SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES UNIVERSITY

OF GHANA

FACTORS INFLUENCING HEALTH WORKERS' ADHERENCE TO THE WHO INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA IN PREGNANCY RECOMMENDATION, NORTHERN REGION, GHANA

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY IN APPLIED EPIDEMIOLOGY AND DISEASE CONTROL DEGREE

DECEMBER, 2021

DECLARATION

I, ABDUL GAFARU MOHAMMED, declare that this thesis is my original work undertaken under supervision, except for duly referenced works. No form of this work has been presented elsewhere for another degree in this university or elsewhere.

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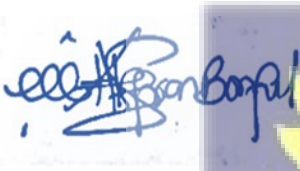

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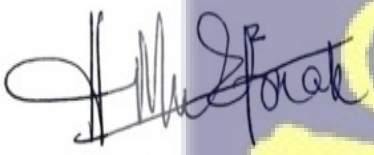

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Dr. Alexander Manu (Co-Supervisor)

ABSTRACT

Background: Although IPTp-SP is a lifesaving WHO recommended preventive intervention for pregnant women in malaria endemic regions, two-thirds of pregnant women do not receive the IPTp-SP doses during their visits to ANC units globally. Optimal health worker adherence to IPTp-SP recommended guidelines can reduce malaria cases, deaths and poor birth outcomes. Assessing the extent of adherence and its associated factors will generate useful pointers to be targeted at the program level. The study determined the factors influencing health workers adherence to the WHO IPTp-SP recommended guidelines in the Northern Region.

Methods: A cross-sectional study among 315 health workers in the Northern region was conducted. Data was collected on health workers adherence to the recommended practices through observation using a checklist. A semi-structured questionnaire was used to collect data on health workers' sociodemographic characteristics, facility-based factors and knowledge level. Facility observations were also conducted using a checklist. Crude and adjusted logistic regression were used at a 5% significance level to determine predictors of the health workers' adherence, adjusting for clustering.

Results: Of the 315 health workers studied, the median age was 29 years (26 – 34 years). Overall, 56.2% (CI 51.0 – 62.0) were adequately adhering to the recommended guidelines. Lower levels of adherence were recorded in health centers 15.6% (5.0 - 33.0) and CHPS compounds 21.2% (11.0 - 35.0). The factors associated with adherence included health workers' knowledge (aOR 7.31, 95%CI 3.00 – 17.83, p<0.001), job satisfaction (aOR 6.13, 95%CI 4.95 - 7.60, p<0.001), in-service training (aOR 7.01, 95%CI 2.40 - 20.43, p<0.001), supervision (aOR 5.62, 95%CI 3.10 - 10.20, p<0.001), availability of job aids (aOR 3.79, 95%CI 2.82 - 5.10, p<0.001), health workers

experience (aOR 3.01, 95%CI 1.97 – 4.58, p<0.001) and educational level attained (aOR 2.53, 95%CI 1.12 – 5.71, p<0.025).

Conclusion: Adherence to the recommended IPTp-SP guidelines is suboptimal in the region, with lower health facilities recording the least adherence levels. Health centers and CHPS facilities should be prioritized in the distribution of limited resources to improve health worker quality of care for antenatal care clients.

Keywords: Adherence, Health workers, IPTp-SP, Ghana, Northern Region, Ghana, Malaria

DEDICATION

Dedicated to my family and friends

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I am eternally grateful to my primary supervisor Dr. Harriet Affran Bonful for her overwhelming support and guidance in shaping this work and making it great. To my secondary supervisor, Dr. Alexander Manu, I say thank you for the guidance.

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LIST OF ABBREVIATIONS

ANC	Antenatal Care
ACT	Artemisinin Based Combination Treatment
ALU	Artemether Lumefantrine
CDC	Center for Disease Control and Prevention
CFR	Case Fatality Rate
CHMT	Council Health Management Teams
DOT	Direct Observation Therapy
GFELTP	Ghana Field Epidemiology and Laboratory Training Program
GHS	Ghana Health Service
GMAP	Global Malaria Action Plan
HCW	Health Care Workers
HF	Health Facilities
IFPMA	International Federation of Pharmaceutical Manufacturers & Association
IPTp	Intermittent Preventive Treatment of Malaria in Pregnancy
ITN	Insecticide Treated Mosquito Net
MIS	Malaria Indicator Survey
NMCP	National Malaria Control Program
OTSS	Onsite Training and Supportive Supervision
OPD	Outpatient Department
SP	Sulfadoxine Pyrimethamine
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

In 2018, there were an estimated 228 million malaria cases worldwide, with an estimated 405,000 malaria deaths. The WHO African Region is responsible for a disproportionately large amount of the worldwide malaria burden. In 2018, 93 per cent of malaria cases and 94 per cent of malaria deaths occurred in the region (Global Malaria Programme: WHO Global, 2019). In Ghana, malaria is a significant cause of illness and death, with the entire population of 29.77 million being at risk (WHO, 2019a). In 2018, malaria accounted for 34.5% of all out-patient illnesses and 21.8% of all hospital admissions (PMI, 2020). Ghana's northern region is characterized by highly seasonal malaria, with about 50-59% of clinical malaria cases occurring during four months (July-October). The Northern Region of Ghana recorded the highest above five malaria CFR of 21(0.67%) in 2017 (GHS, 2017).

Children, pregnant women, immunosuppressed, and the elderly are particularly at risk of a severe form of the disease (WHO, 2011). In moderate and high malaria transmission zones, pregnant women are three times more likely to develop a severe form of malaria than nonpregnant women (Sohail et al., 2015).

During pregnancy, malaria infection is a significant public health problem with severe consequences not only to the pregnant woman but also to her fetus and the neonate if not prevented or treated early (WHO, 2016). In 2018, an estimated 11 million pregnant women living in 38 countries with moderate-to-high transmission in sub-Saharan Africa were infected with malaria (29% of all pregnancies). The impact of malaria on the fetus's health can lead to preterm birth and low birth weight, which are significant contributors to neonatal and infant mortality. In 2018, an

estimated 872,000 children in 38 African countries were born with a low birth weight due to malaria in pregnancy (Global Malaria Programme: WHO Global, 2019). In Ghana, malaria in pregnancy accounts for 3.4% of deaths and 16.8% of all hospital admissions, and it is the singular highest contributor to all OPD admissions among pregnant women (NMCP, 2014; Owusu-Boateng & Anto, 2017)

The World Health Organization (WHO) recommends a package of measures to reduce the negative effects of malaria on pregnant women, foetuses, and newborns. Promotion and use of long-lasting insecticide-treated nets (ITN), administration of intermittent preventive treatment with sulphadoxine-pyrimethamine (IPTp-SP) during pregnancy, and appropriate case management through prompt and effective treatment of malarial infections are among these interventions (WHO Global Malaria Program, 2013). Intermittent Preventive Treatment of malaria in pregnancy with sulphadoxine-pyrimethamine (IPTp-SP) is a full therapeutic course of antimalarial treatment given to pregnant women during normal prenatal care appointments for malaria prevention (WHO, 2019b). IPT for malaria in pregnancy (IPTp) is founded on the idea that every pregnant woman living in a malaria-endemic area has malaria parasites in their blood or placenta, which might cause complications whether or not she shows symptoms of malaria (Gifty, 2010). IPTp-SP prevents maternal malaria episodes, maternal and foetal anaemia, placental parasitemia, low birth weight, and neonatal mortality (WHO, 2019b).

The WHO issued the first policy on the use of IPTp with SP in the year 2000. Starting in the second trimester, it was recommended to provide a minimum of two doses of SP to all pregnant women. The WHO modified its recommendations for IPTp-SP in 2012, requiring all pregnant women to get SP at each antenatal care (ANC) appointment until delivery. SP treatment should begin early in the second trimester, with doses spaced at least one month apart. Four ANC visits are

recommended, the first of which should be in the first trimester, and SP should be given during these visits (WHO Global Malaria Programme, 2013).

Ghana began employing the intermittent preventive therapy during pregnancy (IPTp) method with sulfadoxine and pyrimethamine (IPTp-SP) in 2003, together with insecticide-treated nets, to prevent malaria in pregnant women (Oppong et al., 2019). These preventive interventions were integrated into ANC visits, with IPTp-SP being given to women from the 16th week of pregnancy, at monthly intervals, as directly observed therapy (WHO Global Malaria Programme, 2013). Between 2013 and 2017, the National Malaria Control Program revised its policy to three or more IPTp-SP doses till delivery, following the WHO recommendations (Vandy et al., 2019).

Evidence suggests that the recommended three or more doses of IPTp-SP are associated with higher mean birth weights and fewer low birth weights than the two doses of IPTp-SP. At least three doses have also been associated with less placental malaria (Kayentao et al., 2013). The WHO IPTp policy of three or more doses infers that in areas of moderate-to-high malaria transmission, IPTp with SP be given to all pregnant women per the following protocols:

- IPTp-SP should preferably be given as directly observed treatment (DOT) in the form of three sulfadoxine/pyrimethamine tablets (each containing 500 mg/25 mg SP), a total of 1500 mg/75 mg SP.
- IPTp-SP should not be administered during the first trimester of pregnancy
- During the second trimester of pregnancy, the first IPTp-SP dose should be given as soon as possible.
- Throughout the pregnancy, at least three doses of IPTp-SP should be given at a month interval
- The final dose of IPTp-SP can be given up until the time of delivery without causing any problems

- SP can be taken on an empty stomach or with a meal.
- SP should not be administered to women receiving co-trimoxazole prophylaxis
- The World Health Organization advises a daily dose of 0.4 mg of folic acid, which can be safely used with SP. Folic acid at a daily dose of 5 mg or more should not be given with SP since it reduces its antimalarial effectiveness

Approximately two-thirds of pregnant women in Africa do not receive the recommended number of IPTp doses during their visits to antenatal care (ANC) facilities (Azizi, 2020). According to the WHO, although there may be several reasons for the slowing of efforts to scale up IPTp-SP in several countries in Africa, an essential factor is confusion among health workers about sulfadoxine-pyrimethamine administration for intermittent preventive treatment of malaria in pregnancy (WHO Global Malaria Programme, 2013).

Studies conducted in Ghana to assess health workers adherence to IPTp-SP guidelines focus particularly on individual tertiary health facilities or districts, with none assessing this problem at the regional level. These studies also adopt structured questionnaires or exit interviews with pregnant women to assess health workers adherence levels. These techniques might not reflect these health workers' actual practices due to the health workers' untruthfulness and the possibility of recall bias on these pregnant women's part (Amankwah & Anto, 2019; Ibrahim et al., 2017; Stephen et al., 2016).

1.2 Problem statement

According to the WHO, Antenatal Care (ANC) clinics serves as the entry points for the successful implementation of the Intermittent Preventive Treatment for malaria in pregnancy using Sulphadoxine Pyrimethamine (IPTp-SP), making the services rendered by these antenatal health workers optimal to the coverage of IPTp-SP (WHO Global Malaria Program, 2013).

Two-thirds of pregnant women do not take the required IPTp-SP doses during their visits to ANC units in Africa (Azizi, 2020). Data from cross-sectional surveys demonstrate that despite the availability of SP, eligible women accessing ANC services in the Volta and Northern regions of Ghana were not offered SP dose (De-gaulle & Kamgno, 2020; Stephen et al., 2016). Additionally, routine health facility data at the NMCP and other nationally representative surveys demonstrate a rise in uptake of IPTp-SP3 from 43.0% in 2017 to 48.2% in 2019 (NMCP, 2021). However, Ghana recorded a 4.0% decrease in the uptake of IPTp-SP3 from 48.2% in 2019 to 44.2% in 2020.

The Northern region also recorded a decline in uptake from 36.4% in 2019 to 27.2% in 2020 (NMCP, 2021).These national and regional uptake levels are far below the national target of 80.0% (PMI, 2020).

Health workers' inappropriate delivery of IPTp-SP services is a threat to reducing maternal malaria, maternal deaths, and poor birth outcomes. According to the WHO, an essential factor for the low uptake of IPTp-SP3 among pregnant women is confusion among health workers about the IPTp-SP recommendations (WHO Global Malaria Programme, 2013). In a national survey conducted in 2019, the commonly cited reasons for which 39.0% of pregnant did not receive the required dose during their most recent pregnancy were that they were not aware they had to take more (42%), and health workers did not give it to them (35%) (MIS, 2019).

Several considerations should be made to improve health workers' adherence to the WHO IPTp-SP recommendation. Some of the factors that can affect health workers' adherence include; regular in-service training, monitoring, supportive supervision, career development programs, providing logistics (water and cups for DOT practice, drugs, IPT manuals or leaflets). Other factors such as reducing staff workload and motivating staff are important (Amankwah & Anto, 2019; Arulogun & Okereke, 2012; Stephen et al., 2016).

Measuring health workers' adherence to the WHO IPTp-SP guidelines and the associated factors will enhance the early identification of areas that need the attention of policymakers and implementors. Researchers can create a composite adherence indicator using 7 binary questions items (Arulogun & Okereke, 2012). In an attempt to examine the problem of inappropriate delivery of IPTp-SP guidelines in Ghana, most of the studies considered less than the ideal number of question-items of the IPTp-SP guideline in assessing health workers adherence, potentially leading to an underestimation of adherence level and thus masking the actual burden (Amankwah & Anto, 2019; Stephen et al., 2016). Therefore, this study sought to generate data on health workers adherence considering all components of the IPTp-SP guideline and the factors associated with it in the Northern region.

1.3 Conceptual Framework

The framework presents possible factors influencing health workers' adherence to the WHO IPTp-SP recommendation in the Northern region. The framework outlines how these factors interrelate with each other to influence the adherence level of health workers. There are three broad factors that directly and indirectly influence the outcome (HCWs' level of adherence to the WHO IPTp-SP). These factors include sociodemographic characteristics, individual factors and facility-based factors.

The sociodemographic characteristics of the HCWs provide their features such as age, sex, level of education, length of practice and a professional cadre. These sociodemographic factors may, directly influence the level of HCWs' adherence. A health worker's professional cadre, level of education or work experience may influence their level of curiosity in their area of expertise. This will keep them informed of recent developments and increase their knowledge and awareness of the current IPTp recommendations. Knowing the current recommendation will increase their practice of it and hence their adherence. A midwife or staff nurse is most likely to be committed

to the course of IPTp and hence compliance with its recommendations compared to a general nurse or physician.

The facility-based factors directly influence adherence to the IPTp recommendations and indirectly through the individual based-factors. In-service training of health workers on revised IPTp-SP protocols is important to keep them well informed and technically equipped to deliver the recommended services. Knowledge of IPTp-SP treatment guidelines acquired by health workers through individual training or general training conducted by their health facilities is instrumental to their adherence level. An empty stomach and the unavailability of water and cups in some facilities have been reported as reasons for non-adherence to the DOT protocol of the IPTp recommendation (Diengou et al., 2020; Onoka, Onwujekwe, Hanson, & Uzochukwu, 2012). IPTp reading materials such as protocol manuals, leaflets or posters at the various wards the service is rendered are likely to increase the level of knowledge and adherence to the new recommendation. The constant availability of SP at the facility is another facility-based factor that influences health workers adherence to the recommendation. Monitoring of health workers IPTp-SP service delivery by superiors will influence health workers appropriate delivery of the services. Health workers who are constantly monitored by their superiors are more likely to adhere to the recommended practices than those who are not supervised.

Finally, the health worker's individual-based factors also directly influence their level of adherence to the IPTp recommendations. The awareness level and level of knowledge of the health worker are likely to affect their adherence level. A health worker with adequate knowledge of the recommendation is likely to go strictly by it and educate pregnant women on taking the required doses. The health worker's personal access to IPTp-SP training manuals and leaflets also influences their level of adherence. A staff who sources and read training materials on IPTp-SP administration

will be abreast with new developments in the area and will most likely adhere to the recommended guidelines compared to a staff who does not source and read these materials.

Health workers adherence to the WHO IPTp-SP guidelines influences the level of IPTp-SP uptake by pregnant women. Low compliance by these health workers leads to low uptake of IPTp-SP, increased placental malaria, anaemia in pregnancy, maternal deaths and poor birth outcomes. These health workers' high compliance rate increases the level of IPTp-SP uptake, improves maternal conditions and birth outcomes (**Figure 1.1**).

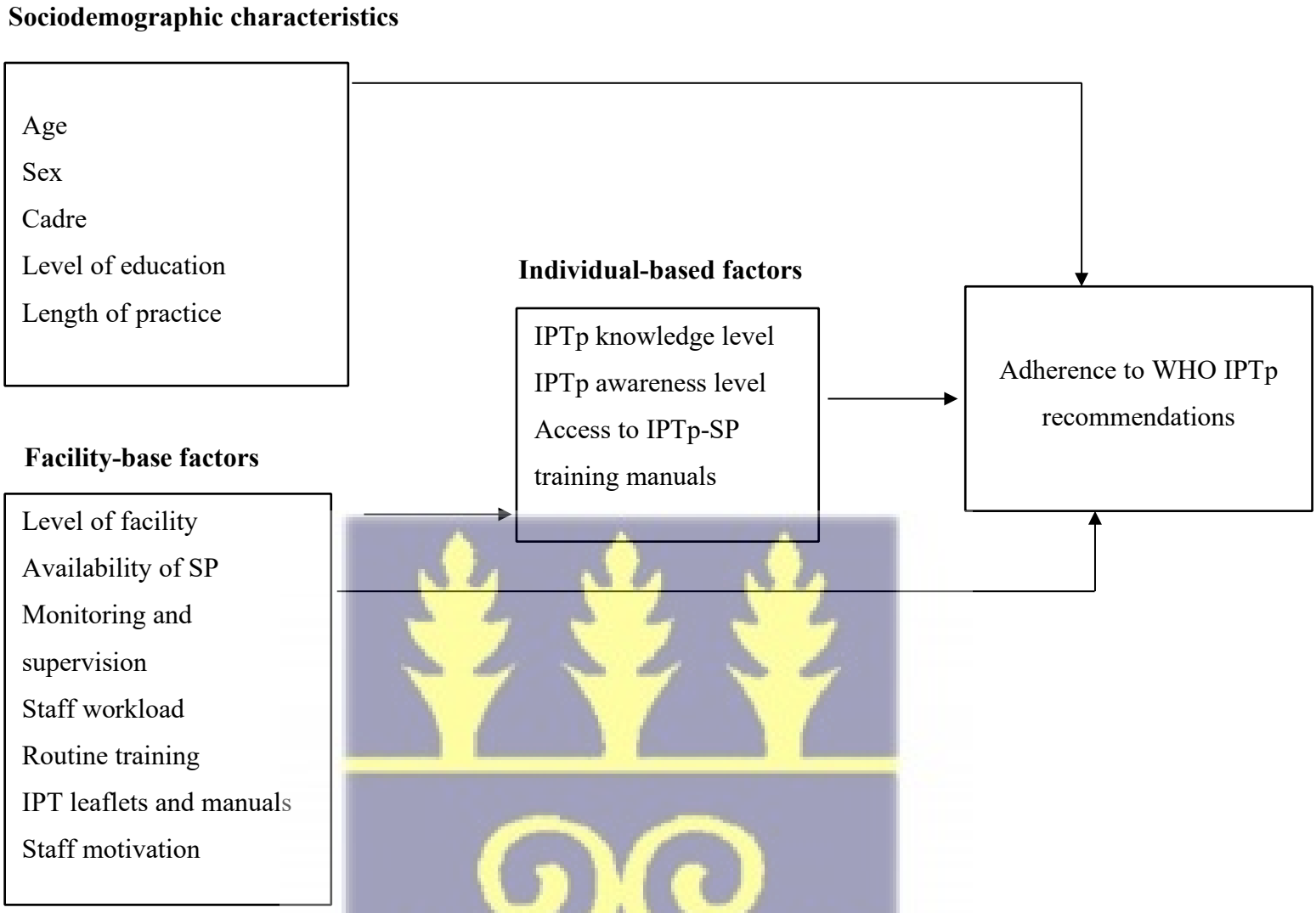


Figure 1.1: A conceptual framework of factors associated with current WHO IPTp-SP adherence levels among health workers, Northern Region, 2021

1.4 Significance of the study

In the Northern region of Ghana, studies conducted on health workers adherence to the IPTp-SP recommended guidelines by the WHO only focus on particular districts or health facilities.

This study explores the factors influencing health workers' adherence to the WHO IPTp-SP recommendation in Ghana's Northern Region. The study will contribute to the existing literature

on the supply-related factors implicated in the low uptake of higher IPTp-SP doses in the region and country and inform policymakers on measures to increase health workers' adherence to the WHO IPTp recommendations.

The findings of this study will inform the National Malaria Control Program and the Northern Regional health directorate to concentrate their efforts on improving health workers adherence to IPTp-SP protocols to encourage and increase uptake of IPTp-SP by pregnant women in the region.

1.5 Research questions

1. What is the level of health workers adherence to the WHO IPTp-SP guidelines in the Northern Region?
2. Which sociodemographic factors of the health worker influence their adherence to the WHO IPTp-SP guidelines
3. What facility-based factors influence health workers level of adherence to the WHO IPTp-SP guidelines in the Northern Region?
4. What individual-based factors influence health workers level of adherence to WHO IPTp-SP guidelines in the Northern Region?

1.6.0 Objectives

1.6.1 Main objective

The study assessed the factors associated with health workers' adherence to the current WHO IPTp-SP recommendation in the Northern Region of Ghana

1.6.2 Specific objectives

1. To determine the level of health workers' adherence to the WHO IPTp-SP guidelines in the Northern Region.

2. To identify the sociodemographic factors of the health worker that influence their adherence to the WHO IPTp-SP recommendation
3. To assess the association between facility-based factors and health workers' level of adherence to the WHO IPTp-SP in the Northern Region
4. To assess the association between individual-based factors on health workers' adherence to the WHO IPTp-SP in the Northern Region of Ghana

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Epidemiology and burden of malaria

Malaria is a life-threatening disease caused by plasmodium parasites and spread by the bite of an infected female *Anopheles* mosquito, which bites most often between dusk and dawn (CDC, 2020; Perez-Jorge, 2014). The *Plasmodium* parasite causes malaria, a single-celled parasite that multiplies in human red blood cells and mosquito intestines (Global Malaria Programme: WHO Global, 2019). When the infective female *Anopheles* mosquito bites its victim, it injects saliva that contains parasites (*sporozoite*) into the human blood. The parasites are then carried to the human liver cells. About 1 to 2 weeks later, the parasites are released into the blood, at which time the person starts showing symptoms of malaria (CDC, 2020). The parasites then attack red blood cells leading to haemoglobin breakdown and eventually causing anaemia in the infected individual (Spottiswoode, Duffy, & Drakesmith, 2014). Four different *Plasmodium* species cause human malaria: P. *falciparum*, P. *malariae*, P. *ovale* and P. *vivax* (CDC, 2017). The first two types are the most common in Africa. Plasmodium species are the most prevalent on the African continent and responsible for most malaria-related deaths globally. In 2018, it was responsible for 99.7% of all malaria cases in the WHO African Region (WHO, 2019a).

Malaria is a leading cause of sickness and death in Ghana, with children and pregnant women particularly vulnerable (NMCP, 2013). Pregnant women are three times more likely than nonpregnant women to get severe malaria in moderate and high malaria transmission zones. Malaria in pregnancy comes with many consequences not only to the mother but also to the fetus. Some of these consequences include; premature delivery, low birth weight, premature delivery, congenital infections and perinatal deaths.

With successive pregnancies, susceptibility decreases, and this trend is most pronounced in high transmission regions where women with their first pregnancies are substantially more at risk than multigravida to malaria (McLean, Ataide, Simpson, Beeson, & Fowkes, 2015).

To minimize the burden of malaria infection among all pregnant women, WHO AFRO advises a multi-pronged approach. Intermittent preventive treatment (IPT), insecticide-treated nets (ITN), and case management of malaria disease Insecticide-treated nets are used (ITN). Because mosquitoes bite at night when the pregnant woman sleeps, sleeping under an ITN is probably the most efficient approach for preventing mosquito bites. Mosquito bites are prevented with ITNs, which repel mosquitos or kill them if they land on the net. The Ghana Malaria Control Programme and the Reproductive and Child Health Unit, with the help of partners, have created guidelines/strategies for the implementation of IPT in response to the WHO proposal.

Symptoms, diagnoses and treatment of MIP

Malaria is characterized by variable clinical manifestations such as chills, headache, fever, muscle aching and weakness, vomiting, cough, diarrhea, and abdominal pain, usually about 12 to 14 days after infection. Children, pregnant women, immunosuppressed, and the elderly are particularly at risk of a severe form of the disease (WHO, 2011). In Ghana, malaria in pregnancy is diagnosed through microscopy or Rapid Diagnostic Test (RDT).

Drug Policy for Malaria in Pregnancy in Ghana

Ghana introduced a new anti-malaria drug strategy in 2002, focused on artemisinin-based combination therapy. It was meant to substitute chloroquine and quinine as monotherapy (World Health Organization, 2008). The management of malaria in pregnancy is as follows:

Uncomplicated malaria in pregnancy:

First Trimester

- A combination of oral Quinine with Clindamycin, OR

- Oral Quinine
- When Quinine is unavailable, or compliance to Quinine cannot be guaranteed, Artesunate-Amodiaquine or Artemether Lumefantrine can be utilized

Second and Third Trimester

- Artesunate-Amodiaquine
- Artemether-Lumefantrine

Different approaches are adopted for the different trimesters of the pregnancy in managing severe or complicated malaria cases in pregnancy. According to the Malaria Treatment Guideline in Ghana, the risk of hypoglycemia is lower in the first trimester, and there are more concerns about the safety of Artemisinin derivatives. When these concerns are weighed against the evidence that Artesunate lowers the risk of death from severe/complicated malaria, both Artesunate and quinine may be regarded as choices until more information becomes available. If only one of the medications Artesunate, Artemether, or quinine is available, treatment should begin as soon as possible. Parenteral Artesunate is preferable over quinine in the second and third trimesters because quinine is linked to recurrent hypoglycemia. The following is a treatment plan to follow:

Artesunate 2.4 mg/kg body weight given intravenously (IV) on admission (time =0), then every 12 hours, 24 hours, and 48 hours. A maximum of seven days must be spent in total.

2.2.0 Policies of Malaria Prevention in Pregnancy

2.2.1 The Roll Back Malaria (RBM) Partnership

In 1998, the WHO launched the Roll Black Malaria partnership programme for the control of malaria. This malaria control program's strength lies in its ability to form effective global and national partnerships, where partners work together to scale up malaria control efforts at the

country level. The United Nations Children's Fund (UNICEF), the World Bank, and the United Nations Development Program are among the program's key partners (UNDP) (Nabarro, 1999). In supporting countries to achieve the objectives or aims of the program, the RBM partnership developed the Global Malaria Action Program

RBM's overall strategy aims to reduce malaria morbidity and mortality by reaching universal coverage and strengthening health systems (RBM, 2008). The partnership aims to:

- Scale-up malaria prevention and treatment in endemic countries
- Mobilize resources to increase donor funding for malaria
- Increase public awareness about malaria through advocacy

After an extensive consultation process, the Global Malaria Action Plan (GMAP) was developed by the Roll Back Malaria (RBM) Partnership. The GMAP provides a global framework for action, around which partners can coordinate their efforts. Thirty endemic nations and areas, 65 international organizations, and 250 experts from various fields came together as part of an intensive consultative process to bring their collective contributions.

The GMAP gives a detailed picture of the global malaria situation,

(i) an evidence-based strategy for providing effective prevention and treatment to all those at risk

(ii) a forecast of the annual funding needed to achieve the RBM Partnership's objectives in 2010, 2015, and beyond. The GMAP is a live document that will change as malaria techniques and tools advance.

Ghana joined the RBM project in 1999 and created a strategic framework to guide its implementation (RBM, 2008).

Overall, the Ghana RBM stresses strengthening health systems and making care and prevention measures more widely accessible through multi- and inter-sectoral collaborations. By 2010, the

goal was to cut malaria's actual morbidity and mortality by half. Four main methods were followed to accomplish the objective. These were to:

- Encourage the use of treated bed nets, chemoprophylaxis during pregnancy, and environmental management, among other things.
- An improve malaria case management at all levels
- Promote evidence-based research to develop effective solutions. and
- Improve collaboration with all partners at all levels.

2.2.2 Abuja Declaration

The African Summit adopted the Abuja Declaration in April 2000. Regional leaders committed themselves to ensure that 60% of pregnant women in malaria-endemic areas had access to successful malaria prevention and care (WHO, 2014).

With 43 countries reducing malaria cases/deaths by 50 per cent (IFPMA, 2019), this program has decreased global malaria deaths by an estimated 38 per cent. The RBM Partnership Board set and accepted a goal in 2011 to attain universal access and preventive actions. In terms of ITNs, every person at risk has one and sleeps under it or in an IRS-protected location. In endemic areas, universal access to ITNs and IPTp are effective tools for scaling up malaria prevention and treatment.

2.2.4 Drug Policy for Malaria Control in Ghana

Every malaria-endemic country should have a medical policy in place to combat the disease. This will ensure that the population at risk has access to safe, high-quality, and inexpensive medicines (World Health Organization, 2008).

In 1998, Ghana dedicated itself to the World Health Organization (WHO) Roll Back Malaria (RBM) Initiative, which builds on the Global Malaria Strategy, emphasizing Africa and halving

the global malaria burden by 2010. It is also committed to the Abuja Declaration on the roll-back of malaria in Africa, aiming to achieve concrete goals for the prevention and control of malaria. Despite these efforts, malaria remains hyper-endemic in Ghana and is the leading cause of death and morbidity, particularly among children under the age of five and pregnant women.

In this regard, Ghana began employing ACTs in 2002, in accordance with WHO recommendations for all countries suffering monotherapy resistance in the treatment of falciparum malaria. The drug artesunate-amodiaquine was chosen as the first-line treatment for uncomplicated malaria. Adverse drug reactions, a lack of alternative therapeutic options, and safety concerns plagued the rollout process. As a result, it's become appropriate to review the drug policy and address all of the issues that have been raised.

Artemether Lumefantrine and Dihydroartemisinin/Piperaquine were chosen as two other ACTs. Nonetheless, for the treatment of uncomplicated malaria, artesunate-amodiaquine remains the preferred ACT. One of the key tactics for controlling malaria in the country has been and continues to be case management. Treatment is usually prophylactic, with cases of fever being treated as malaria with the approved anti-malaria medicine.

Ghana revised its anti-malaria drug strategy in 2004, choosing the combination of Artesunate Amodiaquine as the first-line drug to control uncomplicated malaria. Oral quinine or a combination of Artemether-Lumefantrine or Artesunate Amodiaquine can be used. In the case of malaria, pregnant women with HIV and sickle cell anemia are treated as described above.

2.3 Intermittent Preventive Treatment (IPT) for Malaria in Pregnancy

Intermittent malaria preventative treatment during pregnancy is a systematic clinical course of antimalarial drugs given to pregnant women during normal pregnancy, whether or not they are infected with malaria. Maternal malaria, maternal and fetal anemia, placental parasitemia, low birth weight, and neonatal mortality are all reduced by IPTp (WHO, 2019).

The WHO recommends three or more doses of IPTp for all pregnant women living in areas of Africa with moderate to high malaria transmission. Preventive therapy should begin at the second trimester and continue at monthly intervals until the baby is born. IPTp has been found to reduce anemia and low birth weight, which are significant causes of infant death.

As of October 2012, the WHO recommends that women be given at least three SP doses during pregnancy, at least one month apart for each dose (WHO Global Malaria Program, 2013).

Sulphadoxine-Pyrimethamine (SP) is the medication chosen to be used for IPTp in Ghana. SP is a single dose antimalarial drug that effectively prevents malaria in pregnancy and reduces malaria infection effects in mothers and infants. IPTp with SP lowers placental malaria infection, low birth weight in neonates, and severe maternal anemia, according to various trial. IPTp has been included in prenatal care kits for the past decade. Sulphadoxine-Pyrimethamine (500 mg Sulphadoxine + 25 mg Pyrimethamine) should be given under the observation of a certified health care professional - "Directly Observed Therapy" (DOT) (NMCP, 2014). Despite the careful adoption and implementation of these guidelines and the established significance of IPTp-SP, the level of uptake remains low. In a study by Yaya, Uthman, Amouzou, & Bishwajit, (2018), about 29.5% of pregnant women from malaria-endemic sub-Saharan countries received at least three doses of IPTp-SP. According to the 2019 Demographic Health Survey, about 61.0% of pregnant women in Ghana received three or more SP doses in their recent pregnancy. The level of uptake in the northern region of Ghana was 64.5%.

2.4 Effectiveness of IPTp-SP in Reducing Malaria Burden

The impact of intermittent malaria prevention in pregnancy with SP on enhancing pregnant women's health and delivery outcomes has been confirmed by various researchers worldwide.

The IPTp-SP has been reported to reduce malaria morbidity and mortality among infants, children and pregnant women (Gosling, Cairns, Chico, & Chandramohan, 2010). In a study by Anto (2019),

the uptake of three or more SP doses was found to have contributed to improved pregnancy outcomes (Anto, Agongo, Asoala, Awini, & Oduro, 2019).

Non-adherence was found to substantially impact maternal anemia in a Benin study (21.50 per cent of non-compliant women developed anemia compared to 9.25 per cent of complying women, p0.05). In addition, a significant link was discovered between low birth weight and noncompliance with IPTp-SP, with rates of 21.77 per cent and 7.51 per cent in non-compliant and compliant women, respectively (MV et al., 2016).

In a Ghanaian trial, people who got at least three doses of IPTp-SP had a decreased risk of P. falciparum infections detected by qPCR than those who had received one or two doses (Quakyi et al., 2019).

Malaria greatly impacts fetal health when it infects the mother during the second trimester of pregnancy. Low birth weight (LBW) is caused by malaria infection in the placenta and maternal anemia, which leads to more significant perinatal mortality and poor child growth. Maternal malaria, malaria-related maternal anemia, and poor birth outcomes have all been linked to IPTp-SP (Deloron, Bertin, Briand, Massougbodji, & Cot, 2010; Isah DA, 2017; Manore et al., 2019).

2.5 Health Workers Compliance with IPTp-SP Treatment Guidelines by the WHO

Health care workers in the area of obstetric care are the primary providers of IPTp in our health care settings. The adherence or compliance of these health workers to the recommended dose regimen and treatment guidelines influence their level of uptake of IPTp-SP among pregnant women in our community. Studies have reported low compliance or adherence levels of health care workers to the WHO recommended treatment guidelines across Africa. A study conducted in South Western Nigeria by Arulogun & Okereke (2012) reported low adherence levels of health workers to recommended IPTp practices, particularly the directly observed practice. However, this

study did not assess the factors influencing health workers' adherence to the treatment guidelines but concluded on health workers' level of knowledge as the only influencing factor. The study also concluded on the level of health workers compliance based on exit interviews with pregnant women attended by the health workers. The possibility of recall bias could have influenced their results since the researchers did not directly observe the practice. In a study conducted in Tema Metropolis by Amankwah & Anto (2019), through an in-depth interview, about 29% of pregnant women confirmed that they have ever been allowed by the midwives to take SP home. This study did not exploit the possible reasons these women were allowed to take the drug home. These reasons could inform the efforts of the health workers' efforts in adherence to the treatment guidelines. Poor adherence to the directly observed therapy protocol of IPTp administration among health workers is associated with the low knowledge of IPTp policies among the health workers (Anto et al., 2019).

2.6 Methods for Assessing Health workers level of compliance

Researchers have used several methods to assess health workers compliance or IPTp practices in the past. These methods include focus group discussions with antenatal care staff, surveys involving interviews with staff or recipients of ANC services, overt and covert observation of health workers practices.

Surveys

Interviews with health workers using a semi-structured questionnaire can be used as a technique to assess their level of adherence. Health workers' actual practices might not necessarily be the same as what they will be reported, making this technique unsuitable for assessing their actual practices (Stephen et al., 2016).

Another approach is to combine health workers interviews with exit interviews with pregnant women. These health workers practices might not be what will be reported by them and the

pregnant women making this technique unsuitable for assessing these health workers' actual IPTp practices (Arulogun & Okereke, 2012).

Observations

Observation of health workers practice using a checklist is another technique used to assess their compliance with the updated guidelines. This technique presents the opportunity to observe firsthand what is practised and suitable for assessing the health workers' actual practices (Ibrahim et al., 2017). In assessing health workers level of practice of IPTp, we observed their actual practices using a checklist as they went by their activities.

2.7.0 Factors influencing health workers level of adherence to IPTp-SP treatment guidelines

To ensure health workers adherence to WHO IPTp-SP recommendations or treatment guidelines, factors that affect the compliance should be identified. Facility-based factors and Health worker-based factors are known to positively or negatively affect the level of their adherence. Various studies sought to assess the factors that significantly affect adherence to the recommendation and help inform policy change.

2.7.1 Sociodemographic factors

The cadre of the ANC health care worker has been found to influence their knowledge level and adherence to recommended IPTp-SP practices. In a study conducted in the southwestern part of Nigeria by Oluwasomidoyin, Bello, & Oni, (2020), more doctors were aware. They had correct knowledge of the current WHO IPTp-SP guidelines compared to nurses/midwives. However, in a study in the Volta region of Ghana, no relationship existed between job cadre and appropriate delivery of IPTp-SP (De-gaulle & Kamgno, 2020).

The health workers length of practice also influences their adherence to the IPTp-SP recommended guidelines by the WHO. In a study conducted by De-gaulle & Kamgno, (2020) in the Volta region of Ghana, antenatal health workers with one to five years of working experience had 3.6 times

odds of appropriate delivery of IPTp-SP compared to those with less than a year of working experience (aOR 3.57, 95%CI=1.564-8.145). The finding is, however, different in a similar study conducted in South-Western Nigeria, when compared to those who had practiced for five years or more, the majority of health workers who had provided prenatal obstetric care for less than five years were aware and had a correct understanding of the current WHO IPTp-SP recommendations (p=0.012) (Oluwasomidoyin et al., 2020).

2.7.2 Individual-based factors

2.7.2.1 Health Worker Awareness and Knowledge Level

The level of knowledge of the health worker on the IPTp-SP WHO treatment guidelines has been reported by different studies to be positively associated with their level of adherence to the recommendation. Health workers with adequate knowledge of the recommendations have been found to have an increased adherence level compared to health workers who are not aware of the recommendations. Adherence to the recommended guidelines will inevitably be low if health workers lack knowledge of the guidelines (Onikeh & Vandy, 2018).

In a study conducted in Cameroon among 39 health care workers on knowledge of the timing of IPTp, 71.8% of them knew when to start administering IPTP to the pregnant woman, whiles 28.2% did not know when to start administering the drug. Also, 41.0% did not know precisely when to stop IPTp (Diengou et al., 2020).

In a survey of 108 health workers in Nigeria who claimed to know what the policy on intermittent preventive treatment of malaria in pregnancy says, 15.7 per cent said the first dose should be given in the second trimester, 21.3 per cent said Sulphadoxine Pyrimethamine should be given to pregnant women after quickening, and 26.9% said the drug should be given to pregnant women

under direct observation. In contrast, 3.1 per cent said malaria should be treated regularly (Arulogun & Okereke, 2012).

According to research conducted in Ghana, only 47.8% of health professionals fully understood the IPT policy. Furthermore, per the survey, only 49.3 per cent of midwives and frontline nurses could demonstrate complete competence of the national guidelines. This is surprising because these healthcare professionals are critical in promoting IPT among pregnant women (Smith Paintain et al., 2011).

A survey in Nigeria found that 62.2 per cent of health personnel were aware of the current WHO IPTp recommendation. Only 39.1 per cent of them, on the other hand, knew how to administer it properly. Most health workers (72.2 per cent) who were aware of the current WHO IPTp-SP recommendation prescribed it (Oluwasomidoyin et al., 2020). This study was conducted in only Secondary and Tertiary hospitals. There could have been some bias in generalizing these findings since these hospitals have a more robust information dissemination system and are more resourceful than the primary health centers.

Similarly, according to a survey, 90.9 percent of ANC workers in Ghana grasped the precise terminology of IPTp. The indicated medication, dose, and interval for IPTp were all known to all respondents (100.0%). Only 45.5 percent of people knew when to start IPTp, and 81.8 percent knew when it was not recommended during pregnancy (Vandy et al., 2019).

In a Nigerian study, only 51 (32.5%) of 157 health workers who attempted to define IPTp correctly stated it was a preventive treatment for malaria in pregnancy. In addition, 75.5 percent properly identified Sulphadoxine Pyrimethamine as the approved antimalarial medicine, 78.0 percent correctly identified the gestational age for the first dose of IPTp as the second trimester, and 63.9 percent health workers correctly stated the correct number of doses. (Arulogun & Okereke, 2012).

A comparable survey of 34 health workers found that 94.1 percent were aware of the national

policy on IPTp. The majority of study participants recognized which medication to use for IPTp and that women should take two or three doses. Only a handful of them were aware that the drug should be given throughout the second and third trimesters and that it should be given under the supervision of a health professional. Only 14.7 percent of all providers met the four criteria for measuring their knowledge of the IPTp recommendations (Onoka, Onwujekwe, Hanson, & Uzochukwu, 2012).

2.7.3 Facility-based factors

2.7.3.1 Type of health facility

The type of health facility is another factor that has been found to influence healthcare workers' adherence to the recommended IPTp practices by the WHO. In a study conducted by De-gaulle & Kamgno (2020) in Ghana, regarding the type of health facility, the faith-based hospital, the health centres and CHPS compounds had reduced odds of appropriate delivery of IPTp-SP services compared to the district hospitals.

2.7.3.2 Staff Workload

The number of pregnant women attended by a health worker in a day has also influenced these health workers' adherence level to the treatment guidelines or recommendations. In a survey by Onoka et al. (2012) in Nigeria on the influence of provider factor in the sub-optimal uptake and delivery of IPTp-SP, the public health facilities had more clients per skilled birth attendant per day than the private health facilities. The nurse-client ratio could have influenced the level of practice of the protocols. However, the study did not explore the relationship between compliance and the

staff's workload. The authors only reported a verbal assertion by the staff on the lack of correlation between the two factors.

2.7.3.3 Staff Monitoring and Supervision

In the same study, healthcare practitioners agreed that senior health officials from within and outside the facility supervised ANC activities on a relatively infrequent basis, focusing primarily on cross-checking facility registers for the number of women enrolled in antenatal care, as well as the number and outcome of deliveries, rather than the content and process of most ANC interventions, including IPTp.

According to a study conducted in Uganda, health personnel followed outdated standards rather than the new WHO policy proposal. The lack of supervision and training was assumed to be the cause of health workers' lack of understanding and uncertainty about SP's efficacy and safety and the new IPTp standards. In addition, there was a lack of IPTp recording and reporting, which hampered the process of increasing the ability to increase IPTp adherence (Rassi et al., 2016). However, in a study conducted by Maheu-Giroux & Castro, (2014), health care staff supervised during the six months prior to the study were not more likely to deliver IPTp during a consultation than those who were not supervised.

2.7.3.4 Staff Motivation

On the influence of staff motivation on staff adherence to IPTp-SP recommendations, studies have indicated that the positively motivated staff tend to adhere to the recommended protocols compared to staff who are uncomfortable with their working environment.

In a study conducted by Mubyazi et al., (2012) in Tanzania to assess supply related drivers of staffs providing IPTp services, respondents in both districts affirmed IPTp as a critical intervention. Still, they were dissatisfied with their professional conditions, which included understaffing in health

facilities units, unsystematic and unfriendly supervision, limited opportunities for career development, and poor infrastructure and staff housing.

2.7.3.5 Training

Regular in-service training of health workers is necessary to keep them informed and technically equipped to conduct ANC services. It encourages HCWs to follow required IPT guidelines and develop a favorable attitude toward pregnant women who come to the ANC for IPTp-SP services (Stephen et al., 2016).

In a recent study by the WHO, it was reported that the drop in efforts to scale up IPTp-SP is also due to health personnel who do not know how to administer SP for IPTp. It is believed that healthcare workers' training and message on IPTp improves IPTp coverage (WHO, 2017).

In a case-control study conducted in Zaria Nigeria, health workers' training on IPTp-SP protocols was positively related to the excellent practice of IPTp-SP. About 2.4 percent of the health workers in the case group and 1.76 percent in the control group could be classified as having good practice with a score greater 6 at baseline. There was a significant improvement in good practice of the IPTp in the case group after the training intervention, from four clients (2.4 percent) at baseline to 88 (51.8 percent) post-intervention (Oyefabi, Sambo, & Sabitu, 2015). In their study among five African countries, Maheu-Giroux & Castro (2014), in their research among five African countries suggested that annual training of ANC health staff on IPTp guidelines would have the most significant impact on IPTp delivery with an estimated 13.9% increase. In the same study, the availability of IPTp guidelines or protocols at the health facilities studied was associated with an increase in the delivery of IPTp services (RR = 1.12; 95% CI: 1.01-1.24).

2.7.3.6 Absence of Water and Cups for the Practice of DOT

According to the WHO's updated recommended IPTp guidelines, a pregnant woman must ingest SP at a prenatal care clinic under the direct supervision of a certified healthcare provider. The absence of potable drinking water and disposable cups at the various health facilities has been reported by multiple studies to influence health workers adherence to the DOT practice component of the WHO IPTp-SP recommendations.

The water quality and hygiene of the cups supplied at the ANC clinics were cited as reasons for enabling pregnant women to take the medicine SP at home. It was discovered that 61.1 percent of pregnant women in rural south-west Nigerian ANC clinics would refuse to take their medications if they were allowed to carry personal cups (Akinleye, Falade, & Ajayi, 2009). In a Nigerian research, 64.7 percent of health care professionals said that women were given the medicine to take home because they complained of empty stomachs. (Onoka et al., 2012).

In a Cameroonian study of 381 women who used IPTp-SP, 254 (66.7 percent) took the medicine in front of the health professional, while 127 (33.3 per cent) did not (Diengou et al., 2020). In a similar study conducted in Nigeria among 209 women, about 14.3% took the drug in the health provider's presence, whiles the remaining had to go home with the drug (Akinleye et al., 2009).

2.7.3.7 Drug Stockouts

A health worker will inevitably not adhere to the recommended practices' DOT component if the drug to be administered is not available. A shortage of SP has hampered IPTp-SP rollout in Ghana. Throughout the first half of 2016, Ghana's stock of SP was depleted across the country. This had a big impact on IPTp adoption across the country (GHS, 2016). Health care providers usually write prescriptions in stockout situations for pregnant women, but they have no way of knowing if the women completed the prescription or took the medication correctly.

In a study of 330 reproductive-age women in central Tanzania, it was observed that 96 per cent of health providers interviewed reported stock out of SP for one to twelve months in the year prior to the study. 90% of the facilities reported stock out, leaving ANC personnel with little choice but to halt IPTp treatments at ANC clinics, issue a prescription for purchase outside the facilities, and ask clients to return for their next visit (Rassi et al., 2016).

In another study conducted by Stephen et al. (2016), SP was unavailable at the RCH during the entire study period, making it impossible to observe DOT.

2.8 Summary of Literature Review

Previous studies conducted to assess health workers' compliance level to the recommended IPTp-SP guidelines by the WHO in Ghana have established a low compliance level of health workers to the IPTp recommended guidelines. However, these studies primarily focused on a single recommended guideline component to determine the health worker's practice level. This component is the DOT practice. Health workers who adhere to the DOT protocol are reported to have high compliance levels. Meanwhile, the WHO IPTp recommended guidelines go beyond just the practice of DOT. Other components should be considered to make a complete reportage on the health workers compliance levels. Also, these studies have established the association between factors such as the knowledge level of health workers, the availability of SP and the presence of potable water and cups with the compliance level of these health workers. However, the factors considered are but a few of the various factors that influence these health workers adherence levels (Al-Hajeili et al., 2019; Amankwah & Anto, 2019; Stephen et al., 2016; Vandy et al., 2019).

This study considered all the components of the recommended IPTp guidelines in determining health workers level of compliance. The influence of other factors such as job training, supervision and monitoring, staff workload, staff motivation, and sociodemographic characteristics were also explored.

The comprehensive performance of health workers in terms of each component was established in this study. This study adds to existing knowledge the influence of other factors on health workers' adherence to the IPTp protocols. The study gives policymakers a comprehensive idea of the health workers adherence to the IPTp-SP recommended guidelines and measures to improve their adherence.

CHAPTER THREE

3.0 METHODS

3.1 Study design

This is a cross-sectional study conducted in the Northern Region of Ghana. Health workers in the obstetric and antenatal clinic departments of 16 randomly sampled health facilities in the Northern Region who consented to the study were interviewed from April to July 2021. The adherence of these health workers to the WHO IPTp-SP recommendation and the factors associated with it were assessed using a semi-structured questionnaire, a health worker observational checklist and a health facility observational checklist. Both descriptive and inferential analyses were used to examine the nature and association between the study variables.

3.2 Study location

Ghana's Northern Region is one of the country's sixteen regions. The region, which covers an area of 70,384 square kilometers, is Ghana's largest in terms of landmass. It took up 31% of Ghana's land before the Savanna and North East Regions were established in December 2018. There are 16 districts in the Northern Region. Tamale is the region's capital. The population of the region is 1,905,628 people (GSS, 2020).

The ground is mainly level, except for the Gambaga escarpment and the western corridor in the northeastern part. The region is drained by the Black and White Volta Rivers and their tributaries like the Nasia and Daka rivers. The region's climate is dry, with only one rainy season extending from May to October. The annual rainfall varies between 750 and 1,050 millimetres. The dry season lasts from November to March/April, with the hottest months being March/April and the coldest months being December and January. The harmattan winds, which blow from December to early February, have a big influence on the temperature in the area. Because of the low humidity,

the effects of the afternoon heat are exacerbated. The annual temperature range is between 25 and 30 °C, which appears to be favourable for *Anopheles* larval development. The Northern region of Ghana has 308 registered health facilities, with all these facilities offering antenatal care services. The region has an estimated 3,346 registered community health nurses, enrolled nurses, professional nurses and midwives. Sulphadoxine Pyrimethamine for IPTp administration is procured by each health facility offering antenatal care services from the Northern Regional medical stores monthly and as and when they run short of supplies. Health centers at the district level depend on the district medical stores for the procurement of these supplies.

According to the 2019 Malaria Indicator Survey, 64.5% of pregnant women in the region received three or more doses of IPTp-SP between 2017 - 2019, although 91.8% ANC attendance was recorded (MIS, 2019).

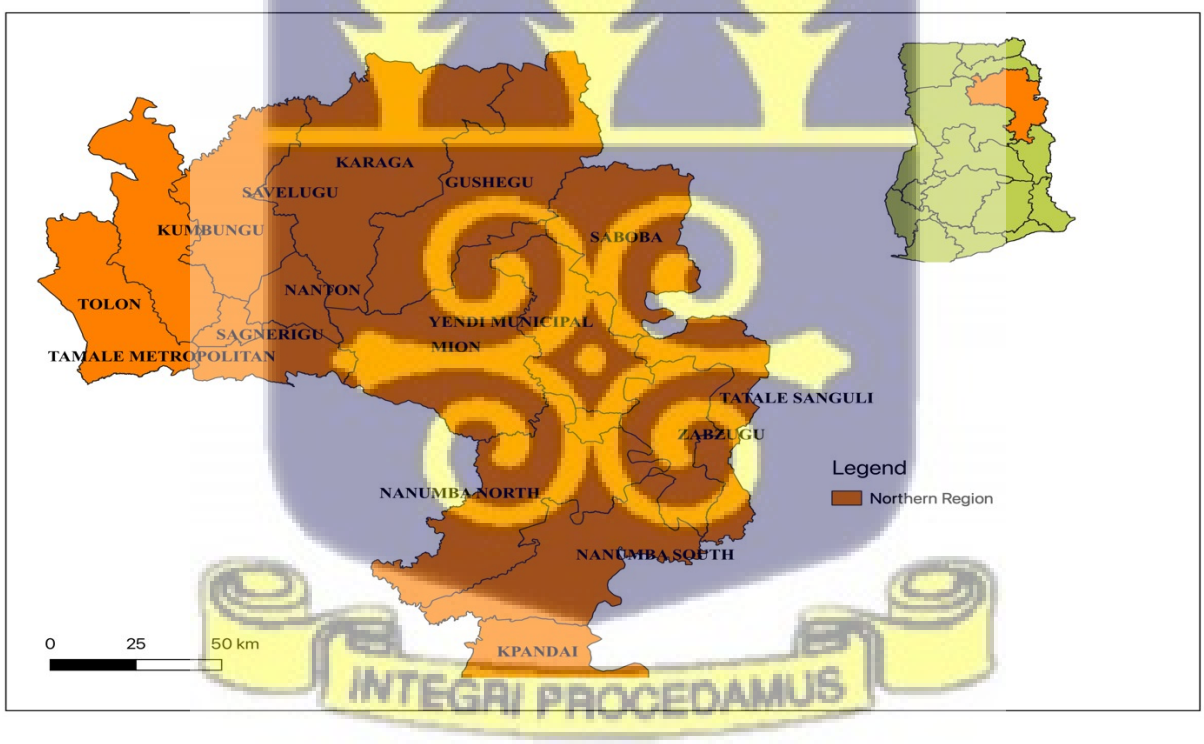


Figure 3.1: Map of the Northern Region of Ghana

3.3 Study Variable

The study variables were grouped into outcome and explanatory variables

3.3.1 Outcome variable

- The outcome variable was Adherence to IPTp-SP guidelines

A total of 7 binary question items were used to assess health workers' adherence to the IPTp-SP WHO recommendations. The question items were adapted from Arulogun, O.S., and Okereke, (2012) & Oluwasomidoyin, Bello, & Oni, (2020) in assessing health workers knowledge and compliance levels to IPTp treatment guidelines in South-West Nigeria. The total scores obtained by each study participant was categorized into inadequate adherence (0-3) and adequate adherence (4-7).

The question items were as follows:

1. Did the health worker confirm the gestational period of the pregnant women before administering the drug?
2. Did the health worker inquire from the pregnant woman if she is on any drug such as cotrimoxazole for HIV?
3. Did the pregnant woman take the SP in front of the health worker?
4. Did the health worker administer the required dose of SP?
5. Did the health worker record the drug administered in the antenatal attendance card and ward registers?
6. Did the health worker inform the pregnant woman to report adverse reactions?
7. Did the health worker inform the pregnant woman when the next dose of SP is due?

3.3.2 Independent variables

The explanatory variables of interest were varied and included health workers' sociodemographic variables, individual-based variables, and facility-based variables.

Health workers sociodemographic variables included age, sex, cadre, level of education and length of practice (**Table 3.1**).

Facility-based variables included level of the facility, availability of SP, monitoring and supervision, staff workload, routine training, IPT leaflets and manuals, staff motivation and availability of water and cups (**Table 3. 1**).

Individual-based factors comprised health workers' knowledge of IPTp, health workers' awareness level, and access to IPTp-SP training materials.

Health workers knowledge of updated IPTp-SP recommendations

A total of 11 question items were used to assess health workers knowledge of the IPTp-SP WHO recommendations. The question items were adapted from Oluwasomidoyin, Bello, & Oni, (2020). The total knowledge score was categorized into low knowledge (1 - 4), moderate knowledge (5 - 8) and high knowledge (9 - 11).

The question items were as follows

1. What drug is used for malaria prevention during pregnancy?
2. What minimum dose of SP is required during the entire pregnancy?
3. How many doses of SP are recommended for a pregnant woman to take during her entire pregnancy?
4. When is the recommended gestation age for the first dose of SP for IPTp?
5. What is the time interval between one dose of SP and the next dose?
6. To your knowledge, up to what period can SP be given during pregnancy?
7. Where is the recommended place for SP to be swallowed?
8. During which period (GA in weeks) is SP not allowed to be given during pregnancy
9. During pregnancy, what are the conditions that can hinder a pregnant woman from taking SP for IPTp
10. If a pregnant woman is diagnosed with malaria during routine ANC attendances, what will you do?

11. If a pregnant woman who attends ANC is allergic to SP, what will you do to prevent malaria during pregnancy?

Table 3.1a: Independent variables in the study

Variables		Operational Definition	Measurement	Source of Data
Independent variables	Age	Age of respondent at last birthday	Continuous in years	Health worker
	Sex	Biological make-up	Binary (Male, Female)	Health worker
	Education	The educational attainment of the staff	Ordinal (Certificate, Diploma, Degree)	Health worker
	Experience	Duration of providing obstetrics care (years)	Ordinal (<5 years, 5 – 10 years, >10 years)	Health worker
	Type of facility	Type of health facility health worker works	Ordinal (Hospital, Health centre, CHPS)	Health worker
	Cadre	The professional background of staff	Nominal (Midwife, General nurse, Others)	Health worker
	Training	Training on revised IPTp-SP guideline	Binary (Yes, No)	Health worker
	Staff workload	The average number of pregnant women attended weekly	Ordinal (0 – 30 clients, >30 clients	Health worker

Table 3.1b: Independent variables in the study

Variables	Operational Definition		Measurement	Source of Data
Independent variables	Staff motivation	Health workers level of satisfaction with working conditions in the antenatal or obstetric units	Nominal (Satisfied, not satisfied)	Health worker
	Awareness level	Being aware of the updated guidelines on IPTp-SP delivery	Nominal (Aware, Not aware)	Health worker
	SP stock level	Shortage of SP in the past 6 months	Binary (Yes, No)	Health worker
	IPTp protocols	Provision of IPTp-SP training materials by the facility to staff	Binary (Yes, No)	Health worker
	Monitoring and supervision	Availability of supervisory bodies for monitoring the work of the care providers	Binary (Yes, No)	Health worker
	IPTp-SP materials access	Health worker sourcing and reading IPTp-SP training materials	Binary (Yes, No)	Health worker
	Knowledge of IPTp-SP	The knowledge level of health workers on the revised recommendations	Ordinal (low, moderate, high)	Health worker

3.4.0 Sampling

3.4.1 Study population

The study population consisted of health workers in the antenatal and obstetric units of 16 randomly selected health facilities who consented to participate in the study.

3.4.2 Sample Size Determination

A study conducted by Amankwah & Anto, (2019) reported that about 75.4% of IPTp-SP was administered through the directly observed IPTp administration therapy per the WHO IPTp recommendation.

The sample size was determined using the Cochran sample size calculation formula
$N = Z^2 \{P\} \{1-P\} / m^2$

Z (Standard value for 95% confidence level) = 1.96

P (proportion of health workers adhering to the IPTp recommendation) = 75.4% (0.754)

m (margin of error) = 5% (0.05)

$N = 1.96^2 \{0.754\} \{1-0.754\} / 0.05^2$

$N = 3.8416 \{0.754\} \{0.246\} / 0.0025$

N = 285.02

The minimum sample size (N) is 286

3.4.3 Sampling Process

3.4.3.1 Sampling of Districts

A multistage sampling approach was employed in the sampling of study participants. There are 16 districts in the Northern Region of Ghana. These districts are Gushegu District, Karaga District, Sagnarigu District, Tolon District, Kumbungu District, Savelugu District, Nantong District,

Tamale Metropolis, Yendi Municipality, Zabzugu District, Mion District, Nanumba North District, Nanumba South District, Saboba District and Tatale Sangule District. The first stage of the multistage sampling approach involved a simple random sampling of 8 districts, including;

Tamale Metropolis, Tolon District, Savelugu Municipality, Kumbungu District, Yendi Municipality, Karaga District, Gushegu District and Nanumba North District from these 16 districts in the northern region.

3.4.3.2 Sampling of Health facilities

The next stage involved sampling of 16 health facilities from the sampled eight districts in the region. A restricted stratified sampling approach was adopted. The health facilities were divided into stratum A (district hospitals) and stratum B (CHPS, health centres, polyclinics) in each district. One facility was selected from each stratum, making up the two health facilities in the district. For one of the 8 districts, two health facilities (Tamale Teaching Hospital and Tamale Central Hospital) were purposively selected because they serve as major referral centers for all health facilities in the 16 districts of the Northern region.

3.4.3.3 Sampling of Health Workers

The last stage involved the sampling of 286 health workers from the 16 health facilities that were sampled in stage two (Table 3.2). The population of health workers in antenatal care services for each of the facilities sampled was obtained. A proportionate to size sampling approach was used to determine the number of study participants sampled from each health facility. The number of health workers sampled from each facility was calculated using the formula

$$n = \frac{\text{Number of ANC health workers from the facility (u)}}{\text{Total number of ANC health workers from the 16 facilities}} * X$$

n (Number to be sampled from the health facility)

X (Sample size)

u (Name of health facility)

Table 3.2: The proportionate to the size sampling of health workers, Northern region, 2021

Number	Health facility	Sample size calculated	Number selected
1.	Tamale Teaching Hospital	(50&431) x 286	34
2.	Tamale Central Hospital	(35&431) x 286	24
3.	Zinindoo Health center	(16&431) x 286	11
4.	Gushegu District Hospital	(31&431) x 286	21
5.	Tolon Health Center	(20&431) x 286	14
6.	Tamalgu CHPS	(12&431) x 286	8
7.	Savelugu Municipal Hospital	(34&431) x 286	23
8.	Savelugu RCH	(14&431) x 286	10
9.	Kumbungu RCH	(10&431) x 286	7
10.	Kumbungu Missionary Hospital	(25&431) x 286	17
11.	Tamale West Hospital	(42&431) x 286	28
12.	Yendi Municipal Hospital	(50&431) x 286	34
13.	Tingoli CHPS	(7&431) x 286	5
14.	Bimbila Municipal Hospital	(42&431) x 315	28
15.	Kugafong CHPS	(12&431) x 315	8
16.	Karaga District Hospital	(31&431) x 315	21

3.4.3.4 Sampling of Health Workers on the survey day

On each day of the survey, research assistants obtained a list of all staff available in the facility for the shift. Yes and No options were written on pieces of papers for staff willing to participate in the study to choose from. The total number of staff available determined the number that were sampled per visit (**Table 3.3)**. The pieces of paper were kept in a box for health workers to choose from. Health workers who picked the option yes were recruited to participate in the study. The health facilities were visited a number of days until the required sample was met. Health workers already interviewed were excluded from the participants to be sampled in the subsequent visits to the facility.

Table 3.3: Sampling of health workers on survey day, Northern Region, 2021

Health facility	Required sample	Average staff count per shift	Average staff sampled per visit	Number of days used
Tamale Teaching Hospital	34	10	5	7
Tamale Central Hospital	24	10	5	5
Zinindoo Health center	11	12	5	3
Gushegu District Hospital	21	8	4	5
Tolon Health Center	14	10	5	3
Tamalgu CHPS	8	6	3	3
Savelugu Municipal Hospital	23	12	6	4
Savelugu RCH	10	10	5	2
Kumbungu RCH	7	6	3	3
Kumbungu Missionary Hospital	17	8	4	4
Tamale West Hospital	28	12	6	5
Yendi Municipal Hospital	34	12	6	6
Tingoli CHPS	5	3	2	3
Bimbila Municipal Hospital	28	12	6	5
Kugafong CHPS	8	4	2	4
Karaga District Hospital	21	8	4	5

3.4.4 Inclusion criteria

- ANC staff who have worked for at least one year at the selected health facilities and present at the study time

3.4.5 Exclusion criteria

- ANC staff who have worked for at least one year but are not directly involved in IPTp-SP administration.

3.5.0 Data Collection

3.5.1 Data Collection Tools

Three data collection tools were deployed for data collection. A semi-structured questionnaire and participant observation checklist for health workers' data and a facility observational checklist for health facility assessment.

Phase 1 Semi-structured questionnaire

The semi-structured questionnaire (**Appendix III**) consisted of three different sections. Section one collected data on the sociodemographic characteristics of the study participants. A total of seven questions were asked in this section. The questions elicited information on health workers' age, sex, cadre, religion, highest educational level, number of pregnant women attended to in a day, and years of experience.

Section 2 collected data on study participants' awareness and knowledge of the WHO's IPTp-SP recommended protocols. A total of 11 questions were asked to elicit information on the type of drug used, the minimum dose required, the total number of doses recommended, recommended gestational age to start SP, the time interval between one dose and another, the gestational stage SP can be given until, the recommended place to take SP, the recommended period SP not allowed,

the conditions that are contraindicated for SP, the actions taken when a pregnant woman is allergic to SP and the actions taken if a pregnant women test positive to malaria in the process of administering the SP.

Information on staff workload, training, IPTp-SP training materials availability, SP stock, monitoring and supervisory activities and staff motivation was collected in section 3. A total of 11 questions were asked to elicit this information. The information included; staff workload, their satisfaction with working conditions, IPT training attended, the availability of monitoring bodies and how often supervision and monitoring are conducted.

Phase 2 Checklist 1

The second tool used was an observational checklist (**Appendix IV**) for observation of IPTp practices. The checklist facilitated the observation of the IPTp-SP adherence level of the study participants as they were carrying out the services. The checklist contained seven items that were ticked either yes or no based on the study participants' practices. The information captured included DOT practice, recording of information on ANC card, confirming the duration of pregnancy before giving the drug, giving the correct dose, informing a client to report adverse reactions, confirming pregnant woman is not on other drugs such as co-trimoxazole and informing the client when the next dose is due.

Phase 3 Checklist 2

The third tool was a checklist (**Appendix V**) used to collect information on health facility assessments. The checklist facilitated observation of aggregate health facility IPTp-SP related activities. A total of 16 copies of the checklist were made, one for each health facility visited. The list elicited information on the availability of SP, portable water and cups, health talks conducted, health education programs drawn and the availability of IPT manuals, leaflets or posters at the ANC units.

3.5.2 Data Collection Process

On the day of the survey, data was consecutively collected in three phases. Each of the phases are described below.

Phase 1

This involved the administration of semi-structured questionnaires to the sampled health workers in the facility. The semi-structured questionnaires collected information on study participants' sociodemographic and professional characteristics, individual-based factors and facility-related factors. Five research assistants visited a health facility at a time. Each research assistant administered a questionnaire and waited whiles the respondent completed the questionnaire for collection. Questionnaires were given identification numbers.

Phase 2

The second phase involved the collection of data on health workers adherence to the recommended IPTp-SP guidelines. This data was collected through covert observation of health workers IPTp-SP practices. Upon completion of the semi-structured questionnaire. Each research assistant was responsible for observing the IPTp-SP practices of their respective respondents. The research assistants observed each of the health workers as they administered the services to their clients. The ANC cards of discharged clients were collected for confirmation of proper documentation of services rendered to them. Through the observation and confirmation from the ANC card, research assistants completed the checklist on health workers adherence to IPTp-SP guidelines.

Phase 3

The principal investigator carried out an aggregate health facility assessment. This assessment was done with the health facility as the unit of observation. Aggregate IPTp-SP related activities conducted in each of the 16 health facilities visited were observed by the principal investigator. This phase was carried out concurrently with phase 2. The principal investigator observed the

posters at the ANC unit, the availability of free and safe water, components of health talk given, if any. The principal investigator engaged the head of the unit on the availability of quarterly health education programs drawn for the unit and the components it entailed. Through the information gathered, the principal investigator completed the third checklist.

3.6 Training and Pretesting

Twenty level 400 Nursing students of the University for Development Studies were recruited as research assistants. A two-day training exercise from10:00 am to 12:00 pm was organized for research assistants at the University for Development Studies City Campus lecture hall one. Research assistants were coached on data gathering strategies, questionnaire administration, COVID-19 precautions during data collection, completing a checklist through observation and stakeholder engagement during data collection. Every question on the semi-structured questionnaire and every indicator on the checklist were explained in detail for the comprehension of all research assistants. The principal investigator and two persons with master's degrees in public health conducted the training.

Afterwards, the tools were pre-tested to ensure they reflect the local conditions and to determine the clarity, strengths, and weakness of these tools on the field. Ten health care workers from the Sunyani Municipal Hospital, located in the Bono region were randomly sampled for pre-testing the data collection instruments. The data collection tools were reviewed where necessary to improve their quality. A pretest report was written from the findings and shared with the supervisor (**Appendix VI**).

3.7.0 Safety Considerations

There was no physical or social harm in participating in the study. Research assistants ensured study participants were in a stable condition before engaging them to respond to the questionnaire. Also, there were no direct benefits from participating in the study; however, findings from this

study were communicated with policymakers to help improve IPTp activities in the region and the nation.

3.7.1 COVID-19 Safety Protocols to be Observed

Research assistants visited the field with at least ten pens each. Pens were given to each study participant to complete a questionnaire. Upon completing the questionnaire, the research assistants retrieved and sanitized the pen before giving it to the next study participant.

All research assistants were in an N-95 face mask and face shield on the field. Research assistants washed their hands with soap under running water when moving from one health facility to the next.

3.8 Data Management and Statistical Analysis

3.8.1 Data Management

The returned questionnaires were cleaned and edited to ensure accuracy and completeness before coding them in IBM SPSS and analyzed using STATA version 15 (StataCorp LLC, College Station, Texas 77845 USA). All incomplete forms with missing outcome variables were excluded from the analysis. Subtotals were used to indicate missing independent variables in data presentation.

The health workers adherence level was derived from the responses emanating from 7 different questions asked. A correct response was scored 1, and a wrong response scored 0. The total scores obtained by each study participant were categorized into inadequate adherence (0-3) and adequate adherence (4-7). The health workers' knowledge score on IPTp-SP was derived from 11 questions asked on IPTp definition, the drug used for IPTp-SP, time to start IPT-SP, the interval of IPTp-SP administration, the doses required and the number of tablets. A mark of one (1) was assigned for a correct answer and zero (0) for an incorrect answer. A total score was awarded based on the number

of correct responses given by the health worker. The least score assigned was 0, and the highest score was 11. The total knowledge score was categorized into three levels: low knowledge (1- 4), moderate knowledge (5-8) and high knowledge (9-11).

3.8.2 Statistical Analysis

Firstly, the data was descriptively analyzed. All categorical variables such as sex, religion, cadre, educational attainment, workload, training, job satisfaction, monitoring, access to IPTp-SP manuals, availability of IPTp-SP manuals, health workers' knowledge level and level of adherence were analyzed into frequencies and proportions at 95% CI. Skewed continuous variable such as age was presented using a median and interquartile range.

Secondly, A Chi-square test of association was performed to determine the association between health workers sociodemographic factors, individual-based factors and facility-based factors on their level of adherence. The level of significance was determined at 5%.

Thirdly, A crude logistic regression analysis was performed to assess the association between health workers sociodemographic characteristics, individual-based and facility-based factors and health workers' adherence to the IPTp-SP recommended guidelines. The crude odds ratio, the p values and corresponding confidence intervals were presented. Variables with statistically significant associations were indicated. The crude analysis was performed for all sociodemographic variables, individual-based variables and health facility related variables. Variables with statistically significant association with the health workers' adherence at a significance level of 0.1 were further selected and fitted into a multivariate logistic regression model.

Lastly, a multivariate binary logistic regression was performed. Health workers sociodemographic variables and individual based variables were referred to as health worker related factors for the

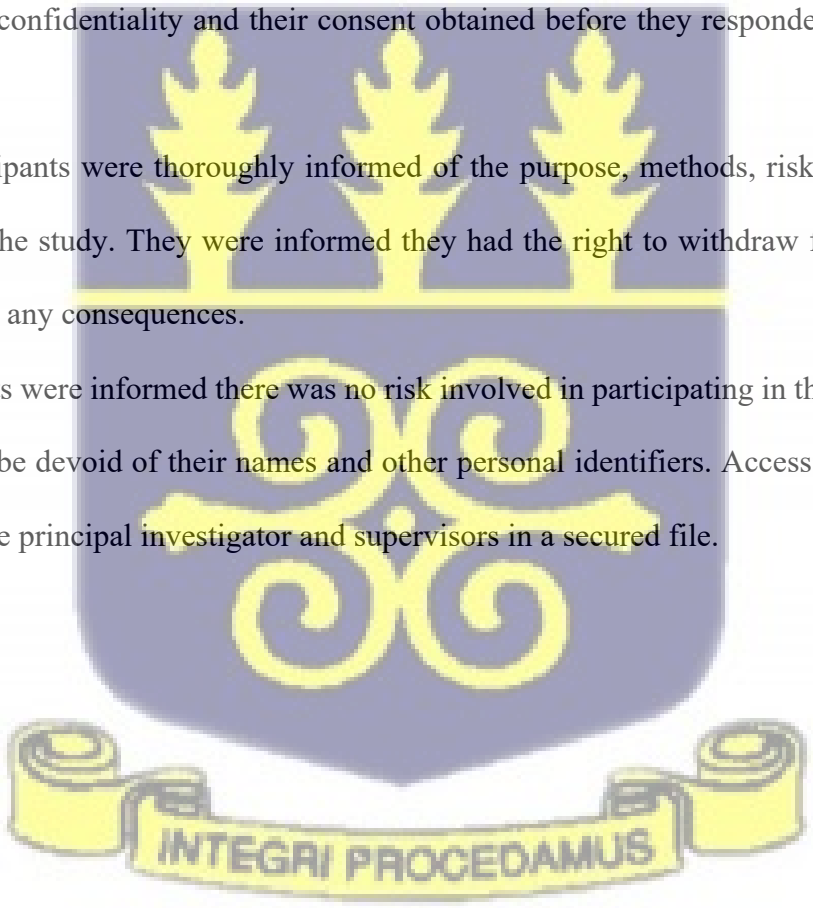
adjusted logistic analysis. The adjusted odds ratio, p-values and corresponding confidence intervals were presented in a tabular form. Adjusted logistic regressions were performed at 5% level of significance. Robust standard errors were used to adjust for clustering in both the crude and adjusted analyses, with the type of facility as the main clustering variable.

3.9 Ethical Consideration

The Ethical Review Committee of Ghana Health Service approved the protocol for this research work with ethics approval number GHS-ERC 032/05/21 (**Appendix I**). Permission was sought from the Northern Regional Health Directorate to conduct this research (**Appendix II**). Permission was also sought from the heads of the various health facilities data was collected. Study participants were assured of confidentiality and their consent obtained before they responded to the research questionnaires.

The study participants were thoroughly informed of the purpose, methods, risks and benefits of participating in the study. They were informed they had the right to withdraw from the study at any time without any consequences.

Study participants were informed there was no risk involved in participating in the study, and data collected would be devoid of their names and other personal identifiers. Access to data collected was limited to the principal investigator and supervisors in a secured file.



CHAPTER FOUR

4.0 RESULTS

4.1 Health Workers Sociodemographic Characteristics, Northern Region, 2021

Of the 315 health care workers studied, more than two thirds 80.5% (252/313) were females. The median age of the health workers was 29 years (26 – 34 years). The majority 47.44% (148/312) of the health workers, were midwives, whiles 39.7% (124/312) and 12.8% (40/312) were nurses and others (physicians, pharmacist, physician assistants), respectively. In terms of the level of education, almost half 48.7% (149/306) of the health workers studied were diploma holders, whiles 34.0% (104/306) and 17.3% (53/306) were certificate and degree holders, respectively. More than half 59.2% (177/299) of the health workers studied had been providing obstetric care for less than five years, whiles those providing obstetric care between 5 – 10 years and more than ten years were 24.1% (72/299) and 16.7% (50/299) respectively (**Table 4.1**)

Table 4.1: Sociodemographic Characteristics of Health Workers in Northern Region, 2021 (N=315)

Characteristics	Frequency (N)	Percentage (%)
Sex		
Male	61	19.5
Female	252	80.5
Subtotal	313	100.0
Experience		
> 5	177	59.2
5 – 10	72	24.1
10+	50	16.7
Subtotal	299	100.0
Cadre		
General nurse	124	39.7
Midwife	148	47.5
Others	40	12.8
Subtotal	312	100.0
Education		
Certificate	104	34.0
Diploma	149	48.7
Degree	53	17.3
Subtotal	306	100.0
	Median (years)	**Range (years)**
Age of HWs	29.0	26.0 – 34.0

*Incomplete forms were excluded from the analysis

4.2 Health Facility-related Factors of IPTp-SP administration, Northern Region, 2021

Of the total health workers interviewed, more than two thirds 73.3% (231/315) of the health workers studied were from hospitals. More than half 52.6% (164/312) had received training on the updated IPTp-SP guidelines. Among those trained, only 37.8% (62/164) received their training within 12 months before the study. Less than half 48.8% (146/298) of the health workers had received supervisory visits within 12 months before to the study. The regional teams made the majority of these visits.

Over half 51.3%, (159/310) of the health workers were not satisfied with their current working conditions at the ANC unit. Almost two-thirds 68.3% (200/293) of health workers had never received any training manuals from their health facility or management. More than two thirds 74.0% (219/296) of the health workers indicated there had not been any shortage of IPTp-SP in the last six months before to the study. On average, more than half, 54.3% (157/289) of the health workers attended to less than 30 pregnant women weekly (**Table 4.2**).

Table 4.2: Health facility-related factors of IPTp-SP administration in the Northern Region, 2021 (N=315)

Variable	Frequency (N)	Percentage (%)
Staff workload		
0 – 30	157	54.3
>30	132	45.7
Subtotal	289	100.0
Facility type		
Hospital	231	73.3
Health Centre	32	10.2
CHPS compound	52	16.5
Subtotal	315	100.0
Training		
Yes	164	52.6
No	148	47.4
Subtotal	312	100.0
Monitoring		
Yes	146	48.8
No	152	51.2
Subtotal	298	100.0
Job satisfaction		
Satisfied	151	48.7
Not satisfied	159	51.3
Subtotal	310	100.0
IPT training manuals		
Available	93	31.7
Not available	200	68.3
Subtotal	293	100.0
Shortage of SP		
Yes	77	26.0
No	219	74.0
Subtotal	296	100.0

*Incomplete forms were excluded from the analysis

4.3 Health Workers Individual-Based Factors of IPTp-SP Administration, Northern Region, 2021

More than two-thirds 71.7% (220/307) of the health workers studied were aware of the current WHO recommendation of IPTp-SP. The majority 54.6% (171/313), of the health workers had moderate knowledge of IPTp-SP guidelines. In terms of health workers personal access to IPTp manuals, leaflets or other learning materials, more than half 56.7% (178/314) indicated they had not accessed any IPTp manual or learning material in the last six months before to the study (**Figure 4.1**).

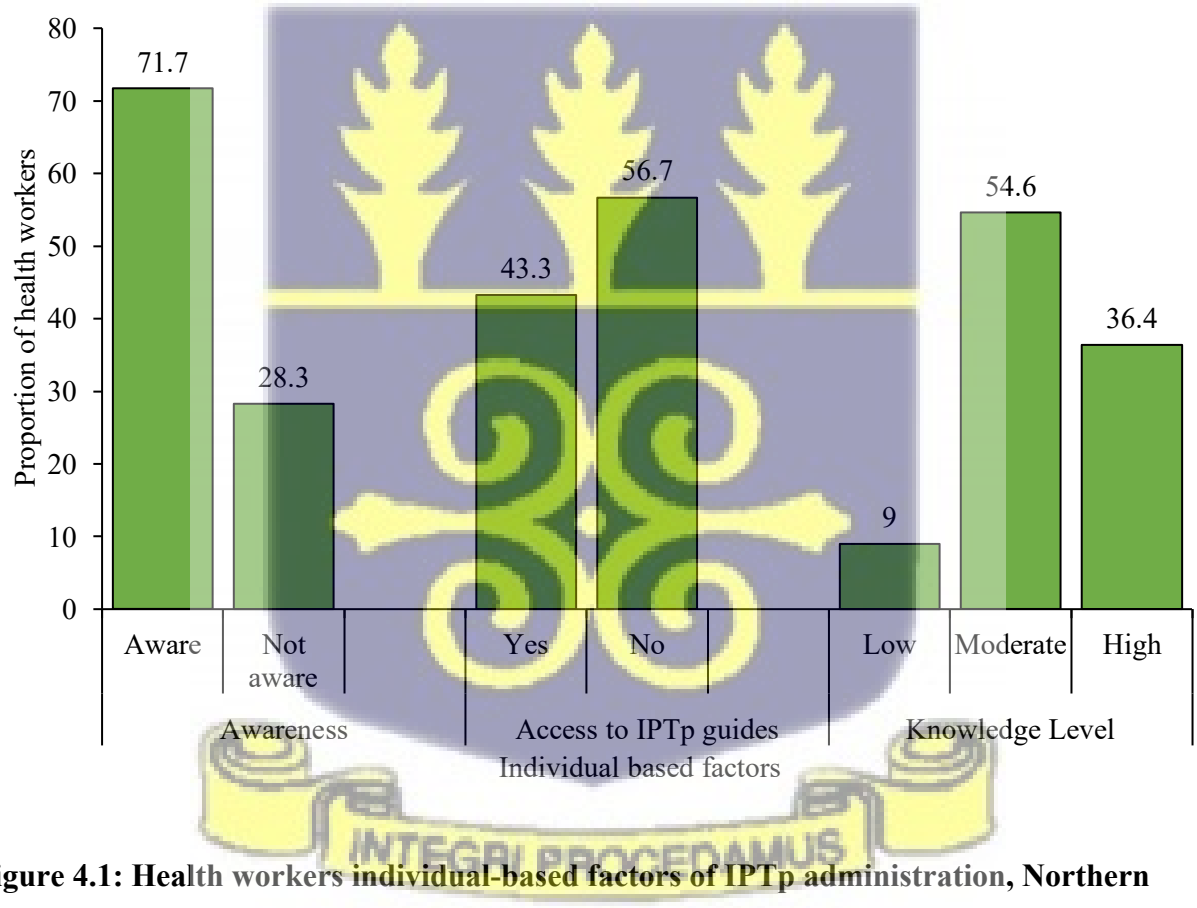


Figure 4.1: Health workers individual-based factors of IPTp administration, Northern Region, 2021 (N=315)

4.4 Health Workers Awareness and Knowledge of IPTp-SP, Northern Region, 2021

Almost all 97.5% (306/314) stated SP as the recommended drug for IPTp administration in Ghana. More than half 58.4% (181/310) reported the recommended minimum dose of SP to be three doses, about 1.3% (4/310), 2.6% (8/310) and 37.7% (117/310) reported a minimum dose of one, two and four respectively. In terms of the total recommended dosing throughout pregnancy, more than two third 72.0% (221/307) of the health workers studied reported more than three doses, with 2.6% (8/307) and 25.4% (78/307) reporting two and three doses, respectively. The majority, 65.7% (205/312) reported IPTp is commenced in the 16th week; however, 11.5% (36/307), 17.0% (53/307), and 5.8% (18/307) choose 12th, 20-24th and 30-36th week, respectively. With the time interval between consecutive doses of IPTp-SP, more than two thirds 82.3% (256/311) reported four weeks; however, 2.6% (8/311) and 7.4% (23/311) selected two weeks and eight or more weeks, respectively. More than half 59.0% (183/310) of health workers studied believe IPTp-SP should be given until delivery, whiles 12.9% (40/310) and 20.3% (63/310) believe SP should be given up to 32 weeks and 34 weeks, respectively. In terms of the recommended place for taking SP, more than two thirds 80.5% (252/313) of studied participants mentioned in front of the health worker. However, 16.9% (53/313) and 1.3% (4/313) mentioned home and on the way home, respectively. The majority 62.7% (195/311) reported 12 weeks as a period IPTp-SP is not allowed during pregnancy, whiles 26.1% (81/311), 5.1% (16/311) and 4.2% (13/311) reported 16 weeks, 20-24 weeks and 30-36 week respectively. When asked what to do when a pregnant woman has clinical signs and symptoms of malaria, 71.1% (221/311) mentioned they would withhold SP and treat with Quinine or Artemether Lumefantrine; however, a significant proportion 14.2% (44/311) mentioned they would treat with SP (**Table 4.3**).

Table 4.3a: Health Workers Awareness and Knowledge of Intermittent Preventive Treatment for Malaria in Pregnancy, Northern Region 2021 (N=315)

Health workers knowledge of IPTp-SP	Frequency (N)	Percentage (%)
Drug for IPTp		
SP (Sulfadoxine Pyrimethamine)	306	97.5
Quinine	8	2.5
Subtotal	314	100.0
IPTp minimum dose		
One	4	1.3
Two	8	2.6
Three	181	58.4
More than 3	117	37.7
Subtotal	310	100.0
Total recommended doses		
Two	8	2.6
Three	78	25.4
More than 3	221	72.0
Subtotal	307	100.0
Gestation age		
12th week	36	11.5
16th week	205	65.7
20-24 weeks	53	17.0
30-36 weeks	18	5.8
Subtotal	312	100.0
Time interval between doses		
Two-weeks	8	2.6
Four-weeks	256	82.3
8 or more	23	7.4
Don't know	24	7.7
Subtotal	311	100.0

*Incomplete forms were excluded from the analysis

Table 4.3b: Health Workers Awareness and Knowledge of Intermittent Preventive Treatment for Malaria in Pregnancy, Northern Region 2021 (N=315)

Health workers knowledge of IPTp-SP	Frequency (N)	Percentage (%)
End of IPTp		
Up to 32 weeks	40	12.9
Up to 34 weeks	63	20.3
Up to delivery	183	59.0
Don't know	24	7.7
Subtotal	310	100.0
Recommended place to swallow SP		
In front of ANC staff	252	80.5
At home	53	16.9
On the way home	4	1.3
Don't know	4	1.3
Subtotal	313	100.0
Period SP not recommended		
12 weeks	195	62.7
16 weeks	81	26.1
20-24 weeks	16	5.1
30-36 weeks	13	4.2
Don't know	6	1.9
Subtotal	311	100.0
Conditions that hinder SP uptake		
Diarrhea	17	5.6
HIV	52	17.1
Vomiting	66	21.6
G6PD	157	51.5
Don't know	13	4.3
Subtotal	305	100.0
Positive for malaria		
Treat with SP	44	14.2
Withhold SP and treat with ALU/Quinine	221	71.0
Don't know	46	14.8
Subtotal	311	100.0
Allergic to SP		
Stop SP completely	148	48.1
Give anti-allergic	74	24.0
Prescribe another anti-malaria	44	14.3
Don't know	42	13.6

*Incomplete forms were excluded from the analysis

4.5 Health Workers' Adherence to IPTp-SP Treatment Guidelines, Northern Region, 2021

The majority 56.2% (CI 51.0 – 62.0) of the health workers were found to adequately adhere to the recommended IPTp-SP guidelines **(Figure 4.2)**. Among the health workers studied, almost two third, 66.7% (210/315) confirmed pregnant women's gestational age before administering SP (gestational age assessment was through manual palpation of fundal height). Most 65.1% (205/315) of the health workers did not inform the pregnant women they attended to report in the event of adverse drug reactions. Proper documentation of SP administered in client ANC cards was done by 73.3% (231/315) of the health workers studied. Almost all 97.1% (306/315) administered the recommended dose of SP, with 87.9% (277/315) administering the drug under direct observation therapy. Most 72.4% (228/315) of health workers studied did not ask if pregnant women were on other medications such as co-trimoxazole. On informing pregnant women on the next dose's date, 56.8% (179/315) of the health workers failed to inform the pregnant women they attended (**Table 4.4**).

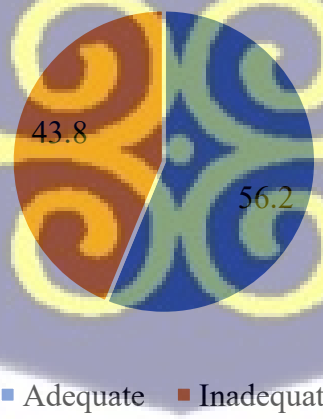


Figure 4.2: Health workers' level of adherence to IPTp-SP recommended administration, Northern Region, 2021

Table 4.4 Health Workers Adherence to IPTp Treatment Guidelines, Northern Region, 2021 (N=315)

Adherence to IPTp treatment guidelines	Frequency (N)	Percentage (%)
Confirmed gestational period		
Yes	210	66.7
No	105	33.3
Subtotal	315	100.0
Report adverse reactions		
Yes	110	34.9
No	205	65.1
Subtotal	315	100.0
Proper documentation		
Yes	231	73.3
No	84	26.7
Subtotal	315	100.0
DOT practice		
Yes	277	87.9
No	38	12.1
Subtotal	315	100.0
Other medications		
Yes	87	27.6
No	228	72.4
Subtotal	315	100.0
Required dosage		
Yes	306	97.1
No	9	2.9
Subtotal	315	100.0
Next dose		
Yes	136	43.2
No	179	56.8
Subtotal	315	100.0

4.6 Stratification of Health Workers' Adherence level by Health Facility Type, Northern Region, 2021

Health workers' adherence level was 69.7% (63.0 - 76.0) among health workers from the hospital. However, a low level of adherence was recorded in the health centers 15.6% (5.0 - 33.0) and CHPS compounds 21.2% (11.0 - 35.0) (**Table 4.5**).

Table 4.5: Stratification of Health Workers' Adherence level by Health Facility Type, Northern Region, 2021 (N=315)

Facility type	Adherence level (%)	95% CI	
CHPS	21.20	0.11	0.35
Health Centre	15.60	0.05	0.33
Hospital	69.70	0.63	0.76

4.7 Bivariate Analysis of factors influencing health workers compliance to the IPTp-SP recommended guidelines, Northern Region, 2021

From the Chi-square analysis conducted, health workers level of education ($\chi 2$= 12.43; p<0.002), length of practice ($\chi 2$= 30.66; p<0.001), type of facility ($\chi 2$= 64.44; p<0.001), job training ($\chi 2$= 98.86; p<0.001), monitoring and supervision ($\chi 2$= 105.00; p<0.001), job satisfaction ($\chi 2$= 91.58; p<0.001), provision of IPTp-SP training manuals by facility ($\chi 2$= 29.30; p<0.001), knowledge level ($\chi 2$= 31.74; p<0.001) and personal access to IPTp-SP training manuals ($\chi 2$= 11.49; p<0.001) were the factors found to be significantly associated with their adherence to the IPTp-SP recommended guidelines.

However, the sex of the health worker, cadre, staff workload and awareness of the guidelines were not significantly associated with the level of adherence (P>0.05) (**Table 4.6**).

Table 4.6a: Chi-square test for association between health workers sociodemographic, individual and facility-based factors and their level of adherence, Northern Region 2021 (N=315)

Variable	Level of adherence		χ 2(P-value)
	Inadequate	Adequate	
Sex			
Male	25 (41.0)	36 (44.8)	0.30 (0.586)
Female	113 (59.0)	139 (55.2)	
Experience			
< 5	98 (77.2)	79 (45.9)	30.66 (<0.001)
5 – 10	20 (15.8)	52 (30.2)	
>10	9 (7.1)	41 (23.8)	
Cadre			
General Nurse	64 (47.1)	60 (34.1)	5.61 (0.060)
Midwife	58 (42.7)	90 (51.1)	
Others	14 (10.3)	26 (14.8)	
Education			
Certificate	54 (40.9)	50 (28.7)	12.43 (0.002)
Diploma	66 (50.0)	83 (47.7)	
Degree	12 (9.1)	41 (23.6)	
Facility type			
Hospital	70 (50.7)	161 (91.0)	64.44 (<0.001)
Health Centre	27 (19.6)	5 (2.8)	
CHPS compound	41 (29.7)	11 (6.2)	
Staff workload			
0 – 30	67 (53.6)	90 (54.9)	0.05 (0.829)
>30	58 (46.4)	74 (45.1)	
Training			
No	108 (79.4)	40 (22.7)	98.86 (<0.001)
Yes	28 (20.6)	136 (77.3)	
Monitoring			
No	110 (84.6)	42 (24.9)	105.00 (<0.001)
Yes	20 (15.4)	127 (75.1)	
Job satisfaction			
Not satisfied	111 (82.2)	48 (27.4)	91.58 (<0.001)
Satisfied	24 (17.8)	127 (72.6)	
IPT training manual			
Not provided	119 (86.2)	103 (58.2)	29.30 (<0.001)
Provided	19 (13.8)	74 (41.8)	
Awareness			
Not Aware	44 (33.1)	43 (24.7)	2.60 (0.107)
Aware	89 (66.9)	131 (75.3)	
Access to IPTp manuals			
No	93 (67.4)	85 (48.3)	11.49 (<0.001)
Yes	45 (32.6)	91 (51.7)	

Table 4.6b: Chi-square test for association between health workers sociodemographic, individual and facility-based factors and their level of adherence, Northern Region 2021 (N=315)

Variable	Level of adherence		χ 2(P-value)
	Inadequate	Adequate	
Knowledge Level			
Low	21 (15.4)	7 (4.0)	31.74 (<0.001)
Moderate	87 (64.0)	84 (47.5)	
High	28 (20.6)	86 (48.6)	

4.8 Association between Health Worker-related Factors and their Adherence to IPTp-SP guidelines, Northern Region, 2021

From the analysis, health workers' experience, knowledge and personal access to IPTp-SP training manuals were the health worker-related factors significantly associated with their adherence to the WHO IPTp-SP guidelines. Health workers who personally sourced and read IPTp-SP manuals had 1.9 times odds of adherence to the recommended practices compared to their counterparts (aOR = 1.89, 95% CI 1.04 - 3.43, p < 0.036).

Similarly, the odds of adhering to the recommended guidelines was 2.8 times among health workers with 5 – 10 years working experience (aOR = 2.78, 95% CI 1.06 - 7.24, p < 0.037) and 10.6 times among those with more than ten years of working experience (aOR = 10.64, 95% CI 5.99 - 18.91, p<0.001) compared with health workers with less than five years working experience. Regarding the knowledge level of the health workers, the odds of adhering to the recommended guidelines was 3.2 times among health workers with moderate knowledge compared to those with low knowledge (aOR = 3.20, 95% CI 2.28 - 4.49, p<0.001). Also, the odds of adhering to the recommended guidelines was 7.6 times among health workers with high knowledge compared to those with low knowledge of the guidelines (aOR = 7.64, 95% CI 4.21 - 13.87, p<0.001) (**Table**

4.7).

Table 4.7: Association between Health worker related factors and their Adherence to IPTp-SP guidelines, Northern Region, 2021

Variable	cOR (95 % C.I)	P-value	aOR (95 % C.I)	P-value
Age of HWs	1.11 (1.1 1.16)	0.001	0.99 (0.96 1.01)	0.325
Sex				
Male	1.00			
Female	0.85 (0.48 1.51)	0.586	0.52 (0.15 1.79)	0.302
Experience				
< 5	1.00			
5 – 10	3.23 (1.78 5.85)	0.001	2.78 (1.06 7.24)	0.037++
>10	5.65 (2.59 12.33)	0.001	10.64 (5.99 18.91)	0.001++
Cadre				
General Nurse	1.00			
Midwife	1.66 (1.02 2.68)	0.041	0.15 (0.06 0.37)	0.001
Others	1.98 (0.95 4.15)	0.070	1.34 (0.65 2.78)	0.429
Education				
Certificate	1.00			
Diploma	1.36 (0.82 2.24)	0.232	2.37 (0.99 5.68)	0.052
Degree	3.69 (1.74 7.81)	0.001	2.27 (0.71 7.26)	0.165
Awareness				
Not Aware	1.00			
Aware	1.51 (0.91 2.48)	0.108	2.56 (0.86 7.78)	0.092
Knowledge level				
Low	1.00			
Moderate	2.90 (1.17 7.17)	0.021	3.20 (2.28 4.49)	0.001++
High	9.21 (3.54 23.96)	0.001	7.64 (4.21 13.87)	0.001++
Access to IPTp materials				
Not Accessed	1.00			
Accessed	2.21 (1.39 3.51)	0.001	1.89 (1.04 3.43)	0.036++

++statistically significant

4.9 Association between Facility-based factors and Health Workers' Adherence Level

Regarding the health facility-related factors, facility type, job training, staff motivation, supervision and availability of IPTp-SP job aids and manuals were significantly associated with health workers adherence. Higher odds of adherence were found among health workers who received training on IPTp-SP administration compared with those who had not received any training on IPTp-SP administration (aOR 10.11, 95%CI 4.53 - 22.56, p<0.001).

The odds of adherence among health workers satisfied with the conditions surrounding the ANC unit was 10.9 times compared with those not satisfied with the conditions of their working environment (aOR 10.87, 95%CI 7.04 - 16.79, p<0.001).

Similarly, health workers who had received supervisory visits from their superiors had 4.0 times odds of adherence to the recommended practices than those who had not received any supervisory visits (aOR 4.01, 95%CI 2.09 - 7.68, p<0.001). Health workers who receive IPTp-SP training manuals from their facilities had 3.6 times odds of adherence compared with health workers who do not receive these materials from their facilities (aOR 3.61, 95%CI 2.44 - 5.35, p<0.001) (**Table 4.8**).

Table 4.8: Association between facility-based factors and health workers' Adherence to IPTp-SP guidelines, Northern Region

Variable	cOR (95 % C.I)	P-value	aOR (95 % C.I)	P-value
Facility type				
Hospital	1.00			
Health Centre	0.08 (0.03 0.22)	0.001	0.03 (0.01 0.07)	0.001++
CHPS compound	0.11 (0.06 0.24)	0.001	0.03 (0.02 0.05)	0.001++
Staff workload				
0 – 30	1.00			
>30	0.95 (0.60 1.52)	0.829	-	-
Training				
No	1.00			
Yes	13.11 (7.60 22.62)	0.001	10.11 (4.53 22.56)	0.001++
Monitoring				
No	1.00			
Yes	16.63 (9.21 30.02)	0.001	4.01 (2.09 7.68)	0.001++
Job satisfaction				
Not satisfied	1.00			
Satisfied	12.24 (7.04 21.26)	0.001	10.87 (7.04 16.79)	0.001++
IPT training manual				
Not provided	1.00			
Provided	4.50 (2.55 7.95)	0.001	3.61 (2.44 5.35)	0.001++
Shortage of SP				
No	1.00			
Yes	0.42 (0.25 0.71)	0.001	1.08 (0.71 1.64)	0.730

++statistically significant

4.10: Health facility IPTp Implementation Assessment, Northern Region, 2021

Observations made at the various 16 health facilities on the days of data collection revealed the following findings. Health education programs drawn, including malaria in pregnancy, were found in 75.0% (12/16) of the facilities visited. The majority of health facilities 62.5% (10/16) visited, had their quarterly education programs, including IPTp-SP. Health talks were given in 8 of the 16

health facilities visited. Of the eight facilities with health talks delivered, five facilities included malaria in pregnancy in their presentation, whereas only three facilities mentioned IPTp-SP in their talk. SP was available in all the facilities visited, with eight facilities having posters of IPTp-SP pasted on the walls of the ANC unit. DOT was practiced in all the facilities visited; however, only two of these health facilities had free and safe water for the practice. Pregnant women were told to buy water from a seller in the ANC unit or from a nearby provision store **(Table 4.9).**

Table 4.9: Health Facility IPTp Implementation Assessment, Northern Region, 2021 (N=16)

Variables	Frequency (N)	Percentages (%)
Health education programs include MiP		
Yes	12	75.0
No	4	25.0
Health education plan includes IPTp-SP		
Yes	10	62.5
No	6	37.5
Health talk delivered on the day of visit		
Yes	8	50.0
No	8	50.0
MiP education		
Yes	5	31.3
No	11	68.8
IPTp education		
Yes	3	18.8
No	13	81.3
MiP/IPTp posters on walls		
Yes	8	50.0
No	8	50.0
SP available		
Yes	16	100.0
Water availability		
Yes	2	12.5
No	14	87.5
DOT practice		
Yes	16	100.0

CHAPTER FIVE

5.0 DISCUSSIONS

This chapter discusses health workers adherence to recommended IPTp-SP guidelines and the factors that influence it, as found in this study. Over half of the health workers studied were found to be adequately adhering to the recommended IPTp guidelines by the WHO. Health workers age, experience, cadre, level of education, training, job satisfaction, monitoring and supervision, provision of IPTp manuals, IPTp awareness, and knowledge were factors identified to possibly influence the health workers adherence to the recommended IPTp-SP guidelines. The use of covert observation in this study allowed for the identification of health workers adherence to the IPTp-SP recommended guidelines. Also, with the help of covert observation, we eliminated the possibility of Hawthorne's effect on the part of the health workers, which could have influenced the study findings. In addition, the study considered all the components of the recommended IPTp-SP guidelines in determining health workers level of adherence which enabled the identification of comprehensive performance of health workers in terms of each element.

Furthermore, the collection of data from all levels of the health system, from hospitals to CHPS compounds, enabled the identification of factors peculiar to each level and how they affect health workers adherence levels. This study adds to existing knowledge the influence of factors on health workers' adherence to the IPTp guidelines. The study gives policymakers a comprehensive idea of the health workers adherence to the recommended IPTp-SP guidelines and the major modifiable factors to address to increase adherence levels.

5.1 Health workers' adherence level

Intermittent Preventive Treatment for malaria in pregnancy was implemented in all the health facilities visited. Overall, inadequate adherence by health workers was recorded at all levels of the health system studied. This affirms that aside from demand-side related factors, health workers related factors also influence the uptake of IPTp-SP among pregnant women. With inappropriate delivery of IPTp-SP services by health workers, addressing all demand-side related factors of IPTp-SP uptake might not solve the problem of low uptake. This finding corroborates the results of a study in the Volta region of Ghana, where inappropriate delivery of IPTp-SP and ITN services were recorded in all facilities studied (De-gaulle & Kamgno, 2020). The consistency in findings could be attributed to the use of observations in both studies to assess IPTp-SP delivery by health workers, even though their study used a three-indicator algorithm to assess health workers' level of adherence compared to the seven-indicator algorithm we used in this study. However, the findings are inconsistent with a similar study conducted in Tema Metropolis by Amankwah & Anto (2019), where adherence to recommended practices was reportedly high. The disparity in findings could be attributed to two factors. The researchers assessed the adherence level of health workers using a single indicator that is the DOT practice. Also, in-depth interview with pregnant women was used by researchers to assess health workers' practice. The problem of recall bias could have influenced the findings of their study. In a similar study conducted in South Nigeria, health workers adherence to the recommended guidelines was low. However, the study assessed health workers adherence level using three indicators: the drug used, the gestation, and the DOT practice (Arulogun & Okereke, 2012).

The majority of studies conducted to assess the adherence level of health workers mostly adjudged health workers adherence level based on the DOT practice (Amankwah & Anto, 2019; Ibrahim et al., 2017; Vandy et al., 2019). Health workers who administer SP under supervision are usually

termed adhering to the recommended guidelines. This presents a problem because health workers who comply with the practice of DOT might not adhere to other indicators such as administering the correct dose and drug, informing pregnant women to report adverse effects and when to come for the next dose. This present study presents a more comprehensive and holistic adherence of the health workers to all available indicators of the IPTp-SP guidelines; hence the findings will be more conclusive than other studies using fewer indicators.

5.2 Factors associated with health workers adherence level

5.2.1 Health Workers Sociodemographic Characteristics

The sociodemographic characteristics of health workers have been reported by various studies to influence the appropriate delivery of IPTp-SP services to pregnant women. In this study, no sociodemographic characteristic of the health workers was significantly associated with their appropriate delivery of IPTp-SP services.

Most of the health workers interviewed in this study were females. The high proportion of females among the health workers studied corroborates a study conducted in Mali where over 60% of health workers surveyed were females (Hill et al., 2013). Also, in a similar survey by Arulogun & Okereke (2012), more than 90.0% of health workers studied were females. The high preponderance of females among the studied health workers could be attributed to the high proportion of nurses and midwives among the study population. Both of these health professions are dominated by the female population. The sex of the health workers was not significantly associated with their level of adherence in this study.

The cadre of frontline health workers determines the content and kind of training given them by their training institutions. Health workers such as midwives and gynecologists have their training geared much towards obstetric and gynecological services, including IPTp-SP services unlike the training received by nurses, general medical doctors and lab technicians. Without on-job training

for these health workers, midwives and gynecologists are likely to have better knowledge of IPTp-SP services compared to the other cadre of health workers. Most of the health workers interviewed in the study were midwives. This was an expected finding since health workers found in ANC and obstetric related units are mostly midwives. The cadre of the ANC health care worker has been found to influence their knowledge level and adherence to recommended IPTp-SP practices. However, there was no significant association between the cadre of health workers and their adherence to the recommended guidelines. This is consistent with the findings of a study conducted in the Volta region of Ghana. (De-gaulle & Kamgno, 2020).

The educational level of health workers determines the kind of training they went through and their training content. Almost half of the study participants interviewed were diploma holders. This could be attributed to the high number of nursing and midwifery training institutions awarding diplomas relative to the country's certificate and degree-granting institutions. However, the level of education attained by health workers was not significantly associated with their adherence to the recommended guidelines.

One of the factors associated with the health workers adherence to IPTp-SP recommended guidelines is their level of experience. Health workers with five or more years of working experience were more than three times more likely to adhere to the recommended guidelines than those with four or fewer years of experience. The possible explanation could be because health workers with less than five years' experience might be newly posted health workers and those in the first phase of their career and might not have had the opportunity to attend more training on IPTp-SP that will enlighten them on the recommended guideline of IPTp-SP delivery and hence their low adherence levels. This highlights the fact that health facilities do not have capacity building plans where newly recruited staff are trained on guidelines peculiar to the units they will be working. It also highlights the fact that health training institutions might not have incorporated

the current policy of IPTp-SP recommendations in their training materials. This corroborates the findings of a study conducted by De-gaulle & Kamgno (2020) in the Volta Region of Ghana, where health workers with more than a years' experience were three times more likely to deliver IPTp-SP appropriately compared to those with less than a year's experience.

5.2.2 Health Facility-related Factors of IPTp-SP administration

5.2.2.1 Type of health facility

Stratification of adherence level by health facility type showed that the inadequate adherence was more pronounced in the health centers and CHPS compounds studied. These health facilities serve as the first point of health care for pregnant women, mainly in the villages.

This could be caused by the enormous resources at the disposal of health workers working at the hospital compared to those working at the health centres and the CHPS compounds. Health workers with available SP, free and safe water and job aids are likely to adhere to the recommended guidelines compared to those at the health centers and CHPS where these things are not constantly available. The cadre of health workers in these facilities could also explain the difference in adherence in these facilities. Hospitals are usually characterized by sufficient staff of all categories, unlike health centers and CHPS with limited staff, usually of lower ranks. The finding is consistent with the results of a study conducted by De-gaulle & Kamgno (2020) in Ghana, where health centres (aOR 0.60, 95%CI=0.236-1.545) and CHPS compounds (aOR 0.12, 95%CI=0.039-0.375) had reduced odds of appropriate delivery compared to the district hospital. If not addressed, the high inadequate adherence in health centers and CHPS compounds, will curtail the impact of all demand-side related measures taken to address low uptake of IPTp-SP. More cost-effective measures adopted to address low adherence need to focus on the health centre and CHPS compounds level.

5.2.2.2 Job training

The training of ANC health workers makes them well informed and technically equipped to deliver IPTp-SP services to pregnant women. Despite its relevance, this training is sometimes overlooked, affecting health workers' perception of IPTp-SP and how to administer it to pregnant women. Half of the health workers studied had not received any training on IPTp-SP recommended practices. The low proportion of trained health workers on the recommended protocols could be attributed to the cascade form of training organized by the NMCP. The relevance of this training is further reiterated by a study conducted by Rassi et al., (2016) in Uganda, where health workers expressed doubts about the safety and efficacy of SP as an IPT. They did not understand why they needed to discontinue SP to treat clinical malaria using ACTs and quinine. These doubts and ignorance expressed by the health workers were attributed to the lack of training on the appropriate delivery of IPTp-SP services.

In this study, health workers who received training on IPTp-SP administration had an increased odds of adherence compared with those who had not received any training on IPTp-SP administration. This increased odds further substantiate the relevance of training to these frontline health workers. The findings are consistent with the results of a case-control study conducted in Zaria. After a training intervention, there was a significant increase in the good practice of the IPTp in the case group from 2.4% at baseline assessment to 51.8% post-intervention (Oyefabi et al., 2015). Also, in a similar study among five African countries, Maheu-Giroux & Castro (2014), suggested that annual training of ANC health staff on IPTp guidelines would have the most significant impact on IPTp delivery with an estimated 13.9% increase. Based on this finding, training if enforced and conducted at all levels of the health system could improve appropriate delivery of IPTp-SP services. To ensure adequate training of health workers, the NMCP needs to move from the cascade form of training and adopt a more peripheral system of training where all

health workers at the health centers and CHPS compounds benefit from this training. Also, policymakers need to consider capacity building and training programs for all health facilities in the country. With this in place health facilities will be able to organize and manage training programs that will build the capacity of their workers.

5.2.2.3 Job satisfaction

The satisfaction of health workers determines how committed they will be to the delivery of health care services. Health workers in facilities where all conditions necessary for the performance of their duties are provided and their services well-compensated will be motivated to carry out their duties compared with those who need to improvise all the time due to the lack of the necessary resources. More than half of the health workers studied were not satisfied with the working conditions in their facilities. This could be explained by the September 2020 strike undertaken by nurses and midwives to demand better conditions of service, which was never met (GRNMA, 2020). These health workers feel they are not adequately compensated for what they do in their facilities and hence are less motivated to carry out their duties. Health workers who were satisfied with the ANC unit's conditions had more than six times the odds of adherence among those not satisfied with the conditions of their working environment. This corroborates the findings of a Tanzanian study undertaken by Mubyazi et al. (2012) to analyze supply-related determinants of IPTp staff. Respondents in both districts accepted IPTp as a necessary intervention but reported discontent with their working circumstances, which hampered their performance. This dissatisfaction was considered a limitation to their optimal performance of ANC services. Health workers' job satisfaction could be modified to help improve the delivery of IPTp-SP services in health facilities. Policymakers and health facility managements should consider incentives for best-

performing health workers at the ANC units of health facilities to motivate health workers to deliver IPTp-SP services appropriately.

5.2.2.4 Staff monitoring

Supervision and monitoring are essential to keep frontline health workers in check and ensure optimal patient health care. With supervision, facility management can determine areas of their optimal performing units and those that need more attention. The study revealed that less than half of the study participants had received supervisory or monitoring visits in the past 12 months. For those who received supervisory visits, the regional team conducted the monitoring exercise. The lack of scheduled supervisory visitation could explain the low supervisory visits to the wards to monitor IPTp-SP services. Health workers also mentioned their units had never received any feedback report from these purported supervisory bodies. Health workers who received supervisory visits by superiors had 6.6 times odds of adherence to the recommended practices than those who had never received any supervisory visits. In a similar study conducted in Uganda, the inadequate knowledge of health workers and uncertainty about SP's efficacy, safety and the new IPTp guidelines was thought to be due to lack of supervision (Rassi et al., 2016). The finding implies that an increase in supervision might increase the appropriate delivery of IPTp-SP services. The Outreach Training and Supportive Supervision (OTSS) adopted by the National Malaria Control Program and IMPACT MALARIA for other malaria control areas such as case management and laboratory diagnosis should be extended to the delivery of IPTp-SP services.

However, in a study conducted by Maheu-Giroux & Castro (2014), health care staff supervised during the six months prior to the study were not more likely to deliver IPTp during a consultation than those not supervised. This study, unlike this report adopted a secondary data analysis design which could have accounted for the inconsistency in findings.

5.2.2.5 Availability of IPTp-SP manuals and Job aids

Resource materials and job aids that are mostly used as reference materials are essential to delivering health care services. Health workers access to IPTp training manuals, and job aids keep them informed on relevant changes made to the existing guidelines. Most of the health workers studied had not accessed IPTp manuals, leaflets or other learning materials in the past six months before the study. IPTp-SP related manuals or pamphlets were found in the ward in charge's office in all the facilities visited, with none at the nurses' station. This gives health workers limited access to the training manuals. It was also revealed that IPTp-SP manuals are seldomly made available in the ward for reference. On providing IPTp -SP manuals or leaflets to the health workers by their facilities, health workers who receive IPTp-SP training manuals from their facilities had more than five times odds of adherence to the recommended guidelines compared with health workers who did not receive these materials from their facilities. Health facilities must make available references or learning materials to help improve their staff's knowledge level and make them deliver their services in accordance with documented principles.

5.2.3 Individual-based factors of the health workers

5.2.3.1 Health workers knowledge of IPTp-SP

Health workers at ANC units or engaged in IPTp-SP delivery are expected to know the services they render. High knowledge of IPTp-SP services among frontline health workers implies that they are well aware of what is recommended and will adhere to them, all things being equal. Less than half of the health workers studied had high knowledge of the guidelines of IPTp-SP administration. The high proportion of health workers with inadequate knowledge of IPTp-SP guidelines implies that even with the availability of SP and control of demand-side related factors of IPTp-SP uptake, some pregnant women will still not take SP due to poor knowledge among health workers. This is

not surprising as other studies have cited factors such as health worker forgetfulness (Ashwood-Smith, Coombes, Kaimila, Bokosi, & Lungu, 2002), poor health worker knowledge on delivery directives (Onoka et al., 2012) as well as confusion among health workers over timing and dosing of SP (Webster et al., 2013) as reasons for missed opportunity to administer the medicine. The disparity in findings could be associated with the number of indicators or criteria adopted by the two studies in assessing the level of knowledge. The knowledge gap between high and low knowledge health workers could be attributable to a lack of personal and institutional updates on new malaria-prevention measures in pregnancy in the country. It could also be the result of a lack of funding to make copies of the National IPTp guideline and strategic documents available in health facilities. However, health workers' knowledge was not significantly associated with the level of adherence in this study.

5.2.3.2 Awareness level

The first step to adhering to the recommended guidelines is being aware of the guidelines. Health workers at ANC units and involved with IPTp-SP services should be kept informed on recent developments or changes in the delivery of their services. Health workers who are unaware of the changes made due to lack of training or job aids will stick to what was previously practiced, which will affect the number of doses they will offer to their clients. Almost 30% of the health workers studied were not aware of the updated guidelines. The findings are consistent with a similar study conducted in Nigeria to assess health workers awareness and knowledge of the current WHO IPTp recommendation. About 62.2% of the health workers were aware of the recommendation (Oluwasomidoyin et al., 2020). The consistency in findings could be explained by the similar sample sizes used by both studies. In another similar study conducted in Nigeria, the findings were, however, different. The study reported a much higher level of awareness of the recommended

practices by the health workers, with over 90% of health workers studied being aware of the recommended guidelines (Onoka et al., 2012). The study interviewed a smaller sample size of 38 health workers; this could have contributed to the inconsistency of the findings. However, health workers' level of awareness was not significantly associated with their level of adherence to the recommended guidelines in this study.

5.3 Study limitations

A few limitations were, however, identified in the study design used. The study used covert observation to determine whether health workers were adhering to all indicators of the recommended guidelines. Some of the indicators, such as proper documentation of services rendered, could not be reported based on the observation. To curtail this limitation, research assistants engaged pregnant women to confirm documentation of services in their ANC booklets by the observed health worker. Before the actual data collection, the research assistants received thorough training on data collection tools and extensive pre-test activities to ensure that they were able to gather the data accurately by observing and listening intently to the delivery of care by ANC health workers.

Further research should be conducted to explore ways of improving health worker adherence to guidelines.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Inadequate adherence was recorded in all the facilities studied. The health worker-related factors associated with adherence were experience, level of education and knowledge of IPTp-SP. Facility-based factors such as health workers' training, job satisfaction, supervision or monitoring and provision of IPTp-SP training manuals for health workers were significantly associated with adherence.

6.2 Recommendations

- The Family health division of Ghana Health Service and the NMCP should disseminate national guidelines along with updated information based on new WHO recommended guidelines to the district, sub-district levels and all service delivery points in the country.
- The regional health directorate should organize updates for district and health center staff on a comprehensive/holistic plan to improve implementation, including all the essential components, both technical and management.
- National, regional or district data quality review teams should take advantage of existing systems such as Performance Improvement Meetings to introduce relevant updates made to existing guidelines or protocols
- Heads of health facilities and ANC units should routinely supervise the services delivered to pregnant women in the units, particularly SP
- The NMCP and the family health division of Ghana Health Service should provide and disseminate user-friendly job-aids and checklists to promote the correct application and

usage of IPTp guidelines. Health facility management should ensure that the job aids are visibly posted or readily available to staff.

- Health facility management should provide free and safe water at all ANC units where SP is given. With the availability of water, health workers will have no excuse to allow any pregnant woman to take SP away from the facility
- The NMCP should move from the cascade form of training organized at the national level where only supervisors or regional and district supervisors training to facility-based training where all ANC staff at the facility are trained
- In charges of various ANC units or wards should ensure IPTp training manuals and job aids are made accessible to health workers at all times
- Health facility managements should implement capacity building plans where newly posted health workers are trained on recommended protocols or guidelines before they are fully integrated into the units

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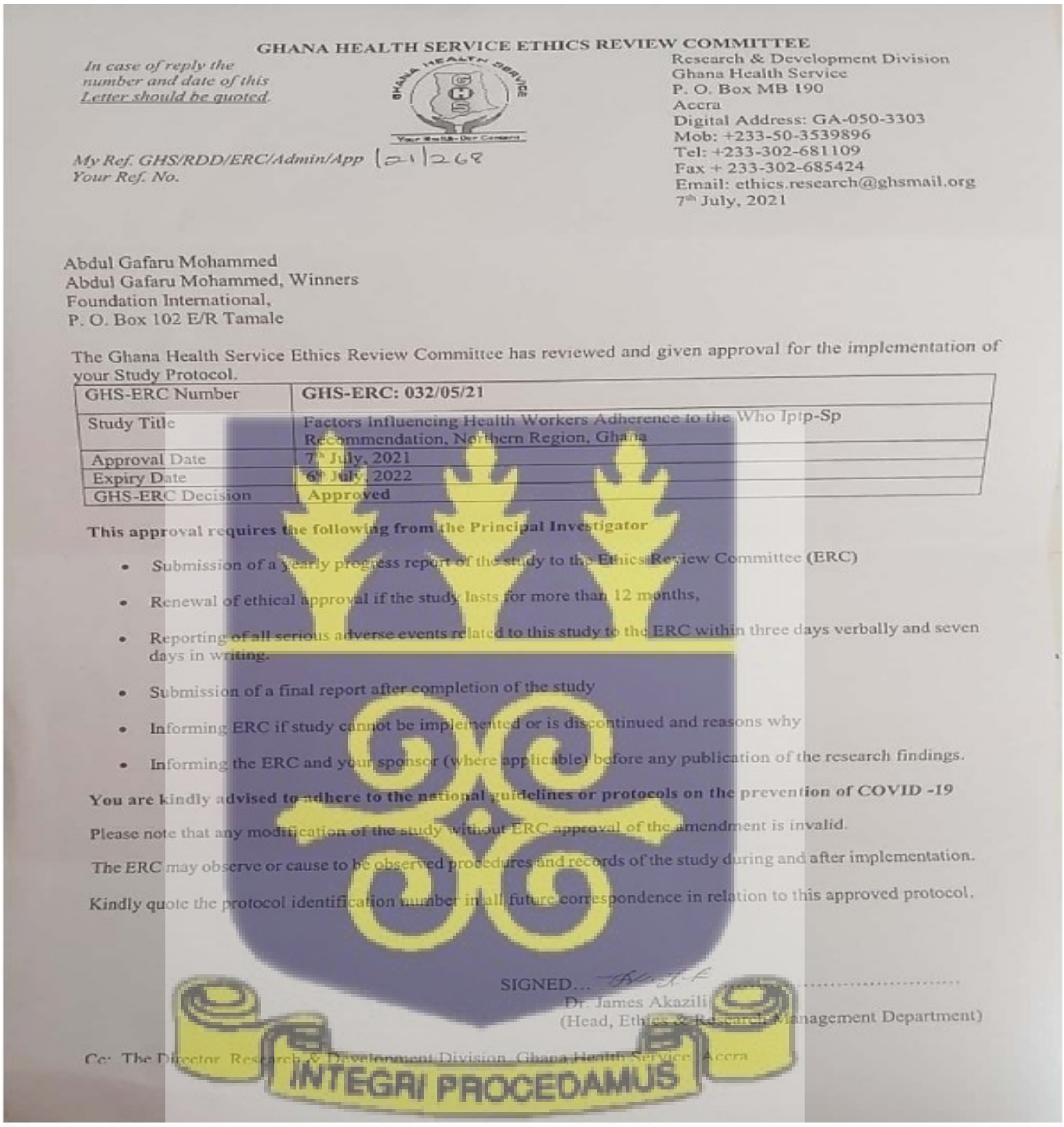
APPENDIX I

Ethical Approval for the Study



GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

My Ref. GHS/RDD/ERC/Admin/App 21268
Your Ref. No.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Digital Address: GA-050-3303
Mob: +233-50-3539896
Tel: +233-302-681109
Fax + 233-302-685424
Email: ethics.research@ghsmail.org
7th July, 2021

Abdul Gafaru Mohammed
Abdul Gafaru Mohammed, Winners
Foundation International,
P. O. Box 102 E/R Tamale

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

GHS-ERC Number	**GHS-ERC: 032/05/21**
Study Title	Factors Influencing Health Workers Adherence to the Who Iptp-Sp Recommendation, Northern Region, Ghana
Approval Date	7th July, 2021
Expiry Date	6th July, 2022
GHS-ERC Decision	Approved

This approval requires the following from the Principal Investigator

- Submission of a 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.

You are kindly advised to adhere to the national guidelines or protocols on the prevention of COVID -19

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. James Akazili
(Head, Ethics & Research Management Department)

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

INTEGRI PROCEDAMUS

Scanned with CamScanner

APPENDIX II

Approval by Study site

GHANA HEALTH SERVICE

OUR CORE VALUES:
1. People-Centered
2. Professionalism
3. Team work
4. Innovation
5. Discipline
6. Integrity

My Ref No: GHS/NR/ 15-0/679

Your Ref No: .....

Regional Health Directorate
Ghana Health Service
P.O. BOX 99
Tamale

Tuesday, 20 April 2021

Tel: (233) (03720) 22912, 22710, 22146
Fax: (233) (03720) 22941
Email: rdhs.nr@ghsmail.org

ABDUL GAFARU MOHAMMED
DEPARTMENT OF EPIDEMIOLOGY AND DISEASE CONTROL
SCHOOL OF PUBLIC HEALTH
UG, ACCRA

RE: INTRODUCTION LETTER

I write to acknowledge the receipt of your letter dated 6th April, 2021. The office has granted you the permission to conduct the study in the region subject to you getting approval from Ghana Health Service Ethics Review Committee on the research topic: **"Factors influencing Health Workers adherence to the WHO IPTp-SP recommendation, Northern Region, Ghana"**

You will be given an introductory letter to the study area upon submitting ethical clearance approval letter from Ghana Health Service Ethics Review Committee to this office.

Thank you.

.....

DR. JOHN BERTSON ELEEZA
REG. DIRECTOR OF HEALTH SERVICES, NORTHERN REGION

APPENDIX III

QUESTIONNAIRE

FACTORS INFLUENCING HEALTH WORKERS ADHERENCE TO THE WHO IPTp-SP RECOMMENDATION, NORTHERN REGION, GHANA

QUESTIONNAIRE

QUESTIONNAIRE NO:

NAME (OPTIONAL): _____

INTERVIEWER

I am a post graduate student from the University of Ghana undertaking research on health workers adherence to WHO IPTp-SP recommendations. I would be glad if you participate in this study by answering a few questions to enable the achievement of the objectives of this study. Your responses would be treated as confidential and used only for the purposes of this research. Your name is not required. Kindly respond as truthfully as possible. You can ask questions if you want.

Thank you.

Respondent general information

Name of health facility ……

SECTION 1

Health workers demographic information

No	Question	Response	Code
Q1	What is your sex?	☐Male 1 ☐Female 2	Q1sex
Q2	What is your age?	……	Q2age
Q3	What is your profession?	☐ General Nurse 1 ☐ Midwife 2 ☐Others 3 specify……	Q3cadre
Q4	What is your highest educational level?	☐ Certificate 1 ☐ Diploma 2 ☐ BSC 3 ☐ Other, specify……	Q4educ
Q5	Which religion do you belong to?	☐ Islam 1 ☐ Christianity 2 ☐ Traditionalism. 3 ☐ Other, specify ……	Q5religion
Q6	How many pregnant women do you attend to in a week?	……	Q6load

Q7	How long have you worked in the medical field?	……	Q7experience

SECTION 2

In this section, I would like to ask questions about IPTp and how it is administered to pregnant women

Awareness & Knowledge of ANC Staffs on Intermittent Preventive Therapy of Malaria Using Sulfadoxine-Pyrimethamine –IPTp-SP

No	STAFF KNOWLEDGE ABOUT IPTp-SP	Response	Code
Q8	What drug is used for malaria prevention during pregnancy?	☐ SP (Sulfadoxine Pyrimethamine) 1 ☐ Quinine 2 ☐ Other, specify 3	Q8kw
Q9	What minimum dose of SP is required during the entire pregnancy?	☐ One 1 ☐ Two 2 ☐ Three 3 ☐ More than 3 4 ☐ Other, specify……	Q9kw
Q10	How many doses of SP are recommended for a pregnant woman to take during her entire pregnancy?	☐ One 1 ☐ Two 2 ☐ Three 3	Q10kw

		☐ More than 3 4 ☐ Other, specify……	
Q11	When is the recommended gestation age for the first dose of SP for IPTp?	☐ 12th week. 1 ☐ 16th week 2 ☐ 20-24 weeks 3 ☐ 30-36 weeks 4 ☐ Other, specify……	Q11kw
Q12	What is the time interval between one dose of SP and the next dose?	☐ Two-weeks 1 ☐ Four-weeks 2 ☐ 8 or more weeks 3 ☐ Don't know 4 ☐ Other, specify……	Q12kw
Q13	To your knowledge up to what period can SP be given during pregnancy?	☐ Up to 32 weeks 1 ☐ Up to 34 weeks 2 ☐ Up to delivery 3 ☐ Don't know 4	Q13kw
Q14	Where is the recommended place for SP to be swallowed?	☐ In front of ANC staff 1 ☐ At home 2 ☐ On the way home 3	Q14kw

		☐ Don't know. 4 ☐ Other, specify……	
Q15	During which period (GA in weeks) is SP not allowed to be given during pregnancy	☐ <12weeks. 1 ☐ 16th week 2 ☐ 20-24 weeks 3 ☐ 30-36 weeks 4 ☐ Other, specify……	Q15kw
Q16	During pregnancy which condition can hinder a pregnant woman from taking SP for IPTp	☐ Diarrhea 1 ☐ HIV (co-trimoxazole) 2 ☐ Vomiting 3 ☐ G6PD 4 ☐ Don't know 5 ☐ Other, specify……	Q16kw
Q17	If a pregnant woman is diagnosed with malaria during routine ANC attendances, what will you do?	☐ Treat her with SP 1 ☐ Withhold SP and allow patient be treated with ALU/Quinine 2 ☐ Don't know 3 ☐ Other, specify……	Q17kw

Q18	If a pregnant woman who attends ANC is allergic to SP, what will you do for	☐ Stop SP completely 1	Q18kw
	prevention of malaria during pregnancy?	☐ Give anti allergic drug and give SP 2 ☐ Will prescribe another antimalarial drug aside SP 3 ☐ Don't know 4 ☐ Other, specify……	

SECTION 3

In this section, I would like to ask questions on your workload, availability of SP stock, available motivating factors, training sessions and supervisory services

	Staff motivation and workload	**Response**	**Code**
Q19	Averagely how many pregnant women do you attend to in a day	…….	
Q20	Are you satisfied with all the working conditions surrounding the ANC unit	☐Yes/1 ☐No/0	Q20mt
	Staff training	**Response**	**Code**
Q21	Have you had any training in IPTp before	☐Yes/1 ☐No/0	Q21tg
Q22	If yes, was it helpful	☐Yes/1 ☐No/0	Q22tg

Q23	How many times in the last twelve months did you have training on IPTp?	……..	Q23tg
	Staff supervision and monitoring	**Response**	**Code**
Q24	Did you have any supervisory/monitoring visits at your unit last year	☐Yes/1 ☐No/0	Q24sm
Q25	If yes, how many times during the last year did you have monitoring/supervisory visits for IPTp?	…….	Q25sm
Q26	Who did the monitoring/supervision	…….	Q26sm
	IPTp training manuals and SP availability	**Response**	**Code**
Q27	Does your facility provide you with IPTp training materials	☐Yes/1 ☐No/0	Q27sp
Q28	Have you sourced and read any IPTp training material in the last 6 months	☐Yes/1 ☐No/0	Q28sp
Q29	Have you experienced a shortage of SP in the last 6 months	☐Yes/1 ☐No/0	Q29sp

APPENDIX IV

CHECKLIST NUMBER | | | |

Checklist for Health Worker IPTp-SP Adherence to WHO IPTp-SP treatment guidelines

No	ADHERENCE TO IPTp-SP RECOMMENDATIONS	Response	Code
Q1	Did HCW confirm the duration of pregnancy	☐Yes/1 ☐No/0	Q1ad
Q2	Did she ask if the client is on other any medications such as co-trimoxazole	☐Yes/1 ☐No/0	Q2ad
Q3	Did HCW administer the required dosage	☐Yes/1 ☐No/0	Q3ad
Q4	Did the client take the drug in front of the health worker	☐Yes/1 ☐No/0	Q4ad
Q5	Did HCW record on the ANC booklet and ward register	☐Yes/1 ☐No/0	Q5ad
Q6	Did the HCW inform the client on when the next dose is due	☐Yes/1 ☐No/0	Q6ad
Q7	Did the HCW inform the client to report adverse reactions	☐Yes/1 ☐No/0	Q7ad

APPENDIX V

FACILITY ASSESSMENT

Facility general information

No	Question	Response	Code
Q1	Date of Survey		Q1date
Q2	code		Q2id
Q3	Name of District		Q3district
Q4	Name of facility		Q4facility

Observation of facility practices on IPTp-SP treatment guidelines

Q5	Health education program drawn for the quarter includes MIP	☐Yes/1 ☐No/0	Q5ff
Q6	Health education program drawn for the quarter includes IPTp	☐Yes/1 ☐No/0	Q6ff
Q7	Health talk given at ANC on day of visit	☐Yes/1 ☐No/0	Q7ff
Q8	Health talk given that day included malaria in pregnancy	☐Yes/1 ☐No/0	Q8ff
Q9	Health talk given that day included IPTp	☐Yes/1 ☐No/0	Q9ff
Q10	Presence of posters of IPTp/MIP on the wall	☐Yes/1	Q10ff

		☐No/0	
Q11	SP available at ANC	☐Yes/1 ☐No/0	Q11ff
Q12	Practice of DOT	☐Yes/1 ☐No/0	Q12ff
Q13	Presence of free, clean, safe water for DOT	☐Yes/1 ☐No/0	Q13ff

APPENDIX VI

Participants' Information Sheet and Consent Form

Title of study	Factors influencing health workers adherence to the WHO IPTp-SP recommendation, northern region, Ghana
Objective of study	The study aims to assess the factors associated with adherence to the current WHO recommendation of IPTp-SP among health workers in the Northern Region of Ghana
Name of principal investigator	Abdul Gafaru Mohammed (mohammedabdulgafaru46@gmail.com)
Name of supervisor	Dr Harriet Affran Bonful
Information for participants	I am an MPhil student of School of Public Health, University of Ghana- Legon. I am conducting a study to assess factors influencing health workers adherence to the who IPTp-SP recommendation, northern region, Ghana, in partial fulfill of the requirement of a master of Philosophy Applied Epidemiology and Disease Control. Your participation and honest information in this study will be most appreciated.
Procedure	You will be asked some questions as you are relaxed for information
Risk	There is no direct risk in participating in this study. You may however be required to answer few questions from research assistants that will frequently visit your house

	during the study period.
Benefits	There are no direct benefits from this study. However, results from this study will be used to improve IPTp activities in the region and the country as a whole.
Confidentiality	Be assured that all information obtained from you will be treated with utmost confidentiality and used strictly for the purposes of the study. You will not be associated with the information provided during the study.
Right to refuse	You have the right to refuse to take part in this study. You may also freely withdraw at any point in the study.
Consent	The content of this form and the purpose of the study and the risk and benefits have been read and explained to me in the language I understand. I do hereby give my consent to participate in the study.
Signature/thumb print of participant	
Date	
Signature of Investigator	
Date	
Contact of investigator	
Contact the following persons for further clarifications or questions	Dr Harriet Affran Bonful (024 427 1821) haefua@gmail.com

	Nana Abena Apatu (0503539896) ethics.reseach@ghsmail.org

APPENDIX VII

PRE-TEST REPORT

The pre-testing of the data collection tools was carried out in the Sunyani Municipal hospital on the 25th of April, 2021. Ten nurses and midwives from the antenatal care unit were recruited to respond to the questionnaire.

Through the hospital administration, we were led into the ward by one of the facility administrators. On arrival, we explained to the ward in charge our purpose and was allowed to sample 10 of the staff in the ward. We proceeded to explain the purpose of the study to the participants and administered the questionnaire to each of them with a pen each.

Observations made During the Pre-Testing Process

Semi-structured questionnaire

Study participants spent an average of 10 minutes responding to the semi-structured questionnaire

Study participants identified problems with the following questions

Question 17

The correct response to this question was 16 weeks, but 16 weeks was not part of the possible responses to the question

Question 21

There were two possible responses to this question, though we desired only one answer to the question

Question 28

The question was not complete to warrant understanding and answering of it

Question 29

Space should have been provided for respondents to fill in, but we instead added possible responses

Question 31

Space should have been provided for respondents to fill it, but we instead added possible responses though the question was not one to be given possible responses

Question 32

Space should have been provided for respondents to fill it, but we instead added possible responses

Checklist 1 (observation of health staff practices)

The principal investigator did the observation of health care staff practices. It took averagely 8 minutes for an ANC health care staff to attend to and discharge a pregnant woman who comes for IPTp-SP services. Ten checklists were used, one for each respondent. The observation of their practices took averagely 8 minutes too. All the indicators on the checklist were apt, and no challenges were encountered in observing their practices.

Checklist 2 (observation of health facility factors)

A single checklist was used to observe the health facility-related factors that influence adherence to IPTp recommended practices by health care staff in the municipal hospital. The principal investigator did the observation. It took averagely 5 minutes to observe and check all indicators on the checklist. A challenge encountered in the observation was that some indicators were not pasted, and we had to ask the ward in charge to ascertain if there were any at the ward and, if yes if we could see them. For example, the health education program drawn quarterly if he contains plans on IPTp.

Address of issues detected through pre-testing of data collection tools

Semi-structured questionnaire

Question 17

Response option 2, which was 12 weeks, was replaced with 16 weeks which was the correct response.

Question 21

Response option 2, which was 12 weeks, was replaced with 16 weeks to make option 1 "< 12 weeks" the only correct response.

Question 28

The last words of the question, which were missing due to typographical errors, were added to make the question complete to warrant answering.

Question 29

The possible responses to this question were taken out and a space provided for the response to be written there

Question 31

The possible responses to this question were taken out and a space provided for the response to be written there.

Question 32

The possible responses to this question were taken out and a space provided for the response to be written there.

Checklist 1 (observation of health staff practices)

Research assistants will be trained and cautioned on how to keenly observe health care staffs practices so as not miss out on any of the practices

Checklist 2 (observation of health facility factors)

In addressing this challenge, research assistants will be trained on how to seek information on some of these indicators that might not be seen pasted on the ward's walls.

SUMMARY OF PRE-TEST RESULTS

4.1 Sociodemographic characteristics of health care workers

A total of 10 health care workers from the ANC unit of the Sunyani municipal hospital was recruited for the pre-testing of the data collection tools. The average age of study participants was 31.1 (sd=13.76). Males represented 50.0% (5/10) of the total participants interviewed. Of the ten health care workers, the majority, 60.0% (6/10) were nurses, whiles 30% (3/10) and 10%.0% (1/10)

were midwives and public health practitioners, respectively. In terms of the level of education, the majority were diploma holders 80.0% (8/10), 50% (5/10). Half, 50.0 % (5/10), had been providing obstetrics care during the antenatal period for less than five years (**Table 1**).

Table 1: Sociodemographic characteristics of health workers

Characteristics	**Frequency (N)**	**Percentage (%)**
Sex		
Male	5	50.0
Female	5	50.0
Length of practice		
> 5	5	50
5 - 10	5	50
Cadre		
General nurse	6	60
Midwife	3	30
Others	1	10
Education		
Certificate	1	10
Diploma	8	80
Degree	1	10
	Mean	**Sd**
Age	31.11	3.76

4.2 Health facility-related factors of IPTp administration

Of the total number of health workers interviewed, the results showed that 70.0% (7/10) had received training on the updated current IPTp guidelines on IPTp administration; however, a significant proportion of 30% (3/10) had not received any training. Among those trained, only 20% (2/10) received their training in the last 12 months. The majority of health care workers, 60% (6/100) had received supervisory visits in the previous 12 months. The regional teams made these visits. With job satisfaction, 30% (3/10) were satisfied with their current working condition at the ANC unit. Health care workers all indicated the availability of SP. There were no available IPTp training manuals and free water for administration in their facility. On average, less than half, 30% (3/10%), of the health workers attended more than 30 pregnant women and above weekly (**Table 2**).

Table 2: health facility-related factors of IPTp administration

Variables	**Frequency (N)**	**Percentage (%)**
Staff workload		
0 – 30	7	70.0
>30	3	30.0
Training		
Yes	7	70.0
No	3	30.0
Monitoring		
Yes	6	60.0
No	4	40.0
Job satisfaction		

Satisfied	3	30.0
Not satisfied	7	70.0
Availability of IPT training manual		
Available	0	0
Not available	10	100.0
Availability of SP		
Available	10	100.0
Not available	0	0
Free, safe and clean drinking water		
Available	0	0
Not available	10	100.0

4.3 Health workers individual-based factors of IPTp administration

Regarding the current WHO recommendation of IPTp-SP, more than two-thirds (70%) of the health workers were aware of it, while 50% (5/10) of them had a good knowledge of its administration (**Table 3**).

Table 3: Health workers individual-based factors of IPTp administration

Variables	**Frequency (N)**	**Percentage (%)**
Awareness of WHO updated guidelines		
Aware	7	70.0
Not aware	3	30.0
IPTp knowledge level		

Moderate	5	50.0
High	5	50.0
Personal access to IPTp-SP manuals		
Yes	6	60.0
No	4	40.0

4.3.1 Health workers awareness and knowledge of intermittent preventive treatment of malaria in pregnancy

All health workers knew SP as the recommended drug for IPTp administration in Ghana. Almost all, 90.0% (9/10), knew the minimum recommended dose of IPTp. The majority, 50% (5/10) reported IPTp is commenced in the 12th week; however, 30% (3/10) and 20% (2/10) choose 16th week and 20-24th week, respectively. More than half 60% (6/10) of the respondents the health workers mentioned three doses as the total number of SP to be administered throughout the pregnancy, with 30% (3/10) and 10% (1/10) reporting more than three doses and two doses respectively as the required number throughout the pregnancy. Almost all the health workers, 90% (9/10) thinks there should be four weeks interval doses, with up to delivery mentioned by 20% (2/10) as the time IPTp should be stopped. Of the health workers studied, 70% (7/10) believe SP should be taken in front of the health care worker, with 30% (3/10) saying SP can be taken at home. In terms of conditions that can hinder the update of SP, 60% (6/10) mentioned G6PD in the pregnant woman, with a significant number 40% (4/10) choosing vomiting as a condition contraindicated in SP uptake (**Table 4**).

Table 4: Health workers awareness and knowledge of intermittent preventive treatment of malaria in pregnancy

Health workers knowledge of IPTp-SP	**Frequency (N)**	**Percentage (%)**

Drug for IPTp		
SP (Sulfadoxine Pyrimethamine)	10	100.0
Quinine	0	0
IPTp minimum dose		
Three	9	90.0
More than 3	1	10.0
Total recommended doses		
Two	1	10.0
Three	6	60.0
More than 3	3	30.0
Gestation age to commence IPTp		
12th week	5	50.0
16th week	3	30.0
20-24 weeks	2	20.0
Time interval between doses		
Two-weeks	1	10.0
Four-weeks	9	90.0
End of IPTp		
Up to 32 weeks	3	30.0
Up to 34 weeks	4	40.0
Up to delivery	2	20.0
Don't know	1	10.0

Recommended place to swallow SP		
In front of ANC staff	7	70.0
At home	3	30.0
Period SP not recommended		
12 weeks	10	100
Conditions that hinder SP uptake		
Vomiting	4	40.0
G6PD	6	60.0
Positive for malaria		
Withhold SP and treat with ALU/Quinine	10	100
Allergic to SP		
Stop SP completely	10	100

4.4 Health workers adherence to IPTp treatment guidelines

Intermittent Preventive Treatment of malaria was being implemented in the health facility visited. Practices related to IPTp included confirming the due date for the SP (50.0%), establishing the pregnant woman is not on other drugs like co-trimoxazole (20.0%), administering the required dose (100.0%), the drug taken in front of the health worker (80.0%), informing pregnant women of the next dose (90.0%), informing pregnant women to report any reaction to the drug (20.0%) and documentation of dispensed doses in the patient card (100.0%) (**Table 5**).

Table 5: Health workers adherence to IPTp treatment guidelines

Adherence to IPTp treatment guidelines	**Frequency (N)**	**Percentage (%)**
Confirmed gestational period		

Yes	5	50.0
No	5	50.0
Report adverse reactions		
Yes	2	20.0
No	8	80.0
Proper documentation		
Yes	10	100
No	0	
DOT		
Yes	8	80.0
No	2	20.0
Other any medications such as co-trimoxazole		
Yes	2	20.0
No	8	80.0
Required dosage		
Yes	10	10
No	0	0
Next dose		
Yes	9	90.0
No	1	10.0
Level of practice		

Adequate	10	100
Inadequate	0	0