FACTORS INFLUENCING ADHERENCE TO NEW INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY POLICY IN KETA DISTRICT IN VOLTA REGION, GHANA.

BY

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JULY, 2018
DECLARATION

I, Alren Onikeh Nandawa Vandy declare that except for other people’s investigations which have been duly acknowledged, this proposal has been written independently by me and has not been submitted for the award of any degree in any institution.

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DEDICATION

This dissertation is dedicated to my parents, Mr. and Mrs. Albert Vandy.
ACKNOWLEDGEMENT

I thank God Almighty for his blessings and favor in my life, who has granted me wisdom, knowledge and understanding to go through this period of study.

Thanks to TDR/WHO for awarding me a scholarship to pursue my Master of Public Health (MPH) degree at the University of Ghana and to staff at the Office of Research Innovation and Development (ORID) for their support throughout the course.

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ABSTRACT

Background

Malaria is a notable public health problem despite implementation of several preventive strategies. Over 90% of malaria related deaths in the world is in Sub Saharan Africa. About 25% of pregnant women are infected with malaria in areas endemic for malaria and accounts for about 15% of maternal death globally. Intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine (IPTp-SP) is one of the main strategies for prevention of malaria in pregnancy. A new recommendation was made by WHO that at least three (3) doses of IPTp-SP should be administered before delivery. The rate of IPTp-SP adherence is moving slowly in places like the Volta region in Ghana. This study seeks to determine the factors influencing adherence to new IPTp-SP policy in Keta District, Volta region, Ghana.

Method – A cross sectional quantitative study among 375 nursing mothers and all health workers at the antenatal clinic (ANC) at four (4) selected health facilities in Keta district, Ghana. The study was conducted from May to July, 2018 using a structured questionnaire to interview participants. Factors such as sociodemographic, individual and institutional factors were analyzed to determine if they influence adherence to IPTp-SP. Data was analyzed using STATA 15. Chi square was used to test association between categorical variables and adherence. Regression analysis was used to determine the factors influencing adherence to IPTp-SP.

Result - About 82.1% of participants adhered to the WHO policy recommendations of at least 3 doses of IPTp. However, only 17.1% received Ghana’s 5 dose coverage recommendation. The proportion of IPTp-SP coverage for IPT1 was 98.9%; IPT2 95.5%; IPT3 80.8%; IPT4 39.5%; IPT5 17.1%. Gestational age at first IPT and ANC, Sociodemographic factors (age and
educational level) and number of ANC visits were significantly associated with adherence to IPTp.

**Conclusion:** Adherence to IPTp was satisfactory according to WHO’s policy recommendation but however majority of the participants had less than the 5 dose coverage recommendation in Ghana. Number of ANC visits and knowledge of malaria were the main determinants of adherence to IPTp-SP.
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LIST OF ABBREVIATIONS

ACT Artemisinin-based combination therapy
ANC Antenatal Care
CDC Centers for Disease Control and Prevention
CHO Community Health Officer
CWC Child Welfare Clinics
DOT Directly Observed Treatment
FANC Focused Antenatal Care
G6PD Glucose-6-Phosphate Dehydrogenase
GHS Ghana Health Service
HCW Health Care Workers
IPTp Intermittent Preventive Treatment of Malaria in Pregnancy
LLINs Long Lasting Insecticide-treated Nets
MiP Malaria in Pregnancy
NMCP National Malaria Control Programme
PMI President's Malaria Initiative
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<td>Rapid Diagnostic Tests</td>
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<tr>
<td>SP</td>
<td>Sulfadoxine Pyrimethamine</td>
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<td>WHO</td>
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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Malaria is a life threatening disease that is caused by a parasitic protozoan called Plasmodium. It is endemic in 91 countries and nearly 50% of the world’s population at the start of 2016 were susceptible to malaria. Majority of malaria reported deaths occurs in sub-Saharan Africa and about 212 million new cases of malaria and 429,000 deaths were reported globally. (World Malaria Report 2016. Geneva: World Health Organization, 2016).

Malaria is transmitted to humans by the bites of an infected female Anopheles mosquito. There are four species of Plasmodium that causes malaria in humans: Plasmodium vivax, Plasmodium ovale, Plasmodium malariae and Plasmodium falciparum. There are two categories of malaria: uncomplicated malaria and severe (complicated) malaria. The most severe form of malaria is caused by Plasmodium Falciparum and is responsible for malaria mortality in pregnant women and children under five (5) years.

The World Health Organization (WHO) encourages the diagnosis of malaria with malaria rapid diagnostic test (RDT) or microscopy in all suspected malaria cases before commencing treatment (World Health Organization, 2015).

Treatment of malaria is very important not only to completely cure the patient and prevent complications but also to prevent transmission of the parasite to others. The preferred treatment
of uncomplicated malaria is Artemisinin-based combination therapy (ACT) and artesunate injection (Intravenous or intramuscular) for severe malaria followed by three-day course of ACT.

WHO Global Technical Strategy for Malaria (2016-2030) was adopted in 2015 which has three main pillars. Pillar 1 is to ensure universal access to malaria diagnosis, treatment and prevention, Pillar 2 is to scale up effort to eliminate and attain a malaria free status and Pillar 3 is to transform malaria surveillance to an essential intervention (WHO, 2015).

Malaria is still of great concern despite several preventive strategies in place for the 2020 Global Technical Strategy for Malaria milestone of at least 40% reduction in malaria mortality and case incidence. In sub-Saharan Africa, malaria is the most important cause of death in pregnant women and also in children under 5 years of age.

To reduce the burden of malaria, prevention is of great importance especially in high risk groups. The high risk groups of contracting malaria are children under 5 years of age, immunocompromised individuals, non-immune travelers and pregnant women. In spite of this, a lot of malaria endemic countries are still struggling in implementing these preventive strategies and lack access to the required preventive tools.

Malaria in pregnancy is a public health concern and has many complications for both the mother and the fetus. Some of these complications are – maternal anemia, premature delivery, low birth weight, miscarriage, congenital infection and perinatal mortality. Severe complications of malaria in pregnancy is striking for women in their first and second pregnancies.

WHO recommends three (3) main strategies for the treatment and prevention of malaria during pregnancy. These approaches are: intermittent preventive treatment in pregnancy(IPTp) with
sulfadoxine-pyrimethamine (SP), using long lasting insecticidal nets (LLINs), and early diagnosis and treatment of malaria cases. (WHO, 2017)

Chemoprevention of IPTp improves the maternal and neonatal outcomes and is recommended in regions where there is moderate to high transmission of malaria.

In 2007, The first WHO recommendation policy on IPTp was made which recommended that all pregnant women attending antenatal care (ANC) services should be given two doses of SP during pregnancy. The first dose of SP should be given at the start of the second trimester and second dose at the start of the third trimester. It should be given as direct observational treatment (DOT) during antenatal visits. In 2012, WHO Evidence Review Group convened to review new evidence from published and unpublished studies on IPTp with SP in relation to the WHO recommendations. It was agreed that more than two doses would be more effective in preventing malaria in pregnancy. A new recommendation was made that the first dose of IPTp-SP should be administered as early as possible in the second trimester and each dose of SP should be given at least one (1) month apart up to the time of delivery. (Updated WHO Policy Recommendation, 2012). This update was done to maximize the number of SP doses given.

According to WHO, about 69% of pregnant women in sub Saharan Africa do not have access to the recommended 3 or more doses of IPTp (WHO, 2017d).

Malaria is endemic in Ghana and an estimated 28,606 suspected malaria cases reported daily at health facilities and about 382,862 pregnant women suffer from malaria in 2016. (GHS, 2016).
1.2 STATEMENT OF THE PROBLEM

Malaria in pregnancy is a notable public health concern and accounts for about 15% of maternal death globally. It has risks for the mother, fetus and new born and majority of malaria related deaths in the world is in Sub Saharan Africa with at least 25% of pregnant women infected with malaria in areas endemic for malaria (Schantz-Dunn & Nour, 2009).

In Ghana, malaria is one of the leading cause of illnesses resulting to 10.4 million suspected cases reported in 2016 (GHS, 2016). It accounts for 17.6% of Out Patient Department (OPD) attendances, 13.7% of admissions and 3.4% of maternal deaths of pregnant women in Ghana.

The Volta region in Ghana has been known to be one of the highest malaria prevalence regions in Ghana. In 2017, the Volta region recorded the lowest score for 2016 Ghana Health Service National Health League Table and performed poorly in maternal health service delivery. (UNICEF & CDD, 2016).

Malaria prevention in pregnancy is very important as it prevents maternal and neonatal deaths and also reduces complications in pregnancy.

IPTp-SP is one of the methods recommended by the World Health Organization (WHO) for controlling malaria in pregnancy. It includes taking a single dose of SP at antenatal care visit after first trimester.

Studies have shown that even with the implementation of IPTp- SP in pregnancy, malaria is still
a major problem in Ghana. The rate of IPTp-SP compliance is moving slowing in places like the Volta region in Ghana (“PRESIDENT’ S MALARIA INITIATIVE Ghana Malaria Operational Plan FY 2014,” 2014).

Adherence is low in the first policy recommendation of two doses of IPT-SP in pregnancy and only few studies have been conducted since the new WHO IPTp-SP implementation in Ghana.

This study aims to assess the parameters influencing adherence to the new IPTp-SP policy in four (4) selected health facilities in Keta district, Volta region in Ghana.

1.3 JUSTIFICATION

In 2014, Ghana adopted the new WHO IPTp-SP policy recommendations of a minimum of three (3) doses and maximum of five (5) doses to be given before delivery.

Despite the implementation of malaria preventive strategies, recent studies have shown that there is low adherence to IPTp in Ghana. Some of the factors contributing to the low adherence to IPTp are SP stock out (unavailability of SP at hospitals), healthcare workers not adhering to protocols, number of antenatal care (ANC) visits made and also unavailability of skilled attendants at the antenatal clinics (Akinleye, Falade, & Ajayi, 2009; Ayubu & Kidima, 2017; Owusu-Boateng & Anto, 2017; Pool, Pell, Straus, Andrew, & Men, 2012).

Adherence to IPTp in pregnancy is low in different regions in Ghana and Volta Region has one of the highest level. (National Malaria Control Programme, 2017)
A lot of studies has been done on IPTp but only few have focused on the new IPTp policy that was adopted in Ghana. There has been no report on any studies in Volta Region on the new IPTp policy despite Volta regions’ recent records of poor maternal health service delivery.

This study aims to establish the factors influencing the adherence to the new IPTp-SP policy in Volta region and also the effectivity of its maternal health service delivery in relation to IPTp.

The findings from this study will be of help to the Volta Region Health Services in achieving the set goals by Ghana Health Service and find strategies for sustainability.
1.4 CONCEPTUAL FRAMEWORK

The conceptual framework on page 8 shows different factors that influences the adherence to IPTp-SP policy recommendations in pregnancy.

Socio-economic and demographic factors can play a vital role in adherence to IPTp-SP recommendations. For example, knowledge about the importance of ANC visits will enable pregnant women to commence first dose of IPTp-SP at the stipulated time and thereby enabling full coverage of five (5) doses before delivery as recommended in the new IPTp-SP policy adopted. The outcomes can directly depend on such factors like educational status of the woman, age, parity, occupation and even religion.

Health system factors can also influence the adherence to IPTp-SP. In a proper ANC setting, pregnant women should be well informed about the risk factors involved in pregnancy and also the importance of SP. In places with unskilled staff or lack of ANC services, pregnant women will not be able to access the drug needed (SP) to prevent malaria in pregnancy, leading to non-adherence to the IPTp-SP policy recommendations and thus increasing the risk of both maternal and new born mortality.
Figure 1 Conceptual framework of factors influencing adherence to IPTp-SP policy.

Socioeconomic and demographic factors
- Age
- Marital status
- Educational status
- Parity
- Occupation
- Religion

Individual Factors
- Knowledge of malaria and its effects on pregnancy
- Gestational age at first ANC visit
- Gestational age at first IPTp-SP

Health System Factors
- Drug (SP) Availability
- Access to ANC/IPTp Services
- Knowledge and delivery of IPTp Policy by ANC Staff

Adherence to IPTp-SP
1.5 RESEARCH QUESTIONS

1. What proportion of pregnant women adhered to the IPTp-SP Policy?
2. What is the knowledge of pregnant women about malaria in pregnancy?
3. What are the Healthcare Provider’s knowledge on the new IPTp-SP policy recommendations?
4. What are the factors influencing the adherence to the new IPTp policy by pregnant women?

1.6 OBJECTIVES

1.6.1 GENERAL OBJECTIVES

To determine the factors influencing the adherence to the new IPTp-SP policy in four (4) selected health facilities in Keta District in Volta region in Ghana.

1.6.2 SPECIFIC OBJECTIVES

1. To determine the proportion of pregnant women that adhere to the new IPTp-SP Policy
2. To measure knowledge level of pregnant women on new IPTp-SP policy.
3. To determine the knowledge of healthcare providers at the antenatal clinic on the new IPTp-SP policy recommendations.
4. To determine factors associated with adherence to the new IPTp-SP policy in pregnant women.
CHAPTER TWO

LITERATURE REVIEW

2.0 OVERVIEW

This chapter reviews literature related to the study and objectives of the study. Search engines and online databases were used to select relevant articles, books and report that were published between January 2008 and July 2018 to identify key areas related to the study.

The chapter has been divided into 4 main sections:

- Malaria
- Burden of Malaria and Strategies for the Prevention of Malaria in Pregnancy
- Intermittent Preventive Treatment of Malaria in Pregnancy
- Factors Influencing the Adherence to IPTp-SP in Pregnancy

2.1 MALARIA

Malaria is a public health concern especially in Sub Saharan Africa. It’s a life threatening condition and accounts for significant maternal and infant mortality.

The NMCP Ghana in first quarter bulletin in 2017 reported that there were 2.3 million reported suspected malaria cases at the OPD which is about 1.18% increase over cases reported during the same period in 2016 (GHS, 2017). According to the World Malaria Report 2017 by WHO, Ghana, Nigeria, Côte d’Ivoire, Burkina Faso, Niger and Mali were the six (6) countries in West Africa that accounted for 85% of the estimated 111 million cases reported in 2016. and (World malaria report, 2017).
Plasmodium falciparum (one of the five species of plasmodium parasite) is responsible for about 90% of the severe cases of malaria. (Roman et al., 2015). The incubation period for malaria varies from 7-30 days but is much shorter with plasmodium falciparum. There are wide ranges of symptoms of malaria from asymptomatic to severe and eventually death if left untreated. Some of the clinical symptoms are fever, headache, chills, nausea, general malaise, vomiting, cough, abdominal. Initial symptoms may be mild but if left untreated can lead to severe (complicated) malaria and mortality (CDC, 2015).

To reduce the burden of malaria, there has been scale up of various treatment and preventive strategies such as rapid diagnosis of malaria using RDTs, case management with ACT, distribution of LLINs and also indoor residual spraying (IRS) which has an impact on infections and transmission of malaria (Coleman et al., 2017; World malaria report, 2017).

Previous management of malaria cases employed presumptive treatment with antimalarial drugs for febrile cases to reduce morbidity and mortality associated with malaria. In 2010, WHO revised its’ policy recommendation to conduct investigations (microscopy or RDT testing) for confirming presence of malaria parasite before commencement of antimalarial treatment. This was known as the test, treat and track strategy and was implemented to improve the quality of surveillance and care. This is considered very essential for reducing needless use of antimalarial drug. Early diagnosis and treatment of malaria prevents complications of malaria like cerebral malaria, acute renal failure, severe anemia, hypoglycemia, pulmonary edema, metabolic disorders and death (World Health Organization, 2015).

A study conducted in Zambia in 2014 suggested that despite scale of malaria control interventions and high coverage of these interventions, there is still a high burden of malaria.
This was attributed to improvement in case reporting and also access to the necessary care needed (Mukonka et al., 2014).

Malaria has been known to have a significant economic burden. In 2014, it was reported that US$ 6.8 million was lost to malaria and 90% of this was due to direct cost(Nonvignon et al., 2016).

### 2.2 BURDEN OF MALARIA AND STRATEGIES FOR THE PREVENTION OF MALARIA IN PREGNANCY

Malaria in pregnancy has significant risk for pregnant women, the fetus and newborn. About 25 million women in Sub Saharan Africa become pregnant each year and are at risk of malaria infection. Ten thousand (10000) of these pregnant women and 200,000 of newborns die due to malaria in pregnancy (Roman et al., 2015).

Diagnosis of malaria in pregnancy is difficult due to the fact that in many pregnant women peripheral microscopy will not be able to identify parasite sequestered in the placenta. (Takem & D’Alessandro, 2013).

A mother and child cohort study of 527 children in Gabon showed that, infants born to mothers with placental plasmodium falciparum infection at delivery had higher risk of malaria in the first 30 days of life. Although the study did not take into account the effect of gravidity which is likely to be stronger in primigravidae, this shows the importance of prevention of malaria which will decrease the risk to newborns (Schwarz et al., 2008).

Vulnerability of pregnant women to malaria is associated with hormonal and immunological
changes in pregnancy. First and second pregnancies are more susceptible to malaria and the level of parasitaemia decreases with increasing numbers of pregnancies (Stephens et al., 2017).

Studies in Ghana have showed that malaria during pregnancy increases maternal anemia and low birth weight especially in women living in rural communities. (Ofori et al., 2009)

Prevention of malaria in pregnancy is as important as treatment. It prevents complications of severe malaria and risk to both pregnant women and their unborn child.

The strategies recommended by WHO for the prevention of malaria in pregnancy are:

- Intermittent preventive treatment in pregnancy in regions with moderate to high transmission of malaria in Africa with SP during ANC.
- Early diagnosis and treatment of malaria infections.

In 2015, Ghana adopted WHO’s approach for the prevention of malaria in pregnancy in the National Guidelines for malaria in pregnancy. This included training on-site when needed and also distribution of LLINs to pregnant woman during their first ANC visit.(PMI, 2016)

NMCP in Ghana uses communication through radio and TV programs to improve knowledge and practice of desired health behaviors, to create positive attitudes and improve use and provider confidence in RDT, SP uptake and LLINs use in local languages and English (GHS, 2017).

Despite strategies in place for the prevention of malaria in pregnancy, coverage if LLINs and IPTp-SP in African women is still low (Pell et al., 2013). However, in 2016, Ghana had one of
the highest proportion (over 80%) of population with access to ITN in West Africa. ITNs are distributed at no cost to all age groups through mass campaigns (World malaria report, 2017).

2.3 INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY

Intermittent preventive treatment of malaria in pregnancy is the administration of SP, an antimalarial medication as a directly observed treatment to pregnant women at routine ANC visits, regardless of whether the pregnant women has malaria infection. IPTp-SP is recommended by WHO in all regions where there is moderate to high malaria transmission in Africa. (WHO, 2017)

In 2012, IPTp-SP was recommended by WHO to be given to all pregnant women attending ANC at the beginning of the second trimester, each dose of SP given at least one month apart until delivery and at least three (3) doses during pregnancy (WHO, 2017).

According to the NMCP, the coverage of IPTp in the first quarter of 2017 for the five (5) reported IPTp doses were; IPTp 1-66.6%, IPTp 2- 57.3%, IPTp 3 – 41.3%, IPTp 4-19.5% and IPTp 5 -5.6%(GHS, 2017).

IPTp-SP is cost effective and efficient. It is considered to be safe with no risk to the fetus once given at the second and third trimester of pregnancy. It reduces the occurrence of maternal malaria, placental parasitaemia, low birth weight, infant mortality and maternal and fetal anemia. (Takem & D’Alessandro, 2013). However, a study in Muheza, Tanzania of a cohort of 880 pregnant women found out that there was no relationship between IPTp and placental malaria or overall outcome of pregnancy. The same study showed that IPTp was associated with increased
risk of fetal anemia which was hypothesized to be related to SP in utero. Failure of IPTp to boost the outcome of pregnancy was considered to be due to resistance of the community studied (Harrington, Mutabingwa, Kabyemela, Fried, & Duffy, 2011). There has also been reports in Ghana about SP drug resistance (Orish et al., 2015). Areas with wide spread SP resistance do not confer the benefits of IPTp.

2.4 FACTORS INFLUENCING THE ADHERENCE TO IPTp IN PREGNANCY

2.4.1 SOCIOECONOMIC AND DEMOGRAPHIC FACTORS

Sociodemographic factors like age, marital status, educational level, parity and religion can play a great role in IPTp adherence according to previous studies conducted.

Level of education can influence pregnant women’s knowledge on the complications of malaria and in turn increases the chances of seeking preventive methods to use in the prevention of malaria in pregnancy. A study conducted in Malawi among 3213 recently pregnant women concluded that educated women who completed primary or secondary school with adjusted odds ratio of 2.5 and 4.1 respectively were more likely to have received IPTp compared to women with no education. Women in the poorest socioeconomic status quintile were less likely to receive IPTp than those in the least poor quintile (Mwandama et al., 2015). However, the study did not record the timing and number of ANC visits made by each pregnancy women or whether IPTp adherence was limited by ANC attendances.
Kibusi, Kimunai, & Hines, (2015) conducted a research on predictors of uptake of IPTp among individuals aged 15–49 years. It showed that there was a significant relationship between age and IPTp uptake. Participants in the age groups 30–34 and 35–39 years were more likely to adhere than others. Participants who were self-employed were more likely to not adhere to IPTp compared to those in other occupational group. Further analysis revealed that about 58% of those with no children took the recommended number of dosages and 24% of mothers with three or more children (parity) had the lowest uptake.

2.4.2 INDIVIDUAL FACTORS

2.4.2.1. Knowledge of malaria in pregnancy and IPTp-SP policy by pregnant women

Knowledge about the importance of IPTp and number of doses needed before delivery will guide pregnant women and enable them to complete their required doses before delivery. This should mostly be done by ANC staff at the clinic. In a study done in Tanzania it showed that 49% of women who knew about IPTp-SP did not know what the recommended dosage to be taken during pregnancy and about 83.5% of interviewed women did not know the effect of malaria during pregnancy. With the use of contingency tables, it was discovered that pregnant women’s knowledge on complications of malaria in pregnancy was associated with drug uptake (odds ratio (OR) = 11.81, 95% CI (5.755–24.23), p= 0.0001 (Ayubu & Kidima, 2017).

Akinleye, Falade, & Ajayi, (2009) conducted a research on knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria. The study included two hundred and nine (209) pregnant women attending ANC clinics. It was discovered that about 52% of the
pregnant women have heard about IPTp but only 23.9% could define it and majority did not know that SP was the drug of choice recommended for IPTp. About 18.8% identified SP as Fansidar which is the brand name in the market.

Pregnant women who receive anti-malarial medications during ANC visits and awareness of malaria prevention has a significant relationship with adherence to IPTp \((p < 0.001)\). Knowledge about IPTp has higher uptake of IPTp than those with no knowledge (Kibusi et al., 2015).

### 2.4.2.2 Gestational Age at First ANC Visit and First IPTp

Timely visit to ANC clinic is very important for achieving the recommended dose of IPTp before delivery. According to WHO, first dose of IPTp should be given at the beginning of the second trimester (at the beginning of the thirteenth week of gestation). In some countries where ultrasound is not available for gestational dating of pregnancy, quickening is used to determine the start of the second trimester. This method is not an accurate marker of the start of second trimester as some women might not experience quickening until 20\(^{th}\) week of gestation (WHO, 2014).

A study in Cameroon showed that there was a significant association between amount of SP doses taken and early first ANC attendance (at an early gestation age). Pregnant women who had early first ANC attendance were more likely to receive the recommended doses of SP(Anchang-Kimbi et al., 2014).

In 2016, WHO updated its policy recommendation on ANC Visits. The initial Focused Antenatal Care (FANC) model required at least 4 ANC visits during pregnancy. The new recommendation states that eight (8) ANC contacts are necessary during pregnancy for a positive pregnancy
experience. It includes recommendations on preventive measures, interventions for health system to improve quality of care and use of ANC, nutrition recommendations and also treatment of common pregnancy related symptoms. (Tunçalp et al., 2017)

In 2014, a study conducted in Mali points to a significant relationship between timing of ANC visits and IPTp coverage. Pregnant women who had adequate IPTp doses also had increasing number of ANC attendance and the gestational age of first ANC visit was associated with number of SP doses (Hill et al., 2014).

Gestational age at first ANC visit also has a relationship with knowledge of preventive strategies of malaria in pregnancy. (Nganda, Drakeley, Reyburn, & Marchant, 2004) found out that women attending ANC clinics in their first trimester for the first time were more than two times likely to have health talks by ANC staff compared to those attending for the first time in their third trimester. This in turn gave those who attend ANC clinic earlier a better chance of adhering to IPTp recommendations with complete uptake.

2.4.3 HEALTH SYSTEM FACTORS

Health system barriers play a role in hindrance of the implementation of IPTp policy (Thiam, Kimotho, & Gatonga, 2013). Studies have reviewed literature from sub Saharan African which showed that some health system factors responsible for the adherence to IPTp-Sp were; poor leadership and governance, low budgets allocation for implementation of policies, work force challenges like insufficient staff and low motivation of staff, service delivery barriers (long distance to health facilities and long waiting time), drug stock out and poor management of information (Thiam et al., 2013).
2.4.3.1 Knowledge and Delivery of IPTP-SP Policy by Health Care Workers

Health worker’s knowledge of IPTp policy recommendation is crucial for prompt and accurate administration of IPTp. Training of ANC staff is essential to improve on the low uptake of IPTp. Without knowledge of protocol or guidelines it is inevitable for IPTp adherence to be low. A study conducted in Uganda revealed that incorrect guidelines were used by health workers rather than the recent WHO policy recommendation. The poor knowledge of health worker and uncertainty about efficacy and safety of SP and the new IPTp guidelines was thought to be due to lack of supervision and training. There was also lack of recording and reporting of IPTp which will hinder the process of strengthening the ability to improve on IPTp adherence. (Rassi et al., 2016)

Health workers who do not know how to administer SP for IPTp are also responsible for the decline in efforts to scale-up IPTp-SP. From studies, it is believed that training of health care workers and message on IPTp improves IPTp coverage (WHO, 2017a)

2.4.3.2 Directly observed treatment (DOT) practices

WHO IPTp policy recommendation stipulate that the drug SP should be taken as a directly observed treatment given by the ANC staff at the ANC clinic. However, studies have uncovered that it is not always practice at ANC clinics. This inhibits ability to determine whether the drug was taken by pregnant women and its effects on pregnancy. In Nigeria, 82.4% of pregnant women who took SP during a study on low coverage of IPTp for malaria reported that they were allowed to take the drug home (Onoka, Onwujekwe, Hanson, & Uzochukwu, 2012).
Akinleye, Falade, & Ajayi, (2009) disclosed that the compliance rate of DOT was 14.3%. A lot of pregnant women interviewed and had taken SP in the clinic were not supervised by health worker at time of ingestion. This leads to low use of IPTp and poor adherence.

2.4.3.3 Access to ANC Services

Antenatal care is paramount during pregnancy. It creates an opportunity for health worker to render care, support and also information to pregnant women about pregnancy dos and don’ts which includes nutrition, healthy lifestyle, prevention and diagnosis of diseases and psychosocial support (WHO, 2016). In sub Saharan Africa, accessibility and coverage of malaria intervention strategies are inhibited by limited health infrastructure, poverty and ineffective drug policy regulations (Mubyazi et al., 2008).

Travel distance has been known to be a hindrance to accessing antenatal health services. A study in Kenya showed that, pregnant women sometimes have to travel a distance of one to two hours to access ANC services. The study of 278 participants concluded that there is up to 99% chance that the uptake of IPTp is significantly associated with the distance covered to the nearest ANC facility (computed $\chi^2$ value = 37.173, df = 3 and $\rho$-value = 0.000) (Chepkemoi Ng’etich Mutulei, 2013).

In Nigeria, IPTp coverage levels is about 12.6% amongst women living in urban and 6.0% amongst women living in rural areas. This indicates that access barriers still exist to higher degrees for those in the rural areas. (Onoka, Hanson, & Onwujekwe, 2012)
2.4.3.4 Availability of SP and clean drinking water at the ANC clinic

Stock out of SP has been a major challenge in IPTp implementation. In 2016, Ghana had a stock out of SP in the entire country throughout the first half of the year. This significantly affected the uptake of IPTp throughout the country (GHS, 2016).

Rassi et al., (2016) conducted a study among 330 women of reproductive age in central Tanzania. It was discovered that 96% of health workers that were interviewed reported stock out of SP for one to twelve months’ duration during one year proceeding the study. Ninety percent (90%) of the facilities reported of stock out and ANC staff were left with no option but to suspend IPTp services at the ANC clinics, issues prescription for purchase outside the facilities and/or request clients to return for next visit.

Reports of allowing pregnant women to take the drug SP at home was attributed to the quality of water and hygiene of cups that are available at the ANC clinics. It was shown that 61.1% of pregnant women at ANC clinics in rural south west Nigeria would have accepted to take their drugs if they were allowed to bring their own cups(Akinleye et al., 2009)

**Literature Review Conclusion**

There has been a lot of research and discussions conducted on IPTp-SP since its implementation in 2007. From the literature reviewed it is clear that IPTp-SP is very important during pregnancy and plays significant role in preventing complications of malaria in pregnancy(Takem & D’Alessandro, 2013).
Individual factors such as sociodemographic factors, knowledge of IPTp-SP policy, gestational age at first ANC visit and gestational age at first IPTp has shown to influence the uptake of IPTp in different studies, Likewise Health system factors such as knowledge of HCW on IPTp-SP policy recommendations, DOT practices, Access to ANC services and availability of clean drinking water at the facilities.(Akinleye et al., 2009; Ayubu & Kidima, 2017; Kibusi et al., 2015; Nganda et al., 2004; Thiam et al., 2013)

Since WHO’s recommendation of the new IPTp-SP policy in 2012, there has been only few studies focusing on the adherence of this new policy which suggests at least three SP doses to be administered.

Ghana adopted the WHO IPTp-SP policy in 2014 and few studies have focused on the new IPTp policy.

A hospital-based study was conducted among nursing mothers in Accra Osu Government which revealed that 3.9% of mothers made the required amount of visit before delivery(Owusu-Boateng & Anto, 2017). This has had a great effect on the uptake of IPTp-SP doses as recommended by the new policy. The study mainly concentrated on nursing mother and SP stock level and ignored the health system factors which can play a vital role in the adherence to IPTp-SP. This gap informs my study to include health care workers in order to estimate the impact of health system on the adherence to IPTp-SP. Also, the population size used was small and was a limitation for the study and suggested an increase in the sample size for future researches.
CHAPTER THREE

METHODOLOGY

3.1 STUDY DESIGN

A cross sectional analytic study among nursing mothers who had delivered within three (3) months and attending the Child Welfare Clinics (CWC) and Postnatal Clinic at the selected health facilities. Also, the ANC staff at the selected health facilities. The study was conducted between May and June, 2018.

The selected health facilities were –

- Keta Municipal Hospital,
- Sacred Heart (Keta) Hospital,
- Tegbi Health Centre
- Anloga Health Centre.

The study employed quantitative approach to determine the factors influencing adherence to new IPTp-SP policy.

3.2 STUDY AREA

The study was conducted in Keta District in the Volta region of Ghana. Keta district is about 160km from Accra and east of the Volta estuary. The total surface area of the municipality is 753.1km$^2$ and its Capital is Keta. It shares boundaries with Akatsi South District to the north, Gulf of Guinea to the south, South District and Ketu North to the east and South Tongu District.
to the west. The Municipality has the largest lagoon in Ghana, the Keta Lagoon.

Keta District has a population of 147,168 people with 46.4% representing males and 54.6% of females. It accounts for about 7% of Volta region’s Population (Ghana Statistical Service, 2014). About 53% of the population in Keta District live in urban area and the district is dominated by the Ewes (98.7%). Christianity is the predominating religion in the municipality with about 72.8%, traditional religion 25.4% and 1% of Islamic religion.

In Keta district, 75.1% are literate out of 27,047 persons 11 years and older with the proportion of literate males (87.0%) higher than the female (65.4%) according to the 2010 Population and Housing census (Ghana Statistical Service, 2014). Ninety-three and half percent of the population are employed with majority involved in agricultural activities. Private sectors are the largest employers in the municipality (about 91.1%) and 5.6 percent from public sector. About 70.9% of the population are self-employed.

Keta district has six (6) health zones (Keta, Anloga, Tegi, Anyako, Anyanui, Shime) and 28 health facilities which comprises of two (2) Hospitals, thirteen(13) Health Centres, Four (4) CHPs Zones/RCH Centres, Five(5) Maternity Homes and Four (4) Private Clinics.
3.3 STUDY POPULATION

The study population included nursing mothers who had delivered within 3 months before data collection and Health care workers (ANC Staff) at the selected health facilities.
### 3.4 STUDY VARIABLES

**Table 1: List of Study Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Indicators</th>
<th>Operational definition</th>
<th>Scale of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence to IPTp</td>
<td>Adherence</td>
<td>3 or more doses of IPTp-SP</td>
<td>Binary</td>
</tr>
<tr>
<td>Sociodemographic</td>
<td>Age</td>
<td>Age of respondents in years</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>Marital Status</td>
<td>Marital status of respondents</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td>Religion</td>
<td>Religion of respondents</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td>Educational Level</td>
<td>Educational level attained</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td>Employment status</td>
<td>Unemployed, Employed or Self-employed</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td>Occupation</td>
<td>Current occupation of respondents</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td>Parity</td>
<td>Number of live births</td>
<td>Continuous</td>
</tr>
<tr>
<td>ANC Attendance and Obstetric Characteristics</td>
<td>Number of ANC Visits</td>
<td>Number of ANC visits during most recent pregnancy</td>
<td>Binary</td>
</tr>
<tr>
<td></td>
<td>Gestational age at first ANC visit</td>
<td>The age of pregnancy(fetus) in weeks at which first ANC visit was made</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>Gestational age at first IPTp-SP dose</td>
<td>The age of pregnancy(fetus) in weeks at which first IPTp-SP dose was received</td>
<td>Continuous</td>
</tr>
<tr>
<td>Individual factors</td>
<td>Knowledge level on Malaria, MiP and IPTp</td>
<td>Knowledge measured by answers to questions</td>
<td>Categorical</td>
</tr>
<tr>
<td>Health System / Institutional factors</td>
<td>SP availability</td>
<td>Availability of SP at time of data collection</td>
<td>Binary</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------</td>
<td>-----------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Access to IPTp Services</td>
<td>Provision of IPTp-SP services at health facility</td>
<td>Binary</td>
<td></td>
</tr>
<tr>
<td>Knowledge level of ANC Health Workers on new IPTp-SP policy recommendation</td>
<td>Knowledge measured by answers to questions.</td>
<td>Categorical</td>
<td></td>
</tr>
<tr>
<td>Training of ANC Healthcare Workers</td>
<td>ANC Healthcare workers who had formal training on IPTp.</td>
<td>Binary</td>
<td></td>
</tr>
<tr>
<td>DOT practices</td>
<td>Practice of DOT for IPTp delivery.</td>
<td>Binary</td>
<td></td>
</tr>
</tbody>
</table>

### 3.4.1 Dependent Variables

Primary outcome measure is the adherence to the new IPTp-SP policy in the district.

Secondary outcome measures include knowledge level of IPTp-Sp policy among pregnant women and health care workers and IPTp Services at the facility level.

### 3.4.2 Independent Variables

There are four (4) main groups of exposure outcome. These are:

- Socioeconomic and demographic factors- age, marital status, educational status, parity occupation, religion
• ANC attendance and Obstetrics Characteristics – number of ANC visits, gestational age at first ANC visit, gestational age at first IPTp-SP dose

• Individual factors - knowledge of malaria, MiP and IPTp-SP.

• Health System / Institutional factors - drug (SP) availability, access to IPTp services, knowledge and delivery of IPTp policy by ANC Staff, training of ANC staff, DOT practices.

The Socioeconomic and demographic factors and individual factors was assessed by questionnaires to the nursing mothers and the health system/institutional factors was assessed by questionnaires to the ANC Staff.

3.5 SAMPLE SIZE DETERMINATION

Sample size for the nursing mothers was determined using Cochran’s formula:

\[
\frac{Z^2 \times p(1 - p)}{d^2}
\]

\( n \) = estimated sample size

\( Z = 1.96 \) at 95% confidence interval

\( p = 37.5\% \) (IPTp 3 prevalence in Volta region, NMCP 2017)

\( d \) = precision level of 0.05

Therefore,
\[ n = \frac{-1.234 + (51.234)}{1.14} = 360 \]

Allowing for 10% of losses,

\[ n = (0.1 \times 354) + 354 = 395 \] nursing mothers.

### 3.6 SAMPLING METHOD

Four health facilities were selected purposively based on the case load. The four health facilities with the highest volume of antenatal attendances and nursing mothers in Keta district were selected due to the large sample size. These were Keta Municipal Hospital, Sacred Heart (Keta) Hospital, Tegbi Health Centre and Anloga Health Centre.

### 3.6.1 SELECTION OF NURSING MOTHERS

Sampling proportionate to the size of facility was used to determine the number of nursing mothers from each facility based on previous work load. Total ANC attendants for the previous month was used for allocation. Systematic random sampling was used for the selection of nursing mothers at the CWC who meet the criteria. A sampling interval was determined by using estimated average clinic attendance per month. The first client was randomly selected by balloting and every second nursing mother attending the CWC was interviewed. This was done until sample size was achieved. All consenting nursing mothers who had delivered within three (3) months prior to data collection and visiting postnatal clinic or CWC at the selected health facilities were interviewed using a structured questionnaire.
3.6.2 SELECTION OF HEALTH CARE WORKERS

Health Care Workers who are directly linked to ANC clinic (Doctors/CHO and Midwives) at the selected health facilities were interviewed using a structured questionnaire.

3.7 INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria for the study were –

- Consent ing nursing mothers who had delivered within 3 months and attended ANC services at the selected hospitals.
- ANC Staff who have worked at selected health facilities for at least one year

Exclusion Criteria

- Nursing mothers who had delivered within 3 months but do not want to participate in the study
- Health care workers who have worked at the selected health facilities at least a year but do not want to participate in the study.

3.8 DATA COLLECTION METHODS AND TOOLS

Data was collected from nursing mothers at the CWC and post-natal clinic using a structured questionnaire adopted and modified by Atasige (2014). Their consent was sought before the
questionnaires were administered. The questionnaire included the following data:

- socioeconomic and demographic characteristics of nursing mothers
- knowledge on malaria in pregnancy by nursing mothers
- Knowledge on IPTp and SP doses
- Gestational age at first ANC visit, number of ANC visit and number of SP before delivery (this was extracted and recorded from individual ANC records). Challenges/ side effects of SP were also asked.
- Availability of SP at the health facility during ANC visits
- DOT practice at the ANC clinic

Data from health care workers were collected by using questionnaires to inquire about IPTp services rendered at the selected health facilities. It was conducted at the health facilities and sought information about the health care worker’s knowledge on IPTp-SP new policy recommendations, availability of IPTp-SP services at the health facilities, availability of SP drug and stock level and DOT practices.

Incentives in the form of snacks were given to both the nursing mothers and the health care workers.

Data were collected by principal investigator and trained research assistants. The questionnaires were interviewer-administered lasting approximately 40 mins. The questionnaires were interpreted in the local language by research assistants for easy comprehension.
3.9 DATA PROCESSING AND ANALYSIS

Data using pre-coded questionnaires were entered in Microsoft Excel 2016, checked for completeness and exported to STATA 15 for analysis.

Descriptive analysis was done for continuous variables (mean, median, mode, standard deviation) and nominal variables were expressed as graphs and charts. Proportions was used to determine the level of adherence and knowledge of the new IPTp-SP policy. A minimum of three doses, taken as a DOT one month apart at the ANC clinic, was considered as adherence to IPTp-SP policy recommendation. Continuous outcome measure based on composite score analysis was used. Where in Yes will =1 and No=0. Adherence was ranged between 0% to 100%. The higher the value the better the adherence. The client’s and health worker’s knowledge of malaria in pregnancy was measured by asking questions about malaria transmission and interventions which was scored. The scores were added to give a total score.

Chi square was used to test association between categorical variables and adherence. Regression analysis was used to determine the factors influencing adherence to IPTp-SP.

Analysis was done at 95% confident level and p values <0.05 was considered as statistically significant.

3.12 QUALITY CONTROL

Data collection was done by principal investigator and trained and experienced research assistants from the Volta region. The research assistants were trained on the questionnaires, briefed on the research objectives and ethics in the field.
The questionnaires were pretested at Legon Hospital and Madina Polyclinic with similar characteristics. This was used to determine the relevancy of the questions and time needed per interview. The questionnaire was modified after the pre-testing process.

At the end of each day of data collection, there was a review meeting with principal investigator and research assistants to discuss progress and any emerging problems or constraints. All questionnaires were collected by the principal investigator and was checked for completeness and correction of errors on a daily basis. Data collected were cleaned and entered into excel. Double data entry was done to minimize data entry errors. The data were then transferred to Stata 15 software.

Data collected were kept securely locked in cabinets where only the principal investigator having access to. Soft copy of data were stored on laptop and another copy on external hard drive with both copies password protected. The data will be destroyed after five (5) years.

3.13 ETHICAL CONSIDERATION

Ethical approval was sought from the Ghana Health Service Ethical Review Committee. Approval was also sought from Volta Region and Keta District Health Directorates. Also, the In charges of the selected health facilities were consulted and approval sought before the commencement of data collection.

Description of Consenting Process

An informed consent was sought from nursing mothers who had delivered within three months and health care workers at the ANC clinic before administrating of questionnaire. The consent form included details about the study and contacts information about the principal investigator.
and that their participation is voluntary. Consenting participants signed or thumb printed to indicate approval.

**Potential Risk and Benefits**

There was no risk involved in the study. Participants were not coerced into participating in the study and only consenting individuals were recruited.

There was no direct benefit to participants for participation in the study. However, the information provided will help to come up with recommendations that will increase the adherence to IPTp-SP Policy recommendations.

**Privacy/Confidentiality**

No names were required for this study and personal information collected was coded for ease of identification and sorting. All information provided was grouped with others and stored on a password-protected device. Data collected used only for research and academic purposes. Access to the data would be only limited to the principal investigator and the assistants, and will be destroyed after five years.

**Voluntary Withdrawal**

Participation to the study was voluntary. If at any time participant decided to not continue with the interview before completion or withdraw from participating during interview, their request was granted and their information was destroyed.
Compensation

Participants in the study were given snacks at the end of the interview as a token of appreciation.

Declaration of Conflict of Interest

There was no conflict of interest in the study

Funding Information

The study was funded by WHO/TDR.
CHAPTER FOUR

RESULTS

4.0 INTRODUCTION

This chapter outlines analysis of the data collected during the study and summarizes the findings in various sections as indicated below:

1. Sociodemographic characteristics of respondents
2. ANC attendance and obstetric characteristics of respondents
3. Adherence to new IPTp-SP Policy recommendations and proportion of IPTp-SP coverage
4. Individual factors
5. Healthcare system factors
6. Factors associated with adherence to IPTp

4.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS

A total of 375 nursing mothers within the reproductive age group (15 – 49 years) in the 4 selected health facilities were interviewed for the study. Table 1. summarizes the socio-demographic characteristics of the participants.

In all, 53.1% (199/375) of the participants were between the ages of 26 – 35 years and majority (91.7%, 344/375) were married with 41.3% (15/375) having three or more children. The most of them had secondary level education 45.1%, (169/375) and most of the participants (62.9%,
236/375) were self-employed as traders and artisans.

Majority of the participants 88.1% (331/375) were Christians followed by traditionalist (8.0%, 30/375) and then Muslims (3.7%, 14/375).

A total of 11 healthcare workers from the ANC at the selected health facilities participated in the study. More than half (54.6%) of the health workers were between the ages of 36-45.

All the healthcare workers that participated in the study were females, 72.0% were midwives and 27.3% (3/11) were nurses. Eight (72.7%) of the respondents had 1-5 years of experience and three (27.3) with more than 5 years’ experience working at the ANC.
Table 2: Sociodemographic characteristics of participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age grouping</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 18</td>
<td>9</td>
<td>2.4</td>
</tr>
<tr>
<td>18 - 25 years</td>
<td>132</td>
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<tr>
<td>26 -35 years</td>
<td>199</td>
<td>53.1</td>
</tr>
<tr>
<td>36 -45 years</td>
<td>35</td>
<td>9.3</td>
</tr>
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<td><strong>Marital Status</strong></td>
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<td></td>
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</tr>
<tr>
<td>Married</td>
<td>344</td>
<td>91.7</td>
</tr>
<tr>
<td>Divorce / Separated</td>
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<td>0.8</td>
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<tr>
<td>Widowed</td>
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<td><strong>Educational level</strong></td>
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<td>No formal education</td>
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<td>16.3</td>
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<tr>
<td>Primary</td>
<td>119</td>
<td>31.7</td>
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<tr>
<td>Secondary</td>
<td>169</td>
<td>45.1</td>
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<tr>
<td>Bachelor’s degree</td>
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<td>4.8</td>
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<tr>
<td>Post graduate degree</td>
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<td>0.5</td>
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<td>Others</td>
<td>6</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
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<tr>
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<td>40</td>
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<td>Self-employed</td>
<td>236</td>
<td>62.9</td>
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<tr>
<td>Unemployed</td>
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<td><strong>Occupation</strong></td>
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<td>Trader</td>
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<td>Teacher</td>
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<td>7.9</td>
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<td>Artisan</td>
<td>94</td>
<td>33.9</td>
</tr>
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<td>Farmers / Fishmongers</td>
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<td>8.3</td>
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<tr>
<td>Healthcare Workers</td>
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<td>1.8</td>
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<tr>
<td>Others</td>
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<td>7.9</td>
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<td><strong>Religion</strong></td>
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<tr>
<td>Christians</td>
<td>331</td>
<td>88.3</td>
</tr>
<tr>
<td>Muslims</td>
<td>14</td>
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<tr>
<td>Traditionalist</td>
<td>30</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>101</td>
<td>26.9</td>
</tr>
<tr>
<td>2</td>
<td>118</td>
<td>31.5</td>
</tr>
<tr>
<td>≥ 3</td>
<td>155</td>
<td>41.3</td>
</tr>
</tbody>
</table>
4.2 ANC ATTENDANCE AND OBSTETRIC CHARACTERISTICS OF PARTICIPANTS

Most of the nursing mothers (66.1%, 248/375) had less than the eight (8) WHO recommended ANC visits/contacts during pregnancy, 33.9% (127/375) had eight (8) or more ANC visits during the period of pregnancy with a mean of 6.5 ± 2.6 visits.

More than half (53.1%, 199/375) of the participants had their first ANC visit during the second trimester (13-27 weeks), 44.0% (165/375) during the first trimester and only 2.9% (11/375) had their first ANC visit in third trimester. The mean gestational age at first ANC visit was 14.4 ± 6.5 weeks.

In all, 91.4% (339/375) had their first dose of IPTp-SP during the second trimester between 13 – 27 weeks of gestation and 21 (5.7%) respondents had theirs in the third trimester of pregnancy. Thirteen respondents (3.5% 13/375) had at least one dose of IPTp-SP with majority (42.7%, 160/375) having at least three doses of IPTp-SP before delivery. About 16.8% (64/375) nursing mothers had 5 doses of IPTp-SP before delivery. Only 4 respondents (1.1%) did not take SP during their pregnancy.

The nursing mothers were interviewed on the number of SP tablets taken during their pregnancy. Majority (88.0%, 330/375) reported of receiving three (3) tablets of SP per dose, 29 of the respondents (7.82%) reported of receiving less than three (3) SP tablets and 12 (3.2%) claimed to have received more than three SP tablets per dose.
Table 3:ANC and Obstetric Characteristics of participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency(n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age at first ANC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 weeks</td>
<td>165</td>
<td>44.0</td>
</tr>
<tr>
<td>13-27 weeks</td>
<td>199</td>
<td>53.1</td>
</tr>
<tr>
<td>≥ 28 weeks</td>
<td>11</td>
<td>2.9</td>
</tr>
<tr>
<td>Number of ANC visits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;8</td>
<td>248</td>
<td>66.1</td>
</tr>
<tr>
<td>≥8</td>
<td>127</td>
<td>33.9</td>
</tr>
<tr>
<td>Gestational age at first IPTp-SP</td>
<td></td>
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</tr>
<tr>
<td>≤ 12 weeks</td>
<td>11</td>
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<td>13-27 weeks</td>
<td>339</td>
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<tr>
<td>≥ 28 weeks</td>
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<tr>
<td>0</td>
<td>4</td>
<td>1.1</td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>3.5</td>
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<td>2</td>
<td>50</td>
<td>13.3</td>
</tr>
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<td>3</td>
<td>160</td>
<td>42.7</td>
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<td>4</td>
<td>84</td>
<td>22.4</td>
</tr>
<tr>
<td>≥ 5</td>
<td>64</td>
<td>17.1</td>
</tr>
<tr>
<td>Number of SP tablet given per dose</td>
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<td></td>
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<tr>
<td>≤ 2</td>
<td>29</td>
<td>7.7</td>
</tr>
<tr>
<td>3</td>
<td>330</td>
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</tr>
<tr>
<td>&gt;3</td>
<td>12</td>
<td>3.2</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>1.1</td>
</tr>
</tbody>
</table>

4.3 ADHERENCE TO THE NEW IPTp-SP POLICY

RECOMMENDATIONS AND PROPORTION OF IPTp-SP COVERAGE

Majority of the participants (82.1%, 302/375) had more than 3 doses of IPTp-SP during their pregnancy period as recommended by WHO and only 17.9% (67/375) had less than 3 doses.
However, when using Ghana’s five dose IPTp-SP coverage recommendation, only 64 (17.1%) participants adhered and 82.9% did not receive 5 doses of IPTp-Sp during their pregnancy period.

The proportion of IPTp-SP coverage for IPTp1 was 98.9%; IPTp2 95.5%; IPTp3 80.8%; IPTp4 39.5%; IPTp5 17.1% (Figure 4).

Figure 3 Adherence to IPTp-SP policy
Figure 4 Coverage of IPTp-SP

4.4 INDIVIDUAL FACTORS

Over half of the respondents (52.0%) had average knowledge about malaria and Malaria in Pregnancy (MiP), 42.8% (158/375) had poor knowledge and only 5.2% (19/375) had good knowledge about malaria and MiP (Figure 5). Majority (83.5%, 308/375) of respondents had knowledge about the IPTp-SP and the benefits of it and 66 respondents (16.5%) had no knowledge about the benefits of IPTp during pregnancy. The main source of information on malaria was from ANC/Health facility followed by the media.

Some respondents reported of side effects after taking SP tablets. Of these side effects, 52 (13.9%) nursing mothers reported of vomiting after taking SP, 43 (11.5%) complained of generalized body weakness and about 20.0% (75/375) of them complained nausea and dizziness. Table 3 shows the side effects experienced by respondents.
Figure 5: Knowledge of Malaria and MiP

Figure 6: SP Administration
<table>
<thead>
<tr>
<th>Side effects</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dizziness</td>
<td>20</td>
<td>5.3</td>
</tr>
<tr>
<td>Nausea</td>
<td>23</td>
<td>6.1</td>
</tr>
<tr>
<td>Vomiting</td>
<td>52</td>
<td>13.9</td>
</tr>
<tr>
<td>Weakness</td>
<td>43</td>
<td>11.5</td>
</tr>
<tr>
<td>Rashes</td>
<td>7</td>
<td>1.9</td>
</tr>
<tr>
<td>No side effects</td>
<td>203</td>
<td>54.1</td>
</tr>
<tr>
<td>Others</td>
<td>27</td>
<td>7.2</td>
</tr>
</tbody>
</table>

### 4.5 HEALTHCARE SYSTEM FACTORS

All the selected health facilities offered IPTp services (both static and outreach services).

SP was the drug of choice at these facilities but however, one out of the four facilities did not have SP at the time the study was conducted. Seven (63.6%) of the HCWs mentioned that they receive supplies of SP for IPTp from the regional medical stores and two respondents reported that they receive SP supplies from district pharmacy and one from health facilities in the district.

As stated by the HCW participants, SP is given as directly observed therapy (DOT) at all the health facilities where the study was conducted and clean drinking water (sachets) was available for pregnant women to take SP. Six (54.6%) of respondents have had training on IPT-SP and 5 (45.5%) had no previous training on IPTp-SP.

Assessment of Knowledge of ANC staff on IPTp showed that, 90.9% of the ANC workers knew the correct definition of IPTp. All respondents (100.0%) knew the recommended drug, the dose
and the correct interval for IPTp. However, only 45.5% knew when to start IPTp and 81.8% knew when it was prohibited to give IPTp during pregnancy.

Some challenges faced by HCWs at ANC were reported to be shortage of SP drug, side effects of SP and the referral of pregnant women for Glucose-6-Phosphate Dehydrogenase (G6PD) test before commencing IPTp which leads to missed opportunity for IPTp uptake.

**Table 5 Knowledge of ANC Workers on IPTp-SP**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct definition of IPTp</td>
<td>10</td>
<td>90.9</td>
</tr>
<tr>
<td>Recommended drug for IPTp in Ghana</td>
<td>11</td>
<td>100.0</td>
</tr>
<tr>
<td>When to start IPTp</td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td>When not to give IPTp</td>
<td>9</td>
<td>81.8</td>
</tr>
<tr>
<td>Recommended dose for IPTp in Ghana</td>
<td>11</td>
<td>100.0</td>
</tr>
<tr>
<td>Correct interval for IPTp</td>
<td>11</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**4.6 FACTORS ASSOCIATED WITH ADHERENCE TO IPTp**

The univariate analysis of sociodemographic factors and adherence, showed that adherence to IPTp was more likely among nursing mothers between the ages of 26 to 35 years (COR 4.89, 95% CI=1.24-19.31).

Also, educational level was significantly associated to adherence for nursing mothers with secondary level education and above (COR 2.61, 95% CI=1.02 – 5.55) but not for those with primary and no formal education. No statistically significant association was found with adherence and other sociodemographic factors (Table 5).

Univariate analysis of ANC and obstetric characteristics also revealed that adherence to IPTp during pregnancy was significantly associated with gestational age at first ANC visit and gestational age at first IPTp.
Pregnant women who booked at ≥ 28 weeks were less likely to adhere (COR=0.1, 95% CI =0.03-0.37) compared to those who booked at ≤ 12 weeks.

Similarly, adherence to IPTp was more likely among pregnant women who had their first IPTp at ≤ 12 weeks compared to those who had their first dose at ≥ 28 weeks (COR 0.17, 95% CI= 0.03 – 0.97) (Table 6).

In the multivariate logistic regression model, after adjusting for characteristics of participants, having ≥8 ANC visits (AOR=4.51, 95% CI 1.76-11.57, p<0.05) and knowledge of IPTp (AOR=2.74, 95% CI 1.29-5.82, p<0.05) were significantly associated to adherence to IPTp. This is shown in table 7.
Table 6: Univariate Analysis of Sociodemographic Characteristics and Adherence

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Non Adherence &lt; 3 doses</th>
<th>Adherence ≥ 3 doses</th>
<th>COR(95%CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age grouping</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 18</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>18 - 25 years</td>
<td>132</td>
<td>30</td>
<td>102</td>
<td>2.72 (0.69-10.77)</td>
<td>0.154</td>
</tr>
<tr>
<td>26 - 35 years</td>
<td>199</td>
<td>28</td>
<td>171</td>
<td>4.89 (1.24-19.31)</td>
<td><strong>0.024</strong></td>
</tr>
<tr>
<td>36 - 45 years</td>
<td>35</td>
<td>5</td>
<td>30</td>
<td>4.8 (0.95-24.26)</td>
<td>0.058</td>
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<tr>
<td><strong>Marital Status</strong></td>
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<td>Single</td>
<td>24</td>
<td>3</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>344</td>
<td>63</td>
<td>281</td>
<td>0.64 (0.18-2.20)</td>
<td>0.598</td>
</tr>
<tr>
<td>Divorce / Separated</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0.29 (0.02-4.20)</td>
<td>0.361</td>
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<td>Widowed</td>
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<td>4</td>
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<td><strong>Educational level</strong></td>
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<td></td>
</tr>
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<td>No formal education</td>
<td>61</td>
<td>14</td>
<td>47</td>
<td>Ref</td>
<td></td>
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<tr>
<td>Primary</td>
<td>119</td>
<td>33</td>
<td>86</td>
<td>0.78 (0.38-1.59)</td>
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<tr>
<td>Secondary and more</td>
<td>195</td>
<td>20</td>
<td>175</td>
<td>2.61 (1.22-5.55)</td>
<td><strong>0.013</strong></td>
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<td><strong>Employment Status</strong></td>
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<td></td>
</tr>
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<td>Self-employed</td>
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<td>37</td>
<td>199</td>
<td>0.95 (0.37-2.42)</td>
<td>0.913</td>
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<tr>
<td>Unemployed</td>
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<td>24</td>
<td>75</td>
<td>0.55 (0.21-1.47)</td>
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<td>Teacher</td>
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<td>21</td>
<td>5.19 (0.66-40.71)</td>
<td>0.117</td>
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<tr>
<td>Artisan</td>
<td>94</td>
<td>10</td>
<td>84</td>
<td>2.08 (0.93-4.64)</td>
<td>0.075</td>
</tr>
<tr>
<td>Farmers / Fishmongers</td>
<td>23</td>
<td>5</td>
<td>18</td>
<td>0.89 (0.30-2.66)</td>
<td>0.835</td>
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<td></td>
</tr>
<tr>
<td>Others</td>
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<td>5</td>
<td>17</td>
<td>0.84 (0.28-2.53)</td>
<td>0.757</td>
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<td></td>
<td></td>
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<td>Christians</td>
<td>331</td>
<td>58</td>
<td>273</td>
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<td>Muslims</td>
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<td>14</td>
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<td>Traditionalist</td>
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<td>9</td>
<td>21</td>
<td>0.5 (0.22-1.14)</td>
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</tr>
<tr>
<td>1</td>
<td>101</td>
<td>22</td>
<td>79</td>
<td>0.76 (0.40-1.42)</td>
<td>0.387</td>
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<tr>
<td>2</td>
<td>119</td>
<td>18</td>
<td>101</td>
<td>1.17 (0.61-2.25)</td>
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<tr>
<td>≥ 3</td>
<td>355</td>
<td>27</td>
<td>128</td>
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*- p <0.05
Table 7: Univariate analysis of ANC and Obstetric Characteristics with Adherence

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Non Adherence</th>
<th>Adherence</th>
<th>COR(95%CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gestational age at first ANC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 weeks</td>
<td>165</td>
<td>25</td>
<td>140</td>
<td>0.84 (0.48-1.47)</td>
<td>0.533</td>
</tr>
<tr>
<td>13-27 weeks</td>
<td>199</td>
<td>35</td>
<td>164</td>
<td>0.1 (0.03-0.37)</td>
<td>0.001</td>
</tr>
<tr>
<td>≥ 28 weeks</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of ANC visits</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&lt;8</td>
<td>248</td>
<td>59</td>
<td>189</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥8</td>
<td>127</td>
<td>8</td>
<td>119</td>
<td>4.64(2.14-10.06)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Gestational age at first IPTp-SP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>≤ 12 weeks</td>
<td>11</td>
<td>2</td>
<td>9</td>
<td>1.32 (0.28-6.27)</td>
<td>0.731</td>
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<tr>
<td>13-27 weeks</td>
<td>339</td>
<td>49</td>
<td>290</td>
<td>0.17 (0.03-0.97)</td>
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<td>≥ 28 weeks</td>
<td>12</td>
<td>12</td>
<td>9</td>
<td></td>
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</tr>
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<td>4</td>
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*- p <0.05
Table 8: Multivariate analysis of factor associated with adherence

<table>
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<tr>
<th></th>
<th>AOR</th>
<th>95% CI</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td><strong>Age grouping</strong></td>
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<td></td>
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<tr>
<td>&lt; 18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>2.46</td>
<td>0.43 - 14.13</td>
<td>0.311</td>
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<tr>
<td>26-35</td>
<td>5.50</td>
<td>0.94 - 32.08</td>
<td>0.058</td>
</tr>
<tr>
<td>36-45</td>
<td>4.49</td>
<td>0.58 - 34.81</td>
<td>0.151</td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
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</tr>
<tr>
<td>Muslim</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditionalist</td>
<td>0.52</td>
<td>0.19 - 1.42</td>
<td>0.201</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
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</tr>
<tr>
<td>no formal education</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>primary</td>
<td>0.86</td>
<td>0.36 - 2.05</td>
<td>0.734</td>
</tr>
<tr>
<td>secondary and above</td>
<td>2.21</td>
<td>0.84 - 5.84</td>
<td>0.109</td>
</tr>
<tr>
<td><strong>Gestational age at first ANC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-24 weeks</td>
<td>1.22</td>
<td>0.60 – 2.49</td>
<td>0.589</td>
</tr>
<tr>
<td>&gt; 27 weeks</td>
<td>0.68</td>
<td>0.09 – 4.93</td>
<td>0.705</td>
</tr>
<tr>
<td><strong>Gestational age at first IPTp-SP</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>≤ 12 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-27</td>
<td>0.94</td>
<td>0.17 – 5.35</td>
<td>0.946</td>
</tr>
<tr>
<td>&gt; 27</td>
<td>0.15</td>
<td>0.02 – 1.37</td>
<td>0.093</td>
</tr>
<tr>
<td><strong>Number of ANC visits</strong></td>
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<td></td>
</tr>
<tr>
<td>&lt; 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 8</td>
<td>4.51</td>
<td>1.76 – 11.57</td>
<td>0.002*</td>
</tr>
<tr>
<td><strong>Knowledge on Malaria</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1.34</td>
<td>0.67 – 2.67</td>
<td>0.402</td>
</tr>
<tr>
<td>Good</td>
<td>3.26</td>
<td>0.30 – 35.21</td>
<td>0.33</td>
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<tr>
<td><strong>Knowledge of IPTp</strong></td>
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<td>No knowledge</td>
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<td></td>
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<tr>
<td>Knowledge</td>
<td>2.74</td>
<td>1.29 – 5.82</td>
<td>0.009</td>
</tr>
<tr>
<td>*- p &lt;0.05</td>
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</table>
CHAPTER FIVE

DISCUSSION

5.0 INTRODUCTION

This chapter discusses the findings of the study with regards to adherence to IPTp-SP policy recommendations and the factors influencing adherence according to the result from the study. The discussion also includes findings from other studies related to IPTp-SP. It describes specific objectives involved in the study.

5.1 BACKGROUND CHARACTERISTICS OF PARTICIPANTS

All participants were from Keta district in the Volta region and over half of them were between the ages of 26 – 35 years within the reproductive period. Majority of the nursing mothers were married which is common in the African settings. Most women marry before childbearing or are expected to get married as soon as they become pregnant.

Most of the participants had formal education and more than half of them achieved secondary level and above. However, only a small proportion (about 5 %) had a tertiary education. Education has been known to contribute to knowledge and health seeking behaviors which have an effect with adherence to IPTp as shown in the findings to be associated with adherence. Education empowers women with information to make informed choices which can improve their health and lifestyles. Many of the nursing mothers were employed as traders, farmers, fishmongers and Christianity was the major religion among the nursing mothers which is consistent as reported in the national profile of the district (Ghana Statistical Service, 2014).
Health care workers at the ANC were mainly midwives and nurses. Only two midwives were present at each health center and no doctors were seen during the study at the ANC department. This shows the lack of human resource which can affect the adherence to IPTp service delivery.

### 5.2 PROPORTION OF PREGNANT WOMEN ADHERING TO IPTp

Adherence to IPTp-SP in Keta district, Volta region was found to 82.1% according to the WHO policy recommendations which was introduced in 2012 stating that SP should be given to women as early as possible in the second trimester of pregnancy (after quickening).

At least 3 doses of SP should be taken during pregnancy with each dose given monthly up to the time of delivery (WHO, 2017).

Ghana has a five dose coverage regime for administration of IPTp-SP during pregnancy and according to the findings of the research majority of the nursing mother did not have 5 doses of SP during pregnancy. Only about 17% had 5 doses or more during their pregnancy period.

According to NMCP, IPTp coverage for Volta region in 2017 was IPTp 1 - 63.7%, IPTp 2 – 53.0%, IPTp 3 – 37.5%, IPTp 4 – 18.8%, IPT 5 – 5.9% which appears to be lower than those found in the present study (GHS, 2017). However, in the same year, a study conducted in Accra Metropolitan area in Ghana, had similar findings to the current study. It was reported that IPTp1 to be 98.8%, IPTp 2-94.9%, IPTp3 – 87.5%, IPT 4 – 55.7%, IPTp 5 – 14.5% (Boateng & Anto, 2017).

In a study by Sikambale, Halwindi, & Baboo, (2013) in Zambia, IPTp3 coverage was found to be much lower (30%). About a third (28.8%) had no IPTp dose taken during their most recent pregnancy which compared to the present study is slightly different. Only 1.1% of the
respondents did not have any dose of IPTp and a much higher IPT 3 coverage.

These variations can be due to the region the study was conducted or that there are improvements in IPTp delivery services.

Several studies have shown an increase in adherence to IPTp. According to WHO (2016), there is an increase in adherence to the IPTp policy in malaria endemic regions and at least 50% of women reported to have received one or more doses. Also, only 19% of eligible pregnant women had 3 or more doses of IPTp compared to 18% in the previous year (World Malaria Report 2016 Geneva: World Health Organization, 2016).

A study conducted in Mali on uptake of IPTp found a higher uptake of SP of 3 doses more than the DHS reported data (Hurley, Harvey, Rao, & Diarra, 2016). Nonetheless, Mpogoro et al (2014) in Tanzania identified a much lower proportion of pregnant women adhering to IPTp compared to the national survey report.(Mpogoro et al., 2014).

5.3 FACTORS INFLUENCING ADHERENCE TO IPTp POLICY

RECOMMENDATION

Individual Factors

5.3.1. ANC ATTENDANCE

In 2016, WHO updated its guidelines on ANC which was aimed to increase opportunities to improve IPTp-SP coverage. The new model recommends at least eight (8) ANC contacts with the first contact in first trimester, two contacts in second trimester and five contacts in third
trimester. Contact is used to describe an interaction session between the healthcare worker (ANC staff) and the pregnant woman which is different from the previous FANC model (WHO, 2016). The number of ANC visits was the main determinant of adherence to IPTp in the current study though gestational age at first ANC and dose of first IPTp were significant. Most of the previous studies focused on the FANC model of 4 ANC visits during pregnancy which also showed significant association with adherence to IPTp. A study conducted in Cameroon showed that lack of quality of care, late recognition of pregnancy, lack of awareness of health benefits and social economic factors are factors that affects timing of ANC visits (Gross, Alba, Glass, Schellenberg, & Obrist, 2012). ANC visits promotes uptake of IPTp which prevents malaria in pregnancy, protects mother and unborn baby from complications of malaria in pregnancy and improves perinatal outcome. Early detection of pregnancy is important for early commencement of ANC. In Ghana, there is government policy of free maternal care and most ANC services are covered by the national health insurance scheme but yet due to cultural and social challenges, pregnant women report late to the health facilities (ANC clinics) which prevents early monitoring of pregnancy for early detection and management of complicated and pregnancy related symptoms.

5.3.2 KNOWLEDGE LEVEL OF PREGNANT WOMEN

Slightly over half respondents in the study had average knowledge of malaria and MiP. A large proportion (42.8%) also had poor knowledge with only a few (5.2%) with good knowledge of malaria and MiP. However, majority were knowledgeable about the recommendations for IPTp and its benefits.
Various studies have been conducted to assess the relationship between knowledge and IPTp use. Studies in Zambia and Nigeria have shown that knowledge level of pregnant women on IPTp strongly influences their adherence to the IPTp-SP recommendations and women were 2.6 times more likely to complete IPTp doses. (Akinleye et al., 2009b; Sikambale et al., 2013). The studies also supports the finding from the current study that knowledge on malaria and IPTp use is average among pregnant women. This can be associated with the level of education of the respondents from the study.

To reiterate, education empowers women with knowledge which in turn enables women to make informed choices and in this case, choice of ANC and IPTp use.

**Healthcare System Factors**

### 5.3.3 KNOWLEDGE OF HEALTH WORKERS ON MiP AND IPTp-SP

Healthcare workers (ANC staff) were found to be knowledgeable about the definition, dose and interval for IPTp but not about the correct time to commence IPTp during pregnancy.

Knowledge of when to start IPTp administration is considered very important for IPTp coverage as this can influence the amount of dose taken during the period of pregnancy. Studies have shown that commencing IPTp at the scheduled time can increase the chances of receiving the recommended dose of IPTp during pregnancy.

Arulogun & Okereke, (2012) shared their findings from a study which showed that out of 157 healthcare workers who were interviewed about the definition of IPTp-SP, only 51 (32.5%) knew the correct definition of IPTp and 63.9% mentioned the correct number of doses.
Compared to the current study, these figures are much improved which can be as a result of training of healthcare workers on new updates on IPTp.

The poor knowledge about time for IPTp administration in healthcare workers can be due to the over reliance on quickening which is not highlighted in the new WHO recommendations to commence IPTp. Quickening is used to determine the start of the second trimester in the absence of modern methods such as ultrasound in resource limited countries. However, quickening varies in women and some may experience it as late as 20 weeks of gestation. One of the healthcare workers during the data collection period mentioned that it is very difficult to determine quickening and it takes experience. Primigravidae usually have difficulties in recognizing movement of the foetus and therefore this can delay the commencement of IPTp. Healthcare workers with little experience usually fail to probe for more information to determine whether quickening has commenced. Most of the pregnant women claimed to experience quickening at the end of the second semester instead.

5.3.4 IPTp SERVICES, STAFFING AND SP AVAILABILITY

The study found out that all health facilities rendered IPTp services as DOT and majority had SP available for IPTp services. However, there were reports of stock out in one of the facilities and about three stock outs within one-year period. They had to depend on other facilities for SP which is not sustainable or reliable.

A study conducted in Tanzania in 2017 showed a significant association between drug uptake and SP availability and 77% of ANC clinics at the time of study did not have SP (Ayubu &
Kidima, 2017). This shows the growing need of SP in malaria endemic regions even after several years of implementation.

Healthcare workers had concerns about the referral of pregnant women for G6PD testing before commencing IPTp which lead to missed doses of IPTp. G6PD is routine screening that all pregnant women go through at ANC before administration of IPTp-SP but not all facilities are equipped to perform such screening and therefore have to refer to other facilities.

The findings of the study also showed that not all ANC staff members were trained on IPTp. Almost half (45.5%) of healthcare workers that participated in the study at the ANC had no previous training on IPTp.

ANC card records were used to determine the number of IPTp taken during pregnancy and the gestational age at IPTp administration. There were some inaccuracies in some of the ANC records which might be due to untrained healthcare workers.

A recent observational study in Kenya, observed that untrained ANC staff have the tendency to input wrong data in ANC records (Okello, Gerrets, Zakayo, Molyneux, & Jones, 2018).

Side effects of SP were reported by both healthcare workers and nursing mothers. Healthcare workers claimed that pregnant women do not complete IPTp due to complains of side effect. Another concern raised by healthcare workers was the fact that women need to eat before taking SP. This causes healthcare workers to postpone IPTp administration which sometimes leads to missed doses of IPTp.
CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.0 INTRODUCTION

This chapter comprises of conclusion derived from the study, recommendations and limitations of the study.

6.1 CONCLUSION

Adherence to IPTp-SP in the study was determined to be 82.1% with WHO’s recommendation of 3 or more doses of IPTp and 17.1% with Ghana’s 5 dose policy recommendation. Sociodemographic factors (age and educational level) were found to be significantly associated with adherence to IPTp-SP.

Number of ANC visits during pregnancy was one of the main determinants of adherence to IPTp-SP followed by knowledge level of malaria and MiP and also of benefits of IPTp. Majority (66.1%) of the participants had less than the recommended 8 ANC visit during pregnancy. About half of the nursing mothers had average level knowledge on malaria, MiP and IPTp. Obstetrics characteristics such as gestational age at first ANC and gestational age at first IPTp were both significantly associated with adherence to IPTp.

Healthcare system functions such as knowledge of healthcare workers about IPTp-SP, staffing, SP available and DOT practices are considered important in IPTp services and thus adherence to IPTp.
Knowledge of ANC workers was satisfactory but however they scored poorly when asked about when the correct time to commence IPTp was. This can lead to missed doses or delay in the commencement of IPTp and hence decrease the level of adherence.

6.2 RECOMMENDATIONS

Based on the finding from the study, the following recommendation can be made to improve IPTp services and adherence to IPTp-SP: -

A clear definition criterion for when to commence first IPTp dose should be provided. This will prevent the over reliance on quickening which is not always reliable. WHO’s recommendation should be adopted fully to enable pregnant women to receive SP as early as possible in the second semester. This also involves preventing stock out of SP at all facilities. This can be done by improving the functions of the elements of the health system in Ghana.

- **Human resource and Governance** - increase training of healthcare workers at the ANC unit and refresher training for all ANC staff member on IPTp.

- **Information management** – ANC cards should be updated to match the current IPTp recommendations of 5 doses to prevent loss of information and proper reporting. Provision of updated guidelines on IPTp for healthcare workers.

- **Medicines and technology** – provision of necessary drugs and equipment for IPTp services. To ensure that SP is always available for use. Also, provision of better diagnostics equipment such as ultrasound can help with determination of gestational age. Equipment needed for G6PD should be made available at all ANC clinics for ease of administration of IPTp
- **Service delivery** – to improve health education on IPTp and Malaria. To also improve in health commodity management.

### 6.3 OPPORTUNITIES FOR FURTHER RESEARCH

It is necessary for more research to be conducted on IPTp service delivery using observational studies to determine factors such as DOT practices including availability of clean drinking water for DOT. It is also important for research to be conducted to estimate the exact gestational age that is safe for IPTp administration instead as the current WHO guideline is not specific on when to commence IPTp-SP. More research can be done on the safety of SP and how to decrease effects of the drug.

### 6.4 LIMITATIONS

- The study may not be sufficient for generalization to represent the entire Volta region or Ghana since it was carried out in only one district in Volta region in Ghana.
- There may be recall bias from participants due to the fact that the participants were interviewed few months after delivery.
- Although all the healthcare workers that participated in the study claimed to administered SP as DOT, there was no way to verify this information during the study.
REFERENCES


Hill, J., Kayentao, K., Touré, M., Diarwar, S., Bruce, J., Smedley, J., … Webster, J. (2014). Effectiveness of antenatal clinics to deliver intermittent preventive treatment and insecticide


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APPENDICES

APPENDIX A: CONSENT FORM FOR NURSING MOTHERS

Title of Study: Factors influencing adherence to new intermittent preventive treatment of malaria in pregnancy policy in Keta district in Volta region, Ghana.

My name is Alren Onikeh NandawaVandy and I am a post-graduate student at the University of Ghana, School of Public Health, Legon. I am conducting a research to determine the factors influencing adherence to the new intermittent preventive treatment of malaria in your district. This is part of my requirement for the award of Master of Public Health degree. All information provided will be confidential and will be used only for the purpose of this study.

What is involved: I will be administering questionnaires to interview nursing mothers attending child welfare clinics at four (4) selected health facilities in Keta District. This will take approximately 45 minutes of your time. The study will be done at your pace and you may also choose not to answer any question.

Benefits: There is no direct benefits to you as a person for your participation in the study. However, the information you provide will help me to come up with recommendations that will increase the adherence to IPTp-SP Policy recommendations.

Risk: Some questions which are relevant to the study may cause you some amount of discomfort. However, you may decline to answer or terminate your participation at any time.
Costs: There will be no costs incurred to you throughout the study duration.

Compensation: Snack will be provided at the end of the interview as a token of appreciation for your time.

Confidentiality: Any information given will remain confidential and will be used for only the purpose of this study. No names will be required for this study and personal information collected will be coded for ease of identification and sorting. All information provided will be grouped with others and stored on a password-protected device. Access to the data would be only limited to the principal investigator and the assistants, and will be destroyed after five years.

Voluntary participation/withdrawal: Participation to this study is voluntary. Please note that it is up to you to decide whether to take part in this study or not. If at any time you decide not to continue with the interview before completion, your request will be granted and your information will be destroyed. Please feel free to ask any question for any further clarification.

Contact: For any question or clarification, please contact me at the School of Public Health, University of Ghana or call: 0205429493, or via email: aonvandy@st.ug.edu.gh. You may also contact the Ethical Review Committee Administrator Ms. Hannah Frimpong on 0507041223.

Feedback: If you wish to receive results from this research, kindly provide your email address: -

Volunteer Agreement:

I have read and I understand the information provided. I have had the opportunity to ask questions and questions asked have been answered to my satisfaction. I consent voluntarily to
participate as a respondent in this study and I understand that I am free to withdraw from the study at any time without giving a reason and without cost.

Signature/thumbprint of respondent: ……………………………………………………………

Date: …………………………………………………

Witness (If participant cannot read): I certify that I was present when the above was read to the participant and all questions were answered and participant has agreed to take part in the study.

Signature…………………………………………………………

Date…………………………………………………………

Principal Investigator or RA: I attest that I have explained the study information accurately to the participant and that enough time has been given to ask question and all questions answered to the best of my knowledge. The participant has freely given consent to participant in the study.

Signature: ……………………………………………………………

Date: ……………………………………………………………
APPENDIX B: CONSENT FORM FOR HEALTH CARE WORKERS

Title of Study: Factors influencing adherence to new intermittent preventive treatment of malaria in pregnancy policy in Keta district in Volta region, Ghana.

My name is Alren Onikeh NandawaVandy and I am a post-graduate student at the University of Ghana, School of Public Health, Legon. I am conducting a research to determine the factors influencing adherence to the new intermittent preventive treatment of malaria in your district. This is part of my requirement for the award of Master of Public Health degree. All information provided will be confidential and will be used only for the purpose of this study.

What is involved: I will be administering questionnaires to ANC staff at four (4) selected health facilities in Keta District. This will take approximately one hour of your time. The study will be done at your pace and you may also choose not to answer any question.

Benefits: There is no direct benefits to you as a person for your participation in the study. However, the information you provide will help me to come up with recommendations that will increase the adherence to IPTp-SP Policy recommendations.

Risk: Some questions which are relevant to the study may cause you some amount of psychological discomfort. However, you may decline to answer or terminate your participation at any time.

Costs: There will be no costs incurred to you throughout the study duration.
Compensation: Snack will be provided at the end of the interview as a token of appreciation for your time.

Confidentiality: Any information given will remain confidential and will be used for only the purpose of this study. No names will be required for this study and personal information collected will be coded for ease of identification and sorting. All information provided will be grouped with others and stored on a password-protected device. Access to the data would be only limited to the principal investigator and the assistants, and will be destroyed after five years.

Voluntary participation/withdrawal: Participation to this study is voluntary. Please note that it is up to you to decide whether to take part in this study or not. If at any time you decide not to continue with the interview before completion, your request will be granted and your information will be destroyed. Please feel free to ask any question for any further clarification.

Contact: For any question or clarification, please contact me at the School of Public Health, University of Ghana or call: 0205429493, or via email: aonvandy@st.ug.edu.gh. You may also contact the Ethical Review Committee Administrator Ms. Hannah Frimpong on 0507041223.

Feedback: If you wish to receive results from this research, kindly provide your email address: -

Volunteer Agreement:

I have read and I understand the information provided. I have had the opportunity to ask questions and questions asked have been answered to my satisfaction. I consent voluntarily to participate as a respondent in this study and I understand that I am free to withdraw from the study at any time without giving a reason and without cost.
Signature/thumbprint of respondent: .................................................................

Date: .................................................................

Witness (If participant cannot read): I certify that I was present when the above was read to the participant and all questions were answered and participant has agreed to take part in the study.

Signature.................................................................

Date.................................................................

Principal Investigator or RA: I attest that I have explained the study information accurately to the participant and that enough time has been given to ask questions and all questions answered to the best of my knowledge. The participant has freely given consent to participate in the study.

Signature: .................................................................

Date: .................................................................
APPENDIX C: QUESTIONNAIRE FOR NURSING MOTHERS

Factors influencing adherence to new intermittent preventive treatment of malaria in pregnancy policy in Keta district in Volta region, Ghana.

Date: .................................................. Questionnaire no: .............................................

Name of facility................................. Type of facility .............................................

SECTION A. SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS

1. Age

2. Sex:
   Male ☐       Female ☐

3. Marital status:
   Single ☐       Married ☐       Divorce/Separated ☐       Widowed ☐

4. Religion:
   Christian ☐       Iuslim ☐
   Others (please specify) .... ........................

5. Educational Level:
   No formal education ☐       Primary ☐       Secondary ☐
   Bachelor’s degree ☐       Post graduate degree ☐
Others (please specify) ........................................

6. Employment status:
   Employed  o  Self-employed  o
   Unemployed  o

7. Occupation: ........................................................

8. Place of residence:
   Urban  o  Rural  o

9. How many times have you been pregnant?
   .................................................................

10. How many successful deliveries have you had?
   .................................................................

11. Where was your most recent delivery done?
   Home  o  Public facility  o  Private facility  o

SECTION B: KNOWLEDGE OF MALARIA IN PREGNANCY

1. Have you heard about malaria?  Yes  o  No  o
2. How can you get malaria? (You can select more than one answer)
   a. through hugging
   b. Bite from infected mosquito
   c. Fly
   d. Evil spirit
   e. Don’t know
   f. Others (please specify) .................................

3. Have you suffered from malaria before?  Yes ☐  No ☐

4. What are the symptoms of malaria? (You can select more than one answer)
   a. Headache
   b. Fever
   c. Loss of appetite
   d. Vomiting
   e. Others; (please specify) .........................

5. What are the complications of malaria in pregnancy? (You can select more than one answer)
   a) Low birth weight
   b) Still birth
   c) Anemia
d) Death

e) Others (please specify) ……………….

6. How can malaria be prevented in Pregnancy? (You can select more than one answer)

- Eating well
- Use of mosquito nets
- Use of mosquito spray
- IPTp-SP
- Proper sanitation

Others, specify: ……………………………

7. Where do you get health information about malaria in pregnancy? (You can select more than one answer)

- ANC Clinic
- Radio
- TV
- Newspaper

Other, specify: ……………………

SECTION C: KNOWLEDGE ABOUT IPTP-SP

1. Have you heard about Intermittent Preventive Treatment of Malaria in Pregnancy?

- Yes
- No

If yes, please provide information about what IPTp is …………………………………………………
2. What are some of the benefits of IPTp-SP? *(You can select more than one answer)*
   
   a) For treatment of malaria in children
   
   b) To prevent malaria in pregnancy
   
   c) To treat sexually transmitted diseases
   
   d) To prevent complication of malaria in pregnancy
   
   e) Don’t know
   
   f) Other, specify: …………………….

3. How many doses are required for IPTp-SP?

   ……………………………………………

4. How many tablets were you given during every visit?

   ……………………………………………

5. Was the SP drug given under supervision?

   Yes o  No o

6. What are some of the constraints / challenges during your ANC visit with regards to IPTp administration?
SECTION D: RECORDS FROM ANTENATAL CARDS

1. Gestational age at first ANC Visit…………………………………………………………

2. Number of ANC visits during most recent pregnancy……………………………………

3. Gestational age at which first IPTp was given ………………………………………

4. Number of IPTp-SP doses given during most recent pregnancy.

   IPTp 1  o    IPTp 2  o    IPTp 3  o    IPTp 4 o    IPTp 5 o
APPENDIX D: QUESTIONNAIRE FOR ANC STAFF

Factors influencing adherence to new intermittent preventive treatment of malaria in pregnancy policy in Keta district in Volta region, Ghana.

Name of facility Sub-district

Type of health facility

Section A: General Information

1. Age:

2. Sex:
   Male ☐ Female ☐

3. Designation:
   Doctor ☐ Midwife ☐ Nurse ☐
   Others, specify…………………………………………………………

4. Number of years of practice:
   Less than one year ☐ 1-5 years ☐ 6-10 years ☐
   More than 10 years ☐
Section B: Knowledge of IPTp

1. What is Intermittent Preventive Treatment of malaria in pregnancy (IPTp)?
   a) Giving curative doses of an effective anti-malaria drug weekly during pregnancy
   b) Giving of curative doses of an effective antimalarial drug at predefined intervals during pregnancy
   c) The injection of artesunate to a pregnant woman when she has malaria
   d) Giving of artesunate combined treatment (ACT) to pregnant women when they have malaria
   e) Don’t know

Others, (please specify) .................................................................

2. What drug is recommended for IPTp use in Ghana?
   a) Chloroquine Artesunate- amodiaquine
   b) Fansidar (SP)
   c) Lumether
   d) Don’t know

Others, (please specify) .................................................................

3. When is IPTp supposed to be started during pregnancy?
   a) In the first trimester
   b) at the middle of second trimester
   b) the third trimester
   d) At the start of the second trimester
   e) Don’t know

Other, (please specify) .................................................................
4. At what gestation is IPTp NOT given during pregnancy?
   
a) 32 weeks  
b) 10 weeks  
c) 36 weeks  
d) 38-40 weeks  
e) Don’t know  
       Others, (please specify) ………………

5. How many times during pregnancy is it recommended to give IPTp in Ghana?
   
a) Once  
b) Twice  
c) Three times  
d) Four times  
e) Five times  
       Other, specify: ………………

6. At what interval is it recommended that IPTp is given?
   
a) Monthly  
b) Fortnightly  
c) Every three months  
ed) Every week  
       Other, specify: ………………

7. What are some of the benefits of IPTp? (You can select more than one answer)
   
a) Reduces the incidence of low birth weight infants  
b) Reduces the incidence of maternal anaemia  
c) Reduces the incidence of infant and maternal mortality  
d) no benefit  
e) others, (please specify) ……………………………………………………………
Section 3: IPTp Services at the ANC Clinic

1. Do you administer IPTp in your facility?
   - Yes o
   - No o

2. If yes, what drug is used for IPTp in your facility?
   - Chloroquine o
   - Fansidar (SP) o
   - Artesunate-amodiaquine o
   - Lumether o

3. Is the drug available at the ANC today?
   - Yes o
   - No o

4. How is the drug administered at your clinic?
   - a) Given to the pregnant women to take home
   - b) We observe the pregnant women take the medicine in clinic
   - c) Prescriptions are written for the pregnant women to go and collect at the pharmacy
   - d) Prescriptions are written for the pregnant women to go and buy outside the clinic
   - e) Other, specify ..............................................................

5. Has there been any stock out of SP in your clinic?
   - Yes o
   - No o

   If yes, How many times during the last year? .........................
6. Where do you get supplies of SP for IPTp?
   a) District pharmacist
   b) Regional medical stores
   c) Health facility in district
   d) Other, specify ........................................

7. Do you supply water for the pregnant women to take the drug at the ANC clinic?
   Yes ☐ No ☐

8. If yes, what is the source of water used for pregnant women at your facility?
   a) sachet water (pure water)
   b) bottle water
   c) water from stand pipe
   d) water dispenser
   e) other, (please specify) ........................................

9. Have you had any training in IPTp-SP before?
   Yes ☐ No ☐
   If yes, how many times in the last twelve months did you have training on IPTp-SP?
   ........................................................................

10. What are some of the challenges faced during IPTp service delivery at your facility?
GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

MyRef. GHS/RDD/ERC/Admin/App 18/02/4
Your Ref. No.

Alren Onikek Nandawa Vandy
University of Ghana
School of Public Health
Legon, Accra

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

<table>
<thead>
<tr>
<th>GHS-ERC Number</th>
<th>GHS-ERC: 035/12/17</th>
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<td>Project Title</td>
<td>Factors Influencing Adherence to New Intermittent Preventive Treatment of Malaria in Pregnancy Policy in Keta District in Volta Region, Ghana</td>
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<tr>
<td>Approval Date</td>
<td>14th March, 2018</td>
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<tr>
<td>Expiry Date</td>
<td>13th March, 2019</td>
</tr>
<tr>
<td>GHS-ERC Decision</td>
<td>Approved</td>
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This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol.

SIGNED
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra