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SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY: UPTAKE OF THREE-TO-FIVE DOSE REGIMEN OF SULPHADOXINE PYRIMETHAMINE AT OSU GOVERNMENT MATERNITY HOME

BY

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DECLARATION

I, Ivy Owusu-Boateng, hereby declare that except for the other people's investigation which have been duly acknowledged, this dissertation is the result of my own original research, and that this dissertation, either in whole or in part has not been presented elsewhere for another degree.

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DR. FRANCIS ANTO

(SUPERVISOR)

DATE _____

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DEDICATION

This dissertation is dedicated to my husband Mr. Deric Owusu-Boateng and our sons, Nana, Owuraku and Adom.

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INTEGRI PROCEDAMUS

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ABSTRACT

Introduction: Malaria in pregnancy poses great risk to both mother and foetus. In Ghana, among pregnant women, malaria accounts for 3.4% of deaths and 16.8% of all admissions. In 2014, Ghana updated its policy on intermittent preventive treatment of malaria in pregnancy with sulphdoxine pyrimethamine (IPTP-SP) to reflect the updated policy of WHO (2012) of IPTP-SP.

The purpose of this study is to determine the level of uptake of three to five dose of sulphdoxine pyrimethamine (SP) and to determine the stock levels of SP at the Osu Government Maternity Home.

Methods: A crossectional study was carried out among 255 nursing mothers who have delivered within the past twelve weeks using interviewer structured questionnaire. Antenatal record books of mothers were reviewed to collect accurate information on their ANC characteristics during their recent pregnancy. Data on SP stock levels and stock out at the pharmacy for the past six months prior to the study were also reviewed using data extraction form. Data collected was analysed using Stata version 12. Pearson Chi-Square/Fischer Exact was used to test association between uptake of IPTp-SP and measured variables, and also further logistic regression analysis was carried out to determine the strength of antenatal indicators on uptake of IPTp-SP.

Results: The proportion of uptake of three to five doses of IPTp-SP among the study participants were IPT3 (87.5%), IPT4 (55.7%) and IPT5 (14.5%). The proportion of women who received the first dose of IPTp-SP at sixteen weeks was 21.3%. Women who made ≥four visits were more likely to receive ≥ three doses of IPTp-SP than those who made < four visits (AOR=4.57, 95%CI 1.15-18.16, $p<0.05$). Women receiving the first dose of IPTp-SP in the third trimester were less likely to receive ≥ three doses of IPTp-SP

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than those who received in the second trimester (AOR=0.04, 95%CI 0.01-0.16, p<0.05). Stock levels of SP were adequate to meet the demands of IPTp-SP by the pregnant women at the Maternity Home for the period of review.

Conclusion: The uptake of ≥ three doses of IPTp-SP was high in the study area. Frequent visits to the antenatal clinic and early uptake of the first dose of IPTp-SP by pregnant women were found to be necessary to achieve a high uptake of IPTp.

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TABLE OF CONTENTS

INTEGRI PROCEDAMUS

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University of Ghana http://ugspace.ug.edu.gh

University of Ghana http://ugspace.ug.edu.gh

LIST OF TABLES

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

LIST OF TABLES FIGURES

Figure **Page**

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LIST OF ABBREVIATIONS

ANC	Antenatal Care
CWC	Child Welfare Clinic
DHS	Demographic Health Survey
DOT	Direct Observe Therapy
GHS	Ghana Health Service
IPT	Intermittent Preventive Treatment
IPTp-SP	Intermittent Preventive Treatment of Malaria in Pregnancy with Sulphadoxine Pyrimethamine
ITN	Insecticide Treated Net
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in Pregnancy
MOH	Ministry of Health
NMCP	National Malaria Control Programme
OPD	Out Patient's Department
PMI	President's Malaria Initiative
SP	Sulphadoxine Pyrimethamine
WHO	World Health Organisation

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Malaria is a parasitic disease caused by a protozoan of genus *Plasmodium.* The main species of the parasite are *Plasmodium falciparum, P. malariae, P.ovale, P.vivax.* In recent years, some human cases of malaria have also occurred with *Plasmodium knowlesi,* a specie that causes malaria among monkeys and occurs in certain forest areas of South-East Asia. The mode of transmission to humans is from the bite of an infected female *Anopheles* mosquito. The parasite enters the liver, multiplies and later is release into the blood stream. The parasites attack the red blood cells, resulting in the rapture of the red blood cells leading to the breakdown of haemoglobin and subsequently causing anaemia in the infected person (WHO Epidemiological Approach, 2013).

Estimates show that 3.4billion people are at risk of being infected with malaria globally. About 80% of cases and 90% of death occur in sub-Saharan Africa (WHO report, 2013). In Ghana malaria accounted for 38.9% of all out-patients illness and 38.8% of all admission in 2012. Malaria is a major cause of illness and death particularly among children and pregnant women. This is due to their low immunity making them the most vulnerable group. Infection rates are especially high in women in their first and second pregnancies (Garner & Gulmezoglu, 2006). Among pregnant women, malaria accounts for 3.4% of deaths and 16.8% of all admissions that is due to malaria (Guidelines for Case Management of Malaria in Ghana, 2014).

Malaria infection in pregnancy contributes to severe anaemia, which affects the mother. This may lead to maternal death (Desai et al., 2007). Malaria infection in pregnancy also results in the infection of the placenta of foetus. Infection of the placenta prevents the supply of oxygen and nutrients to the foetus leading to miscarriage, stillbirths and low

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birth weight. Low birth weight contributes to growth retardation which is a major cause of neonatal morbidity and mortality (Odhiambo, 2011).

To control the effects of malaria in pregnancy, WHO recommended packages of interventions for areas of moderate to high transmission of malaria. These packages includes

1. Promotion and use of insecticide treated-nets (ITN).
2. Administration during pregnancy of intermittent preventive treatment with sulphadoxine pyrimethamine (IPTp-SP).
3. Appropriate case management through prompt and effective treatment of malaria in pregnant women (WHO Policy Brief, 2013).

Intermittent preventive treatment (IPT) is the use of an anti-malaria drug given in treatment doses at predefined intervals to clear a presumed burden of parasites. IPT of malaria in pregnancy (IPTp) is based on the assumption that every pregnant woman living in areas of high malaria transmission has malaria parasites in her blood or placenta (Antwi, 2010).

In 2012, WHO updated the recommendations for IPTp-SP and now requires that, SP should be given to all pregnant women at each antenatal care (ANC) visit until delivery. SP administration should commence early in the second trimester, with doses given at least one month apart. Four ANC scheduled visits are recommended, with the first visit in the first trimester and SP should be administered during these visits (WHO Global Malaria Programme 2012).

In Ghana, the National Malaria control Programme (NMCP) also updated its policy and now recommends a minimum of three doses of IPTp-SP. This should be given monthly

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starting from 16 weeks of gestational age until delivery. The implementation of this policy started in 2014. The old policy which was implemented in 2003, recommended the use of three doses of IPTp-SP, starting from 16 weeks and given before 36 weeks of gestation. The Strategic Plan for Malaria Control in Ghana, 2005- 2015 has the objective to reach 100% of pregnant women with IPTp by 2015. Thus all pregnant women should be put on IPTp-SP to prevent malaria in pregnancy.

1.2 Problem Statement

Malaria is a major public health problem. The most vulnerable groups are children and pregnant women. Estimates show that malaria causes about 3.4% of maternal deaths and 16.8% of all admissions of pregnant women in Ghana (Guidelines for case management of malaria, 2014). To prevent malaria in pregnancy, WHO recommended among others the use of intermittent preventive treatment (IPT) with sulphadoxine pyrimethamine (SP).The target set by the Roll back Malaria (2011) was that 100% of pregnant women should be put on IPTp by 2015.

In the year 2000, WHO came out with the first policy on use of IPT_p of malaria with SP. The recommendation was to give a minimum of two doses of SP during pregnancy starting from the second trimester. The National Malaria Control Programme of Ghana (NMCP) in 2005 adopted a maximum of three doses of IPT_p policy using SP. In October 2012 the WHO reviewed its recommendation on IPT_p-SP. The recommendation was that SP should be given to all pregnant women at each scheduled antenatal care visit starting from the second trimester. The expectation is that most women will have four antenatal care visits and therefore a dose of SP should be given up to the time of delivery without safety concerns.

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Starting in 2014 the NMCP recommends a minimum of three doses regimen of IPTp-SP with the first dose administered at week 16 of gestation and given monthly until the time of delivery. The target set is that, 100% of pregnant women should receive IPTp-SP (Strategic Plan 2005-2015). It is well known that the earlier policy involving fewer doses had challenges meeting the set targets. According to the World Malaria Report 2013, in 2012, among African countries, only 23% of pregnant women received three doses SP.

IPTp three up take in the Osu-Klottey district where the Osu Government Maternity Home is located for the past three years has been low (40.2% in 2011; 45.1% in 2012 and 33.6% in 2013). Uptake for January to December, 2014 (current policy) was 69.2%, 49.8%, 34.0%, 5.5% and 1.1% for IPT_1, IPT_2, IPT_3, IPT_4 and IPT_5 respectively (DHIMS Data). The purpose of the current study was to establish the level of uptake of IPTp-SP under the new policy at the Osu Government Maternity Home, as this could serve as baseline for the eventual evaluation of the programme in the area.

1.3 Conceptual Framework

This gives a general overview of factors that may contribute to the IPTp-SP coverage rate in the Osu Government Maternity Home and how these factors are linked to each other. This gives a description of the framework in which the study will be carried out.

The socio-demographic factors of the respondents give their general characteristic such as the age, marital status, educational background, number of children and occupation. These factors tend to influence healthcare seeking behaviour of the respondents and may likely affect ANC attendance and hence IPTp-SP coverage. Also factors such as number of ANC visits, the gestational age at first ANC visit and the availability of SP at ANC visit will contribute to IPTp-SP coverage. Early reporting at ANC by the pregnant mother, will give her a number of chances to receive IPTp-SP before delivery.

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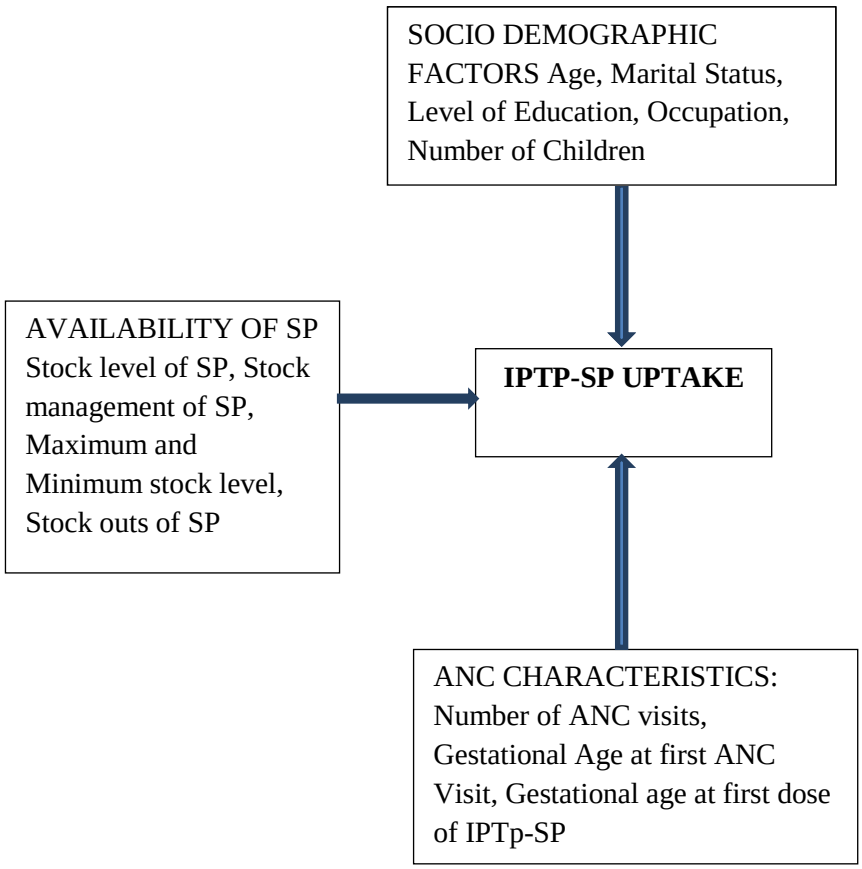
The stock level of SP at the pharmacy and ANC centre will ensure that there are no interruptions in the programme. This will intend influence IPTp uptake.

Figure 1: Conceptual framework of IPTp-SP uptake



1.4 Justification

In Ghana IPTp-SP started in the year 2003 with scale-up country wide in 2005. Currently the new recommendation for IPTp-SP use commenced in 2014. This research is being carried out to determine the level of uptake of three to five doses of IPTp-SP. The findings of this study will inform the management of Osu Government Maternity Home and the Osu Klottey sub-district on the strategies to take to improve the uptake of IPTp-SP with the new policy and also the attainment of high IPTp coverage rate. The findings of this study would provide information that will be useful to the Regional Health Directorate and NMCP in assessing its IPTp programme in the country. This research will serve as

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baseline information for subsequent studies in the country. It will also help identify new strategies for the design of IPTp implementation programmes in the country.

1.5 Objectives

1.5.1 General Objective

To determine the level of uptake of the three-to-five-dose regimen of intermittent preventive treatment with sulphadoxine pyrimethamine for control of malaria in pregnancy at the Osu Government Maternity Home.

1.5.2 Specific Objectives

1. To determine the proportion of pregnant women receiving three-five doses of sulphadoxine pyrimethamine at term.
2. To determine the proportion of pregnant women receiving the first dose of sulphadoxine pyrimethamine at 16 weeks of gestation
3. To determine the stock levels of SP at the Maternity Home for the past six months.

1.5.3 Research Questions

1. What is the proportion of pregnant women who receive three-five doses of IPTp-SP before delivery at the Maternity Home?
2. What is the proportion of pregnant women who receive IPTp-SP at16weeks of gestational age at the Maternity Home?
3. To what extent does the stock levels of SP affect the uptake of IPTp-SP among pregnant women at the Maternity home?

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CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Malaria in Pregnancy Global Vision and Targets

Malaria is a major public health concern with the most affected being in sub-Saharan Africa. The Global Malaria Action Plan (GMPA) for Roll Back Malaria has the vision of making the world free from the burden of malaria by 2015, and that the malaria-specific MDG is achieved. Malaria will then not be considered as the major cause of mortality in the world. The target set for the control of malaria in pregnancy by the Global Strategic Plan 2005-2015 in areas of high transmission is that 100% of pregnant women should receive intermittent preventive treatment (WHO, 2008).

2.2 Ghana's target for Control of Malaria in Pregnancy

The National Malaria Control Programme (NMCP) of Ghana in its Strategic Plan (2005-2015) for the control of malaria in pregnancy has its set objectives as:

1. To ensure that all registrants at ANC are on appropriate IPTp (receive at least 2 or more doses of SP under direct observe treatment by 2015
2. To ensure that 100% (All) pregnant women use at least one personal protective measure by 2015.

All pregnant women will receive three doses of SP using the directly observed therapy in the antenatal clinics.

2.3 WHO Recommendations for IPTp-SP

To prevent malaria in pregnancy, WHO recommends the use of IPT of malaria in pregnancy with sulphadoxine pyrimethamine in countries with high malaria transmission

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(World Malaria Report, 2013). SP is an anti-malarial drug, which has been found to be safe to use in pregnancy and has no adverse effects on the foetus (WHO, 2013). It prevents the adverse effects of malaria on the pregnant woman and the unborn child. Such adverse effects include placental infection, clinical malaria, maternal anaemia, foetal anaemia, low birth weight and neonatal mortality. It is highly cost effective for both prevention of malaria in pregnancy and reduction of neonatal mortality in areas with moderate or high malaria transmission (Sicuri et al., 2010).

IPT is the administration of a full curative treatment dose of an effective anti-malaria drug at predefined intervals during pregnancy(Kibusi, Kimunai, & Hines, 2015). WHO (2000) recommended the use of a minimum of two doses of SP to prevent malaria in pregnancy. This should be administered in the second trimester and not later than thirty-six weeks before delivery.

In 2012, WHO updated recommendations on the use of IPTp-SP. This was as result of meta-analysis of seven trials evaluating IPTp-SP. The findings of which proved that three or more doses of IPTp-SP were associated with higher mean birth weight than two doses of IPTp-SP. The relative risk reduction for low birth weight was estimated to be 20% (95% CI 6-31) and absolute risk of reduction of 33 per 1000 births (95% CI 10-52). This effect was consistent across a number of SP resistant levels. There was less placental malaria associated with three plus dose group. There was no difference in serious adverse events between the two groups (Kayentao, Garner, Macarthur, & Luntamo, 2013). The new recommendation now is the use of IPTp-SP at each antenatal care visit. Four antenatal care visits are required. SP should be given at monthly interval, in the second trimester and the last dose administered up to time of delivery without safety concerns (WHO, 2013).

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2.4 IPTp-SP Policy and Coverage in Ghana

The NMCP started implementation of IPTp-SP in 2003 in some districts in the country. There was a scale up of the programme in all districts in the country in 2005. It recommended three doses of IPTp-SP, starting at sixteen weeks of gestation, given at monthly intervals and before thirty-six weeks for every pregnant woman (MOH, 2008).

The NMCP reviewed its policy on IPTp-SP in 2014 to reflect the new recommendations of WHO (2012). The new policy requires that, a minimum of three doses of IPTp-SP, starting from sixteen weeks of gestational age, given monthly until time of delivery (MOH, 2014).

According to GHS Annual Report 2011, the proportion of pregnant women achieving four plus antenatal visits for a three year period were: 88% (2009), 82.4% (2010) and 74% (2011). There was a slight increase in ANC coverage: 92.1% (2009), 93.3% (2010), and 94.4% (2011), despite a decline in the number of visits. Also the proportion of women who received two or more dose of IPTp during their pregnancy in the last two years was reported to be 44% (DHS, 2008) and 64% (MICS, 2011). This shows a significant progress, however the 100% target set by NMPC is yet to be achieved.

2.5 IPTp-SP as National Policy and IPTp-SP Coverage in sub-Saharan Countries

Most countries in Africa have adopted WHO policy on IPTp-SP for the control of malaria in pregnancy. A survey shows that at least thirty-nine sub-Saharan African countries have policies for the prevention of malaria in pregnancy [MIP] (Gomez et al 2014). Most countries have adopted the WHO's three-pronged approach to prevention of MIP. These include (i) the promotion and distribution of long-lasting insecticide nets to pregnant women (ii) intermittent prevent treatment with SP (iii) prompt diagnosis and effective treatment of malaria cases and maternal anaemia (WHO, 2013).

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A study was carried out in five African countries namely Kenya, Mali, Mozambique, Mainland Tanzania and Uganda, to review their national-level documents on IPTp-SP administration. These documents included, MIP polices, guidelines and training manual. The documents were assessed to find whether they reflected the WHO recommendations for IPTp-SP. Four countries recommended the first dose of IPTp-SP at twenty weeks or later (instead of sixteen weeks). Three countries restricted the first and second of IPTp-SP doses to specific gestational weeks. The study concluded that inconsistencies in guidelines have the potential to cause confusion and lead to incorrect practises among health workers resulting in low coverage of IPTp-SP. Most countries have not yet updated their documents to reflect WHO 2012 recommendations (Gomez et al., 2014). The world malaria report (2013) indicates that, among African countries only 23% pregnant women received at least three doses of IPTp-SP.

Malawi has been at the forefront of policy development and implementation of IPTp-SP. The policy was introduced in 1998 and revised in 2002. It recommended at least two treatment doses of SP. A survey done indicates that, 54% of pregnant women received two or more doses of IPTp-SP (MICS, 2012). This figure is below the target of 80% for all pregnant women receiving ANC services (Malawi NMCP Strategic Plan 2011-2015). Efforts to increase uptake of IPTp-SP has been through training of health care providers and community-based messages to encourage women to attend ANC early in their pregnancy. The NMCP in conjunction with PMI are taking further steps to update IPTp-SP policy to three or more doses of SP as recommended by World Health Organisation (WHO, 2012).

In Tanzania IPTp-SP was recommended in 2001(PMI, 2014). But effective implementation started several months later after orientation/training of health workers. Since its implementation, the proportion of pregnant women receiving two doses of IPTp-

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SP increased from 29% to 65% between 2001 and 2007. However, a drop was observed in 2007, with proportion as low as 27%, but increased to 33% (NBS & ICF 2009, 2011). The low coverage rate could be due to inconsistencies in their national guidelines and guidelines from agencies operating in the district levels. Whiles the national guideline recommends two IPTp-SP doses, the agencies were recommending three doses. This situation had created confusion among health workers in Tanzania (Mubyazi et al., 2008).

A study carried out in Gabon to determine level of ANC attendance, intermittent preventive treatment and bed net use during pregnancy among 442 women at the end of their pregnancy, revealed that 71.5% made at least four ANC visits, 84.1% were given IPTp-SP, out of which 57.4% received at least two doses. It was further revealed that despite high level of ANC attendance IPTp-SP coverage of two doses did not get to the set target of 80% (Bouyou-Akotet, Mawili-Mboumba, & Kombila, 2013).

A study conducted by Toure et al (2014) in Cote d'Ivoire to determine IPTp-SP coverage and efficacy of SP revealed that only 43.3% of pregnant women received at least two doses of IPTp-SP although a high proportion (90.4%) of women received ANC services and made two or more visits. Sangare et al., (2010) also conducted a study in Uganda and reported that 89.3% of study participants reported for at least two ANC visits but only 31.3% received a least two doses of IPTp-SP. Another study conducted in rural Kenya showed that 41% of respondent received at one dose of IPTp-SP and 21% received at two doses of IPTp-SP. IPTp-SP coverage in Africa has been low with regards to this reported coverages.

2.6 Socio-demographic factors influencing uptake of IPTp-SP

Socio-demographic factors are factors which tend to influence the choice of action and behaviour in relation to a perceived problem. Studies conducted on IPTp-SP have shown

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that socio-demographic factors tend to influence the level of uptake of IPTp-SP. According to the World Malaria Report 2014, factors such as age under 20years, having no formal education or living in a rural area were significantly associated with pregnant women not receiving IPTp-SP. Kisibu et al., (2015) also reported that pregnant women having first or second child had higher odds of completing recommended IPTp-SP dosages than those who have had two or more children. Also being married or living with partner were significantly associated with higher uptake of IPTp-SP than women who never married or were divorced. According to Exavery et al., (2014) women with secondary or higher education were almost twice as likely as those who had never been to school to have received higher IPTp-SP doses during pregnancy (RRR=1.93; 95%CI= 1.04-3.56). Another study conducted in rural Western Kenya identified being single and having a lower level of education as factors associated with IPTp-SP uptake (Ouma et al., 2007). These findings were not consistent with that reported by Marchant et al., (2008). In their study none of the socio-demographic factors were associated with uptake of IPTp-SP.

2.7 Antenatal attendance characteristics influencing uptake of IPTp-SP

2.7.1 Gestational age at first ANC visit

The timing of IPTp-SP administration may depend on the gestational age at which the pregnant woman register at the ANC. A late registration will result in late administration of IPTp-SP. A study conducted by Anchang-Kimbi et al., (2014) to evaluate the determinants of ANC clinic attendance and uptake of IPTp-SP among parturient women, reported that a higher proportion of women who made the first visit during the third trimester received only one dose of IPTp-SP. Meanwhile, women who made early first ANC attendance were more likely to receive two or more doses of IPTp-SP (OR= 0.4; 95%CI =0.2-0.7). This findings were contrary to that reported by Gross et al (2011). In

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their study they found out that facility and policy factors are greater barriers to IPTp-SP coverage than women's timing of ANC attendance. Exavery et al., (2014) reported that early ANC initiation was associated with a higher likelihood of higher uptake of IPTp-SP. Similar findings by Kibusi et al (2015) revealed that having first ANC visit in the first or second trimester was associated with higher uptake of IPTp-SP than those having the first visit in the third trimester.

2.7.2 Frequent visits to ANC clinic

Frequent visits to the ANC center have resulted in higher uptake of IPTp by pregnant women. Ndyomugyenyi et al., 2010 conducted a study to determine the relationship between ANC visits and coverage of IPTp-SP, and barriers to IPTp-SP. Of the four hundred and fifty study participants, only 21.2% made four or more visits. Access to two or more doses of IPTp-SP increased with the number of ANC visits. The findings from this study also revealed that 28.9% of study participants made two or more ANC visits, giving them the opportunity to have received two or more doses of IPTp-SP however these pregnant women did not receive IPTp-SP. They identified SP-stock outs and irregular ANC attendance as barriers to uptake of IPT-SP. They concluded that frequent visits to ANC do not seem to ensure access to IPTp-SP in the presences of other barriers.

Another study conducted by Olorunda et al., (2013) in Nigeria to determine the relationship of ANC attendance and IPTp-SP uptake and also factors that could affect IPTp uptake reported that 62.2% of study participants made four or more visits to the ANC and adherence to IPTp-SP increased with the number of ANC visits. Adherence to IPTp-SP was significantly higher among those who made four or more visits compared to those who made less than four visits.

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Other studies have also shown that frequent visits to antenatal care does not necessary translate into full coverage with IPTp-SP (Ouma et al., 2007; Kiwuwa & Mufubenga, 2008).

2.7.3 Gestational age at first dose of SP

Gestational age at which pregnant women take the first dose of IPTp-SP differ from country to country. This is based on recommendations by their national guidelines. In Ghana, the national policy on IPTp-SP administration recommends that IPTp-SP should be taken at sixteen weeks of gestation, whiles in Tanzania first dose is administered between 20-24 weeks of gestation. Mali and Kenya also recommends uptake of the first dose of SP at sixteen weeks. However Mozambique's national guidelines recommends the first dose of SP is given at twenty weeks (Gomez et al., 2014). However irrespective of the time for initiation of first dose, early uptake of first dose may be necessary to achieve complete schedule doses of IPTp-SP. Anders et al., (2008) reported that early uptake of IPTp-SP was found to be hampered by factors such as insufficient SP drug stocks or women's individual preferences. Additional factor could also be unexpected high proportion of women attending antenatal clinic before recommended gestation for administration of the first dose of IPTp-SP.

2.8 Health delivery system challenges to uptake of IPTp-SP

Some barriers to effective uptake of IPTp-SP have been identified. Systematic review of relevant literatures from Africa indicate that (i) implementation of IPTp policies is hampered by prevailing service delivery barriers, such as long waiting time, long distance to health facilities and poor service provider/client relations and (ii) drug stock-outs and poor management of information and supply chain impair sustain availability of SP.

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Targeting health system barriers which result in low coverage is necessary for a successful IPTp policy implementation(Thiam, Kimotho, & Gatonga, 2013)

A study carried out by Amoran et al., (2012), identified barriers such as SP stock out and lack of health education of the pregnant women, and that solving these challenges will increase IPTp-SP uptake. Diala, Pennas, Marin, & Belay, (2013) also identified some system-based challenges. These were stock out of SP, lack of provider knowledge of IPTp-SP protocol coupled with individual women's belief and lack of understanding of IPT. All these contributed to low uptake and adherence to IPTp-SP (Diala et al., 2013).

There have been reported cases of increasing resistance to SP as more than 94% of malaria parasites in pregnant women with asymptomatic parasitemia presenting at an ANC visit in Malawi had quintuple mutations for SP resistance (PMI, 2014).

2.9 Impact of IPTp-SP on Neonates

A study conducted in Offinso district of Ghana on the effect of SP on neonatal birth weight and its impact on Malaria in pregnancy revealed that SP administration during pregnancy reduces the burden of malaria and improve birth weights of neonates. Thus, successful implementation of IPTp-SP will improve birth weight of neonates and consequently reduce neonatal mortality (Tutu, Browne, & Lawson, 2011).

Another study was carried out in Mozambique on the impact of IPTp-SP administration on neonatal mortality using a placebo-controlled trial of IPTp-SP on 1030 pregnant women. New-borns of these mothers were followed up until twelve months of age to assess impact of SP in prevention of neonatal complications. Among the neonates that were followed, twenty died in the first week of life, of which 75% of these deaths were born to women in the placebo group and 25% to those who received IPTp-SP during pregnancy. There were fifty-eight infant deaths of which 60.4% occurred in children born to women who received

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placebo and 39.6% to women who received IPTp-SP. They concluded that malaria prevention with SP in pregnancy can reduce neonatal mortality and recommended the need to promote the implementation of IPTp-SP (Menéndez et al., 2010).

2.10 Effectiveness of SP as antimalarial

SP is an antimalarial used as a prophylaxis against malaria infection in pregnancy. It has been found to be safe, cheap and efficacious. Also its single-dose therapy lends itself to supervised administration and ensures compliance (Wilson et al., 2011). SP acts by blocking two enzymes involved in biosynthesis of folinic acid within the parasite. It is contraindicated in G6PD deficient individuals and those hypersensitive to sulphonamides (MIH, 2009). Folic acid at a dose of 5mg or more should not be given concomitantly with SP as this counteracts its efficacy as antimalarial (MOH, Drug Policy 2014). According to Radeva-Petrova et al., (2014) IPTp-SP has clinically important benefits on anaemia, parasitaemia in the mother and on birthweights of infants. Significant positive correlation of SP use with Hb level ($r=0.15$, $p<0.008$) was observed in a study conducted in Ghana by Tutu et al., (2011) to assess the effectiveness of SP and perception of it use in pregnant women. They reported that IPTp-SP was effective in the control of malaria and malaria related anaemia in pregnancy. Another study conducted in Ghana by Wilson et al., (2011) to evaluate the effectiveness of SP among pregnant women, compared IPTp-SP users and non-users. The study revealed that 58.4% of non- IPTp-SP users were anaemic compared with 22.8% of IPTp-SP users. Also 15.3% of IPTp-SP users had malaria compared with 44.7% of non- IPTp-SP users. Thus IPTp-SP is useful in preventing malaria and anaemia among pregnant women.

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CHAPTER THREE

3.0 METHODS

3.1 Study Design

A cross-sectional study was conducted at the Osu Government Maternity Home from May to June 2015. It involved the collection of data from nursing mothers who had delivered within the past twelve weeks. Data on Intermittent Preventive Treatment of malaria in pregnancy using sulphadoxine pyrimethamine (IPTp-SP) during their most recent pregnancy was extracted from the antenatal record books of the mothers. Additional relevant data pertaining to antenatal services was collected directly from the mothers using interviewer administered questionnaire. Also, data on receipt, stock levels and stock outs of SP for the past six months were collected from the pharmacy records of the health facility using data extraction form. Antenatal register at the antenatal centre was observed for daily issuing of SP to eligible pregnant women.

3.2 Study Area

The Osu Government Maternity Home is located in the Osu Klottey Sub-District which is one of the Sub-Metropolitan Districts of Accra Metropolitan Assembly. It is situated at the eastern part of the city of Accra and covers an area of approximately 6.59 kilometres square. It is bounded to the north by Graphic road through Ring road to Danquah circle, to the south by 28th February road, to the east by Korle stream through Okodan Street and to the west by the Kinbu road. It is divided into five zones. The Sub-District has seven government health facilities- one hospital, one polyclinic and five clinics. The study was carried out at Osu Maternity Home, one of the government health facility in the sub-district. It is found in the Osu zone which has a population of 47,909. It provides reproductive and child health services to women in their fertility age (15-49). Women in

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their fertility age form about 36% of the total population in the catchment area. Services offered include family planning, antenatal care, delivery, postnatal care, child welfare clinic, laboratory service and pharmacy service. The antenatal care service is offered daily except on Wednesdays. The delivery service renders a 24 hour service. There are nine beds in the lying-in ward and four beds in the labour ward. The postnatal and child welfare services are held on Wednesdays and Tuesdays respectively. There are twenty-four staffs at the facility. The annual report for 2013 indicated a total of 3,337 attendants at the antenatal care and a total of 963 attendants at postnatal clinic and child welfare clinic.

3.3 Study Population

The study population was made up of nursing mothers who had delivered within the past twelve weeks visiting the child welfare clinics (CWC) and postnatal clinics. Nursing mothers who have delivered beyond twelve weeks were excluded from the study to minimise the problem of recall of activities at time of IPTp-SP administration during their recent pregnancy.

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3.4 Variables Measured

Table 1: Study Variables

VARIABLES	OPERATIONAL DEFINITIONS	TYPE OF VARIABLE
Outcome Variable		
Uptake of IPTp-SP	Doses of SP received during pregnancy	Binary Variable
Independent Socio-demographic, characteristics		
Age	The age in years of the woman	Continuous Variable
Marital Status	Married or not married	Categorical Variable
Level of Education	Stage of education attained	Categorical Variable
Occupation	Self Employed or Government employed or unemployed	Categorical Variable
Number of children	The number of live births of the woman	Continuous variable
Number of ANC visits	The number of visits to ANC during last pregnancy	Continuous Variable
Gestational age at first dose of SP	Stage of pregnancy in weeks at receiving first dose of SP	Continuous Variable
Gestational age at first ANC visit	Stage of pregnancy in weeks at first ANC visit	Continuous Variable
Where did you get SP drug?	Place where SP was dispensed to pregnant woman	Categorical Variable
Was the drug taken under a Nurse's observation?	Taking SP under supervision of health worker	Binary Variable
How many tablets did you swallow	Number of tablets of SP swallowed per dose	Categorical Variable
Stopped folic acid whiles taking SP	Suspension of folic acid whiles taking SP	Binary Variable
Stock Level of SP	The quantity of SP tablets in stock	Continuous Variable
Stock outs of SP	The number of days that drug was not available at the facility	Continuous Variable
Source of SP	The place of procurement of SP drug	Categorical Variable
Frequency of Issue of SP	The number of times of issue of drug to ANC	Continuous Variable
Challenges of stocking of SP	The problems associated with procurement of SP	Binary Variable

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3.4.1 Dependent variable

The dependent variable was uptake of IPTp-SP. This was obtained from the mother's antenatal record book by counting the number of doses of SP she took during pregnancy as recorded. This was categorised into two groups-those receiving less than three doses of SP and those receiving three or more doses of SP.

3.4.2 Independent variable

The independent variables were grouped as:

a) Socio-demographic characteristics- age, marital status, educational level, occupation and number of children.
b) ANC characteristics- gestational age at first ANC visit, number of visits, gestational age at receiving first dose of SP, number of SP tablets swallowed per dose, place where SP was dispensed, taking SP under supervision and whether folic acid was suspended while taking SP.

3.5 Sample Size Calculation

The sample size for the study was calculated using the Cochran's formula

$n=Z^2pq / e^2$ (Cochran Formula 1963;75)

n = estimated sample size,

Z= 1.96 at 95% confidence interval

p = 33.6% IPT3 coverage rate (Osu Klottey DHIMS Data, 2013)

e = precision level of 0.05

q= 1-p

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Computed sample size of 343 was obtained. This was further adjusted because of small population size using Cochran's formula for small size population.

$n = n_o / 1+ [(n_o -1)/N]$

n=new sample size

n_o =estimated sample size

N= population size (963)

A sample size of 253 was obtained.

3.6 Sampling Method

The study was carried out in the Osu-Klottey district which has seven health facilities. Four of the facilities do not offer antenatal care, postnatal and child welfare services. Osu Government Maternity Home was purposively selected because the remaining two facilities had not yet started implementation of new policy on IPTp-SP, uptake of IPT5. Consecutive sampling method was used in the selection of study participants until the estimated sample size was achieved. This was used because of limited period for data collection and also the sample size. Every other mother who reported at the postnatal clinic on the day of visit was recruited for the study. Postnatal services are offered to mothers who had delivered within the past six weeks on Tuesdays at Maternity Home. At the child welfare clinic which is held on Wednesdays, every other nursing mother who had delivered within the past twelve weeks was recruited for the study.

3.7 Data collection method and tools

The data was collected using interviewer administered structured questionnaire. Nursing mothers were interview after their consent were sought. The coded questionnaire was

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designed purposely for this study making reference to questionnaire used by other researchers. Together with three trained research assistants, we interviewed the mothers one on one and filled in their responses on the questionnaire. Information on socio-demographic characteristics such as age, educational level, number of children, occupation and marital status were collected from the nursing mothers. Also data on antenatal services provided such as whether the drug was available at ANC centre, the number of tablets swallowed per dose of SP and whether drug was administered under supervision were collected. For accurate information, data on gestational age at first ANC visit, number of ANC visits during their last pregnancy, number of doses of SP taken before delivery and the gestational age at which first dose of SP were extracted from the ANC record books of mothers.

Inventory control cards at the pharmacy were reviewed using data extraction forms designed for this study. The period of review was six months prior to the study. The information that was gathered included monthly stock levels of SP, source of SP, monthly stock outs of SP, minimum and maximum stock levels and quantity of SP dispensed as per month to the antenatal centre. Also, the challenges associated with stocking of SP were documented. The ANC attendance register was also reviewed. Daily issuing of SP to pregnant women who were eligible to receive was assessed.

3.8 Training of Research Assistants

Three research assistants were recruited and trained to assist in administering the questionnaire. The research assistants were trained on, the purpose of the study, how to collect data, and the communication skills to use in collecting data. They were also trained on the ethics of research.

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3.9 Quality Control

At the end of each day of the study, questionnaires collected were assessed for completeness. Errors identified were corrected on the field. The questionnaire had the code of the interviewer to help in cross checking of the questionnaires. Double data entry was done to ensure validity of data before analyses.

3.10 Pre-testing of questionnaire

The questionnaire was pretested at the Civil Service Clinic in Osu-Klottey district. This was done to evaluate the time needed for each questionnaire and also to assess its appropriateness. After pre-testing some of the questions asked were modified for clarity.

3.11 Data Processing and Analysis

The data collected was cross checked for completeness before data entry. The data entry was done using Microsoft Excel 2013 software and subsequently imported into Stata version 12 for cleaning and analysis. The data was summarised using descriptive statistics such as graphs, frequency, percentages, mean, standard deviation, median and range. The proportion of IPTp-SP uptake was defined as the percentage of the number of respondents interviewed that have received at least one dose (IPT1), at least two doses (IPT2), at least three doses (IPT3), at least four doses (IPT4) and at least five doses (IPT5). The uptake of IPTp-SP was categorised into two groups, those receiving < three doses and those receiving ≥ three doses. The socio-demographic and ANC characteristics were also grouped into categories. Chi-square/Fischer Exact tests were conducted to establish association between uptake of IPTp-SP and each independent categorical variable. Any association with a p-value of less than 0.05 was considered significant. A further logistic

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regression analysis reporting odds ratio was used to determine strength of association between uptake of IPTp-SP and any significant independent variable.

The data collected from pharmacy were described using graph. The number of tablets of SP per month that were less than the minimum stock level were categorised as not adequate and those that were more than the minimum or maximum stock level as adequate. The minimum and maximum stock levels were abstracted from the inventory control card of SP drug.

3.12 Ethical Consideration

Ethical approval for the study was sought from the Ghana Health Service Ethical Review Committee of the Research and Development Division of the Ghana Health Service before commencement of the study.

Permission was also sought from the Midwife in charge of the Osu Government Maternity Home through the Director of Osu Klottey Sub- Metro before data collection. The staffs at the child welfare and postnatal clinics were also notified of the study.

A written informed consent was sought from study participants before data were collected.

Participation in the study was absolutely voluntary as participants had the right to withdraw from the study at any time they felt uncomfortable. The purpose of the study, benefits and rights of the participants and the procedure involved were explained to the participants.

Participants were assured of confidentiality. All questionnaires were coded and data entry done within twenty-four hours of collection by the principal investigator.

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No compensation was given to participants of the study. However, their contribution to the study was acknowledge and appreciated.

All data collected were kept under lock and key by the principal investigator. Data will be kept for 3-4 years to allow for publication of research after which questionnaires will be destroyed. This research has been fully self-funded. I have no conflict of interest in this research. A copy of the study document will be sent to the research division of GHS.

3.13 Study Limitation

The study collected information on SP administration and antenatal services offered to mothers during their last pregnancy. There is a possibility of lack of accuracy in recall of activities, although study was limited to mothers who had delivered within the past twelve months. Also the study results may not be generalised to other areas in Ghana considering the location of the study area.

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CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic characteristics of respondents

A total of 255 nursing mothers, who had delivered within the past twelve weeks were participated in the study. The mean age of the mothers was 27.1 years (SD 5.5) with a range of 15 to 47 years. Most of the respondents 166 (65.1%) were between the ages of 20-29 years with 6 (2.4%) between the ages of 40 to 46 years and 10 (3.9%) of the respondents between 15-19 years. The highest level of education for most of the respondents was basic education (primary and junior high school) 144(44.7%) with 29 (11.4%) having no formal education. Eighty-three percent of respondents were married while 44 (17%) were single. Majority of the respondents were in some form of employment 208 (81%) with 47 (18.2%) being unemployed. The mean number of children of the respondents was 2.0 (SD 1.1) ranging from 1 to 7 (Table 2).

Table 2: Socio-Demographic Characteristics of respondents

Characteristics	Frequency (n)	Percentage (%)
Age		
15-19	10	3.9
20-29	166	65.1
30-39	73	28.6
40-47	6	2.4
Marital Status		
Married	211	82.8
Single	44	17.2
Educational Level		
No formal education	29	11.4
Basic education	114	44.7
Secondary education	80	31.4
Tertiary education	32	12.5
Occupation		
Employed	208	81.6
Unemployed	47	18.4
Number of children		
1-2	175	68.6
3-4	72	28.2
5-7	8	3.2

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4.2 ANC characteristics of respondents

One hundred and five (41.2%) of the respondents registered for their first visit at the ANC in the first trimester of their pregnancy, 126(49.4%) in the second trimester and 24(9.41%) in the third trimester. The mean gestational age at first visit was 15.9 weeks (SD 6.4) ranging from 4 to 34 weeks. The number of visits made by the respondents at antenatal center ranged from 1 to 9 visits with a mean of 4.9 (SD 1.4). Overall, 226(88%) made four or more visits with 2(0.8%) making nine visits before delivery. Of the 252 respondents who took SP, 53(21.0%) received the first dose at sixteen weeks of pregnancy as recommended by the national guidelines for IPTp-SP administration (Guidelines May 2014). However, majority (165, 65.5%) received the first dose from 17-24 weeks. The median gestational age at receiving first dose of SP was 20 (SD 3.9) ranging from 16-34 weeks. Two hundred and forty (94.1%) respondents had babies weighing 2.5kg or more with mean birth weight of 3.1kg (SD 0.4) and ranging from 2.1 to 4.8kg (Table 3).

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Table 3: ANC attendance characteristics and IPTp-SP uptake of respondents

Characteristics	Frequency (n=255)	Percentage (%)
Gestational age at first ANC		
First trimester	105	41.18
Second trimester	126	49.41
Third trimester	24	9.41
Number of ANC visits		
<4	29	11.37
≥4	226	88.63
Number of doses received		
None	3	1.18
One dose	10	3.92
Two doses	19	7.45
Three doses	81	31.76
Four doses	105	41.18
Five doses	37	14.51
Gestational age at first dose of SP		
16	53	21.03
17-24	165	65.48
25-36	34	13.49
Number of SP tablets swallowed per dose during pregnancy		
2	3	1.2
3	249	98.8
Place where SP was dispensed		
ANC	250	99.21
Pharmacy	2	0.79
Stopped folic acid whiles taking SP drug		
Did not stop	249	98.8
Stopped	3	1.2
Took SP drug under DOT		
Not directly observed	2	0.8
Directly observed	250	99.2

n= number of respondents, ANC= antenatal centre, SP sulphadoxine pyrimethamine, DOT= direct observed therapy.

4.3 Uptake of 3-5 doses of IPTp-SP

The total number of respondents interviewed was 255, of which 3 did not take SP during their most recent pregnancy giving IPTp coverage of 98.8% of at least one dose. Of the three who did not receive SP, two had the first ANC registration in the first trimester and made six visits, whiles the third registered in the third trimester and made two visits to the ANC before delivery. The extent of IPTp-SP uptake was found to be: one dose 10(3.9%), two doses 19(7.56%), three doses 81(31.76%), four doses 105(41.2%) and five doses 37(14.51%) (Fig 2), giving proportions of IPTp coverage of IPT1, 98.8%; IPT2, 94.9%; IPT3, 87.5%; IPT4,55.7% and IPT5, 14.5% (Fig 3). The extent of IPT-SP received was further categorised into two groups- those receiving less than three doses and those receiving three or more doses during their most recent pregnancy, as the national policy recommends a minimum of three doses. From the study, of those who received SP, 132 (12.6%) re(d)-269(int)-3(o)-2less than three doses, whiles 223 (87.3%) re(d)-269(int)-3(o)-2three or

trimester (COR=0.05, 95%CI 0.02-0.12, p<0.001). After adjusting for other characteristics of respondents, having ≥four visits (AOR=4.57, 95%CI 1.15-18.16, p<0.05), gestational age at first dose of SP (AOR=0.04 95%CI 0.01-0.16, p<0.001) and three or four children (AOR=0.35, 95%CI, 0.12-0.97, p<0.05) were significantly associated with receiving uptake of ≥3 doses of SP during pregnancy (Table 5)

Figure 2: IPTp-SP uptake among recently delivered women at Osu Government Maternity Home.

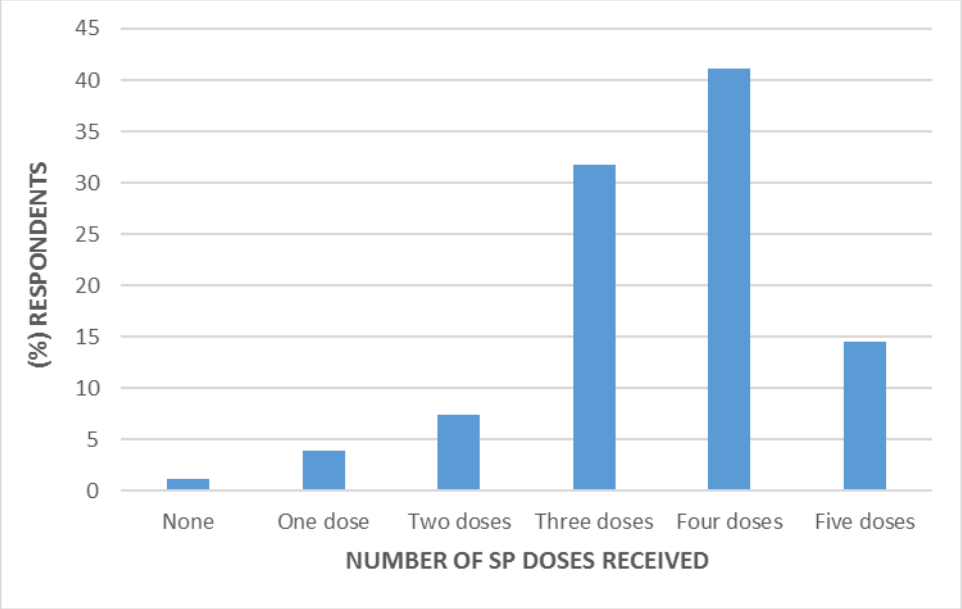


Table 4: Relationship between ANC characteristics, socio-demographic characteristics and IPTp-SP uptake among recently delivered women.

Variables	Frequency (n)	IPTp-SP uptake (%) <3doses	≥3doses	P-value
Gestational age at first ANC				
First trimester	105	6.67	93.33	
Second trimester	126	9.52	90.48	<0.001
Third trimester	24	54.17	45.83	
Number of ANC visits				
< 4	29	44.28	51.72	<0.001
≥ 4	226	7.96	92.04	
Gestational age at first dose of SP				
16	53	0.00	100	
17-24	165	6.67	93.33	<0.001*
25-36	34	52.94	47.06	
Number of children				
1-2	175	10.29	89.71	
3-4	72	16.67	83.33	0.16*
5-7	8	25.00	82.5	
Marital Status				
Married	211	11.37	88.63	0.22
single	44	18.18	81.82	
Educational Level				
No formal education	29	10.34	89.66	
Basic education	114	17.54	82.46	0.22*
Secondary education	80	8.75	91.25	
Tertiary	32	6.25	93.75	
Occupation				
Employed	208	11.54	88.46	0.31
Unemployed	47	17.02	82.98	
Age				
15-19	10	10	90	
20-29	166	15.06	84.94	0.44*
30-39	73	8.22	91.78	
40-47	6	0.00	100	
Weight of child at birth(kg)				
<2.5	15	60	40	<0.001
≥2.5	240	9.58	90.42	

IPTp-SP= Intermittent preventive treatment in pregnancy with sulphadoxine pyrimethamine, *= Fischer's exact value, n= number of respondents

Figure 3: Proportion of women by the number of IPTp-SP received

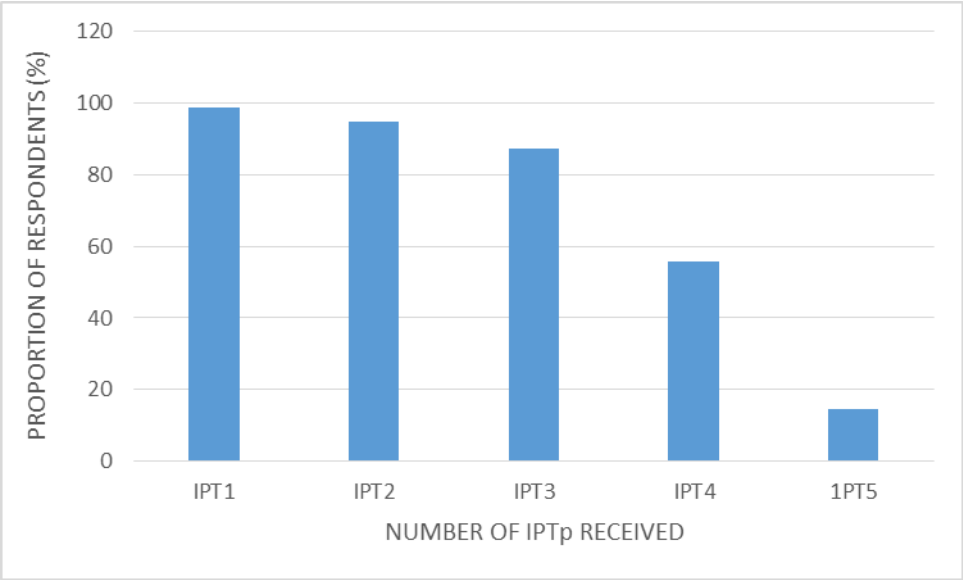


Table 5: Effect of ANC characteristics of respondent on IPTp-SP uptake of ≥3 doses

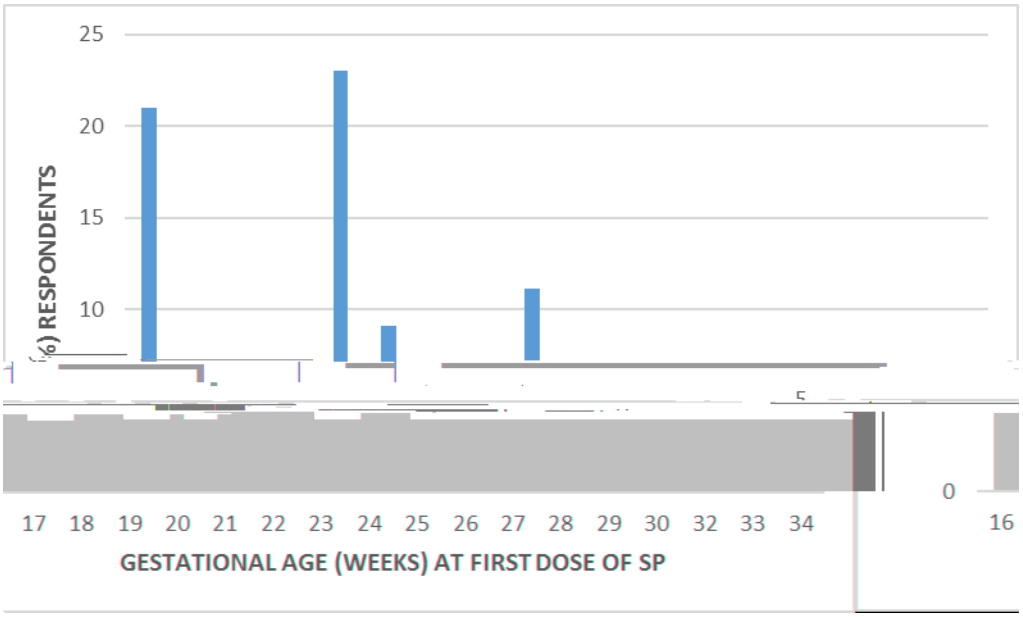
Characteristics	IPTp-SP uptake		COR (95%CI)	p-value	AOR (95%CI)	p-value
	<3 doses n (%)	≥3 doses n (%)				
Gestational age at first ANC visit						
First trimester	7(6.67)	98(93.33)	Ref		Ref	
Second trimester	12(9.52)	114(90.48)	0.68(0.26-1.79)	0.434	0.74(0.22-2.46)	0.630
Third trimester	13(54.17)	11(45.83)	0.06(0.02-0.18)	**<0.001**	2.8(0.31-24.55)	0.352
Number of visits						
< 4	14(48.28)	15(51.72)	Ref		Ref	
≥ 4	18(7.96)	208(92.04)	10.76(4.5-25.82)	**<0.001**	4.57(1.15-18.16)	**0.031**
Gestational age at first dose of SP						
Second trimester	11(5.05)	207(94.95)	Ref		Ref	
Third trimester	18(52.94	16(47.06)	0.05(0.02-0.12)	**<0.001**	0.04 (0.01-0.16)	**<0.001**
Number of children						
1-2	18(10.29)	157(89.71)	Ref		Ref	
3-4	12(16.67)	60(83.33)	0.57(0.26-1.26)	0.167	0.35(0.12-0.97)	**0.043**
5-7	2(25)	6(75)	0.34(0.06-1.83)	0.211	0.23(0.03-1.90)	0.172

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

4.4 Gestational age at first dose of IPTp-SP

The median gestational age at which respondents received the first dose of SP was 20 (SD 3.9) ranging from 16-34 weeks. Of the total of 252 respondents, 53(21.03%) received the first dose at 16weeks, 58(23.03%) at 20weeks, 28 (11.11%) at 24weeks, and 4 (1.6%) at 32weeks. Majority of the respondents had their first dose at 20weeks (Figure 4). Gestational age at first dose of SP was associated with uptake of ≥ 3 doses of SP ($p<0.001$). Of the total of 218 respondents who took their first dose in the second trimester, 207 (94.95%) attained a higher uptake of IPTp-SP. Of all the respondents (34) who received the first dose of SP in the third trimester, 16(47.06%) received ≥ 3 doses of SP, whiles 18(52.94%) received <3doses of SP.

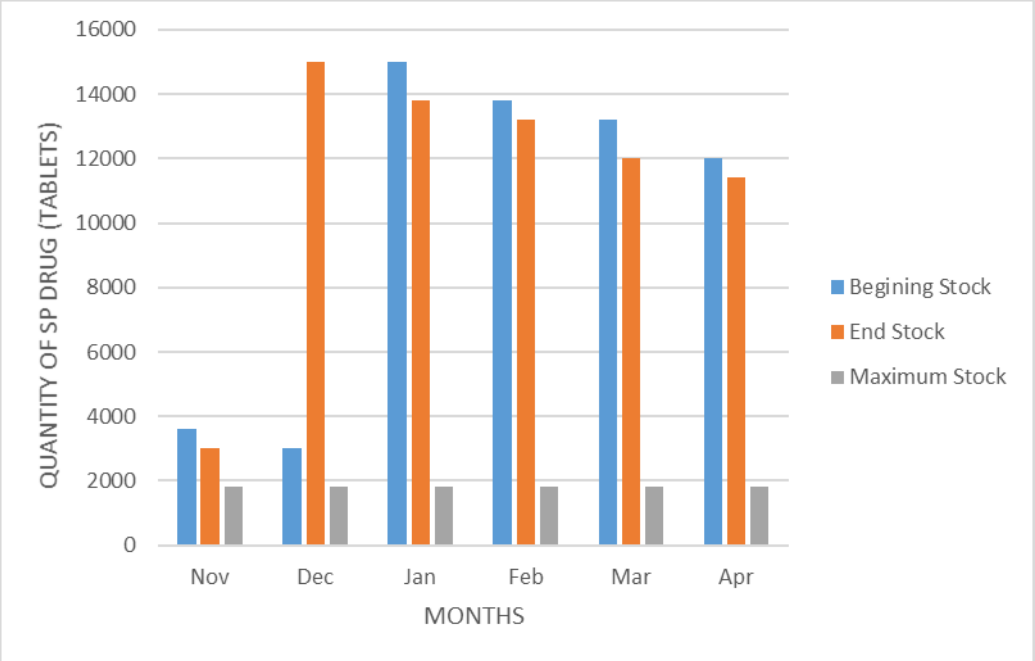
Figure 4: Gestational age at uptake of First dose of IPTp-SP among recently delivered women.



4.5 Stock-levels of SP at the Maternity Home

Stock-levels of SP at the pharmacy was adequate, as the quantity of SP at the beginning and end of each month of the six months period of review were more than the maximum stock levels of SP(1800tablets) for the facility. This is shown in Figure 5. There were no stock-outs of SP within the period of review. The drug was procured from the Regional Medical Store. About ninety-nine percent of respondents had their SP given to them by the midwives at the antenatal centre. This is an indication that SP was available at the antenatal centre. A review of the ANC register, shows a daily dispensing of SP to pregnant mothers who were eligible to receive the drug.

Figure 5: Stock Levels of SP at the Maternity Home for Six Months Period (Nov 2014- April 2015)



4.6 Compliance to guidelines for IPTp-SP administration

Two hundred and fifty (99.2%) respondents took SP under direct observed therapy with only 2 (0.8%) taking drug at home. Two hundred and forty-nine (98.81%) respondents were given three tablets of SP to swallow per dose. SP drug was concomitantly administered with 5mg of folic acid. Two hundred and forty-nine (98.8%) of the respondents took SP whiles taking folic acid (5mg). None of the respondent took SP in the first trimester of pregnancy. Two hundred and eighteen (86.5%) respondents received the first dose of SP in the second trimester with 34(13.49%) in the third trimester.

CHAPTER FIVE

5.0 DISCUSSION

The study was carried out at a Maternity Home, where antenatal care, delivery and child welfare clinic services are offered to clients who visited the health facility. Nursing mothers that have delivered within the past twelve weeks were the study participants. The level of uptake of IPTp-SP was assessed among these participants with respect to their most recent pregnancy.

5.1 Uptake of 3-5 doses of IPTp-SP

The national guidelines for IPTp-SP administration recommends a minimum of three doses of SP for every pregnant woman starting from week sixteen until the time of delivery. The proportions of IPTp-SP uptake obtained in this study were: IPT1 (98.8%), IPT2 (94.9%), IPT3 (87.5%), IPT4 (55.7%) and IPT5 (14.5%).The proportion of uptake IPT5 was low compared to the initial four doses. Thus many of the women did not receive the fifth dose of SP. The number of doses of IPTp taken depends largely on the time of uptake of the initial dose by the pregnant woman. The earlier the first dose is taken, the more likely it is that more doses will be taken. Comparing these proportions with the target of 100% set by the NMCP, IPTp coverage of 100% was nearly achieved for IPT1, IPT2 and IPT3 at study area. However that of IPT4 and IPT5 is not achieved. IPTp coverage for the Maternity Home for 2014 was IPT1 (86.5%), IPT2 (64.4%), IPT3 (44.5%), IPT4 (15.3%) and IPT5 (1.8%). Comparing these figures with that obtained in this study, one can say that there has been an improvement over that in 2014. The implementation of the new policy of IPTp-SP uptake of IPT5 started at Maternity Home in 2014. Challenges of implementation of the new policy could have contributed to the not very high IPTp coverage in 2014. According to the Ghana Demographic Health Survey

2008 report, IPT2 coverage was found to be 44%, which is far below that reported in this study. Education of pregnant women on the need to take malaria preventive treatment during pregnancy has been intensified, this might have contributed to the high IPTp coverages. However uptake of IPT4 and IPT5 still remains a challenge. Pregnant women having ANC registration in the first trimester should be encouraged to obtain higher doses of SP as this improves the birth weight and prevent neonatal complications as reported by other studies. (Kayentao et al., 2013; Menendez et al., 2010).

Findings from this study, show that three of the participants did not receive SP during pregnancy. Two were found to be G6PD deficient and therefore not eligible to take SP. SP is contraindicated in such individuals. The national anti-malaria drug policy recommends an alternative antimalarial proguanil to prevent malaria in such individuals. However this is not being implemented. The third participant for no reason was not giving SP although she visited the ANC twice before delivery. Such missed opportunities need to be rectified. Health workers at the ANC need to be trained to prevent such occurrences. Empowering the women can also enable them request for the drug.

In this study, making four or more visits to the ANC was associated with receiving three or more doses of IPTp-SP. The more frequent visits made by the pregnant woman, increases her chance of taking higher doses of IPTp-SP. The number of visits made to the ANC was found to be a determinant of IPTp-SP uptake. This findings was also reported by Mporogol et al., (2014) in their study on uptake of IPTp-SP in Tanzania. Likewise studies conducted by Gies et al., (2008) and Exavery et al., (2014). All reported that higher dose uptake of IPTp-SP was achieved by an increase in the number of visits to ANC.

The time at which pregnant women made their first ANC visit was not associated with receiving three or more doses of IPTp-SP in this study. Women reporting earlier in the

third trimester were found to have made more visits before delivery, thereby increasing their chance of receiving three or more doses of SP. Thus attending ANC in the first trimester was not a criteria for achieving a higher uptake of SP. This finding in this study, however was not consistent with that reported by Hill et al., (2014) in which higher doses were achieved by women who reported in the first trimester. Olliaro et al., (2008) also reported that early attendance to ANC favours completion of IPTp-SP scheduled doses.

Number of children that a pregnant woman has was found to be associated with receiving three or more doses of IPTp-SP unlike the other socio-demographic factors. Study participants having one or two children were found to have received three or more doses of SP than those having three to four children. These women might have experienced beneficial effect of taking SP in previous pregnancy and therefore took more doses of SP in subsequent pregnancy. Those with three or four children might have had some experiences with the taking SP, notably the side effects of the drug with the first dose and therefore did not want to encounter such experiences leading to a lower uptake of SP. This was similar to that reported by Kibusi et al., (2015) in which women having one or two children had higher odds of completing the recommended number of IPTp dosage than women having three or more children.

5.2 Gestational age at first dose of IPTp-SP

Twenty-one percent of the study participants were found to have received their first dose of SP at sixteen weeks of gestation with 65% receiving the first dose between seventeen and twenty-four weeks. The national policy recommends the first dose of SP to be given at sixteen weeks with subsequent doses at monthly interval. Starting the first dose at sixteen weeks is necessary to achieve a higher uptake of SP. Participants who visited earlier in the second trimester that is at thirteen, fourteen or fifteen weeks, were not eligible to take SP

and will therefore have to take SP at the next visit which is after four weeks. This will further extend their weeks of receipt of the first dose. This may explain why many (34.5%) had to take the first dose between seventeen and twenty weeks. About 41% of the women registered at the ANC in the first trimester. These were not eligible to receive the first dose. Such attendees need to be educated on IPTp-SP uptake and the benefits of receiving higher doses of SP. They should be encouraged to make the next visit in the second trimester at sixteen weeks when they will be eligible to take SP. From the study it was realized that many of the participants preferred to start ANC in the second trimester where they will be given the first dose. Ander et al., (2008), reported on similar findings in which 86% of respondents registered prior to the schedule for receiving first dose of SP. Of those women who took SP in the second trimester, 95% received three or more doses of SP with only 5% receiving less than three doses. A possible explanation for those receiving less than three doses even though they received the first dose in the second trimester could be due to individual factors such as delay in return visits and also midwives low performance in IPT p-SP delivery. Further studies need to be conducted to evaluate delivery of IPTp by health workers and knowledge of IPTp-SP uptake among pregnant women. A study carried out to assess uptake of IPTp-SP and ITN among pregnant women reported that 57.7% of participants took the first dose in the second trimester and 15.8% in the third trimester (Mpungu et al., 2008). Gross et al., (2011) conducted a study to determine the combined effect of determinants of coverage of IPTp in Tanzania reported that most of the participants got a first dose of SP but many could not receive a complete dose of SP. Hills et al., (2014) find out that about 81% of study participants received the first dose at schedule time of national guidelines for IPTp administration. However, Anders et al., (2008) reported 67% receiving the first dose as recommended by national guidelines. These figures are higher than that obtained in this study, where only 21% received the first

dose of SP at sixteen weeks as stipulated in the national guidelines. This calls for more education of the pregnant mothers.

5.3 Stock levels of SP at the Maternity Home

Stock levels of SP at the Maternity Home was found to be adequate as the quantity of SP at the beginning and end of each month of the six months review period were above the recommended maximum stock levels for the facility. Maximum stock level of drugs is computed based on the rate of consumption of the drug by the clients at the facility. It takes into account the daily attendants at the facility. The quantity of SP at the facility can be said to have met the demands of SP by the pregnant women for the six months review period. However drugs that are stock above the maximum stock have the possibility of getting expired which has financial implications on IPTp programme. There were no stock-outs of SP during the period of review. The study participants (99.2%) confirmed receiving SP at the antenatal centre. Health workers at the ANC said they had no challenge with getting SP from the pharmacy. Findings in this study were contrary to that in other studies. Some studies conducted on uptake of IPTp-SP reported stock outs of SP at the ANC clinics which undermined the IPTp programme resulting in low coverages. A study conducted by Thiam et al. (2013) in Tanzania revealed that inadequate stock of SP was a common problem in the study area. The major factor being the quantification of the required amounts of SP as a result of lack of accurate consumption data. Amoran et al. (2012) also reported that clients missed uptake of SP due to drug stock outs.

5.4 Compliance to guidelines for IPTp-SP administration

In this study, 99.2% of participants took SP under direct observed therapy with only 0.8% taking SP without supervision. WHO recommends that SP administration should be

supervised by health workers at the antenatal centres. This will ensure uptake of the drug by pregnant women. Health workers at the study area thus complied with this guideline and provided water in disposable cups for their clients to take SP under observation. Study participants who took the drug at home were found to have had their antenatal care services at private health facilities. They were given prescriptions to buy SP at the Pharmacy and took the drug without supervision. The unavailability of SP at private facilities can lead to low IPTp coverages. Private health facilities offering antenatal services need to be monitored to ensure that IPTp programme are successfully implemented.

These findings were unlike that reported by Onoka et al. (2012) in which three quarters of clients took SP at home and therefore not supervised to take SP at ANC by the health worker. In a study conducted by Akinleye et al. (2009) also reported that 14.3% of the clients took SP that was supervised by the health worker.

IPTp policy guideline recommends that SP should not be given concomitantly with 5mg of folic acid as this counteracts the efficacy of the antimalarial drug. Where SP is given, 5mg of folic acid should be suspended for a week. In this study, 98.8% of participants took SP together with 5mg of folic acid. This implies that maximum efficacy of the drug may not be achieved and therefore the objective for the use of SP to prevent malaria in pregnancy was undermined. WHO guidelines recommends that when SP is administered, 0.4mg of folic acid can be given. However this strength is not available in the country. Health workers at the ANC need to be trained to give appropriate counselling to clients when given SP to them.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The proportion of uptake of three-five doses in the study area were found to be IPT3 (87.5%), IPT4 (55.7%) and IPT5 (14.5%). This is quite encouraging, however that of IPT5 needs further consideration. Frequent visits to the antenatal clinic and early uptake of the first dose of SP by pregnant women were found to be necessary to achieve a high coverage of IPT5.

The proportion of women taking first dose of SP at sixteen weeks of gestation was found to be 21%. A high proportion of women (65%) took the first dose of SP between seventeen and twenty-four weeks of gestation. This reduces the number of chances required to receive five doses of SP at term.

Stock-level of SP was adequate to meet the demands of SP by pregnant women at the Maternity Home. Stock level of SP was more than the maximum stock level of SP required for the facility.

6.2 Recommendations

1. The Management of Maternity Home in collaboration with community leaders should organize health education programme in the communities to educate women in their reproductive age on the benefits of receiving more doses of IPTp-SP during pregnancy and to frequently visit the antenatal clinic before delivery.
2. Health workers at the Maternity Home need to emphasis on counselling aspect when administering SP together with 5mg of folic acid to clients.
3. The Management of Maternity Home should ensure that SP drugs are not over stocked at the facility.

4. The Ministry of Health together with the National Malaria Control Programme should consider revising guidelines on IPTp-SP especially, the gestational age at uptake of first dose of SP. This will ensure higher uptake of IPTp. Uptake of first dose at thirteen weeks will give a number of chances for the receipt of five doses of SP before delivery.
5. The Ministry of Health through the Procurement Directory should engage local pharmaceutical companies in the production of 0.4mg folic acid to be distributed to all antenatal centres to ensure that the objective for the use of SP to prevent malaria in pregnancy is not compromise.

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APPENDICES

Appendix 1: Consent Form

Title of Project: Intermittent Preventive Treatment in Malaria in Pregnancy: Uptake of three-five dose regimen of sulphdoxine pyrimethamine at Osu Government Maternity Home

My name is Ivy Owusu-Boateng and I am a Graduate student of the School of Public Health, University of Ghana, Legon, Accra. I am carrying out the above titled research in partial fulfilment of the requirements for a Master Degree in Public Health.

The purpose of research is to determine the uptake of sulphadoxine pyrimethamine for malaria prevention in pregnancy .The research will help identify challenges with the uptake of SP and also assist policy makers and managers of the Maternity Home on how to improve malaria prevention with sulphdoxine pyrimethamine.

Questionnaires will be used in the interview process. The interview will be centred on how SP was administered and the number of times you took SP during your last pregnancy. Your background information will also be taken. The interview will take not more than 30 minutes to complete.

Your participation in this study is completely voluntary. You have the right to refuse participation or withdraw from the study at any time. Should you choose to withdraw, the information you provide will not be used in the study. No penalties or negative consequences will result from your withdrawal. All responses will be treated as confidential as no names will be placed on the questionnaires. Questionnaires will also be coded for data analysis.

I hope that you will participate fully since your views are important, thereby enable me to accomplish this academic requirement. If you want to ask any questions or seek further clarification about the exercise, I would be ready to provide an answer.

For further information or clarification on this study, please contact Ivy Owusu-Boateng (0244811746, email divyboat@yahoo.com) or Hannah Frimpong (ERC Administrator GHS, 0243235225/0507041223)

PARTICIPANT'S CONSENT FORM

I have read the foregoing information/the foregoing information has been read to me or interpreted to me and have fully understood the purpose, procedures, and conditions of this research. I understand that I can withdraw from the study at any time without any consequence to me. I have been given opportunity to ask questions I had and they have been satisfactorily answered.

I consent voluntary to participate in this research. Please confirm your participation by signing below.

Signature/ Thumbprint: ……

Date: ……

P.I/Research Assistant's Name: ……

Signature: ……

Date: ……

Appendix 2: Questionnaire

Title of Project: Intermittent Preventive Treatment of Malaria in Pregnancy: Uptake of three-five dose regimen of sulphdoxine pyrimethamine at Osu Government Maternity Home

QUESTIONNAIRE FOR NURSING MOTHERS				
FORM NUMBER :				
DATE OF INTERVIEW:				
CODE OF INTERVIEWER:				
SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS				
1	AGE OF RESPONDENT(in completed years)			
2	MARITAL STATUS		1. Married	[ ]
			2. Single	[ ]
			3. Cohabitation	[ ]
3	LEVEL OF EDUCATION		1. No formal education	[ ]
			2. Primary	[ ]
			3.JHS	[ ]
			4. SHS	[ ]
			5. Tertiary	[ ]
4	OCCUPATION		1. Government / Private Worker	[ ]
			2. Self-employed	[ ]
			3. Unemployed	[ ]
				[ ]
5	NUMBER OF CHILDREN			[ ]
6	WEIGHT OF BABY AT BIRTH		[ ] Kg	

	SECTION B UPTAKE OF IPTp-SP		
7	At what stage of your pregnancy did you first visit the ANC		[ ] months
8	How many times did you visit ANC before delivery?		[ ]
9	Did you take any drug(s) for malaria prevention during pregnancy?		Yes[ ] No[ ]
10	If yes, what drug did you take?		SP [ ] ACT [ ] Others [ ]
			DON'T KNOW [ ]
11	Where did you get the drug?		1. ANC [ ]
			2. PHARMACY [ ]
12	Was the drug taken under a Nurse's observation		Yes [ ] No [ ]
13	Did you pay for the drug		Yes[ ] No [ ]
14	How many tablets did you swallow?		1. One [ ]
			2. Two [ ]
			3. Three [ ]
15	How many times did you take the drug during		1. One [ ]
	Pregnancy?		2. Two [ ]
			3. Three [ ]
			4. Four [ ]
			5. Five [ ]
16	What was the interval between each dose?		1. Weekly [ ]
			2. Monthly [ ]

			3.Others [ ]
17	At what stage of your pregnancy did you take the first dose of the drug?		1. No. of months[ ]
18	Did you get any side effect with the drug?		1. Yes [ ]
			2. No [ ]
19	What side effect did you experience upon taking the drug?		1. Skin rash[ ]
			2. Nausea [ ]
			3. Vomiting[ ]
			4. Others [ ]
20	Did it prevent you from taking other doses?		1. Yes [ ]
			2. No [ ]
21	Did the nurse ask you to stop taking folic acid whiles taking the drug?		Yes [ ] 2. No [ ]
22	Did you get malaria during your pregnancy?		1. Yes [ ] 2. No[ ]
23	How many times did you get malaria during pregnancy?		[ ]

24	Gestational age in weeks for first ANC visit (record book)		[ ] weeks
25	Number of ANC visits before delivery (record book)		[ ] times
26	Number of IPT-SP received (record book)		[ ]
27	Time of first IPT-SP (record book)		[ ] weeks

Appendix 3: Data Extraction Form

	DATA EXTRACTION FORM FOR STOCK LEVEL OF SP AT PHARMACY	
	DATE OF COLLECTION:	
	STAFF CATEGORY:	
	MONTH:	
1	QUANTITY OF SP BEGINNING OF THE MONTH	[ ]
2	QUANTITY OF AT END OF THE MONTH	[ ]
3	QUANTITY OF SP RECEIVED FOR THE MONTH	[ ]
4	NUMBER OF STOCK OUT IN MONTH	[ ]
5	SOURCE OF SP DRUG	[ ]
6	FREQUENCY OF ISSUING TO ANC CENTRE	[ ]
7	MAXIMUM STOCK LEVEL OF DRUG	[ ]
8	MINIMUM STOCK LEVEL OF DRUG	
9	ANY CHALLENGES WITH ACQUISITION OF SP	_____
	_____	
	_____	
	_____	

Appendix 4: Ethical Approval