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FACTORS ASSOCIATED WITH UPTAKE OF INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY IN NINGO PRAMPRAM DISTRICT OF GREATER ACCRA, GHANA.

BY

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20th /APRIL/2021

DECLARATION

I, **Asiimwe Nashira** declare that apart from references to other works that I have duly acknowledged, this report is a product of my original work conducted under the supervision of Prof. Anto Francis. I further declare that no part or whole of this dissertation has ever been submitted for the award of any academic credit at this University or elsewhere.

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ABSTRACT

Introduction: Malaria is endemic throughout Ghana with pregnant women and children under five years, having a higher risk of severe illness. Ghana adopted a new IPTp-SP of MIP policy in 2004, which was updated in 2014, to reflect the updated policy of WHO 2012. In 2017, uptake of IPTp3 was 43.0%, and IPTp5 was 8.9%, which was below the target of 80%. The study aimed at assessing IPTp-SP uptake and associated factors in the Ningo Prampram District. **Methods:** An analytical study was carried out in July 2020 in Ningo Prampram District. Data were collected from women who had delivered within the past six months using structure questionnaires. Their ANC books were also reviewed to extract obstetric data. Midwives were interviewed concerning their knowledge and practices towards IPTp-SP. Data on health facilities readiness to provide IPTp-SP were also collected using a check-list. The quantitative and qualitative data were analysed using Stata16 and thematically, respectively. **Results:** The postnatal mothers were recruited from five public health facilities. Among all participants, 6.1 % did not take any IPTp; those that took IPTp1 were 93.9%, IPTp2 82.5%, IPTp3 62.8%, IPTp4 31.1%, IPTp5 15.3% and IPTp6 0.4%, with reasons from HCWs for the low uptake like, *" patients have rights if they say no to taking a drug because of previous experiences, I can't force them, or else they will run away and never come back for other services."* hwc8. Regardless of this, all HCWs had good knowledge and practices. Of the 23 variables evaluated, only Gestation age at IPTp1(AOR=0.33, P=0.012) and Knowledge about IPTp-SP (AOR=5.7, P=0.022) were statistically significant in multivariate analysis as factors affecting IPTp5 uptake. Most facilities had medium facility readiness to provide IPTp for pregnant women. **Conclusion:** This study found that IPTp-SP uptake fell below the NMCP national targets for IPTp1,2,3,4, and 5 among the postnatal mothers. With factor such as voluntary refusal to take the drug, SP stock out issues and ineligibility to take SP drug.

DEDICATION

I dedicate this work to my daughter Ahlam Hafsa Mutebi, my mother Hajat Afuwa Nansamba, my friends Tembo Hafsa, Naitala Jean Noel, and my siblings (Niwagaba Abdul Wahab, Baguma Arafat, Kasigazi Abdul Nasir, Ayebare Swabra). Thank you all for the support.

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LIST OF ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal care
CI	Confidence Interval
DHS	Demography Health Survey
DOT	Directory Observed Therapy
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HCW	Health care Worker
IPTp	Intermittent Preventive Treatment of malaria in pregnancy
IPTp-SP	Intermittent Preventive Treatment of Malaria in Pregnancy with Sulphadoxine Pyrimethamine
ITNs	Insecticide Treated Nets
MIP	Malaria in Pregnancy
NHIS	National Health Insurance Scheme
NMCP	National Malaria Control Program
OPD	Out Patient Department
OR	Odds Ratio
PMI	President Malaria Initiative
RBM	Roll Back Malaria
SP	Sulfadoxine-pyrimethamine
SSA	Sub-Sahara Africa
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Malaria is a tropical disease found in 91 countries globally (World Health Organization [WHO], 2017a). It is both a preventable and curable disease caused by a protozoan of the *Plasmodium genus* and of which only five species are known to cause disease in humans. The mode of human transmission is from an infected Anopheles mosquito's bite. In 2017, 99.7% of malaria cases in the World Health Organization (WHO) African region were due to *P. falciparum* (WHO, 2018).

Malaria is endemic throughout Ghana, with some seasonal variations. Although the entire population of Ghana is at risk of infection, children under the age of five years and pregnant women are at increased chance of a severe form of the disease (PMI, 2016). In areas of relatively high malaria transmission, by adulthood, after an individual has survived recurrent malaria episodes, he or she tends to develop partial immunity against the severe form of the disease.

Nevertheless, pregnant women (mainly first or second pregnancies) reclaim their susceptibility to malaria due to; changes in their immune system and the existence of a new organ (placenta) that is a new parasite hiding spot (Kovacs, Rijken, & Stergachis, 2015). Compared to women that are not pregnant, pregnant women have a three times higher risk to have severe malaria with a mortality rate of up to 50% (African Strategies for Health, 2016; Kovacs et al., 2015). During pregnancy, *P. falciparum* infection can also take-up an asymptomatic form. This form triggers mild to severe anaemia, placental malaria which interferes with the placenta's maternal-fetal

exchange, resulting in miscarriage, the delivery of infants with low birth weight, and neonatal death (Anto, Agongo, Asoala, Awini, & Oduro, 2019; Statistical Service Accra, 2015). In high-transmission geographical areas, the second trimester seems to bring the highest infection rate, with younger pregnant women more commonly infected as compared to older ones (Rogerson et al., 2018).

Therefore the WHO suggests a three-pillar program for malaria prevention and control in pregnant women living in high-endemic areas, i.e. use of intermittent preventive treatment in pregnancy with sulphadoxine-pyrimethamine (IPTp-SP), Insecticide Treated Mosquito Nets (ITNs), and efficient case management of anaemia and clinical malaria (Chan & Aylward, 2016; WHO, 2017b). The intermittent preventive treatment in pregnancy (IPTp) pillar consist of providing full-course Sulfadoxine-pyrimethamine (SP) treatment for pregnant women if they visit antenatal care (ANC) clinic, irrespective of whether they have malaria or not (WHO, 2017a).

Currently, Sulphadoxine Pyrimethamine (SP) is the best medication choice for IPT because of its established safety among women of reproductive age, its extensively researched safety during the prescribed months of pregnancy, its affordability and viability for use in programs as it can be offered every month under directly observed therapy (DOT) by the antenatal care (ANC) staff. Besides, SP is being used because of its revealed high levels of acceptance among pregnant women and its low antimicrobial drug resistance levels in Ghana (Ministry of Health, 2006).

Earlier studies showed that SP-IPTp use is related to a reduction in pregnancy malaria episodes, placental malaria parasitemia, both maternal and fetal anaemia, and neonatal mortality as well as

improvement of birth weight (Bouyou-Akotet et al., 2016; Meghna Desai et al., 2018). Unfortunately, other studies in sub-Saharan Africa suggest that SP effectiveness is challenged by widespread drug resistance in some parts like northern Tanzania (Harrington, Mutabingwa, Kabyemela, Fried, & Duffy, 2011) due to the presence of *P.falciparum* mutations (Tan et al., 2014).

The above and a meta-analysis in Africa showed that a three-course of SP monthly was safe with added effect as compared to the earlier recommended two-course SP strategy due to many factors with resistance inclusive, prompted WHO to review and update its policy in 2012 (Desai et al., 2018). As of October 2012, the WHO recommended that all pregnant women starting early in the second trimester be given IPTp (i.e. not in the first trimester), in at least three doses, each dose administered at least a month apart (WHO Global Malaria Programme, 2012).

According to the World malaria report (2017), 36 African countries (Ghana inclusive) had implemented a policy of providing at least IPTp3 to all pregnant women by 2016. Progress in adherence to this policy had improved marginally: among the 23 countries documented in the same year, only about 19% of qualifying pregnant women received the recommended IPTp dosage, compared to 18% in 2015 and 13% in 2014. Despite widespread coverage, more than two-thirds (69%) of sub-Saharan Africa pregnant women still did not have access to the WHO IPTp recommended doses (WHO, 2017b). In agreement with this, approximately no more than 38% of women in Ghana reported having received at least IPTp3 during their most recent pregnancy (Statistical Service Accra, 2015). The rate of IPTp3 uptake has since increased to 43% in 2017 (Odjidja, Kwanin, & Saha, 2017).

1.2 PROBLEM STATEMENT

In 2017 close to 219 million people were infected with malaria parasites leading to 435,000 deaths worldwide, of which 93% occurred in Africa (WHO, 2018). Although malaria affects people of all ages, children under the age of five years and pregnant women are the most susceptible. Malaria in pregnancy (MIP) is still a significant public health problem since it affects not only the pregnant woman, but also her fetus, or newborn child if not well managed, contributing to adverse outcomes of pregnancy, like LBW, maternal mortality, fetal and maternal anaemia (Bhatt et al., 2016).

In 2017, MIP accounted for 14% of the attendance of Out Patient Department (OPD), 11% of the admissions and 9% of the deaths among pregnant women in Ghana (Odjidja et al., 2017). To prevent this, Ghana's National Malaria Control Program (NMCP) recommended a minimum of five doses of IPTp-SP. Based on the 2017 annual NMCP report, uptake of IPTp3 was 43.0%, and IPTp5 was 8.9%, which were below the target of 80% (Ghana Health Service [GHS], 2018).

Several factors including low maternal knowledge (Ibrahim et al., 2017), distance to the health facility (Odjidja et al., 2017), IPTp-SP unavailability, nonadherence to protocols like DOT (Amankwah & Anto, 2019), lack of male partner involvement (Yargawa & Leonardi-Bee, 2015) and missed opportunities to deliver IPTp-SP (Desai et al., 2018) have been identified to influence IPTp-SP uptake.

Therefore, the purpose of this investigation was to determine factors associated with uptake of IPTp-SP at the different facility levels (polyclinic, health centre, and CHPS compound) of health delivery in the Ningo Prampram District of the Greater Accra Region. Ningo Prampram as a

district had IPTp uptake below the regional average, despite Greater Accra as a region having above the national IPTp uptake average (GHS, 2018).

1.3 CONCEPTUAL FRAMEWORK

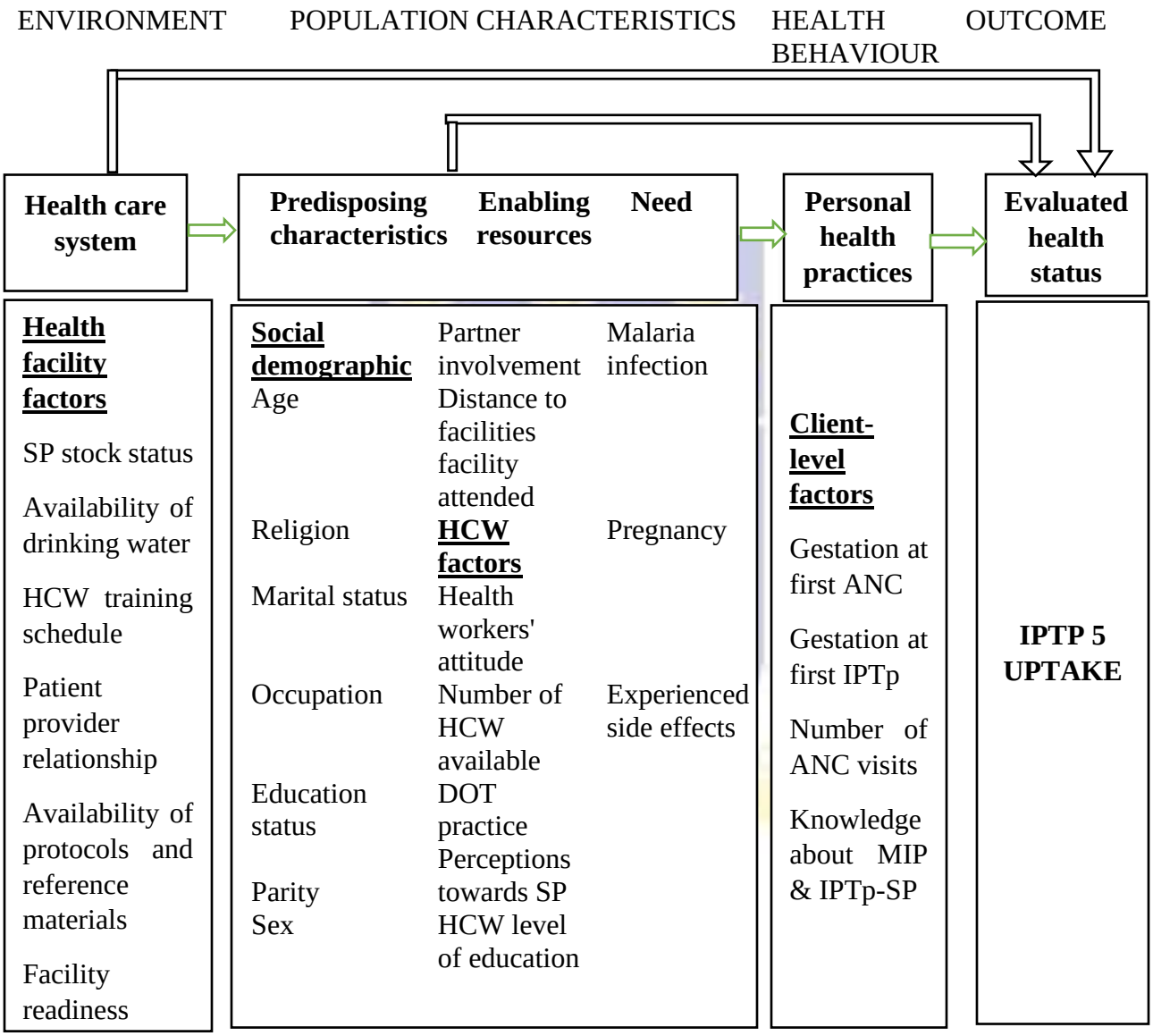

Figure 1: Conceptual framework of factors associated with uptake of intermittent preventive treatment of malaria in pregnancy with sulphadoxine-pyrimethamine. Adapted from: Andersen and Newman behavioral model of Health Services Utilization

1.3.1 NARRATIVE

The conceptual framework above gives a general overview of what the research looked like with the adaption of the Andersen and Newman behavioural model of Health Services Utilization. The purpose of this model was to explore conditions that would either promote or hinder the use of health services. It is the fourth phase framework that was used, whose first phase was first developed in the 1960s (Anderson, 2018). It was necessary to identify and quantify determinants that influence the uptake of IPT-SP5 at the various health facilities in greater Accra Ghana and how these are linked to each other.

According to Andersen and Newman, access and use of health services by an individual is a result of three characteristics: 1. predisposing factors are the socio-cultural characteristics of individuals prior to their disease, including social context, e.g. education and occupation; Health Beliefs like Attitudes and knowledge towards the health care and demographic, e.g. sex. 2. Enabling factors are the practical aspects of acquiring care, including family, access to health facilities means and know-how, the community including health care workers (HCW) and the services available. 3. Need factors are the immediate cause of the use of health services, both from the functional and health concerns that generate the need for health care services (Andersen, 1995).

Although the model is mainly one of use of health services, it also recognizes that the external environment/ healthcare system is an important input for understanding the use of health services. It also recognizes that the interaction of personal health care practices (such as self-care) and the use of formal health services can affect health outcomes (Andersen, 1995). This phase 4 model portrays the multiple influences on health services' use and subsequently on health status.

A review by Babitsch, Gohl, and Lengerke (2012) revealed that the following variables were used age, marital status, sex, parity, and education as predisposing factors and self-reported/ perceived health situation like being pregnant or having MIP as need factors. And the same were used in this current study. For the enabling factors, HCW factors, facility attended, partner involvement and distance to facilities were used. Different studies showed that these were seen to affect IPTp uptake (Boateng et al., 2018; Diengou et al., 2020). Regardless, a study in Tanzania found no association between facility readiness and IPTp 5 uptake (Bajaria et al., 2019). These influenced this study's variable selection.

Other studies assessing different personal health practices like the timing of gestation at first ANC and number of ANC attended in relation to IPTp uptake also informed our choice of variables (Azizi, 2020; Weldemariam et al., 2018). In a typical world, several factors are always interacting to determine the health status of the community. So, we used this model to identify and quantify the determinants that contributed to the uptake of IPT-SP5 in Ningo Prampram district setting.

1.4 RESEARCH QUESTIONS

1. What is the IPTp-SP uptake among postnatal mothers in Ningo Prampram district?
2. What are the client factors associated with the low IPTp-SP uptake in the Ningo Prampram district?
3. What are the health care worker factors associated with the low IPTp-SP uptake in the Ningo Prampram district?

4. What are the health facility factors associated with the low IPTp-SP uptake in the Ningo Prampram district?

1.5 OBJECTIVES

1.5.1 GENERAL OBJECTIVE

To assess the level of IPTp-SP uptake and its associated factors among mothers who received antenatal care serves at the polyclinic, health centres and CHPS compounds in Ningo Prampram District, Greater Accra Region.

1.5.2 SPECIFIC OBJECTIVES

1. To determine the level of IPTp-SP uptake among postnatal mothers in the Ningo Prampram District.
2. To assess client factors associated with low uptake of IPTp-SP among postnatal mothers in the Ningo Prampram District.
3. To determine health care worker factors associated with uptake IPTp-SP among postnatal mothers in the Ningo Prampram District.
4. To identify health facility factors associated with IPTp-SP uptake among postnatal mothers in the Ningo Prampram District.

1.6 JUSTIFICATION

Among the three package interventions fronted by WHO and adopted by Ghana towards fighting MIP (NMCP, 2016). A 2015 report on 20 African countries showed that IPTp-SP intervention had the lowest coverage (WHO, 2016). This is evident in Ghana because, four years after the IPTp-

SP5 strategy was rolled out, in 2018 IPTp-SP5 coverage was 10.8%(NMCP, 2019). Furthermore, data from the World Malaria Report (2016) indicates that one in every five pregnant women did not receive ANC (20%) in 2015. However, among those that received ANC, 30% did not receive even a single dose of IPTp-SP, and many did not complete the full schedule recommended by the WHO.

In agreement, Odjidja et al. (2017) in Ghana reported optimal dose (3+ doses) IPTp uptake of only 38.5% while ANC visits stood at about 87.3%. Yet the Ghana anti-malarial drug policy requires that IPTp should be administered as Directly Observed Therapy (DOT) at monthly intervals during pregnancy until delivery (GHS, 2010). This is why this study tried to find the fidelity and other factors as to why the situation is as it is at the different health facility levels to pinpoint the specifics for each setting.

According to the NMCP annual report, (2018) Greater Accra region generally had fewer MIP cases as compared to the country average. And even if it is below the national target of 80% the Greater Accra region still performed fairly well with IPTp-SP3 uptake, with values slightly below the country average (46.7%). Despite the above, Ningo prampram as a district in Greater Accra performed worse than the region's averages at both the number of MIP cases and IPTP-SP uptake (DHIMS2, 2019). This influenced selection of this study area, as it seeks to provide evidence-based research information regarding the level of IPTp-SP uptake and associated factors among mothers who received ANC serves at the different health facility levels in the Ningo Prampram District of the Greater Accra Region.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 MALARIA IN PREGNANCY (MIP)

Worldwide, malaria continues to be a major public health concern. In 2016 alone, about 216 million malaria infection cases were reported globally, a slight increase from 211 million in 2015. These led to the death of 445,000 people in 2016 and 446,000 in 2015 (WHO, 2017a). Accordingly, more than 88% of the global malaria problem is in Africa, specifically pregnant women and children under five years (Prasad, Rai, & Hussain, 2018; WHO, 2017a). About 125 million pregnant women worldwide live in areas where they are at high risk of developing MIP (Dellicour, Tatem, Guerra, Snow, & Ter Kuile, 2010).

Moreover, pregnant women are at three times more risk to experience severe malaria, whose mortality rate stands at 50 per cent compared to non-pregnant women (Kovacs, Rijken, & Stergachis, 2015; WHO, 2015). Approximately every year, around 200,000 newborn deaths result from MIP (WHO, 2019). This makes MIP a focus region of malaria prevention. In 2017, Ghana's outpatient departments (OPD) reported, approximately 399,736 suspected MIP cases compared to the 383,034 reported in 2016. That same year, the top three areas with the largest number of cases of MIP were the Western, the Central and the Ashanti Region with 62,512 cases, 55,327 cases, and 52,665 cases, respectively. In contrast, the Upper West Region came in with the least MIP cases, with a total of 11,730 cases (NMCP, 2018).

2.2 INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY USING SULFADOXINE-PYRIMETHAMINE (IPTp-SP)

IPTp means giving a full therapeutic dose of an anti-malaria drug at predetermined intervals during pregnancy in moderate to high malaria transmission areas. In Africa, it is given when pregnant women visit health facilities for ANC, irrespective of whether or not she is infected with malaria (Kibusi, Kimunai, & Hines, 2015). Only a correct IPTp dose decreases risks of MIP infection like maternal mortality, fetal and maternal anaemia (Bhatt et al., 2016).

First implemented in 2000, IPTp-SP strategy was adopted in 2004 by the WHO African Region (WHO, 2004). As of 2012, WHO updated IPTp-SP guidelines because of multiple studies into SP multiple-dose safety. It emerged from the meta-analysis of seven IPTp-SP evaluation trials that three or more IPTp-SP doses were associated with less placental malaria, higher average birth weight than two SP doses (WHO, 2012). Yet there were no differences among them on serious adverse event incidents (Kassoum et al., 2015; Ndeserua, Juma, Mosha, & Chilongola, 2015).

Thus the current recommendation that pregnant women take SP at each monthly ANC facility visit until delivery(WHO, 2014). SP must be administered as a Directly Observed Therapy (DOT) starting early in the fourth month of pregnancy (WHO, 2013). Lastly, SP can also be taken with or without food (WHO Global Malaria Programme, 2012). The current recommendation is to encourage pregnant women to make around 8 ANC visits, three tablets of SP equal to 1500mg/75 mg administered as DOT. Notwithstanding, it ought not to be given to pregnant women taking co-trimoxazole prophylaxis. Or with folic acid at a daily dose above 5 mg, Since it inhibits SP efficacy as an antimalarial (WHO Global Malaria Programme, 2012).

2.3 IPTP-SP COVERAGE IN SUB-SAHARAN COUNTRIES

Several African countries adopted the WHO IPTp-SP policy for MIP prevention. A study showed that at least thirty-nine sub-Saharan African countries had policies in place for MIP prevention (Gomez et al., 2014; WHO, 2017a). The World Malaria Report (2013) showed that only 23% of pregnant women in African countries received at least three doses of IPTp-SP. This was short of the 80% global target for IPTp coverage.

2.4 IPTP-SP COVERAGE IN GHANA

In 2003, the Ghana NMCP started the implementation of IPTp-SP strategy in some districts in the country. Later in 2005, there was a scale-up of the program to all districts in the country. It was reported that 44% and 64% received two or more doses of IPTp during their then-recent pregnancies (Ghana Statistical Service [GSS], 2011; GSS & Ghana Demographic Health [DHS], 2008). This showed substantial progress, even if the NMCP 100% target was never achieved. NMCP also updated its policy in 2014 to reflect WHO's new recommendations (2012) that required all pregnant women to receive at least five doses of SP from sixteen weeks of gestational age monthly until delivery (PMI, 2016).

Given these recommendations, it was important for the women to initiate ANC visits early enough so that the required doses of SP can be accomplished (Oppong et al., 2019). Ghana's target to achieve a 55% uptake of at least three doses of SP in 2015 was never achieved as merely 41.3% of the women took three or more doses of SP (GHS, 2015). There were 942,755 pregnant women recorded in 2017, of which 68.3% received IPTp1, compared to 64.0% in 2016. Compared with 43.0 % in 2017, 36.7% took IPTp3 in 2016. Lastly in 2017, 83,890 (8.9%) took up IPTp5 (NMCP,

2018). In that same year, hospital-based research in the capital, Accra reported a low level of IPTp-SP 5 uptake of 14%. (Owusu-Boateng & Anto, 2017).

2.5 SOCIO- DEMOGRAPHIC FACTORS AFFECTING IPTP-SP UPTAKE.

A study by Nkoka, Chuang, and Chen (2018) did not observe any important correlation between socio-demographics and IPTp uptake. Below are other factors and how they were studied.

2.5.1 AGE

Generally, studies reported age to be significant predictors for IPTp uptake (Choonara, Odimegwu, & Elwange, 2015). For instance, WHO (2014) stated that being 20 years of age or under is significantly associated with pregnant women not receiving IPTp-SP. According to Kibusi et al., (2015), participants in the 30–34 and 35–39 age groups were proportionally more likely than those in other age groups to complete the optimal IPTp dose. However, Okethwangu et al. (2019), relieved that women older than 34 years were linked with decreased chances of taking optimal IPTp-SP doses. As for Bajaria et al. (2019), women's age was not significantly correlated with the IPTp uptake.

2.5.2 PARITY

While first-time pregnant participants were less likely to take at least one IPTp-SP dose, there was no significant relationship between a history of pregnancy and taking the prescribed three or more IPTp-SP doses (Oppong et al., 2019). Those with three or four children may have had some experience with taking SP, especially the drug's side effects with the first dose, and thus may not want to have these encounters leading to lower SP intake (Owusu-Boateng & Anto, 2017). The

same conclusion of no association between parity with IPTp uptake was obtained in research by (Bajaria et al., 2019; Ibrahim et al., 2017). So did Amoran & Ariba (2012) in a study carried out in western Nigeria. On the contrary Tanzanian studies Detected parity as a key predictor of IPTp uptake (Mwandama et al., 2015). As for Kisibu et al. (2015) and Stephen et al. (2016), low uptake of IPTp was reported by participants with three or more children.

2.5.3 MARITAL STATUS

In a study of Tanzanian origin, married women or those cohabiting were substantially linked with higher IPTp-SP uptake than women who never married or were divorced (Kibusi et al., 2015). Similarly, in a Kenyan based study, the married women were more likely to take recommended doses of IPTp in comparison to unmarried women (Choonara et al., 2015). This could be due to the potential support provided during pregnancy to marrieds by their partners since women are largely dependent on their husbands for financial support in seeking healthcare in most rural settings in Ghana (Oppong et al., 2019). Otherwise, Bajaria et al. (2019) reported no association.

2.5.4 EDUCATION

The World Malaria Report, (2014), states that having no formal education was significantly associated with pregnant women not receiving IPTp-SP. The same was also reported in a study in Tanzania, that there existed a significant relationship between the level of education and IPTp uptake (Kibusi et al., 2015). Furthermore, in Arnaldo et al., (2018); Exavery et al., (2014); Mpogoro et al., (2014) women with secondary school education or higher were almost twice as likely to have received higher IPTp-SP doses during pregnancy as those who never went to school. In conclusion, these findings informed us that the promotion of formal education beyond primary school could lead to an improvement in IPTP uptake (Arnaldo et al., 2018). Therefore, for a lasting effect, formal girl-child education should be promoted (Anto et al., 2019).

2.5.5 OCCUPATION AND SOCIAL-CULTURAL (RELIGION)

IPTP Uptake was lower among self-employed participants (30.4%) relative to other occupational classes (Choonara et al., 2015). From both studies, Sociocultural practices such as religious beliefs or family support biased ANC attendance, thus IPTp uptake too (Bajaria et al., 2019; Yaya, Uthman, Amouzou, & Bishwajit, 2018).

2.6 CLIENT LEVEL FACTORS

2.6.1 KNOWLEDGE ABOUT IPTp AND MIP

According to Amaron et al., (2012), Knowledge of IPTP-SP and MIP was found to be a major determinant of IPT uptake. Since IPTp uptake could be significantly improved if health education about the benefits of SP administration and malaria complications during pregnancy are provided. IPTp-SP awareness was a critical factor affecting IPTp-SP uptake as observed in previous studies in East African countries (Exavery et al., 2014a; Odongo, Bisaso, Byamugisha, & Obua, 2014). On the other hand, Gulema & Berhane, (2017); Njim, (2016), went on to state that a lack of adequate understanding of the suggested ANC schedule would negatively affect IPTP execution.

2.6.2 ANC ATTENDANCE (TIMING AND FREQUENCY)

Antenatal care (ANC) by trained pregnant women's health care workers is essential to maintain a healthy pregnancy and to improve pregnancy outcomes by; recognizing any complications early enough, encouraging healthy habits and giving opportunities for clients to interact effectively with health care workers. Over the years, ANC coverage has improved in sub-Saharan African countries, although rates vary across countries (World demographics health survey, 2016).

A large proportion of pregnant women in Ghana had four or more ANC visits, 92% in urban areas and 83% in rural areas (Statistical Service Accra, 2015). Compared to a recent study in Ghana's private health facilities with an average number of five ANC visits (Amankwah & Anto, 2019). Although higher than the four, WHO policy formerly recommended ANC visits (WHO, 2014). The result was significantly lower than the minimum of eight contacts suggested in the new policy (WHO, 2016). In another facility-based study in Accra, the proportion of women making the required eight or more visits was 15.2% (Owusu-Boateng & Anto, 2017). Owusu-Boateng & Anto, (2017) continued that although very significant, the gestational age at which a pregnant woman made her first ANC visit was not the main factor in receiving more doses of SP, but rather the number of pre-delivery visits as recorded in some earlier studies.

Exavery et al., (2014) stated that the timing of initiation of ANC was revealed to be significantly useful in determining the extent of IPTp-SP uptake among expectant mothers in Tanzania, and early initiation of ANC was linked to a higher probability of IPTp-SP uptake. Amankwah & Anto, (2019), reported that a fairly high percentage (46%) of women initiated ANC visits in the first trimester. Similar to the 41% reported by (Owusu-Boateng & Anto, 2017) and that reported in South Africa (Muhwava, Morojele, & London, 2016).

These, however, were much higher than the values reported from other studies in Africa like Ethiopia's 18% to 37 %(Ejeta, Dabsu, Zewdie, & Merdassa, 2017; Geta & Yallew, 2017), Nigeria's 32 % (Fagbamigbe, Mashabe, Lepetu, & Abel, 2017) and Tanzania's 18 %(Exavery et al., 2014a). The broad gap between the national target and what was achieved, irrespective of multiple expansion efforts, represents unexplored opportunities (Ibrahim et al., 2017).

On the contrary to these, a study about rural women in the upper west region of Ghana reported a much higher value of 71% (Sumankuuro, Crockett, & Wang, 2017). This might be one of the reasons why malaria in pregnancy prevalence was lowest in the part of the country (DHS 2014). Basically, late registration will reduce the number of IPTp-SP that can be administered. In a study by Anchang-Kimbi et al., (2014) conducted to assess the determinant of ANC clinic attendance and IPTp-SP intake among pregnant women, it was reported that only one dose of IPTp-SP was received by women who made the first visit during the third trimester. In the meantime, women who attended ANC early in the first trimester were more likely to receive two or more IPTp-SP doses. Kibusi et al., (2015); Okethwangu et al., (2019) revealed similar findings.

These two factors were dependent on each other as seen in survey results that showed early induction of ANC resulted in a higher number of visits and IPTp-SP uptake (Amankwah & Anto, 2019). An earlier report by Bouyou-Akotet et al., (2013), showed that both the total number of ANC visits made and early SP first dose uptake were the key determinants of uptake of higher IPTp-SP doses. Even With the multiple studies above that showed an association, between the timing of the first ANC visit and uptake of IPTp, some studies in Uganda, and Nigeria reported no such association. (Onoka, Onwujekwe, Hanson, & Uzochukwu, 2012; Rassi et al., 2016).

The observed differences may be clarified by the absence of regard to the potential interactive effects of social demographics and ANC attendance on IPTp uptake. Also to confirm the above findings Odjidja, Kwanin, & Saha, (2017) asserted that several visits to ANC clinics, in addition to other factors including health information, health workforce governance, finance, product,

technology, and service delivery, was an underlying factor affecting optimal uptake of IPTp-SP in Ghana. Furthermore, Nkoka et al.,(2018), went ahead to confirm the moderating effects of socio-demographics on the association between ANC attendance and IPTp uptake as found in the subgroup analysis. In Particular, the effect of adequate ANC visits on taking the recommended IPTp dose was significant among married women, parity, rural residents and women aged ≤ 34 years.

2.6.3 SOURCE OF KNOWLEDGE

A study in Uganda by Okethwangu et al. (2019), showed a positive association between exposure to radio messages about health once a week and taking optimal IPTp-SP doses. In an earlier study, women with radio as their main source of information were 3.7 times more likely to receive more IPTp doses compared to women with sole dependence on community healthcare workers as their main source of information (Chepkemoi Ng'etich-Mutulei & Odhiambo, 2014).

On the contrary, this was not the case in a study by Sabin et al. (2018), which affirmed the near-universal respect for clinicians by pregnant women throughout these communities in eastern India, as also highlighted in other settings such as in Uganda (Rassi et al., 2016). Even when women are unsure about a preventive or treatment strategy, they shared their willingness to use anything advised by a clinician, finding it more credible than other sources of advice and guidance.

2.6.4 MALE PARTNER INVOLVEMENT

A study by Boateng et al. (2018) demonstrated that one of the most significant factors influencing the uptake of IPTp was male partner involvement at the clinic, results from two out of three models confirmed this outcome. As evidenced by an increment in the proportion of men involved in ANC increased uptake of IPT2 by 0.5% and IPT3 by 0.7%. Since in most rural settings in Ghana, women

depend largely on their husbands for financial support in finding healthcare, male partner involvement can directly or indirectly affect IPTp uptake (Oppong et al., 2019). Lastly, In developing countries, an empirical study by Yargawa & Leonardi-Bee, (2015) disclosed that male involvement in maternal issues was linked with improved maternal health outcomes.

2.7 HEALTHCARE WORKER FACTORS

2.7.1 CLIENT- HEALTHCARE WORKER INTERACTION

In a study by Amankwah & Anto, (2019), it was reported that the quality of interaction between the HCW and the client was essential in IPTp-SP uptake, as pregnant women would typically accept IPTp-SP if encouraged by a HCW to do so. The same was reported in East Africa (Chama-Chiliba & Koch, 2015; Rassi et al., 2016). Both (Bajaria et al., 2019; Exavery et al., 2014b) agreed on what other studies had recorded on the positive relation between IPTp intake and provider advice on the effectiveness of malaria medicines, the threat of malaria during pregnancy and patient to re-visit the same facility, leading to taking more IPTp doses as prescribed during visits.

On the other hand, results obtained by Ibrahim et al., (2017) show that poor attitudes of health services staff hinder the implementation of IPTp-SP. This was also implied in Bajaria et al. (2019) who suggest that women may choose to use ANC not only based on facility readiness but also based on the perceived quality of care, providers deliver clearer and more authoritative messages to them.

2.7.2 HCW KNOWLEDGE ABOUT MIP/ IPTP-SP

A survey in Ghana showed that nearly all ANC clinic staff knew when to begin the pregnant woman's SP operation. However, only 11 (36.7%) of the workers knew SP's common side effects

that pregnant women are likely to experience. It was also found that only 56.7% of the workers were aware of the SP administration contraindication (Antwi, 2010). However, in a study in India, at the time of the research, awareness of the recommended methods for malaria prevention in international guidelines was relatively low among HCWs. This highlighted the need to improve education among HCWs and to make better use of them to disseminate awareness and knowledge of options for effective methods of malaria prevention for pregnant women, especially those employed in ANC clinics or working in communities (Sabin et al., 2018).

2.7.3 TRAINING OF HCWS

Both Amankwah & Anto, (2019) and Rassi et al., (2016) though in different countries assert that regular training for ANC service providers and supervision was important in improving the uptake of SP. Rassi et al. (2016) add that regular training on IPTp-SP guidelines, and supervising opportunities for HCW led to improved confidence and knowledge about SP's effectiveness. In Kampala (Uganda), an old study found that only 1.6% of surveyed health workers obtained malaria training in the protocols for pregnancy. Furthermore, while attending to clients, those who were trained did not even adhere to the IPTp guidelines. And that regular training of healthcare workers on guidelines for the implementation of IPTp was essential to update their knowledge and also to help promote positive attitudes towards pregnant women (Nankwanga & Gorette, 2008).

2.8 HEALTH FACILITY FACTORS

None of the individual and facility-level factors investigated in Amankwah & Anto, (2019), established any association with IPTp-SP uptake.

2.8.1 PATIENT NURSE RATIO

The Ministry of Health Holistic Assessment of Health Sector Program of Work 2015, published April 10, 2016, noted that Ghana, as a country, surpassed the WHO recommended ratios of 1 nurse per 1,000 people. In 2014 the national nurse population ratio was one nurse to 959 people, and it improved to 1 nurse to 739 in 2015 (PMI, 2016).

2.8.2 ACCESSIBILITY TO HEALTH FACILITIES

To expand access to underserved communities, the GHS invented CHPS compounds. CHPS compound refers to a community health nurse's base of operation and consists at least of a two-room facility with basic curative and preventive care equipment. The CHPS program was launched to tackle the challenge that more than 70% of all Ghanaians lived more than eight kilometres from the nearest healthcare provider at the time of launch, a problem aggravated by poor roads.

A typical district with 100,000 inhabitants has one district hospital, about five health centres and 10-15 compounds of CHPS. CHPS compounds provide at least 6,000 residents in communities. In Ghana, the preventive intervention of MIP was mainly carried out through the districts to the sub-district to the CHPS zones (PMI, 2016). Furthermore, (Bajaria et al., 2019; Nsibu et al., 2016) identified that difficulties in accessing health facilities were associated with low IPTp uptake.

2.8.3 IPTP-SP AND DOT POLICY

In comparison, a qualitative study in Uganda described inconsistent guidelines as one of the obstacles to pregnant women's uptake of IPTp (Chepkemoi Ng'etich Mutulei, 2013). Directly observed treatment by attending midwives was an important component of the IPTp-SP policy that ensured effective swallowing of doses of SP given to pregnant women. Unfortunately, the level of

compliance with this component of the guidelines was very low, as the midwives themselves admitted during the in-depth interviews and supported by 29% of the women who said they have ever taken the SP home. (Amankwah & Anto, 2019). Some of the midwives stated that, since they run private facilities, they cannot force the women to take the medication under observation. This reason cannot hold as low levels of compliance with the DOT policy were recorded in an earlier study in Tanzania for both private and public health facilities (Hill, Dellicour, et al., 2013).

Many private midwives also did not think DOT should be practised since they expect women to take their drugs at home (Amankwah & Anto, 2019). In the same study, it was stated that problems such as the lack of water and cups at the ANC units also acted as obstacles to the successful implementation of DOT. However, a cross-sectional study among twenty-eight public and six private health facilities providing ANC services in Enugu State, Nigeria found the absence of water in the facility did not affect the delivery of optimal IPTp-SP services to pregnant women (Onoka, Onwujekwe, Hanson, & Uzochukwu, 2012).

2.8.4 STOCK STATUS

In-depth interviews with midwives in Ghana showed that SP's supply was not a problem (Owusu-Boateng & Anto, 2017). Amankwah & Anto, (2019) agreed by stating that there was a regular supply of SP since supplies from the NMCP were readily available, provided a request was made on time. Despite the MoH Mozambique, not reporting any SP stockouts since 2013, it was likely that women were not always provided with IPTp-SP at ANC visits, as stated in previous Sub-Sahara Africa studies. (Arnaldo et al., 2018; Florey, 2013; Hurley et al., 2016). On the contrary, qualitative research in Uganda described a weak supply chain and stock out as some of the supply-side obstacles for pregnant women to IPTp uptake (Chepkemoi Ng'etich Mutulei, 2013).

Still in Uganda and another study in Ghana revealed that facility-level shortage of SP could be a barrier to achieving high IPTp-SP uptake (Rassi et al., 2016; Doku, Zankawah, & Adu-Gyamfi, 2016). A systematic review of relevant African literature indicated that drug stockouts, poor management of information on SP availability and supply chain knowledge specifically as the major barriers to successful IPTp policy implementation (Thiam, Kimotho, & Gatonga, 2013). Protas, Tarimo, & Moshiro (2016) found that SP availability at the facility was among the predictor of the timely uptake of IPTp ($P < 0.0001$) further concluded that stockouts of SP could potentially destroy the gains made in IPTp program implementation (Antwi, 2010).

2.8.5 HEALTH FACILITY READINESS

According to the scores that were developed, basic services that were positively related to higher women's IPTp uptake include DOT of IPTp administration, receiving IPTp during the consultation process, and attending facilities where there is the provision of explanation of the why, how to take it, the consequences and relevance of antimalarial drugs (Bajaria et al., 2019). These results indicate that the establishment of a health facility environment that is more malaria service-ready would lead to an increase in IPTp uptake. The finding that the readiness of health facilities was correlated with IPTp highlighted the need for government and private organizations that provide ANC programs to reinforce critical criteria of readiness for malaria services, such as ensuring the use of training manuals, regular in-service training for malaria service providers and the maintenance of policies of DOT and IPTp provision during consultation practices. Women attending health care facilities with high readiness ratings had 2.1 (95% CI 1.4–3.3) times higher chances of taking IPTp dose than those attending low readiness facilities (Bajaria et al., 2019).

CHAPTER THREE

3.0 METHODOLOGY

3.1 STUDY DESIGN

It was a mixed-method, facility-based, cross-sectional, study using an analytical approach. The study assessed client-level, HCW and health facility level factors that could influence the uptake of IPTp-SP. It was carried out in 3 CHPS compounds, a health centre, and a polyclinic of Ningo Prampram District in the Greater Accra Region in July 2020. A face-to-face structured interviewer-administered questionnaire was administered to postnatal women attending the Child Welfare Clinics (CWC) and Postnatal Clinic at the selected health facilities and a review of each of their antenatal record book to extract and compare data on IPTp-SP uptake and ANC attendance during their most recent pregnancy. Data were also collected from health care workers; the ANC staff at the selected health facilities using a semi-structured interview guide. Lastly for each of the selected health facilities data were collected using a checklist for both the ANC clinic and drugstore to assess health facility readiness to provide IPTp-SP.

3.2 STUDY AREA

Ningo Prampram District is among the sixteen districts in the Greater Accra Region of Ghana. It was established in 2012 when it was carved from the former Dangame west district. It was located in the eastern part of Greater Accra within latitudes 5°42″ south and 5°54″ north and from 0°60″ west to 0°22″ east. The total land area is about 622.2 km square located about 40 km from Accra. It shares common borders with Shai Oshudoku district to the north, Ada west district to the east, the Gulf of Guinea to the south and Kpone Katamanso district to the west.

Basing on the 2010 Population and Housing Census, the population of the district was 70,923 with 47.3% males and 52.7 % females. Its population represents 1.8 % of the region's total population. About 39.0% of the population aged 12 years and older were married. Of the population 11 years and above, 71.2% were literate (GSS, 2012).

Figure 2: Map of Ningo Prampram district showing health facility distribution(GHS, 2014)

The district has 14 health facilities out of which nine were public, and the remaining five were private. Access to health services delivery was generally fair with the available health facilities also distressingly inadequate. In the years between 2011 and 2013, malaria was the highest cause of OPD attendance at an average of 40% of all OPD attendance (GSS, 2014).

Table 1: Health facilities by Sub-district

No	NAME OF SUB-DISTRICT	HEALTH FACILITIES AVAILABLE
1	Afienya	CHPS Compound, Maternity Home and Clinic
2	Dawhenya	CHPS Compound, Clinic and Medical Centre
3	Prampram	CHPS Compound, Polyclinic and Hospital
4	Old Ningo	Health Centre, CHPS Compound
5	Nyigbenya	CHPS Compound
6	Lekpongunor/Dawa	2 CHPS Compounds

3.3 STUDY VARIABLES

3.3.1 DEPENDENT VARIABLE

Uptake of IPTp-SP. Obtained from the questionnaire filled with confirmation from the mother's antenatal record book by counting the number of doses of SP she took during pregnancy recorded.

3.3.2 INDEPENDENT VARIABLES

1. Socio-demographic characteristics of postnatal women (age, marital status, education level, parity, occupation). Obtained from postnatal mother questionnaires and ANC book audit.

2. Client-level factors (ANC attendance, gestational age at first ANC, gestational age at first SP dose, knowledge about MIP & IPTP-SP, SP side effects, the perceived attitude about staff, and male partners' involvement). Obtained from postnatal mother questionnaires and ANC book audit.

3. Health facility factors like health facility readiness to provide IPTp-SP (average health provider-patient ratio at the ANC clinic, availability of drinking water at ANC clinic, distance from home to the health facility, availability of SP in the month of data collection, training schedule for its

practitioners, the place where SP was dispensed). Obtained from the HCW semi-structured questionnaire, postnatal mother questionnaires and the facility checklist.

4. Health care worker factors like HCWs' attitude, level of knowledge about MIP/ IPTp-SP, level of education, DOT policy practice. Obtained from the HCW semi-structured questionnaires and postnatal mother questionnaires. (table 2).

Table 2: showing all variables, their operational definition, type and scale of measurement

VARIABLES	OPERATIONAL DEFINITION	TYPE OF VARIABLE	SCALE OF MEASUREMENT
DEPENDENT			
Uptake of IPTp-SP	Doses of SP received during pregnancy	Discrete	Ratio
INDEPENDENT VARIABLES			
Socio-demographic factors			
Age	Age at as last birthday	Continuous	Ratio
Educational level	No formal education primary JHS, SHS/ vocational, Tertiary	Non-numerical	Ordinal
Marital status	Single, married, divorced, widow	Non-numerical	Nominal
Occupation	Formal or informal work or non	Non-numerical	Nominal
Parity	Number of children one had ever given birth to	Discrete	Ratio
Client-level factors			
Awareness of SP	Low (unaware) or high (aware)-level of awareness	Non-numerical	Ordinal
ANC attendance	Number of ANC visits	Discrete	Ratio
Male partners involvement	Number of times client was escorted by their partner for the ANC visits	Discrete	Ratio
SP side effects	Have the experience any adverse drug reaction following SP administration	Non-numerical	Nominal
Knowledge about MIP	Poor, good	Non-numerical	Ordinal
Knowledge about IPTP-SP,	Poor, good	Non-numerical	Ordinal

VARIABLES	OPERATIONAL DEFINITION	TYPE OF VARIABLE	SCALE OF MEASUREMENT
Gestational age at first ANC	Number of months at which the client first visited the hospital	Continuous	Ratio
Gestational age at first SP dose	Number of months at which client received first SP dose	Continuous	Ratio
Health care worker factors			
Level of education	Diploma/ degree	Non-numerical	Ordinal
Level of knowledge about MIP/IPTp-SP	Low, middle and high (what's the dose, how many doses and when to give them)	Non-numerical	Ordinal
Perception towards IPTp-SP	Do they believe IPTp-SP was effective or not	Non-numerical	Nominal
DOT policy	Whether they observe as clients swallow the medication	Non-numerical	Nominal
	Do they record in the client's ANC book	Non-numerical	Nominal
Health care worker-patient relationship	How clients perceive attitude about staff	Non-numerical	Ordinal
Health facility factors			
Health care worker-patient ratio	average health care provider-patient ratio on ANC clinic	continuous	Ratio
Drinking water availability	availability of a water dispenser or drinking water at ANC clinic	Non-numerical	Nominal
Distance to the health facility	Accessibility of the health facility	continuous	Ratio
Availability of SP	stock status in the last year	Non-numerical	Nominal
Training status for practitioners	IPTp-SP training for ANC staff	Non-numerical	Nominal
The place where SP was dispensed	Pharmacy/ ANC clinic	Non-numerical	Nominal

3.4 STUDY POPULATION

The study population was made up of Postnatal mothers from day one to within six months, in order to limit recall bias among mothers. For the HCWs, it was those who routinely provided ANC services for at least a year at the facility. And those who were also on duty on the data collection days.

3.5 SAMPLING

3.5.1 SAMPLE SIZE DETERMINATION

A total sample size of 457 postnatal mothers from all health facilities was used.

It was derived from Cochran's sample size formula, as shown below (Cochran, 1972).

$$n = \frac{z^2 p(1-p)}{d^2}$$

Where

n = minimum sample size required

Z = confidence level (95% level of confidence = 1.96)

P = 50% prevalence was used since each of the health facility levels have a different prevalence which was unknown. So 50% was used to maximize the number.

d = the margin of error (5% = [0.05]).

Substituting,

$$n = \frac{1.96^2 * 0.5(1-0.5)}{0.05^2}$$

n = 385

Adjusted for 10% of non-response, a minimum of 423 participants was required.

All health workers found attending to the pregnant women on the days of data collection and who had worked for that facility for more than a year were included in the study.

3.5.2 SAMPLING PROCEDURE

A multi-stage sampling procedure was used. Of the 14 health facilities, one of each type of facility that provided both ANC and postnatal services was chosen. For those that are more than one in each level, random sampling was used. So Prampram polyclinic, old Ningo health centre and

Lekpongunor, Ayetepa, and Dahwenya CHPS compounds were selected. Then proportionate sampling was used to divide the sample size among these health facilities according to the average number of mothers per the postnatal clinic/ CWC register (size of health facility). The clients were consecutively enrolled until the target sample size was achieved. This was so because the period for data collection was short, and the sample size was large.

All postnatal mothers of less than six months, attending the postnatal clinic or CWC at the time of data collection, were requested to participate in the study. The study was explained to them and informed consent obtained. The principal investigator carried out this activity alongside the research assistant. At the end of the ay tallying was done, and facilities whose target were not met were targeted to achieve the required numbers.

Convenience sampling was used for HCWs in all the earlier sampled health facilities, ANC days were targeted, and HCWs attending to pregnant women during the ANC process were invited to participate in the study. For those who consented, the principal investigator then administered the interview until data saturation was achieved at eight interviews. Saturation allowed for the researcher to continue sampling until when no new information was generated (Green & Thorogood, 2014).

A non-participant observation approach was used to observe activities in the facilities each day of the data collection period. This was a joint role for all investigators since they discussed the observation at the end of the day, and PI would fill the observation checklist.

3.6 DATA COLLECTION TECHNIQUE

For nursing mothers, data was collected using interviewer-administered structured questionnaires after their consent. A sample of SP used in that specific facility was displayed the whole time while administering the questionnaire. Individual questions were read with detailed explanations to the mothers to choose options they deem fit for a particular statement, from time to time whenever a question could be answered by details from the ANC book it would be crosschecked, to confirm. In situations when there was an inconsistency between what the mother said and what appeared in the ANC book. What was in the book was considered superior. Data collection from each mother would take between 15 to 30 minutes. A face mask was given to every participant involved in the study either before (if they were not wearing one) or after the interview.

For the health care workers, key informant interviews using semi-structured interview guides were administered to those who provided both written consent and permitted the interview to be audio-recorded. These also lasted 15 to 30 minutes. For this period, the investigator would note down responses from the HCWs.

For the health facilities, observation and record review using a checklist was done, the investigators reviewed records at the facility to establish the availability of IPTp-SP protocol, training manual, ANC attendance register, and daily health talk. Also, SP inventory control cards reviewed for information like that month's SP stock levels, source of SP, frequency of SP receipt, and dispense to the ANC clinic.

Lastly, the principal researcher individually supervised the data collection throughout the period.

3.6.1 INCLUSION CRITERIA

Only facilities that provide both ANC and postnatal care/ CWC services were included. Mothers who had recently delivered (less than six months ago) and were attending postnatal care/ CWC at the health facility to which they attended ANC and agree to participate in the study. And healthcare workers that were facilitating the ANC clinic and had been working at the facility for at least one year were included.

3.6.2 EXCLUSION CRITERIA

All postnatal mothers who were already pregnant and those without their ANC records.

3.7 DATA QUALITY CONTROL

3.7.1 TRAINING OF RESEARCH ASSISTANTS

Research assistants that understood and were fluent in both English and Dangbe languages were recruited and trained to support the data collection process through understanding the questions and interpreting them appropriately. The training was carried out a day to piloting of the tools. The training was about the purpose of the study, how to collect data, research ethics, communication skills and how to use kobocollect software. Only three research assistants were involved in this data collection. This was to avoid person to person variation specifically.

3.7.2 DATA HANDLING

After each day of data collection, the client questionnaires were filled electronically and sent to the server. The paper-based filled consent forms would be filed and collected by the principal investigator to ensure that no forms are lost. The principal investigator would then review each electronically submitted questionnaire to ensure completeness of data elements and approve only those fully filled. A daily review of the collection was done and problems emerging were

immediately addressed. For the HCWs' interviews, the audio recording would be backed up on a password-protected laptop owned by the principal investigator daily.

3.7.3 PRE-TESTING OF QUESTIONNAIRE

Pre-testing was carried out at Afienya, and Nyigbenya CHPs compound. This was done to help determine the time needed for each questionnaire and interview, to assess the appropriateness of questions asked to ensure that the questions accurately answered the research questions. The pilot also tested whether the questions are appropriate and well defined, thus understood by both the research assistants and the respondents and presented consistently. After the pre-testing stage, some questions were restructured, modified, and others were removed.

The same research assistants that carried out the pre-test were maintained for data collection

3.7.4 TRIANGULATION

We used multiple data collection techniques and sources to strengthen the credibility of outcomes and enable different interpretations and meanings to be included in data analysis.

3.8 DATA PROCESSING AND ANALYSIS

Only PI approved filled forms were added to the database after crosschecking for completeness. At the end of data collection, the whole database was downloaded as an excel sheet with questions as titles. Data was managed and cleaned in Microsoft excel, including variable coding, scoring and other manipulations and subsequently imported into Stata version 16 for final preparations like re-categorisation the analysis. Data was summarised using frequency tables, graphs, percentages, mean and standard deviation. Chi-Square Test, Fischer Exact, and logistic regression analysis were used to test the level of significance and measure the association between all variables and IPTp-SP uptake.

Crude odds ratios were used to measure the strength of association between variables independently with IPTp-SP uptake. Later all variables that were found to be statistically significant in simple logistic regression were used in a multiple logistic regression to obtain adjusted odds ratios. A p-value <0.05 and a 95% confidence interval were set as the level of statistical significance to establish the association with the uptake of IPTp-SP.

Five-year intervals categorised age; parity was categorised into one child, two children and three or more children; marital status was categorised into married, cohabiting, single/ widowed/ divorced. And education status, into no formal education, primary, JHS, secondary/ vocational and tertiary and employment status into unemployed, self-employed, and employed. IPTp uptake was defined as the percentage number of postnatal mothers interviewed that took none, one, two, three, four, five or six doses of SP during their last pregnancy. This was then categorised into two: sub-optimal (≤ 4 doses) and optimal (≥ 5 doses).

The mothers' level of knowledge about IPT was assessed based on nine questions; whether they took medicine that was displaced, what that medicine was for, whether they took medicine for malaria prevention; could they identify that medicine; when was it supposed to be started during pregnancy; the number of doses; the number of tablets per dose; the interval between doses; the number of times a woman was supposed to attend ANC. For every correct response, a mark was awarded per question. Based on the number of correct responses. The scores were categorised into no knowledge (0), low knowledge (1&2), average knowledge (3&4), good knowledge (5) and very good knowledge (6&7).

The level of knowledge of malaria in pregnancy was assessed based on four questions; the cause of malaria, effects of malaria on the pregnant woman, effects of malaria on the unborn baby and malaria prevention methods for a pregnant woman. Except for the cause of malaria question that

was scored either one or zero for correct and false answer respectively, the rest of the questions for every correctly identified answer a mark was awarded. The number of responses was the basis for categorisation into no knowledge (zero scores); low knowledge those with scores 1 to 3; average knowledge 4 and 5, good knowledge 6 and 7, and very good knowledge for 8 and 9 scores. For these two knowledge variables when recategorised in binary outcomes, good and very good consisted of good knowledge, the rest were poor knowledge.

The patient-provider relationship was assessed using seven questions which included; being greeted on arrival, ever been shouted at ANC, felt comfortable to ask any question at ANC, was satisfied with answers provided, was given enough time with the HCW, whether the way they were treated encouraged the mother to come back for subsequent ANC visits and whether they would recommend the facility to colleagues for ANC. These were yes or no unidirectional question, so every appropriate answer fetched a mark. These were used in categorisation. Very bad (0 and 1), bad (2 and 3), average (4 and 5), good (6) and very good (7).

For assessment of health facility readiness to provide IPTp, a list of 15 variables was used, 14 of which the score was either zero or one, then for the 15th variable a facility would score 0 to 4 according to the specifics of the storage area. The maximum a facility could score was 18. This was categorised into three as poor readiness for scores six and below, average readiness for scores 7-12 and good for scores 13 to 18. Facilities scored between 6 and 13

Responses from the HCWs semi-structured interviews: the audio recordings were listened to twice, then transcribed verbatim to make transcripts, these were supplemented with the notes that were taken during the matching interview. The transcripts were read over, then entered into Microsoft Excel software. A codebook based on the study objectives was created. The data was manually and thematically analysed, employing both deductive and inductive analysis (Creswell, 2009).

3.9 ETHICAL CONSIDERATION

Ethical approval for the research was obtained from the Ghana Health Service Ethical Review Committee before the commencement. Ref number: GHS/RDD/ERC/Admin/App/20/73. Permission was also gotten from the district health directorate Ningo Prampram. And Directors of each of the health facilities that were used for data collection. Written informed consent was received from every study participant before data collection. After the purpose of the study, the benefits, and rights of the participants were explained to them in a language best understood to them. Participation in the study was voluntary. Confidentiality to the provided data was assured to them too.

The WHO/ TDR scholarship fully funded this research. I had no conflict of interest in this research.

Compensation: Mothers did not receive any compensation and were duly informed before they consented to participate in the study. Only that due to the current Covid-19 pandemic, each of them got a nose mask for protection.

Risk and benefits: There was no risk, cost or direct benefit associated with participating in the study. However, the respondent's time was lost in answering either the questionnaire or the interview. Findings of the study were envisaged to help contribute towards policy decisions making to improve the quality of healthcare delivery.

3.10 LIMITATIONS OF THE STUDY

For some mothers, the information they gave was not accurate. Therefore, their ANC records were consulted to confirm those details captured during their pregnancy.

Recall bias as a result of respondents not recollecting all that happened during their ANC visits in their last pregnancy. The interviews were conducted while displacing a sample of SP to them so they can relate their responses to the drug. Also, only those who had given birth less than six months before data collection were included as research participants

Data collection was carried out during the COVID-19 pandemic, to avoid infection or to be infected. Each participant was given a face mask, although this too affected audibility. The number of mothers at the facility was lower than expected, so the data collection period was lengthened. Some mothers refused to give correct responses due to fear of reporting the HCWs. So, the interviews were carried out from the compound, outside the hospital buildings to ensure that they were free to express themselves. For women who could not speak English, the research assistants who were fluent in Dangbe, Ga and Twi languages conducted the interviews.

Most HCWs could not summarise/ organise their thoughts and give straight-up answers to the asked questions, so their responses were recorded to be able to deduce meaning from it later.

CHAPTER FOUR

4.0 RESULTS

4.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF HEALTHCARE WORKERS

All HCWs were Christian, female, midwives that had attained tertiary education ranging from certificate to degree. They were 8 in total selected from five different health facilities in Ningo Prampram District. (Table 3)

Table 3: Socio-demographic characteristics of ANC HCW participants

Health facility	Sex:	Designation	Level of education	Number of years of practice	Distance to the facility on foot (min)
Dawhenya CHPS	Female	Midwife	Diploma	5	60
Old ningo health centre	Female	Midwife	Degree	12	1
Old ningo health centre	Female	Midwife	Certificate	4	60
Lekpongunor CHPS	Female	Midwife	Certificate	16	1
Ayetepa CHPS	Female	Midwife	Diploma	11	20
Prampram polyclinic	Female	Midwife	Diploma	3	180
Prampram polyclinic	Female	Midwife	Diploma	1	45
Prampram polyclinic	Female	Midwife	Degree	14	45

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF POSTNATAL MOTHERS

Four hundred and fifty-seven nursing mothers took part in the study. These were recruited from five public health facilities in the district. Their ages stretched from 15 to 45 years (mean and standard deviation of 27.42 ±5.94), 57.1% were aged 20-29 years. Nearly all of them (96.3 %) were Christians, and 89.7% were either married or cohabiting. Three hundred eighty-five (84.3 %) of the mothers had a formal education. Two hundred sixty-two of the participants (57.5%) were self-employed, and most mothers (70%) had two or more children. (Table 4)

Table 4: Socio-demographic characteristics of postnatal mother Participants.

Characteristics	Frequency	Percent (%)
Age Group (years)		
15-19	32	7.00
20-24	126	27.57
25-29	135	29.54
30-34	99	21.66
35-39	52	11.38
>40	13	2.84
Parity		
One child	137	29.98
Two children	128	28.01
Three or more children	192	42.01
Marital Status		
Cohabitating	225	49.23
Married	185	40.48
Single/Widowed/Divorced	47	10.29
Education Status		
No Formal Education	72	15.75
Primary	92	20.13
JHS	198	43.33
Secondary Vocational	72	15.75
Tertiary	23	5.03
Employment status		
Not Employed	169	36.98
Self-Employed	262	57.33
Employed	26	5.69
Health facility		
Ayetepa CHPs compound	74	16.19
Dawhenya CHPs compound	63	13.79
Lekpongunor CHPs compound	82	17.94
Old Ningo Health centre	151	33.04
Prampram polyclinic	87	19.04
Religion		
Christianity	440	96.28
Islam	11	2.41
Traditional	6	1.31

4.3 IPTP UPTAKE AMONG POSTNATAL MOTHERS

SP uptake by these postnatal mothers during ANC ranged between 0 and 6 doses. An average of 5 doses received was considered optimal IPT uptake. About 28 (6.1%) of the postnatal mothers who were within six months after delivery received no dose of SP, and only 70 (15.3%) had taken up to 5 IPTp doses during their pregnancy (Fig. 3).

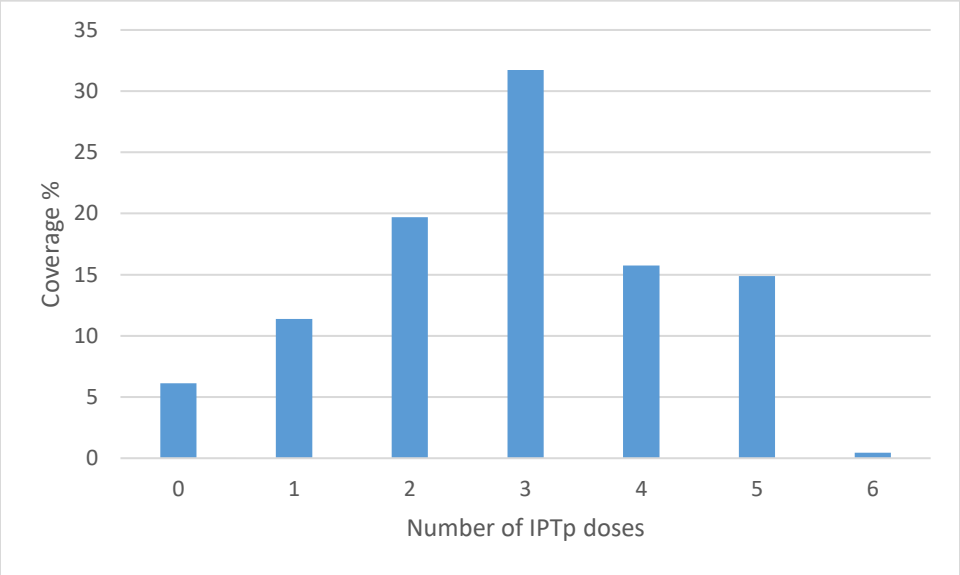

Figure 3: IPTp-SP uptake among study participants

4.4 CLIENT-LEVEL FACTORS

4.4.1 ANC ATTENDANCE AND UPTAKE OF IPTP-SP

ANC attendance was 98%, the mean gestational age for the pregnant women at the first ANC visit was 14.8 weeks (ranging between 1 and 38 weeks). Two fifths (39.7%) of the women made their first ANC visit after 16 weeks gestation (Table 5). Some of the reasons given for late first ANC attendance (>16 weeks) were: financial issues, no NHI, were unaware about going to the hospital and not being sick to go to the hospital (Table 6).

The average number of ANC visits made by the participants was 5.71 ±2.6 (ranging from 0 to 13 visits), with only 27% achieving the minimum recommended eight ANC visits. Among those that took IPTp, only 140 (32.56%) took it at four months as per the policy. The rest took before or after. Among all participants, 28 (6.1%) did not take any IPTp; those that took IPTp1 were 93.9%, IPTp2 82.5%, IPTp3 62.8%, IPTp4 31.1%, IPTp5 15.3% and IPTp6 0.4%. Of the 28 women who did not take any SP dose, four had not attended ANC, and the rest had attended ANC between 1 to 8 times. More than half the participants (61.9%) were not escorted to any ANC visit by their partners with reasons such as he was busy at work, he stayed far from where I stay, I am single, he travelled, he was shy, he was not interested, and I did not ask him to come alongside (Table 7).

4.4.1.1 SP DROPOUT AND WHAT ACCOUNTS FOR THESE DROPOUTS

Semi-structured interviews with HCWs about IPTp uptake dropouts and it's cause showed that: Nearly all the HCW participants agreed that many of the mothers do drop out. They gave different reasons to try to explain why it was so, these included seasonal migrations in many coastal communities whose main source of income was fishing, side effects from the drug, like vomiting, appetite loss, nausea, and weakness, reaction to a drug despite the preliminary tests like G6PD enzyme deficiency test, lack of SP stock, and not attending ANC regularly. As for the HCWs, their poor documentation was also mentioned. One of them stated:

> *" many mothers do not follow the given schedule, for instance, if you give a mother an appointment to come back at 20 weeks gestation, and they don't come, then the community health team finds them at 23 weeks and gives them an SP dose, so even if the patient comes to the hospital at 25 weeks they are not eligible for the next dose, yet asking them to come back*

at 27 weeks will seem like a burden to them. So, they end up missing many doses in-between" hcw 3.

Another said, *"patients have rights if they say no to a drug because of previous experiences I can't force them or else they will run away and never come back for other services"*.

The same HCW continued "*midwives are also humans, they get tired, and they forget, so some do not write down everything they have done*" hcw8.

Table 5: ANC attendance and uptake of optimal doses of IPTp-SP

Characteristics of Participants	**Frequency (N=448)**	**Percent %**
Gestation at first ANC		
<16 weeks	270	60.27
>16 weeks	178	39.73
Gestation first IPTp dose		
first trimester	67	15.58
second trimester	315	73.26
third trimester	48	11.16
Number of ANC attended		
less than 8 times	328	73.21
more or equal to 8 times	120	26.79
Number of SP Doses received		
Suboptimal (<5 doses)	387	84.68
Optimal (≥5 doses)	70	15.32
Number of times escorted by partner		
Never escorted	278	61.92
Escorted at least once	171	38.08
Got malaria during pregnancy		
Yes	65	14.3
No	391	85.7
Experienced side effect		
I did not experience any side effect	299	69.53
I experienced a side effect	131	30.47

Table 6: Reasons given by clients for late first ANC attendance

Reason for late first ANC attendance (>16 weeks)	N=161	Percent %
Financial issues	48	29.81
No health insurance	35	21.74
Was not sick/ was feeling fine	23	14.29
Did not know I had to come to the hospital before a specific time	13	8.07
Culture	2	1.24

Table 7: Showing reasons why partners did not escort the expectant mothers for any ANC visit

The reason why partner did not come with for ANC visit	N=278	Percent %
No reason	125	44.96
Work	72	25.90
Travelled	47	16.91
Not interested	9	3.24
Did not ask him	8	2.88
Not in my life	7	2.52
Stays far	7	2.52
Feeling shy	3	1.08

Majority of the participant did not report experiencing any side effect, but for those that did, the side effects included: nausea, vomiting, weakness, dizziness etc. (Table 8):

Table 8: Side effects experienced by the postnatal mothers after taking SP

Side Effect	N=131	Percent %
Vomiting	46	35.1
Weakness	43	32.8
Nausea	20	15.3
Dizzy	12	9.2
Sleepy	3	2.3
Stomach pain	3	2.3
Body rash	2	1.5
Coughing	2	1.5

4.4.2 CLIENTS' KNOWLEDGE OF IPTP-SP AND MALARIA IN PREGNANCY

Table 9 is a summary of knowledge variables on MIP and IPTp, while Table 10 summarises their level of knowledge. When assessing the respondent's knowledge of MIP, four questions were used. Knowledge about the cause of malaria, the effect of malaria on pregnant woman, the effect of malaria on the unborn baby and the recommended ways to prevent MIP. The mother's IPTp knowledge was assessed using eight questions, as shown below. Generally, 82 (17.94%) women had above-average knowledge of MIP compared to 215 (47.05%) for above-average knowledge of IPTp.

For the majority of the women (84%), the staff at the ANC was their major source of information about IPTp and MIP was ANC clinic (76.2%) followed by friends (8.3%) community outreaches (2.8%) and media like TV and radio (1.3%).

Table 9: Knowledge of MIP and IPTp among postnatal mothers

Knowledge Variables	Responses	N=457	%
Malaria in pregnancy			
Causes of malaria	Mosquito bite	431	94.3
Effect of malaria on pregnant women	Can cause anaemia	142	31.07
	Can cause death	105	22.98
	Can cause jaundice	8	1.75
Effect of malaria on the unborn baby	Can cause spontaneous abortion	90	19.69
	Can cause low birth weight	97	21.23
	Can cause stillbirths	138	30.20
Malaria Preventive methods	Sleep under an ITN	440	96.28
	Use mosquito repellent	241	52.74
	Wear protective clothing	123	26.92
	Take preventive medicine	19	4.16
	Cleaning surroundings	7	1.53
IPTp			
Took medicine to prevent malaria	Took malaria prevention drugs	410	89.72
Swallowed medicine that looked like this when pregnant	Swallowed medicine that looks like that	430	94.09
Use of the medicine	Prevent malaria	224	49.02
Identify /name the medicine	Sulphadoxine-pyrimethamine	293	64.11
Gestation supposed to start	At four months	124	27.13
Number of recommended Doses in Ghana	≥ 5	137	29.98
Interval between doses	Monthly	378	82.71
Number of tablets to be swallowed per dose	3	333	72.87

Table 10: Levels of Knowledge of IPTp and MIP among postnatal mothers

Characteristics	MIP		IPTp	
Level of knowledge	Frequencies	%	Frequencies	%
No Knowledge	5	1.09	20	4.38
Low Knowledge	168	36.76	54	11.82
Average Knowledge	202	44.20	168	36.76
Good Knowledge	65	14.22	115	25.16
Very good Knowledge	17	3.72	100	21.88

4.4.3 BIVARIATE ANALYSIS OF CLIENTS' SOCIO-DEMOGRAPHIC CHARACTERISTICS AND UPTAKE OF SP

IPTp uptake was re-categorised into optimum for those that took five or more doses and sub-optimal for those that took less than five doses. The uptake increased with an increase in education level (p=0.001). IPTp5 Uptake also increased with the employment status, from unemployed to employed (p=0.001) (table 11).

Table 11: Bivariate Analysis of the socio-demographic characteristics and IPTp-SP Uptake

Characteristics	Sub Optimal (≤4 doses)	Optimal (≥5 doses)	p-value
Age (years)			
<30	285 (86.36)	45 (13.64)	0.108
>30	102 (80.31)	25 (19.69)	
Parity			
Primipara	113 (82.48)	24 (17.52)	0.393
Multipara	274 (85.63)	46 (14.37)	
Marital Status			
Stays without partner	44 (93.62)	3 (6.38)	0.086*
Stays with a partner	343 (83.66)	67 (16.34)	
Education Status			
No formal education	68 (94.44)	4 (5.56)	
Primary	84 (91.30)	8(8.70)	
JHS	163 (82.32)	35(17.68)	**0.001**
Secondary/ vocational	57 (79.17)	15 (20.83)	
Tertiary	15 (65.22)	8 (34.78)	
Employment status			
Unemployed	155 (91.72)	14 (8.28)	**0.001**
Employed	232 (80.56)	56 (19.44)	
Source IPTp-SP information			
I do not have information	49 (94.23)	3 (5.77)	
ANC health facility	289 (83.05)	59 (16.95)	
Friends	32 (84.21)	6 (15.79)	0.059*
Media (radio/ tv)	4 (66.67)	2 (33.33)	
Community outreach	13(100)	0(0)	

*Fisher's Exact Test. Significant p-values are presented in bold.

4.4.4 BIVARIATE ANALYSIS OF CLIENT CHARACTERISTICS AND UPTAKE OF SP

Increase in number of ANC attended, knowledge of MIP, knowledge about IPTp, whether escorted by the partner to ANC increased IPTp uptake. Whereas on the contrary, an increase of variables like Gestation Age at 1st ANC visit, Gestation first IPTp dose reduced IPTp uptake (Table 12).

Table 12: Bivariate Analysis of client characteristics and IPTp-SP Uptake

Characteristics	Sub Optimal (≤4 doses)	Optimal (≥5 doses)	p-value
Gestation Age at 1st ANC visit			
<16 weeks	218 (80.74)	52 (19.26)	**0.005**
>16 weeks	161 (90.45)	17 (9.55)	
Number of ANC attended			
Less than 8 times	301 (91.77)	27 (8.23)	**<0.001**
More or equal to 8 times	78 (65)	42 (35)	
Gestation first IPTp dose			
First trimester	54 (80.60)	13(19.40)	**0.001***
Second trimester	258 (81.90)	57(18.10)	
Third trimester	48 (100)	0(0)	
MIP knowledge			
Poor knowledge	327 (87.20)	48 (12.80)	**0.001**
Good knowledge	60 (73.17)	22 (26.83)	
IPTp knowledge			
Poor knowledge	225 (92.98)	17 (7.02)	**<0.001**
Good knowledge	162 (75.35)	53 (24.65)	
Experienced a side effect			
Did not get a side effect	253 (84.62)	46 (15.38)	0.448
Experienced a side effect	107 (81.68)	24 (18.32)	
Whether escorted by partner			
Not escorted	244 (87.77)	34 (12.23)	**0.019**
At least once or more	136 (79.53)	35 (20.47)	
Side effect prevent the client from taking other doses			
Side effects did not affect pregnant women' corresponding doses	82 (78.10)	23 (21.90)	**0.044***
Side effects affected pregnant women's corresponding doses	25 (96.15)	1(3.85)	

4.5 HEALTHCARE WORKER FACTORS

4.5.1 BIVARIATE ANALYSIS OF HCW CHARACTERISTICS AND UPTAKE OF SP

None of the clients who swallowed SP from home achieved IPTp5, the same applied to those who rated staff attitude as bad and very bad. More of the clients who acknowledged having been taught about SP achieved IPTp5 as compared to those that said otherwise (p=0.016). (Table 13).

Table 13: Bivariate Analysis of HCW characteristics and IPTp-SP Uptake

Characteristics	Sub Optimal (≤4 doses)	Optimal (≥5 doses)	p-value
Clients received education about SP			
Acknowledged being taught about SP	272 (82.18)	59 (17.82)	**0.016**
Said they were not taught about SP	108 (91.53)	10 (8.47)	
ANC staff attitude towards clients			
Very bad	5 (100)	0 (0)	
Bad	5 (100)	0 (0)	
Fair	48 (88.89)	6(11.11)	0.668*
Good	230 (84.56)	42(15.44)	
Very good	93 (81.58)	21(18.42)	
Patient-provider relationship			
Very bad	13 (92.86)	1 (7.14)	
Bad	14 (77.78)	4(22.22)	0.650*
Average	37 (88.10)	5(11.90)	
Good	79 (81.44)	18(18.56)	
Very good	244 (85.31)	42 (14.69)	
Swallowed SP from			
Home	4 (100)	0(0)	1.000*
Under the midwife's observation	356 (83.57)	70(16.43)	

*Fisher's Exact Test, Significant p-values are presented in bold.

4.5.2 DISTANCE FROM HOME TO FACILITY AND HCW SERVICE DELIVERY

This gathered mixed responses with two of the eight saying that distance to work had no impact on their service delivery, one of these two worked in a facility that doesn't offer delivery services

while the other worked in the largest facility in the district with several colleagues doing the same role. The rest acknowledged distance as a factor that affects their service delivery.

"The fact that I stay a minute away has helps me a lot in my work, I can be called upon any time of the day and night, actually I have not showered right now because I was called for an emergency delivery, and you found me before I could go back and properly prepare for work" hcw 4.

Another narrated that: *"Yes, the distance from home to work affects my service delivery. I am a mother of three with a four months old baby. I have to first cater to my children in the morning before I can come to work. This takes time, so I end up being delayed for work, and like you have seen today I wasn't able to give a morning ANC talk, I just dived right into attending to clients individually*" hcw 3.

4.5.3 MALARIA SITUATION: MIP COMPARED TO MALARIA IN OTHER ADULTS AND FACTORS CONTRIBUTING TO THE SITUATION.

All HCW's in this study corroborated that pregnant women are more at risk of malaria as compared to other adults. Three of them further commented that despite the above situation, the current prevalence of malaria was lower for pregnant women that attend ANC in comparison to the rest of the adults or their counterparts that do not attend ANC. As stated below:

"*Late attendance of ANC makes them come with severe malaria, but early attendees are ok*" hwc4.

"*Pregnant women are more at risk of malaria, but they are catered for in additional ways so MIP is not as prevalent as it should be*" hcw1.

Several reasons were identified, mostly to do with the different interventions for pregnant women. Like the free mosquito net, preplanned regular health facility visits for checkups, use of medicine for prevention of new malaria infections administered throughout pregnancy, and pregnancy schools (regular health talks at the facility) as noted below:

> *"Pregnant women have many interventions targeting them: including health education at each hospital visit, IPTp and LLIN distribution and use"* hcw2.

> *"As for those who come to hospital late, they usually claim poverty and distance to a health facility as the reason"* hcw4.

> Hcw7 *added that "refusal to adhere to safety and preventive measures can cause a reversal in the situation."*

4.5.4 HCW KNOWLEDGE

Generally, all HCWs had good knowledge of MIP and IPTp. They said it was a form of malaria prophylaxis given during pregnancy, with the drug of choice in Ghana as fansidar/ sulphadoxine-pyrimethamine, meant to be taken as a single dose of three tablets starting from 16 weeks of pregnancy every month till birth with five minimum recommended times. They all explicitly said that IPTp-SP should not be given in the first trimester. And that its primary role was to prevent malaria in pregnancy. Except for a few of them that could not identify the effects of malaria on both the unborn baby and the pregnant mother. As noted below;

> "*IPTp is giving a single dose of SP to a pregnant woman at predetermined intervals at least four weeks apart from 16 weeks onwards*" hcw8

The HCWs had divergent views about the effect of MIP on the mother and the unborn baby. One shared the following in an interview:

"*For the mother, it prevents malaria, miscarriage, stillbirth, Post-Partum Hemorrhage and death while for the child it prevents death in utero, getting infected with malaria, and ensures safe delivery*" hcw4.

4.5.4.1 SP RELEVANCE TO THIS COMMUNITY

All respondents believed SP was still effective and relevant as malaria prophylaxis for the community they serve. *"This is extremely true; it can be seen from my patients; it is rare to see one of my compliant clients coming down with severe malaria while pregnant. It is usually women that I have never seen that do"* hcw4.

4.5.5 SERVICE DELIVERY PRACTICES

All participants acknowledged practising DOT every time, alongside ways to mitigate its unwanted effects. One said

"To ensure DOT, we asked all our clients to come from home after eating something so that they qualify to swallow SP." hcw1

"I ask the pregnant women to come with drinking water as they come for ANC." hcw6

Half of the participants said SP was not always in stock, and this affected coverage.

"Like right now we have not had stock for close to 2 months, this generally affects our progress, because we know even if we write the drug down for the patients to buy, they rarely do". Hcw5 continued *"SP is a program drug, we are advised not to sell it at the facility, but now we are forced to"*.

Nearly all participants said they record this exercise down. Some said they do the recording in one document, others in two then the rest in three books. These include clients' ANC book, health

facility ANC register, daily log IPT tally sheet from NMCP. In contrast, one of the in-charges declared that some staff don't recode as they should.

"*Some of my nurses don't write down all information; they skip some patients, this creates a challenge for me when tallying at the end of a workday"* hcw8.

Finally, only half the participants acknowledged receiving refresher MIP/IPTp training courses in the last 12 months.

4.5.6 THE CHALLENGES HCWS FACE IN IMPLEMENTING THE IPTP PROGRAM.

Seven main challenges were identified; client non-compliance to schedule, reaction to SP despite favourable results from the preliminary tests carried out (G6PD), side effects of SP, drug formulation; the tablet size was too big, and the dose was made up of 3 tablets, those that test positive for G6PD have no other option, no training for HCWs, few health care workers and poor documentation by staff. Below are some of their views shared: HCWs reported

"clients claim not having eaten so that they don't take SP. Some want to take it at home to swallow it just before sleeping, and this is all in the effort to avoid SP's side effects" hcw5.

"Some clients lie about adverse drug reactions just to avoid taking SP" hcw2.

"Home visits have been scrapped due to few staff available, so those that don't come to the facility will not be found" hcw4.

"I was last trained about MIP & IPTP in school. That is more than four years ago. No refresher courses since then. I would love to keep updated if possible" hcw3.

Lastly, one participant indicated that: *"The tablet is too big and doesn't look good; I think they would easily accept it if the three tablets were merged into one small smooth tablet, the later they come up with a tablet to be taken once for the whole pregnancy"* hcw5.

"It is hard to get mothers at the right month" hcw1.

4.6 HEALTH FACILITY FACTORS

Five health facilities in Ningo Prampram were assessed, from four subdistricts: Dawhenya, Lekpongunor/Dawa, Old Ningo and Prampram. Among the five facilities in July, only 4 had SP stock. We also observed that all facilities had implemented IPTp as part of their routine ANC services, none of the facilities provided free drinking water and that most women had to buy sachet water before entering the examination room. All these facilities reported receiving SP drug supply from regional medical stores despite it being of different brands (appendix 4). Three of them ordered monthly while the rest ordered quarterly. All the storage facilities were away from the sun; however, they all did not have temperature and humidity monitoring units for where the SP was stored. Four of the facilities issued SP to the ANC clinic weekly while the other stated quarterly/ when it was needed.

The ANC clinics were operated by two HCW in two of the facilities and by one HCW in each of the other three facilities. For health facility readiness to provide IPTp5, we classified them into three according to their scores from the 15 factors listed below. One health facility had low readiness, 3 had medium readiness, and the last one had high readiness. (Table 14).

Table 14: Summary of the health facility characteristics

Characteristics	Hf 1	Hf 2	Hf 3	Hf 4	Hf 5
Frequency of SP ordering	Monthly	Monthly	Monthly	Quarterly	Quarterly
Frequency of issuing SP to ANC clinic	Weekly	Quarterly	Weekly	Weekly	Weekly
Number of ANC HCW/ clinic day	2	1	2	1	1
number of clients per ANC clinic	40	10	50	35	10
Patient-Health care worker ratio per ANC clinic day	20	10	25	35	10

Characteristics	Hf 1	Hf 2	Hf 3	Hf 4	Hf 5
HEALTH FACILITY READINESS					
Availability of IPTp national protocol	No	Yes	Yes	No	No
Availability IPTp staff training manual	Yes	No	No	No	No
Presence of posters of IPTp/MIP on the wall	No	No	Yes	No	No
Presence of ANC Monthly Data returns form	Yes	Yes	Yes	Yes	Yes
The Health education schedule for the quarter includes IPTp/ MIP	No	No	Yes	No	No
The health talk was given at ANC on the day of the visit	No	No	No	Yes	No
Availability of SP at ANC	Yes	Yes	Yes	No	Yes
The practice of DOT observed	Yes	Yes	Yes	No	Yes
Availability of free water for DOT	No	No	No	No	No
SP was recorded in the first five client's ANC book	Yes	Yes	Yes	Yes	Yes
SP was recorded in the last five client's ANC book	Yes	Yes	No	No	Yes
SP given was recorded in the ANC register	Yes	Yes	Yes	Yes	Yes
Presence of SP Adverse Event forms	No	No	Yes	No	No
The facility implemented IPTp as part of routine ANC services	Yes	Yes	Yes	Yes	Yes
400mcg folic acid in stock	Yes	Yes	Yes	Yes	Yes
Possess onsite G6PD enzyme deficiency test	Yes	No	Yes	No	No
Storage of SP	In temperature-controlled room	In an enclosed wooden cabin	In temperature-controlled room	In an open wooden cabin	In a wooden cabin
Total health facility readiness to provide IPTp score	11	10	13	6	8

4.6.1 BIVARIATE ANALYSIS OF HEALTH FACILITY CHARACTERISTICS AND UPTAKE OF SP

The health facilities were categorised into two: district facilities (polyclinic and health centre) and community facilities (CHPS compound). The source of water for swallowing SP was the only variable associated with differences in IPTp uptake (Table 15).

Table 15: Bivariate Analysis of health facility characteristics and Uptake of SP

Characteristics	Sub Optimal (≤4 doses)	Optimal (≥5 doses)	p-value
Distance to the health facility			
Near (within 30 minutes' walk)	233(84.12)	44(15.88)	0.676
Far (more than 30 minutes' walk)	154 (85.56)	26 (14.44)	
Health Facility Type			
Community	242 (86.74)	37 (13.26)	0.127
District	145 (81.46)	33 (18.54)	
Purchased SP			
Did not purchase SP throughout pregnancy	330(82.91)	68(17.09)	0.287*
Purched SP atleast once	26 (92.86)	2(7.14)	
Told SP was out of stock			
Was never told SP was out of stock	355 (84.12)	67(15.88)	0.401*
Was told at least once SP was out of stock	24 (92.31)	2 (7.69)	
Source of drinking water			
Bought water	292 (84.64)	53 (15.36)	0.041*
Fetched water from tap	2 (100)	0 (0)	
Got free water at the ANC	31 (91.18)	3 (8.82)	
Had my water carried from home	31 (68.89)	14 (31.11)	

*Fisher's Exact Test

4.7 UNIVARIATE AND MULTIVARIATE ANALYSIS WITH UPTAKE OF IPTP

Table 16 includes only individually statistically significant factors for IPTP-SP uptake among mothers. Uncentered variance inflation factor (VIF) was run as a diagnostic for potential collinearity, a value of 4.68 which falls below the cutoff of 10 was obtained, so the model was acceptable. In comparison to not being employed, being employed increased one's odds of taking IPTp5 by 2.67 folds (p=0.002). There was no variation in the level of IPTp uptake among participants who had no formal education and those that attended primary level (p=0.447) yet there was a significant difference with all other levels of education, i.e. attending JHS (p=0.018), secondary/ vocational (p=0.011), and tertiary (p=0.001), education increased the odds of one taking IPTP5 by 3.65, 4.47, and 9.07 folds.

In comparison to those that attended the first ANC visit before 16 weeks, those that attended after 16 weeks are less likely to take IPTp5 by 56% (p=0.006). In comparison to those that attended ANC less than eight times, those that attended more than eight visits had 6.0 increased odds of taking IPTp5. Every one month increase in Gestation age at IPTp 1, reduced one's odds of taking IPTp5 by 37% (p<0.001). Knowledge, having good MIP knowledge increased the odds of one taking IPTp 5 by 2.5 folds in comparison to having poor MIP knowledge while having good IPTp knowledge increased one's odds of taking IPTp5 by 4.33 folds in comparison to having poor IPTp knowledge (p<0.001). Acknowledging receiving education about IPTp increased the odds of one taking IPTp5 by 2.34 folds in comparison to those that said they did not receive the education.

Having one's partner escort her for ANC visits increased her odds of taking IPTp5 by 85% in comparison to those not escorted by partners(p=0.020). Lastly in comparison to those that brought water from home, buying water for DOT decreased one's odds of taking IPTp 5 by 60% (p=0.010). Of all variables above, only two variables maintained their statistical significance in multivariable

analysis; they include gestation at first IPTp dose (AOR=0.33, p=0.012) and mothers IPTp knowledge (AOR=5.87, p=0.022).

Table 16:Summary of all the variables that showed a P-value below 0.05 with the corresponding COR and adjusted OR.

Variable	*COR*	95% CI		p-value	*AOR*	95% CI		p-value
Education status				0.001				
Primary	1.62	.4675518	5.60647	0.447	0.86	.09	8.05	0.893
JHS	3.65	1.249004	10.66829	0.018	2.61	.36	20.29	0.358
Secondary/ vocational	4.47	1.40562	14.23845	0.011	1.13	.11	11.50	0.914
Tertiary	9.07	2.412212	34.07845	0.001	0.19	.007	5.38	0.331
Employment status				0.001				
Employed	2.67	1.437692	4.967541	0.002	0.43	.12	1.51	0.187
Gestation Age at 1st ANC visit				0.004				
>16 weeks	0.44	.246802	.7939693	0.006	2.20	.35	14.00	0.404
Number of ANC attended				<0.001				
More or equal to 8 times	6.00	3.484777	10.34046	0.000	2.70	.74	9.81	0.132
Gestation at IPTp1(months)	0.63	.5120801	.7790525	<0.001	0.33	**.14**	**.78**	**0.012**
MIP knowledge				0.023				
Good knowledge	2.50	1.405848	4.43831	0.002	0.94	.22	4.00	0.939
IPTp knowledge				<0.001				
Good knowledge	4.33	2.418492	7.752543	0.000	5.87	**1.29**	**26.76**	**0.022**
Received education about IPTp				0.012				
Acknowledged being taught about SP	2.34	1.155946	4.747621	0.018	1.76	.33	9.31	0.508
Whether escorted partner	1.85	1.101907	3.095532	0.020	1.58	.50	5.02	0.434
Drinking water source				0.02				
Bought water	0.40	.2004495	.8058391	0.010	0.19	.03	1.09	0.063
Got free water at the ANC clinic	0.21	.0559612	.820539	0.025	0.28	.12	4.13	0.354
Fetched water from tap				(empty				
Side effect hinder consequent SP uptake				0.015				
SEs affected clients' corresponding doses	0.14	.0183297	1.109523	0.063	0.12	.009	1.67	0.117

COR crude odds ratio, *AOR* adjusted odds ratio, *95% CI* 95% confidence interval.
Significant multivariate analysis p-values are presented in bold.

4.8 SOCIO-DEMOGRAPHIC FACTORS, HCW FACTORS, HEALTH FACILITY FACTORS RELATIONSHIP WITH THE KNOWLEDGE OF IPTP.

Among the social demographic factors, age, distance in minutes to the facility and facility type were not predictors of IPTp knowledge for these study participants while the rest were:

Uncentered variance inflation factor (VIF) was run as a diagnostic for potential collinearity, a value of 9.23 which falls below the cutoff of 10 was obtained, so the model was acceptable.

An increase in education level increased one's IPTp knowledge ($p<0.001$). In comparison to having no formal education except for primary and JHS level, having secondary/ vocational and tertiary education increased ones odd of having good IPTp knowledge by 1.97 ($p=0.046$) and 17.5 folds ($p<0.001$) respectively.

And, compared to not knowing the source of information, identifying ANC/ health facility as the source of information increased ones odds of having good knowledge about IPTp by 7.38 folds ($P<0.001$), identifying friends as the source of information increased one's odds of having good knowledge about IPTp by 4.68 folds ($P=0.003$), identifying media as the source of information increased ones odds of having good knowledge about IPTp by 6.43 folds ($P=0.041$).

Lastly, in comparison to not purchasing SP, having bought SP reduced one's odds of having good knowledge about IPTp by 62.3% ($P=0.023$) and all the above are statistically significant in the univariate analysis since the P-values are less than 0.05 (Table 17). The same variables maintained statistical significance with multivariate analysis.

Table 17: Socio-demographic, HCW, and health facility factors' relationship with the knowledge of IPTp

Characteristics	COR	95% CI		p-value	AOR	95% CI		p-value
Age				0.1809				
	1.02	.99	1.05	0.182	0.99	.95	1.03	0.607
Education level attained				**<0.001**				
Primary	1.07	.57	2.02	0.831	0.84	.40	1.75	0.643
JHS	1.45	.83	2.51	0.191	1.30	.68	2.49	0.430
Secondary/ vocational	1.97	1.01	3.83	0.046	1.55	.72	3.35	0.265
Tertiary	17.5	3.80	80.56	<0.001	17.35	**3.34**	**90.25**	**0.001**
Marital status				**< 0.001**				
Cohabitation	3.04	1.44	6.42	0.004	4.88	**2.16**	**11.01**	**< 0.001**
Married	4.43	2.07	9.44	<0.001	4.11	**1.77**	**9.54**	**0.001**
SP source of information				**<0.001**				
ANC health facility	7.38	3.24	16.82	<0.001	3.59	**1.40**	**9.21**	**0.008**
Friends	4.68	1.68	13.02	0.003	3.25	**1.03**	**10.26**	**0.044**
Media radio TV	6.43	1.08	38.41	0.041	1.87	.26	13.37	0.534
Community outreach	1.93	.42	8.78	0.396	1.62	.32	8.23	0.557
Received education about SP				**<0.001**				
Said were taught	3.72	2.33	5.93	<0.00	2.92	**1.68**	**5.07**	**< 0.001**
Purchased SP				**0.017**				
Bought SP	.377	.162	.88	0.023	0.339	**.13**	**.86**	**0.023**
Distance				0.469				
> 30mins walk	1.17	.80	1.71	0.470	1.24	.80	1.92	0.331
Health facility type				0.091				
District	1.38	.95	2.02	0.092	1.22	.78	1.91	0.373

COR crude odds ratio, *AOR* adjusted odds ratio, *95% CI* 95% confidence interval
Significant p-values are presented in bold.

4.9 SOCIO-DEMOGRAPHIC, HEALTHCARE WORKERS, AND HEALTH FACILITY FACTORS RELATIONSHIP WITH GESTATION AT FIRST ANC VISIT.

Education status and parity were not associated with gestation at first ANC visit, although, marital status, employment status and distance to the facility were. Uncentered variance inflation factor (VIF) was run as a diagnostic for potential collinearity, a value of 3.41 which falls below the cutoff of 10 was obtained, so the model was acceptable. In comparison to the single/ divorced/ widowed, being married/ cohabiting reduced a woman's odds of late first ANC attendance by 55% (p=0.016). Every unit increase in distance to health facility increased odds of late first ANC attendance by 1%. Lastly, in comparison to those not employed, being employed reduced the odds of late first ANC attendance by 39% And all these are statistically significant in the univariate analysis since the p-values are less than 0.05 (table 18). The same variables maintained statistical significance also with multivariate analysis.

Table 18: Socio-demographic, HCW, and health facility factors' relationship with gestation at first ANC visit

Characteristics	*COR*	95% CI		P-value	*AOR*	95% CI		p-value
Education				0.8519				
	1.01	.88	1.17	0.852	1.04	0.89	1.21	0.634
Age				0.1032				
	.97	.94	1.01	0.106	0.98	.94	1.02	0.316
Marital status				**0.020**				
Cohabitation/ married	.45	.24	.83s	0.010	0.46	**.24**	**.86**	**0.016**
Parity				0.578				
Multipara	1.12	.74	1.70	0.579	1.43	.88	2.32	0.145
Employment status				**0.012**				
Employed	.61	.41	.90	0.012	0.64	**.42**	**.97**	**0.036**
Distance				**0.022**				
	1.01	1.00	1.01	0.024	1.01	**1.00**	**1.01**	**0.040**

COR crude odds ratio, *AOR* adjusted odds ratio, *95% CI* 95% confidence interval
Significant p-values are presented in bold.

4.10 FACTOR ASSOCIATIONS WITH WHETHER A CLIENT WAS ESCORTED BY PARTNER OR NOT

In multivariate analysis, age, parity, employment status, and distance to health facility do not predict whether the partner escorts one to the facility or not. Yet, age and employment status did in the univariate analysis, as seen below. Every one-year increase in age increased the odds of being escorted by the partner to the health facility by 4% folds (p=0.035). In comparison to those not employed, being employed increased the odds of being escorted by a partner by 73% (p=0.0073). Uncentered variance inflation factor (VIF) was run as a diagnostic for potential collinearity, a value of 4.65, which falls below the cutoff of 10, was obtained, so the model was acceptable. Marital status, secondary and tertiary education level were statistically significant in both univariate and multivariate analysis. Women who were married/ cohabiting had higher odds of being escorted by a partner than those who were single/ divorced/ widowed (AOR=2.89; p=0.010). Lastly, women with secondary and tertiary educational level had higher odds to be escorted by a partner compared to those with no formal education (AOR=2.42, p=0.019; AOR=23.03, p<0.001) (table 19).

Table 19: factors' relationship with whether escorted by partner or not.

Characteristics	***COR***	**95% CI**		**p-value**	***AOR***	**95% CI**		**p-value**
Age				**0.035**				
	1.04	1.00	1.07	0.036	1.03	.99	1.07	0.174
Education				**<0.001**				
Primary	0.98	.49	1.98	0.956	1.07	.52	2.20	0.856
JHS	1.68	.92	3.06	0.091	1.74	.93	3.23	0.080
Secondary/ vocational	2.45	1.22	4.93	0.021	2.42	**1.16**	**5.06**	**0.019**
Tertiary	28.74	6.14	134.40	<0.001	23.03	**4.83**	**109.87**	**<0.001**
Parity				0.0921				
Multipara	0.70	.46	1.06	0.091	.68	.41	1.15	0.151
Employment status				**0.0073**				
Employed	1.73	1.15	2.60	0.008	1.39	.89	2.17	0.152
Marital status				**0.0043**				
Married/cohabiting	2.76	1.30	5.88	0.008	2.89	**1.30**	**6.44**	**0.010**
Distance to the health facility				0.2489				
Far	0.79	.54	1.18	0.250	.84	.55	1.28	0.422

COR crude odds ratio, *AOR* adjusted odds ratio, *95% CI* 95% confidence interval, Significant p-values are in bold.

CHAPTER FIVE

5.0 DISCUSSION

5.1 IPTP UPTAKE AMONG POSTNATAL MOTHERS.

In this hospital-based study, about 94% of participants received at least one dose of IPTp, which was consistent with 95.3% reported in a Cameroon study (Diengou et al., 2020). Despite IPTp1 uptake being high, it still fell below the 100% NMCP national target, which might be due to; missed opportunities, women not attending ANC throughout pregnancy, voluntary refusal to take the drug, SP stock out issues and ineligibility to take SP drug because of; the G6PD enzyme deficiency, allergy to sulphonamides or current cotrimoxazole therapy. The study further showed IPTp3 and IPTp5 uptake of 62.8% and 15.3% for the mothers, respectively.

IPTp 3 uptake was consistent with the 64.5% reported earlier in Ghana and 60% reported in a multicounty malaria indicator survey for Ghana (Quakyi et al., 2019; Yaya et al., 2018). Nonetheless, this was lower than 87.5% reported (Owusu-Boateng & Anto, 2017) or 93.24% in Sierra Leone (Amos Buh, 2019). On the other hand, our IPTp3 uptake was higher than that reported in multiple studies: Malawi 42%, Kintampo 32.4% (2015), Cameroon 54.9% and Uganda18%. (Azizi, 2020; Diengou et al., 2020; Okethwangu et al., 2019; Oppong et al., 2019). Probably because the studies were carried out in different settings, like country, private facilities yet ours was in public health facilities, social-cultural characteristics, and a difference in the target study population. i.e. use of pregnant women, yet we used postnatal mothers.

For IPTp5 uptake, values were comparable with results from other studies in Ghana, a hospital-based study carried out in Accra reported 14% another in Navrongo reported 16.0% (Anto et al., 2019; Owusu-Boateng & Anto, 2017). In contrast, Lower IPTp5 uptake of 8.9% and 10.8% were reported for the whole of Ghana 2017 and 2018, respectively (NMCP, 2018: NMCP, 2019). This could be attributed to the national survey being community-based. Despite the slight increase in uptake, they all fell below the NMCP's target (MoH/NMCP, 2014). The whole low uptake could be due to both late ANC attendance and late gestation at IPTp1, poor maternal knowledge of IPTp, low partner support and awareness of the IPTp program and its relevance for the woman and the unborn baby. This was also evidence of the healthcare systems' failure to promote maternal healthcare services use due to persisting infrastructural, social, and financial barriers. So, this study tried to assess the factors associated with this low IPTp5 uptake.

SP dropout

HCW identified seasonal migrations in many coastal communities whose main source of income was fishing, side effects from the SP like vomiting, appetite loss, nausea, and weakness, reaction to a drug despite the preliminary tests like G6PD enzyme test, lack of SP stock, not attending ANC regularly and poor documentation by HCWs as barriers for this. The same was identified earlier in Ghana (Doku et al., 2016; Sumankuuro et al., 2017).

5.2 SOCIAL DEMOGRAPHIC FACTORS AFFECTING IPTP UPTAKE.

There was no difference in IPTp5 uptake according to age, parity, marital status, and information source since the P-value was above 0.05, thus not significant. Similar results were reported in Malawi, Tanzania and Ghana (Azizi, 2020; Bajaria et al., 2019; Stephen et al., 2016). This finding seems strange because it was widely expected that women with more children would take more doses of IPTp due to the knowledge gained from past pregnancies about the importance of

preventing malaria during pregnancy and the benefits of IPTp-SP. Or those whose source of information was ANC/ health facility would have taken more doses since it was at the same facility that the SP was given. Those at extreme ages would be expected to take fewer doses due to their stigmatisation at facilities. And for marital status, we would expect those living with partners to take more IPTp doses due to the support presumably received; this could be in terms of finances or company.

In contrast, several studies reported an association for some of these variables. Sierra Leone showed that IPTp-SP uptake tended to be higher in women aged 25–29 and those who had given birth twice than their fellows (Buh, Kota, Bishwajit, & Yaya, 2019). Oppong et al., (2019) and Yaya et al., (2019) reported that higher age groups were found to be associated with uptake of adequate doses of IPTp-SP. However, a study from Uganda reported that pregnant women older than 34 years were less likely to take optimal doses of IPTp-SP (Okethwangu et al., 2019).

For the source of information, Okethwangu et al., (2019) reported high IPTp uptake association with exposure to radio messages. An earlier study in Ghana reported that a married woman was significantly more likely to take more doses of IPTp-SP (Oppong et al., 2019). Nevertheless, this study showed education and occupation status were positively associated with IPTp5 uptake. This was expected because education can empower women to take better and more informed decisions concerning their health issues, and employment makes one financially independent, thus easily covering ANC related expenses when there was a need. These could be contributing to adequate uptake of healthcare services like IPTp-SP uptake. Similar results were seen in Uganda, Ghana, Ivory Coast, and Malawi (Mwandama et al., 2015; Okethwangu et al., 2019; Oppong et al., 2019;

Yaya et al., 2019). Another study in Ghana reported that unemployment was associated with inadequate SP uptake, yet education was not linked to it (Stephen et al., 2016). On the other hand, Azizi (2020) reported no association between education and occupation with IPTp uptake, and Bajaria et al. (2019) only reported no association between Education level and IPTp uptake. Surprisingly, a study in Sierra Leone reported the opposite. Women with higher education had a lower chance of receiving IPTp-SP than women without education. (Buh et al., 2019).

5.3 CLIENT LEVEL FACTORS AFFECTING IPTP UPTAKE.

5.3.1 ANC ATTENDANCE CHARACTERISTICS

Nearly all mothers had attended ANC at least once. Comparable findings of 96% were reported in Malawi and Cameroon (Mwandama et al., 2015; Njim, 2016). This may be due to them being hospital-based research, also the general high awareness about ANC relevance by women in recent years, relatively good community sensitisation and mobilisation at using maternal health service than ever by the health sector.

Regarding gestation at first ANC, despite the WHO's recommendation to have the first ANC visit within the first 16 weeks of gestation, two in every five mothers made their first ANC visit late during their last pregnancy (WHO, 2012). The National Health Insurance Scheme (NHIS) was formed to ensure equitable distribution of health since it exempts pregnant women from premium payment and provides most ANC services freely to mothers in Ghana. Despite this, the second most mentioned reason in the current study was the lack of health insurance. Those who had NHIS also complained about the indirect costs one incurs even when insured; thus, financial costs remained a significant barrier to ANC.

Other reasons could be low ANC knowledge and awareness, lack of support from partners, cultural limitations, and inaccessibility to the health facilities. Meanwhile, the result was relatively lower in comparison to studies in Ethiopia 81.5 % and 52.5% (late first ANC prevalence was reported, 60.5% in Ghana, 79.5% in Cameroon, 67.3% in Nigeria (Ejeta et al., 2017; Fagbamigbe et al., 2017; Njim, 2016; Weldemariam et al., 2018; Wolde, Tsegaye, & Sisay, 2019). This could be because the classification of the outcomes, like Wolde et al., (2019) classified women as, late ANC booking when they come after 12 weeks of gestation, while the current study classified late ANC attendance gestation after16 weeks. Other rationales could be the socio-demographic differences between the study sites and ANC related information source.

Only 27% of the mothers achieved the recommended 8 ANC visits, which was higher than 13% reported in the same region (Amankwah & Anto, 2019). This could be attributed to time differences between the studies since time comes with better awareness about ANC and better access to health facilities. Another reason could be because our study was in public facilities, yet the latter was in private facilities. Nevertheless, our findings fell short of the WHO target, and this might be due to the financial situation of the population since the more ANC visits, the more costs attached, low partner support and this policy/protocol being a relatively new distance to ANC provider, transport difficulties, and cultural influence (Sumankuuro et al., 2017).

About a third of participants took the first dose of IPTp at the right time, with the IPTp timeline an even lower value of 16.9%, reported in Navrongo (Anto et al., 2019). This could be because of the late ANC attendance, low HCW knowledge about IPTp, and scheduling inconsistencies.

The majority of participants were not escorted by their partners for ANC, probably because of low levels of partner awareness on the relevance of health service uptake. The study was also carried out in fishing communities, where partners can only earn if they work, so every day was a working day to provide for their families. Sumankuuro et al., (2017) identified several reasons to explain such a situation. Some men might feel like ANC attendance was for women, Others do not think it was their responsibility to help expectant mothers to reach the appropriate medical facility for ANC. With quotes like

> ANC can be received any day, but the moisture in the farm is available for a few days; hence, let's go to the farm. For fear of the partner, some expectant mothers comply with him and even sometimes receive few ANC visits before childbirth [FGDs, opinion leader, Jang]. (p11)

Most participants did not have any side effects. Probably because for our study area, a pregnant woman had to undergo preliminary tests before they are initiated on SP. Also, SP was known to be a relatively safe drug and HCWs advice that women came after eating despite SP being safe in the fasted state. A few women declared they had gotten malaria during pregnancy. All HCW agreed that normally, pregnant women were expected to have more malaria cases than normal adult counterparts.

Still, for women that take IPTp, it was lower. This can also be attributed to good knowledge about malaria prevention among the mothers, SP effectivity in this community and the existence of multiple interventions that help protect the pregnant women further, including free ITN at first encounter. For those that got malaria, HCWs identified poverty as a factor that hinders access to

health care. Also, nonadherence to guidelines and prescribed procedures could alter all the success achieved.

The majority of the participants said ANC was their source of IPT & MIP knowledge, which was probably because at most of these sessions' comprehensive training about ANC is provided. In the contrast, a study in Uganda identified radio as the main source of information (Okethwangu et al., 2019). Nearly all participants knew that ITN was a way of malaria prevention in pregnancy which could be due to nearly all of them receiving a mosquito net for the time they were pregnant. Many other prevention forms were mentioned. Nevertheless, a study in Nigeria reported a considerable number of both pregnant and postnatal mothers not having the correct knowledge of malaria prevention (Oladimeji, Tsoka-Gwegweni, Ojewole, & Yunga, 2019).

Generally, the knowledge about malaria's effects on either the pregnant woman or the unborn baby was so low. This could be probably due to these not being topics included in the pregnancy school syllabus. Or the low knowledge exhibited by the HCWs about the same. That was why the majority of women acknowledged not knowing. Generally, the participants were knowledgeable about IPTp and MIP. However, more for the latter and this could be due to the practicability/ tangibility of IPTp, since the tablet was given to the mothers as directly observed therapy, so they had a chance to ask a question about the tablets before they swallowed it. Unlike for MIP, where the assessed reasons are theoretical. Like the effects of malaria on the unborn baby.

5.3.2 ASSOCIATIONS WITH THE UPTAKE OF IPTP-SP5

All 8 ANC factors except the experience of side effects were statistically significant at predicting IPTp5 uptake. This was probably because most SP side effects were not severe, and SP was given

DOT, which blocked most chances of them not taking it. The probability of taking optimal doses of IPTp-SP increased with an increase in the number of ANC attended. The study found that those who attended ANC ≥ 8 times had six times the odds of taking IPTp5 in comparison to the rest. Multiple studies agreed with this (Azizi, 2020; Bajaria et al., 2019; Boateng et al., 2018; Buh et al., 2019; Nkoka et al., 2018; Oppong et al., 2019). This might be due to SP being given as DOT.

Although WHO recommended that the number of ANC visits was important, the first visit's timing was also equally important. Late ANC Attendance (≥ 16 weeks gestation) was associated with 56% decreased odds of taking IPTp5. Uganda also reported similar results, that those who participated in ANC for the first time in the third trimester were less likely to take the optimal dose of IPTp-SP (Okethwangu et al., 2019). And in Ghana, Anto et al. (2019) noted that taking the first dose of SP during the second trimester allowed for taking more SP doses compared to taking the first dose during the third trimester.

This could be explained that when one starts ANC early, they get to be educated/ informed about what is good for pregnancy to expect or demand such services in subsequent visits if not offered. The study showed a significant relationship between good knowledge about MIP, acknowledging being taught about MIP/IPTp and IPTp uptake. This was expected since, with such knowledge, one can make informed decisions about their life choices.

Further, being escorted by a partner for ANC was linked to higher IPTp uptake. Consistent with this, a study in Ghana reported male partner involvement in ANC clinic attendance as a key driver of IPTp-SP uptake (Boateng et al., 2018). While a review of studies from developing countries

revealed that Men in developing countries are the chief decision-makers, thus determining women's access to maternal health services and influencing their health outcomes.

Therefore, male involvement was associated with improved maternal health outcomes in developing countries (Yargawa & Leonardi-Bee, 2015). A possible explanation may be the support offered to the pregnant woman. Like the partner can help remind and encourage the woman about upcoming visits, thus fighting together with the woman's poor healthcare-seeking behaviours. Also, as a couple, they will demand better services at the facility, including IPTp, thus achieving optimal uptake. Likewise, community involvement had been seen to favour program implementation, so programs that do not only target the primary beneficiaries are seen to be more successful.

Among the eleven covariates that were positively associated with IPTp5 uptake individually, only two, "knowledge about IPTp" and "Gestation in months at IPTp-SP1" variables were found to be strongly associated with IPTp5 in multivariate analysis. For Knowledge about IPTp, consistent results were seen in Cameroon (Diengou et al., 2020). This could be due to knowing the schedules, the dose and what was expected of them at every stage of the pregnancy helped them plan accordingly to adhere. Also, knowledge could have improved the acceptability of the interventions.

5.3.3 ASSOCIATIONS WITH KNOWLEDGE ABOUT IPTP.

Among the social demographic factors, age, distance in minutes to the facility, and facility type were not predictors of knowledge about IPTp for this study. Simultaneously, the rest, like education, marital status, source of information and acknowledging receiving education had

significant values both in univariate and multivariate analysis: Increase in education was associated with having good knowledge about IPTp, with it being significant for secondary/ vocational level and tertiary level. Oladimeji et al., (2019) reported the same. This was probably because formal education exposes one to basic information about malaria or that educated people can easily learn something new as compared to non-educated people.

In comparison to being single/divorced/widowed, cohabiting/ being married increased the odds of mothers having good knowledge about IPTp. Similar findings were reported in Nigeria (Oladimeji et al., 2019). This might be due to the pregnant woman's knowledge being supplemented by the partner's knowledge about the topic. The Source of information about MIP/IPTp was a strong significant predictor of the level of knowledge about IPT. This could be explained by the accuracy of information received from these sources and the duration it takes to pass on this information. ANC usually takes up to 30 minutes presentation to train pregnant mothers about MIP/IPTp and from a skilled healthcare worker. Despite media having well-crafted messages, it usually takes a shorter period, while the accuracy of information from friends/ colleagues might not be that comparable, thus the differences.

Acknowledging being taught about MIP/IPTp was associated with having good knowledge about IPTp, and this was probably because these received the training or were attentive during the training that they remember a few things that can help improve their knowledge. Consistent results were reported in sierra leone, that in general, educated women were more likely to be aware of problems related to pregnancy health and take preventive measures (Buh et al., 2019).

5.3.4 ASSOCIATION WITH GESTATION AT FIRST ANC VISIT

From both univariate and multivariate analysis, age, education status, and parity do not influence gestation at the first ANC visit. However, marital status, occupation and distance to facility do. In agreement, a study from Cameroon also found no association between age, level of education, parity and early first ANC visit (Njim, 2016). This was unexpected because, with age, one was expected to have richer experiences, more knowledge, and the power to make decisions. Our results contradict findings from Ethiopia where the high rate of late ANC booking was associated with illiterate respondents, multiparous women, and women older than 25 years (Ejeta et al., 2017).

Nsibu et al., (2016) reported that parity did not influence the timing of the first ANC while age and the educational level were positively associated with the time of the first ANC visit. The observed difference might be due to the socio-cultural differences among the study populations.Married/ cohabiting mothers had reduced odds of late first ANC attendance. The same was reported in the rural area of South Africa (Muhwava et al., 2016). This was probably because these mothers more likely planned to have the pregnancy, so they will look forward to confirming it, thus early first ANC visit. Contrary to the above, a study from Cameroon did not find any association (Njim, 2016).

Being employed reduced the odds of late first ANC attendance. Consistent results were seen in Ethiopia, where being unemployed was associated with late ANC attendance (Gulema & Berhane, 2017; Wolde et al., 2019). This could be due to employed women are quite financially independent, so they do not have to wait for the partner for money to go for a health checkup. In contrast to this, a study from Cameroon reported no association between the two variables (Njim, 2016).

Mothers who stay farther away from the health facility were more likely to start ANC late. The same was noted in Ethiopia, DRC, and South Africa (Muhwava et al., 2016; Nsibu et al., 2016; Weldemariam et al., 2018). This was probably because the longer the distance to the facility is, the more costly the trip gets in regards to energy, time and money.

5.3.5 FACTORS ASSOCIATED WITH WHETHER ONE WAS ESCORTED OR NOT BY PARTNER

After controlling for basic demographic characteristics like parity and distance to health facility factors like age, occupation status, and marital status still influenced whether partner escorts one to the facility or not. The younger the woman, the less likely it was to be a stable/responsible partner willing to escort them to the health facility for ANC. Being employed usually translates into having an extra source of income for the family, so it was easier for such an income to support two people to go for a health check more than one source of income. Lastly, living with a man makes it easier to plan for such activities that are scheduled.

5.4 HCW FACTORS

Among the four health care worker factors, only one was significant at predicting IPTP5 uptake, that was clients acknowledging receiving information about IPTp or not. The rest, like patient providers relationship, the site from which was swallowed, and the ANC staff attitude towards the clients, were not significant determinants of IPTP5 uptake. Contradicting results were reported that none of the ANC staff-related variables was found to be statistically associated with IPTp-SP uptake (Stephen et al., 2016). Nonetheless, it was important to note that among clients who

swallowed SP from home, none achieved IPTp 5 probably because they did not have supervision or probably because it never got documented in their ANC books.

The same applied to those who rated staff attitude as very bad and bad, maybe because they were not encouraged to continue taking IPTp or even to keep coming back to the health facility. Contradicting findings were reported in a qualitative study that showed that, while staff's attitude towards the women was generally acceptable, the attitude had an impact on the way women were using ANC services. And that poor attitude of some health workers was identified as a barrier to achieving high IPT coverage (Doku et al., 2016).

All HCWs acknowledged practising DOT every time. This was possible because it was part of the SP administration protocol, which had been in place for an exceptionally long time. Similar findings of the practice of Directly Observed Therapy (DOT) of IPTp-SP administration was reported by nearly all the respondents (Diengou et al., 2020; Doku et al., 2016; Stephen et al., 2016). Despite the site of SP administration not being a significant predictor of IPTp uptake, other studies reported so, that women who attended facilities where direct observation therapy was practised were more likely to receive at least one dose of IPTp (Bajaria et al., 2019).

Generally, all HCWs had good knowledge of MIP and IPTp. Consistent findings were reported in Gushegu (Stephen et al., 2016). Contrary to these, a study in Nigeria reported only 62.2% awareness of the current WHO IPTp-SP recommendation, with only about two-fifth correctly knowledgeable about it (Bello & Oni, 2020). This could be due to these study participants being more experienced, all of them being midwives. Additionally, their speciality being obstetrics and

gynaecology, so with continuous practice, these facts became part of them, and the presence of guidelines and protocols that they keep referring to while doing their jobs.

Like in the current study, a study in Cameroon reported that a few HCWs lacked some information (Diengou et al., 2020). This could be due to lack of refresher training, lack of reference material or not using those available since the most preferred reference material identified in this study was flip charts. Doku et al., (2016) also identified a lack of knowledge by ANC staff as a barrier to achieving high IPT coverage.

There was an inconsistency in the number of books the SP administration exercise was recorded in, with most mentioning two, the others three and the rest one. This was possible because they don't adhere to the guiding protocol of this exercise, some may deem the process repetitive, yet others prefer to record in the third document at the end of the working day since it's a summary of the work done (daily log IPT tally). For others, it might have been due to the exhaustion and being tired since they were alone on duty with a number of clients; for the rest, it was probably because they were not well trained.

Despite all the HCWs having good knowledge about MIP/IPTp. Only half of them acknowledged receiving refresher MIP/IPTp training courses in the last 12 months. Perhaps this was because most low-level health facilities have one midwife, so they are on duty most of the time. There were also no training planned for at the facility. Comparable findings were reported that two other studies (Doku et al., 2016; Okethwangu et al., 2019; Stephen et al., 2016). A study in Tanzania showed that women who attended facilities with providers who had received any in-service

training were considerably more likely to have received at least one dose of IPTp (Bajaria et al., 2019). In conclusion, the successful implementation of the IPT strategy relies on the level and type of training given to the health staff.

5.5 HEALTH FACILITY FACTORS

Among the five facilities in July, only four had SP stock, each of which had a different brand of SP. Yet, they all said they receive SP stock from the same supplier, this might be due to the procurement and stock management inconsistencies at both the supplier's side and at some of the facilities, or some facilities could have outsourced from other supplies to avoid being out of stock. Half of the HCWs said SP was not always in stock, and this affects its coverage. SP out of stock status was also reported earlier on in Ghana and in a review that acknowledged out of stock as a contribution to low coverage of IPTp (Diengou et al., 2020; Roman et al., 2019).

Probably because of the lengthy procurement process, SP being a program drug thus not sold but given away for free, so facilities are meant to wait until the stock was availed, and poor stock management practices showed since all facilities order from the same supplier yet some had stock and others didn't have. Even if clients being told SP was out of stock was not a significant IPTp predicting factor, other studies reported it and stated that might be a determiner of lower IPTp uptake SP dropout(Bajaria et al., 2019; Doku et al., 2016).

Of the five facilities, only one was categorised as having high readiness, one categorised as low readiness and the rest as medium readiness. Generally, community facilities scored lower than the district facilities at readiness to provide IPT probably because they have more funding to execute

plans, they have more staff, and their staff have a higher qualification. Yet a study in Tanzania showed that women who attended ANC at a facility with a high readiness score were more probable to take IPTp than those that attended facilities with low readiness scores (Bajaria et al., 2019).

In agreement with our findings, another study also identified the following as some of its modifiable determinants of IPTp delivery; facilities having IPTp guidelines increased IPTp delivery, facilities that implemented IPTp as part of their routine ANC services were more likely to have increased IPTp delivery, stock-outs of sulphadoxine-pyrimethamine were linked to reduced IPTp delivery, and having HCW that received IPTp training was linked to increased IPTp delivery(Maheu-Giroux & Castro, 2014).

Consistent with our results, Doku et al., (2016) identified the following health facility barriers to IPTp coverage: Shortage of sulphadoxine-pyrimethamine (SP), inadequate supply of potable water for the administration of SP, and lack of knowledge by ANC staff. The unavailability of water at most of the facilities could also lead to a low intake of SP and, consequently a high dropout rate.

All facilities had 0.4mg folic acid in stock for pregnant women, and this was in line with the WHO IPTp guidelines since higher doses of folic acid are known to counter the effects of SP towards malaria prevention.

A fifth (1/5) of the facilities had a poster about IPTp/MIP on the wall. This was unexpected since Posters are usually an easy and flexible way of passing on information and further educating the facility users. Unlike our study, a study in Gushegu found that no poster about the IPTp program was seen on the health facility walls (Stephen et al., 2016). This could be due to poor resource

management, lack of funds, low knowledge by the HCWs themselves about the relevance of visual aid. Even now, only one of five facilities had an ANC health talk just before the clinic started. Yet that same study showed that health talks at the ANC during clinic days might impact the mothers' health-seeking behaviours (Stephen et al., 2016).

These findings could be due to the limited number of HCW at the facility, lack of health talk schedule, lack of HCW training and lack of close supervision of health care workers. And these pointed to a missed opportunity to use posters and ANC health talks as a means of health education. Among the five health facility factors only one, source of drinking water showed statistical significance towards predicting IPTp5 uptake, the rest like distance to health facility(minutes), whether or not the SP was purchased or received free, the health facility type, and lastly whether the client had ever been told SP was out of stock. Consistent with this, a study in Tanzania also did not find any correlation between health facility type with IPTp uptake (Bajaria et al., 2019).

Finally, our study showed that the source of drinking water for SP administration was a significant factor concerning IPTp uptake, with those who bought water less likely to take optimal doses of IPTp. The same was noted in a study in tamale (Doku et al., 2016). This finding could be due to the additional cost one has to incur at the facility, thus could discourage some women, especially those who may not have money to buy the water, thus leading to low IPTp uptake. HCW opinion about their residence and its effect on their service delivery was that distance to health facility strongly affects service delivery. This could be explained by the nature of work since they not only carry out ANC work but also in charge of the delivery section. Which was not a regular schedule job, of 9 to 5 thus requires them on site on short notice.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The study concludes that the current IPTp uptake of at least five doses is 15.3%, that there are only two client level factors: gestation age at IPTp1 and knowledge about IPTp, which are quantitatively the factors that affect IPTp5 uptake among postnatal mothers of Ningo Prampram District. Qualitatively the study identified: seasonal migrations in many coastal communities whose main source of income was fishing, side effects from the drug, reaction to SP despite the preliminary tests like G6PD enzyme test, lack of SP stock, and mothers not attending ANC regularly as the factors for the observed IPTp uptake.

In addition, that even with good knowledge about MIP/IPTp, most HCWs had not been trained in the last year and were not using the provided reference materials for their daily activities. The HCWs had both a good attitude towards the clients and a good patient-provider relationship. The HCWs believed that SP was still effective in their communities and that their distance to work was a major factor in service provision.

Lastly, most facilities were graded medium at facility readiness to provide IPTp for pregnant women. This was mainly attributed to lack of free drinking water for SP administration, lack of IPTp staff training manual, irregular service provision like health talk at ANC clinic, absence of SP adverse drug event forms and the absence of onsite G6PD enzyme deficiency test. Therefore, these finds can be of importance in the development of effective strategies to improve IPTp uptake.

6.2 RECOMMENDATIONS

6.2.1 FACILITY-BASED

HCWs should be enrolled for short courses, or regular refresher training should be planned and executed for ANC staff; these should be in turns to enable all the HCWs to attend. With topics like MIP, IPTp, use of reference materials, Adverse Drug Reaction reporting. Other forms of presentation/ information sharing at the ANC clinic health talks should be used to avoid monotony and help pregnant women understand easily. This can be in the form of skits or their colleagues presenting, or husbands presenting, etc. Lastly, SP stock-out audits should be put in place to determine their root causes.

6.2.2 NON-FACILITY BASED

More supervision should be offered, by either management or district heads, to ensure the HCWs adhere to IPTp-SP protocols and standards. Like the provision of SP as DOT, maintaining the ANC clinic health, palpitation of all clients, etc. The NMCP should ensure all facilities have visual aid onsite every day of the year. These include posters and charts with more information. Standardisation of pregnant women's ANC books since several versions are being used concurrently. Some of which are not suited for the IPTp5 target (see appendix 4). NMCP and GHS should ensure the provision of reference materials like guidelines and protocols to all health facilities. Like alongside drug deliveries. More efforts should be put into awareness and increased coverage of NHIS in the whole district. Encourage technology to improve ANC attendance, like through automatic message reminders for those whose scheduled near return dates.

6.2.3 FUTURE RESEARCH

To understand how ANC service provision during emergencies like the COVID-19 pandemic.

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APPENDICES

APPENDIX 1: HEALTHCARE WORKERS

INFORMATION FORM FOR HEALTH CARE WORKERS

The Information Sheet provides information about the research for participants to make an informed decision of whether to participate in the study or not. It outlines the nature of the research, what the research involves, risks, benefits, compensation (if there is none, this should be stated).

Title of Study Factors associated with uptake of intermittent preventive treatment of malaria in pregnancy with sulphadoxine-pyrimethamine at the district and community levels in the Ningo Prampram District of the Greater Accra Ghana**.**

Introduction: My name is Asiimwe Nashira, and I am a graduate student at the School of Public Health, University of Ghana, Legon, Accra. Staying at Valco trust hostel phase 2. And can be contacted on +233244203817 and fancynash@gnail.com

Background and purpose of the research: The purpose of the research is to assess the level of uptake of IPTp-SP and associated factors among mothers who received antenatal care services at the polyclinic, health centres and CHPS compounds in your district.

Nature of research: I will be administering semi-structured interviews with ANC staff at health facilities in Ningo Prampram District. The study will be done at your pace.

Participants involvement:

- **Duration /what is involved:** All you will have to do is answer most appropriate for you. it will last for about 20-35 minutes

- **Potential Risks:** The procedures involved in this study are non-invasive and will not cause any discomfort to you as a participant. If you feel uncomfortable responding to some of the questions, you are free not to respond.
- **Benefits:** There is no direct benefit to you as a person for your participation in the study. However, the information you will provide will contribute to overall knowledge about the level of uptake and factors Influencing IPTp-SP uptake in the district. The results of the study may be used to improve IPTp services in the facilities and to come up with recommendations that will better the uptake to IPTp-SP.

- **Costs: there will be no costs incurred by the participants.**

- **Compensation:** a face mask will be provided at the end, as a token of appreciation.
- **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 limited to the principal investigator and the assistants and will be destroyed after five years.
- **Voluntary participation/withdrawal:** Your participation in this study is completely voluntary. You have the right to refuse participation or withdraw from the study at any time. Should you choose to withdraw, the information you provide will not be used in the study. No penalties or negative consequences will result from your withdrawal. and without having to give any reasons. Please feel free to ask any question for any further clarification
- **Feedback to participant**: If you wish to receive results from this research, kindly provide your email address. After the study, the team will come back to this facility to offer a CPD for the practitioner's available talks to inform those who will be available the results.
- **Funding information:** I am a TDR student on the WHO TDR scholarship. The research funding is part of the package. And I can use up to 3,000 USD
- **Sharing of participants Information/Data:** I am the sole owner of the data that will be generated**.**
- **Provision of Information and Consent for participants: a** copy of the Information Sheet and Consent form will be given to you after it has been signed or thumb printed to keep.

Who to Contact for Further Clarification/Questions: I hope that you will participate fully. If you want to ask any questions or seek further clarification about the exercise, I would be ready to provide an answer.

For further information or clarification on this study, please contact Asiimwe Nashira (**0244203817**). You may also contact the Ethical Review Committee Administrator Ms Hannah Frimpong on **0507041223** for more information.

CONSENT FORM FOR HEALTH CARE WORKERS

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: …….

Phone number:……..

Principal Investigator or RA: I attest that I have explained the study information accurately to the participant. The participant has freely given consent to participate in the study.

Signature: ……..

Date: ……..

SEMI-STRUCTURED INTERVIEW GUIDE FOR HEALTH CARE WORKERS

Title of Project; Factors associated with uptake of IPTp-SP at the district and community levels in the Ningo Prampram District of the Greater Accra Ghana

Form number; **Date;**		**Health facility……** **Health facility type……**	
Q1	Sex:		1.Male [ ] 2.Female[ ]
Q2	Designation		Doctor [ ] Midwife [ ] Nurse [ ]
Q3	Level of education		
Q4	Number of years of practice		
Q5	How long does it take from your home to reach this facility on foot?		
Q6	Does this an impact on your service delivery, how?		
Q7	What are your comments on the prevalence of malaria in pregnancy?		
Q8	Is it the same as the rest of adult patients? Please elaborate		
Q9	What are the factors accounting for the situation in this setting?		
Q10	What is Intermittent Preventive Treatment of malaria in pregnancy (IPTp)?		
Q11	When is IPTp supposed to be started during pregnancy? (weeks)		
Q12	What is the current drug recommended for IPTp in Ghana??		
Q13	What dose (number of tablets)?		
Q14	At what interval is it recommended that IPTp is given?		
Q15	How many times during pregnancy is it recommended to give IPTp in Ghana?		
Q16	What are some of the benefits of IPTp for pregnant women?		
Q17	What are some of the benefits of IPTp for the unborn baby?		
Q18	In what trimester is IPTp **NOT** given during pregnancy? why		
Q19	Are there dropouts of SP uptake? Why?		
Q20	What accounts for these dropouts?		
Q21	How helpful is the IPTp in the prevention of malaria in pregnancy? Do you believe SP is still effective and relevant?		
Q22	What are some of the challenges you face in implementing the IPTp program?		
Q23	What do you recommend concerning the improvement of the IPTp uptake?		
Q24	Availability of reference material, examples, the roles of each		
Q25	What is reference material of choice		
Q26	Do you administer IPTp in this facility?		
Q27	what is the drug choice for IPTp in this facility		
Q28	Is the drug available at the ANC today?		
Q29	Is the drug always available at the facility?		
Q30	If no, How many times during the last year has it been out of stock? Why?		
Q31	How is the drug administered at this facility? Why?		
Q32	Do you recode this exercise down? Why?		
Q33	In what books (multiple answers are possible) for what reasons?		
Q34	Have you had any training in IPTp-SP before? If yes, how many times in the last twelve months did you have training on IPTp-SP? Evidence? Why do you think so?		
Q35	Have you had any training in MIP before? If yes, how many times in the last twelve months did you have training on MIP? Evidence? Why do you think so?		
Q36	What are some of the challenges faced during IPTp service delivery at your facility?		

APPENDIX 2: POSTNATAL MOTHERS

CONSENT FORM

STUDY TITLE: Factors associated with uptake of intermittent preventive treatment of malaria in pregnancy with sulphadoxine-pyrimethamine at the district and community levels in the Ningo Prampram District of the Greater Accra Ghana**.**

PARTICIPANTS' STATEMENT

I acknowledge that I have read **OR** have had the purpose and contents of the Participants' Information Sheet read, and satisfactorily explained to me in a language I understand (Dangbe, English). I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Initials of Participant…….. ID Code ……..

Signature OR Thumb Print…… Contact Details ……

Date:…….

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet to the forenamed participant to the best of my ability in the (Dangbe, English) language to his proper understanding. All questions, appropriate clarifications sort by the participant and answers were also duly interpreted to his/her satisfaction.

Name of Interpreter…… Signature……

INVESTIGATOR STATEMENT

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name…….…….Signature……..…….

Date…….

QUESTIONNAIRE FOR POSTNATAL MOTHERS

Title of Project; Factors associated with uptake of intermittent preventive treatment of malaria in pregnancy with sulphadoxine-pyrimethamine at the district and community levels in the Ningo Prampram District of the Greater Accra Ghana

Form number; Date; Code of interviewer;				**Variable code**
	Sub-district		1. Afienya 2. Dawhenya 3. Prampram 4. Old ningo 5. Lekpongunor/ dawa 6. Nyigbenya	
	Health facility		1. Ayetepa CHPS Compound 2. Dawhenya CHPS Compound 3. Prampram polyclinic 4. Old ningo Health Center 5. Lekpongunor CHPS Compound 6. Nyigbenya CHPS Compound 7. Afienya CHPS Compound **8**. Dawa CHPS Compound	
	Health facility type		1. CHPS compound 2. Health centre 3. Polyclinic	
SECTION A; SOCIO-DEMOGRAPHIC CHARACTERISTICS				
Q1	Age at last birthday			**Q1AGE**
Q2	Place of residence			**Q2RES**
Q3	Marital status		1. Married [ ] 2. Divorced [ ] 3. Single [ ] 4. widowed [ ] 5.Cohabitation [ ]	**Q3MSTAT**
Q4	Level of education		1. No formal education [ ] 2. Primary [ ] 3. JHS [ ] 4. Secondary/ Vocational [ ] 5. Tertiary [ ]	**Q4EDUC**
Q5	How many children have you given birth to?			**Q5CHD**
Q6	What is your religion?		1. Christianity [ ] 2. Islam [ ] 3. Traditional [ ] 4.Other, specify…….	**Q6RELIG**
Q7	How long does it take from your home to reach this facility on foot (minutes)?		----------	**Q7DIST**
Q8	Occupation		1. Self-employed[ ] 2 employed[ ] 3. Not employed[ ]	**Q8OCU**
SECTION B; UPTAKE OF IPTp-SP				
Q9	Did you attend ANC during the recent pregnancy?		1.Yes [ ] 2.No [ ]	**Q9ANC**

Q10	Have you been given a medicine like this to swallow? Please show a sample of SP.		1.Yes [ ] 2.No [ ]	**Q10SAMP**
Q11	At what month of your pregnancy did you take the first dose of the medicine? **(Confirm from maternal records).**		1……months of pregnancy 2. N/A	**Q111DOSE**
Q12	Where did you take the medicine from?		1.under the midwife's observation (health facility) [ ] 2.took it at home [ ]	**Q12OBS**
Q13	Did you pay for the medicine?		1. Yes [ ] 2. No [ ]	**Q13PAY**
Q14	How many tablets did you swallow per visit?		1 One. [ ] 2.Two [ ] 3.Three [ ]	**Q14NUM**
Q15	How many times did you swallow this medicine for this pregnancy? **(confirm from records)**		1. One [ ] 2. Two [ ] 3. Three [ ] 4. Four [ ] 5. Five [ ] 6.Six[ ] 7.None [ ]	**Q15TIMES**
Q16	Did the nurse ask you to stop taking folic acid whiles taking it?		1.Yes [ ] 2.No [ ]	**Q16FO**
Q17	How did you get the water to take medicine?		1. Bought water [ ] 2. Fetched water from the tap [ ] 3. Had my water carried from home[ ] 4. Got water from the ANC [ ] 5. Other, specify……..	**Q17HOW**
Q18	Was there any occasion that you were told the medicine was not available?		1. Yes [ ] 2. No [ ]	**Q18OOS**
Q19	Were you given a prescription to go and buy		1. Yes [ ] 2. No [ ] 3. N/A[ ]	**Q19PRES**
Q20	Did you buy the prescribed SP?		1. Yes [ ] 2. No [ ] 3. N/A[ ]	**Q20BUY**
Q21	Did you take any drug(s) for malaria prevention during pregnancy?		1. Yes [ ] 2. No [ ] 3. I don't know	**Q21DRUG**
Q22	If yes, what drug did you take?		1.Sulphadoxine-pyrimethamine [ ] 2. ACT [ ] 3. I don't know[ ] 4. others, specify [ ]	**Q22WTD**
Q23	Where did you get the drug?		1. ANC clinic (health facility) [ ]	**Q23WHD**

			2. PHARMACY(outside health facility) [ ]	
SECTION C: CLIENT-LEVEL FACTORS				
Knowledge of IPT SP				
Q24	At what stage of your pregnancy did you first visit the ANC? **(confirm from maternal records).**		…….. Weeks	**Q24FST**
Q25	If above 16 weeks, why did you not attend ANC earlier?		1. No health insurance 2. financial issues 3. I did not know I had to come to the hospital at that time 4. I was not sick (i was feeling fine) 5. No reason 6. Cultural reason 7. other, specify	**Q25WYL**
Q26	Were you given education about this medicine?		1. Yes [ ] 2. No [ ]	**Q26EDM**
Q27	What was the medicine for?		1. Fever 2. De-worming 3. protect baby 4. prevent malaria 5. I do not remember/ know 6. other, specify 1.	**Q27IND**
Q28	When is a woman supposed to start IPT? (Month)		……months	**Q28SIPT**
Q29	How many times during pregnancy, does a woman have to swallow the tablets at the ANC in Ghana?		1. 1time [ ] 2. 2times [ ] 3. 3times [ ] 4. 4times [ ] 5. 5times [ ] 6. Don't know [ ]	**Q29SSS**
Q30	At what regular interval does the pregnant woman have to take the medicine at the ANC?		1. Weekly [ ] 2. Fortnightly (2 weekly) [ ] 3. Monthly [ ] 4. Quarterly[ ] 5. Don't know [ ]	**Q30RITV**
Q31	How many times during pregnancy does a woman have to attend ANC in Ghana			**Q31YOUANC**
Client practices				
Q32	How often did you attend ANC? **(Confirm from records)**		…… times during the pregnancy	**Q32ATDV**

Q33	How many times were you escorted by your partner for the ANC visits		……...	**Q33MALE**
Q34	Where did you get information about SP from?		1. media (TV /Radio) [ ] 2. friends [ ] 3. ANC (health facility) [ ] 4. outreach community health workers [ ] 5. I don't have any information[ ]	**Q34SOC**
Q35	Did you get any side effects with the drug?		1. Yes [ ] 2. No [ ]	**Q35DSE**
Q36	What side effect did you experience upon taking the drug?		1. 2.N/A[ ]	**Q36WSE**
Q37	Did it prevent you from taking other doses?		1. Yes [ ] 2. No [ ] 3. N/A[ ]	**Q37SEP**
Knowledge of MIP				
Q38	What is the cause of malaria?			**Q38CMAL**
Q39	What are the effects of malaria on the pregnant woman?		1. I do not know 2. anaemia 3. dehydration 4. death 5. eclampsia 6. others, specify	**Q39EPMAL**
Q40	What are the effects of malaria on the unborn baby?		1. I do not know 2. Stillbirths 3. low birth weight 4. miscarriage 5. Deformity of child 6. other, specify	**Q40EBMAL**
Q41	Did you get malaria during your pregnancy?		1. Yes [ ] 2. No [ ]	**Q41IFMAL**
Q42	How many times did you get malaria during pregnancy?			**Q42NUBML**
Q43	What ways can a pregnant woman prevent herself from getting malaria? **(multiple answers)**		1. Taking herbal preparations [ ] 2. Sleep under an insecticide-treated net [ ] 3. Use mosquito repellent [ ] 4. Wear protective clothing, especially at night [ ] 5. Don't know [ ] 6. Other, specify……..	**Q43PPML**

Patient-staff relationship					
Q44	Did the staff always greet you before starting the ANCs?		1. Yes [ ]	2. No [ ]	**Q44SGRT**
Q45	Have you ever been shouted at during any of your ANC visits?		1. Yes [ ]	2. No [ ]	**Q45SSHT**
Q46	Did you feel comfortable to ask the staff questions during your ANC visits?		1. Yes [ ]	2. No [ ]	**Q46ASKQ**
Q47	Were your questions answered to your satisfaction?		1. Yes [ ]	2. No [ ]	**Q47ANSQ**
Q48	Did the staff spend enough time attending to you during your ANC visits?		1. Yes [ ]	2. No [ ]	**Q48SPDT**
Q49	How would you rate the attitude of the ANC staff towards you?		1. very bad 2. bad 3. fair 4. good 5. very good		**Q49ATT**
Q50	Did the way you are treated encourage you to attend ANC?		1. Yes [ ]	2. No [ ]	**Q50ATDV**
Q51	Did the way you are treated encourage you to tell others (friends) to attend ANC?		1. Yes [ ]	2. No [ ]	**Q51RECMD**

APPENDIX 3: FACILITY CHECKLIST

Code number; Date:	Name of the facility; Sub-district;		variable code
Q1	Source of SP drug		**C1SOCD**
Q2	Frequency of SP ordering		**C2FRQO**
Q3	Frequency of issuing to ANC centre		**C3FRQANC**
Q4	The average number of days out of stock		**C4AOOS**
Q5	Storage condition of SP		**C5STRG**
Q6	Any challenges with the acquisition of SP		**C6CHAQ**
Q7	health care worker-patient ratio		**C7HPPR**

CHECK LIST FOR ANC UNIT OBSERVATION

Q8	Availability of IPTp national protocol	Yes [ ]	No [ ]	**C8AVPRTCL**
Q9	Availability of SP at ANC	Yes [ ]	No [ ]	**C9SPAV**
Q10	Availability IPTp staff training manual	Yes [ ]	No [ ]	**C10STRNG**
Q11	Presence of posters of IPTp/MIP on the wall	Yes [ ]	No [ ]	**C11PWAL**
Q12	Presence of ANC Monthly Data returns form	Yes [ ]	No [ ]	**C12MDATA**
Q13	Health education schedule for the quarter includes IPTp	Yes [ ]	No [ ]	**C13SCHIPT**
Q14	Health education schedule for the quarter includes MIP	Yes [ ]	No [ ]	**C14SCHMIP**
Q15	The health talk was given at ANC on the day of the visit	Yes [ ]	No [ ]	**C15DAYTK**
Q16	The practice of DOT observed	Yes [ ]	No [ ]	**C16DOT**
Q17	Availability of water for DOT	Yes [ ]]	No [	**C17WATDOT**
Q18	SP is recorded in clients book	Yes [ ]	No [ ]	**C18RECPB**
Q19	SP given is recorded in the ANC register	Yes [ ]	No [ ]	**C19RECREG**
Q20	Presence of Adverse Event forms for SP	Yes [ ]	No [ ]	**C20ADEF**
Q21	Use of 0.4 mcg folic acid at facility	Yes [ ]	No [ ]	**C21FA**
Q22	Presence of G6PD enzyme deficiency test at the facility	Yes [ ]	No [ ]	**C22G6PD**

APPENDIX 4: PHOTO GALLERY

BRANDS OF SP USED IN THE DIFFERENT DISTRICT FACILITIES

Figure 4: showing an image of the brand of SP found at Prampram polyclinic and Lekpongunor CHPS

Figure 5: showing an image of the brand of SP found at Dawhenya CHPS compound

Figure 6: showing an image of the brand of SP found at Old Ningo health centre

TYPES OF ANC REPORT BOOKS USED BY PREGNANT WOMEN

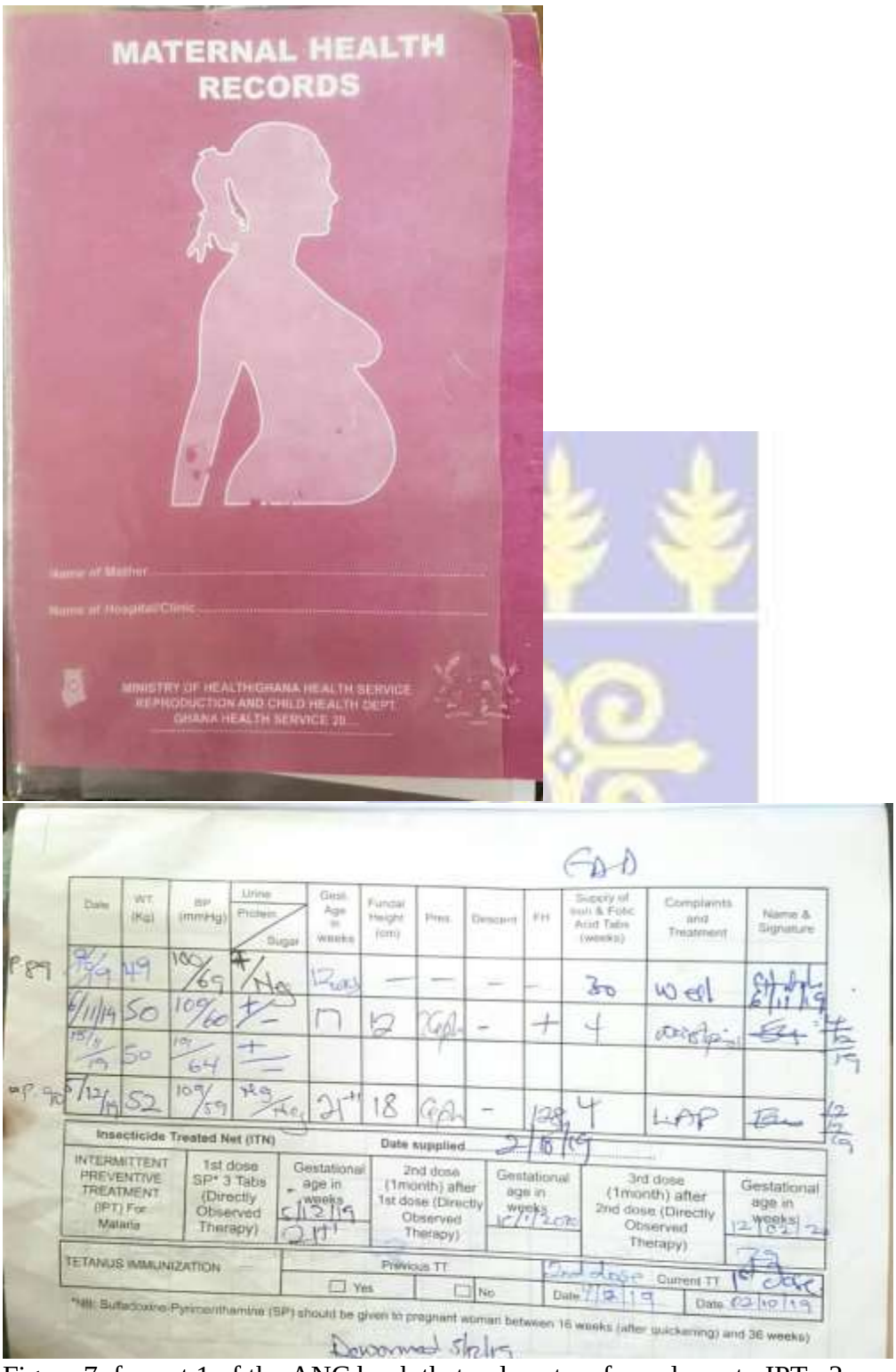

Figure 7: format 1 of the ANC book that only caters for only up to IPTp 3

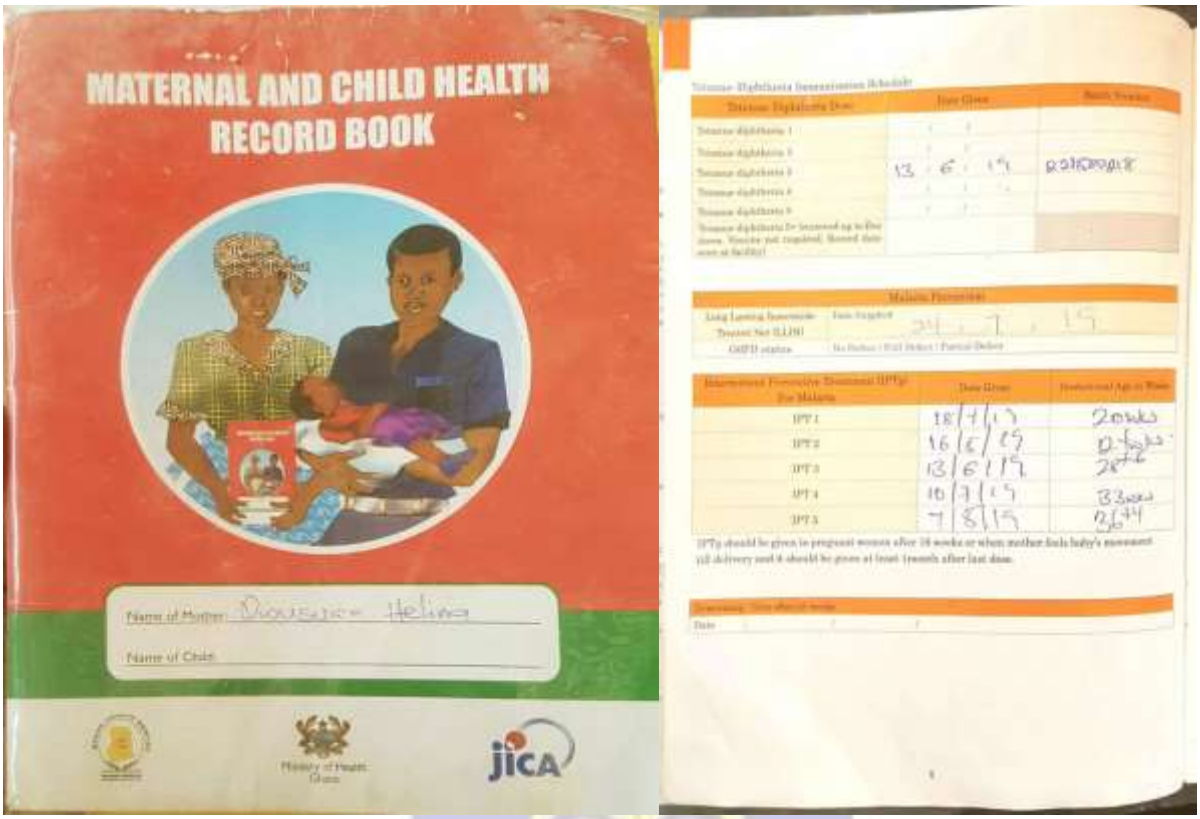

Figure 8: format 2 of ANC book that has an allowance of up to IPTp5

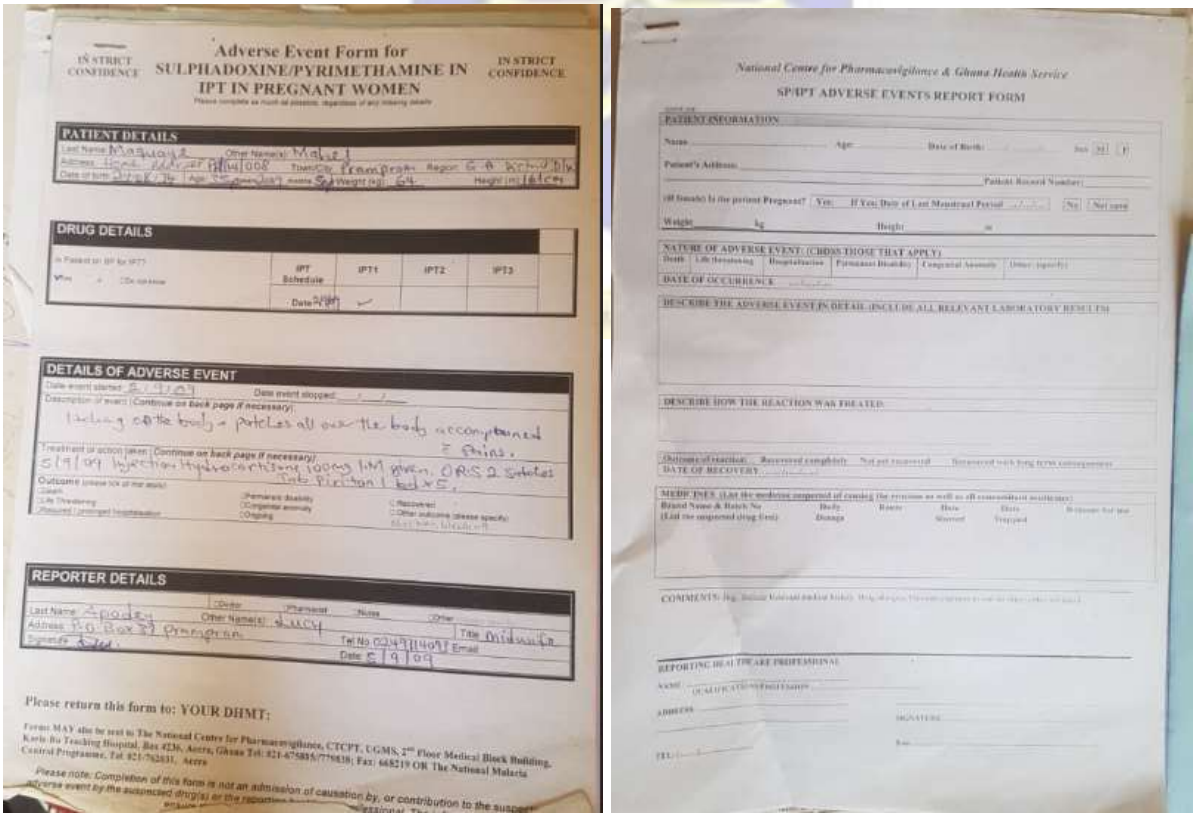

Figure 9: Images of SP adverse event report forms

APPENDIX 5: TABLE OF THEMES

Name	Description
SP dropout and what accounts for these dropouts	No IPTp uptake, IPTp1 to 4 uptakes, factors attributing to below IPTp5 uptake: drug-related, environment-related, individual factors.
Distance from home to facility and HCW service delivery	Distance does not Influence HCW service delivery. Influences HCW service delivery: either positively or negatively.
Malaria situation: MIP compared to malaria in other adults and factors contributing to the situation.	Malaria Risk profile, interventions to prevent MIP, adherence to interventions, health checkups
HCW knowledge MIP/ IPTP-SP	SP Dose, dosage, MIP effects on unborn baby, MIP effect on pregnant, contra-indications
SP relevance to this community	Perception of SP effectiveness, SP effectiveness in Ningo Prampram district.
Service delivery practices	DOTS, documentation of DOTs, SP stock status, source of drinking water
The challenges HCWS face in implementing the IPTp program	Human resource challenges, drug related challenges, policy and guidance challenges.

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

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MyRef. GHS/RDD/ERC/Admin/App/20/73
Your Ref. No.

12th February, 2020

Nashira Asiimwe
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.

GHS-ERC Number	**GHS-ERC029/12/19**
Project Title	Factors Associated with Uptake of Intermittent Preventive Treatment of Malaria in Pregnancy with Sulphadoxine-Pyrimethamine at the District and Community Levels in the Ningo Prampram District of the Greater Accra Ghana
Approval Date	12th February, 2020
Expiry Date	11th February, 2021
GHS-ERC Decision	**Approved**

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