CHAPTER ONE – INTRODUCTION

1.1 Background information

Human malaria is a disease of wide distribution that is caused by sporozoa of the genus Plasmodium. There are four species of malaria parasites that affect man: *Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae and Plasmodium ovale.* The predominant parasite species is *Plasmodim falciparium*, which causes the most severe form of malaria. Malaria remains a major global problem. It has devastating effects on both health and development, exacting its greatest toll on the world's poorest and most marginalized (WHO/UNICEF, 2005). Malaria cost Africa 12 billion dollars lost in Gross Domestic Product (GDP) every year. According to estimates from a recent Harvard study commissioned by the Roll Back Malaria (RBM) partnership, Africa's GDP would be 32 percent greater today if malaria had been effectively controlled 35 years ago (WHO, 2000).

Globally, 3.2 billion people (representing 40% of the world's total population) in 107 countries and territories are at risk of contracting the disease annually. An estimated 350 to 500 million clinical episodes of malaria occur annually, mostly caused by *P. falciparum* and *P. vivax* (WHO/UNICEF, 2005). About 60 percent of the cases of malaria worldwide and more than 80 percent of the malaria deaths worldwide occur in Africa, south of the Sahara. The burden of malaria contributes substantially to the poor health situation in Africa. The effect of malaria on people of all ages especially those in highly transmissible areas are quite immense, but it is more severe among groups such as pregnant women and children because they have less immunity (WHO/UNICEF, 2005).

Malaria infection during pregnancy poses a very serious risk to both the pregnant woman and her unborn child. Prevention of malaria in pregnancy thus remains a major public health challenge for the Roll Back Malaria partnership. In the malaria endemic areas of the African region, each year around 30 million of pregnant women are at risk of *P. falciparum* during their pregnancy (WHO, 2003).

In Africa, malaria's ill effect on pregnant women and children differ according to transmission and immunity levels. Pregnant women, especially primi- and secundi-gravidae are particularly prone to malaria and are more likely to have *P. falciparum* infections than women who are not pregnant. In areas of high or stable transmission of *P. falciparum*, where levels of acquired immunity tend to be high, women are known to be semi-immune and so are susceptible to asymptomatic infection, which could result in maternal anaemia and placental parasitaemia, both of which could subsequently result in low birth weight (LBW) (Steketee *et al.*, 1996).

In areas of low or unstable transmission of *P. falciparum*, where levels of acquired immunity are not significant or low, women are susceptible to episodes of severe malaria when parasitaemic, which could lead to stillbirths, spontaneous abortion, premature delivery or could result in maternal death. Low birth weight contributes greatly to infant mortality (McCormick, 1985; McDermott *et al*., 1996). It is estimated that malaria during pregnancy is responsible for 5 to 12 percent of all low birth weight and 35 percent of preventable low birth weight (Steketee *et al.*, 1996) and contributes to 75,000 to 200,000 infant deaths each year (Steketee *et al*., 2001).

1.1.1 Key malaria control initiatives

In the past, a number of global and national efforts aimed at reducing the burden of malaria in pregnant women were initiated (WHO/UNICEF, 2005). These included the Roll Back Malaria (RBM) Partnership, the African Summit on RBM, and then quite recently the Millennium Development Goals (MDGs). The World Health Organization (WHO) currently recommends a package of interventions for controlling malaria during pregnancy in areas with stable (high) transmission of *P. falciparum.* This intervention includes the use of insecticide treated nets (ITNs), Intermittent Preventive Treatment (IPTp) of malaria in pregnancy and effective case management of malaria and anaemia (WHO, 2004). Effective implementation of these strategies for malaria control in pregnancy requires close collaboration between malaria control and reproductive health programmes at all levels, including policy development, planning, logistics, procurement, training and service delivery.

The RBM Partnership, launched in October 1998, aims at a 50 percent reduction of the incidence of malaria morbidity and mortality by the year 2010 (WHO, 2004). The United Nations MDGs address issues of poverty, hunger, primary education, sex equity, under-five and maternal mortality, infectious diseases, safe water, environmental sustainability, and global partnerships for development, targets to halt all these conditions by 2015. (WHO, 2000).

Despite the toll malaria exacts on pregnant women and their babies, malaria control during pregnancy has not received broad program support in the past (WHO, 2004). This is attributed to the fact that malaria infection in women is largely asymptomatic in hyper endemic countries or regions and therefore it is not generally recognized as a health risk (Steketee *et al.*, 1996).

The lack of effective linkages between malaria control and antenatal care (ANC) programmes has also constrained the success of malaria control during pregnancy (WHO, 2004).

1.1.2 Control of malaria in pregnancy in Ghana

Over the years, the WHO recommended that pregnant women in malaria-endemic areas receive full anti malarial treatment on their first contact with antenatal service followed by weekly chemoprophylaxis (WHO/UNICEF, 2005). Until 2004, the anti-malaria drug policy in Ghana recommended weekly chloroquine prophylaxis (300 mg chloroquine base) throughout pregnancy and six weeks post partum. The compliance was low, around 11.6 percent outside the clinical setting and made the malaria prevention programme ineffective (GHS, 2004). The low compliance was due to unfounded fear on the part of pregnant women that chloroquine causes abortion, coupled with the unpleasant itching (pruritus) due to chloroquine, the bitter taste and the fact that too many tablets have to be swallowed.. This, coupled with the increasing resistance of falciparum malaria to chloroquine, necessitated a change in policy on malaria control (WHO, 1994).

The impairment of the development of natural immunity to plasmodium parasites associated with weekly chemoprophylaxis using chloroquine was a major concern to health authorities (Greenwood, 2004). Consequently, the WHO 20th Malaria Expert Committee now recommends Intermittent Preventive Treatment programme (IPTp) to replace the previous policy of weekly chloroquine chemoprophylaxis in pregnancy. The IPTp has been adopted in malaria control programmes in most malaria endemic countries. IPTp has been identified as a cost-effective tool for both the control and prevention of malaria in pregnancy in sub-Saharan African countries with stable malaria transmission like Ghana. The Ghana Health Service (GHS) in the Ashanti region started a pilot project with sulphadoxine–pyrimethamine (SP) in the Offinso district in

2004 after a series of field trials in Ejisu. Subsequently, by April 2005, the project coverage had been extended to all the districts in the Region.

1.2 Problem statement

Malaria in pregnancy is a major reproductive health problem in sub-Saharan Africa.. Each year approximately 50 million women (30 million living in Africa) in malaria endemic countries throughout the world become pregnant. About 10,000 of these women and 200,000 of their infants die as a result of malaria infection, with severe malarial anaemia contributing to more than half of these deaths (WHO/UNICEF, 2005).

According to the WHO, malaria accounts for significant morbidity in pregnant women. It accounts for 2 to 15 percent of maternal anaemia and 5 to 14 percent of low birth weight. The disease is thus the leading cause of LBW in the tropics. It also accounts for between 3 to 5 percent of all newborn deaths (WHO, 2004).

Consequences of malaria among pregnant women include anaemia, spontaneous abortion, preterm deliveries and low birth weight. Although these serious impacts of malaria infection during pregnancy have been known since long, the World Health Organization and national guidelines note that coverage of pregnancies at risk of malaria infection has been low in most malaria-endemic countries (WHO, 2004).

Ghanaian women mostly in their reproductive age group (15 to 49 years) are generally anaemic (less than 1% is severe) and therefore strategies for malaria control in pregnancy remain a crucial

maternal and child survival intervention (GHS, 2004). Again, prevention of malaria in pregnancy remains a major challenge as it is linked to the achievement of the 4th and 5th Millennium Development Goals (MDGs), which are the improvement in maternal health and reduction in child mortality respectively.

In Ghana, malaria amongst pregnant women accounts for about 13.8 percent of outpatient attendance, 10.6 percent of admission and 9.4 percent of deaths (GHS, 2004). In the Kwabre district of the Ashanti Region of Ghana where this study was conducted, malaria accounted for 5.2 percent of ANC attendance among pregnant women in 2005 (Kwabre District Annual Health Report, 2006). It is not known whether factors that affect the uptake of IPTp services in the District, such as ANC utilization, the supply management of SP, training of midwives and the education of pregnant women on the effects of malaria in pregnancy are being well implemented. This is because the uptake of IPTp services is expected to cause an increase in IPTp coverage, which would lead to improved birth weight and reduced maternal anaemia.

Unfortunately, not much is known about the successes, challenges and failures of the IPTp program in the Kwabre district to inform health policy. This study was conducted to evaluate the implementation processes and outcomes of the IPTp programme.

1.3 Rationale of the study

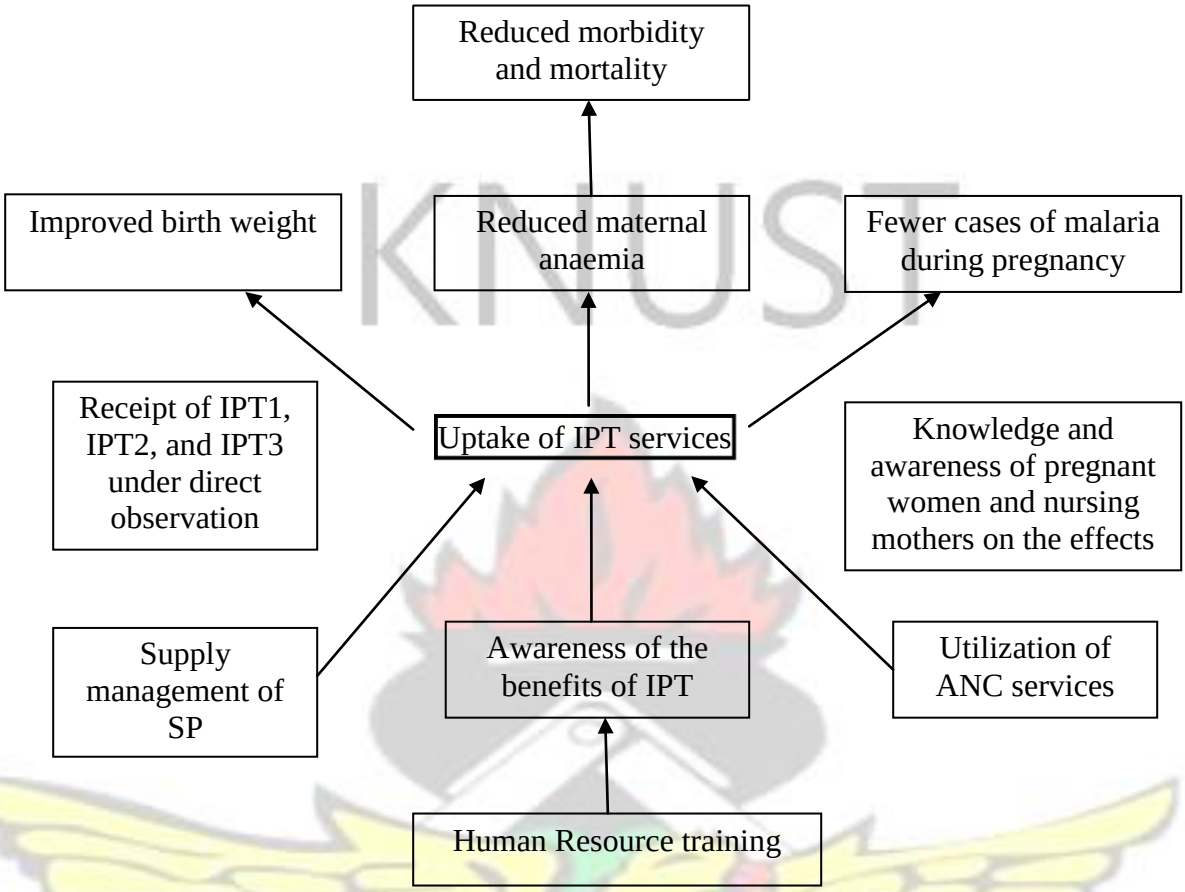
The IPTp programme has been introduced in all the districts in the Ashanti region since 2005. However, there has not been any empirical evaluation of the programme since its inception in the

Kwabre district. The impact of the implementation of a programme is not only seen from the systematic perspective, it is also reflected in the awareness, knowledge and acceptability of the target groups and drivers for change. Moreover, since the IPTp strategy is a new initiative in the country, an understanding of factors influencing its utilization and coverage are essential requirements at both the community and national levels for informed decision-making.

The need for evaluation of the IPTp programme at its early stage of implementation in the Kwabre district is important because such information would inform further implementation and the scaling up of the programme in other parts of the country. This would enhance effective resource utilization and maximization of expected health outcomes from the IPTp programme in furtherance of the achievement of the MDGs 4 and 5.

1.4 Conceptual framework

Figure 1.1: A Conceptual framework of IPTp implementation.



Source: Agyare, 2008.

i. Figure 1.1 is a conceptual framework that illustrates the major factors which influences the uptake and coverage of IPTp services. The linkages between these factors are explained as follows: Effective human resource training can greatly affect the quality of IPTp service provided by midwives. This can determine the uptake of IPTp services.

ii. The extent to which pregnant women use IPTp services would be determined by their utilization of ANC services. This is because SP is given at the ANC clinic by Directly Observed Therapy (DOT). The knowledge and awareness of the effects of malaria in pregnancy and the proper supply management of SP also has an influence on the uptake of IPTp services by pregnant women.

iii. The uptake of IPTp services would therefore lead to the receipt of IPT1, IPT2 and IPT3 under DOT, which would also impact positively on the number of malaria cases during pregnancy leading to reduction in maternal anaemia and low birth weight in infants. This would then positively affect morbidity and mortality in pregnant women and infants.

1.5 Research questions

1. What proportion of midwives have been trained for the IPTp programme and what is the level of knowledge and awareness of pregnant women, nursing mothers and midwives towards malaria in pregnancy?
2. How is the supply management of SP in the district like?
3. What proportion of pregnant women has been given IPTp1, IPTp2 and IPTp3 and how many have reacted adversely to SP?
4. What proportion of pregnant women have had malaria since the inception of the IPTp programme in the district?
5. What is the prevalence of low birth weight and maternal anaemia in the district?
6. How is the utilization of ANC services in the district like?

1.6 General objective

To evaluate the implementation of the SP-IPTp programme for malaria control in pregnancy.

1.7 Specific objectives

1. To evaluate the implementation of the IPTp programme in terms of:
   i. The proportion of midwives trained in IPTp;

ii. The awareness and knowledge of midwives, pregnant women and nursing mothers towards malaria in pregnancy and the IPTp programme;

iii. The supply management of SP in the district;

iv. the proportion of pregnant women and nursing mothers who received IPT1, IPT2 and IPT3;

v. Ascertain the incidence of adverse drug reactions to SP in IPTp.

2. To assess the proportion of pregnant women who had malaria in the district since the inception of the IPTp programme.

4 To determine the prevalence of low birth weights and maternal anaemia in the district.

5 To determine the utilization of ANC services in the district.

CHAPTER TWO – LITERATURE REVIEW

2.1 Overview

Malaria infection with *Plasmodium falciparum* during pregnancy results in a wide range of adverse consequences for the pregnant woman, the developing foetus and the neonate. The clinical effects of malaria in pregnancy depend to a large extent on the immune status of the woman, which in turn is determined by her previous exposure to malaria or transmission intensity

(Steketee *et al*., 1996). Acquired anti-malarial immunity depends on the intensity of malaria transmission, the number of previous pregnancies and the presence of other conditions such as human immunodeficiency virus (HIV) infection, which may further impair the efficacy of immune responses during pregnancy.

The particular dangers of malaria in pregnancy in these women are hyperpyrexia (very high fever), hypoglycemia, severe haemolytic anaemia, cerebral malaria and pulmonary oedema (Steketee *et al*., 2001). Women of all parities are affected (Hammerich *et al*., 2002). During the second half of pregnancy, malaria infection, in combination with maternal anaemia, can interfere with foetal weight gain and contribute to intrauterine growth retardation or prematurity and thus result in low birth weight (Menendez *et al*., 2000).

Malaria in pregnancy in sub-Saharan Africa is associated with maternal anaemia and low birth weight infants, the single greatest risk factor for neonatal and early infant mortality (McCormick 1985). In the past, WHO recommended the use of chloroquine in a regular suppressive dose throughout pregnancy for women living in malaria endemic areas (WHO, 1986). The spread of chloroquine resistance and the low adherence to anti-malarial prophylaxis during pregnancy has led to the reconsideration of the role of chemoprophylaxis in malaria control in pregnancy. Studies of IPTp with SP have demonstrated that this regimen is efficacious in many settings, safe, affordable and deliverable (Schultz *et al.*, 1994; Parise *et al.*, 1998; Verhoeff *et al.*, 1998; Shulman *et al.*, 1999). The World Health Organization (WHO) now recommends that pregnant women in malaria endemic areas receive IPT, that is 'the administration of full, curative-treatment doses of an effective anti-malarial drug at predefined intervals during pregnancy'.

Prevention of malaria in pregnancy is a major public health challenge and a priority for the Roll Back Malaria Partnership. To achieve the targets of the RBM partnership, African Heads of States in April 2000 in Abuja, resolved to strengthen national health systems to ensure that by the year

2005, 60 percent of malaria patients would have access to appropriate treatment within 24 hours of onset of symptoms; 60 percent of children and pregnant women at risk of malaria will be protected using insecticide-treated nets (ITNs); 60 percent of pregnant women would have access to appropriate malaria chemoprophylaxis or presumptive intermittent treatment; and 60 percent of epidemics will be detected within two weeks of onset, and responded to within two weeks of detection.

The effectiveness of the previous policy of weekly chemoprophylaxis with chloroquine was limited, due to poor compliance outside the clinic settings. The expansion of drug resistance of *P. falciparum* to chloroquine further eroded the effectiveness of chloroquine chemoprophylaxis. In the past decades, strategies were developed to more effectively control the adverse effects of malaria during pregnancy but some of these strategies faced various challenges. The development of the IPTp approach constitutes a major effort for achieving high programme coverage and effectiveness. Expanding programme coverage will therefore require careful evaluation of programme implementation and impact.

2.2 Implementation of IPTp

2.2.1 Proportion of midwives trained in IPTp

Training is an act of being prepared for a job or activity by learning skills. In other words, it is a systematic process of molding a person who has acquired some knowledge through education to increase his suitability for a job. Training of healthcare providers (midwives) and support efforts to raise awareness of malaria in pregnancy especially among women of reproductive age is crucial for the effective implementation and success of the IPTp programme.

Training of midwives in the prevention and control of malaria in pregnant women should at a minimum include guidelines for the IPTp programme. The training should also include procedures for data collection, analysis, interpretation and use of the resultant information for local decision-making. To avoid duplication of efforts, the training should be integrated as much as possible into predefined or existing curricula (e.g. pre-service and in-service programmes) or other 'making pregnancy safer' training orientation courses. It should also be a part of malaria control training programmes for implementing new anti-malarial drug policies.

Quality assurance methods and tools for improving the quality of malaria in pregnancy service delivery are also necessary to strengthen supervision of health workers. A study conducted in Kenya on the effects of the healthcare worker training on IPTp showed that, training of healthcare staff and use of simplified IPTp messages could be a key strategy in achieving RBM targets for malaria prevention in pregnancy (Ouma *et al.*, 2007). Another study conducted in Western Kenya revealed that, training ANC staff to increase the awareness of earlier attendance for ANC has the potential to substantially increase the proportion of women receiving at least two doses of SP in order to prevent the adverse effects of malaria during pregnancy (Peters *et al.*, 2007). A survey conducted in Uganda indicated that 64 percent of the clients seen by trained providers received SP during the correct time according to the Ministry of Health guidelines as compared to only 42 percent of the clients seen by providers who had not received in-service training. This Ugandan study highlights the significance of capacity building for service providers towards strengthening and scaling up IPTp services including malaria in pregnancy control (WHO, 2004).

Training of healthcare staff especially midwives is therefore very vital since it emphasizes skill development and changing of attitudes among workers. Training leads to progress and so lack of training invariably leads to deterioration, incompetence and lack of trust of pregnant women on

services that are being provided to them. Training therefore improves productivity by increasing an employee's ability to perform.

Training, which should include before-service as well as in-service training, is very essential for healthcare staff especially ANC staff/midwives providing services to pregnant women in order to equip them with the right attitude, knowledge, and skills to perform their tasks. Adequate training of ANC staff will help raise awareness in pregnant women of the importance of early ANC attendance.

2.2.2 Knowledge and awareness of midwives, pregnant women and nursing mothers on malaria in pregnancy and the IPTp programme.

Knowledge, attitude and perception about a disease quite often play a significant role in the healthcare-seeking behaviour of individuals and communities as a whole. This means that, people would seek a particular service/product depending on the knowledge they have acquired about the service, their attitude towards the service and how they perceive the service to be.

This means that, intensified sensitization of pregnant women about the benefits of IPTp is an important approach for improving IPTp compliance.

A qualitative study conducted in North Eastern Tanzania on the knowledge, attitudes and practices of ANC staff and pregnant women found out that, knowledge of malaria risks during pregnancy was high among pregnant women although some women did not associate coma and convulsions with malaria. Again, ANC staff were generally aware of SP as the recommended drug for IPTp although some nurses and the majority of pregnant women expressed concern about the use of SP during pregnancy. Study participants suggested that, intensified sensitization of pregnant women about the benefits of IPTp was an important approach for improving IPTp compliance. The study therefore concluded that, the successful implementation of the IPTp strategy in that country depended on the proper planning of, and support to, the training of health

staff and sustained sensitization of pregnant women at health facility and community levels about the benefits of IPTp for the women and their unborn babies. (Mubyazi *et al*., 2005).

Community members' attitude towards a disease is important in understanding their health seeking behaviour and use of preventive methods. Most research however indicated a relatively low level of knowledge about the severity and risks of malaria in pregnancy, the safety of IPTp, and the importance of IPTp to ensuring healthy pregnancies. Moreover, there is low level of knowledge regarding malaria in pregnancy with the levels much lower among men.

However, studies by Mangeni in 2003 and Mufubenga in 2001 and 2004 revealed that a good number of pregnant women and nursing mothers studied perceived that fever duringpregnancy were dangerous although some incorrectly believed that fever during pregnancy was normal and nothing should be done about it. These studies further revealed that most of the women studied had heard about preventive treatment of malaria during pregnancy. However, many of them did not have a practical experience with it. Despite low levels of knowledge and use of IPTp, most of the respondents perceived IPTp to be useful in preventing malaria and recommended that IPTp distribution should go hand in hand with provision of ITNs to pregnant mothers (Mangeni, 2003; Mufubenga, 2001*;* and Mufubenga, 2004).

Another qualitative study by Delivery of Improved Services for Health II (DISH II) in Uganda in 2002 indicated that malaria in pregnancy is recognized and classified in the local languages with terminologies that represent broad symptom complexes. Several community members perceived mild fever (malaria) and general weakness as a normal sign of pregnancy, but they also recognized that severe malaria can be fatal in pregnant women. The majority of respondents associated malaria with mosquitoes both in pregnant and non-pregnant people. However, some respondents perceived malaria to be sexually transmitted or to be caused by the foetus in the

womb. Whereas mild fever was perceived as a normal sign of pregnancy, which would heal by itself, severe malaria was recognized as a dangerous illness that can lead to miscarriages, premature delivery, stillbirths or the eventual death of a baby.

Furthermore, malaria in pregnancy was believed to affect the baby more than the mother. In a qualitative study about IPTp and ITN use in pregnancy in Busia district of Uganda, it was revealed that respondents observed that malaria related problems in pregnancy include miscarriages, malaise, anemia, back and joint pains, labour complications, and maternal and child death. Among participants of focus group discussion, low birth rate was seldomly mentioned as a result of malaria in pregnancy, as was knowledge of the implications of low birth weight babies (Mangeni, 2003).

Another qualitative study by the DISH II (2002) again reported that most respondents knew about the existence of SP. However, they did not know its dosage schedules. SP was perceived to be too strong for treatment of malaria in pregnancy. Health workers (midwives) knew the signs and symptoms of malaria, its transmission process, the drugs used and its importance among other illnesses, but they did not appreciate the dangerous signs and symptoms for severe and complicated malaria. Surprisingly, in the same study, health workers reported that SP was too strong for pregnant women and should be reserved for severe cases, contrary to the Ministry of Health policy guidelines. Several of the health workers and caretakers were unaware of IPTp, and most health workers did not know the generic name of Fansidar, which is

SP.

2.2.3 Supply management of SP

The provision and uptake of IPTp services largely depends on the availability of the recommended drug Sulfadoxine-Pyrimethamine at health facilities. In other words, the success of the IPTp programme, like any other programme that involves the use of drugs, depends to a large extent on uninterrupted drug supply. Surveys have indicated that more than 90 percent of pregnant women in Ghana attend ANC at least once during pregnancy (GHS, 2004). For this reason drug supply management is a very crucial requirement for high IPTp coverage.

As a policy of the Ministry of Health/Ghana Health Service, SP should be given under the IPTp programme at no cost to clients during antenatal clinics. All health facilities are supplied with drugs from the Regional Medical Stores (RMS). At the end of each quarter, forms are filled as to how the drugs were used in order to request another batch. Any break in the supply chain may deprive health facilities of the drug.

It is important to note that to achieve an uninterrupted supply of SP for IPTp use, there should be an effective team in place comprising of doctors, nurses, health workers and storekeepers. Each staff member should know how to correctly manage the drug supply at the facility by checking stock levels frequently, estimate for stock and dispense SP using the general principles for stock management and control.

The WHO recommends that the percentage of health facilities reporting no disruption of stock of anti-malarial drugs for more than one week during three months preceding a stock taking exercise indicates good supply management and should be employed as the indicator for assessment of drug supply management during facility surveys (WHO, 2000).

2.2.4 Proportion of pregnant women who received IPT1, IPT2 and IPT3

The policy for malaria control and prevention during pregnancy in areas of stable transmission is that, all pregnant women should receive at least two doses of SP after quickening. The WHO recommends a schedule of four ANC visits with three after quickening. The delivery of IPTp with each scheduled visit after quickening will ensure that a high proportion of women receive at least two doses. Current scientific evidence suggests that at least two doses of SP are required to achieve optimal benefit in most women. There is no evidence however, that a third dose of IPTp causes any risk, that more than three IPTp doses during pregnancy offers additional benefit or that receiving three or more doses of IPTp with SP will result in an increased risk of adverse drug reactions.

In Malawi, where IPTp with SP has been the policy since 1993, a recent survey conducted showed that maximum benefit of IPTp can be gained by receiving two or more doses of SP. The survey further revealed that even a single dose was beneficial. Women receiving SP during pregnancy had significantly lower rates of placental infection (reduced from 32% to 23%) and low birth weight babies (a reduction from 23% to 10%). SP during pregnancy also reduced the rates of maternal anemia (Rogerson *et al*., 2000).

Another study in Kenya also showed that, out of 1,498 women who delivered between June 1999 and June 2000, 23.7 percent, 43.4 percent and 32.9 percent received less than two, one or no dose of SP, respectively. Late first ANC attendance was the most important factor contributing to incomplete IPTp; 45 percent of the women started attending ANC in the third trimester. The study concluded that education of pregnant women and ANC staff to increase earlier attendance

for ANC has the potential to substantially increase the proportion of women receiving at least two doses of IPTp with SP (Eijk *et al.*, 2004).

A study in Malawi did not associate use of SP with maternal side-effects or perinatal complications. The results indicated that multiple doses of SP taken during pregnancy would lead to a highly significant reduction in the incidence of low birth weight in infants born to primi-gravidae, even if the women have HIV infections. This reduction is observable even when parasite prevalence at delivery is high because of re-infections in late pregnancy; reduction in parasite prevalence earlier in pregnancy as the result of SP treatment, leads to improved foetal growth (Verhoeff *et al*., 1998).

2.2.5 Incidence of adverse drug reactions to SP of pregnant women on IPTp

Drugs given on regular basis to large numbers of pregnant women must be extremely safe. Newman "and others" (2000) showed that SP has a good safety profile in pregnancy and has good efficacy in reproductive-age women in most areas of Africa with stable transmission of *P. falciparum* malaria where resistance to SP is low.

Both sulfonamides and pyrimethamine are generally considered safe in the second and third trimesters of pregnancy (Morley *et al*., 1964). Although there are concerns that sulfa drugs may be associated with kernicterus when given to premature neonates, this problem has not been noted in studies of IPTp where SP has been administered to the mother (WHO, 2004). Gimnia "and others" (2006) showed that in Malawi infrequent treatment doses with SP are associated with a low risk of an adverse cutaneous reaction, and SP can be recommended for treatment of malaria in areas where *P. falciparum* is susceptible.

Several studies examining the risk to the foetus from inutero exposure to SP combinations have generally not found an increased risk to spontaneous abortions or congenital defects (Schultz *et al*., 1994). When given as weekly prophylaxis, SP has been associated with rare severe cutaneous reactions such as toxicepidermal necrolysis and Stevens-Johnson syndrome (Miller *et al.*, 1986). However, there is no evidence that the risk of severe cutaneous reactions is any greater in pregnant women or when SP has been used for treatment. Studies in pyrimethamine alone have also found no increase in adverse pregnancy outcomes (Morley *et al*., 1964). In addition, pyrimethamine is considered compatible with breastfeeding (Briggs *et al*., 2002).

Several studies have been conducted to detect adverse reactions to SP, including cutaneous reactions and other potentially serious conditions that would either pose risks to the pregnant woman or infant or limit programme effectiveness. No evidence has been found from these studies of increased risk for serious cutaneous side effects or for increased jaundice in the newborn when SP has been delivered in the second and third trimesters (Parise *et al*., 1998). Although no serious adverse events attributable to SP administration have been reported during trials, the possibility that occasional serious adverse effects may have been missed or ignored cannot be excluded. “David and others” (1997) in a study in Sierra Leone, revealed that chemoprophylaxis with Maloprim (a brand of SP) resulted in hyperpigmented skin lesions, which disappeared when patients were put off the drug.

There are a few data on the safety of anti-malarials when used for chemoprophylaxis in pregnancy because most studies have involved only relatively small numbers of women and did not have the ability to detect uncommon effects or a small increase in an adverse outcome of pregnancy

(Greenwood, 2004). Thus, even though there are reassuring data on the safety of SP, there is still the need for an ongoing monitoring of the safety of SP to ascertain its usefulness.

Weekly sulfadoxine/pyrimethamine prophylaxis is associated with rare but potentially fatal cutaneous reactions. Fortunately, sulfadoxine/pyrimethamine use in IPTp programmes in Africa, with two to four 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.

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 anti-malarial efficacy of sulfadoxine/pyrimethamine.

However, the recommended standard dose of folic acid supplementation (0.4 mg/day) does not affect anti-malarial efficacy and may provide the optimal balance to prevent neural tube defects and maintain the effectiveness of IPTp-SP. No clinical association between sulfadoxine/pyrimethamine use and kernicterus has been reported despite the extensive use of sulfadoxine/pyrimethamine and related compounds to treat maternal malaria and congenital toxoplasmosis in near-term pregnant women and newborns. Although few drugs in pregnancy

can be considered completely safe, sulfadoxine/pyrimethamine - when delivered as IPTp - has a favourable safety profile.

2.3 Burden of malaria in pregnancy in different epidemiological settings

The symptoms and complications of malaria in pregnancy vary according to transmission intensity and the level of acquired immunity. Although these are presented as discrete epidemiological entities, the reality is usually more of a continuum, with a range of transmission intensity, acquired immunity, and clinical presentation occurring within the same country (Luxemburger *et al*., 2001).

2.3.1 Areas of low epidemic (unstable) transmission

Pregnant women living in areas of low or unstable malaria transmission have little or no immunity to malaria, and are at a two to three-fold higher risk of developing a severe disease as a result of malaria infection than are non-pregnant adults living in the same area. In these areas, maternal death may result directly from the complications of severe malaria (hypoglycaemia, cerebral malaria, and pulmonary oedema being particular problems), or indirectly from malaria-related severe anaemia.

Malaria in pregnancy can also result in stillbirth, spontaneous abortion, low birth weight (birth weight < 2.5 kg), and neonatal death. In areas of low or unstable transmission, control of malaria during pregnancy is achieved primarily by prompt and effective treatment of acute episodes of malaria, since IPTp will be relatively ineffective in such settings. Since malaria in a non-immune pregnant woman can rapidly progress into severe disease, any pregnant woman with symptomatic malaria must receive urgent treatment with an effective anti-malarial drug plus appropriate supportive treatment.

A study on the effects of malaria during pregnancy on infant mortality in an area of low malaria transmission showed that malaria during pregnancy contributes to early infant mortality. Malaria during pregnancy reduces birth weight and indirectly influences neonatal mortality in all gravidae. Moreover, when maternal malaria occurs close to term and is associated with symptoms, the risk of premature birth and infant death increases. It further went on to suggest that, malarial control programs in such low transmission areas should focus on the prevention of malaria in pregnancy, because this will increase infant survival (Luxemburger *et al*., 2001).

Other surveys carried out in seventeen districts in Uganda by the MOH/WHO/UNICEF revealed that the prevalence of malaria in pregnancy ranged between 15 to 55.4 percent among ANC attendees while the prevalence of severe anaemia during pregnancy was 18 percent. In the same survey, of 2,316 pregnancy records examined at health units, malaria related pregnancy outcomes observed included stillbirths (3.4%) with incidence highest in northern and central Uganda, abortion (4.2%) with incidence highest in western and central Uganda, and low birth weight < 2.5 kg (12.3%) with incidence highest in northern Uganda (22.4%) and among teenagers (Mufubenga *et al*,, 2001).

Another study in eastern Sudan, a country characterized by unstable malaria transmission revealed that prevalence of *P. falciparium* was considerable in pregnant women and severe cases of malaria do occur. Preventive measures (chemoprophylaxis and insecticide-treated bed nets) may be beneficial in this area for all women irrespective of age or parity (Adam *et al.,* 2005).

2.3.2 Areas of high or moderate (stable) transmission

Most pregnant women in malaria-endemic regions of Africa live in areas of relatively stable transmission. In these settings, the deleterious impact of malaria is particularly apparent in first and second pregnancies. Although parasite prevalence and density are higher among pregnant women compared to non-pregnant women, infection with *P. falciparum* is usually asymptomatic. Partial clinical immunity acquired during years of exposure to the malaria parasite prior to pregnancy does not prevent infection, but does reduce the risk of severe disease. Clinical malaria is not therefore, a prominent feature of infection during pregnancy, and the major detrimental effects of infection are low birth weight and maternal anaemia

Although anaemia during pregnancy may have multiple causes (HIV infection, inadequate nutrition, haemoglobinopathies and hookworm infection), the contribution of malaria is substantial. Severe maternal anaemia increases the mother's risk of death, and malaria-related anaemia is estimated to cause as many as 10,000 maternal deaths each year in Africa (Guyatt and Snow, 2001).

Insecticide Treated Nets and IPTp are the key components of the preventive package for pregnant women living in areas of stable transmission. *P. falciparum* parasites may be present in the placenta and contribute to maternal anaemia even in the absence of documented peripheral parasitaemia. Any pregnant woman with severe anaemia from a malaria-endemic area must therefore be treated presumptively with an effective anti-malarial drug, whether or not peripheral parasitaemia is present, and whether or not she has a history of fever.

In a large randomized trial recently conducted in an area of intense perennial malaria transmission in western Kenya, use of IPTp by pregnant women was associated with a 38 percent reduction in

the incidence of malaria parasitaemia, 47 percent reduction in malarial anaemia (Hb < 8 g/dl plus parasitaemia), and 28 percent reduction in the prevalence of low birth weight (Kuile *et al*., 2003).

Intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine–pyrimethamine has recently been adopted by many African countries to reduce maternal and neonatal morbidity and mortality associated with malaria in pregnancy. In an assessment of the impact of a newly established national IPTp program on maternal and neonatal health in Gabon, data on the prevalence of maternal *Plasmodium falciparum* infection, anemia, premature birth and birth weight was collected on a total of 1,403 women and their offspring in cross-sectional surveys in urban and rural regions before and after the implementation of IPTp. The study found that after the introduction of IPTp, the prevalence of maternal *Plasmodium falciparum* infection decreased dramatically (risk ratio 0.16, $P < 0.001$). Whereas only a modest effect on the rate of anemia in pregnant women was observed, there was a marked benefit on the prevalence of low birth weight and premature birth for women adhering to recommendations. These effects were most pronounced in primi- and secundi-gravid women **(**Ramharter *et al.*, 2007).

2.4 Prevalence of low birth weight due to malaria in pregnancy

In malarious areas, malaria and anemia are likely to act together to reduce birth weight. Their independent effects are difficult to distinguish. Low birth weight, defined as birth weight less than 2.5 kg in a live born infant, is an important indicator of the health status of a pregnant woman and the adequacy of ANC services. Birth weight strongly influences the chances of survival and growth of the newborn.

In a study conducted in a highly malarious area of Papua New Guinea, severe maternal anemia was associated with low birth weight in primi-gravidae, whereas there was no obvious consistent association between parasite positivity and low birth weight (Brabin *et al.*, 1990). However, a more recent study conducted in the same country, which attempted to quantify the separate effects of anemia- and malaria-attributable low birth weight concluded that, in malarious areas, malaria was a more important risk factor for low birth weight than was anemia.

The lower the birth weight, the higher the risk of dying. As much as 50 percent of low birth weight among primi-gravidae is attributed to malaria in some malaria endemic areas (Brabin, 1991). It is estimated that 40 to 80 percent of neonatal deaths occur as a result of low birth weight. Neonatal deaths accounted for 1,025,488 deaths globally in 2000. Low birth weight attributable to malaria in pregnancy is a significant risk for millions in Africa. The relative risk for low birth weight (less than 2500 g) associated with primi-parity is increased in malariaendemic areas and significantly correlates with the malaria parasite rate at delivery in primiparae.

In Africa, low birth weight is ranked as the sixth leading cause of death and the seventh leading cause of disease burden in children under five years. Low birth weight accounted for 247,798 deaths in under five's in 2000 (WHO, 2000). The main causes of low birth weight in subSaharan Africa are malaria in pregnancy, maternal malnutrition, pre-maturity and HIV/AIDS.

There has been a consistent decline in the proportion of low birth weight babies in Ghana since it peaked at 10 percent in 2002 (GHS, 2004). The low birth weight rate in 2004 was 7.0 percent.

Ashanti region recorded a low birth weight rate of 5.3 percent as against the national value of 7 percent in 2004. In the Kwabre district, low birth weight rate however decreased from 8.5 percent in 2004 to 5.2 percent in 2005.

In a study conducted in Zanzibar, Tanzania, findings suggested that placental malaria causes intrauterine growth retardation, leading to low birth weight newborns, and that malarial preventive interventions in pregnant women are needed in Tanzania. It further stated that, malaria infection increased the risk of low birth weight in full-term neonates by about ten-fold, with a population-attributable proportion of 55.4 percent (Matteelli *et al*.,1996).

2.5 Burden of anaemia during pregnancy

The major adverse effect of malaria in pregnancy on the mother is anaemia. The WHO defines anaemia in pregnancy as haemoglobin levels of 11g/dl or less. It has long been recognized as a major public health problem especially among the poor segments of the population in developing countries. It is also identified as the most prevalent nutritional deficiency problem afflicting pregnant women. Anaemia that complicates pregnancy threatens the life of both the mother and the foetus. In sub-Saharan countries, research has documented that anaemia in pregnancy is due to iron deficiency resulting from poor diet and malaria. Maternal anaemia is associated with increased risk of preterm delivery and low birth weight.

According to Lone "and others" (2004), in Pakistan, the risk of preterm delivery and low birth weight among anaemic pregnant women was 4 and 1.9 times more respectively than the

nonanaemic women. The neonates of anaemic women also had 1.8 times increased risk of having low Apgar scores at 1 minute, and there was a 3.7 greater risk of intrauterine fetal death among the anaemic women than the non-anaemic women. Again, a study conducted in Pakistan concluded that *P. falciparum* species, moderate parasitic load, haemoglobin < 10 gm/dl and platelet count < 50,000/mm3 are identified as few of the potential risk factors for poor outcome in pregnancy (Bhatti *et al*, 2007).

The Ghana Demographic and Health Survey (GDHS) 2003 revealed that forty-five percent of Ghanaian women between the ages of 15 and 49 years are anaemic. In Ghana, 26 percent and 12.2 percent of all ANC registrants have haemoglobin levels less than 11 g/dl at registration and at 36 weeks respectively (GHS, 2004). Between 2004 and 2005, maternal anaemia at registration and at 36 weeks in the Kwabre district increased from 13 percent to 23 percent and from 9.3 percent to 10 percent respectively.

2.6 Utilization of ANC services

Antenatal care (ANC) is the healthcare and education given during pregnancy. Antenatal care can be more effective in preventing adverse pregnancy outcomes when it is sought early in the pregnancy and continued through to delivery. Utilization of ANC services is paramount to the success of the IPTp programme since pregnant women are required to take the drug under directly observed therapy (DOT) during ANC.

In Ghana, ANC services are provided by both public and private healthcare facilities and trained TBAs. Nearly two-thirds (64.8%) of pregnant women receive ANC from GHS facilities, many of which are found in rural and peri-urban areas and the Teaching hospitals..

The Reproductive and Child Health Report of the GHS indicated a gradual increase in the average number of ANC visits from 2.4 in 1998 to 3.3 in 2004. In the Ashanti region, ANC coverage is estimated at 79 percent.

However, Mekonnen and Mekonnen (2002) demonstrate that in Ethiopia the utilization of maternal healthcare services is inadequate, as clearly depicted by the major maternal healthcare indicators (antenatal, delivery and postnatal care services). The situation is worst in the rural areas, where more than 80 percent of the population resides. This study shows that the most important factors influencing the use of maternal health services in Ethiopia are demographic and socio-cultural.

2.7 Methodological issues

2.7.1 Community and household surveys

Most efforts of Health Management Information Systems (HMIS) are directed at attendance data, which is then used as a proxy for population health. This is rather deceptive since the problems of the population attending health services are representative of the health problems of those who do not attend (De Savigny and Binka, 2004). For instance, most deaths in Africa occur at home, and many without any health-seeking behaviour at formal health services monitored by HMIS. A recent study in Ghana revealed that for every case of febrile illness seen in the health facilities, there were approximately four to five in the community (Agyepong and Kangeya-Kayondo, 2004). The proportion of febrile children less than five years old who are treated with anti-malarials ranges from approximately 2.5 percent to a maximum of 65 percent in sub-Saharan Africa (De Savigny and Binka, 2004).

People may be differentially deflected or repelled from these services by a whole range of issues including geographic and physical access, socioeconomic access, temporal access, sex, age, belief systems, quality of health services, and availability of drugs. Community-based information on prevention and treatment practices are therefore critical for monitoring the effectiveness of related RBM interventions. Such information is especially important for monitoring the outcomes and the effects of RBM action in areas where a large proportion of cases are managed at the home and where the burden of malaria is usually most severe. Community surveys tend to be time consuming and relatively costly, and they can therefore only be undertaken in selected sentinel sites in each country and at intervals of two to three years. The Roll Back Malaria programme has developed a methodology for situation analysis, which includes instruments for community level assessment of indicators such as percentage of under five year old children sleeping under ITNs, provision of intermittent treatment in pregnancy, provision of timely and appropriate treatment of children with fever and community action against malaria.

2.7.2 Health facility assessment

The WHO Regional Offices designed monitoring and evaluation systems to monitor the progress and evaluate the outcomes and impact of their Regional Strategies for the prevention and control of malaria. The instruments include an assessment of the clinical skills of healthcare staff, as well as an assessment of the available supplies and equipment at the health facility. The application of the method requires special skills, and it cannot be done in every facility. The WHO recommends the combination of health facility assessment with the community-based surveys, and to undertake them in the same districts and at the same interval (WHO, 2000). In case the

indicator on technical skills of healthcare staff is not selected, the health facility assessment becomes much simpler and consists only of an assessment of the presence of the required anti-malarials. However, it is recommended that the technical skills of healthcare staff be evaluated at least every two years.

2.7.3 Review of documents

Review of documents is the easiest and cheapest of the data collection methods. The main requirement is that the necessary documents exist and are made available to the researcher. It will also be important to retain copies of the relevant documents so that these can be made available as supporting evidence for the monitoring findings on the selected indicators. It however has its own limitation, in that the right information might not be available.

CHAPTER THREE – METHODOLOGY

3.1 Introduction

This chapter discusses the study methods and design including the materials and the methods employed in the study. The section also covers the sampling techniques and the sample size as well as the method used for data analysis.

3.2 Study design

The study was a descriptive cross-sectional study conducted from June to September 2007 to assess the processes and outcomes of IPTp implementation in the district. As part of this, the knowledge and awareness of pregnant women and nursing mothers in IPTp programme was also assessed.

3.3 Study area and population

The study was conducted in the Kwabre district of the Ashanti region. The District is largely peri-urban, adjoining the Ashanti regional capital Kumasi to the south. On the north of the district is the Afigya-Sekyere district, and to the east is the Ejisu-Jauben district, whilst to the west are the Offinso and the Atwima districts. The District has total land area of about 1,254.06km. The district is made up of eighty-nine (89) communities, and according to the 2000 Population and Housing Census, has a total population of 194,631. It is divided into five sub-districts or health areas namely Mamponteng, Afrancho, Aboaso, Aboabogya and Asonomaso. The District capital is Mamponteng, situated 14.4km on the Kumasi-Mampong trunk road.

The Kwabre district has a very good trunk road running from Kumasi to the Mampong Scarp. However, most of the feeder roads are in bad condition and not motorable.

A greater number of people in the District are cash crop farmers. Their main produce is palm nut, cultivated on subsistence basis. Food crops grown include plantain, cassava and maize. Most of the women engage in supplementary jobs as petty trading whilst most of the men are also wood carvers and kente weavers.

Majority of the inhabitants obtain water mainly from streams whilst a few others depend on hand-dug wells. The drainage system in most of the communities is very bad contributing to poor sanitation. Inadequate supply of portable water and poor sanitation are major public health problems in the District.

The District has eleven (11) government hospitals, two (2) mission hospitals, two (2) private clinics, eight (8) maternity homes, three (3) pharmacy shops and sixty-seven (67) chemical shops. Health staff in the District include five (5) doctors, one (1) pharmacist, six (6) medical assistants, twelve (12) midwives, fifteen (15) clinical nurses, seventeen (17) public health nurses, nine (9) dispensary technicians, five (5) technical officers, eight (8) field technicians, three (3) laboratory technicians, seven (7) ward assistants, twelve (12) ward maids and sixteen (16) orderlies. The ten most reported cases at Out Patients Department (OPD) attendance include malaria, cough or cold (IMCI), diarrhoeal diseases, hypertension, skin diseases and ulcers, home/occupational injuries, anaemia, typhoid fever, road traffic injuries and acute urinary tract infections.

Table 3.1: A frequency distribution of ANC coverage in the study district

Indicator	**2003**	**2004**	**2005**	**2006**
Number of ANC registrants.	5,523	6431	7,047	9,532
% ANC coverage	108.4	110.8	90%	83.1%
TT 2 Coverage	136.1	81	90%	81.7
Total no of deliveries	3,937	4107	4,306	4,043
% Supervised deliveries	77.2%	66.8%	55%	51.6%
Number of PNC registrants.	4,355	4821	4,698	5,128
% PNC coverage	85.4%	-	60%	65%
Number of family planning acceptors	7,756	-	11,746	10,176
% Family planning acceptors.	18.4	-	25%	22%
Couple years of protection (short term)	-	-	-	4073.24
Couple years of protection (long term)	-	-	-	533.00
Number of maternal death	-	-	-	3
Rate of maternal death	-	-	-	0.75
Number of C/S	-	-	196.5	67

Rate of C/S	-	-	5%	1.65%
Low birth weight <2.5kg	-	8.5	-	5.2
Stillbirth	-	1.2	-	1.1

Source: Kwabre District Health Administration Performance Review Report, 2006.

3.4 Study population

The study population comprised health managers directly involved in the IPTp programme including heads of 24 health facilities in the Kwabre district, twenty five (25) midwives in the District, and 308 pregnant women and mothers who had delivered from January 2007 - June 2007.

3.5 Data collection techniques and tools

3.5.1 Data collection

Field assistants were trained on data collection techniques such as interviewing, administering written questionnaires and reviewing available information and then deployed for the field work. The Kwabre District Director of Health Services and District pharmacist supervised all field activities.

Three (3) main approaches were employed to collect data. These were;

i. Administration of questionnaires

A community survey was conducted using a close-ended questionnaire to interview mothers who had just delivered over the past six months as well as pregnant women in the community. Some of the information obtained included the background information of the respondents and their awareness and knowledge about the effects of malaria in pregnancy and the IPTp programme.

ii. Health facility survey

An interview guide was used to interview heads of twenty-four health facilities and twenty-five midwives in the District. Both private and public health centres within the study area which offer maternity services were selected for the survey. These facilities comprised two (2) hospitals, ten (10) health centres, three (3) private clinics and nine (9) private maternity homes.

iii. Desktop study and review of available information

A desktop study and review of available information was done. This involved collecting secondary data by use of data compilation forms and checklist and reviewing the data to monitor and assess the IPT programme both at the health facilities and district levels. The information obtained included ANC attendance, the proportion of pregnant women who received IPT1, IPT2 and IPT3, the haemoglobin levels of pregnant women, the recorded birth weights of newly born babies and the malaria prevalence before and after the inception of the IPT programme.

3.5.2 Pre-test

All data collection techniques and tools were pre-tested on the 5th of June, 2007 in a non-study zone called Adwumakase-kese, an area within the study district where respondents were not interviewed. Final versions of the interview guides and the close-ended questionnaires were finally constructed.

3.6 Study variables

Table 3.2: Logical framework of study variables.

Variables	Indicators	Operational definition	Scale of measurement	Method of data collection	Data collection tool	Objective
• Demographic	• Age • Residence	• Age in completed years • Place of permanent abode for the past 6 months	• Ratio • Nominal	i. Community survey	Questionnaire	
• Socio-economic	• Parity • Occupation	• Number of live births • Ones occupation for the past 6 months	• Ratio • Nominal			
	• Education	• The highest level of education attained				
	• Religion	• The religious organization respondent belongs to				
• Training of health staff	• Proportion of midwives trained on IPTp	• Proportion of health staff who have had training on IPTp	• Ratio	Interview	Interview guide	One
• Awareness and knowledge of health staff, pregnant women and nursing mothers towards malaria in pregnancy and IPTp	• Level of awareness • Level of knowledge	• Awareness as measured by answers to questions • Knowledge as measured by answers to questions	• Ordinal	i. Community Survey ii. Facility Survey	1.Questionnaire 2. Interview guide	One

• Supply management of SP	• Proportion of health facilities reporting no disruption of stock of SP for more than 1 week during the previous 3 months	• Proportion of health facilities reporting no disruption of stock of SP for more than 1 week during the previous 3 months divided by the total number of health facilities visited multiplied by 100	• Ratio	Health facility survey	Data compilation forms Checklist	One
• IPTp coverage	• Proportion of pregnant women receiving IPTp1, IPTp2 and IPTp3 under direct observation • Proportion of pregnant women reacted adversely to SP (confirmed or perceived)	• Proportion of women receiving IPTp1, IPTp2 and IPTp3 under direct observation divided by total number of pregnant women in the population multiplied by 100.	• Ratio	Health facility survey Community survey	Data Compilation form Interview guide Data compilation form Questionnaire	One
• Incidence of side effects		• Proportion of pregnant women reacted adversely to SP (confirmed or perceived) divided by the total number of pregnant women multiplied by 100	• Ratio	i. Health facility survey ii. Community survey	1.Questionaire 2.Data compilation forms	One
• Utilization of ANC	• ANC coverage • Proportion of pregnant women who reported having malaria during pregnancy • Proportion of low birth weight	• Proportion of pregnant who received ANC services from a health facility • Proportion of pregnant women who reported having malaria during pregnancy divided by the total number of pregnant women multiplied by 100	• Ratio • Ratio	i. Community survey ii. Health facility survey i. Health facility survey	i. Data compilation form Data compilation forms 2.Questionaire	Four Two

• Prevalence of malaria				1.Health facility survey 2. Community survey		

• Incidence of Low Birth Weight and Maternal anaemia	• Proportion of maternal anaemia	• Birth weight of a live birth less than 2.5kg irrespective of gestational age • Haemoglobin level less than 11g/dl	Ratio Ratio			Three

Source: WHO 2004 Table 3.3: Measurement Indicators of the Study

Specific objectives	**Indicator**	**Indicator scale**
Objective one: To evaluate the proportion of midwives trained	Proportion of midwives trained	• Adequately trained – more than 50% of midwives trained • Not adequately trained – less than 50% of midwives trained
	Period of training	• Adequately trained – more than 50% trained almost a year • Not adequately trained – more than 50% trained over a year ago
Objective two: To evaluate the knowledge and awareness of respondents of the IPTp programme	Sufficiency of knowledge of the IPTp programme	• Sufficient knowledge – more than 70% know SP as the current drug of choice for preventing malaria in pregnancy
		• Sufficient knowledge – more than 70% know SP should be started after 16 weeks of pregnancy
		• Sufficient knowledge – more than 70% know SP should be administered under direct observation
		• Sufficient knowledge – more than 70% know SP should be taken three times before delivery

Objective two: To evaluate the awareness and knowledge of respondents of the effects of malaria in pregnancy	Sufficiency of knowledge of effects of malaria on pregnant women	• Sufficient knowledge – more than 70% know maternal anaemia, maternal death, and stillbirth as effects of malaria in pregnancy
	Sufficiency of knowledge of effects of malaria on the unborn child	• Sufficient knowledge – more than 70% know spontaneous abortion, stillbirth, low birth weight, congenital infection, intra-uterine growth retardation, premature birth, and intra-uterine death as effects of malaria in pregnancy
Objective three: To evaluate the supply management of SP	Drug supply management in health facilities	• Good supply management – SP available in the last 3 months prior to the study
		• Poor supply management – SP not available for more than one week in the last three months prior to the study
Objective four: To evaluate the proportion of nursing mothers who received IPT1, IPT_2, and IPT_3.	IPTp coverage	• Good coverage – more than 70% receive at least 3 doses of SP. • Poor coverage – less than 70% receive least 3 doses of SP

Source: Adapted (with modifications) from WHO 2004

3.7 Sampling technique and sample size

3.7.1 Sample size determination

Using a confidence interval of 95 percent and allowing a 5 percent margin of error, a calculated sample size of 288 was obtained. Pregnant and delivered mothers who knew about IPT in the district were assumed to be 75 percent. The sample size was arrived at using the formulae below:

$$\mathbf{n = z^2_{(1-\alpha)} \, x \, p \, x \, q \, / \, d^2}$$

Where; **n** = sample size;

$\mathbf{z_{(1-\alpha)}}$ = co-efficient of reliability which is 1.96 at 95 percent confidence interval;

p = the proportion of pregnant women and nursing mothers who were assumed to have knowledge about IPT which is 75%; **q** = 1-p which is 0.25; (25%) **d** = the margin of error allowed which is 5 percent.

Therefore n = $(1.96)^2$ × 75 × 25/25 N = 288

However, a total number of three hundred and eight (308) pregnant women and nursing mothers were eventually interviewed. At the health facility level, twenty-five (25) midwives and (24) twenty-four heads of health facilities were interviewed.

3.7.2 Sampling method

A multi-stage sampling and simple random sampling procedures were employed for the community-based survey. Specifically, a three-stage sampling procedure was used. Simple random sampling using the lottery method was used to select three of the five sub-districts. This was done by writing the names of the five sub-districts on pieces of paper. The pieces of paper were then folded up, put in a box and shaken vigorously. Three people then selected the three sub-districts, which were Mamponteng, Aboaso and Asonomaso sub-districts.

Again, for each of the selected sub-district, ten communities were selected by simple random sampling employing the lottery method. For each selected community, systematic sampling technique was employed to select ten (10) households. Sampling intervals were then calculated and ten (10) households selected from each community. Simple random sampling was used to select the first household from each community. Eventually, 308 respondents were interviewed comprising 156 mothers who had delivered in the past six (6) months and 152 pregnant women. The study however employed purposeful sampling technique for the midwives and the heads of health facilities because this techniques best permitted the identification of respondents who were on the IPTp programme. All heads of public health facilities and all midwives in the district were selected for the survey.

3.8 Statistical analysis of data

The data from the survey was thoroughly checked for accuracy and consistency and inputed into the Statistical Package for Social Scientists (SPSS Version 13.0) computer programme. This generated frequency tables and pie-charts for subsequent analysis of the data.

3.9 Ethical considerations

Initial approval to carry-out the field work was sought from the Kwame Nkrumah University of Science and Technology (KNUST). Subsequently, permission was obtained from the Ashanti Regional Health Directorate and the District Health Administration. Consent of community elders, assembly members, and other opinion leaders in the community was also obtained before the study was carried out. Participants were assured of the confidentiality of the data

obtained. The culture of the communities was learnt and respected during the entire study period.

3.10 Limitations of study

1. Factors which can affect birth weight of babies such as genetics, multiple pregnancies, placental abnormalities, maternal age, viral, bacterial and parasitic infections, HIV status, maternal nutrition, history of smoking and parity were not factored into the studies.
2. Factors that can cause maternal anaemia in pregnant women such as helminthes infestation, lack of iron supplementation were also not factored into the studies.
3. Health records for a majority of the respondents in the community survey were incomplete.
4. The birth weight of babies delivered by Traditional Birth Attendant (TBAs) could not be obtained since TBAs do not weigh babies they deliver.
5. Procedures for measuring birth weight and haemoglobin levels were done by different people using different devices/machines, materials, methods and measurement scales. This made it impossible to obtain any standard information.
6. The study could not take account of possible defects in the machines used in checking birth weight and haemoglobin levels.

3.11 Assumptions

The following assumptions were made:

1. That all people sampled would participate and would give correct answers.
2. Medical records were 100 percent accurate.

3. All pregnant women and nursing mothers prior to the commencement of the programme were not on any form of malaria prophylaxis.

CHAPTER FOUR – RESULTS

4.1 Background characteristics of nursing mothers and pregnant women

4.1.1 Age, religion, education, and occupation of nursing mothers and pregnant women

Table 4.1: A frequency distribution of background characteristics of nursing mothers and pregnant women

a) Age	Frequency	Percentage
15-19	38	12.3
20-24	95	30.8
25-29	81	26.3
30-34	48	15.6
> 35	46	14.9

Total	***308***	***100.0***
b) Religion		
Christian	275	89.3
Muslim	27	8.8
Traditionalist	3	1.0
Rastafarian	3	1.0
Total	***308***	***100.0***
c) Education		
None	35	11.4
Primary	39	12.7
JHS/Middle School	211	68.5
SHS/Secondary School	18	5.8
Tertiary	5	1.6
Total	***308***	***100.0***
d) Occupation		
Farming	42	13.6
Teaching	7	2.3
Hairdressing	43	14.0
Trading	123	39.9
Health Services	2	.6
Dressmaking	33	10.7
Catering	1	.3
Clerical work	1	.3
Baking	1	.3
Media practice	1	.3
Fish Mongering	1	.3
Unemployed	53	17.2
Total	**308**	**100.0**

Source: Field Survey, 2007

The average age of the nursing mothers and pregnant women was twenty six (26) years. Majority (30.8%; N=308) of the pregnant women and nursing mothers were between the ages of 20 and 24 years. This indicates that respondents were adults, and well in the child bearing phase of their lives. The least proportion of respondents (12.3%) was between the ages of 15 and19 years.

Majority of them were Christians (89.3%; N=308), with a few being Muslims (8.8%), whereas the least were traditionalists (1.0%) and Rastafarians (1.0%).

Most of the nursing mothers and pregnant women attained formal education with majority (68.5%; N=308) of them being Middle School Leavers or Junior Secondary School graduates. The least proportion of them (1.6%) have attained tertiary education.

The major occupation amongst the nursing mothers and pregnant women was trading (39.9%; N=308), followed by hairdressing (14%), farming (13.6%), and dressmaking (10.7%). The least occupation types were catering, civil service work, baking, media practice, and fish mongering, each of which accounted for 0.3 percent of respondents. Significantly, 17.2 percent of them was unemployed.

4.2 Implementation of the IPTp programme

4.2.1 Proportion of midwives trained in the IPTp programme

Table 4.2: A frequency distribution of the proportion of midwives trained and time period of training

Trained in IPTp	**Frequency**	**Percentage**	**Indicator scale**
Yes	23	92.0	• Adequately trained – more than 50% of midwives trained • Not adequately trained – less than 50% of midwives trained
No	2	8.0	
Total	**25**	**100.0**	
Period of time trained	**Frequency**	**Percentage**	**Indicator scale**
Over a year ago	18	78.3	• Adequately trained – more than 50% trained almost a year • Not adequately trained – more than 50% trained over a year ago
Almost a year ago	5	21.7	
Total	**23**	**100.0**	

Source: Field Survey, 2007.

Table 4.2 shows that 92 percent of the midwives on the IPTp programme (N=25) were trained in the programme, whilst 8 percent were not trained because they had not been posted to the District when the training was organised. For those midwives who were trained (N=23), 78.3 percent were trained over a year ago, whilst 21.7 percent were trained almost a year ago. By the indicator scale in column four of the table, the midwives had been adequately trained in the IPTp programme because more than 50 percent were trained but the period of time trained was inadequate since more than 50 percent were trained over a year ago.

4.2.2 Awareness and knowledge of midwives on the IPTp programme

Table 4.3: A frequency distribution of midwives' knowledge of current drug for prevention of malaria in pregnancy and time of its administration

Current drug of choice	**Frequency**	**Percentage**	**Indicator scale**
SP	24	96.0	Sufficient knowledge – more than 70% know SP as the current drug of choice for preventing malaria in pregnancy
Artesunate/Amodiaquine	1	4.0	
Total	**25**	**100.0**	
Time to start on SP	**Frequency**	**Percentage**	**Indicator scale**
First trimester	5	20.0	Sufficient knowledge – more than 70% know SP should be started after 16 weeks of pregnancy
After 16 weeks	20	80.0	
Total	**25**	**100.0**	

Source: Field Survey, 2007.

Table 4.3 shows that 96 percent of all the midwives on the IPTp programme (N=25) mentioned Sulphadoxine/Pyrimethamine (SP) as the current drug of choice for the prevention of malaria in pregnancy. Only one person (4.0%) indicated Artesunate/ Amodiaquine. Eighty percent of the midwives (N=25) mentioned that pregnant women should be started on SP after sixteen weeks of pregnancy, whilst 20 percent said that the pregnant mother should be started on SP in the first trimester of pregnancy. From the indicator scale, the midwives had sufficient knowledge because more than 70 percent knew SP as the drug for preventing malaria in pregnancy, and that SP should be started after sixteen weeks of pregnancy.

Table 4.4: A frequency distribution of mode of administration and dosage of SP

Administration of SP	**Frequency**	**Percentage**	**Indicator scale**
Under direct observation	24	96.0	Sufficient knowledge – more than 70% know SP should be administered under direct observation
At bed time	1	4.0	
Total	**25**	**100.0**	
SP doses before delivery	**Frequency**	**Percentage**	**Indicator scale**
Twice	1	4.0	Sufficient knowledge – more than 70% know SP should be taken three times before delivery
Thrice	24	96.0	
Total	**25**	**100.0**	

Source: Field Survey, 2007.

From the indicator scale in column four of Table 4.4, midwives had sufficient knowledge in the administration and the number of times SP should be administered before pregnancy. This is

because a significant percentage of the midwives (96%; N=25) mentioned that SP should be taken by pregnant women only under Direct Observation Therapy (DOT), that is, at the health facility under the observation of the health staff, whilst only one (4.0%) indicated that SP should be taken at bed time. Majority of the midwives (96%; N=25) knew that SP should be taken three times by pregnant women before delivery, whilst only one respondent (4.0%) mentioned that SP should be taken twice before delivery.

Table 4.5: A frequency distribution of midwives' knowledge of conditions under which SP is contra-indicated in pregnancy

Before 16 weeks of pregnancy	**Frequency**	**Percentage**	**Indicator scale**
Yes	19	76.0	Sufficient knowledge – more than 70% know SP is contra- indicated before 16 weeks of pregnancy
No	6	24.0	
Total	**25**	**100.0**	
After 36 weeks of pregnancy	**Frequency**	**Percentage**	**Indicator scale**
Yes	22	88.0	Sufficient knowledge – more than 70% know SP is contra- indicated after 36 weeks of pregnancy
No	3	12.0	
Total	**25**	**100.0**	
When SP is taken less than 4 weeks ago	**Frequency**	**Percentage**	**Indicator scale**
Yes	21	84.0	Sufficient knowledge – more than 70% know SP is contra-indicated if SP is taken less than 4 weeks ago
No	4	16.0	
Total	**25**	**100.0**	

When pregnant woman is allergic to sulpha drugs	Frequency	Percentage	Indicator scale
Yes	22	88.0	Sufficient knowledge – more than 70% know SP is contra-indicated if one is allergic to sulpha drugs
No	3	12.0	
Total	**25**	**100.0**	

Source: Field Survey, 2007.

In table 4.5, 88 percent of the midwives (N=25) pointed out that SP is contra-indicated after thirty-six weeks of pregnancy but 12 percent did not know this contra-indication. Moreover, 88 percent mentioned that SP is contra-indicated if the pregnant woman is allergic to sulpha drugs, whilst 84 percent indicated that SP is contra-indicated if the mother had taken SP less than four weeks before, and 76 percent indicated that it is contra-indicated before the 16th week of pregnancy. Only 16 percent did not know about this contra-indication. The indicator scale therefore confirms that midwives had sufficient knowledge of conditions under which SP is contra-indicated.

4.3 Knowledge of effects of malaria in pregnancy

4.3.1 Midwives' knowledge of effects of malaria on the pregnant mother

Table 4.6: A frequency distribution of midwives' knowledge of effects of malaria in pregnancy on the pregnant mother

Maternal anaemia	Frequency	Percentage	Indicator scale
Yes	22	88.0	Sufficient knowledge – more than 70% know maternal anaemia as an effect of malaria in pregnancy
No	3	12.0	
Total	**25**	**100.0**	
Maternal death	**Frequency**	**Percentage**	**Indicator scale**
Yes	18	72.0	Sufficient knowledge – more than 70% know maternal death as an effect of malaria in pregnancy
No	7	28.0	
Total	**25**	**100.0**	
Stillbirth	**Frequency**	**Percentage**	**Indicator scale**
Yes	5	20.0	

No	20	80.0	Sufficient knowledge – more than 70% know acute renal failure as an effect of malaria in pregnancy
Total	**25**	**100.0**	

Source: Field Survey, 2007.

Table 4.6 shows that amongst midwives (N=25), maternal anaemia is the most known effect of malaria in pregnancy on the pregnant mother, which accounted for 88 percent of midwives' responses, followed by maternal death (72%) and stillbirth (20%). In other words, majority of the midwives (80%) did not know about stillbirth as an effect of malaria on the pregnant woman. From the indicator scale, the midwives had sufficient knowledge of maternal anaemia and maternal death as effects of malaria on the pregnant woman, but not of stillbirth.

Table 4.7: A Frequency distribution of midwives' knowledge of effects of malaria in pregnancy on the unborn child

Spontaneous abortion	**Frequency**	**Percentage**	**Indicator scale**
Yes	20	80.0	Sufficient knowledge – more than 70% know spontaneous abortion as an effect of malaria in pregnancy
No	5	20.0	
Total	**25**	**100.0**	
Stillbirth	**Frequency**	**Percentage**	**Indicator scale**
Yes	21	84.0	Sufficient knowledge – more than 70% know stillbirth as an effect of malaria in pregnancy
No	4	16.0	
Total	**25**	**100.0**	
Congenital infection	**Frequency**	**Percentage**	**Indicator scale**
Yes	7	28.0	Sufficient knowledge – more than 70% know congenital infection as an effect of malaria in pregnancy
No	18	72.0	
Total	**25**	**100.0**	

Intra-uterine growth retardation	Frequency	Percentage	Indicator scale
Yes	5	20.0	Sufficient knowledge – more than 70% know intra-uterine growth retardation as an effect of malaria
No	20	80.0	
Total	**25**	**100.0**	
Premature birth	**Frequency**	**Percentage**	**Indicator scale**
Yes	15	60.0	Sufficient knowledge – more than 70% know premature birth as an effect of malaria in pregnancy
No	10	40.0	
Total	**25**	**100.0**	
Low birth weight	**Frequency**	**Percentage**	**Indicator scale**
Yes	22	88.0	Sufficient knowledge – more than 70% know low birth weight as an effect of malaria in pregnancy
No	3	12.0	
Total	**25**	**100.0**	
Intra-uterine death	**Frequency**	**Percentage**	**Indicator scale**
Yes	10	40.0	Sufficient knowledge – more than 70% know intra-uterine death as an effect of malaria in pregnancy
No	15	60.0	
Total	**25**	**100.0**	

Source: Field Survey, 2007

In Table 4.7, 88 percent of the midwives (N=25) mentioned low birth weight as an effect of malaria in pregnancy on the unborn child, whereas 84 percent mentioned stillbirth as an effect on the unborn child. Spontaneous abortion was mentioned by 80 percent of the midwives, premature birth by 60 percent, intra-uterine death by 40 percent, congenital infection by 28 percent, and intra-uterine growth retardation by 20 percent. From the indicator scale, it can be said that the midwives had sufficient knowledge of the fact that low birth weight, stillbirth and spontaneous abortion were effects of malaria in pregnancy on the unborn child, whereas not much was known about congenital infection, intra-uterine growth retardation and intrauterine death.

4.3.2 Pregnant women and nursing mothers' knowledge of the effects of malaria in pregnancy on the pregnant woman

Table 4.8: A frequency distribution of community respondents' knowledge of effects of malaria in pregnancy on the pregnant woman

Maternal anaemia	**Frequency**	**Percentage**	**Indicator scale**
Yes	250	81.2	Sufficient knowledge – more than 70% know maternal anaemia as an effect of malaria in pregnancy
No	58	18.8	
Total	**308**	**100.0**	
Maternal death	**Frequency**	**Percentage**	**Indicator scale**
Yes	288	93.5	Sufficient knowledge – more than 70% know maternal death as an effect of malaria in pregnancy
No	10	6.5	
Total	**308**	**100.0**	
Stillbirth	**Frequency**	**Percentage**	**Indicator scale**
Yes	180	58.4	Sufficient knowledge – more than 70% know acute renal failure as an effect of malaria in pregnancy
No	128	41.6	
Total	**308**	**100.0**	

Source: Field Survey, 2007.

Table 4.8 shows that for 93.5 percent of the community respondents (N=308) maternal death was the most known effect of malaria in pregnancy on the pregnant mother, whilst for 81.2 percent, maternal anaemia was the most known effect of malaria on pregnant women. Stillbirth was however not well known as an effect of malaria in pregnancy. Other conditions mentioned by the respondents included loss of appetite, being prone to fatigue, nausea, sleeplessness, and ectopic pregnancy.

Table 4.9: A frequency distribution of respondents' knowledge of the effects of malaria in pregnancy on the unborn child

Spontaneous abortion	**Frequency**	**Percent**	**Indicator scale**
Yes	150	48.7	Sufficient knowledge – more than 70% know spontaneous abortion as an effect of malaria in pregnancy
No	158	51.3	
Total	**308**	**100.0**	
Stillbirth	**Frequency**	**Percent**	**Indicator scale**
Yes	296	97.4	
No	12	2.6	

Total	**308**	**100.0**	Sufficient knowledge – more than 70% know stillbirth as an effect of malaria in pregnancy
Premature birth	**Frequency**	**Percent**	**Indicator scale**
Yes	75	24.4	Sufficient knowledge – more than 70% of respondents know premature birth as an effect of malaria in pregnancy
No	233	75.6	
Total	**308**	**100.0**	
Low birth weight	**Frequency**	**Percent**	**Indicator scale**
Yes	232	75.3	Sufficient knowledge – more than 70% of respondents know low birth weight as an effect of malaria in pregnancy
No	76	24.7	
Total	**308**	**100.0**	

Source: Field Survey, 2007.

Table 4.9 shows that 97.4 percent of the community respondents (N=308) mentioned stillbirth as an effect of malaria in pregnancy on the unborn child, 75.3 percent mentioned low birth weight, 48.7 percent mentioned spontaneous abortion, whilst 24.4 percent mentioned premature birth. It can be read from the indicator scale that respondents had sufficient knowledge that stillbirth and low birth weight were effects of malaria in pregnancy on the unborn child, but they did not know about spontaneous abortion and premature birth. Other conditions mentioned included sleeplessness, transfer of malaria to the foetus and paralysis.

4.4 Supply management of SP in the Kwabre district

4.4.1 Availability of drugs and record keeping at the health facilities

Table 4.10: A frequency distribution of stock availability of SP in 24 health facilities

Availability of SP	**Frequency**	**Percentage**	**Indicator scale**
Facilities that run out of stock of SP in the last three months prior to the study	12	50.0	• Good supply management – SP available the last three months prior to the study • Poor supply management –SP not available the last three months prior to the study
Facilities that did not run out of stock of SP in the last three months prior to the study	12	50.0	
Total	**24**	**100.0**	

Source: Field Survey, 2007.

Table 4.10 reveals that twelve (50%) of the health facilities in the District (N=24) run out of stock of SP for over a week in the last three months before this study. This indicates that 50 percent of the facilities faced problems concerning the availability of SP. It can be read from from the indicator scale that supply management with regards to the availability of SP was poor in the health facilities.

Table 4.11: A frequency distribution of record keeping in 24 health facilities in the Kwabre district

Availability of copy of IPTp manual in facility	**Frequency**	**Percentage**
Available	20	83.3
Not available	4	16.7
Total	**24**	**100.0**
Employment of ledger/tally card to keep records on drugs	**Frequency**	**Percent**
Employed	15	62.5
Not employed	9	37.5
Total	**24**	**100.0**
Filling–out of data collection form	**Frequency**	**Percent**
Data collection forms completely filled-out	16	66.7

Data collection forms not filled-out	8	33.3
Total	**24**	**100.0**
Maintenance of patiences' records at facility	**Frequency**	**Percent**
Patient's record maintained at facility	22	91.7
Patients record not maintained at facility	2	8.3
Total	**24**	**100.0**
Analysis of patients' data	**Frequency**	**Percent**
Data on patients analyzed	10	41.7
Data on patients not analyzed	14	58.3
Total	**24**	**100.0**

Source: Field Survey, 2007

Table 4.11 shows that 83.3 percent of the health facilities in the Kwabre district (N=24) had copies of the IPTp manual available at the facility. Only 62.5 percent employed ledger/tally cards to keep records on the drugs, and 66.7 percent had completely filled-out their data collection forms. A significant proportion of the facilities (91.7 percent) maintained patients' records at the facility, whilst only 41.7 percent analysed patients' records. Record keeping was thus quite poor in the facilities.

4.5 Proportion of nursing mothers who received IPTp1, IPTp2 and IPTp3

Table 4.12: A frequency distribution of nursing mothers' receipt of IPTp whilst pregnant

Whether given SP	Frequency	Percentage
Yes	102	65.4
No	54	34.6
Total	**156**	**100.0**

Source: Field Survey, 2007.

Table 4.12 shows that 65.4 percent of nursing mother respondents (N=156) were given SP during ANC to prevent malaria whilst they were pregnant, whilst a significant 34.6 percent were not. This indicates that a rather high proportion of pregnant women who attended ANC were not covered in the IPTp programme. This could affect the implementation of the programme in the District.

Table 4.13: A frequency distribution of number of times nursing mothers received SP whilst pregnant

Frequency of taking SP (N=102)	**Frequency**	**Percentage**	**Indicator Scale**
Once	41	40.2	• Good coverage – more than 70% receive at least 3 doses of SP • Poor coverage – less than 70% receive at least 3 doses of SP
Twice	33	32.4	
Thrice	27	26.5	
Four or more times	1	1.0	
Total	**102**	**100.0**	

Source: Field Survey, 2007

Table 4.13 shows that of those respondents who were given SP whilst pregnant (N=102), 40.2 percent was given the SP once, 32.4 percent twice, 26.5 percent thrice, and 1 percent at least four times. Available district records showed a similar trend for the first half of 2007 where coverage of IPT1, IPT2 and IPT3 was 17.1 percent, 11.5 percent and 4.3 percent respectively. This implies that IPT1 coverage was quite higher compared to IPT2 and IPT3.

However, according to the indicator scale, there is good coverage of the IPTp programme only when 70 percent of nursing mothers had received at least three doses of SP. This implies that by the indicator scale, IPT coverage as depicted in Table 4.13 was poor in the District.

Table 4.14: A frequency distribution of place of administration of SP

Where SP was taken	**Frequency**	**Percentage**

At facility in the presence of health worker	97	95.1
At home	5	4.9
Total	**102**	**100.0**

Source: Field Survey, 2007

In Table 4.14, the majority of the nursing mothers who were given SP (95.1%; N=102) took the drug at the facility in the presence of the health worker, whilst 4.9 percent took it at home. It is important to note that though only 4.9 percent of the nursing mothers took SP at home, taking SP at home is against the IPTp policy as regards the administration of SP.

4.6. Incidence of adverse reactions to SP in pregnant women on the IPTp programme

Table 4.15: A frequency distribution of incidence of adverse reactions to SP

Whether one experienced adverse reactions to SP	**Frequency**	**Percentage**
Yes	84	27.3
No	224	72.7
Total	**308**	**100.0**

Source: Field Survey, 2007.

In table 4.15, 27.3 percent of respondents (N=308) experienced adverse reactions to SP, whilst 72.7 percent did not. However, no records were found at the various health facilities that clients had reported any of these adverse reactions to SP.

Table 4.16: A frequency distribution of kinds of adverse reactions to SP in pregnant women

Adverse reactions	**Frequency (N=84)**	**Percentage**
Dizziness		
Yes	72	85.7
No	12	14.3
Total	**84**	**100.0**
Nausea/vomiting		
Yes	79	94.0
No	5	6.0

Total	**84**	**100.0**
Palpitation		
Yes	4	4.8
No	80	95.2
Total	**84**	**100.0**
Itching		
Yes	15	17.9
No	69	82.1
Total	**84**	**100.0**

Source: Field Survey, 2007.

Table 4.16 shows that 94 percent (N=84) of the pregnant women who took SP experienced nausea and vomiting, 85.7 percent experienced dizziness, 17.9 percent had itching, and 4.8 percent had palpitations.

4.7 Proportion of pregnant women who had malaria before and after the inception of IPTp programme in the Kwabre district

Table 4.17: A frequency distribution of prevalence of malaria in pregnant women in the Kwabre district

Year	No. of pregnant women seen	% change in no. of women seen	No. with confirmed malaria	% change in women with confirmed malaria
2003	7,012	-	319	-
2004	6,998	-0.2	378	18.5
2005	8,113	15.9	422	11.6
2006	9,354	15.3	402	-4.7

Source: Kwabre District Health Administration Directorate Annual review reports.

Table 4.17 reveals that in 2003, 7,012 pregnant women attended ANC in the District, with 319 confirmed as having malaria. This declined to 6,998 in 2004, with 378 confirmed as having malaria. From 2004, the number of women seen rose sharply to 8,113 in 2005, with 422

confirmed as having malaria, and rising again to 9,354 in 2006, with 402 confirmed as having malaria.

By inferences, Table 4.17 also reveals that whilst the number of women seen at ANC decreased from 2003 to 2004, the number of those confirmed with malaria from 2003 to 2004 increased, but proportionately declined by 4.7 percent from 2005 to 2006, even though the number of women seen rose by 15.3 percent from 2005 to 2006. The proportionate decline in the number of women confirmed with malaria in 2006 could be explained by the introduction of the IPTp programme in 2005.

4.8. Prevalence of low birth weight in the Kwabre district

Figure 4.1: A pie-chart of birth weight of babies delivered by mothers who were given SP during pregnancy

Source: Field Survey, 2007.

Figure 4.1 shows that 95.5 percent of nursing mothers who received SP (N=102), delivered babies who weighed 2.5 kg or more, whilst 4.5 percent of nursing mothers who were given SP delivered babies who weighed less than 2.5 kg. This means that those babies who weighed less than 2.5 kg were low birth weight babies. This implies that the receipt of SP during pregnancy

had the positive effect on the birth weights of babies, and therefore only 4.5 percent of the babies weighed less than 2.5kg.

Records from the Kwabre District Health Directorate also revealed that percentage low birth weight rate had declined from 8.5% in 2004 to 5.2% in 2005, and to 4.3% in 2006. This decline could be attributed to the fact that pregnant women in the District were given SP during ANC and this contributed to the reduction in low birth weight in the babies they delivered.

4. 9 Haemoglobin (Hb) levels of community respondents at registration

Figure 4.2: A pie-chart of community respondents' haemoglobin level at registration

Source: Field Survey, 2007.

Figure 4.2 depicts that 51.6 percent of the community respondents (N=308) had haemoglobin (Hb) levels greater than 11g/dl at registration, whilst 16.9 percent had Hb levels less than 11g/dl at registration. Data on the haemoglobin levels for a significant proportion of 31.5 percent of the respondents was not available because there were no records that they underwent the test to check their haemoglobin level at registration.

Data on haemoglobin levels of pregnant women available at the Kwabre District Health Directorate from 2004 to 2006 showed that the percentage of women with haemoglobin level less than 11g/dl at registration rose from 13 percent in 2004 to 23 percent in 2005, but declined to 21 percent in 2006. Data on the haemoglobin levels of pregnant women at 36 weeks was however, not available mainly because most health facilities lacked laboratory facilities. This prevented pregnant women from checking their Hb levels to determine whether or not they were anaemic. For this reason, this study could not make a meaningful conclusion on the prevalence of maternal anaemia in the District.

4.10 ANC utilization in the Kwabre district

Records available at the District Health Directorate revealed a high ANC attendance in the District, from 5,523 in 2003 to 9,532 in 2006. This is consistent with data gathered from the community survey, which is presented in Tables 4.18 and 4.19. Table 4.18: A frequency distribution of ANC attendance

Attended clinic regularly	**Frequency**	**Percent**
Yes	304	98.7
No	4	1.3
Total	**308**	**100.0**

Source: Field Survey, 2007

Table 4.18 shows that majority of the nursing mothers (98.7%; N=308) attended ANC whereas four (1.3%) did not, who however, did not give any reasons for their inability to attend ANC.

CHAPTER FIVE – DISCUSSION

5.1 Background characteristics

The dominant age group amongst the community respondents (nursing mothers and pregnant women) was 20 to 24 years, accounting for 30.8 percent of total number of respondents (N=308). This was followed by those between 25 and 29 years (26.3%), and those between 30 and 34 years (15.6%). Respondents above 35 years of age accounted for 14.9 percent, whilst those below 20 years of age accounted for 12.3 percent. This shows that community level respondents are adults in their child-bearing ages. This age structure of the community level respondents also reflects the age structure of the female population of the Kwabre district reported in the 2000 Population and Housing Census, where the population of females reduces with increasing age.

Christians by far dominated amongst the community respondents, accounting for 89.3 percent of the respondents, followed by Muslims (8.8%), traditionalist (1.0%), and rastafarians (1.0%). This also follows the pattern of religious affiliation of the people in the District reported in the 2000 Population and Housing Census, where Christianity accounts for 78.8 percent of the people, Islam (11.9%), and Traditional religion (0.8%).

Most respondents had attained up to junior high school or middle school education, accounting for 68.5 percent of respondents. This is followed by those who had attained up to primary level education (12.7%), whilst the least proportion (1.6%) had attained tertiary education. Significantly, 11.4 percent of respondents had no education at all. This pattern of educational attainment is reflective of the pattern of educational attainment for females in the District. According to the Ghana Demographic and Health Survey, 2003, the highest proportion of females of school-going age (age 6 and above) in the Kwabre district attained middle/junior secondary school education (46.6%), followed by those who attained primary level education (38.0%), whilst the least proportion include those who attained tertiary education (2.3%).

Trading was the major occupation of the respondents which is confirmed in the annual report of the District (DHMT, 2006).

5.2 Implementation of the IPTp programme

5.2.1 Proportion of midwives trained in the IPTp programme

More than 90 percent of midwives on the IPTp programme were trained in the implementation of the IPTp programme. This implies that high capacity had been built among these service providers towards strengthening and scaling up of IPTp services in the control of malaria in

pregnancy. Thus, all things being equal, the ITPp programme should be well implemented in the District. This is because, Ouma *et al.* (2007) and MOH/WHO/UNICEF (2002) demonstrated from studies in Kenya and Uganda respectively, that training of health personnel on the IPTp programme has a direct positive impact on malaria control in pregnancy.

Training leads to progress and so lack of training invariably leads to deterioration, incompetence and lack of trust of pregnant women on services that are being provided to them. Training therefore, improves productivity by increasing an employee's ability to perform. It also promotes sensitization on the benefits of ANC attendance and IPTp for pregnant women and their unborn babies. Mubyazi *et al*. (2005) noted that the successful implementation of the IPTp depends on the proper planning of, and support to, the training of health staff and sustained sensitization of pregnant women at health facilities and community levels about the benefits of IPTp for pregnant women and their unborn babies.

However, 78.8 percent of the midwives who had been trained had their training more than twelve months ago. There was no training for these midwives for the entire year in which this study was conducted, primarily because of lack of resources and logistics to undertake the training. This can affect the smooth implementation of the programme. For the IPTp programme to achieve its targets, the midwives should be trained on timely basis, at least twice every year.

5.2.2 Awareness and knowledge of midwives on the IPTp programme

All but one of the midwives (96%; N=25) mentioned that SP is the recommended drug for the

IPTp. Moreover, 80 percent of the midwives knew that pregnant women should be started on SP at the most appropriate time, which is after the 16th week of pregnancy. Furthermore, all but one (96%; N=25) of the midwives knew SP should be given under direct observation, that is, SP should be taken at the facility, and should be taken thrice before delivery.

The midwives' high knowledge of the administration of SP conforms to the required standards in the policy by WHO on malaria control and prevention during pregnancy in areas of stable transmission, which requires that all pregnant women should receive SP at least thrice at ANC attendance after 16 weeks of pregnancy. The indication from the midwives that pregnant women should receive SP at least thrice before delivery is also coherent with findings in Rogerson *et al*. (2000) that maximum benefit of IPTp can be achieved by receiving two or more doses of SP. This high knowledge of midwives could be due to the fact that more than 90 percent of them had been adequately trained in the IPTp programme. The adequacy of training is reflective also from the responses of the midwives on the conditions under which SP is contra-indicated in pregnancy, which are taking SP before the 16th week of pregnancy, after 36 weeks of pregnancy, when a woman had taken SP less than four weeks before, and if she is allergic to sulpha drugs.

These facts demonstrate that the midwives on the IPTp programme have sufficient knowledge of the programme, which is an indication that the programme was well implemented in the District. The sufficient knowledge of the midwives could also translate into good sensitization of pregnant women about the benefits of IPTp as an important approach for improving IPTp compliance.

5.3 Knowledge of effects of malaria in pregnancy

5.3.1 Effects of malaria in pregnancy on the pregnant mother

Some adverse effects of malaria in pregnancy on the pregnant woman were mentioned by both the midwives and the community respondents. These included maternal anaemia and maternal death. This conforms to the findings of a study in the Busia district of Uganda by Mangeni (2003), where anaemia was named as one of the major adverse effects of malaria in pregnancy. Indeed, the WHO notes that the major adverse effect of malaria in pregnancy on the mother is anemia, which it defines as the haemoglobin level of a pregnant mother of 11g/dl or less. Guyatt and Snow (2001) relate maternal anaemia to high risk of maternal death. It can be concluded that both the midwives and the community respondents had sufficient knowledge of the effects of malaria on the pregnant woman.

Surprisingly, the majority of both the midwives and the community respondents were not aware of stillbirth as an effect of malaria in pregnancy. Moreover, community respondents named some other conditions such as loss of appetite, being prone to fatigue, nausea, sleeplessness and ectopic pregnancy, which were not effects of malaria on the pregnant woman. This high knowledge of the adverse effect of malaria in pregnancy is expected to urge pregnant women and nursing mothers to patronize the IPTp programme,which aims at reducing these adverse effects.

5.3.2 Effects of malaria in pregnancy on the unborn child

The adverse effects of malaria in pregnancy on the unborn child that were mentioned by both the midwives and community respondents were spontaneous abortion, stillbirth, low birth weight, transfer of malaria to the foetus, premature birth, paralysis, sleeplessness, congenital

infection, intra-uterine death and intra-uterine growth retardation. Amongst these effects, the commonest that were mentioned were stillbirth and low birth weight.

These adverse effects were also found by McCormick (1985), Luxemburger *et al.* (1997) and Menendez *et al*. (2000), as the likely effects of malaria in pregnancy. However, these finding is at variance with that of Mangeni (2003), who notes from a study about IPTp in pregnancy conducted in the Busia District of Uganda, that participants in a focus group discussion seldomly mentioned low birth weight rate as an effect of malaria in pregnancy on the unborn baby.

In the context of this study, respondents have sufficient knowledge of the effects of malaria in pregnancy on the unborn child. The sufficient knowledge of the respondents of these adverse effects could be attributed to the fact that, majority of midwives in the District had had training on the IPTp programme, although not in recent times. Therefore, the midwives had sufficiently educated the pregnant women on the adverse effects of malaria in pregnancy.

5.4 Supply management of SP in the Kwabre district

5.4.1 Availability of drugs and record keeping at the health facilities

The drug supply management in the district could generally be described as poor. This is because according to WHO's recommendation, the percentage of health facilities reporting no disruption of stock of anti-malarial drugs for more than one week during three months preceding a stock taking survey should be employed as the indicator for assessment of drug supply management during facility surveys. This study however found out that as many as 12

(50%) of the facilities (N=24) had run out of stock of SP for over a week in the last three months preceding this study.

Record keeping at the facilities was also very poor. Keeping ledger or tally cards to record drug use at the facility, and maintaining and analysing patients' data at the facilities are important record keeping practices that ensure the effective implementation of the IPTp. As many as nine (37.5%) of the health facilities did not employ ledger or tally cards to keep records on drugs. However, 91.7 percent of the facilities maintained patients' records at the facilities, though only 41.7 percent analyzed such data.

5.5 Proportion of respondents who received IPTp1, IPTp2, and IPTp3

Although a high proportion of respondents were given SP during ANC (65.4 percent), a significant proportion (34.6 percent) was not given. The high proportion of those who were not given SP reveals inefficiencies in the implementation of the IPTp programme. This poses considerable challenge to efforts at reducing the incidence of malaria in pregnancy.

Moreover, it is not encouraging that a high proportion of those who were given (N=102), had it once (40.2%), whilst those who had it twice were only 32.4 percent, those who had it thrice 26.5 percent, and those who had it four or more times 1 percent. Available records from the Kwabre District Health Directorate showed a similar trend for the first half of 2007 where coverage of IPT_1, IPT_2, IPT_3 was 17.1 percent, 11.5 percent, and 4.3 percent respectively. This indicates that coverage of IPT_1 was rather higher compared to IPT_2 and IPT_3.

According to WHO policy on malaria control and prevention during pregnancy in areas of stable transmission, all pregnant women should receive at least three doses of SP after quickening. The results of this study, based on the WHO policy on malaria control and prevention during pregnancy, indicates that IPTp coverage is quite poor in the District. This means that respondents who received SP only once might not derive the optimum benefit of SP. Current scientific evidence suggests that at least two doses of SP are required to achieve optimal benefit in most women. For instance, in Malawi, where IPTp with SP has been the policy since 1993, Rogerson *et al.,* (2000) found that maximum benefit of IPTp can be gained by receiving two or more doses of SP.

Whilst receiving SP just once or twice during the entire period of pregnancy could be due to late first ANC attendance making it impossible to receive all the doses recommended by WHO, non receipt of SP at all could also be attributed to two reasons: that most nursing mothers did not attend ANC at all when they were pregnant, or that the drug was not available in the facility when they attended ANC. This study agrees with Eijk *et al. (*2004) that there should be education of pregnant women and ANC staff on the benefits of taking the required doses of SP.

However, it is good that majority (95.1 percent) of those who were given SP (N=102) took the drug at the facility in the presence of the health worker, whilst only 4.9 percent took it at home. In this regards, the administration of SP follows the policy of the IPTp programme, which directs that the programme should be a directly observed therapy. This confirms the fact that majority of midwives knew that SP should be taken under DOTs though a few of the respondents (4.9 percent) still went against the policy.

5.6 Incidence of adverse drug reactions to SP in pregnant women on the IPTp programme

Records at the twenty-four health facilities in the District indicated that no patient had ever reported any adverse reactions to SP at the facility. A similar occurrence in Malawi (a low risk of an adverse cutaneous reaction) was attributed to infrequent treatment doses with SP (Gimnia *et al.*, 2006). However, the absence of adverse reactions to SP in the records of the health facilities is consistent with the finding by the WHO that though sulfa drugs may be associated with kernicterus when given to premature neonates, this problem has not been found in studies of IPTp where SP has been administered to the pregnant mother (WHO, 2004). Nonetheless, in the communities, 27.3 percent of respondents (N=308) experienced side effects of SP such as dizziness, nausea, itching and palpitations. Most of them did not report these reactions to any health facility because they thought were not very dangerous conditions.

5.7 Proportion of pregnant women who had malaria in the district since the inception of IPTp programme.

Inferences can be made from records at the Kwabre District Health Directorate that the IPTp programme had had quite a good impact on reducing the incidence of malaria in pregnancy. Records at the Kwabre District Health Directorate revealed that the number of women confirmed with malaria proportionately declined by 4.7 percent from 422 in 2005 to 402 in 2006, even though the number of women seen at the health facilities rose by 15.3 percent from 8,113 in 2005 to 9,354 in 2006. The proportionate decline in the number of women confirmed with malaria in 2006 could be explained by the introduction of the IPTp programme in 2005.

The declining incidence of malaria in pregnancy found in the records of the Kwabre District Health Directorate is consistent with another finding in Kuile *et al.* (2003), which reported from a large randomised trial conducted in an area of intense perennial malaria transmission

in western Kenya that use of IPTp by pregnant women was associated with a 38 percent reduction in the incidence of malaria parasitaemia.

The declining incidence of malaria in pregnancy found by this study and by Kuile *et al.* (2003) indicates the potential positive impact of the IPTp programme in eliminating the incidence of malaria in pregnancy. However, a more conclusive assertion in this regard requires an extensive study on the trend of occurrence of malaria in pregnancy in the District.

5.8 Prevalence of low birth weight in the Kwabre district

Low birth weight, which is defined as birth weight less than 2.5 kg in a live born infant is an important indicator of the health status of a pregnant woman and the baby. Birth weight strongly influences the chances of survival and growth of the newborn. The community survey revealed that 95.1 percent of babies delivered by the respondents who received SP weighed more than 2.5 kg at birth, with only 4.9 percent weighing less than 2.5 kg.

In view of the finding of Matteelli *et al.* (1996) that malaria infection increased the risk of low birth weight in full-term neonates by about ten-fold, with a population-attributable proportion of 55.4 percent, the high proportion of babies who weighed above 2.5 kg is encouraging for the IPTp programme. This confirms studies by Bouyou-Akotet *et al.* (2003) and Shulman *et al.* (1999) that IPTp led to not only significant reductions in premature birth, but also marked reductions in low birth weight, especially for women who adhered to official recommendations

in the administration of the programme. McCormick (1985) and Brabin (1991) indicate that low birth weight is a major cause of infant mortality in many areas of the world. For these reason, and based on the finding of this study on the birth weight, the IPTp programme should be encouraged in all areas of Ghana to realize its immense benefits to both mother and baby.

The proportion of high birth weights revealed by the community survey is consistent with records at the Kwabre District Health Directorate, which indicated that there had been a declining trend in low birth weight rates, from 8.5 percent of all live births in 2004, to 5.2 percent in 2005, and 4.3 percent in 2006. It also confirms the assertion by the GHS 2004 report that there had been a consistent decline in the proportion of low birth weight babies in Ghana since it peaked at 10 percent in 2002. This decline could be due to the introduction of the IPTp programme in the District in 2005. This is because Matteelli *et al.* (1996) found in Zanzibar, Tanzania, that placental malaria causes intrauterine growth retardation, leading to low birth weight in newborns, and that malarial preventive intervention like the IPTp were likely to reduce malaria in pregnancy and reduce low birth weight.

5.9 Haemoglobin (Hb) levels of community respondents at registration

Anaemia in pregnancy is defined as haemoglobin levels of 11 g/dl or less. This is to say that, pregnant women with Hb level less than 11 g/dl were more likely to suffer from maternal anaemia. A significant proportion of 51.6 percent of the respondents had haemoglobin levels greater than 11 g/dl at registration, but it is disturbing that whilst 16.9 percent of the respondents had Hb levels less than 11 g/dl at registration, 31.5 percent did not have any records on Hb levels at the facilities. Moreover, all respondents did not also have records on Hb levels at 36 weeks. The main probable reason for this is that most of the facilities do not have laboratories

to perform test on Hb levels, and it is unlikely that pregnant women would travel long distances for such laboratory tests in the cities where they exist.

These revelations on Hb levels are disturbing because according to a study in Pakistan, the risk of preterm delivery and low birth weight among anaemic pregnant women was 4 and 1.9 times respectively more than non-anaemic pregnant women. The neonates of anaemic women have a 3.7 greater risk of intrauterine foetal death among the anaemic women than the nonanaemic women (Lone *et al.*, 2004). This makes it imperative that the IPTp programme should be made effective to reduce the occurrence of maternal anaemia in pregnant women.

5.10 ANC utilization in the Kwabre district

There was high attendance at ANC, where the majority of respondents (98.7%) attended ANC regularly. Only 1.3 percent did not. This is consistent with records of the Kwabre District Health Directorate, which showed increases in ANC registrants from 5,523 in 2003 to 6,532 in 2006. This trend is also confirmed by the GDHS report for 2003, which showed that the utilization of antenatal services improved in the past 15 years, from 82 percent of mothers receiving care for their most recent birth in the five-year period preceding the survey in 1988, to 92 percent in 2003 (GSS/NMIMR/ORC Macro, 2004). High ANC attendance is paramount to the success of the IPTp programme since the success of the programme largely depends on the administration of SP under directly observed therapy (DOT) during ANC.

However, this was not the case in some African countries. For instance, it was found in Ethiopia that the utilization of maternal healthcare services was inadequate, as clearly depicted by the major maternal healthcare indicators (antenatal, delivery, and postnatal care services). The

situation was worst in the rural areas of Ethiopia, where more than 80 percent of the population resided. The study concludes that most important factors influencing the use of maternal health services in Ethiopia were demographic and socio-cultural in nature (Mekonnen and Mekonnen, 2002).

In Ghana, the increasing trend of ANC attendance could be due to the fact that though most mothers have access to ANC services from GHS facilities and Teaching hospitals; many private institutions such as maternity homes have been established over the years in many communities in the rural and peri-urban areas, thereby increasing accessibility to ANC services.

CHAPTER SIX – CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study makes a number of findings that provide lessons to tackle challenges of successfully implementing the IPT programme not only in the Kwabre district, but throughout the country.

6.1.1 Background characteristics

Respondents were adults in their twenties and thirties, well in the child bearing phase of their lives. They were also educated, at least to the Middle School level. Trading was their main occupation with majority of them being Christians.

6.1.2 Training midwives in the IPTp programme

Midwives had been adequately trained to enable high competence levels to deliver effective services to their clients. Most of them though had not had any training to improve their skills in the last two years.

6.1.3 Awareness and knowledge of midwives, nursing mothers and pregnant women of malaria in pregnancy and the IPTp programme

Knowledge and awareness of the IPTp programme and the effects malaria in pregnancy amongst the midwives and community respondents was sufficient and encouraging. Majority of the midwives, pregnant women and nursing mothers mentioned maternal anaemia and maternal death as effects of malaria in pregnancy on the pregnant woman, whereas stillbirth and low birth weight were mentioned as effects on the unborn child.

6.1.4 Supply management of SP in the Kwabre district

Health facilities implementing the IPTp programme in the district lacked some basic logistics for the effective implementation of the programme. For instance, most of the facilities did not

have tally cards and ledgers for good record keeping. Only fifteen facilities out of the twenty four kept tally cards and ledgers to keep good records of the stock of SP. Almost half of the facilities (50%) had run out of stock of SP for over a week in the last three months preceding this study.

6.1.5 Proportion of pregnant women who received IPT1, IPT2 and IPT3

Although a high proportion of nursing mothers was given SP during pregnancy, an equally high proportion was not given. The majority of those who were given SP had it once whereas only a few pregnant women received the second and third doses. Those who were not given did not know why they were not. Coverage of IPT1, IPT2 and IPT3 in the District was not encouraging.

6.1.6 Incidence of adverse reactions to SP

The common adverse reactions of SP experienced by respondents included dizziness, nausea, itching, and palpitations. However, no records of these adverse reactions were found in any of the health facilities in the District.

6.1.7 Proportion of pregnant women who had malaria before and after the inception of IPTp in the Kwabre district

The proportion of pregnant women who had malaria in the District declined from 5.4 percent in 2004 to 4.3 percent in 2006 with the introduction of the IPTp programme.

6.1.8 Low birth weight and haemoglobin levels of pregnant women

The incidence of low birth weight had declined in the District since the inception of the IPTp programme, but data on Hb levels at 36 weeks was not available and therefore no meaningful conclusion on maternal anaemia could be made.

6.1.9 ANC utilization in the Kwabre district

ANC attendance was very high according to records at the Kwabre District Health Directorate and also from the community survey.

6.2 Recommendations

Based on the findings of the study, the following strategies are recommended as per stakeholders:

6.2.1 Midwives in the Kwabre district

In the short term, the following are recommended;

1. All the three doses of SP should be given to clients and should be under DOT.
2. Midwives should intensify education of pregnant women on the effects of malaria in pregnancy.

6.2.2 Health facilities in the Kwabre district

The following are recommended as short term strategies;

1. For easier and faster record keeping, computers should be made available by management of the health facilities. The health institutions should organize in-service training on drug

management of SP and good record keeping for midwives at least at the end of each quarter.

2. Monitoring of the incidence of adverse effects of SP in pregnant women on IPT should be improved by creating a monitoring team on pharmacovigilance that would ensure that adverse reactions to SP are well addressed.

6.2.3 Kwabre District Health Directorate

The following are recommended as short term strategies;

1. Monitoring and evaluation of the IPT programme should be stepped-up at all levels of implementation by a monitoring team especially in documentation, data collection, analysis and utilization. The monitoring team should go round all the health facilities from time to time and make sure that the right thing is done..
2. Regular in-service training on the IPTp programme should be conducted for all healthcare staff especially midwives at least twice a year in order to upgrade and help improve on their skills.
3. Checking of haemoglobin levels of all pregnant women at 36 weeks should be strictly enforced by the District Health Directorates.

6.2.4 Ghana Health Service/ Ministry of Health (GHS/MoH)

The Ghana Health Service should provide Hb strips/haemoglobinometers for easy checking of Hb in the districts.

6.3 Concluding remarks

The implementation of the IPT programme in the Kwabre district has been successful in terms of the awareness and knowledge of both the midwives and pregnant women on the effects of

malaria in pregnancy. However, to achieve overall targets, major challenges which constrain the effective running of the programme such as improper records keeping, adverse drug effect monitoring, frequent running out of stocks of SP, low second and third dose IPTp coverage and irregular training of healthcare staff especially midwives, which pose a threat to the successful implementation of the programme must be promptly addressed.

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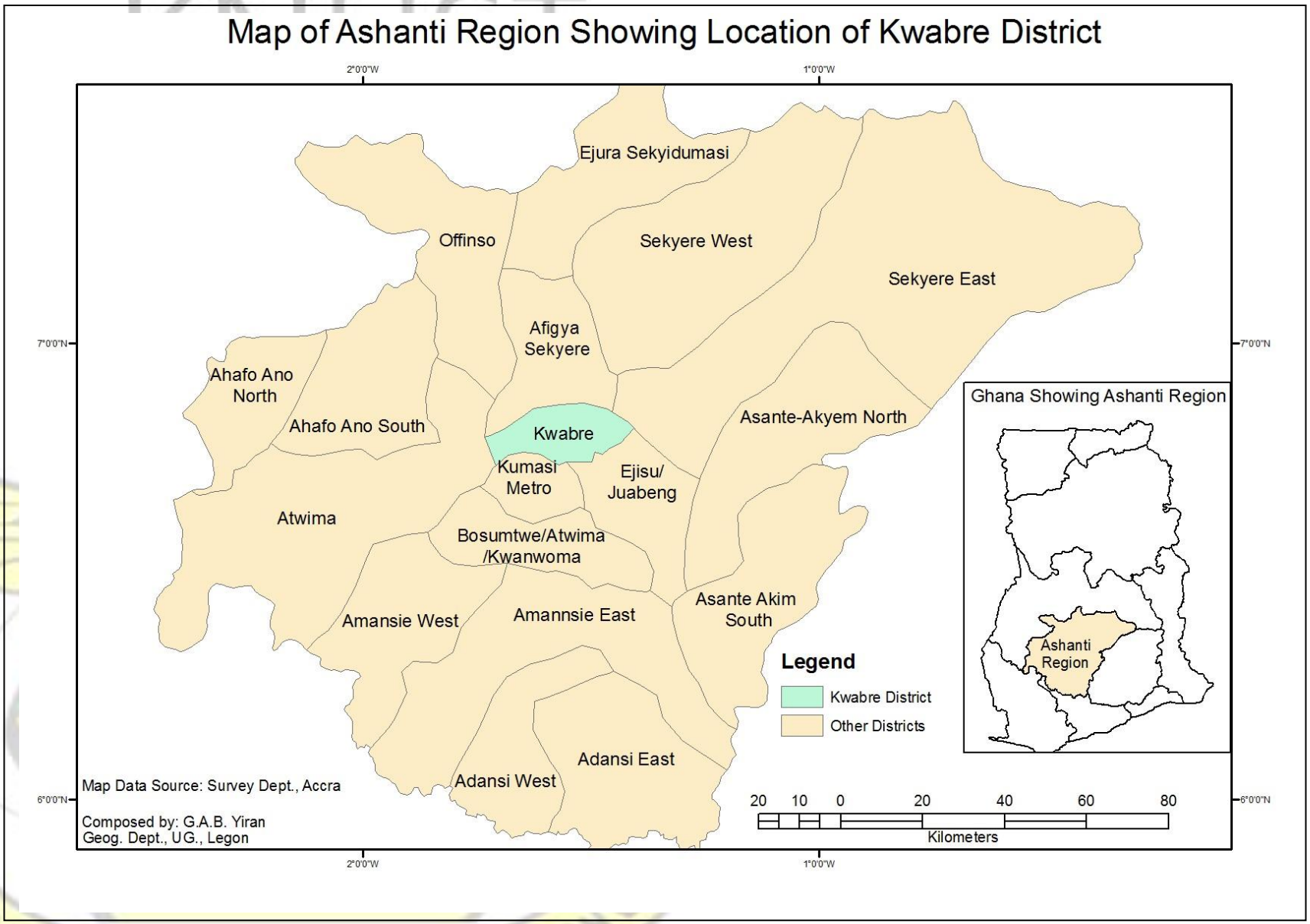
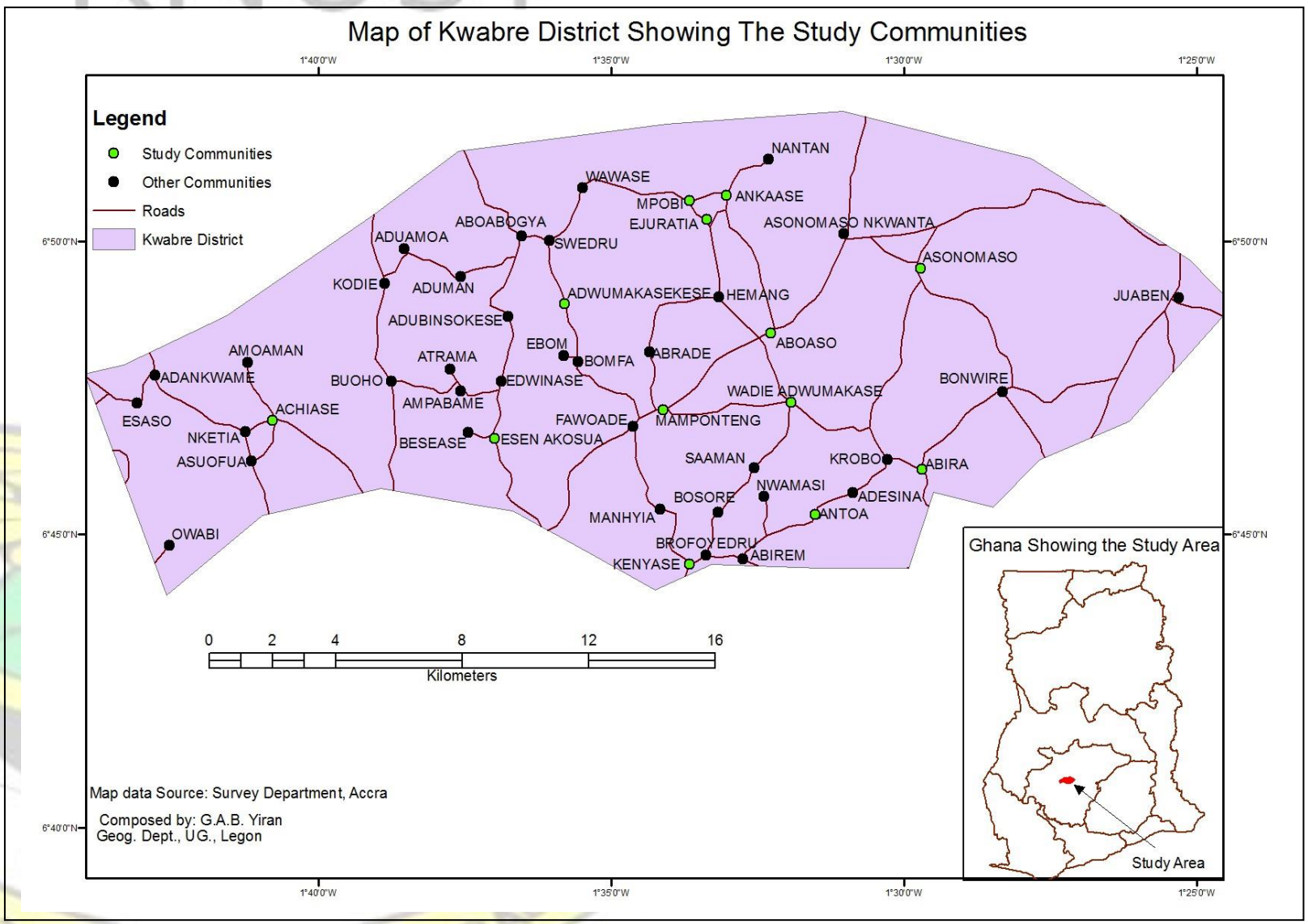

Map of Ashanti Region Showing Location of Kwabre District
2°0'0"W
1°0'0"W
7°0'0"N
6°0'0"N
Ejura Sekyidumasi
Offinso
Sekyere West
Sekyere East
Afigya Sekyere
Ahafo Ano North
Ahafo Ano South
Kwabre
Asante-Akyem North
Kumasi Metro
Ejisu/ Juabeng
Atwima
Bosumtwe/Atwima /Kwanwoma
Asante Akim South
Amansie West
Amannsie East
Adansi East
Adansi West
Ghana Showing Ashanti Region
Ashanti Region
Legend
Kwabre District
Other Districts
20 10 0 20 40 60 80
Kilometers
Map Data Source: Survey Dept., Accra
Composed by: G.A.B. Yiran
Geog. Dept., UG., Legon


Map of Kwabre District Showing The Study Communities
1°40'0"W
1°35'0"W
1°30'0"W
1°25'0"W
6°50'0"N
6°45'0"N
6°40'0"N
Legend
Study Communities
Other Communities
Roads
Kwabre District
NANTAN
WAWASE
MPOBI
ANKAASE
EJURATIA
ASONOMASO NKWANTA
ABOABOGYA
SWEDRU
ADUAMOA
ASONOMASO
KODIE
ADUMAN
ADWUMAKASEKESE
HEMANG
JUABEN
ADUBINSOKESE
ABOASO
AMOAMAN
EBOM
BOMFA
ABRADE
ATRAMA
ADANKWAME
BUOHO
EDWINASE
BONWIRE
WADIE ADWUMAKASE
AMPABAME
ACHIASE
ESASO
FAWOADE
MAMPONTENG
NKETIA
BESEASE
ESEN AKOSUA
SAAMAN
KROBO
ABIRA
ASUOFUA
NWAMASI
BOSORE
ADESINA
MANHYIA
ANTOA
OWABI
BROFOYEDRU
ABIREM
KENYASE
0 2 4 8 12 16
Kilometers
Map data Source: Survey Department, Accra
Composed by: G.A.B. Yiran
Geog. Dept., UG., Legon
Ghana Showing the Study Area
Study Area

APPENDICES APPENDIX ONE: Structured Interview Guide

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICAL SCIENCES DEPARTMENT OF COMMUNITY HEALTH, KUMASI

Evaluation of Intermittent Preventive Treatment (IPT) for Malaria control in Pregnancy in Kwabre District of Ghana

Introduction

Good morning/afternoon and thanks so much for your permission. I am Charlotte Sena Agyare, a student offering an MPH Programme in Population and Reproductive Health at the Department of Community Health, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi. This interview is being conducted as part of a research into the Evaluation of Intermittent Preventive Treatment (IPT) for Malaria control in pregnancy. I would be very much grateful if you would kindly find some time to help me fill these questionnaires. Your views, opinions and contributions are very valuable and important and would go a long way to help me evaluate the usefulness or otherwise, of IPT in pregnancy.

Thanks for your cooperation.

CHECKLISTS FOR FACILITY SURVEY AND INTERVIEW GUIDE FOR MIDWIVES
Section A

01. How long has the programme been running? .....

02. Is a copy of the IPT guideline/Manual available in the facility?

Yes □ No □

03. Is ledger(s) books/tally cards employed for keeping records or monitoring the stock - level of the drugs (SP)? Yes □ No □

04. Is data collection forms completely filled (inspect)?

Yes □ No □

05. Are patients' records for the programme maintained (available) at the facility?

Yes □ No □

06. Is the data collected analyzed?(inspect)

Yes □ No □

07. Is the facility collecting data for self evaluation of the IPT programme (inspect)?

Yes □ No □

08. Is the information generated utilized for health services planning purposes?

Yes □ No □

09. Was staff(s) trained before/during the implementation of the programme?

Yes □ No □

010. Are the drugs (SP) stored under appropriate condition?

Yes □ No □

011. Did the facility record stock-out of drugs for over one week in the past three (3) months (check records)?

Yes □ No □

012. Has any complain of adverse reaction to Malafan/SP (perceived or confirmed) been received or identified ever since the program began?

Yes □ No □

If yes, indicate the type(s) from records ……

013. Are there any recommendation(s) for improving the programme?

……

MIDWIVES Evaluation of IPT for malaria control in pregnancy

01. Rank……

02. Have you ever been trained in IPT?

Yes □ No □ Don't know □

03. When were you trained?

Less than a month □ About three months ago □

About six months ago □ Almost a year ago □

Over a year ago □

04. What is the current drug of choice for the prevention of malaria in pregnancy?

Chloroquine □ Amodiaquine □

Artesunate □ Fansidar/Malafan/SP □

Quinine □ Artesunate/Amodiaquine □

Don't Know □ Others (please

specify)……

05. At what period should a pregnant woman start receiving IPT?

First trimester □ After 16 weeks □

Third trimester □ At labour □

Don't know □

06. How many times should a pregnant woman receive IPT before delivery?

Once □ Twice □

Three times □ Four times or more □

Don't know □

07. When is IPT not recommended or contra-indicated in a pregnant woman?

Before 16 weeks □ After 36 weeks □

Second Trimester □ If she has taken SP less than 4 weeks □

If she is allergic to sulpha drugs □ Don't know □

08. At what interval should a pregnant woman receive IPT?

Weekly □ Monthly (4 weeks) □
Every trimester (3 months) □ Quarterly (every four months) □

Don't know □

09. How should IPT be given?

Under direct observation (DOTS) □ At bedtime □
At home □

010. What is the effect of malaria in pregnancy on the unborn child?
Abortion □ Stillbirth □

Congenital infection □ Intrauterine growth retardation □

Premature birth □ Low birth weight □

Malaria illness □ Intrauterine death □
All of the above □

011. What is the effect of malaria in pregnancy on the mother?
Maternal anaemia □ Maternal death □ Don't

Know □ Others (please

specify)……

012. What are some expected benefits of IPT?

Reduces the incidence of Low birth weight □ Clears placental site of parasites □

Prevents spontaneous abortion and stillbirth due to malaria □

Reduces the incidence of maternal anaemia □ All of these □

Don't know □

Others specify……

013. Do you think IPT is effective in preventing malaria in pregnancy?

Yes □ No □

Don't Know □ If no give

reasons……

014. Are you prepared to take IPT in case you become pregnancy?

Yes □ No □

Don't know □ If no give reasons……

COMMUNITY SURVEY QUESTIONAIRE FOR PREGNANT WOMEN Section A --- Background information

01. Residence

Rural □ Peri - Urban □

02. Age (in Completed Years)……

03. Religion

Christian □ Moslem □

Traditionalist /Spiritualist □ Others please

(specify)……..

04. What is your occupation?

Farming □ Trading □

Teaching □ Health worker □

Hairdressing □ Dressmaking □ Unemployed

Others please

specify……

Section B

05. What is your highest level of education?

None □ Primary □

JSS/Middle school □ Secondary/SSS □ Tertiary

□

06. How many times have you delivered?

Once □ Twice □

Thrice □ Four or more times □

07. How many times have you become pregnant? **(inclusive)**

One □ Two □ Three

□ Four or more □

08. Which trimester are you in currently?

First □ Second □

Third □ Don't know □

09. Do you have an ANC card? [**Ask respondent to show the ANC card if available]**

Yes □ No □

010. Do you attend antenatal clinic (ANC) regularly?

Yes □ No □ Don't know □

If No give reasons ***and skip to 015*:**

……

011. If the answer to 010 is **yes**, indicate where?

Government Health Facility □ Mission □

Private clinic/maternity home □ TBA/Home □ Others (please specify)……..……

012. How many months were you pregnant before you started attending ANC?

No. of months □ Don't know □

013. How many times have you attended ANC? **[Verify from ANC card]**

Once □ Twice □

Thrice □ Four or more times □

014. Check haemoglobin level of pregnant women [from ANC card page 4]

At registration (specify date) g/dl……

Most recent/last (specify date) g/dl……

015. Have you suffered from malaria since you became pregnant?

Yes □ No □ Don't know □ 016.

If yes, how many times? ***If No, skip to 018.***

Once □ Twice □

3 times □ 4 or more □

Don't know □

017. Which trimester were you in?

First trimester □ Second trimester □

Third trimester □ Don't know □

018. Do you think malaria in pregnancy is a serious illness which requires urgent attention?

Yes □ No □ Don't know □

019. Do you think malaria in pregnancy has any effect on the unborn child?

Yes □ No □ Don't know □ 020.

If the answer to 019 is **yes**, indicate the type of effect.

Spontaneous abortion □ Stillbirth □

Prematurity □ Low birth weight □

All of the above □ Don't know □

Others (please specify)……

021. Do you think malaria during pregnancy has any serious effects on the pregnant woman

Yes □ No □ Don't know □

022. If the answer to 021 is **yes** indicate the type of effect.

Maternal anaemia □ Maternal death □

Others (please specify)…… Don't know □

023. How do you think malaria can be prevented in a pregnant woman?

IPT □ Avoiding mosquito bite

□

Using insecticide treated bed net (ITN) □ All of the above

□

Don't know □Any others (please specify)……

024. Have you seen or heard of any message telling pregnant women to take

Malafan/SP tablets to prevent malaria in pregnancy? **[Show Malafan/SP tablets]**

Yes □ No □ Don't know □

025. If the answer to 024 is yes, from where did you get the message?

On television □ On the radio □

In a newspaper / magazine □ From a poster □

From leaflets or brochures □ From a health worker/clinic □

026. Have you been given Malafan/SP during ANC to prevent malaria?

Yes □ No □ Don't know □

027. If the answer to question 026 is **Yes,** ask how many times and ***Continue from 029.***

Once □ Twice □

Three times □ More than three times □

028. If the answer to question 026 is **No** give reasons ***and skip to 033.***

Malafan/SP was not available □

Don't know □

Other (please specify)……..

029. Where was the Malafan/SP taken?

At the facility in the presence of the health worker □ At home □

030. Did you pay for it?

Yes □ No □ Don't know □

If the answer to the above question is yes, indicate cost (in cedis)……..

031. Did you experience any side effect after taking the Malafan/SP (perceived or confirmed)?

Yes □ No □ Don't know □ 032.

If the answer to question 034 is **yes,** indicate the side effect.

Dizziness □ Nausea/vomiting □

Palpitation □ Itching □

Jaundice □ Others (please specify)…… 033.

What do you think are the benefits of taking Malafan/SP during pregnancy?

Malaria episodes reduced □ Reduces prematurity

□

Birth weight is improved □ Reduces maternal anaemia

□

Maternal death due to malaria is reduced □ All of the above

□

Don't know □ Others please specify……...

034. Are you prepared to take Malafan/SP in your next pregnancy to prevent malaria?

Yes □ No □ Don't know □

Gives reasons

……

035. Do you sleep under an insecticide treated bed net?

Yes □ No

QUESTIONNAIRE FOR MOTHERS WHO DELIVERED SINCE JANUARY – JUNE 2007.

Section A- Background information

01. Residence

Rural □ Peri-urban □

02. Age (in Completed Years)……

03. Religion

Christian □ Moslem □

Traditionalist /Spiritualist □ Others (specify)……

04. What is your highest level of education?

None □ Primary □

JSS/Middle school □ Secondary/SSS □

Tertiary □

05. What is your occupation?

Farming □ Trading □

Teaching □ Health worker □

Hairdressing □ Dressmaking □

Unemployed □ Others please specify……

Section B

06. How many times have you gotten pregnant?

Once □ Twice □

Thrice □ Four or more times □

07. How many times have you delivered?

Once □ Twice □

Thrice □ Four or more times □

08. Did you attend antenatal clinic (ANC) during your last pregnancy?

Yes □ No □

If **No** give reasons ***and skip to 014*:**

……

09. If the answer to 08 is **Yes**, indicate where?

Government Health Facility □ Mission □

Private clinic/maternity home □ TBA/Home □ Others (please specify)……

010. Were you given an ANC card? [**Ask respondent to show the ANC card if available]**

Yes □ No □

011. How many months were you pregnant before you started receiving antenatal care for your pregnancy? **(Check from antenatal card if available)**

No. of months □ Don't know □

012. How many times did you attend ANC before delivery? **[Verify from ANC card]**

Once □ Twice □

Thrice □ Four or more times □

013. Check haemoglobin level of mother **[If ANC card is available]**

At registration (specify date)…….g/dl

Most recent/last (specify date)……g/dl

Others (please specify)…….

014. Did you suffer from malaria whilst pregnant?

Yes □ No □ Don't know □ 015.

If **No**, **skip to 016**, but if answer is **Yes,** ask how many times?

Once □ Twice □

Thrice □ Four or more times □

Don't know □

016. At what stage(s) did you get the malaria?

First trimester □ Second trimester □

Third trimester □ Don't know □

017. Have you ever heard or been told that pregnant women need to take Malafan/SP tablets to prevent malaria in pregnancy? **[Show SP tablets]**

Yes □ No □ Don't know □

018. If the answer to 017 is yes, from where did you get the message?

On television □ On the radio □

In a newspaper / magazine □ From a poster □

From leaflets or brochures □ From a health worker/clinic □

Others (please specify)…….

019. Do you think malaria in pregnancy is a serious illness which requires urgent attention?

Yes □ No □ Don't know □

020. Do you think malaria in pregnancy has any effect on the unborn child?

Yes □ No □ Don't know □ 021.

If the answer to 020 is **yes**, indicate the type of effect.

Spontaneous abortion □ Stillbirth □

Prematurity □ Low birth weight □

Don't know □ Others (please specify)……

022. Do you think malaria during pregnancy has any serious effects on the pregnant woman?

Yes □ No □ Don't know □ 023.

If the answer to 022 is **yes** indicate the type of effect.

Maternal anaemia □ Maternal death □ Don't know □ Others (please specify)……

024. How do you think malaria can be prevented in a pregnant woman

IPT □ Avoiding mosquito bite □

Using insecticide treated bed net (ITN) □ All of the above

□

Don' know □ Any others (please

specify)……

025. Were you given Malafan/SP during ANC to prevent malaria?

Yes □ No □ Don't know □

026. If the answer to question 025 is **Yes** ask how many times? **[Check from ANC card if available]** and ***Continue from 028.***

Once □ Twice □

Three times □ Four or more times □ 027. If the

answer to question 025 is **No** give reasons ***and skip to 031***.

Malafan/SP was not Available □ Don't know □

Other (please specify)……..

028. Where was the Malafan/SP taken?

At the facility the presence of the health worker □ At home □

029. Did you pay for it?

Yes □ No □ Don't know □

If the answer to the above question is yes, indicate cost (in cedis)……..

030. Did you experience any side effect after taking the Malafan/SP (perceived or confirmed)?

Yes □ No □ Don't Know □ 031.

If the answer to question 030 is **Yes,** indicate the side effect.

Dizziness □ Nausea/vomiting □

Palpitation □ Itching □ Jaundice

□ Others (please

specify)……

032. What do you think are the benefits of taking Malafan/SP during pregnancy?

Malaria episodes reduced □ Reduces prematurity □

Birth weight is improved □ Reduces maternal anaemia □

Maternal death due to malaria is reduced □ All of the above □ Don't

know □ Others please

specify……

033. Are you prepared to take Malafan/SP in your next pregnancy to prevent malaria?

Yes □ No □ Don't know □

034. Did you sleep under an insecticide treated bed net during pregnancy?

Yes □ No

035. Date of birth of child……..

036. Where was (s)he delivered

Home /TBA □ Private maternity

□

Mission facility □ Government facility

□

Others (specify) ……

037. Was baby (name) weighed at birth?

Yes □ No □ Don't know □

038. How much did baby (name) weigh? (Record weight from ANC Card or weighing card if available)…….Kg.

Weight in kilograms greater or equal to 2.5 kg ……

Weight in kilograms less than 2.5 kg……

039. What was the haemoglobin level of your baby at birth **(Check Hb from ANC card if available**)……