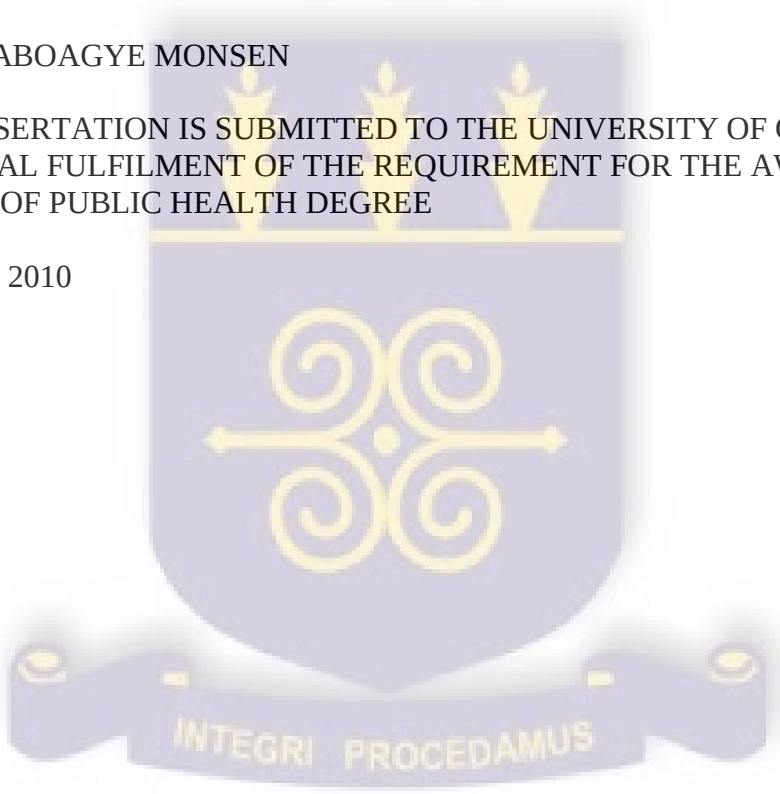
SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA

BARRIERS TO UPTAKE OF INTERMITTENT PREVENTIVE TREATMENT (IPT) WITH SULPHADOXINE-PYRIMETHAMINE TO PREVENT MALARIA IN PREGNANCY IN THE KUMASI METROPOLIS, 2010

BY
OWUSU-ABOAGYE MONSEN

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

AUGUST, 2010



DECLARATION

I, Owusu-Aboagye Monsen, declare that except for the other people's work which have been duly acknowledged, this work 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.

…….. Date: …….. August, 2010

OWUSU-ABOAGYE MONSEN

(MPH Student)

…….. Date: ……August, 2010.

DR. EVELYN K. ANSAH (Academic Supervisor)

DEDICATION

To God Almighty for my life, protection and the strength
To my parents: Mr and Mrs R. O Aboagye for their guidance, encouragement and support.
To my wonderful siblings: Obaapanin Yaa Konadu, Adwoa Afumwaa, Yentumi Gyeabour, Afua Tiwaa and Kwasi Kaakyire, your prayers and emotional support are immeasurable.

ACKNOWLEDGEMENT

My special thanks to Dr. Evelyn K. Ansah, my academic supervisor for your guidance, time and patience you used to supervise my research. May God Almighty Bless you abundantly. My special thanks again to Professor Afari, the Head of Epidemiology Department for the fatherly advice and support you gave me throughout the programme.
I also give thanks to Dr. Christine Clerke, Dr. S. O Sackey and Dr. Priscilla Nortey for their support and encouragement. Many thanks to Dr. Joseph Oduro, Deputy Director (PH), Ashanti Regional Health Directorate, as my Field Supervisor on my project work for your time and advice on my work. Dr. Franklin Asiedu Bekoe for data entry and guidelines for analysis as well Mr. Asubonteng Afriyie for your brotherly support and encouragement. To Dr Akwasi Awuzi Yeboah, the Kumasi Metropolitan Director of Health Service and the entire Metropolitan Health Management Team for the reception, space, opportunity, support and guidance during my 2-month stay for my field work.
Mr. Sampson Obeng, thank you very much for your laptop computer which I used for more than three months for my project work. I owe you a lot of gratitude. A big thank you to Ms Sarah Fodah, for the data entry and the entire team of data collectors, especially Mr. Benard Danso of the Ofinso Municipal Health Directorate.

I cannot forget to thank all the 300 mothers and service providers who participated in the study for their time and response to the study questions. To all my colleagues, especially, Marcia Halm, Frimpomaa Nelson, Ernest Quaye, Ramata and Menerva accept my thanks. Angela Abroso, Edith Tetteh, Irene, Tony all of School of Public Health, please accept my thanks for your support to me.

ABSTRACT

Background: Intermittent preventive treatment for prevention of malaria in pregnancy (IPTp) is a key component of malaria control strategy in Ghana and sulfadoxine-pyrimethamine (SP) is the drug of choice. Despite the evidence of the effectiveness of IPTp strategy using SP in reducing the adverse effects of malaria during pregnancy the uptake and coverage in Kumasi metropolis of the Ashanti Region is low.
Objective: This study set out to assess the use of IPTp among pregnant women and identify barriers to the uptake of IPT during pregnancy in the Kumasi Metropolis.
Methods: A cross-sectional study was carried out between June and July 2010 among 300 mothers with children 0-11months selected by cluster random sampling from communities in Kumasi and 19 health service providers selected by convenience sampling. Information on utilization of IPTp, knowledge on IPTp, timing and number of ANC visits, and reasons for non utilization was obtained using an interviewer administered questionnaire. Key informant interviews were used to obtain information from the service providers. Descriptive statistics such as simple proportions, and medians were used. Logistic regression and Chi-square test were used to examine predictors of IPTp use. All analyses were performed at 5% level of significance.
Results: One hundred and nineteen of the 300 (39.7%) mothers received IPTp1, whilst 101(33.7%) and 63 (21.0%) received IPTp2 and IPTp3 respectively. Only 3.7% (11/300) mothers had very good knowledge on IPTp with more than 50% (152/300) having no knowledge at all. The service providers demonstrated high level of knowledge on IPTp. More than two thirds of the mothers had their first ANC clinic within three months of pregnancy. Almost 90% of the mothers had had five or more ANC visits. The reason for more than 80% of mothers not receiving any IPTp was because they were not offered the medication. This was mainly attributable to shortage of the medicine in the health facilities. Overall, 64.3% (18/28) and 55.4% (41/74) did not receive IPTp2 and IPTp3 respectively for the same reason. All the service providers interviewed admitted periodic shortage of SP over a certain period of time. Irregular ANC visits as well as side effects were some of the reasons for some mothers not receiving IPTp2 and IPTp3. About 4.0% (4/103) of the mothers did not use IPTp because they were using traditional medicine. Treatment for malaria was the reason why 14 (13.9%) mothers did not get IPTp.
Conclusion: Periodic shortage of SP could be the main reason for low IPTp coverage but mother's age, parity, knowledge about IPTp, number of ANC visits and use of a health centre were found to significantly affect the uptake of IPTp.
Recommendation: A concerted effort should be made by the Ghana Health Service to avoid stock out of SP in the health facilities. Public education on IPTp should be stepped up to increase awareness of IPTp among the public especially among women of child bearing age since there was generally poor level of knowledge among mothers.

Table of Contents

LIST OF TABLES

LIST OF TABLES AND FIGURES

LIST OF ABBREVIATIONS

ANC Antenatal care
BW Birth Weight
CHAG Christian Health Association of Ghana
CHAM Christian Hospitals Association of Malawi
DALYs Disability Adjusted Life Years
DHMOI District Health and Medical Officer In-charge
DOT Directly Observed Therapy
G6PD Glucose -6- Phosphate Dehydrogenase
GDHS Ghana Demographic and Health Survey
GHS Ghana Health Service
GDP Gross Domestic Product
Hb Haemoglobin
IEC Information, Education and Communication
IPTp Intermittent Preventive Treatment during pregnancy
IPTp-SP Intermittent Preventive Treatment during pregnancy using sulfadoxine/pyrimethamine
ITN Insecticide-treated Nets
JHPIEGO John Hopkins Program for International Education in Gynecology and Obstetrics.
KMHD Kumasi Metropolitan Health Directorate
KNUST Kwame Nkrumah University of Science and Technology
MDG5 Millennium Development Goal Five
mg Milligram
MOH Ministry of Health
NGO Non-Governmental Organization
NHIS National Health Insurance Scheme
NID National Immunization Day
NMCP National Malaria Control Programme
PNC Post Natal Care
RCH Reproductive and Child Health
RBM Roll Back Malaria
SDA Seventh - day Adventist
SP Sulfadoxine/pyrimethamine
SPSS Statistical Package for Social Scientists
SSA Sub-Saharan Africa
TAM Traditional African Medicine
UNICEF United Nations Children Fund
WHO World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Malaria is a major cause of morbidity and mortality in Ghana, particularly among children and pregnant women (MOH, 2009). In 2006, malaria accounted for 38.6% of all outpatient illnesses and 36.9% of all admissions. The prevalence of malaria was 171 per one thousand population, and 2,835 malaria attributable deaths (all ages) representing 19% of all deaths was reported in 2006. As many as 13.7% of all admissions of pregnant women in 2006 was as a result of malaria and 9.0% of them died from the disease.

Apart from these health consequences, malaria puts a heavy burden on productivity and hence retards economic development in Ghana. Malaria is estimated to cause the loss of about 10.6% Disability Adjusted Life Years (DALYs) costing an equivalent of up to 6% of GDP annually in economic burden. The cost of treating malaria in 2008 in Ghana was said to have amounted to US $772.4 million in the year 2008. Prevention of the serious health impact of malaria during pregnancy represents one of the most imminently achievable public health goals of the Ghana Roll Back Malaria (RBM) Programme (MOH, 2005).

The consequences of malaria in pregnant women are widely documented. They include anaemia, intra-uterine growth retardation, illness episodes, low birth-weight, pregnancy related complications such as stillbirths, prenatal, postnatal or neonatal deaths among others, (Brabin B.J 1983). Malaria is mostly concentrated in sub-Sahara Africa (SSA) where pregnant women and young children under five years of age are the most vulnerable. Protecting pregnant women and children less than five years of age through use of safe and effective malaria preventive and treatment methods is recommended and it includes intermittent preventive treatment (IPT) and the use of insecticide-treated nets (ITNs), among other methods (M O H, 2007).
The World Health Organization (WHO) recommends that at least two doses of sulphadoxine-pyrimethamine (SP) be administered by health workers to women attending antenatal care (ANC) clinics for intermittent preventive treatment of malaria during pregnancy (IPTp). The guidelines for IPTp administration emphasize that SP must be taken by pregnant women under direct observation by a midwife. This strategy for administering the medication is known as Directly Observed Therapy (DOT). Unfortunately, IPTp coverage is still low in most of SSA countries especially for the second and third doses, though most women get the first dose (Hill and Kazembe, 2006).

Reproductive and child health (RCH) services in SSA as in other developing countries involve both the government and non-government sectors and the role of the latter sector is more recognized now than before. However, little is known about the performance of that sector and its interaction with the public sector in RCH services including ANC. Routine ANC services are expected to be free and that cost of services provided to pregnant women are borne by the government through exemptions and the National Health Insurance Scheme. However, where a private facility does not qualify to be accredited by the NHIS, then the facility may have to charge for services including the SP or ignore the IPTp services.

IPTp is implemented throughout the country as part of an essential ANC package. More than 90% of pregnant women in Ghana attend ANC at least once during their pregnancy making a clinic-based approach more feasible (MOH, 2005). The GDHS 2008 report (Ghana Statistical Service (GSS), Ghana Health Service (GHS), ICF Macro, 2009) shows that over nine in ten mothers (95%) receive ANC from a health professional. As reported from other SSA countries, the government recommends the delivery of RCH services to the vulnerable groups free of charge, and this has been one of the key essential elements of the national health sector reform policy strategies in Ghana. Officially, IPTp with SP was recommended in 2003, but became effectively implemented countrywide several months later after orientation/training of frontline health workers (MOH, 2007).

According to the IPTp policy, from the second trimester of pregnancy (after quickening), pregnant women attending antenatal clinics are expected to be given three doses of SP as directly observed therapy (DOT), at monthly intervals (GHS/GLOBAL FUND/JHPIEGO, 2005). This replaces the previous policy of giving a full dose of chloroquine for treatment at the first antenatal visit followed by two tablets weekly until 6 weeks post-partum. The GHS through the Ghana National Malaria Control Programme (NMCP) recommends that pregnant women receive at least two doses of SP during pregnancy as IPT against malaria. In the 2008 GDHS, only 44% of women reported receiving two or more doses at least one of which was during ANC visit. The GDHS 2008 report (GSS *et al*, 2009) also showed that the Ashanti region with Kumasi as the Capital city, recorded that 50.8% of women received two or more doses of SP during pregnancy.

Kumasi is the second largest city of Ghana with five Health Sub-Metropolitan areas. The 2009 population based on the 2000 population and housing census is 1,581,142 people. The metropolis is served by five government hospitals, 180 private facilities, three CHAG institutions and 4 quasi government institutions. Three annual reports of the Kumasi Metropolis showed a wide gap between IPTp1 and IPTp3 (Table 1). The IPTp coverage indicated an overall downward trend (KMHD, 2010).

Table 1 ANC visits and IPTp utilization in Kumasi Metropolis, 2007-2009

Indicator	2007	2008	2009
ANC Registrants	40,273	45,732	48,819
ANC Visits	155,910	184,733	197,780
IPTp1	28,332 (70.3%)	44,787 (97.9%)	24,105 (49.4%)
IPTp2	20,935 (51.1%)	34,451 (75.8%)	18,864 (38.6%)
IPTp3	15,738 (39.1%)	22,456 (49.1%)	12,641 (26.0%)

Source: Metropolitan Health Directorate, Kumasi

1.2 Problem Statement

In Ghana, The intermittent preventive treatment (IPT) using sulphadoxine-pyrimethamine (SP) intervention started in 2003 at all health facilities where ANC services were provided. It is however, worrying to see that the coverage from 2007-2009 in the Kumasi metropolis is declining with wide gap between IPTp1 andIPTp2 which worsens with IPTp3. This is against the background of the government's effort through MOH/GHS with development partners to provide training, free service, supply of SP, IEC and celebration of World Malaria Day. It is also worrying to note that events that may be associated with malaria in pregnancy (low birth weight, spontaneous abortion and stillbirth), according to Kumasi Metropolitan Health Directorate (KMHD), 2007-2009 also seem to be on the increase (Table 2).

So far the evaluation has been based on analysis of output indicators at meetings and performance review sessions where possible barriers are speculated on or guessed. The possible reasons offered include late reporting for ANC services, stock out of SP, cost of ANC services, contacts with traditional herbalists, concerns of potential drug toxicity (side effects) among the pregnant women and others. No systematic research has been carried out in the metropolis to identify the actual reasons for the low IPT coverage

Table 2.
Events that might have been associated with malaria in pregnancy, Kumasi Metropolis , 2007-2009

Indicator	2007	2008	2009
Maternal deaths	108	112	120
Spontaneous abortions	1167	1, 400	918
Still births	640	465	652
Anaemia in Pregnancy (at 36wks)	3,415	3,490	4,058
BW < 2.5kg	2,651	3,450	4,712

Source: Metropolitan Health Directorate, Kumasi

1.3 Justification

Malaria is a leading cause of morbidity and mortality with 11% of the mortality in pregnant women related to malaria (MOH, 2007). The two main interventions to prevent malaria among pregnant women are the use of ITN and intermittent preventive treatment using SP with public education (public and private sector, facility and community based services). This notwithstanding, the IPTp coverage, especially for the second and third doses is low. Understanding the reasons for the level of coverage of IPTp among pregnant women who are at highest risk of the consequences of malaria morbidity and pregnancy outcomes is vital. This study aims to provide vital information to the Kumasi metropolis on the reasons for the relatively low coverage of IPTp to enable them come up with appropriate interventions aimed at reducing or eliminating the barriers to IPTp service utilization.

This study will also determine knowledge in similar perspective and describe perception of health care providers and mothers since their perception will most likely determine service provision and utilization respectively.

Research Questions

General research question

What are the barriers to the uptake of IPTp strategy in the Kumasi Metropolis?

Specific questions

What is the level of utilization of IPTp among the mothers with children 0-11months?

What is the knowledge level and perception of mothers and service providers on IPTp?

How does SP utilization relate to the number and timing of ANC visits?

What practices from health facilities and mothers serve as barrier to the utilization of IPTp among pregnant women?

1.4 Research Objectives

General Objective

To determine the use of IPTp among mothers with children 0-11months and identify barriers to the uptake of IPT during pregnancy in the Kumasi Metropolis.

Specific Objectives

To determine the level of utilization of IPTp among the mothers with children 0-11months

To assess the knowledge and perception of the mothers and service providers on IPTp

To determine SP utilization in relation to the number and timing of ANC visits

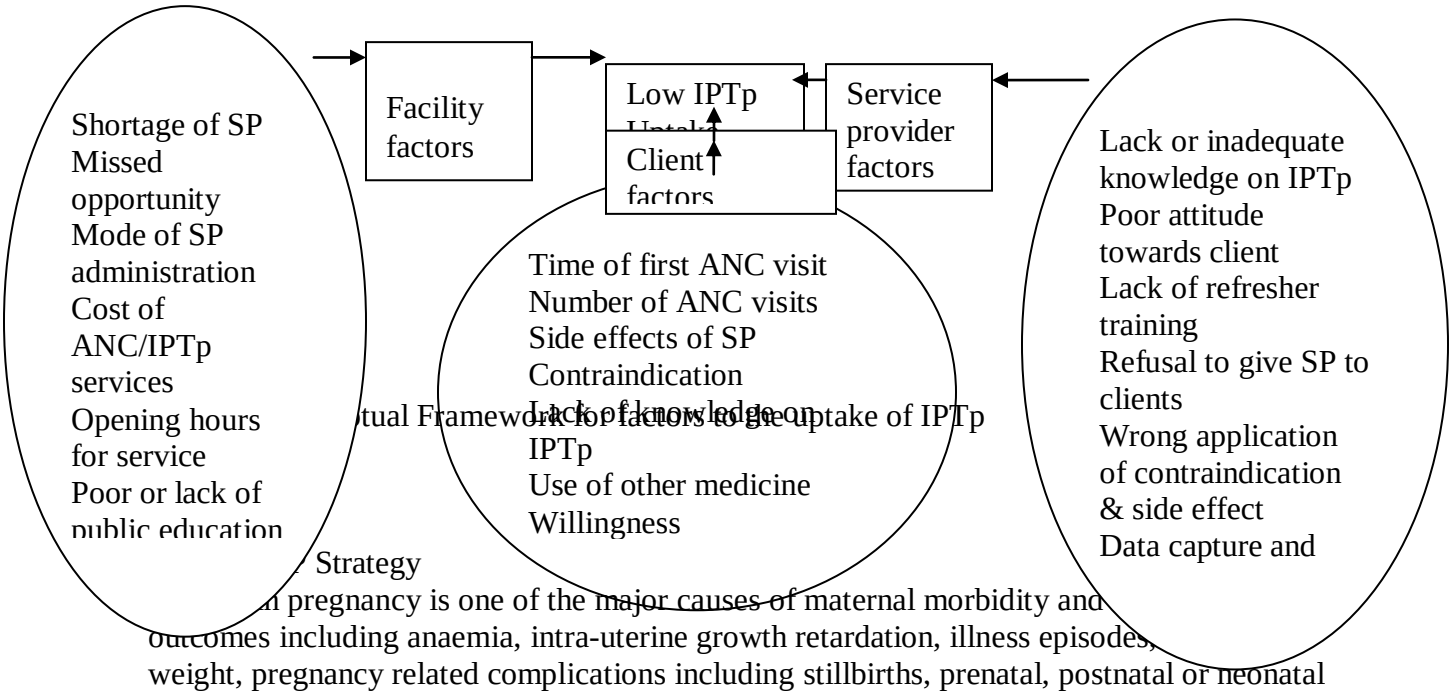
To determine health facilities and mothers' practices that serve as barrier to the utilization of IPTp

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

High coverage of IPTp is expected to reduce the burden of malaria in pregnant women and its birth related outcomes. However, certain factors may serve as barriers to the success of this intervention. Such factors may include pregnant women's knowledge and perception on IPTp, availability of IPTp services, timing and number of ANC visits, side effects of Sulphadoxine-Pyramethamine in pregnancy, contraindication to SP use and the use of other medicines (orthodox and non-orthodox) that may contraindicate the use of SP during pregnancy. The relationship of these factors to the uptake of IPTp is conceptualized in the frame work below.



tual Framework for factors to the uptake of IPTp

Strategy

n pregnancy is one of the major causes of maternal morbidity and outcomes including anaemia, intra-uterine growth retardation, illness episodes, weight, pregnancy related complications including stillbirths, prenatal, postnatal or neonatal deaths and other consequences. The World Health Organization (WHO) policy for malaria prevention and control during pregnancy in areas of stable malaria transmission in Africa from the early 2000s is administration of intermittent preventive treatment (IPT) and provision of insecticide treated nets together with effective management of clinical malaria and anaemia (WHO, 2004). This was a change over from a weekly or bimonthly chemoprophylaxis to intermittent preventive treatment (IPTp). IPTp consists of the administration of a single curative dose of an efficacious anti-malarial drug at least twice during pregnancy – regardless of whether the woman is infected or not. The recommended drug for IPT in pregnancy in areas of Africa where transmission of P. falciparum malaria is stable, and where resistance to the drug is low, is sulfadoxine-pyrimethamine (SP) (WHO, 2004). IPTp as a strategy is used by many countries where malaria is a burden and stable. In Africa almost all the countries in the Sub-Saharan Africa is implementing IPTp with most of them using ANC service as the IPTp service delivery points. The policy states that 'all pregnant women in stable malaria transmission areas should receive at least two doses of the recommended antimalarial drug at the first and second regularly scheduled antenatal clinic (ANC) visits after 'quickening' (first noted movement of the fetus)'. While IPTp-SP seems

an adequate strategy, there are many issues still bordering on the uptake as a result of certain barriers Akinleye *et al*., (2009).

2.3 Knowledge and Perception on IPTp

The Encyclopedia Britanica Library (2008) defines knowledge as the range of one's information or understanding. Acquiring knowledge about IPTp strategy is an important step towards gaining access to IPTp services. A pregnant woman's knowledge on IPTp will help her to see it as an important strategy that will help her to prevent malaria effects on her and her prospective baby. In this way they will be motivated to utilize the ANC and IPT services. Several studies have been carried out on knowledge and perception on IPTp. In a study in Nigeria among 109 pregnant women (Akinleye *et al*., 2009) found varying levels of knowledge and perceptions where only 23.9% who had heard about IPTp were able to give a good definition of IPTp and 67.1% knew the correct dose of SP for IPTp. Much as clients are expected to have knowledge on IPTp, health personnel are also expected to be abreast with knowledge on IPTp to equip them to run the service. Mubyazi *et al*., (2005) qualitatively assessed health personnel knowledge in the Korogwe District, North-Eastern Tanzania. Health personnel at both dispensary and district level were generally aware that SP is the recommended drug for preventive treatment of malaria in pregnant women. An assertive statement from a clinical officer attesting this was: "Yes, we know through presumptive prescription of SP, that the MOH is determined to protect pregnant women, who are the most vulnerable groups together with under-fives and that they should receive it free of charge". In-charges of the two dispensaries acknowledged having received IPTp guidelines from the MOH.

2.4 Availability of IPTp-SP Services

Clients' recognition of a certain service and the need for it is as much important as the availability of service. The DOT approach in Ghana underscores the fact that SP administration is solely a facility-based activity and therefore all facilities providing antenatal care, public and private facilities should be stocked to avoid missed opportunities. The 2009 Anti-malarial Drug Policy of the Ministry of Health in Ghana is explicit on the availability of anti-malarial drugs by stating that "To ensure smooth implementation of this policy, the MOH and its agencies shall ensure access and availability of the recommended anti-malarials under this policy in all facilities".

However, studies have shown that, facilities sometimes run out of stock of SP. A study by Hill *et al*., (2006) reviewed the progress and operational challenges of "Reaching the Abuja target for intermittent preventive treatment of malaria in pregnancy in African women". Of the five countries reviewed, Tanzania was the only country to show high SP availability in 91% of health facilities surveyed. According to Molteni (2003), Tanzania has a variety of different sources of SP, including the district medical office (43%), essential drug programme kits (44%), private market (4%) and others (9%) and that could explain the high availability of 91%. This is in contrast to the four other countries, where SP supply has been reported to be a major constraint to the delivery of IPT. Shulman (2003) found that out, Malawi and Uganda use the 'pull system' for drug supply, where districts forecast need based on ANC attendance. Kenya uses the 'push system', where supply is not related to demand, and this has led to underestimation of need. Drug availability was reported to be the largest constraint to implementing IPTp using sulphadoxine-pyramethamine (IPTp-SP) in Kenya (Leavens, 2002). The main supply barriers appeared to be the distribution chains at district hospitals, which were responsible for delivering drugs to health facilities, as well as insufficient funds for procurement. According to Leavens, 2002 health workers have been

seen to prioritize and use limited SP stocks for treating sick patients at the expense of providing SP for IPTp. The same that Uganda and Zambia have experienced frequent drug stock-outs due to underestimation of requirements, lack of resources, delays in release of funds to districts and monopoly of drug supply by government stores. Ashwood-Smith *et al*., (2002) revealed that health staff in Malawi are limited in the quantity of SP they are entitled to order due to maximums imposed on order forms, which are frequently insufficient to cover needs. Anders *et al*., (2008) found in their study that those who did not receive IPTp as indicated the key reason reported was that it was not offered by ANC staff. Only one woman said she had refused SP when given, due to perceived negative physical effects.

2.5 Timing and Number of Antenatal Care Visits

The GDHS 2008 report (GSS *et al*., 2009) emphasizes that Antenatal care is more beneficial in preventing adverse outcomes when it is sought early in the pregnancy and is continued through to delivery. The earlier the first visit and the more visits a pregnant woman makes, the greater her chances of receiving preventive care like IPTp services. Under normal circumstances, the WHO, recommends that a woman without complications should have at least four visits, of which the first one should take place during the first trimester (GHS, 2008). The number of times a pregnant woman needs to visit may vary. For uncomplicated pregnancy it is recommended that at least four ANC visits, the first of which should take place in the first trimester (GHS, 2008*)*.

In Ghana there is an increasing trend among pregnant women to have four or more antenatal care visits (GSS *et al*., 2009). About 78% of pregnant women aged15-49 years who had a live birth in the five years preceding the survey, had four or more antenatal care visits for most recent live birth compared to 69% in the 2003 survey. There is also an increasing trend for women to have their first ANC visit before the fourth month of pregnancy (55% and 46% in 2008 and 2003 respectively). The median number of months pregnant at first visit was 3.8. Hill *et al*., (2006) also explored the number and timing of ANC visits when reviewing the progress and challenges of Reaching the Abuja Target on IPTp. Their findings were however, contrary to the findings of GSS *et al*., (2009). Hill *et al*., in this study found that in addition to urban/ rural disparities, several of the countries beginning to implement IPTp-SP also face less frequent ANC visits by pregnant women, with four countries showing a median number of ANC visits less than three. They also found that many of these women do however attend ANC earlier than women in the East African countries, with an average of 4.7 median months pregnant at first visit compared to an average of 5.7 for the East African countries. Hill *et al*., (2006) also found that Rwanda has more pregnant women reporting late to ANC with ANC attendance figure of 6.7 median months of pregnancy at first visit and also the lowest median number of ANC visits. The increasing trend of ANC attendance and median months of pregnancy at first visits in Ghana according to GSS *et al*., (2009) is an increased opportunity to provide IPTp services.

WHO recommends that the first dose should be administered at the first ANC visit after quickening – which ensures that the woman is in the second trimester of pregnancy and the remaining two IPTp doses should be given at least one month apart (Briand *et al*, 2007). There is currently no precision regarding the best timing for their administration as it entirely depends on the timing and frequency of ANC visits of the woman. According to McGready *et al*., (2004), when applicable, women should particularly be protected in late pregnancy, when both foetal growth and deleterious effects of malaria are most important. In the absence of ANC visits in the two first trimesters, it could still be worthwhile to administer IPTp even only in the last month of pregnancy. The baby is still growing and has to be protected, and there is no major contraindication in using SP close to delivery

McGready *et al*., (2004). A single study found an increased risk of kernicterus in neonates treated with sulphonamides, (Andersen *et al*., 1956), but this has not been further confirmed. Two recent studies highlighted the relevance of a protection in late pregnancy. A study by van Eijk *et al*., (2004) found that IPTp had a higher efficacy when the last dose was administered close to delivery and another (Filler *et al*., 2006) showed a better protection in women randomized in a SP-monthly group, who received their last dose of SP close to delivery, than in women taking the usual two-dose IPTp-SP.

However, Hill *et al*., (2006) found that the timing of ANC visits is critical for the effective delivery of IPTp. Approximately 25% of women attend ANCs for the first time in the third trimester (WHO & UNICEF, 2003). Late ANC attendance is a barrier to delivering the second dose of SP and will not provide adequate protection for the mother or her fetus. Late attendance to ANC, towards the end of the second trimester, is an issue for all five East African countries with an average of 5.7 median months pregnant at first visit. For example, late ANC attendance in Uganda (around 28 weeks) was a major impediment to delivering the second dose of SP (Mufubenga, 2003). Similarly in Zambia, late antenatal attendance was the main reason for low compliance with the three-dose IPTp regimen (N. Ngoma, personal communication). By improving female education on the benefits of IPT-SP and by simplifying recommendations for IPTp-SP, earlier attendance may be achieved (WHO & UNICEF 2003).

Briand *et al*., (2007), argue that WHO recommendation of the administration of at least two doses of SP during pregnancy was based on the average number of ANC visits women had in African countries, and on the results of the first IPTp studies by Shultz *et al*., (1994), Parise *et al*., (1998) and Shulman *et al*., (1999). According to Parise *et al*., (1998) cited by Briand *et al*., (2007), two doses were found more efficacious than a single dose], few studies have investigated the efficacy of a higher number of intakes. Briand *et al*., (2007), has also recommended an evaluation to the optimal number of doses in terms of applicability since IPTp coverage with a full two-dose treatment, which is the strategy recommended by almost all countries with an IPTp policy, is still low. The administration of a higher number of doses may be difficult to implement.

2.6 Target Group for IPTp

WHO recommends that pregnant women of all gravidities should receive IPTp and Ghana's policy on IPTp is guided by this recommendation. However, Menendez. C (1995) in citing most IPTp studies have been limited to primi- and secundigravidae because their offspring have the highest malaria morbidity. A recent study, specifically conducted in multigravidae, did not show any beneficial effect of IPTp on anaemia or LBW in this population of women, (Mbaye *et al*., 2006).

Briand *et al*., (2007), question the reliability of targeting the intervention to primi- and secundigravidae only. For equity reasons, they argued that it is hardly conceivable to exclude some women from receiving a preventive measure (or public health intervention) and that when implementing the intervention, it would be difficult to identify precisely the women who have the highest risk (i.e primi- and secundigravidae, plus HIV-infected women of all gravidities), to single them out and protect them specifically. They observed that, obstetrical histories are difficult to collect, especially with regard to events such as abortions or stillbirths, and the HIV status of a woman is generally not known. Furthermore, while malaria has a lower impact in multigravidae, it has not yet been fully assessed how deleterious malaria is in women who have been protected during their first pregnancies (Greenwood, 1994). A recent study strengthened the need for multigravidae to be effectively protected as it suggested that their offspring, when the placenta was infected, had a higher

risk of parasitaemia during infancy compared to primigravidae (Mutabingwa, 2005). The issue of gravidity and IPTp use could be given a particular attention when there is inadequate stock level of SP leading to prioritization in favour of those at high risk- primi- and secundigravidae and this study tried to identify if service providers under such circumstance gave priority to primigravidae.

Side effects of SP can also affect the use of IPTp since women who do not tolerate the SP will have to discontinue its use during and subsequent episodes of pregnancies. Most women according to Hill *et al*., (2006) are generally reluctant to take medicines during pregnancy unless absolutely necessary because of concerns for potential effects on the unborn child. The use of SP has raised concerns among pregnant women over risk of severe skin reactions known as Steven Johnson's Syndrome in Tanzania (Mubyazi *et al*., 2005) and the belief that SP should be taken with food observed in Malawi by Ashwood-Smith *et al*., (2002). Mubyazi (2005) qualitative study in Korogwe District, North-Eastern Tanzania also supports this assertion. Peters *et al*., (2007) in attempt to evaluate the toxicity data of sulfadoxine/pyrimethamine, including severe cutaneous adverse reactions, teratogenicity and alterations in bilirubin metabolism agreed that weekly sulfadoxine/pyrimethamine prophylaxis is associated with rare but potentially fatal cutaneous reactions. Their study revealed that sulfadoxine/pyrimethamine use in IPTp programmes in Africa, with 2-4 treatment doses over six months, has been well tolerated in multiple IPTp trials. However, sulfadoxine/pyrimethamine should not be administered concurrently with cotrimoxazole given their redundant mechanisms of action and synergistic worsening of adverse drug reactions. Therefore, HIV-infected pregnant women in malaria endemic areas who are already receiving cotrimoxazole prophylaxis should not also receive IPTp-SP. Again they found out that although folate antagonist use in the first trimester is associated with neural tube defects, large case-control studies have demonstrated that sulfadoxine/pyrimethamine administered as IPTp (exclusively in the second and third trimesters and after organogenesis) does not result in an increased risk of teratogenesis. Folic acid supplementation is recommended for all pregnant women to reduce the rate of congenital anomalies but high doses of folic acid (5 mg/day) may interfere with the antimalarial efficacy of sulfadoxine/pyrimethamine. Ghana's Ministry of Health (MOH, 2009) Anti-malaria Drug Policy for Ghana, categorically states that "All pregnant women shall undergo screening before the commencement of IPT in order to exclude those who are either G6PD deficient or allergic to sulphonamides". Regarding the use of sulphadoxine-pyrimethamine for IPT, the Anti-malaria Drug Policy for Ghana, states that results from three sentinel sites monitoring the G6PD prevalence in pregnant women, shows full G6PD prevalence rate of 2.9% and partial G6PD prevalence rate of 17. 7%. Much as sides effects and G6PD prevalence may serve as barriers to IPT utilization, whether they are being considered or not in the analysis of IPTp coverage is an issue this study tried to explore.

2.7 Use of other medicine that prevent SP use during pregnancy

Despite the drug policy on the IPT-SP, there may be instances whereby the policy will be ignored and other drugs (including traditional medicine) are used. The use of traditional medicine may due to socio-cultural factors. Traditional African Medicine (TAM) serves over 80% of the populations in Africa (Elujoba *et al*., 2005). van der Kooi and Theobald (2006) have also observed that in South Africa most black women use antenatal care services and deliver in clinics, and a considerable number complement this use of formal health services with traditional medicine. They examined the knowledge, beliefs and practical experiences of pregnant women, traditional healers and midwives with regard to "kgaba" (traditional medicine) and explored what constitutes "kgaba". Findings from their

study indicated that "kgaba" remedies are ingested not only to prevent or solve physical problems but are also perceived as valuable in protecting against the harm that evil spirits can cause during pregnancy. They also found that use of crushed ostrich eggshell, which is perceived as inducing labour, emerged as an important finding. These findings may not be different from Ghanaian pregnant women due to shared cultural values. The question was whether the use of the traditional medicine or contact with a traditional leader serves as a barrier to the use of SP. Another way by which IPTp policy can be ignored is when for profit private practitioners may use other antimalarials especially if there are possibilities of drug shortage and are also not accredited by NHIS. Mubyazi *et al*., (2005) has observed that pregnant women consulting private health facilities may opt for drugs other than SP and due to their profit motive such facilities may accept clients' demand for particular drugs even if sub-optimal.

2.8 Financial Accessibility to and Payment policies for IPTp services

Accessibility to health services by pregnant women has many dimensions that include financial, socio-cultural, geographical distance to facilities, permission to go for treatment so on (GSS *et al*., 2009). Financial accessibility to IPTp services in the Kumasi Metropolis was reviewed against payment policies for IPT. Ghana MOH, in the quest for meeting the MDG5-"Reduction of maternal mortality by 75% by 2015" (http://en.wikipedia.org/wiki/mellinium_Development_Goals#Goal_5) is implementing government policy of free maternal care (ANC, Delivery and PNC). In addition to this, the recommended ant-malarials are on the NHIS list so that SP for IPTp is free of charge. Looking at the low utilization level of IPTp especially IPTp3 compared to high ANC visits coverage and the median number of months pregnant at first visit being 3.8 (GSS *et al*., 2009), mothers may be forced to pay for IPTp especially from non-government facilities. If media reports on the difficulties of re-imbursement by NHIS, then paying for IPTp cannot be avoided. Hill *et al*., (2006) observed that government antenatal services are provided free in all five review countries. Conversely, NGO, mission and private clinics often adopt independent payment policies for health services, leading to differential payment policies amongst clinics providing the same service. They found in Malawi, for example, that health facilities run by the Christian Hospitals Association of Malawi (CHAM) charge a fee for the second dose of SP, and this differential payment policy was thought to have accounted for the lower uptake of the second dose of SP in CHAM facilities (17% compared to 40% in government health facilities) as revealed by Ashwood-Smith *et al*., (2002). Hill *et al*., (2006) were of the view that the impact of variable pricing policies on IPTp uptake in Malawi demonstrates that coordination of payment policies across IPTp delivery channels and networks is an important consideration in the delivery of IPTp, as with other ANC services. Payment discrepancies can also arise if public health facilities do not adhere to government policy on payment/fees. Lynam & Munguti (2003) buttressed this point by giving examples of this in Kenya, where staffs in government facilities in Busia and Kilifi districts were charging for SP, resulting in low adherence for the second dose of SP.

CHAPTER THREE

METHODS

3.1 Study Design

A Community-based cross-sectional survey which was ran from June 21 to July 26, 2010.

3.2 Study Area

The study area was Kumasi Metropolis. Kumasi is bounded by four districts; to the north, Kwabre, on the south Bosomtwe-Atwima Kwanwoma; on the east, Ejisu-Juaben; and on the west, Atwima. Politically, Kumasi is divided into ten (10) sub-metropolitan areas namely; Manhyia, Tafo, Suame, Asokwa, Oforikrom, Asawase, Bantama, Kwadaso, Nhyiaeso and Subin. Kumasi is the second largest city of Ghana with five Health Sub-Metropolitan areas. Kumasi Metropolis has an estimated population of 1,634,901 for 2010, based on the 2000 population and housing census (KMHD, 2010) and the expected deliveries for the 2010 equals 65,396. This population is served by seven government hospitals, 180 private facilities, three CHAG institutions and four quasi government institutions. Five Polyclinics (hospitals) and five private maternity homes in the Kumasi metropolis were used for the study.

3.3 Study Variables

The aim of the study was to identify the barriers to the utilization of IPT among pregnant women in the Kumasi Metropolis. To achieve this, the following variables (dependent and independent) were measured. The dependent variables include;

- IPTp usage level
- Knowledge level on the IPTp
- Perception on IPTp use
- Accessibility to SP services
- Timing and number of ANC visits
- Side effects experienced following the 1st or 2nd SP intake
- Use of medicines that contraindicate SP use
- Use of traditional medicine
- G6PD prevalence

3.4 Study population

Two categories of participants were studied: mothers with children 0-11months at the community level (households) and IPTp service providers/managers. Both mothers with ANC cards and those without ANC cards were sampled for the study. The age range of children aged 0-11 months was necessary to help evaluate the IPTp coverage among their

mothers and whether children and mothers were likely protected against malaria during pregnancy and at birth and the reasons why some did not receive IPTp services.
The other population for the study was the IPTp service providers in the five selected government health polyclinics and five private maternity homes in the Kumasi Metropolis. They included heads of the facilities, pharmacists, maternity in-charges and midwives. Their selection was based on their involvement in the management and the implementation of the IPTp services.

3.5 Sampling

Sample size

Epi-Info (Epi-Info, CDC, Atlanta,) sample size calculation model estimated a minimum of 294 mothers with children 0-11months allowed for the estimation of IPTp3 coverage within 5% of the estimated prevalence using 95% confidence level, assuming the prevalence is 26.0% (KMHD, 2009). Twenty IPTp service providers were used to assess service providers and facilities contribution to the low uptake of IPTp. According to the WHO manual outlining the procedure for carrying out EPI cluster survey (WHO, 1991), in most developing countries children in the age range of 12-23 months constitute approximately 3% of the total population. If all children were present, one would need a community of about 500 people to be sure to find at least seven children in this age range. Because of absenteeism, one may need a larger population to find seven children in the age range 12-23 months. Therefore, for practical reasons, one should plan to conduct a 30 cluster coverage survey in a population, or section of a population, greater than 30 000. For this study mothers with children 0-11months were studied representing 4% of the population and it was assumed that each of the 30 clusters would be able to provide 10 mothers per cluster.

Sampling Method

Cluster and convenient sampling procedures were used to select the sample. The cluster sampling was used to select the mothers with 0-11months children while the convenient sampling was used to select the health facilities and the IPTp service providers. The WHO EPI Cluster Survey (WHO, 1991) procedure was adapted to identify 30 clusters from the 287 communities in the Kumasi metropolis (Appendices I-II). These communities were obtained from the 2010 April NID demarcated areas created by the Metropolitan Health Directorate.
The five health sub-metropolitan areas in Kumasi have five hospitals (one for each health sub-metropolis) which serve as the focal facilities for health delivery services (especially preventive care) in the sub-metropolis. These hospitals are complemented by private hospitals and maternity homes. Consequently, purposive and convenient sampling methods were used to select the nine facilities and 22 service providers (Medical Superintendents-2, Pharmacists-4, Maternity In-charges-8, midwives-8) for the study. Four midwives from the four private maternity homes studied doubled up as Maternity In-charges. In each Sub-metro, the sub-metro government hospital and a private maternity home (with the biggest attendance) will be used. Subin Sub-metropolis did not have a functional maternity home at the time of the study. The Medical superintendents and the pharmacists were located at the hospitals.

3.6 Data Collection Technique and Tools

Quantitative data collection technique was used to collect the data and to obtain information from the mothers using an interview guide (Appendix III). The interview guide was administered to mothers with 0-11months children at the community level and they were asked a series of closed questions about their socio-economic background, pregnancy

history, attendance at antenatal clinic and the use of IPT interventions during the pregnancy, as well as questions exploring reasons for not using IPTp among the defaulters.
The source of information on IPTp usage was by card and history. *"By card" means that the information about a mother's IPTp history is obtained by copying it from an ANC card*. ANC cards are usually kept by the mother at home, and provide an important, reliable source of information. Cards provide the exact date of SP administration and, therefore, a way to verify whether the mother was at the appropriate age of gestation when SP was given.*"By history" means that the mother reported that she had received the SP, but did not have it recorded on an ANC card.*
A separate structured interview guide (Appendices IV-VII) was used to collect data from health care providers. Interviews with health workers consisted of a mixture of closed and open questions, soliciting for the attitudes and practices of staff in discussing malaria with pregnant women, administration of IPTp and reasons why a pregnant mother will not be given SP. Stock level of SP will also be assessed at the pharmacies of the various health facilities. A clinic session for one ANC client was also observed to assess the possibility of missed opportunity for SP service.

3.7 Pretesting of Data Collection Tools

The questionnaire and the interview schedule were pre-tested at SDA Hospital, the Sepe Doti Health Centre and a private maternity home in Kumasi. The pretesting helped in the re-organization of the questionnaire and the interview guide items. It also helped in the development of the appropriate codes for data entry using EPI Info.

3.8 Data Processing and Analysis

Descriptive statistics-median and simple proportions were used to describe the data. Pearson's Chi-square test, regression (binary logistics), ratios were used to examine association between categorical variables. All analyses were performed at 5% level of significance. EPI Info was used for data entry and the data were imported into SPSS for analysis. Tables were used to present the numerical data. The statistical analysis (Appendix VIII) was used to determine the relationship between IPTp utilization and the factors-demographic, number and timing of ANC, knowledge on IPTp, stock out of SP, side effect of SP, cost of IPTp service, use of traditional medicine, use of other drugs, G6PD deficiency in order to identify the most likely barriers to IPTp utilization. The G6PD was obtained from mother's ANC cards as the test result is recorded in the card. For those who do not have the cards, reasons for not being given SP at the clinic based on their reaction to sulphur drugs was used to obtain information on G6PD. The odds of a mother using a public or private facility and also utilization of IPTp as well as the odds of a mother using a facility type and utilization of IPTp were also determined (Appendix VIII). Data from the key informant interview and the observation were analysed manually using a qualitative content analysis approach.

3.9 Quality Control

Quality assurance was done through:
Training of data collectors
Pre-testing of the data collection tools
Field supervision of data collectors
Double entry of data
Seminars on proposals presentation

3.10 Ethical Consideration

Ethical consideration was adhered to through the following processes:

Seeking ethical clearance from Ghana Health Service Ethics Review Committee (Appendix XI)

Permission to conduct the study was obtained from the relevant authorities in the Kumasi Metropolitan Health Administration and study facilities. Document regarding ethical clearance from the Ethics Review Committee was presented to the Kumasi Health authorities for their information and support (Appendix IX).

Informed consent was sought from prospective respondents before the administration of the questionnaires (Appendix IX).

Privacy (auditory) was ensured during the entire duration of the interview and any information given was kept in confidence.

3.10 Limitations of the study

Results from a sample survey are affected by non-sampling and sampling errors. Non-sampling errors are the results of mistakes made in the data collection and data processing , which includes failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent and data entry errors. Although numerous efforts were made to reduce this type of error during the implementation of the study, non-sampling errors are impossible to avoid and that this study may be limited to that extent (quality control session). Recall bias was anticipated and was controlled by first, selecting mothers with children 0-11 months who had less than a year interval contact to ANC. Again tablets of SP were shown to them aimed at enhancing their recall on the subject matter. Also, on the reasons for not taking a dose of SP, respondents were allowed to mention as many responses as they could which were then categorized among the options provided when appropriate. It is also important to note that, the data analysis was based on records from the *card* which was more reliable compared to the oral evidence from the mothers.

With the expected IPTp3 coverage of 26% (or 74%) at 95% confidence level with $\pm$ 5 precision level, the study should have used 20 mothers per cluster instead of the 10 mothers for the 30 clusters (WHO, 1991). The representativeness of the results of the study is therefore limited to this sampling error and must be considered for any use of the data. The design effect of a minimum of two (2) based on the sampling procedure means that the confidence interval for all estimates will be wider. That is with 95% confidence level, there is high probability that the true estimates will lie between a wider range of estimates.

CHAPTER FOUR

RESULTS

This chapter looks at the study results. The results are presented according to the study objectives with a brief description of the background characteristics of the respondents who are mothers with children aged 0-11months. The study ran from June 21 to July 26, 2010 and was carried out in the Kumasi Metropolis of the Ashanti Region of Ghana. Appendix VIII shows details of statistical analysis:

- background characteristics of the mothers
- the odds of a mother using a public or private facility and using a facility type and receiving SP
- statistical association between a mother using public or private facility and uptake of IPTp
- statistical association between a mother using a facility type and uptake of IPTp
- statistical association between a mother using a public or private facility and not being given IPTp
- statistical association between age of child and mother not being given IPTp

4.1 Background characteristics of the respondents

A total of 300 mothers with children 0-11months were sampled from 30 clusters in the Kumasi metropolis and all of these mothers responded to the study (100% response rate). Most (35.0%) of the mothers were aged between 25-29years while the mothers between 15-19years formed the least proportion (4.7%) of the respondents. Overall, 80.0% (239/300) of the mothers were married and 48.8% had between 2-3 children. Christians were the majority, 86.7% (260/300). The Akans represented 83.0% (249/300) of the mothers studied. Most (59.3%) of the mothers were educated up to Junior High School level and the majority, 46% (138/300) were traders. The next most common occupation of the mothers was artisans with 19.3% (58/300) being unemployed. Table 3 highlights the background characteristics of the mothers studied.

Table 3 Background Characteristics of the respondents, Kumasi July, 2010
N=300

Background characteristics	No of Mothers	Percent
Age of Mother(yrs)		
15-19	14	4.7
20-24	58	19.3
25-29	105	35.0
30-39	78	26.0
35+	45	15.0
Marital Status		
Married	239	79.7
Single	38	12.7
Separated	1	0.3
Parity		
0-1	86	28.6
2-3	147	48.8
4-5	55	18.3
6+	12	4.7
Religion		
Christian	260	86.7
Moslem	27	9.0
Agnostic	13	4.3
Ethnicity		
Akan	249	83.0
Dagomba	9	3.0
Ga	3	1.0
Ewe	10	3.3
Others	29	9.7

Educational Level		
None	18	6.0
Primary	41	13.7
Junior High School	178	59.3
Senior High School	45	15.0
Tertiary	18	6.0
Occupation		
Trading	138	46.0
Artisan	73	24.3
Public Servant	22	7.3
Unemployed	58	19.3
Others	9	3.0

4. 2 Utilization of IPT among the mothers with children 0-11 months

The utilization of IPTp by the mothers was determined using both Card and History (oral evidence). Data under *By Card* means the result was taken only from the card. On the other hand data from C*ard + History* means the result presented is obtained from both the card and oral evidence from the respondent. Consequently, data from C*ard + History* are always greater than that of the *By Card* since any IPTp recorded on the card was confirmed by mothers. Evidence from the card was used in all analysis and discussion though data obtained from a combination of card and history is presented in all tables for comparison. Some respondents did not have their antenatal cards at the time of the visit and the team was therefore unable to carry out inspection in that case. However, all the mothers with their cards showing evidence of IPTp confirmed the administration of the SP during their various ANC visits. Some mothers without cards gave oral evidence of being given SP during their ANC visits.

In all 39.7% (119/300) mothers received at least one dose of IPTp by Card compared to the 67.3% (202/300) by Card + History. The result is presented in Tables 4.

Table 4 Mothers receiving at least one dose of IPTp by Card and Card + History, in Kumasi July, 2010

N=300

Received at least IPTp1	By card n/N (%)	Card + History n/N (%)
Yes	119/300 (39.7)	202/300 (67.3)
No	181/300 (60.3)	98/300 (33.0)
Total	300	300

Overall, 39.7% (119/300), 33.7 % (101/300) and 21.0% (63/300) received IPTp1, IPTp2 and IPTp3 respectively. The result is presented in Tables 5

Table 5 IPTp doses distribution among the mothers, Kumasi July, 2010
N=300

IPTp Dose Received	By card	Card + History	X^2	p-value
IPTp1	119/300 (39.7)	202/300 (67.3)	14.27	0.000
IPTp2	101/300 (33.7)	174/300 (58.0)	12.23	0.000
IPTp3	63/300 (21.0)	96/300 (32.0)	16.66	0.000

4.3 Background characteristics of mothers and level of IPTp utilization

4.3.1 Age and IPTp utilization

The mothers' age, marital status, parity, religion, educational level and occupation are very important personal characteristics that may affect their ability, freedom and access to ANC services and eventual use of IPTp. With respect to age, 15 (33.3%) out of the total number of 42 mothers aged 35 and above had received IPTp3, Among those aged between 20-24years, 22/58 (37.9%) had received IPTp3. None of the 14 mothers aged 15-19years had received IPT3. Age was found to significantly affect the utilization of IPTp -especially IPTp3 (p = 0.015).

4.3.2 Marital status and IPTp Utilization

Mothers who were married recorded 56/239 (23.4%) IPTp3 coverage compared to 5/38 (13.2%) single mothers and 2/22 (9.1%) of cohabiting mothers who had done so. One woman who had separated from her husband had not received IPTp3. There was no significant difference between the marital status and utilization of IPTp (married –p=0.136, single-p=0.614 and cohabiting-p=1.000).

4.3.3 Parity

Mothers' parity showed that, 14 (16.3%) out of the total number of 86mothers who had one child received IPTp3. Among those with 2-3children, 33/147 (22.4%) had received IPTp3. While 11/55 (20.0) with children 4-5 had IPTp3. Five out of 12 mothers with more than six children were had IPTp3. Parity was found to significantly affect the utilization of IPTp (p = 0.036).

4.3.4 Religion and IPTp Utilization

With regards to religion, Moslems recorded the highest IPTp3 coverage of 6/27 (22.2%) whiles Christians followed with 55/260 (21.2%)). But there was however, no significant difference between the Christians and Moslems about IPTp use (p=0.606, p=0.614, respectively). Two out of the 13 (15.4%) Agnostic mothers had received IPTp3

4.3.5 Ethnicity and IPTp Utilization

There was not much difference in IPTp3 coverage among the Akans, Ewes and the Dagombas (p=0.219, p=0.612, p=0.999 respectively). Two out of the nine (22.2%) Dagombas studied had received IPTp3 whiles the Akans and Ewes had a coverage of 20.7%

(50/249) and 20.0 (2/10) respectively. All three Gas who participated in the study did not receive IPTp3.

4.3.6 Educational status and IPTp Utilization

With regards to mothers' education, those who reached the Senior High School level recorded the highest IPTp3 coverage of 75.6% (34/45). This was followed by those who had no education recording 27, 8% (5/18). The least coverage was among those reaching the Junior high school level who had 19.1% (34/78). Four out of the 18 mothers (22.2%) who had tertiary education received IPTp3. There was however, no significant level between the level of education the mothers attained and the utilization of the IPTp (primary, p=0.221, JHS, p=0.519, SHS, p=0.554 and tertiary, p=0.998).

4.3.7 Occupational status and IPTp Utilization

Mothers who were public servants (in the formal sector of employment) had the highest IPTp3 coverage of 31.8% (7/22), whiles the least coverage (12.1%) was observed among those who were not employed. Traders and artisans recorded 23.9% (33/58) and 19.2 % (14/73) respectively. There was however, no significant level between the level of education the mothers attained and the utilization of the IPTp (trader, p=0.908, artisan, p=0.844, public servant, p=0.595 and farmer, p=0.440). Table4.3 presents a comparison of the background characteristics and the utilization of the 3doses of IPTp as captured by Card and Card + History respectively.

Table 6 Relationship between mothers' background characteristics and the uptake of IPTp, Kumasi, July, 2010

Respondents N=300	By Card	Card +History

Age		IPTp1	IPTp2	IPTp3	IPTp1	IPTp2	IPTp3
15-19	14	6(42.9)	3(21.4)	0(0.0)	11(78.6)	9(64.3)	2(14.3)
20-24	58	25(43.1)	22(37.9)	15(25.9)	37(63.8)	33(56.9)	22(37.9)
25-29	105	35(33.3)	30(28.6)	12(11.4)	67(63.8)	56(53.3)	23(21.9)
30-39	78	34(43.6)	30(48.5)	21(26.9)	58(74.4)	50(64.1)	30(21.9)
35+	45	18(40.0)	16(35.6)	15(33.3)	23(51.1)	20(44.4)	19(42.2)
Marital status							
Married	239	98(41.0)	84(35.1)	56(23.4)	167(69.9)	145(60.7)	82(34.3)
Single	38	17(44.7)	14(36.8)	5(13.2)	26(68.4)	23(23.0)	11(28.9)
Separated	1	0(0.0)	0(0.0)	0(0.0)	0(0)	0(0.0)	0(0.0)
Co-habiting	22	4(18.2)	3(13.6)	2(9.1)	11(50.0)	8(36.4)	3(13.6)
Parity							
0-1	86	32 (37.2)	27(31.4)	14(16.3)	61(70.9)	55(64.0)	23(26.7)
2-3	147	63(42.9)	53(36.1)	33(22.4)	108(73.5)	93(63.3)	50(34.0)
4-5	55	16(29.1)	15(27.3)	11(20.0)	34(61.8)	30(54.5)	18(32.7)
6+	12	8(66.7)	6(50.0)	5(41.7)	9(75.0)	7(58.3)	5(41.7)
Religion							
Christian	260	101(38.8)	86(33.1)	55(21.2)	17466.9)	149(57.3)	83(31.9)
Moslem	27	27(100)	12(44.4)	6(22.2)	21(77.8)	20(74.1)	10(37.0)
Agnostic	13	13(100)	3(23.1)	2(15.4)	7(53.8)	5(38.5)	3(23.1)
Ethnicity							
Akan	249	96(39.7)	81(33.5)	50(20.7)	164(67.8)	140(57.9)	7(31.0)
Dagomba	9	4(4.0)	3(33.3)	2(22.2)	7(77.8)	6(66.7)	3(33.3)
Ga	3	0(0.0)	0(0.0)	0(0.0)	1(33.3)	1(33.3)	1(11.1)
Ewe	10	2(20.0)	2(20.0)	2(20.0)	(5(50.0)	4(40.0)	3(30.0)
Others[*1]	29	17(58.6)	15(51.7)	9(31.0)	23(79.3)	21(72.4)	14(48.3)

Educational Level							
None	18	9(50.0)	7(38.9)	5(27.8)	13(72.2)	11(61.1)	6(33.3)
Primary	41	16(39.0)	15(36.6)	11(26.8)	29(70.7	2765.9)	13(31.7)
JHS	178	67(37.6)	55(30.9)	34(19.1)	119(66.9)	100(56.2)	53(29.8)
SHS	45	44(97.8)	41(91.1)	34(75.6)	44(97.8)	25(55.6)	17(37.8)
Tertiary	18	8(44.4)	8(44.4)	4(22.2)	12(66.7)	11(61.1)	7(38.9)
Occupation							
Trading	138	58(42.0)	51(51.0)	33(23.9)	100(72.5)	87(63.0)	47(34.1)
Artisan	73	20(27.4)	17(23.3)	14(19.2)	40(54.8)	344(6.6)	21(28.8)
Public Servant	22	12(54.5)	12(54.5)	7(31.8)	18(81.8)	17(77.3)	11(50.0)
Unemployed	58	26(44.8)	18(31.0)	7(12.1)	40(69.0)	26(44.8)	14(24.1)
Others[*2]	9	3(33.3)	3(33.3)	2(22.2)	4(44.4)	4(44.4)	3(33.3)

*1 = Gonja (6), Frafra(4), Grusi(3),Sisasla, Kusaase, Zabrama, Kusaase, Bana(2each), the others had 1each including a Nigeria(Uruba).

4.4 Health facilities visited by mothers for their Antenatal Care (ANC) and IPTp utilization.

The IPTp utilization level based on health facilities used by the mothers for their ANC was categorized into public and private facilities as well as the operational levels (facility type) of the facilities (Teaching hospitals, District hospitals, Health centres and Maternity homes). Over 64% (194/300) of the mothers visited public health facilities for their antenatal clinic compared to 35.3% (106/300) of mothers who visited the private facilities. Mothers were two times more likely to use a public facility and two times less likely to use a private facility (Appendix VIII). More than 22% (43/190) of the mothers who visited the public facilities had IPTp3 compared to 18.7% (30/106) of mothers who accessed their ANC services from private health facilities. There was however, no significant difference in the uptake of IPTp between public and private facilities (public, p=0.999, private, p=0.999).

Table 7 A comparison of IPTp utilization among public and private facilities, Kumasi, July, 2010

Facilities	Respondents N=300	By card			Card + History		
		IPTp1	IPTp2	IPTp3	IPTp1	IPTp2	IPTp3
Public facilities	194(64.7%)	83(42.8)	71(36.4)	43(22.2)	143(73.7)	125(64.4)	66(34.0)

Private facilities	106(35.3%)	36(34.0)	30(28.3)	20(18.7)	66(62.2)	55(51.9)	34(32.1)

Three quarters of the mothers used district hospitals (225/300) of the mothers used the District Hospitals mostly in the Kumasi metropolis for ANC services, while the maternity homes which were also private facilities provided service to 14.7% (44/300) of the mothers. Seven percent (21/300) of the mothers received ANC services from health centres. The Teaching hospital attended to the least proportion (3.3%) of the mothers in the study. A mother was 3 times more likely to use district hospital for ANC services. The odds of a mother using the Teaching hospital, a health centre and a maternity home were, 0.03, 0.10 and 0.20 respectively.

A total of 44 out of the 225(19.6%) mothers who used the district hospitals received IPTp3. This was followed by those who visited the maternity homes with coverage of 20.5% (9/44). Four out of the 21 mothers (19.0%) received IPTp3 during ANC from the health centres. None of the 10 mothers who accessed ANC services from the Teaching hospital received IPTp3. Tables7 and 8 highlight the usage and utilization of IPTp3. The odds of a mother receiving IPTp3 from all the four facility types were less than one. However, the use of a health centre significantly led to the uptake of IPT3 (p=0.027) compared to the other facility types (Appendix VIII).

Table 8 A comparison of IPTp utilization among different operational levels of health facilities, Kumasi, July, 2010

Facilities	Respondents N=300	By card			Card + History		
		IPTp1	IPTp2	IPTp3	IPTp1	IPTp2	IPTp3
Teaching hospitals	10(3.3)	1(10.0)	1(10.0)	0(0.0)	2(20.0)	2(20.0)	0(0.0)
Dist hosp	225(75.0)	80(35.6)	67(29.8)	44(19.6)	130(57.8)	114(50.7)	63(28.0)
Health Centres	21(7.0)	9(42.9)	8(38.1)	4(19.0)	13(61.9)	11(52.4)	5(23.8)
Maternity home	44(14.7)	16(36.4)	13(29.5)	9(20.5)	27(61.4)	24(54.5)	17 (38.6)

4.5 Knowledge and perception of the mothers and service providers on IPTp

4.5.1 Knowledge and Perceptions of Mothers

Appendix VII explains the rating of mothers' knowledge level about IPTp. More than 50% (152/300) of the mothers had no knowledge on IPTp whiles 49.3% (148/300) had poor

knowledge (knew IPTp as treatment for prevention of malaria during pregnancy only) with 31.5% (95/300) showing average knowledge (Table 9). A very small proportion, 3.7% (11/300) of the mothers had very good knowledge on IPTp. All the 11 mothers (3.7%) who had very good knowledge on IPTp received IPTp1. This was followed by 63.2% (60/95) IPTp1 coverage among those who demonstrated average knowledge and dropped to 58.1% (86/148) among those who had poor knowledge on IPTp. Moreover, IPTp1 coverage was as low as 21.0 % (33/152) among those who had no knowledge on IPTp. There was a significant difference in knowledge on IPTp observed among those who had used IPTp and those who did not use IPTp (X^2 = 20.5, p = 0.000).

With regards to mothers' perception on IPTp, mothers were asked whether they think is necessary for a pregnant woman to use IPTp and also if every woman could take it. A little over 40% (131/300) perceived that IPTp is necessary for every pregnant woman and 30.5% (40/131) of these women had received 73/131(55.7%) had had IPTp1. Only 8.0% (24/300) mothers thought that the drug for IPTp cannot be given to every pregnant woman. Over 70% of these mothers had received IPTp1.

Table 9 Mothers' knowledge and perception on IPTp and utilization of IPTp, Kumasi, July, 2010

Knowledge and perception	Respondents N=300	By card	By card and history
		IPTp1	IPTp1
Knows what IPTp is about			
1=Very good	11(3.7)	11(100.0)	7(63.6)
2=Average	95(31.7)	60(63.2)	91(95.8)
3=Poor	148(49.3)	86(58.1)	132(89.2)
4=No knowledge	152 (50.7)	33(21.7)	70(46.1)
Mothers' Perception			
IPTp is necessary for every pregnant woman	131(43.7)	73(55.7)	114(87.0)
Every pregnant woman cannot take SP	24 (8.0)	17(70.8)	22(91.7)

4.5.2 Knowledge and Perceptions of Service Providers

The service providers generally exhibited high level of knowledge and they generally explained that is an intervention to control malaria in pregnant women:

"IPTp is a strategy of giving SP to pregnant women after quickening which is given three times and at an interval of one month which must be given at the hospital". (A Medical Superintendent from a District hospital).

Some of the midwives would however stop give SP when the pregnancy is 28 weeks or 32 weeks old. They stated it as follows:
"I will stop administering SP at gestational age of 28weeks" (Midwife from a maternity home)
"I think I must stop SP administration at gestational age of 32". (Midwife from a District hospital).

4.6 Timing and number of ANC visits and IPTp utilization
Among the 296 mothers who could tell the number of months they were pregnant at time of first ANC visit, 66.9% (198/296) had their visit between the first to the third month of pregnancy (1st trimester), 30.7% (91/296) had their first visit between 4-6 months (2nd trimester) while 2.4% (7/296) first accessed antenatal care services between 7-9 months of pregnancy (3rd trimester). IPTp3 coverage among those who had their first ANC visit in the 1st trimester was 22.2% (44/198) compared to 18.7% (17/91) and 28.6% (3/7) of those who had their first visit in the 2nd and 3rd trimesters respectively. Overall, the median number of months pregnant at first visit was 3.0 months. Among the 280 mothers whose total number of ANC visits could be determined, 87.9% (246/280) had five or more visits, 8.9% (25/280) had 3-4 visits and 3.2% (9/280) had 1-2 visits. The median number of ANC visits was seven. Whereas none of the mothers who had 1-2 ANC visits had IPT3, 23.6% (58/246) of the mothers who had five or more visits received IPTp3 with 16.0% (4/25) of those having 3-4 ANC visits received IPTp3. There is significance difference between the number of ANC visits and receiving at least a dose of IPTp2(X^2 = 14.2, p = 0.001) –Appendix VII. Tables 10 and 11 show the results obtained to describe mothers' number and timing of ANC visits in relation to the utilization of the 3doses of IPTp as captured by Card and Card + History respectively.

Table 10 Relationship between gestation age at first ANC visit and IPTp utilization, Kumasi, July, 2010

Number of months pregnant at time of 1st ANC visit	Respondents	By Card			Card + History		
		IPTp1	IPTp2	IPTp3	IPTp1	IPTp2	IPTp3
1-3	198(66.9)	76(38.4)	67(33.8)	44(22.2)	121(61.1)	115(58.1)	71(35.9)
4-6	91(30.7)	38(41.8)	30(33.0)	17(18.7)	64(70.3)	53(58.2)	23(25.3)
7-9	7(2.4)	3(42.9)	2(28.6)	2(28.6)	4(57.1)	3(42.9)	2(28.6)

N=296

Table 11 Relationship between ANC attendance and IPTp utilization, Kumasi, July, 2010

Number of ANC visits	Respondents	By Card			Card +History		
		IPTp1	IPTp2	IPTp3	IPTp1	IPTp2	IPTp3

1-2	9(3.2)	3(33.3)	1(11.1)	0(0.0)	5(55.5)	2(22.2)	0(0.0)
3-4	25(8.9)	14(56.0)	9(36.0)	4(16.0)	16(64.0)	11(44.0)	4(16.0)
5+	246(87.9)	99(40.2)	89(36.2)	58(23.6)	165(67.1)	147(59.8)	87(35.4)

N=280

4.7 Reasons for non utilization of IPT by mothers

There were various reasons why mothers did not get the appropriate SP dose; 78.6% of the mothers did not get IPTp1 while 64.3% of the mothers and 55.4% of the mothers did not get IPTp2 and IPTp3 respectively because they were not given the drug respectively. Over 14% of the mothers and 20.0% of the mothers did not get IPTp2 and IPTp3 respectively because they did not go for ANC when it was due. Almost 35% of the mothers did not get IPTp3 because the health worker said there was no drug. Late ANC visits accounted for 3.6 % and 13.5% of the mothers not receiving IPTp2 and IPTp3 respectively. Nearly 4% (4/103) of the mothers did not get IPTp1 because they were using traditional medicine. Over 13% of the mothers were not given IPTp1 because, they were treated for malaria. Operational level of the health facilities also shows some differences in the reasons for no IPTp intake. The district hospitals accounted for 53.1% (43/81) of the mothers who did not receive any dose of IPTp (all the 15 mothers who received ANC services from the KNUST hospital did not receive any IPTp) followed by the clinics accounting for 28.4% (23/81). (Table 12 and 13 show the reasons for non utilization of IPTp. The district hospitals and the maternity homes had most of the mothers receiving no IPTp2 and IPTp3 (50.0% and 67.0% respectively for district hospitals and 6.0% and 17.0% for maternity homes).

Table 12 Reasons for non utilization of IPT by mothers, Kumasi, July, 2010

Reason	NO IPTp1 (n= 103)	Only IPTp1 (NoIPTp2) (n= 28)	Only IPTp2 (No IPTp3) (n=74)
I was not given the drug	81(78.6)	18(64.3)	41(55.4)
I did not go for ANC when due	0(0.0)	4(14.3)	15(20.0)
Health worker said there is no drug	1(0.9)	0(0.0)	2(2.7)
I had no money to buy the drug	1(0.9)	0(0.0)	0(0.0)
I was late for ANC visits	1(0.9)	5(17.9)	10(13.5)
I experienced Side effects	0(0.0)	1(3.6)	5(6.7)

I was using traditional medicine	4(3.9)	0(0.0)	1(1.4)
I was treated for malaria	14(13.9)	0(0.0)	0(0.0)
I have G6PD defect	1(1.0)	0(0.0)	0(0.0)

The key informant interview with the service providers revealed that shortage of SP was periodic. When they were asked whether they have had stock out within the past one year these were the responses they gave:
"We ran out of stock somewhere in the latter part of last year so we could not give the IPTp"(A midwife from a District hospital).
"NHIS has not absorbed it and no supply from GHS so we couldn't buy the drug since ANC services are supposed to be free."(Pharmacist at a District hospital)
The Maternity in-charges mostly said that:
"There was no supply from the medical stores"
One maternity in-charge was emphatic by saying that:
"Pharmacist says it is finished"
A pharmacist explained as follows:
"In a situation whereby we do not have money to buy drugs, we only buy the basic drugs like Paracetamol to run the system".

On the issue of side effects of SP, the service providers were asked whether they have received reports from their clients and the response showed that the clients generally reported general weakness. Some had this to say:
"The complaints vary but they commonly complain of rashes, itching, headache, vomiting, general weakness, dizziness after taking the SP". (Maternity In-Charge at a District hospital.
On what action they took in the event of side effects the following responses were given:
"I treated the minor side effects and continue with the treatment". (A midwife from a maternity home).
'I referred the client to the appropriate level for further assessment". (A midwife from a Maternity home).
"I would discontinue SP use if the reaction is severe". (A Medical Superintendent from a District hospital).
"I advised mothers to eat before they take the SP". (A midwife from a District hospital).
"I would stop giving the SP when a mother insists that it was not good for her" (A midwife from a District hospital).
Distribution of the mothers who responded not given the drug as the reason for not taking IPTp by public and private facilities is shown in Table 13. Out of the 81 mothers who were not given SP for IPTp1, 59.3% (48/81) were from the public facilities with 40.7% (33/81) coming from the private facilities. While 62.5% (10/16) from the public facility did not receive IPTp2, 37.5% (6/16) from the private facilities also did not receive the drug for the same reason. For the 42 mothers who did not get SP because they were not given, 67.7% (28/42) and 28.6% (12/42) used the public and private facilities respectively. There was

however, no statistical association between public or private facility and a mother not being given the drug.

Table 13 Distribution of the response "I was not given the drug" among public and private facilities, Kumasi, July, 2010

Reason	NO IPTp1 (n=81)	NoIPTp2 (n=16)	No IPTp3 (=42)
Public	48(59.3)	10(62.5)	28(67.7)
Private	33(40.7)	6(37.5)	12(28.6)
X^2	2.493	0.582	1.993
p-value	0.114	0.426	0.158

Table 14 indicates the age groups of children whose mothers indicated not being given SP as the reason for their non utilization of IPTp. The health workers in most health facilities in the metropolis indicated a general shortage of the medication in the latter part of the year 2009 and the early part of the year 2010. Most of the children whose mothers complained of not being given the drug were in the age groups of 0-1month and 2-3months. There was however, no statistical association between the age of the children and the mother not being given IPTp (Appendix VIII)

Table 14 Age of children whose mothers responded as "I was not given the drug" to the inaccessibility of IPTp1, IPTp2 and IPTp3, Kumasi, July, 2010

Age of children in months	NoIPTp1 (n=81)	NoIPTp2 (n=16)	NoIPTp3 (n=42)
0-1	23(28.4)	6(37.5)	11(26.2)
2-3	22(27.2)	4(25.0)	13(31.0)
4-5	11(13.6)	2(12.5)	5(11.9)
6-7	16(19.8)	3(18.8)	8(19.0)
8-9	9(11.1)	1(6.3)	5(11.9)

Table 15 Summary of factors associated with non-use of IPTp, Kumasi, July, 2010

Factor	X^2	p-value
Mothers' Age	-	0.015
Parity	-	0.036
Difference in Knowledge between users and non-users of IPTp	20.5	0.000
Number of ANC visits and receiving at least a dose of IPTp	14.2	0.001
Users of health centres and IPT3 uptake	-	0.027
Shortage of SP	68.3% of all 205 mothers who did not receive SP	

CHAPTER FIVE

DISCUSSION

5.1 Introduction

In malaria endemic areas, adults acquire partial immunity that protects them from repeated malaria infection. Contrary to this, pregnant women-especially those pregnant for the first time-are more susceptible to malaria infection (Brabin B.J, 1983). In some cases, malaria remains asymptomatic but may lead to the development of anaemia in the pregnant woman. Malaria infection during pregnancy can also interfere with the maternal-foetus exchange, which can lead to intra-utrine growth restriction, and ultimately, lead to low birth weight or even stillbirth (Brabin B.J, 1983).

Among the interventions adopted by the MOH and the National Malaria Control programme to control malaria in pregnancy is the Intermittent Preventive Treatment (IPT) with sulphadoxine-pyramethamine (SP) as the drug of choice. The IPTp strategy is expected to be fully implemented country-wide through antenatal care clinics. According to this policy, from the second trimester of pregnancy (after quickening), pregnant women attending ANC clinics are expected to be given three doses of SP as directly observed therapy (DOT) at monthly intervals(GHS,2003). It is however, worrying to observe that the coverage of the IPTp is declining and this was observed in the Kumasi Metropolis (KMHD, 2009).

5.2 Utilization of IPTp among the mothers with children 0-11 months

The results obtained for the coverage of IPTp among the mothers interviewed which were 40.0% (119/300) for at least one dose of IPTp, 33.7% for IPTp2 and 21.0% for IPTp3 are almost the same as the administrative data from the 2009 KMHD report which recorded 49.4%, 38.6% and 26.0% for the IPTp1, IPTp2 and IPTp3. The coverage for the second dose is however much lower than that obtained from the 2008 Ghana Demographic and Health Survey (GDHS) where 44% of the women reported receiving at least two doses of IPT. The WHO expects 80% of all pregnant women living in areas of high transmission to receive at least two dose IPTp during pregnancy by 2010 (WHO, 2005). In Ghana, the IPTp strategy implementation begun in 2003 and based on the results of this study, the KMD is far behind in the realization of the WHO target. Many studies reviewed in this study indicated that there is generally low uptake of IPTp in Africa. For instance though Kenya was one of the first countries to implement the IPTp strategy, the national coverage for two doses of SP was only 4% five years after IPTp implementation (Greenwood et al, 1994). In Tanzania it was due to unreliable supply of free SP at private clinics, clean and safe water shortage at many government ANC clinics limiting direct observation treatment and occasionally pregnant women asked to pay for ANC services (Mubyazi *et al*, 2008).

Akinleye *et al* (2009) attributed the low utilization of rural southwest, Nigeria to periodic shortages of SP in the clinics. They observed that twenty two of the 36 women (61.1%) who did not take their drugs in the clinic would have liked to do so if allowed to bring their own drinking cups.

Hill *et al* (2006) argued that high antenatal clinic (ANC) attendance alone is not sufficient to ensure high IPTp coverage. They noted that staff shortages, poor drug supply, poor ANC access and poor health worker practices are some of the operational challenges in delivering

IPTp. Poor drug supply and poor health worker practices (stopping SP administration at 28 or 32 weeks of pregnancy) were important findings in this Kumasi study.
Apart from the age and parity of the respondents, the other background characteristics of the mothers could not be used to explain the low utilization of IPT. Age was significant when it comes to the utilization of IPTp3 (p = 0.015). This could be explained by the observed coverages of IPTp compared to gestational age for first ANC visits. Those who had the visit in the first trimester had high coverage of IPTp3 since they had the opportunity to be educated on the importance of ANC, more months for ANC visits and the likelihood of being given SP if available. All the 14 mothers aged 15-19 years did not receive IPTp3 and this could be due to late first ANC visit probably due to shyness, fear and even inability to recognize that they are pregnant. Parity also significantly affected the use of IPTp (p=0.036). Table 6 shows that, the higher the number of children of a mother, the more she was likely to use the IPTp. This could be that they are used to the SP administration and understand the importance of SP and therefore were ready to take it once they are available. They might have even secured it outside the facility and have it recorded in their cards since there was a general shortage in the facilities.
The public health facilities seem to attend to the mothers to the private facilities. The odds of a mother using a public facility are two times that of the private facilities. Again a mother was three times more likely to use district hospital for ANC services compared to the other facility types. This could be explained by the numbers and spread of the public facilities in the metropolis. However, a mother was less likely to receive SP at any facility being it public or private facility. Again apart from the health centre, odds of a mother receiving IPTp3 from all the other facility types were less than one.
Background information during the preparation for this study revealed that Komfo Anokye Teaching Hospital (KATH) and The Kwame Nkrumah University Hospital (KNUST) do not provide IPTp service. All the women who used these facilities for ANC do not have access to the drug. All the 15 mothers who did not get any IPTp services at the KNUST hospital explained that they were not given the drug like the four mothers who went to KATH. This observation is contrary to what the MOH Anti-malarial Drug Policy (MOH 2009) indicates. The Anti-malarial Drug Policy is emphatic on the availability of anti-malarial drugs by stating that "To ensure smooth implementation of this policy, the MOH and its agencies shall ensure access and availability of the recommended anti-malarials under this policy in all facilities". This study was however, not designed to find out from the facilities their reasons for not providing IPTp services. There is therefore an urgent need for the MOH to ensure that these facilities adhere to national policies and programmes-considering their training responsibilities for health personnel and the proportion of the population they serve.

5.3 Knowledge and perception of the mothers and service providers on IPTp
An individual's knowledge and perception about a health service is an important determinant for the use of that service. Overall, respondents' knowledge and perception on IPTp were poor in this study. More than 50% (152/300) of the mothers had no knowledge on IPTp and a little over 40% (131/300) perceived that IPTp is necessary for every pregnant woman. There is significant difference in knowledge on IPTp observed among those who had used IPTp and those who did not use IPTp (X^2 = 20.5, p = 0.000). The study result is almost the same as what was found in a study that examined the knowledge level of 109 pregnant women of rural southwest, Nigeria on IPTp in 2009 by Akinleye *et al*, 2008). Majority did not know sulfadoxine-pyrimethamine (SP) as the drug recommended for IPTp and were not aware that IPTp could be given to pregnant women. However, while they did not find a significant difference in knowledge on IPTp among those who had used IPTp and

those who did not use IPTp, this study showed otherwise. There was significant difference in knowledge among those who had received IPTp3 and those who had not. (X^2 = 12, p = 0.000).

A small proportion (8.0%, 24/300) of the mothers thought that the drug for IPTp could not be given to every pregnant woman but majority of the mothers did not know what to say. The knowledge level of the mothers could be explained by what was observed being done by eight midwives who were administering IPTp services at the four district hospitals and four maternity homes during the time of the study. Four of the midwives explained the purpose of IPTp, timing and contraindications to the mothers during the DOT administration of SP. The other four midwives just told them that they were due for their respective IPTp doses and that they should be ready to swallow them. This underscores the existing gap in the information provided by health staff to clients during service delivery.

Health workers' knowledge on IPTp in this study was very good as revealed by the key informant interview. All the respondents knew the definition of IPTp, the drug of choice, the doses, when to start SP administration, the interval between doses and the recommended time frame within which to administer SP. However, some of the midwives interviewed had different practices with regard to the gestational age beyond which IPTp cannot be administered. The resultant effect of their practices is that if a pregnant woman does not have her first ANC visit in the first trimester or is inconsistent in the monthly visit, she is likely to miss the 2nd and 3rd doses of IPTp.

The generally high level of knowledge exhibited by the health workers is comparable to the observation of the study on health personnel knowledge in the Korogwe District, North-Eastern Tanzania (Mubyazi *et al*, 2005) in which the health personnel at both dispensary and district levels were generally aware that SP is the recommended drug for preventive treatment of malaria in pregnant women. An assertive statement from a clinical officer attesting this was: "Yes, we know through presumptive prescription of SP, that the MOH is determined to protect pregnant women, who are the most vulnerable groups together with under-fives and that they should receive it free of charge". In-charges of the two dispensaries acknowledged having received IPTp guidelines from the MOH.

5.4 Timing and number of ANC visits and IPTp utilization

Antenatal care has the potential in preventing adverse outcomes when it is sought early in the pregnancy and is continued through to delivery. The number of times a client needs to be seen during pregnancy may vary. For uncomplicated pregnancy it is recommended that at least four ANC visits, the first of which should take place in the first trimester (GHS, 2008*)*. All the 300 mothers studied had visited the health facility at one time or the other to consult mostly the midwife. Among the 296 (98.7%) mothers who could tell the number of months they were pregnant at time of first ANC visit, two out of three (66.9%) had their first ANC visit between 1-3months pregnant (1st trimester). According to the study, the median number of months pregnant at first visit was 3.0, an improvement over the 3.8 observed by GSS *et al* (2009) and far better than the 5.7 of the East African countries with Rwanda recording 6.7 (Hill *et al* 2006). There was no significant relationship between the timing of first ANC visit and the possibility of getting the three doses of IPTp (X^2 =0.676^a p= 0.713)

. The possible explanation to this is that, most health facilities use every opportunity during an ANC visit so far as the pregnant woman is eligible and for that matter, they stick to the

recommended IPTp timing of >16weeks to 36weeks. This observation is in line with the finding by McGready *et al* (2004) that where applicable, women should particularly be protected in late pregnancy, when both foetal growth and deleterious effects of malaria are most important. McGready *et al* (2004) further suggested that in the absence of ANC visits in the two first trimesters, it could still be worthwhile to administer IPTp even only in the last month of pregnancy. The baby is still growing and has to be protected, and there is no major contraindication in using SP close to delivery.

For almost 90% of the 280 mothers whose number of ANC visits could be determined, had five or more visits when pregnant for the recent birth. This finding supports (GDHS, 2008) observation that in Ghana there is an increasing trend among pregnant women to have four or more antenatal care visits where, among women age 15-49 years who had a live birth in the five years preceding the survey, about 78% pregnant women had four or more antenatal care visits for most recent live birth compared to 69% in the 2003 survey. This study found out that the median number of ANC visits is seven. There was significance difference between the number of ANC visits and receiving at least a dose of IPTp1(X^2 = 14.2, p = 0.001). The result seems to show that the number of ANC visits was not a guarantee to receive IPTp3. This could be due to the fact that most of the five or more visits were meant for women with at risk pregnancies and that they could be visiting the health facilities on weekly basis especially when they are close to term and those weekly visits do not guarantee IPTp service.

5.5 Reasons for non utilization of IPT by mothers

5.5.1 Shortage of SP

The main reason why mothers could not utilize IPTp was that mothers were not given the drug when they visited the health facilities. This constituted almost 80% (81/103) of those not receiving at least one dose of IPTp, more than 60% not receiving IPTp2 and 55. 4% who did not receive IPTp3. The public health facilities were more responsible for this unfortunate situation compared to the private facilities. The district hospitals and the clinics (private facilities) also contributed immensely to this problem. Only three respondents indicated that “Health worker said there is no drug”. The reason which most of the respondents gave, “I was not given the drug” could mostly mean that there was no drug at the facilities. The Komfo Anokye teaching Hospital (KATH) and the KNUST hospital were not providing IPTp service at all according to the findings of the study. This study was however, not designed to find out from these facilities their reasons for not providing IPTp services.

The key informant interviews with the heads of the facilities and the district hospital pharmacists confirm this opinion as they admitted shortage of the SP in the period between the latter part of the 2009 and early part of 2010.

Majority of the children whose mothers did not receive any dose of IPTp were born in March, April and May 2010 which means that their mothers were likely to have visited the ANC clinics when the health facilities had run out of SP. The problem of the SP shortage revealed by this study supports the findings in Kenyan (Leaven, 2000) where drug availability was reported to be the largest constraint to implementing IPT-SP in Kenya. The main barrier to supply appeared to be the distribution chain from the district hospitals to lower level health facilities. The hospitals, which were responsible for delivering drugs to health facilities, seem to have faced challenges in ensuring uninterrupted distribution as well

as insufficient funds for procurement. Uganda and Zambia were also found to have experienced frequent drug stock-outs due to underestimation of requirements, lack of resources, delays in release of funds to districts and monopoly of drug supply by government stores (Leaven, 2002). Other significant reasons for non utilization of IPTp are the use of traditional medicine, malaria treatment, side effects, late first ANC visits and mothers' inability to visit the ANC clinic when they were due.

5.5.2 Traditional medicine use

Almost 4.0% of the mothers did not use IPTp because they were using traditional medicine. Though they could not specify the type of traditional medicine they used, three out of these four mothers said they used it to protect their pregnancy while the other one said she was using it to treat breast cancer. The results are similar to that found by van der Kooi and Theobald (2006) in their South African study where they examined the knowledge, beliefs and practical experiences of pregnant women, traditional healers and midwives with regard to "kgaba" (traditional medicine) and explored what constitutes "kgaba". Findings from their study indicated that "kgaba" remedies are ingested not only to prevent or solve physical problems but are also perceived as valuable in protecting against the harm that evil spirits can cause during pregnancy.

5.5.2 Adverse reaction to SP

Side effects were also mentioned as the reason why six mothers were not given IPTp2 and IPTp3 (5/6 mothers). All the mothers complained of general weakness following the earlier doses and that they could not take it again. The key informant interviewed also revealed that, rashes, itching, headache, vomiting, general weakness, uticaria rash, dizziness were the common complaints mothers gave after taking the SP medication.

Hill et al (2006) found from their study that women are generally reluctant to take medicines during pregnancy unless absolutely necessary because of concerns for potential effects on the unborn child. In this study, however, though the chewing of the drug seemed a disincentive to almost all the mothers looking at their facial expression (as was observed during the observation session of this study), mothers did not seem alarmed over the possible serious reactions as revealed by Mubyazi *et al.(*2005). In Tanzania, it has been found that use of SP has raised concerns among pregnant women over risk of severe skin reactions known as Steven Johnson's Syndrome (Mubyazi *et al*., 2005). However, with regards to the belief that SP should be taken with food as observed by Ashwood-Smith *et al* (2002) in Malawi, this study also observed a similar concern from the midwives who were interviewed. They believed that most of the side effects will not appear if pregnant women ate before taking the drug. A similar concern regarding eating before taking SP was also revealed by Mubyazi (2005) qualitative study in Korogwe District, North-Eastern Tanzania. In the course of discussion with the officer in-charge of the dispensary he asserted that: "Only a few patients are of the opinion that if they take SP and develop adverse reactions, it is due to some additional conditions or abnormalities in their bodies i.e. besides the malaria infection". Furthermore, it was pointed out that some patients disliked Fansidar but were prepared to take Metakelfin, believing the two drugs to be different. The general feeling is that SP is synonymous with Fansidar but not Metakelfin while in reality the two drug regimens are the same. The District Health and Medical Officer In-charge (DHMOI) argued that one reason for poor compliance with IPTp services could relate to inappropriate prescriptions. Pregnant women consulting private health facilities may opt for drugs other than SP and due to their profit motive such facilities may accept clients' demand for particular drugs even if sub-optimal.

Peters *et al* (2007) in attempt to evaluate the toxicity data of sulfadoxine/pyrimethamine, including severe cutaneous adverse reactions, teratogenicity and alterations in bilirubin metabolism agreed that weekly sulfadoxine/pyrimethamine prophylaxis is associated with rare but potentially fatal cutaneous reactions. Their study revealed that sulfadoxine/pyrimethamine use in IPTp programmes in Africa, with 2-4 treatment doses over 6 months, has been well tolerated in multiple IPTp trials and this is similar to the finding of this study where neither the mothers or the health workers referred to the incidence of serious cutaneous drug reaction. G6PD or mothers' reaction to sulpha drugs or reaction to cotrimoxazole was the main medical reason why service providers will not give SP to a pregnant mother. However, only one mother (0.3%) was found in this study to have the defect of G6PD. The problem however, is that this information is not normally indicated in the ANC cards and for that matter it could be one of the reasons for "I was not given the drug". Again, this information is not captured in any report so in the event of an individual ineligible for SP, there will be no record to assess the impact on the IPTp programme.

Though this study did not probe to find out why a side effect would lead to discontinuation of the SP intake, the following concerns might have prompted the mothers' decision. The mothers might be concerned about these side effects because they could not understand why they were healthy before the clinic only to take some drugs and become "sick". This might affect their daily activities and that they should better avoid the use of such drugs. Again, they may view it as a threat to their pregnancy especially those who have experienced miscarriages or might give birth to unhealthy children [because of concerns for potential effects on the unborn child (Hill *et al*, 2006)] and would better stop taking the drug. As rashes are a common reaction to SP, some of these women will be concerned with the loss of the integrity of their skin which can affect them socially. They would thus stop taking the SP.

5.5.4 Poor utilization of ANC clinics

Fifteen mothers did not receive IPTp3 because, they did not go for ANC when due. The reasons for this were unclear. This could be due to the fact that they were afraid of experiencing side effect because once they were there they could not exempt from it. It appeared that the decision of some midwives to stop administering SP after 28 or 32 weeks which is contrary to the national policy might have contributed to the mothers who started ANC late not receiving all their doses. The policy states that, SP is given to an eligible pregnant woman from more than 16weeks (after quickening) to 36 weeks of gestation. Contrary to this, McGready, *et al* (2004), suggested that when applicable, women should particularly be protected in late pregnancy, when both foetal growth and deleterious effects of malaria are most important. The decision resulted in the loss of three or two months window of opportunity for the mothers receiving IPTp if they did not start ANC early enough. In the absence of ANC visits in the two first trimesters, it could still be worthwhile to administer IPTp even only in the last month of pregnancy. The baby is still growing and has to be protected, and there is no major contraindication in using SP close to delivery. Fourteen mothers did not receive IPTp because they were treated for malaria. During an ANC visit, a woman with malaria is not given SP but treated for malaria (GHS/Global Fund/JHPIEGO, 2005). It is therefore commendable that the service providers acted accordingly. But there would have been other opportunities for these mothers to receiving their IPTp doses since it is unlikely that they would always go there with malaria. Further studies may have to explore the possible reason to explain such an observation.

This study has revealed that IPTp uptake in the Kumasi Metropolis is low and far below the WHO target that 80% of all pregnant women living in areas of high malaria transmission receive at least two doses of IPTp during pregnancy by 2010. The main reason for this low uptake of IPTp according to the study results is the fact that mothers were not given the medication when they visited the health facility resulting in several missed opportunities. Shortage of the drug of choice, SP, was also reported in health facilities in the preceding period.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The results of the study have shown that:
the level of IPTp utilization in the Kumasi Metropolis is low. The coverage for IPTp1, IPTp2 and IPTp3 *by card* is 40%, 33.7% and 21.0% respectively. Mothers using health centres were more likely to have received IPTp services (p=0.027*)*. Among the background characteristics of the mothers, age and parity of the mothers were significant factors in the utilization of IPTp (the younger a mother, the more likely she is to miss the IPTp-p=0.015 and the higher the number of children a mother has, the more she is likely to receive IPTp, p=0.036)
The mothers' knowledge and perception on IPTp were generally poor and their level of knowledge on IPTp was an important factor to the use of IPTp. The higher the level of a mother's knowledge on IPTp, the higher the chances of her receiving IPTp (p=0.003). Very few mothers had good perception on IPTp (8.0%). Service providers on the other hand demonstrated high level of knowledge on IPTp but some midwives stopped giving IPTp at the gestational age of 28 and 32 weeks against policy.
All the 300 mothers studied had attended an ANC clinic. More than 2/3 of the mothers had their first ANC visits within three months of pregnancy (first trimester). The study however, did not find any significant difference in the timing of first ANC visit and the utilization of IPTp. A very high proportion (87.9%) of mothers attended the ANC clinic five or more times and there was significance association between the number of ANC visits and receiving at a dose of IPTp2(X^2 = 14.2, p = 0.001).
Some practices from both the health facilities and the mothers affected IPTp utilization and included mothers not given SP when they attended the ANC clinics most probably due to shortage of SP. Service providers admitted that there was shortage of SP for some time. One hospital had run out of SP during the time of this study. Other practices were mothers absenting themselves from the ANC clinics, late visits to the ANC clinics, use of traditional medicine, fear of side effects of SP, treatment of malaria at time of ANC visit and G6PD defect.
In general, IPTp usage among pregnant women was very low despite the early reporting to and high attendance of ANC visits and the main reason for the low uptake was the periodic shortage of SP in the various health facilities. Public facility like KNUST hospital was not providing IPTp services. Side effects of SP, malaria management, the use of traditional medicine and G6PD defect were some of the minor barriers to SP use.

Recommendations
Recommendations to improve the uptake of IPTp in the metropolis are as follows:
The Ministry of Health and the Ghana Health Service should avoid the shortage of SP in the facilities by exploring the possibilities of integrating it through NHIS or the free maternal care package. Where facilities are not accredited by the NHIS, NMCP can arrange with the Regional Health Directorates to supply them with the SP. Again the private facilities should be made aware of the importance of this national policy and are encouraged to come out with their own modalities to provide the service as they do from other services.
The Ministry of Health should find out why the University hospital and KATH do not provide the IPTp service and impress upon them to provide the service. KATH and KNUST

hospital should be made to implement this important national policy if it is true that IPTp is not provided as the study revealed.

The NMCP through the Kumasi Metropolitan Health Directorate should step up public education on IPTp. There should be public education on at the health facilities and other media to raise the awareness of the public especially women in the child bearing age on IPTp. The education should also target the teenage pregnant mothers to seek early ANC services.

The NMCP through the Kumasi Metropolitan Health Directorate should step up public education on IPTp. There should be public education at the health facilities and other media to raise the awareness of the public especially women in the child bearing age on IPTp.

The MOH and GHS should step up routine monitoring of IPTp services to forestall possible shortage of SP at the facilities (public and private facilities).

The Reproductive Health Unit of Kumasi Metropolitan Health Directorate should explore more avenues for effective safe-motherhood education targeting the teenage pregnant mothers to seek early ANC services.

REFERENCES

Akinleye Stella O, Catherine O Falade, Ikeoluwapo O Ajayi (2009). Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria: a cross-sectional study. *BMC Pregnancy and Childbirth*, 9:28

Andersen D, Blanc W, Crozier D, Silverman W. A difference in mortality rate and incidence of kernicterus among premature infants allotted to two prophylactic antibacterial regimens. *Pediatrics.* 1956;**18**:614–625.

Ashwood-Smith H, Coombes Y, Kaimila M, BokosiM& Lungu K (2002) Availability and use of sulphadoxine-pyrimethamine (SP) in pregnancy in Blantyre District. *Malawi Medical Journal* 14, 8–11.

Brabin BJ: An analysis of malaria in pregnancy in Africa. *Bull World Health Organ* 1983/01/01 edition. 1983, 61(6):1005-1016.

Briand V, Cottrell G, Massougbodji A, Cot M: Intermittent preventive treatment for the prevention of malaria during pregnancy in high transmission areas. *Malar J* 2007, 6:160.

Elujoba A A, Odeleye O M and Ogunyemi C M (2005).Traditional medicine development for medical and dental primary health care delivery system in Africa. *Afr. J. Trad*. Cam 2(1):46-6.

Filler SJ, Kazembe P, Thigpen M, Macheso A, Parise ME, Newman RD, Steketee RW, Hamel M. (2006) Randomized trial of 2-dose versus monthly sulfadoxine pyrimethamine intermittent preventive treatment for malaria in HIV-positive and HIV-negative pregnant women in Malawi. *J Infect Dis. 2006 Aug* 1;194 (3):273-5.

Ghana Statistical Service, Ghana Health Service, ICF Macro. (2009). *Ghana Demographic and Health Survey 2008*. Calverton, Maryland, USA: GSS, GHS and ICF Macro.

GHS, NMCP, Global Fund, JHPIEGO (2005). Intermittent Preventive Treatment (IPT) of Malaria in Pregnancy. Training Manual for Health providers

GHS (2008), National Safemotherhood Service Protocol. Yamens Press Limited.

Godfrey M Mubyazi, Ib C Bygbjerg,Pascal Magnussen, Øystein Olsen, Jens Byskov, Kristian S Hansen, Paul Bloch. (2008). Prospects, achievements, challenges and opportunities for scaling-up malaria chemoprevention in pregnancy in Tanzania: the perspective of national level officers

Godfrey Mubyazi, Paul Bloch, Mathias Kamugisha, Andrew Kitua, and Jasper Ijumba (2008)Intermittent preventive treatment of malaria during pregnancy: a qualitative study of knowledge, attitudes and practices of district health managers, antenatal care staff and pregnant women in Korogwe District, North-Eastern Tanzania. *Malar* J. 7: 79.

Greenwood A, Menendez C, Alonso P, Jaffar S, Langerock P, Lulat S, Todd J, M'Boge B, Francis N, Greenwood B: Can malaria chemoprophylaxis be restricted to first pregnancies? *Trans R Soc Trop Med Hyg* 1994, 88:681-682.

Hill J, Kazembe P (2006). Reaching the Abuja target for intermittent preventive treatment of malaria in pregnancy in African women: a review of progress and operational challenges. *Trop Med Int Health*. 11(4):409-18.

Anders Katherine, Tanya Marchant, Pili Chambo, Pasiens Mapunda, and Hugh Reyburn (2008).Timing of intermittent preventive treatment for malaria during pregnancy and the implications of current policy on early uptake in north-east Tanzania. *Malaria Journal*, 7:79doi:10.1186/1475-2875-7-79

Kiwuwa MS, Mufubenga P. (2008) Use of antenatal care, maternity services, intermittent presumptive treatment and insecticide treated bed nets by pregnant women in Luwero district, Uganda. *Malar J*. Mar 1;7:44.

Leavens A *(*2002*)* Malaria in pregnancy: from policy to implementation. MPH Thesis. *London School of Hygiene & Tropical Medicine.*

Lynam PA *&* Munguti K *(*2003*)* MIPESA: Focused antenatal care and malaria in pregnancy. *MIPESA Annual General Meeting, Dar es Salaam, Tanzania.*

Mbaye A, Richardson K, Balajo B, Dunyo S, Shulman C, Milligan P, Greenwood B, Walraven G. A randomized, placebo-controlled trial of intermittent preventive treatment with sulphadoxine-pyrimethamine in Gambian multigravidae. *Trop Med Int Health.* 2006;**11**:992–1002. doi: 10.1111/j.1365-3156.2006.01649.x.

McGready R, Davison B, Stepniewska K, Cho T, Shee H, Brockman A, Udomsangpetch R, Looareesuwan S, White N, Meshnick S, Nosten F. The effects of *Plasmodium falciparum* and *P. vivax* infections on placental histopathology in an area of low malaria transmission. *Am J Trop Med Hyg.* 2004;**70**:398–40

Menendez C (1995): Malaria during Pregnancy: a priority area of malaria research and control. *Parasitology Today*, 11:178-183.

MOH (2005). Intermittent Preventive Treatment (IPT) of Malaria in Pregnancy-Training Manual for Health Providers

MOH (2007). Strategic Plan for Malaria Control in Ghana 2008-2015.

MOH (2009). Anti-Malaria Drug Policy for Ghana. MOH.

MOH (2010). Handbook for the Management of Adverse Drug Reactions to Ant-Malaria medicines in Ghana.

Molteni F (2003) Malaria in pregnancy: Tanzania Update. MIPESA Annual General Meeting. Dar es Salaam, Tanzania.

Mubyazi A, Bloch P, Kamugisha M, Kituua A, Ijimba J: Intermittent preventive treatment of malaria during pregnancy: A qualitative study of knowledge, attitudes and practices of district health managers, antenatal care staff and pregnant women in Korogwe district, Northern eastern Tanzania. *Malar J* 2005, 4:31.

Mutabingwa TK, Maxwell CA, Sia IG, Msuya FHM, Mkongewa S, Vannithone S, Curtis J, Curtis CF: A trial of proguanil-dapsone in comparison with sulfadoxine-pyrimethamine for the clearance of Plasmodium falciparum infections in Tanzania. Trans R Soc Trop Med Hyg 2001, 95:433-438

Parise EM, Ayisi GJ, Nahlen LB, Schultz JL, Roberts MJ, Misore A, Muga R, Oloo JA, Steketee WR. Efficacy of sulphadoxine-pyrimethamine for prevention of placental malaria in an area of Kenya with a high prevalence of malaria and human immunodeficiency virus infection. *Am J Trop Med Hyg.* 1998;**59**:813–822

Peters, Philip J, Thigpen, Michael C, Parise, Monica E, Newman, Robert D. Safety and toxicity of sulfadoxine/pyrimethamine: implications for malaria prevention in pregnancy using intermittent preventive treatment (2007). Drug safety*: an international journal of medical toxicology and drug experience vol 30* (issue 6): pp 481-501

Rolanda van der Kooi, Sally Theobald (2006). Traditional medicine in late pregnancy and labour: perceptions of kgaba remedies amongst the Tswana in South Africa. *African Journal. Traditional, Complementary and Alternative Medicines* Vol. 3, Num. 1,, pp.11-22

Schultz LJ, Steketee RW, Chitsulo L, Macheso A, Kazembe P, Wirima JJ: Evaluation of maternal practices, efficacy, and cost-effectiveness of alternative antimalarial regimens for use in pregnancy: chloroquine and sulfadoxine-pyrimethamine. *Am J Trop Med Hyg* 1996/01/01 edition. 1996, 55(1 Suppl):87-94.

Shulman C (2003) Prevention of severe anaemia and malaria in pregnancy in Kenya.
Malaria Consortium unpublished report,March 2000.

Shulman CE, Dorman EK, Cutts F et al. (1999) Intermittent sulphadoxine-pyrimethamine to prevent severe anaemia secondary to malaria in pregnancy: a randomised placebo-controlled trial.*Lance*t 353, 632–636.

van Eijk AM, Ayisi JG, ter Kuile FO, Otieno JA, Misore AO, Odondi JO, Rosen DH, Kager PA, Steketee RW, Nahlen BL: Effectiveness of intermittent preventive treatment with sulfadoxinepyrimethamine for control of malaria in pregnancy in western Kenya: a hospital-based study. *Trop Med Int Health* 2004, 9:351-360.

WHO (1991) EPI Cluster Survey

WHO: Global strategy plan 2005–2015. 2005 [http://www.roll backmalaria.org/forumV/docs/gsp_en.pdf]. World Health Organization, Geneva, accessed April, 10, 2010

http://en.wikpedia.org/wiki/mellinium_Development_Goals#Goal_5), accessed April, 10, 2010

Appendix I

SELECTION OF CLUSTERS, HOUSES, HOUSEHOLDS AND CHILDREN FOR THE STUDY

Selecting the clusters: In selecting the clusters, the following steps were followed:
1. Enlisted created communities based on the 2010 NID in the Kumasi Metropolis.
2. Population of each community was obtained.
3. The cumulative populations each community was added to get the final cumulative population which is the same as the total population to be surveyed.
4. The sampling interval was determined, using this formula:
(Sampling interval = Total population to be surveyed/30 cluster)
5. A random number which was less than or equal to the sampling interval and had the same number of digits as the sampling interval was selected. Serial numbers on a currency note was used.
6. The community in which Cluster 1 was located was identified by locating the first enumeration area listed in which the cumulative population equaled or exceeded the random number.
7. Cluster 2 was determined by using the formula below:
(Random number + sampling interval = Cluster2)
8. Cluster 3 (population of Cluster 2 + sampling interval).
This procedure was followed till all the 40 clusters in each region were obtained.

Selecting the first house in cluster

Because it was not feasible to number houses in some of the communities, the following procedure to select the first house in each community was used.
A central location in the community/cluster, such as a market, a mosque or church which was close to the approximate geographical centre of the community was located.
Random selection of the direction in which the first house was done by labeling the various directions at the central location and picked one at random.
The number of houses which existed along the directional line which was picked was obtained from the central location to the edge of the community.
A random number between 1 and the total number of houses along the directional line was selected. This identified the first house to be visited in each cluster.
Selecting the household

In a simple house/compound (non-storey building), households were numbered and randomly and the first household to be visited selected. The second household to visit was the one with its door nearest to the first. This process continued till all the households in each house/compound was covered. In each household an eligible children was interviewed. After the whole house had been visited, the nearest door of the nearest house was entered and the process was repeated. This was repeated till all the 10 eligible mothers were selected from that cluster.
In storey building where mostly with many floors, households (a group of people sharing the same kitchen) were selected using the following steps.

Firstly, one floor had to be chosen at random, by numbering the floors in the house. On the selected floor the number of households was obtained and randomly selected the first household to visit. The second household to visit was the one with its door nearest to the first. After visiting all the households on the floor, a direction was randomly chosen (that is, up or down) and then visited all the households on that floor. This process continued from floor to floor visiting the next nearest floor which had not been visited previously. After the whole building had been visited, the nearest door of the nearest building was entered and the process was repeated. This was repeated till all the 10 eligible mothers were selected from that cluster.

Appendix II

STUDY CLUSTERS

Cluster No.	Cluster	Sub-Metropolis
1	Anloga	Kumasi South
2	Bokro	Kumasi South
3	Anwiam	Kumasi South
4	Sepe Timpom	Kumasi South
5	Ayeduase	Kumasi South
6	Oduom	Kumasi South
7	Ayigya	Kumasi South
8	Asawasi Railway QTRS	Manhyia South
9	Buokrom Estate-E-line	Manhyia South
10	Dichemso Nana Kwasi	Manhyia South
11	Amanfrom	Bantema
12	Abrepo Kese	Bantema
13	Mpatasie	Bantema
14	Adumanu	Bantema
15	Denkyemoaso	Bantema
16	Takyiman	Bantema
17	Edwenase	Bantema
18	Anyinam	Bantema
19, 20	Atasemanso	Bantema
21	Patasi Estate	Bantema
22	Daban	Bantema
23	Danyame	Bantema
24	Harris Ch	Manhyia North
25	Kronum Old Town	Manhyia North
26	Breman New York 3	Manhyia North

27	Wesco	Manhyia North
28	Ahenbronum	Manhyia North
29	Yarewa 2	Subin
30	Nsuoase	Subin

Appendix III

QUESTIONNAIRE FOR MOTHERS

Barriers to uptake of intermittent preventive treatment (IPT) with sulphadoxine-pyrimethamine to prevent malaria in pregnancy in Kumasi Metropolis

Section A: Demographic Characteristics of Respondents		
S/n	Question	Response
1	Age of Respondents in years	_____years
2	Age of the child in months	_____months
3	Marital status	□Married □Single □Divorced □Separated □Co-habiting □Other(specify)_____
4	Parity (no. of chn born after 28weeks (dead or alive)	_____
5	Number of living children	_____
6	Religion	□Christian □Moslem □Traditional □Agnostic □Others (Specify) …… ……
7	Ethnicity	□Akan □Dagomba □Ga □Brono □Ewe □ Others (specify)……
8	Level of Education	□None □Primary □JSS/Middle □Secondary □Tertiary
9	Occupation	□Trading □ Artisan (e.g. hairdresser) □ Public servant

		□ Unemployed □ Farming □ Others (specify) _____
Section B :		
Antenatal Care Visits		
10	Date of first antenatal care first (booking visit)	☐☐☐☐☐☐ Did not 99
11	Did you see health worker for antenatal care for this pregnancy?	□ Yes □ No
	If Yes, whom did you see? Probe to identify each type of person and record all mentioned Choose all that apply.	□Doctor □Nurse/Midwife □ Community health Officer/Nurse □Trained TBA □Untrained TBA □Traditional Practitioner (defined) □Others (specify)_____
12	Where did you receive antenatal care for this pregnancy? Probe to identify type(s) of source(s) and tick appropriate box. Choose all that apply Write the name of the facility/facilities visited (Name of facility)	□Govt. hospital/Polyclinic □Govt. health centre □Govt. health post/clinic □ Mobile clinic □ Private hospital/clinic □ Private Maternity home □Others (specify) _____
13	How many months were you pregnant when you first received antenatal care for this pregnancy?	Months ☐☐ □Don't Know 99
14	How many times did you visit the health facility for antenatal care during this pregnancy?	☐☐times □Don't Know
Knowledge and Perception on IPTp		
15	How can a woman prevent herself from malaria during pregnancy? Tick all the options the respondent will give	□Uses IPTp (takes SP) □Sleeps in ITN □Uses mosquito repellent (specify----------) □Other (specify)_____ □Don't know
16	If IPTp is mentioned, indicate the drug recommended for IPTp.	□SP/Fansidar/Malafan □Chloroquine □Proguanil □Daraprim □Other (specify)_____ □Don't Know
17	How many tablets of IPTp drug is used as a dose?	□ 3tablets □ 2tablets

		□ 1tablet □Other (specify)_____ □Don't Know
18	When is IPTp recommended to be used during pregnancy? Tick all the options the respondent will give.	□ 4-6months □ 7-9months □ 1-3months □Other(specify) _____ □Don't Know
19	How many times should IPTp be administered to a pregnant woman? If 2 or 3 times is mentioned Go to Q---	□ Once □ 2 times □ 3 times □ Others (specify) _____ □ Don't know
20	What is the interval between the doses of the IPTp?	□ Less than one month □ One month □ More than one month
21	Do you think it is necessary for pregnant women to take IPTp?	□Yes □No
22	Do you think every pregnant woman can take IPTp?	□Yes □No
23	If No to Q---, who cannot take the IPTp when pregnant?	□ pregnancy has just began □When sick of malaria □ Uses other medicine □Others (specify) _____ _____ □ Don't Know
24	What advantages do you think a pregnant woman will get from using IPTp?	□ Prevents malaria □ Prevents still birth □Prevents anaemia during pregnancy □Improves the birth weight of babies □Prevents spontaneous abortion □ Other (specify)_____ □Not sure
IPT Usage Level		
25	During this pregnancy, were you given SP to keep you from getting malaria?	□ Yes □ No
26	If Yes, what drugs did you take? Record all mentioned drugs. If type of drug is not determined, show typical Antimalarial drugs to Respondents.	□SP/Fansidar/Malafan □Chloroquine □Proguanil □Daraprim □ Other (specify)_____

		□Don't Know
27	Were you supervised to take your SP at the health facility?	□ Yes □ No
28	If No, where did you take it	□ At home □ Others (specify) _____
29	How many times did you take (SP/Fansidar/Malafan) during this pregnancy? (underline the specific drug taken)	Number of Times ☐☐ □Don't Know
30	Check the ANC card and record date of the IPTp doses taken and Gestational age.	IPTp Date Gestational age IPT1 _____ _____ IPT2 _____ _____ IPT3 _____ _____ No records of IPTp .....
Reasons for not taking IPTp drug: Ask those who did not take any IPTp.		
31	What reason(s) prevented you from taking/using any IPTp/ SP during this pregnancy? For those who indicate use of other drugs and traditional medicine, specify. *Other dugs*_____ *Traditional Medicine*_____ Check on the ANC card and note the condition that does not permit the use of SP ("not good for my health") Condition_____	□Have no money to buy the drug □Health worker said there was no drug □ I was not given the drug □I did not go for ANC when it was due □Health worker said it was not necessary because of my time of first visit (it was late) □I was using traditional medicine □I was using other drug which did not allow me to use the SP □Health worker said it was not good for my health □Other(specify) _____ _____
32	If you use traditional medicine, kindly indicate the purpose of using it.	
33	If cost of the drug was the reason, indicate the amount for the IPTp/SP service	GH₵_____
Reasons for not taking IPTp2 drug: *Ask those who took/used IPTp1only*.		

34	What reason(s) prevented you from taking/using the SP (IPTp2) during this pregnancy? For those who indicate use of other drugs and traditional medicine, specify. *Other drugs*_____ *Traditional Medicine*_____ Check on the ANC card and note the condition that does not permit the use of SP ("not good for my health"). Condition_____	□Have no money to buy the drug □Health worker said there was no drug □ I was not given the drug □I did not go for ANC when it was due □Health worker said it was not necessary because of my time of first visit (it was late) □I was using traditional medicine □I was using other drug which did not allow me to use the SP □Health worker said it was not good for my health □Other (specify)_____
35	If you use traditional medicine, kindly indicate the purpose of using it.	_____
36	If cost of the drug was the reason, indicate the amount for the IPTp/SP service	GH₵_____
Reasons for not taking IPTp3 drug: Ask those who took/used IPTp2 only.		
37	What reason(s) prevented you from taking/using SP (IPTp3) during this pregnancy? For those who indicate use of other drugs and traditional medicine, specify. *Other drugs*_____ *Traditional Medicine*_____ Check on the ANC card and note the condition that does not permit the use of SP ("not good for my health"). Condition_____	□Have no money to buy the drug □Health worker said there was no drug □ I was not given the drug □I did not go for ANC when it was due □Health worker said it was not necessary because of my time of first visit (it was late) □I was using traditional medicine □I was using other drug which did not allow me to use the SP □Health worker said it was not good for my health □I experienced side effect upon taking IPTp1 □Other (specify)_____
38	If you use traditional medicine, kindly indicate the purpose of using it.	

39	If cost of the drug was the reason, indicate the amount for the IPTp/SP service	GH₵_____

Appendix IV

KEY INFORMANT INTERVIEW GUIDE FOR HEADS OF FACILITIES AND MATERNITY IN-CHARGE

Barriers to uptake of intermittent preventive treatment (IPT) with sulphadoxine-pyrimethamine to prevent malaria in pregnancy in Kumasi Metropolis, 2010

Name of Health facility
Designation of the health care provider
Type of health facility
Number of years in service (in the health sector)
Duration of service in this facility
Have you ever been trained in the provision of IPTp services?
If yes, how many times have you received such training?
Do you organize in-service training for the staff on IPTp?
What do you know about IPTp?
Do you use guidelines and protocols to provide IPTp service?

Do some of the mothers report on side effects?
If yes, what are some of these side effects and what do you do?
What will stop you from giving SP to a pregnant woman who is due for SP?
Do you sometimes run out of stock for SP?
If yes, how many times has it happened in a year?
What challenges do you face in the provision of the IPTp?

Appendix V

KEY INFORMANT INTERVIEW GUIDE FOR PHARMMACISTS

Barriers to uptake of intermittent preventive treatment (IPT) with sulphadoxine-pyrimethamine to prevent malaria in pregnancy in Kumasi Metropolis, 2010

Name of Health facility
Designation of the health care provider
Type of health facility
Number of years in service (in the health sector)
Duration of service in this facility
Have you ever been trained in the provision of IPTp services?
If yes, how many times have you received such training?
What do you know about IPTp?
Do you use guidelines and protocols to provide IPTp service?

Do some of the mothers report on side effects?
If yes, what are some of these side effects and what do you do?
What will stop you from giving SP to a pregnant woman who is due for SP?
Do you sometimes run out of stock for SP?
If yes, how many times has it happened within the last year?
What challenges do you face in the provision of the IPTp?

Appendix VI

OBSERVATIONAL CHECKLIST FOR ANC SESSION

Barriers to Uptake of Intermittent Preventive Treatment (IPT) using Sulphadoxine-pyrimethamine to prevent malaria in pregnancy

Name of Facility_____ Facility type_____ Respondent's ID_____ Date_____

No.	Activity	Yes	No
1	Welcomes client		
2	Determines if woman is pregnant		
3	Assesses if woman has signs of malaria		
4	If woman has no signs of malaria, checks if woman is >16 weeks pregnant(after quickening)		
5	Determines if woman has been given SP within past month		
6	Checks if pregnant woman has received recent treatment with SP less than one month		
7	Checks if a pregnant woman is allergic to sulpha drugs		
8	Checks if a pregnant woman is taking co-trimoxazole		
9	Records recent treatment with SP		
10	Records woman allergic to sulpa drugs		
11	Records woman on co-trimoxazole		
12	Does not give SP to woman with recent treatment with SP		
13	Does not give SP to woman with sulpha drugs		
14	Does not give SP to woman co-trimoxazole		
15	Explains IPT to pregnant woman:		
15a	Purpose		
15b	Timing		
15c	Contraindication		
16	Explains SP administration (DOT) to pregnant woman		
17	Gives appropriate dose of IPT as DOT		
18	Gives appropriate dose of IPT to be taken at home		
19	Prescribes appropriate SP (IPT dose) to be bought		
20	Records IPT dose given correctly Maternal Records Card		

Appendix VII

RATING OF MOTHER'S KNOWLEDGE LEVEL ABOUT IPTP

An individual's knowledge and perception about a health service is an important determinant for the use of that service. In order to assess the respondents' knowledge on IPTp, the responses to questions on what IPT is about were rated as: 1 (very good) if respondents knew IPTp as treatment for prevention of malaria during pregnancy, recognized SP as the drug of choice, knew the three recommended doses, the correct interval for IPT treatment and mentioned at least one advantage of IPTp (prevents still birth or spontaneous abortion or anaemia in pregnancy or improves baby's birth weight).
Respondents were rated 2 (average) if respondents knew IPTp as treatment for prevention of malaria during pregnancy, recognized SP as the drug of choice, knew the three recommended doses or the correct interval for IPT treatment and could not mention at least one advantage of IPTp (prevents still birth or spontaneous abortion or anaemia in pregnancy or improves baby's birth weight). if they knew that IPT was given to prevent malaria during pregnancy or that IPT is the use of SP during pregnancy and 3 (poor) if respondents knew IPTp as treatment for prevention of malaria during pregnancy only and 4 (no knowledge) if respondents did not know IPTp as treatment for prevention of malaria during pregnancy – these individuals were not asked further questions about IPTp.

Appendix VIII

DATA ANALYSIS

These statistics were performed using Logistic regression, frequencies and chi square test. The dependent variable used mostly was IPTp3 as obtained from the ***Card***. Analysis on the

predictors of a mother not being given a dose of IPTp and timing and number of ANC visits was however done for all the three doses of IPTp.

Mothers' background characters effect on IPT usage

Mothers' Age

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Mother's Age	.063	.026	5.947	1	.015	1.065
	Constant	-3.125	.770	16.456	1	.000	.044

a. Variable(s) entered on step 1: Mother's Age.

Religious affiliation

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Christian	.404	.784	.266	1	.606	1.498
	Moslem	.452	.897	.254	1	.614	1.571
	Constant	-1.705	.769	4.918	1	.027	.182

a. Variable(s) entered on step 1: Christian, Moslem.

Marital status

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Married	1.129	.757	2.225	1	.136	3.094
	Single	.446	.884	.255	1	.614	1.562
	cohabiting	-18.900	4.019E4	.000	1	1.000	.000
	Constant	-2.303	.742	9.640	1	.002	.100

a. Variable(s) entered on step 1: Married, Single, cohabiting.

Parity

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Q4Parity	.187	.089	4.387	1	.036	1.206
	Constant	-1.811	.286	40.064	1	.000	.163

a. Variable(s) entered on step 1: Q4Parity.

Educational status

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	primary(1)	1.545	1.263	1.495	1	.221	4.687
	JHS(1)	.523	.811	.416	1	.519	1.687
	SHS(1)	.569	.961	.350	1	.554	1.766
	Tertiary(1)	19.080	9.462E3	.000	1	.998	1.933E8
	Constant	-22.814	9.462E3	.000	1	.998	.000

a. Variable(s) entered on step 1: primary, JHS, SHS, Tertiary,

Occupation

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Trader	.095	.826	.013	1	.908	1.100
	Artisan	-.169	.855	.039	1	.844	.845
	Public servant	.491	.923	.282	1	.595	1.633
	Farmer	-.693	.898	.596	1	.440	.500
	Constant	-1.253	.802	2.441	1	.118	.286

a. Variable(s) entered on step 1: Trader, Artisan, Public servant, Farmer.

Ethnicity

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Akan	-.531	.432	1.514	1	.219	.588
	Dagomba	-.454	.897	.257	1	.612	.635
	Bono	-20.404	2.321E4	.000	1	.999	.000
	Ewe	-20.404	1.519E4	.000	1	.999	.000
	Others	-.588	.887	.439	1	.507	.556
	Constant	-.799	.401	3.958	1	.047	.450

a. Variable(s) entered on step 1: Akan, Dagomba, Bono, Ewe, Others

The odds of a mother using Public or Private Facility.

Q40Public or Private Facility

		Frequency	Percent	Valid Percent	Cumulative Percent	Odds of using public facility	Odds of using private facility
Valid	Public Facility	100	33.2	33.3	33.3	2.0	0.5
	Private Facility	200	66.4	66.7	100.0		
	Total	300	99.7	100.0			
Missing	System	1	.3				
Total		301	100.0				

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Public Facility	20.091	2.010E4	.000	1	.999	5.313E8
	Private Facility	19.448	2.010E4	.000	1	.999	2.792E8
	Constant	-21.203	2.010E4	.000	1	.999	.000

a. Variable(s) entered on step 1: Q40PuF, Q41PrF.

The Odds of a mother using a facility type

Q42Teaching hospital

		Frequency	Percent	Valid Percent	Cumulative Percent	Odds of using teaching hospital
Valid	No	290	96.3	96.7	96.7	0.03
	Yes	10	3.3	3.3	100.0	
	Total	300	99.7	100.0		
Missing	System	1	.3			
Total		301	100.0			

Q43Dist. Hospital

		Frequency	Percent	Valid Percent	Cumulative Percent	Odds of using District hospital
Valid	No	75	23.6	23.7	23.7	3.00
	Yes	225	76.1	76.3	100.0	
	Total	300	99.7	100.0		
Missing	System	1	.3			
Total		301	100.0			

Q44Health centre

		Frequency	Percent	Valid Percent	Cumulative Percent	Odds of using health centre
Valid	No	279	92.7	93.0	93.0	0.10
	Yes	21	7.0	7.0	100.0	
	Total	300	99.7	100.0		
Missing	System	1	.3			
Total		301	100.0			

Q45Maternity home

		Frequency	Percent	Valid Percent	Cumulative Percent	Odds of using maternity home
Valid	No	256	85.0	85.3	85.3	0.20
	Yes	44	14.6	14.7	100.0	
	Total	300	99.7	100.0		
Missing	System	1	.3			
Total		301	100.0			

The odds of getting a dose of SP given a certain facility (Teaching, District, Health centre or Maternity home)

Q26bSP1givenByCard * Facility Type Crosstabulation

Count

		Facility Type				
		Teaching Hospital	District Hospital	Health Centre	Maternity	Total
Q26bSP1givenByCard	No	9	212	19	35	281
	Yes	0	13	2	3	18
Total		9	225	21	38	299
Odds of using a facility		0.0	0.1	0.1	0.1	

Q26bSP2givenByCard * Facility Type Crosstabulation

Count

		Facility type				
		Teaching Hospital	District Hospital	Health Centre	Maternity	Total
Q26dSP2givenByCard	No	8	195	19	35	262
	Yes	1	30	2	4	38
Total		9	225	21	39	300
Odds of using a facility		0.1	0.2	0.2	0.2	

Q26bSP3givenByCard * Facility Type Crosstabulation

Count		Facility type				Total
		Teaching Hospital	District Hospital	Health Centre	Maternity	
Q26dSP3givenBy Card	No	8	179	12	31	234
	Yes	1	44	9	7	63
Total		9	223	21	38	297
Odds of using a facility		0.1	0.3	0.8	0.2	

Significance level (p-values) of receiving IPTp by facility type
IPTp1 coverage given facility type
Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Maternity	-.149	.519	.083	1	.774	.861
	Health Centre	-.115	.737	.024	1	.876	.892
	Dist. Hospital	-.447	1.040	.185	1	.667	.639
	Teaching Hosp	-19.246	1.269E4	.000	1	.999	.000
	Constant	-1.907	2.081	.840	1	.359	.148

a. Variable(s) entered on step 1: Maternity, HealthCen, DistHosp, TeachHosp.

IPTp2 Coverage given facility type
Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Maternity	-5.352	3.615E3	.000	1	.999	.005
	Health Centre	-7.164	4.821E3	.000	1	.999	.001
	Dist. Hospital	-10.556	7.231E3	.000	1	.999	.000
	Teaching Hosp	-21.319	1.446E4	.000	1	.999	.000
	Constant	19.240	1.446E4	.000	1	.999	2.268E8

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Maternity	-5.352	3.615E3	.000	1	.999	.005
	Health Centre	-7.164	4.821E3	.000	1	.999	.001
	Dist. Hospital	-10.556	7.231E3	.000	1	.999	.000
	Teaching Hosp	-21.319	1.446E4	.000	1	.999	.000
	Constant	19.240	1.446E4	.000	1	.999	2.268E8

a. Variable(s) entered on step 1: Maternity, HealthCen, DistHosp, TeachHosp.

IPTp3 coverage given facility type

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Maternity	.305	.231	1.739	1	.187	1.357
	Health Centre	.811	.366	4.894	1	.027	2.250
	Dist. Hospital	.661	.499	1.753	1	.185	1.936
	Teaching Hosp	.338	1.356	.062	1	.803	1.403
	Constant	-2.720	1.007	7.293	1	.007	.066

a. Variable(s) entered on step 1: Maternity, HealthCen, DistHosp, TeachHosp.

Chi square test for ANC visits and uptake of IPTp

Crosstab

Count

		Number of ANC visits			
		1-2	3-4	5+	Total
Q26dSP3givenByCard	No	9	21	184	214
	Yes	0	4	58	62
Total		9	25	242	276

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.521[a]	2	.172
Likelihood Ratio	5.537	2	.063
Linear-by-Linear Association	3.374	1	.066
N of Valid Cases	276		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 2.02.

Crosstab

Count

		Number of ANC visits			
		1-2	1-2	1-2	Total
Q26cSP2givenbyCard	No	8	20	214	242
	Yes	1	5	31	37
Total		9	25	245	279

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.102[a]	2	.576
Likelihood Ratio	.992	2	.609
Linear-by-Linear Association	.268	1	.605
N of Valid Cases	279		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.19.

Crosstab

Count

		Number of ANC visits			
		1-2	1-2	1-2	Total
Q26bSP1givenByCard	No	7	20	234	261
	Yes	2	5	10	17
Total		9	25	244	278

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.191[a]	2	.001
Likelihood Ratio	9.917	2	.007
Linear-by-Linear Association	12.960	1	.000
N of Valid Cases	278		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .55.

Chi square test for Timing of first ANC visit and uptake of IPTp

Crosstab

Count

		Trimester at first visit			
		1st	2nd	3rd	Total
Q26dSP3givenByCard	No	152	73	5	230
	Yes	44	17	2	63
Total		196	90	7	293

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.676[a]	2	.713

Likelihood Ratio	.672	2	.715
Linear-by-Linear Association	.135	1	.713
N of Valid Cases	293		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 1.51.

Crosstab

Count

		Trimester at first visit			
		1st	1st	1st	Total
Q26cSP2givenbyCard	No	175	78	7	260
	Yes	23	13	0	36
Total		198	91	7	296

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.409[a]	2	.494
Likelihood Ratio	2.238	2	.327
Linear-by-Linear Association	.006	1	.938
N of Valid Cases	296		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is .85.

Crosstab

Count

		Trimester at first visit			
		1st	1st	1st	Total
Q26bSP1givenByCard	No	189	82	6	277
	Yes	9	8	1	18
Total		198	90	7	295

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.876[a]	2	.237
Likelihood Ratio	2.599	2	.273
Linear-by-Linear Association	2.856	1	.091
N of Valid Cases	295		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is .43.

Statistical association between the use of facility and a mother not given the SP
Not given IPTp1
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.493[a]	1	.114		
Continuity Correction[b]	2.077	1	.150		
Likelihood Ratio	2.449	1	.118		
Fisher's Exact Test				.130	.076
Linear-by-Linear Association	2.485	1	.115		
N of Valid Cases[b]	297				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 27.27.

b. Computed only for a 2x2 table

Not given IPTp2
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)

Pearson Chi-Square	.528[a]	1	.467		
Continuity Correction[b]	.206	1	.650		
Likelihood Ratio	.553	1	.457		
Fisher's Exact Test				.591	.334
Linear-by-Linear Association	.526	1	.468		
N of Valid Cases[b]	300				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.33.

b. Computed only for a 2x2 table

Not given IPTp3

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.993[a]	1	.158		
Continuity Correction[b]	1.526	1	.217		
Likelihood Ratio	2.094	1	.148		
Fisher's Exact Test				.216	.107
Linear-by-Linear Association	1.987	1	.159		
N of Valid Cases[b]	300				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.00.

b. Computed only for a 2x2 table

Statistical association between Child's age and mother not given SP (IPTp1, IPTp2 2&IPTp3)

Not given IPTp1 giving children's age

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Child's Age	-.014	.051	.072	1	.789	.986

	Constant	-1.749	.297	34.663	1	.000	.174

a. Variable(s) entered on step 1: ChildAge.

Not given IPTp2 giving children's age

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Child's Age	.079	.078	1.014	1	.314	1.082
	Constant	-3.291	.511	41.533	1	.000	.037

a. Variable(s) entered on step 1: ChildAge.

Not given IPTp3 giving children's age

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Child's Age	-.025	.041	.391	1	.532	.975
	Constant	-.858	.233	13.541	1	.000	.424

a. Variable(s) entered on step 1: ChildAge.

Appendix IX

INFORMED CONSENT FORM FOR MOTHERS

Project Title:

Barriers to utilization of intermittent preventive treatment (IPT) with sulphadoxine-pyrimethamine to prevent malaria in pregnancy in the Kumasi Metropolis

Institutional affiliation

School of Public Health, College of Health Sciences,University of Ghana, Legon.

Background

Hello! My name is Monsen Owusu-Aboagye and I am a student of the School of Public Health, University of Ghana, Legon. I am conducting this research as in partial fulfillment for the award of Masters of Public Health degree, and also to help improve on the general situation of malaria in the Kumasi metropolis.

Procedure

I am conducting a research into the barriers to the utilization of Intermittent Preventive Treatment of Malaria during pregnancy. It will involve administering questionnaire to mothers at the lying-in wards in the health facilities in Kumasi Metropolis.

Risk and Benefits

Although administering the questionnaire will waste some of your time and may inconvenience you since you need some time to rest from labour or breast feeding your time, the information collected will be used to evaluate malaria control intervention in pregnant women. The outcome of this study will help advise policy makers and programme

managers as to the way forward in the malaria control in pregnant women the metropolis and whether new strategies needs to be adopted. This will help reduce the prevalence of malaria and its effect on mothers and the babies in the metropolis.

Right to refuse

Participation in this research is voluntary, and if I should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. Your refusal to participate will not in any way affect the services you and your family receive from this hospital. However, I hope that you will participate in this study since your participation is important.

Anonymity and confidentiality

The questionnaire usually takes about 45 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be discussed to anyone other than members of the research team.

Before taking consent

At this time, do you want to ask me anything about the study? May I begin the interview now?

Thank You.

Consent

I……declare that the purpose, procedures as well as risks and benefits of the study have been thoroughly explained to me in English/Akan languages and I have understood. I hereby agree or disagree to participate in the study.

Signature/Thumbprint of Parent/ Guardian ……..

Date…….

Interviewer statement

I……the undersigned, have explained this consent form to the to the subject in the language he understands. The subject understands the purpose of the study, procedures to be followed as well as the risks and benefits involved. The subject has freely agreed to participate in the study.

Signature of interviewer……

Date……

Appendix X

INFORMED CONSENT FORM FOR HEALTH CARE PROVIDERS

Project Title:

Barriers to uptake of intermittent preventive treatment (IPT) with sulphadoxine-pyrimethamine to prevent malaria in pregnancy in the Kumasi Metropolis
Institutional affiliation
School of Public Health, College of Health Sciences,University of Ghana, Legon.
Background
Hello! My name is Owusu-Aboagye M. and I am a student of the School of Public Health, University of Ghana, Legon. I am conducting this research as in partial fulfillment for the award of Masters of Public Health degree, and also to help improve on the general situation of malaria in the Kumasi metropolis.
Procedure
I am conducting a research into the barriers to the uptake of Intermittent Preventive Treatment of Malaria during pregnancy. It will involve interviewing mothers with children 0-11months and service providers and mangers in health facilities in the Kumasi metropolis using semi-structured interview schedule. I will take note of some of your responses.
Risk and Benefits
Although the interview will take some time of your busy schedule, the information collected will be used to evaluate malaria control intervention in pregnant women. The outcome of this study will help advise policy makers and programme managers as to the way forward in the malaria control in pregnant women in the metropolis and whether new strategies needs

to be adopted. This will help reduce the prevalence of malaria and its effect on mothers and their babies in the metropolis.

Right to refuse

Participation in this research is voluntary, and if I should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, I hope that you will participate in this study since your participation is important.

Anonymity and confidentiality

The questionnaire usually takes about 45 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be discussed to anyone other than members of the research team.

Before taking consent

At this time, do you want to ask me anything about the study? May I begin the interview now?

Thank You.

Consent

I……declare that the purpose, procedures as well as risks and benefits of the study have been thoroughly explained to me in English languages and I have understood. I hereby agree or disagree to participate in the study.

Signature/Thumbprint of Parent/ Guardian ……

Date…….

Interviewer statement

I……the undersigned, have explained this consent form to the to the subject in the language he understands. The subject understands the purpose of the study, procedures to be followed as well as the risks and benefits involved. The subject has freely agreed to participate in the study.

Signature of interviewer……

Date……