respondents claimed that malaria can be transferred by sleeping together, clearly mistaking malaria for an STI like HIV. On the other hand, in contrast with findings from a study conducted by Legesse and Deressa (2009), a good number of respondents were well aware that malaria can be transferred through mosquito bites from an infected person to an uninfected person.

A positively interesting finding from this study is that, all respondents attend ANC and visit health facilities when they develop malaria. On the other hand, some participants in a Focus Group Discussion agreed that *"You can also use local herbs to treat malaria by boiling the pawpaw leaves and then add milk."*

With the MiP interventions, Majority of the respondents were cognisant with LLINs as they were aware that utilising it prevents malaria. It is also important to note that, though most of the women stated that they have and use LLINs, some of them did not acquire them from the health facilities, but from mass distributions. As for IPTp-SP, though more than half of the

respondents take or have taken SP, most of them only did because it was part of the ANC routine drugs.

The women also voiced out some side effects they experienced from using LLINs and taking SP. These side effects included catarrh, body inflammation and body itching for LLINs, and for SP, they experienced nausea, dizziness, tiredness, etc.

5.2 Associations between socio-demographic characteristics and knowledge on mosquito bite as the cause of malaria

Results from a chi-square analysis revealed that there is an association between the educational level of women and the knowledge about the cause of malaria. This result builds on existing evidence divulged by *Obol et al.,* (2011) as their findings stated that there is a relationship between educational level and knowledge on the cause of malaria. Also, as suggested by Yaya *et al*. (2017), education is a major factor in malaria awareness. They again stated that the likelihood of having precise knowledge of malaria improves as the level of education increases.

On the other hand, results also showed that knowledge about the cause of malaria is influenced by the number of children. Possible explanation could be that mothers who previously went through pregnancy had already acquired some level of knowledge or experience to enrich their awareness about MiP. The higher the number of children, the more enriched or exposed they were to knowledge about MiP.

In the domain of associations between socio-demographics and knowledge on MiP interventions, a statistically significant association was found to exist between age, occupation, number of children as well a religion and knowledge on malaria intervention.

As Tijani (2017) had found from his study, age plays a significant role in the knowledge and practice of malaria prevention, a similar result was found in this study. Also, it was revealed

that occupation has an influence on the knowledge about malaria prevention. A possible reason for this is that pregnant women with busy work schedules are more prone to missed opportunities and at more risk of missing antenatal visits where they are educated more about MiP and its interventions (Olukoya and Adebiyi, 2017). Again, number of children was found to influence knowledge about MiP interventions. This, possibly, is because mothers who previously went through pregnancy had already acquired some level of knowledge and have been taught to use these interventions (Idris, 2018). Lastly, there was an association between religion and knowledge about MiP interventions. This finding is parallel with the results of the study conducted in Nigeria on the prevalence of malaria parasite infection among pregnant women. The study found that about 90% of pregnant women in Southwest Nigeria refused to take malaria drugs due to their religious beliefs (Dako-Gyek and Kofie, 2015).

5.3 Associations between socio-demographic characteristics and use of LLINs

Socio-demographic characteristics of respondents including age, occupation, number of children and educational level were all found to have a statistically significant association with the use of LLINs.

Inconsistent outcomes were conveyed regarding the relationship between level of education and use of LLIN. Whereas a number of researches reported increasing utilisation of LLIN influenced by higher educational level and source of income, some others revealed the opposite. Nonetheless, the results from this study, just like a study conducted by Balami *et al.,* (2018) seems in line with the former, since increased utilisation of LLIN was stated by their respondents.

It was also established that mothers with greater number of previous pregnancies have higher chances of sleeping under an ITN. This has been attributed to the fact that they are likely to

have better knowledge about the perils of malaria and a better chance that they will attend ANC clinics, thus boosting their chances of using ITN (Idris, 2018).

5.4 Associations between socio-demographic characteristics and uptake of SP

Both occupation (p-value < 0.001) and number of children (p-value < 0.008) were ascertained to have a statistically significant association with uptake of SP. Contradictory to findings from Rumisha *et al.*, (2014), occupation as expected to be a predictive variable of uptake of recommended doses of SP, was not observed in their study. Number of children on the other hand influences the uptake of SP in sense that, with every pregnancy, a mother is exposed to experiences, education and counselling about the benefits of taking SP (Idris, 2018).

5.5 Barriers to the uptake of malaria interventions

Some participants in the Focused Group Discussion expressed that *"In my view, the health facilities are the best place to access malaria intervention".* It is evident from this that pregnant women are aware that the best point of contact to acquire MiP interventions is the health facility. On the other hand, they also stated that, they acquire LLINs during mass distributions in their various communities, and not necessarily the health facilities. Though it pertains to SP, this can possibly be attributed to supply-side problems as reported by Barriers to IPTp uptake in Uganda, (2015). This can be a barrier to access and use of MiP interventions.

For the barriers to the use of LLINs among pregnant women, a respondent during one of the Focus Group Discussions lamented that; *"Heat prevents me from sleeping under the mosquito net."* Other side effects stated by the participants included body inflammation, catarrh and body itching Singh et al. (2013) discovered that some of the reasons provided for not using ITNs included discomfort, heat or inconvenience, inadequate perceived benefit or preferential use of other preventive techniques for malaria. This is backed by a research undertaken by Aluko and Oluwatosin (2012), in which more than one-quarter of females who slept under ITNs

experience at least one type of pain with the greatest discomfort being excessive heat. This could be due to Africa's typical hot weather and absence of electricity (Idris, 2018).

For the barriers to the uptake of SP, it can also be noted that some mothers seemed negligent by not complying with the recommended ANC visits or taking SP for IPTp (Mubyazi and Bloch, 2014).

Though from the study, 90% of the respondents admitted to taking SP, a number of them said they do not, because of side effects they experienced from previous intake. Some side effects included nausea, dizziness and weakness. Similar results were obtained by Ashwood-Smith *et al.*, (2002) as some pregnant women said that they sometimes felt dizzy after they took SP.

Also, a reported barrier to the uptake of SP was that, the health workers did not provide enough information about SP before administering the drug, hence, their refusal to take it. The WHO (2018) in response to this has therefore reported that simplified IPTp messages and training of health workers have been demonstrated to enhance coverage of IPTp.

5.6 Facilitators to uptake of malaria interventions

The respondents expressed that they adhere to the uptake of SP because it will prevent them from getting malaria and that it help to have a healthy baby, free of deformity. However, a good number of them admitted to taking SP because it was part of the ANC routine drugs and that it is DOT drug. This finding builds on results by Sangaré *et al.*, (2010) as they stated that the primary factor in determining preventive use of SP during pregnancy was being offered IPTp during an ANC visit.

With regards to LLINs, the reported facilitator to its use is to prevent malaria. It is also worthy to note that, regular ANC attendance contributes to the uptake of SP. Findings from Amankwah

and Anto (2019) supports this as they stated that early initiation and regular ANC attendance resulted in a higher number of visits and uptake of SP.

Limitations of this research took account of recall bias on account of information made available by respondents. This limitation notwithstanding this report gives a fair idea of the level of knowledge and perceptions about malaria in pregnancy and its interventions, and the barriers and facilitators to the uptake of these interventions.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study has revealed that pregnant women are conscious about malaria, though there is still a deficiency in the extensive understanding of the disease. A good number of pregnant women recognise various important malaria symptoms like headache, cold and fever. The study also registered some level of misconception regarding malaria, which has to be entirely lay bare by strengthening education about malaria among pregnant women (Oladimeji et al., 2019).

Some barriers could be attributed to supply-side problems as there were reports that some pregnant women were not given LLINs at the health facilities, but rather from mass distributions within their communities. Other barriers included inadequate knowledge about the benefits of the recommended interventions, especially IPTp-SP. Moreover, though most of the women take SP and use LLINs, there were reports of side effects which affect their perception about the interventions.

Pertaining to the facilitators to the uptake of the interventions, it was found that mothers participated because they were fairly knowledgeable about their benefits, especially LLINs.

Also, the mother‟s participation, especially with IPTp-SP, was influenced because SP is an ANC routine drug.

There is therefore, the need for concerted behavioural communication intervention to improve the knowledge of malaria regarding malaria prevention measures, causes and benefits of the uptake of recommended interventions.

This insight will assist policymakers execute incessant tactical action as well as health education and awareness activities to achieve the 2030 malaria objectives.

6.2 Recommendations

1. With the help of the Ghana Health Service, health promotion education to pregnant women should be done both at the community level and at the health facilities during ANC visits, to debunk misconceptions of the causes of malaria and its interventions among women. Health promoters and educators who work with the pregnant women should also be knowledgeable.

2. It is also recommended that with the help of the Ghana Health Service, Sulphadoxine Pyrimethamine (SP) and Long Lasting Insecticide Nets (LLINs) are made readily available at the health facilities for the pregnant women.

REFERENCES

Adongo, P.B., Kirkwood, B. and Kendall, C., 2005. How local community knowledge about malaria affects insecticide‐treated net use in northern Ghana. *Tropical Medicine & International Health*, *10*(4), pp.366-378.

Agboghoroma, C.O., 2014. Current management and prevention of malaria in pregnancy: a review. *West African journal of medicine*, *33*(2), pp.91-99.

Almalki, S., 2016. Integrating Quantitative and Qualitative Data in Mixed Methods Research Challenges and Benefits. Journal of Education and Learning, 5(3), pp.288-296.

Amankwah, S. and Anto, F., 2019. Factors Associated with Uptake of Intermittent Preventive Treatment of Malaria in Pregnancy: A Cross-Sectional Study in Private Health Facilities in Tema Metropolis, Ghana. *Journal of tropical medicine*, *2019*.

Ameh, S., Owoaje, E., Oyo-Ita, A., Kabiru, C.W., Akpet, O.E., Etokidem, A., Enembe, O. and Ekpenyong, N., 2016. Barriers to and determinants of the use of intermittent preventive treatment of malaria in pregnancy in Cross River State, Nigeria: a crosssectional study. *BMC pregnancy and childbirth*, *16*(1), p.99.

Amusan, V.O., Umar, Y.A. and Vantsawa, P.A., 2017. Knowledge, attitudes and practices on malaria prevention and control among private security guards within Kaduna Metropolis, Kaduna State-Nigeria. *Science Journal of Public Health*, *5*(3), p.240.

Aregbeshola, B.S. and Khan, S.M., 2018. Factors affecting the uptake of malaria prevention strategies among pregnant women in Nigeria: evidence from 2013 Nigeria demographic and health survey. *Journal of Public Health*, *26*(4), pp.399-408.

Ashwood-Smith, H., Coombes, Y., Kaimila, N., Bokosi, M. and Lungu, K., 2002. Availability and use of sulphadoxine-pyrimethamine (SP) in pregnancy in Blantyre district: A Safe Motherhood and BIMI Joint Survey. *Malawi Medical Journal*, *14*(1), pp.8-11.

Balami, A.D., Said, S.M., Zulkefli, N.A.M., Norsa"adah, B. and Audu, B., 2018. Knowledge, motivation, self-efficacy, and their association with insecticidal net use among pregnant women in a secondary health centre in Maiduguri, Nigeria. *Malaria journal*, *17*(1), p.359.

Barriers to IPTp uptake in Uganda 2015, Malaria Consortium, accessed on: 17 October 2019, retrieved from: https://www.malariaconsortium.org/blog/barriers-to-iptp-uptake-inuganda/

Belay, M. and Deressa, W., 2008. Use of insecticide treated nets by pregnant women and associated factors in a pre dominantly rural population in northern Ethiopia. *Tropical Medicine & International Health*, *13*(10), pp.1303-1313.

Binka, F.N. and Adongo, P., 1997. Acceptability and use of insecticide impregnated bednets in northern Ghana. *Tropical Medicine & International Health*, *2*(5), pp.499-507.

Bird, D.K., 2009. The use of questionnaires for acquiring information on public perception of natural hazards and risk mitigation–a review of current knowledge and practice. Natural Hazards and Earth System Sciences, 9(4), pp.1307-1325.

Boene, H., González, R., Valá, A., Rupérez, M., Velasco, C., Machevo, S., Sacoor, C., Sevene, E., Macete, E., Menéndez, C. and Munguambe, K., 2014. Perceptions of malaria in pregnancy and acceptability of preventive interventions among Mozambican pregnant

women: implications for effectiveness of malaria control in pregnancy. *PLoS One*, *9*(2), p.e86038.

Bouyou-Akotet, M.K., Mawili-Mboumba, D.P. and Kombila, M., 2013. Antenatal care visit attendance, intermittent preventive treatment and bed net use during pregnancy in Gabon. *BMC Pregnancy and Childbirth*, *13*(1), p.52.

Breman, J.G., Egan, A. and Keusch, G.T., 2001. The intolerable burden of malaria: a new look at the numbers. The American journal of tropical medicine and hygiene, 64(1-2 Su), pp.iv-vii.

Briand, V., Cottrell, G., Massougbodji, A. and Cot, M., 2007. Intermittent preventive treatment for the prevention of malaria during pregnancy in high transmission areas. *Malaria journal*, *6*(1), p.160.

Bryman, A. (2004). Social research methods (2 ed.). New York: Oxford University.

Centers of Disease Control and Prevention (2019) Malaria, Global Health, Division of Parasitic Diseases. Available from: https://www.cdc.gov/parasites/malaria/index.html. Accessed on 20/06/2019

Champion, V.L. and Skinner, C.S. (2008). The health belief model. Health behaviour and health education: Theory, research, and practice, 4, pp. 45-65.

Chico, R.M., Dellicour, S., Roman, E., Mangiaterra, V., Coleman, J., Menendez, C., MajeresLugand, M., Webster, J. and Hill, J., 2015. Global Call to Action: maximize the public health impact of intermittent preventive treatment of malaria in pregnancy in sub-Saharan Africa. *Malaria journal*, *14*(1), p.207.

COMDIS-HSD 2016, Malaria Consortium, accessed on: 17 October 2019, retrieved from: https://www.malariaconsortium.org/projects/comdis-hsd/25/assessing-and-addressingbarriers-to-iptp-uptake-in-uganda

Cot, M. and Deloron, P., 2003. Malaria during pregnancy: consequences and interventional perspectives. *Medecine tropicale: revue du Corps de sante colonial*, *63*(4-5), pp.369380.

Cot, M. and Deloron, P., 2003. Malaria prevention strategies: pregnancy-associated malaria (PAM). *British medical bulletin*, *67*(1), pp.137-148.

Cot, M., Brutus, L., Pinell, V., Ramaroson, H., Raveloson, A., Rabeson, D. and Rakotonjanabelo, A.L., 2002. Malaria prevention during pregnancy in unstable transmission areas: the highlands of Madagascar. *Tropical Medicine & International Health*, *7*(7), pp.565-572.

Dako-Gyeke, M. and Kofie, H.M., 2015. Factors influencing prevention and control of malaria among pregnant women resident in urban slums, Southern Ghana. *African journal of reproductive health*, *19*(1), pp.44-53.

Desai, M., Ter Kuile, F.O., Nosten, F., McGready, R., Asamoa, K., Brabin, B. and Newman, R.D., 2007. Epidemiology and burden of malaria in pregnancy. *The Lancet infectious diseases*, *7*(2), pp.93-104.

Dti, F. G. D. (2016) „Focus Group Discussion“, (March).

Eisele, T.P., Larsen, D.A., Anglewicz, P.A., Keating, J., Yukich, J., Bennett, A., Hutchinson, P. and Steketee, R.W., 2012. Malaria prevention in pregnancy, birthweight, and

neonatal mortality: a meta-analysis of 32 national cross-sectional datasets in Africa. *The Lancet infectious diseases, 12*(12), pp.942-949.

Etikan, I., Musa, S.A. and Alkassim, R.S., 2016. Comparison of convenience sampling and purposive sampling. American journal of theoretical and applied statistics, 5(1), pp.1-4.

Gamble, C.L., Ekwaru, J.P. and ter Kuile, F.O., 2006. Insecticide_treated nets for preventing malaria in pregnancy. *Cochrane Database of Systematic Reviews*, (2).

Ghana Ministry of Health (2010) „Malaria in pregnancy: Training Manual for Health Providers", 51(3), pp. 109–113. Available at: https://www.ghanahealthservice.org/ downloads/ MALARIA IN PREGNACY.pdf.

Glanz, K., Lewis, E.M. and Rimer, B.K. (2002). In Health Behaviour and Health Education: Theory, Research and Practice. San Francisco: Jossey-Bass Publishers.

Gutman, J., Mwandama, D., Wiegand, R.E., Ali, D., Mathanga, D.P. and Skarbinski, J., 2013. Effectiveness of intermittent preventive treatment with sulfadoxine-pyrimethamine during pregnancy on maternal and birth outcomes in Machinga district, Malawi. *The Journal of infectious diseases, 208*(6), pp.907-916.

Hajira, I., 2015. *Factors Influencing Uptake of Intermittent Preventive Treatment of Malaria in Pregnancy using Sulphadoxine Pyrimethamine in the Sunyani Municipality, Ghana* (Doctoral dissertation, University of Ghana).

Hill, J. and Kuile, F.T 2018, Insecticide-treated nets to reduce the risk of malaria in pregnant women, accessed on 18 October 2019, retrieved from https://www.who. int/elena/titles/commentary/bednets_malaria_pregnancy/en/

Hill, J., Dellicour, S., Bruce, J., Ouma, P., Smedley, J., Otieno, P., Ombock, M., Kariuki, S., Desai, M., Hamel, M.J. and ter Kuile, F.O., 2013. Effectiveness of antenatal clinics to deliver intermittent preventive treatment and insecticide treated nets for the control of malaria in pregnancy in Kenya. *PloS one*, *8*(6), p.e64913.

Hill, J., Hoyt, J., van Eijk, A.M., D'Mello-Guyett, L., ter Kuile, F.O., Steketee, R., Smith, H. and Webster, J., 2013. Factors affecting the delivery, access, and use of interventions to prevent malaria in pregnancy in sub-Saharan Africa: a systematic review and metaanalysis. PLoS medicine, 10(7), p.e1001488.

Idris, A.S., 2018. *Factors Influencing the Utilization of Insecticide-Treated Nets in the Prevention and Control of Malaria Among Pregnant Women in Nigeria*. GRIN Verlag.

Kimbi, H.K., Nkesa, S.B., Ndamukong-Nyanga, J.L., Sumbele, I.U., Atashili, J. and Atanga, M.B., 2014. Knowledge and perceptions towards malaria prevention among vulnerable groups in the Buea Health District, Cameroon. *BMC Public Health*, *14*(1), p.883.

Knowledge sharing for severe malaria 2019, severe malaria observatory, accessed on: 17 October 2019, retrieved from: https://www.severemalaria.org/countries/ghana

Legesse, M. and Deressa, W., 2009. Community awareness about malaria, its treatment and mosquito vector in rural highlands of central Ethiopia. *Ethiopian Journal of Health Development*, *23*(1).

Lewis, J.L. and Sheppard, S.R., 2006. Culture and communication: can landscape visualization improve forest management consultation with indigenous communities?. Landscape and Urban Planning, 77(3), pp.291-313.

Malaria in Pregnancy 2015, National malaria control programme, accessed on 17 October 2019, retrieved from: https://ghanahealthservice.org/malaria/subcategory.php?nmcpscid=114&nmcpcid=85

Marchant, T., Nathan, R., Jones, C., Mponda, H., Bruce, J., Sedekia, Y., Schellenberg, J., Mshinda, H. and Hanson, K., 2008. Individual, facility and policy level influences on national coverage estimates for intermittent preventive treatment of malaria in pregnancy in Tanzania. *Malaria journal*, *7*(1), p.260.

Masaninga, F., Bwalya, M.K., Malumo, S., Hamainza, B., Songolo, P., Kamuliwo, M., Meremikwu, M., Kazembe, L., Mufunda, J. and Babaniyi, O.A., 2016. Increased uptake of intermittent preventive treatment for malaria in pregnant women in Zambia (2006–2012): Potential determinants and highlight of lessons learnt. Asian Pacific Journal of Tropical Biomedicine, 6(7), pp.620-624.

Maxwell, J.A., 2016. Expanding the history and range of mixed methods research. Journal of Mixed Methods Research, 10(1), pp.12-27.

Mazigo, H.D., Obasy, E., Mauka, W., Manyiri, P., Zinga, M., Kweka, E.J., Mnyone, L.L. and Heukelbach, J., 2010. Knowledge, attitudes, and practices about malaria and its control in rural northwest Tanzania. *Malaria Research and Treatment, 2010*.

Mba, C.J. and Aboh, I.K., 2006. Prevalence and management of malaria in Ghana: a case study of Volta region. African Population Studies, 22(1), pp. 138.

Mbonye, A.K., Neema, S. and Magnussen, P., 2005. Preventing malaria in pregnancy: a study of perceptions and policy implications in Mukono district, Uganda. *Health policy and planning*, *21*(1), pp.17-26.

Mubyazi, G., Bloch, P., Kamugisha, M., Kitua, A. and Ijumba, J., 2005. Intermittent preventive treatment of malaria during pregnancy: a qualitative study of knowledge, attitudes and practices of district health managers, antenatal care staff and pregnant women in Korogwe District, North-Eastern Tanzania. *Malaria journal*, *4*(1), p.31.

Mubyazi, G.M. and Bloch, P., 2014. Psychosocial, behavioural and health system barriers to delivery and uptake of intermittent preventive treatment of malaria in pregnancy in Tanzania–viewpoints of service providers in Mkuranga and Mufindi districts. *BMC health services research*, *14*(1), p.15.

Murphy, S.C. and Breman, J.G., 2001. Gaps in the childhood malaria burden in Africa: cerebral malaria, neurological sequelae, anemia, respiratory distress, hypoglycemia, and complications of pregnancy. The American journal of tropical medicine and hygiene, 64(1_suppl), pp.57-67.

National malaria control programme 2017, Ghana Health Service, accessed on: 17 October 2019, retrieved from: https://www.ghanahealthservice.org/ghs-subcategory.php?cid=4&scid=41

O. Nyumba, T., Wilson, K., Derrick, C.J. and Mukherjee, N., 2018. The use of focus group discussion methodology: Insights from two decades of application in conservation. Methods in Ecology and evolution, 9(1), pp.20-32.

Obol, J., David Lagoro, K. and Christopher Garimoi, O., 2011. Knowledge and Misconceptions about Malaria among Pregnant Women in a Post-Conflict Internally Displaced Persons' Camps in Gulu District, Northern Uganda. *Malaria research and treatment*, *2011*.

Odjidja, E.N., Saha, M. and Kwanin, C., 2018. Low uptake of intermittent preventive treatment in Ghana: An examination of health system bottlenecks. Strengthening Health Systems, 2(4), pp.75-78.

Okafor, I.P., Ezekude, C., Oluwole, E.O. and Onigbogi, O.O., 2019. Malaria in pregnancy: A community-based study on the knowledge, perception, and prevention among Nigerian women. *Journal of family medicine and primary care*, *8*(4), p.1359.

Okeibunor, J.C., Orji, B.C., Brieger, W., Ishola, G., Rawlins, B., Ndekhedehe, E.U., Onyeneho, N. and Fink, G., 2011. Preventing malaria in pregnancy through community-directed interventions: evidence from Akwa Ibom State, Nigeria. Malaria journal, 10(1), p.227.

Okoko, B.J., Enwere, G. and Ota, M.O.C., 2003. The epidemiology and consequences of maternal malaria: a review of immunological basis. *Acta tropica*, *87*(2), pp.193-205.

Oladimeji, K.E., Tsoka-Gwegweni, J.M., Ojewole, E. and Yunga, S.T., 2019. Knowledge of malaria prevention among pregnant women and non-pregnant mothers of children aged under 5 years in Ibadan, South West Nigeria. *Malaria journal*, *18*(1), p.92.

Olukoya, O.O. and Adebiyi, O.A., 2017. Missed opportunities for intermittent preventive treatment for malaria in pregnancy in Nigeria: evidence from demographic and health survey in Nigeria 2013. *Annals of Ibadan postgraduate medicine*, *15*(2), pp.88-95.

Osei Tutu, E., 2009. Intermittent Preventive Treatment of Malaria in Pregnancy: Its Effects on Maternal Morbidity and Neonatal Birthweight in Offinso District of Ashanti Region, Ghana (Doctoral dissertation).

Owusu-Addo, E. and Owusu-Addo, S.B., 2014. Effectiveness of health education in community-based malaria prevention and control interventions in sub-Saharan Africa: a systematic review.

Pell, C., Straus, L., Andrew, E.V., Meñaca, A. and Pool, R., 2011. Social and cultural factors affecting uptake of interventions for malaria in pregnancy in Africa: a systematic review of the qualitative research. *PloS one*, *6*(7), p.e22452.

Rassi, C., Graham, K., Mufubenga, P., King, R., Meier, J. and Gudoi, S.S., 2016. Assessing supply-side barriers to uptake of intermittent preventive treatment for malaria in pregnancy: a qualitative study and document and record review in two regions of Uganda. *Malaria journal*, *15*(1), p.341.

Rodríguez, A.D., Penilla, R.P., Henry-Rodríguez, M., Hemingway, J., Betanzos, A.F. and Hernández-Avila, J.E., 2003. Knowledge and beliefs about malaria transmission and practices for vector control in Southern Mexico. *salud pública de méxico*, *45*(2), pp.110-116.

Rogerson, S.J., 2017. Management of malaria in pregnancy. *The Indian journal of medical research*, *146*(3), p.328.

Rumisha, S.F., Zinga, M.M., Fahey, C.A., Wei, D., Bwana, V.M., Mlozi, M.R., Shayo, E.H., Malima, R.C., Mayala, B.K., Mlacha, T. and Mboera, L.E., 2014. Accessibility, availability and utilisation of malaria interventions among women of reproductive age in Kilosa district in central Tanzania. *BMC health services research*, *14*(1), p.452.

Sangaré, L.R., Stergachis, A., Brentlinger, P.E., Richardson, B.A., Staedke, S.G., Kiwuwa, M.S. and Weiss, N.S., 2010. Determinants of use of intermittent preventive treatment of malaria in pregnancy: Jinja, Uganda. *PLoS One*, *5*(11), p.e15066.

Singh, N., Shukla, M.M. and Sharma, V.P., 1999. Epidemiology of malaria in pregnancy in central India. *Bulletin of the World Health Organization*, *77*(7), p.567.

Singh, R., Musa, J., Singh, S. and Ebere, U.V., 2014. Knowledge, attitude and practices on malaria among the rural communities in Aliero, Northern Nigeria. *Journal of family medicine and primary care*, *3*(1), p.39.

Steketee, R.W., Nahlen, B.L., Parise, M.E. and Menendez, C., 2001. The burden of malaria in pregnancy in malaria-endemic areas. The American journal of tropical medicine and hygiene, 64(1_suppl), pp.28-35.

Taherdoost, H., 2016. Sampling methods in research methodology; How to choose a sampling technique for research.

Taremwa, I.M., Ashaba, S., Adrama, H.O., Ayebazibwe, C., Omoding, D., Kemeza, I., Yatuha, J., Turuho, T., MacDonald, N.E. and Hilliard, R., 2017. Knowledge, attitude and behaviour towards the use of insecticide treated mosquito nets among pregnant women and children in rural Southwestern Uganda. *BMC public health*, *17*(1), p.794.

Tongco, M.D.C., 2007. Purposive sampling as a tool for informant selection. Ethnobotany Research and applications, 5, pp.147-158.

Turyakira, E., De Beaudrap, P., White, L.J., Nabasumba, C., Tumwebaze, B., Muehlenbachs, A., Guérin, P.J., Boum, Y., McGready, R. and Piola, P., 2013. Impact of malaria during pregnancy on pregnancy outcomes in a Ugandan prospectivecohort with intensive malaria screening and prompt treatment. Malaria journal, 12(1), p.139.

UNICEF (2018) Malaria, UNICEF Data: Monitoring the situation of children and women. Available from: https://data.unicef.org/topic/child-health/malaria/

Van Eijk, A.M., Hill, J., Larsen, D.A., Webster, J., Steketee, R.W., Eisele, T.P. and ter Kuile, F.O., 2013. Coverage of intermittent preventive treatment and insecticide-treated nets for the control of malaria during pregnancy in sub-Saharan Africa: a synthesis and meta-analysis of national survey data, 2009–11. *The Lancet infectious diseases*, *13*(12), pp.1029-1042.

World Health Organization (WHO), 2014. Severe Malaria Section 1: Epidemiology of severe falciparum malaria, Tropical Medicine and International Health, 19(10), p. 967.

World Health Organization, 2010. Malaria 7.1, World Health Organization Technical Report Series No 936.

World Health Organization, 2015. World Malaria Report 2015, World Health, p. 243. doi: ISBN 978 92 4 1564403.

World Health Organization, 2016. *World malaria report 2015*. World Health Organization.

World Health Organization, 2018. World Malaria Report 2018 Isbn 978 92 4 156565 3. Available at: www.who.int/malaria.

Yaya, S., Bishwajit, G., Ekholuenetale, M., Shah, V., Kadio, B. and Udenigwe, O., 2017. Knowledge of prevention, cause, symptom and practices of malaria among women in Burkina Faso. *PloS one*, *12*(7), p.e0180508.

APPENDIX

DATA COLLECTION TOOLS

QUESTIONNAIRE

Kwame Nkrumah University of Science and Technology

Department of Health Education and Promotion

Master of Public Health (Health Education and Promotion) 2018/2019 Thesis Field Research

This questionnaire is intended to gather data geared toward assisting Jamilatu Zakaria, a Master of public Health student in the Department of Health Education and Promotion, School of Public Health, Kwame Nkrumah University of Science and Technology for his Research Thesis titled "*the barriers and facilitators to the uptake of malaria interventions among pregnant women in Yendi Municipal*"

Declaration: *Information supplied herein will be used only for academic purposes and will be treated with utmost confidentiality.*

Instructions to respondents

- Do not write your name or contact details on the questionnaire.
- Tick in the space provided for closed questions
- Fill in the space provided for open ended question

SECTION A

Background Information

1. Age …….
2. Occupation: a. Farmer [ ] b. Artisan [ ] c. Trader [ ] d. Housewife [ ] e. Civil servant [ ] f. Other (please specify)……
3. Marital status: a. Married [ ] b. Single [ ] c. Divorced [ ] d. Widow [ ]

4. Number of children……..

5. Educational level: a. None [ ] b. Primary [ ] c. Middle/JHS [ ]

   d. Secondary/higher [ ] e. Vocational [ ]

6. Religion: a. Christian[ ] b. Muslim [ ] c. Traditional [ ] d. Pagan [ ]

SECTION B

Knowledge and perception

7. What causes malaria? a. mosquito bite [ ] b. Eating unhygienic food [ ] c. Walking in the sun [ ] d. Working too hard [ ] e. Not keeping the environment clean [ ] f. Other (please specify)…….

8. Do you think pregnant women are susceptible to Malaria? a. Yes [ ] b. No [ ] c. Don‟t know [ ]

9. Do you think that Malaria is a serious and life-threatening disease? a. Yes [ ] b. No [ ] c. Don‟t know [ ]

10. How do you know a pregnant woman has malaria? a. Looks pale [ ] b. High temperature/Fever [ ] c. Chills and rigors [ ] d. Weakness [ ] e. Loss of appetite [ ] f. Headache [ ] g. Vomiting [ ] h. Others (please specify)……

11. What are some of the effects of malaria in pregnancy? a. Anaemia [ ] b. Still birth [ ] c. Abortion [ ] d. Premature delivery [ ] e. Underweight baby [ ] f. Don‟t know [ ] g. Others (please specify)……

12. a. Can malaria be transferred from one person to another? Yes [ ] No [ ]

    b. If yes, how is malaria spread from one person to another?

    a. Sleeping together [ ] b. mosquito bite from one with malaria and to another [ ] c. Other (please specify)…….

15. How can malaria be prevented? a. Use repellents [ ] b. Keep gutters clean [ ] c. Use of mosquito nets [ ] d. Use mosquito coil [ ] e. Malaria prophylaxis (SP) [ ] f. Use mosquito sprays [ ] g. Other (please specify)……

14. What will you do if you develop malaria? a. Chemical shop [ ] b. Drug peddler [ ] c. Health facility [ ] d. Traditional birth attendant [ ] e. Herbalist [ ] f. Self-treatment [ ]

16. Do you know any malaria interventions for pregnant women? a. Yes [ ] b. No [ ]

18. If yes, what are some of the malaria interventions for pregnant women? a. LLINs [ ] b. IPTp (Sulfadoxine-Pyrimethamine) [ ]

19. What are some of the side effects? (LLINs) a. Catarrh [ ] b. Inhaling too much chemicals [ ] c. Body itching [ ] d. Body inflammation [ ]

e. Others, please specify……

20. What are some of the side effects? (IPTp) a. Nausea [ ] b. Dizziness [ ]

c. Tiredness [ ] d. Weakness [ ] e. Others, please specify……

SECTION C

Barriers and facilitators to uptake of malaria interventions

21. Where can you access malaria interventions? a. Chemical shop [ ] b. Drug peddler [ ] c. Health facility [ ] d. Traditional birth attendant [ ] e. Herbalist [ ]

22. Have you taken SP in this pregnancy? a. Yes [ ] b. No [ ]

23. If yes, why do you take SP? a. To prevent malaria [ ] b. Part of ANC routine drugs [ ] c. Recommended by significant others [ ] d. Others (please specify)……

24. If no, why don‟t you take SP? a. Side effects [ ] b. Too many drugs [ ] c. Forgetfulness [ ] d. Bitter taste [ ] e. Other, please specify……

25. Have you used LLINs in this pregnancy? a. Yes [ ] b. No [ ]

26. If yes, why do you use LLINs? a. To prevent malaria [ ] b. Part of ANC routine items [ ]

c. Recommended by significant others [ ] d. Others (please specify)……

27. If no, why don‟t you use LLINs? a. Side effects [ ] b. Heat [ ] c. Feels uncomfortable [ ] d. Others (please specify)……

FOCUS GROUP DISCUSSION GUIDE

Kwame Nkrumah University of Science and Technology

Department of Health Education and Promotion

Master of Public Health (Health Education and Promotion) 2018/2019 Thesis Field Research

This Focus Group Discussion guide is intended to gather data geared toward assisting Jamilatu Zakaria, a Master of public Health student in the Department of Health Education and Promotion, School of Public Health, Kwame Nkrumah University of Science and Technology for his Research Thesis titled *"The barriers and facilitators to the uptake of malaria interventions among pregnant women in Yendi Municipal".*

Declaration: *Information supplied herein will be used only for academic purposes and will be treated with utmost confidentiality.*

Section A Knowledge and perception

1. In your opinion how can one acquire malaria?
2. Why do you think that Malaria is a serious and life-threatening disease? / What are some of the effects of malaria in pregnancy? (if it is not treated early)
3. How will you know a pregnant woman has malaria?
4. Can malaria be transferred from one person to another? If yes, how?
5. How can you prevent malaria in pregnancy?

6. What will you do if you develop malaria?
7. Do you know any malaria interventions for pregnant women? What are they?
8. Do you think malaria interventions have side effects? What are some of them?

Section B

Barriers and facilitators to uptake of malaria interventions

1. Where can you access malaria interventions?
2. Why do you think it important to take Sulfadoxine-Pyrimethamine (SP) in this pregnancy?
3. Why do you think it important to use LLINs during pregnancy?
4. What prevents a pregnant women from taking SP?
5. What prevents a pregnant women from using LLINs?

ETHICAL APPROVAL LETTER

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/556/19 — 11th September, 2019.

Miss Jamilatu Zakaria
Department of Health
Promotion and Education
School of Public Health
KNUST-KUMASI.

Dear Madam,

LETTER OF APPROVAL

Protocol Title: ***"The Barriers and Facilitators to the Uptake of Malaria Interventions Among Pregnant Women in Yendi Municipal."***

Proposed Site: ***Yendi Municipality.***

Sponsor: ***Principal Investigator.***

Your submission to the Committee on Human Research, Publications and Ethics on the above-named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 30th July, 2019 from the Yendi Municipal Assembly (study site) indicating approval for the conduct of the study at the Municipality.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 11th September, 2019 to 10th September, 2020 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Thank you, Madam, for your application.

Yours faithfully,

Osomfo Prof. Sir J. W. Acheampong MD, FWACP
Chairman

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chrpe.knust.kath@gmail.com / chrpe@knust.edu.gh