SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

UPTAKE OF THE SULFADOXINE-PYRIMETHAMINE FIVE DOSE POLICY IN GHANA FOLLOWING FOUR YEARS OF IMPLEMENTATION: A CROSS-SECTIONAL SURVEY AMONG POSTNATAL CARE ATTENDEES IN MAMPROBI POLYCLINIC

BY

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DECLARATION

I hereby declare that the work presented, except for references to other people who have been dully acknowledged, is entirely the product of my own effort carried out at the University of Ghana School of Public Health. This is an original research work which has neither in a whole nor in part been submitted anywhere for any other degree.

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(Supervisor)

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DEDICATION

I dedicate this study to my entire family especially my daughter Efua Akyede Bentil.

ACKNOWLEDGEMENT

I thank god almighty for giving me good health and courage to complete this study.

I wish to express my sincerest gratitude to my academic supervisor, Dr Benedict Weobong, department of Social and Behavioral Sciences (SOBS), School of Public Health, University of Ghana, for his immense support and encouragement throughout the study.

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My sincerest gratitude goes to the entire staff of Mamprobi Polyclinic for their help to make this work a success.

Lastly, I extend my warmest gratitude to my parents and siblings for their encouragement throughout the study.

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DEFINITION OF TERMS

Uptake of IPTp: The use of Sulphadoxine-Pyrimethamine tablets by pregnant women at antenatal clinics under the direct observation of trained health care providers. The medication is started at 16 weeks gestation and it's repeated at intervals of four weeks till delivery.

Chemoprophylaxis The use of drugs to prevent a disease.

Compliance: The strict adherence with which a patient follows an agreed treatment plan.

Infection: The invasion of the body by pathogenic microorganisms and their multiplication which can lead to tissue damage and disease

Malaria: A life threatening disease caused by parasites that are transmitted to people through the bites of infected female anopheles mosquito

Plasmodium: Parasitic protozoan of the genus Plasmodium that causes malaria in humans

Pregnancy The period of time within which an infant develops in the body of a woman until delivery

Preterm A baby born before the 37 weeks of gestation

Low birth weight Any baby weighing less than 2.5kg at birth

Pregnant woman: Carrying developing offspring within the body or being about to produce new life

ABBREVIATIONS/ACRONYMS

WHO:	World Health Organization
GHS:	Ghana Health Service
MOH:	Ministry of Health
SP:	Sulphadoxine Pyremethamine
CDC	Centre for disease control
IPTp:	Intermittent Preventive Treatment program
RBM	Roll Back Malaria
ANC	Antenatal Care
NMPC	National Malaria Control Program

ABSTRACT

Introduction. Malaria in pregnancy is one of the leading causes of maternal and neonatal morbidity and mortality in sub Saharan Africa and in Ghana. Several measures have been put in place in a bid to curb the menace and one of them is the use of intermittent preventive treatment of malaria using sulphadoxine pyrimethamine IPT-SP drug. It is taken every one or at least four weeks apart from 16 weeks or the second trimester till delivery.

Objective. The goal of this study was to determine the impact of the new WHO policy on antenatal care (ANC) attendance and its effect on the uptake of IPT-SP program.

Methodology: A descriptive cross sectional study design was used for the study and it involved a consecutive sample size of 280 postnatal mothers within 12 weeks of delivery at the Mamprobi Policlinic. Data on uptake of IPT-SP (primary dependent variable) and independent variables: ANC visit timing (trimester at first visit to ANC), ANC visit frequency (monthly/not-monthly), and number of ANC visits, was retrospectively collected from antenatal records of respondents using a structured form. Data on socio demographic information, including health facility factors was also collected from primary respondents and health facility staff respectively. Simple chi-square statistic and charts were used to examine descriptive relationships between variables, and logistic regression used to examine associations between the dependent and independent variables; effect sizes are reported as odds ratios with 95% confidence intervals. Data analysis was conducted with STATA version 15.0

Results: A total number of 284 postnatal mothers with 12 weeks of delivery consented for this study and were used for the analysis. Out of that of sample, 45.8 % of participants received the optimal 5 doses of SP in their previous pregnancy. 62% of the participants had 8 and above ANC visits. For the number of participants who made less than 8 visits, 30.3% received the optimal 5

doses of SP. Among the participants who made 8 and more visits, 69.7% received 5 doses of SP. There is a significant relationship between number of ANC (χ^2 =3.83, p=0.005, α=0.05) and SP uptake. Participants making 8 ANC visits were 1.22 times more likely to receive 5 dose of SP compared to women making less than 8 visits with an [AOR=1.22 (95% CI: 0.45-1.12); p=0.008]

Conclusion

The WHO new recommended 5 doses of SP uptake in Mamprobi was low in the study population despite the high number of ANC visits. Number of pregnancies and increased number of ANC visits has increased odds for the uptake of SP. However, women with more children have a lower chance of receiving the optimal doses of SP. At health facilities, lack of capacity building activities on SP for ANC staff, inadequate staff and intermittent shortage of SP were identified to be predictors for the uptake of SP.

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

Every single year, 50 million women living in malaria-endemic areas become pregnant with about 50% living in Africa (WHO, 2011).10,000 women and 20,000 new-borns are estimated to die as a consequence of malaria infection during pregnancy worldwide. About 25 million pregnant women are susceptible to this menace every year in the world. Getting malaria in pregnancy can predispose a woman and the unborn child to anaemia, preterm birth, stillbirth, vertical transmission to baby, under weight babies usually the most common cause of neonatal mortality (World Health Organization, 2019). The current condition of Malaria in Ghana is that about 3.5 million people are estimated to contract malaria every year. The mortality rate among children with malaria is nearly 20,000 every year with 25% of the deaths happening in children under the age of five. The economic liability of malaria on national coffers is projected to be about one to two per cent of the Gross Domestic Product in Ghana annually (UNICEF Ghana, 2012).

On 7th November 2016, the World Health Organization (WHO) set out a different set of guidelines on antenatal care for pregnant women. This modification was required by the elevation in levels of maternal deaths documented worldwide. This was predominantly severe in developing countries where maternal deaths were recorded to be 14 times more frequent than in the developed countries.

The WHO recommended a rise in ANC visits from four to eight fundamental visits. This is to ensure a continuation of care in pregnancy, labour, delivery, and the postpartum period. The preceding four-visit model (focused antenatal care) that was substituted was adopted by the WHO in 2002, and had been in use since then until it was replaced by the eight-visit model.

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One of the major public health problems is malaria in pregnancy because of its serious implications on the mother and baby if it is not treated early or possibly prevented. Women in malaria prone regions have increased immunity against the infection but it is usually compromised during pregnancy (usually with women being pregnant for the first time hence, predisposing them to the infection (WHO, 2015). Elevated risks to the infection can be caused by levels of immunity, physiological changes in pregnancy and hormones (Takem & D'Alessandro 2013). The decreased immunity can sometimes cause a risk of serious disease and with repeated episodes (WHO, 2011).

Amid pregnant women, malaria contributes to 17.6%% of OPD cases, 13.7% of admission and 3.4% of maternal mortality (NMCP,2015). Intermittent preventive treatment of malaria using Sulphadoxine Pyrimethamine (SP) is one of the approaches for averting malaria in among expectant mothers and their unborn babies in Ghana (Malaria facts sheet, 2015). The administration of this drug consists of a complete SP prophylaxis to pregnant women throughout each antenatal care (ANC) visit. These visits must be four weeks apart and the drug is administered regardless whether the woman has a known case of the malaria infection or not (WHO, IPT 2016).

The World Health Organization in 2012 updated its recommendation on the use of (Intermittent Preventive Treatment-Sulphadoxine Pyrimethamine (IPTp-SP) and now necessitates that SP is given to all pregnant women every four weeks till delivery. This policy was implemented in Ghana in 2014 by the National Malaria Control Program (PMI, 2017). With this policy, SP administration is generally commenced at the 16 weeks gestational stage and continues every four weeks, and the number of times a woman visits the clinic for care is a major contributing factor for its uptake Although a lot of pregnant women now attend ANC, it is still generally not patronized in most of our communities. More than 80% of pregnant women had at least one contact with a trained professional in pregnancy in 2016, a report by the Ghana health service family health division

though the country in general records decline in antennal coverage(GHS,2016). This means that several pregnant women lacked access to the SP drug. Aside this gap, several reasons such as the absence of skilled professionals at the antenatal clinics, the distance to health communities and the unethical attitude of staff also affect the administration of the IPTp-SP.SP in some instances, not given as a directly observed therapy. IPT3 usage was also predominantly low some years back throughout the country. Studies conducted in the Tamale Metropolis indicated an IPT3 coverage rate of 46% in 2011 in the metropolis. (Doku, Zankawah, Adu-Gyamfi, 2016). Information about the Ashanti region which is also in the middle zone reported an even lower IPT3 coverage rate of 37% (Tutu, Lawson, Brown, 2011). There southern sector also recorded a lower coverage of 26% (Hommerich et al 2012). In the most recent study Boateng and colleagues report a worryingly low IPT5 coverage of 14.5% in a relatively busy clinic in Accra (Boateng & Anto, 2017) though this is likely to be clarified by the fact that the assessment was conducted only a year after the policy was introduced in Ghana.

The purpose of this study is to analyse the uptake of the optimal 5-dose WHO SP policy within the context of the introduction of the new WHO 8-visit ANC target policy. The study is restricted to the Mamprobi Polyclinic within the capital city of Ghana, Greater Accra. Both primary and secondary data will be used in this study.

1.1 Problem Statement

Susceptibility to malaria is very high for all pregnant women living in endemic countries and therefore stringent actions need to be put in place to help reduce the rate of malaria infection in pregnancy as well as its related complications. One such proven intervention recommended by the WHO is the Intermittent Preventive Treatment in pregnancy using Sulphadoxine Pyrimethamine (IPTp-SP). In Malawi, Zambia and Kenya, observations revealed a rise in birth weight and a

reduction in maternal anaemia with increasing number of doses of SP (W. Evidence, 2012). Ghana set a target of 80% of pregnant women to be put on Intermittent Preventive treatment by 2015(Boateng,2018), and thus also implemented the new 8-visit ANC target set by the WHO. This intervention could increase the uptake of SP if measures of compliance amongst mothers are adhered to.

However, according to the GHS 2016 report on ANC coverage, there has been a decline in the total attendance by pregnant women hence, affects the administration of SP since it is given as a directly observed therapy (DOT) per each visit and usually one month apart till delivery. Indeed, a recent report on a study conducted in one of the busy clinics in Accra suggested that only 3.9% of antenatal care attendees were able to complete the newly introduced 8-visit target (Boateng & Anto, 2017).In addition, since the new policy on IPT optimal coverage was introduced in 2014 in Ghana, only one study recorded d

54ata on uptake and challenges during the embedding phase of this new policy a year after its implementation and this data suggested that only 14.5% met the optimal 5 doses of IPT(Boateng & Anto, 2017). Since this initial evaluation which was almost soon after the implementation of the policy, no proper evaluation of this policy has been reported as far as I am aware. Indeed, though the authors reported this as 'baseline' data, this may not be appropriate as the data was collected a year after its implementation (embedding phase data seems more appropriate).

Given the importance of this IPT intervention, and the challenges the previous policy recorded, it's imperative that a review of this new policy is conducted and four years post its implementation appears an appropriate time frame for an assessment of impact and challenges. A cross-sectional analytical design offers a quick and cheaper approach to collecting and analysing these sorts of data.

1.2 Justification of the Study

The question posed by this study is of significant public health importance and interventions which are yet to be evaluated; this evaluation will help inform government and WHO policy in terms of introducing and deploying new interventions will also help immensely in the strengthening of health education of the general public on issues of malaria among pregnant women. Training and retraining of staff on management and health education on the various methods of malaria prevention in pregnant women so as to promote compliance on the uptake of SP among pregnant women. This will help achieve a significant reduction in maternal and infant morbidity and mortality.

1.3 Research Questions

Does increasing the minimum required target for ANC visits to 8 correspond to meeting the optimal 5 SP doses?

What factors are associated with achieving the optimal 5 SP doses target?

1.4 Aims/objectives

To determine the uptake of the optimal 5-dose WHO SP policy within the context of the introduction of the WHO 8-visit ANC target policy. The specific objectives are presented below.

1.4.1 Primary objective

To establish the level of uptake of SP among pregnant women in over a four year period following the introduction of the WHO 8-visit ANC target in Mamprobi Polyclinic in Ghana.

1.4.2 Secondary objectives

To determine the association between the number of ANC visits and SP intake.

To assess factors associated with uptake of the new 5-dose SP policy i.e. their socio-economic status, sociodemographic characteristics, health worker factor, health systems (stock levels).

1.5 Hypothesis

1.5.1 Primary

The uptake of optimal 5 SP doses would increase by 2.5 fold since the introduction of the policy four years ago.

1.5.2 Secondary

Pregnant women who start antenatal in the first trimester are able to reach the targeted 5 doses of SP throughout their pregnancy, compared to those who start later than the first trimester.

Pregnant women who make monthly visits are able to reach the optimal target of 5 doses, compared to those who do not make monthly visits.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of the Study

Malaria in pregnancy is one the major causes of maternal and foetal complications in pregnancy. In an attempt to decrease these risks, the WHO recommended a set of interventions comprising of IPT-SP, ITN and management of cases effectively amongst pregnant women. Intermittent screening and treatment (IST) which involves screening pregnant women for malaria infection using a rapid diagnostic test during ANC visits has been found to be as effective as the SP-IPT. Before the introduction of SP, prevention of malaria in pregnancy was primarily done through weekly medications with chloroquine or sulfadoxine/pyrimethamine. This was poorly complied with generally and parasites also developed resistance to chloroquine over time. IPTpp-SP has henceforth, been endorsed for all pregnant women in malaria prone settlements (GHS,2015). Sulfadoxine/pyrimethamine (SP) is given during each ANC visits every 4 weeks and this commences from 16 weeks gestation. Following the plan, a minimum of five doses of SP can be given throughout the period of pregnancy. This, aided by frequent ANC visits will help minimize the frequency of malaria-caused pregnancy problems.

On 7th November 2016, the WHO released new strategies on access to ANC for pregnant women. This revision was necessitated by the persistently high maternal deaths globally, particularly in developing countries where deaths are still 14 times higher than in the developed regions.

The WHO recommended increasing antenatal care visits from the current four to eight fundamental visits, to ensure a continuum of care in pregnancy, labour, delivery, and the postpartum period. The four-visit model (focused antenatal care) being substituted was adopted by WHO in 2002, and

has remained in use ever since. providing goal-oriented care aimed at making it easier to notice and manage of complications during pregnancy.

However, growing evidence shows that an increased number of ANC visits by women and adolescent girls with the health system is related to a reduced likelihood of stillbirths. At least eight visits for antenatal care can decrease mortality in pregnancy and thereafter by 8 per 1000 births as opposed to a least of four visits.

With the new guidelines, the first visit is supposed to start at 12 weeks, with the subsequent visits at week 20, 24, 28, 32, 36, 38 and 40 weeks of gestation. The new guidelines are also responsible for details on the care that should be provided during each of the eight visits. After the recommendation by the World Health Organization in 2000, Ghana accepted a new malaria treatment policy in 2004. Ghana then reviewed the use of a single remedy to combination therapy with Artemisinine-Based Combination Therapy. There was therefore a change from the weekly use of Chloroquine to Sulphadoxine-Pyrimethamine (SP) as IPT for malaria prevention during pregnancy. This was as a result of increased level of resistance to Chloroquine and with a lower compliance rate of about 11.6% (Ministry of Health, 2014). The new policy of IPTp-SP was started in 20 selected districts and achieved a nationwide coverage by 2005. The policy was revised in 2007 and current policy formulated in 2012 (Ministry of Health, 2014).

2.2 Historical Background of Malaria

China was the arguably the first country to record the first malaria-like symptoms as early as 2700 BC. However, the vector for the disease was not identified until 1880 when Charles Louis Alphonse Laveran identified mosquitos as a vector for malaria (CDC, 2017).

Protozoan parasites causes malaria and they belong to the genus Plasmodium which is spread by female Anopheles mosquitoes (WHO, 2016).

The actions that took place in the blood were discovered by William Callum in 1897and his object of study was the bird. Ronald Ross further revealed the entire transmission cycle concerning the mosquitoes and the bird under study (Lambert, 2013). Henry Shortt and Cyril Garnham in 1948 discovered that malaria parasites progress in the liver before entering the blood stream. Every ensuing finding has from the time been centred on studies on non-human malaria parasites and associated organisms(CDC,2015).

2.3 Conceptual Framework

SP is an antifolate combination drug which acts with systematic and synergistic mechanism to halt the action of two essential enzymes responsible for the synthesis of folates. The pyrimethamine stops the action of dihydrofolate reductase (DHFR), whils the sulfadoxine prevents the action of dihydopteroate synthase (DHPS). (ASHSP, 2012).

Conceptual framework on factors affecting the uptake of IPT-SP

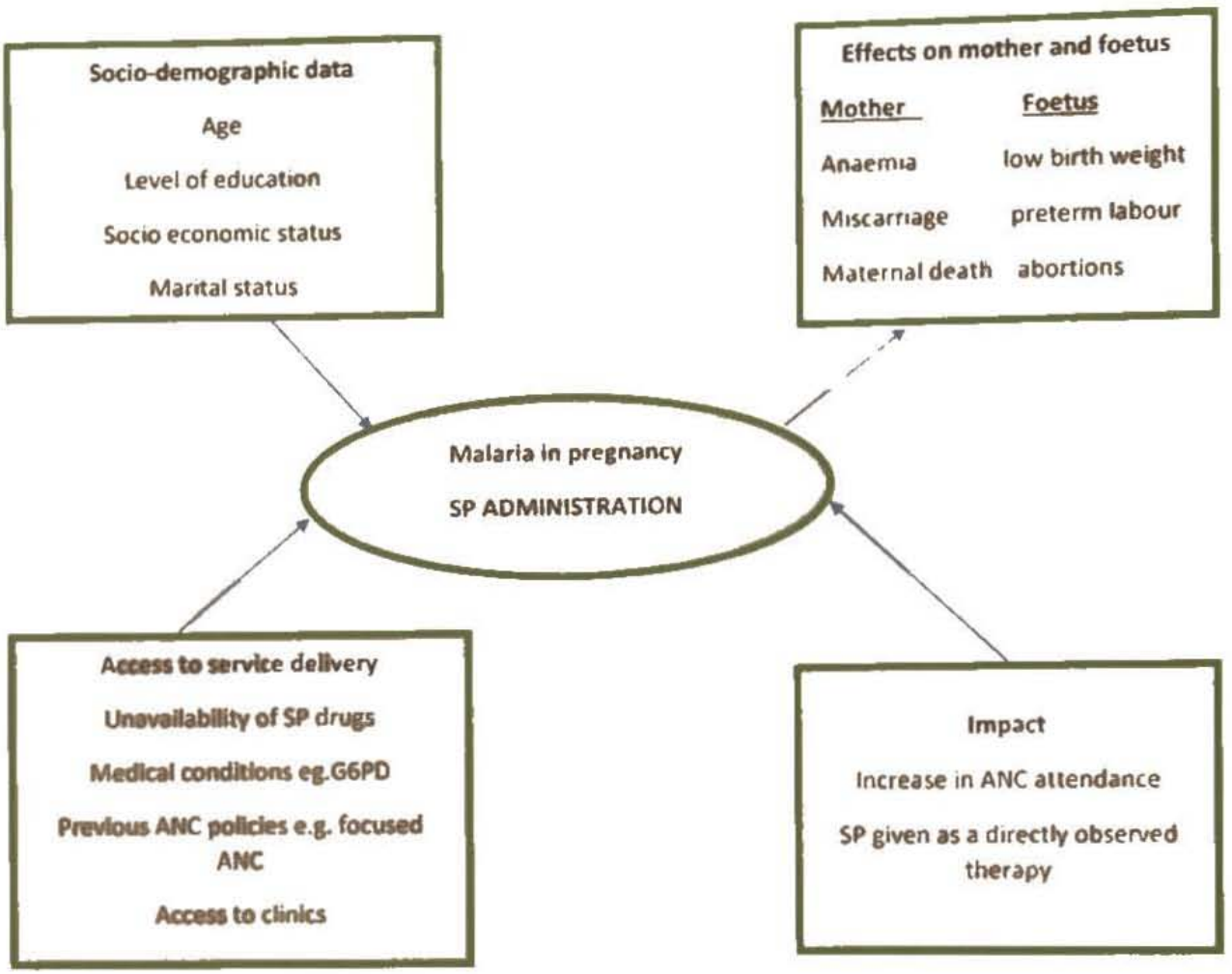

Figure 1 Conceptual framework. Adapted from Hajira 2015.

2.3.1 Narrative of the Theoretical Framework

The framework looked at various factors that could affect the uptake of IPT-SP.

Socio demographic factors such as age, level of education, socio economics status and marital status can affect knowledge on the importance of taking SP at each one-month visit and this can

affect SP administration especially when mothers are not well educated on its importance and hence, put mothers at risk of malaria in pregnancy.

Lack of IPT-SP in pregnancy can predispose a mother to malaria infection and produce effects on the mother such as anaemia since the malarial parasites feeds on the human red blood cells. Other conditions of the mother such as miscarriages and even death can also occur. On the other hand, effects caused by malaria in pregnancy on the foetus can be low birth weight, abortion and preterm labour/delivery.

With access to service delivery, getting pregnant women to take this could be influenced by many factors such as lack of SP, unskilled health personnel, lack of access to the health facility, conditions such as G6PD deficiency which produces life threatening adverse effects with SP, can affect the administration of SP and previous health policies such as the focused ANC which emphasizes at most four visits, can affect SP administration and predispose a pregnant woman to malaria.

Finally, increase in ANC attendance which is at least eight visits or contacts can improve the monthly administration of SP and have a general impact on the reduction of malaria in pregnancy. This is because SP is given one month apart and with the increase in the number of visits per the new policy, an increase in SP uptake cannot be over emphasized.

2.4 Mode of Transmission of Malaria Parasite

People get infected with malaria through the bite female mosquitoes from the *Anopheles genus*. When a female Anopheles mosquito with the infection bites/ feeds on humans, it injects saliva that contains sporozoites into the human bloodstream. The sporozoites move to the liver and attack the liver cells. They leave the liver cells and re-enter the circulation, starting a new cycle of destruction

of red blood cells. They attack the red blood cells and breakdown the cells causing anaemia. During this period, a person starts showing symptoms of malaria (malaria.com, 2016).

Occasionally, a person may get malaria through contaminated blood through blood transfusion. Malaria also may be transmitted from a mother to her foetus before or during delivery ("congenital" malaria). Since the malaria parasite is found in red blood cells, malaria can also be transmitted through organ transplant, or the shared use of needles or syringes contaminated with blood (CDC, 2016).

2.5 Signs and symptoms

The effects and symptoms of malaria in pregnancy may change due to the malaria transmission intensity in the particular ecology of occurrence, and the person's level of acquired immunity. The commonest symptoms of malaria in pregnancy comprises fever, chills, bitter taste in the mouth, headache, fatigue, dark coloured urine with cases of complicated malaria etc. (WHO, 2016). According to National Safe Motherhood Protocol (2010), symptoms of complicated malaria could include persistent vomiting, poor urine output, persistent rise in temperature, severe anaemia, convulsion, and foetal demise,

2.6 Factors Influencing the Susceptibility of Pregnant Woman to Malaria

Movement to a malaria endemic area makes the pregnant woman prone to malaria.

Sickle cell patient: pregnant women with low immunity are prone to malaria

HIV patient: An HIV patient will generally have low immunity and thus be more susceptible to malaria.

Women pregnant either for the 1st and 2nd time lack special antibodies and thus are more prone to getting malaria

2.7 Effects of Malaria in Pregnancy

2.7.1 Effects on the Mother

Usually, immunity developed after several years as the human's cytoadherence molecules gets depleted. Anytime a woman becomes pregnant, the placenta develops new spaces for cytoadherence. Even when the woman had built up previous immunity in her endothelial cells, the placental lumen serves as a new site for parasite development acquired immune effects seen in the differences of severity of malarial infection depending if the woman is primigravida, or multigravida, because of the idea of "pregnancy immunity." (CDC Facts on malaria 2012).

Mother loses previously acquired immunity once pregnant, during pregnancy to able to regain some of that immunity.

The explanation to this is that immunity is built up after several years as the human's cytoadherence molecules are depleted, and the parasites can no longer cloister together and live. However, when women become pregnant, the placenta develops as a new space for cytoadherence for the parasite because there are new receptors (Malaria journal, 2014). Even if the woman had built up previous immunity in her endothelial cells, the placental lumen provides a new stage for the parasite to develop. As the mother loses her previously acquired immunity once she becomes pregnant, during pregnancy she is able to regain some of that immunity which counteracts infection in subsequent pregnancies (CDC, 2018). These acquired immune effects are also seen in the differences of severity of malarial infection depending if the woman is primigravida, or multigravida, because of the idea of pregnancy immunity. Primigravidae are more susceptible to malarial infection and have a greater density of parasitaemia at delivery than multigravidae(Around, 2015).

2.7.2 Effect on the Foetus

Malaria infection in pregnancy accounts for about 5-12% of all babies with low weight at birth and 35% of children with avoidable low birth weight at birth globally every year. Low birth weight can cause premature births and intrauterine growth restriction, as well as being a risk factor for perinatal death and related infant morbidity and mortality In fact, 75,000-200,000 infant deaths worldwide each year are associated with malarial infection during pregnancy (WHO Malaria facts, 2015)

2.8 Prevention of Malaria

2.8.1 Intermittent Preventive Treatment (IPT)

Intermittent Preventive Treatment (IPTp) involves the use of medications with its full therapeutic doses at specific times in pregnancy whether or not the person has signs and symptoms (Learners Guide, 2009). IPTp is centred on the notion that every pregnant woman in a malaria endemic region has plasmodium in the bloodstream and/or placenta, even if she does not exhibit malaria symptoms (A Valley, 2007). The main aim of IPTp programme is to avoid malaria and its related dangerous effect on the mother and baby . Sulphadoxine pyrimethamine is the first drug of choice for malaria prevention in pregnancy.

2.8.2 Intermittent Preventive Treatment (IPT) of Malaria in Pregnancy using sulphadoxine pyrimethamine (SP).

SP is the drug of choice for malaria prevention in pregnancy and it is recommended as early as possible in the second trimester at a regular interval of at least one month (WHO, 2012).

Administration of SP is recommended very early in the second trimester at a regular interval of at least one month (World Health Organization, 2012). SP is not expensive and free in some cases

and its administration at least two times in pregnancy helps in the reduction of maternal anaemia (Haemoglobin less than 8g/dl) by 39%, reduce placental malaria by 56% and reduce low birth weight by 43% (WHO,2012).

2.8.3 IPT-SP coverage

Though 36 countries in Sub-Saharan Africa had by the year 2012 endorsed IPTp as one of the recommended guidelines for ANC, the usage still continued to be a challenge and also, a few countries had data on IPTp-SP coverage existing and this data which was provided to the WHO showed 64% of pregnant women received not more than one dose of IPT-SP in 2012. The data showed 23% receiving three doses (World Health Organization, 2013). In East Africa, Nyonyi (2012) reported that 90% of pregnant women in Dar Es Salaam Health facilities received at least one dose of IPTp-SP with 79.5% receiving the second dose. Less than a third of women received a full-course of IPTp- SP despite the high utilization of ANC (94.2%) in Uganda. Although IPTp-SP is easy to administer, missed opportunities were common in the study (Sangaré et al.2010).

In order to determine the coverage of IPT in Ghana, a study revealed that 62% of expectant mothers in Ghana who attend ANC clinic received IPTp1, 38.1% for IPTp2, and 36.3 % for IPTp3 (NMPC,2015). Data on SP from the Ghana Demographic and Health survey (GDHS, 2014) showed more than 58% of pregnant women took not more than one dose of SP as IPTp with about 44% taking two doses. The Ghana Multiple Indicator cluster Survey for 2011 reported that 97% of pregnant women in the Brong Ahafo Region attended ANC at least once with only about 79% and 62% taking IPT1 and IPT2 respectively (Ghana Statistical Service, 2011).

In 2010, Antwi reported that 95% coverage for IPT1 which declined to 77% for IPT2 and 44% for IPT3 respectively in a study in the Bosomtwe district of Ashanti. Thuis goes to prove that there is

more to be done in order to attain the 100% target for IPT2. Improvements of IPT2 and IPT3 coverage have however been made a priority for the Ghana National Malaria Control Programme.

2.8.4 Factors Influencing IPTp uptake.

Gestational age of mothers at ANC registration

Any delay in starting ANC will lessen the number of times a woman can receive IPT before term. Therefore, the number of SP doses to be taken is directly linked with the time a woman starts her ANC visits. A study by Exavery et al., (2014), found in their study that, timing of ANC initiation important in determining the extent of IPTp-SP uptake among pregnant women in Tanzania. They reported that, an optimal uptake of number of doses (two or more doses) of IPTp-SP was higher (46%) among pregnant women who started ANC in the first trimester of pregnancy and lower (36.5%) among those who started ANC in the third trimester. Anchang-Kimbi et al., (2014) reported a significantly higher percentage of women (62%) with first ANC in their last trimester receiving only IPT-SP 1 as opposed to other women that had their initial ANC visit in the first and second trimesters. Also, pregnant women who booked early at ANC were likely to receive the recommended 5 SP doses

2.8.5Knowledge of Pregnant Women about Intermittent Preventive Treatment and Malaria in Pregnancy

The ANC remains the best place and source of knowledge for pregnant women about IPTp where health workers are educate them. Knowledge about IPTp will help educate expectant mothers about the need to attend antenatal regularly to enable her receive SP, hence improve IPT intake.

One major determinant of use of IPT was found to be the knowledge about the prophylaxis. Hence, uptake of IPT can be significantly improved if backed with health education on the complications of malaria in pregnancy and benefits of taking IPT-SP (Amoran et al., 2012). In

According to Antwi (2010), there is an association between the knowledge of pregnant women about IPTp-SP and the number of doses received. It is probable that knowledge about the benefits of IPT-SP encourages pregnant women to make efforts to attend ANC and with that receive the required number of doses.

2.9 Access to ANC services

Access to antenatal care among pregnant women is crucial in the fight against maternal morbidity and mortality however, there is still a challenge of access and utilization due to a number of factors. Health education through visits to the clinic is also responsible for IPTp-SP uptake. Since IPT-SP is served as a directly observed therapy health workers at the ANC clinic it means access to IPT-SP can only be accessed on condition that the pregnant woman attends ANC. However are known barriers to utilization of ANC services and by extension IPT-SP under direct observation at the clinic.

For those with more than three ANC or the benefit of an early first SP dose on having a second dose is seen earlier in pregnancy as the number of visits increases. Similarly, receipt of partial IPTp-SP doses was reported to be higher among women who received ANC less than four times than that observed among women who had sought ANC at least four times during pregnancy (39.9% against 47.6%) (Exavery et al., 2014). The decreased IPTp coverage level of 13.7% and 7.3% for IPT 1 and 2 respectively, reported by the research may have resulted from the poor knowledge of staff on IPTp policy guidelines (Onoka et al., 2012. In East Africa, SP stock outs was reported in 92% of health facilities under the study and no services were provided on IPTp-

SP during stock outs (Nyonyi, 2012). Stock outs due to non-availability of funds by government to purchase the drug is another factor that has negative impact on IPT uptake (Antwi, 2010). During this period, the options that were used were either to hold on with the IPTp until stocks were replaced, refer the women to other facilities or ask them to buy the SP from the market. The 2008 PMI survey in Ghana showed that IPTp is offered in 94.1% of the facilities, however stock outs occurred in 27% of these facilities.

Practice of DOT In Uganda, the predominant factor in the use of SP during pregnancy was being offered IPTp in the clinic (Sangaré et al., 2010). But studies showed the poor practice of DOT in certain health facilities which affects IPTp-SP programme implementation Similarly, in the River state of Nigeria, a study reported that only 16.4% of those who took SP as IPTp did so under DOT (Tobin-West & Asuquo, 2013). Further in Nigeria, a study reported a poor practice of DOT in both private and public facilities where 64.7% of providers reported giving SP to women to swallow at home. This has been as a result of perceived effects of taking drugs without food. This poor practice of DOT resulted in the suboptimal uptake of SP in these facilities (Onoka et al., 2012). In Dar Es Salaam health facilities of East Africa, even though there was good uptake of IPTp (IPT1- 90% and IPT2- 87%), the practice of DOT was observed in only 56% of the facilities (Nyonyi, 2012). The poor practice of DOT in these facilities has proven to be a limiting factor in achieving the ultimate goal of the IPTp programme. It is not certain that those who are given SP to be swallowed actually do so especially without the supervision of a health staff. Contrary to these findings however, the practice of Directly Observed Therapy was also reported by Antwi (2010) in all ANCs in the Bosomtwe District with supervision of the IPTp program also taking place.

2.9.1 Contraindications

SP is should not to be taken under some circumstances and these include, planning to become pregnant, dietary allergies, history of asthma, severe allergies, kidney or liver problems, the blood disease porphyria or other blood problems, glucose-6-phosphate dehydrogenase (G-6-PD) deficiency, seizures, alcohol abuse, or depression and then diarrhoea, a stomach or intestinal infection, or a sore throat

2.9.2 Anti-Malaria Drug Policy for Ghana Ministry of Health for Intermittent Preventive Treatment (IPT) of Malaria during Pregnancy

In Ghana, Sulphadoxine–Pyrimethamine (SP) is the drug chosen for IPTp by World Health Organisation (WHO, 2016). IPTp-SP is to be administered in all malaria endemic areas in Africa. In October 2012, WHO recommended that this prophylaxis is to be given to all pregnant women at each scheduled ANC visit except in the first trimester.

SP is an anti-malarial drug which has proven to be effective in the prevention of malaria and its complications among pregnant women and baby. SP usage deceases placental malaria infection, low birth weight, decreased haemoglobin levels of mothers as proven by research. It has been part of ANC routines over the years. Research has shown that the preventive effectiveness of SP for IPTp continues even in regions where alterations linked to SP resistance are predominant in P. falciparum. SP is started at 16 weeks of gestation, every four weeks till delivery. SP is generally sage as shown by research with no life threatening effect t on the mother and baby.

Presently, Intermittent Preventive Treatment (IPT) is the most preferred method of preventing malaria in pregnancy aside ITNs. It involves the use of antimalarial medication administered at stated intervals of every four weeks after quickening (16 gestational weeks) to help reduce complications related to malaria in pregnancy with a dose of Sulphadoxine 500mg +

Pyrimethamine 25mg. IPT is served as part of a complete antenatal package with other medications such as dewormers and iron and folic acid supplements. It is a directly observed therapy (DOT) ie. Administered under the observation of a trained professional. All pregnant women must be given and insecticide treated nets (ITNs) throughout the pregnancy with the main aim of preventing malaria.

Indications for use of SulphadoxinePyrimethamine: Pregnant women are usually screened for G-6PD deficiencies and allergies to sulphonamides before the start of IPT-SP. Pregnant women with contraindications with Sulphadoxine Pyrimethamine are educated to sleep under ITNs with early report to the clinic when they have any sign or symptom of malaria. Proguanil can be given for non-immune women starting from the first trimester of pregnancy.

Non-immune persons include:

(a) People in non-epidemic countries for six months or more (b) People with suppressed immune system.

2.9.3 Use of Insecticide-Treated Nets (ITNs)

Insecticide-treated nets (ITNs) are mosquito nets treated with insecticides to kill or repel mosquitoes, avoid exposure to mosquitoes, kill or ward off other insects such as lice, ticks, bedbugs, and cockroaches. ITNs were developed in the 1980s for malaria prevention (Wikipedia 2015). Its effectiveness is two time that of the untreated nets with a greater than 70% protection compared the level of protection one has with the use of no net (CDC,2012). The nets are dip-treated with synthetic pyrethroid insecticide such as deltamethrin or permethrin which double the protection over a non-treated net by killing and repelling mosquitoes. For greater effectiveness,

ITNs should be re-treated with insecticide every six months. This process poses a significant logistical problem in rural areas.

ITN can reduce child mortality by 20%. The new technology of 'long lasting insecticidal nets' eliminates the need for re-treatment and keeps nets effective for up to 5 years. Newer, long-lasting insecticidal nets (LLINs) have now replaced ITNs in most countries.

2.9.4 Indoor Residual Spraying (IRS)

According to President's Malaria Initiative, Indoor residual spraying (IRS) is the spraying of walls and surfaces that are known to be infested by mosquitoes. IRS kills mosquitoes when they come in contact with treated surfaces, preventing disease transmission Vanhauwer et al, 2007 explained that malaria infected mosquitoes rest on nearby surface after feeding while digesting blood meal. These mosquitoes are killed before they can transmit malaria parasites to another person. For indoor residual spraying to be effective, the following conditions must be present; Most of the insects must feed and rest indoors, the insects are susceptible to the insect repellent being used and surfaces that can be sprayed.

In 2010, about 185 million people were provided with IRS globally; nearly half of these people were resident in Africa (President's Malaria Initiative, 2005)

2.9.5 Other methods

Sterile Insect Technique

The sterile insect technique is gradually developing as a potentially effective mosquito control method. Improvement towards transgenic, or genetically modified insects suggest that wild mosquito populations may be made malaria-resistant (D'Andrea,2013).

Vaccination

A full effective vaccine for malaria has not yet been established. The first promising studies showing the potential for a malaria vaccine were carried out in 1967.

Case management

Creation of awareness at all levels about preventive methods of malaria during pregnancy.

Equipping health facilities and their staff properly trained to provide treatment according to national guideline.

2.9.6 The Role of Midwife and ANC Attendance in Malaria in Pregnancy

The role of midwives is essential to help ensure that women and their babies have a range of care during pregnancy and child birth. Midwives play a really critical role which includes providing health education on the effects of malaria asking for the signs and symptoms of malaria, performing rapid diagnostic tests to rule out malaria with other laboratory confirmatory test, treating malaria cases and referral of complicated cases. They are also responsible for giving of malaria prophylaxis (SP) to pregnant women in pregnancy.

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CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted at the post-natal unit of the Mamprobi polyclinic located in the Accra metropolitan district of the Greater Accra Region. It is located at the south of Latebiokorshie, northeast of old Dansoman and north of Chorkor. The district shares boundary with Odododiodio constituency to the East, Weija to the west, Gulf of Guinea to the South and Ablekuma Central and North constituencies. The Polyclinic serves a population of about 200,000 (GHS, 2010) and about eight communities within the district and also provides care for about 65% of pregnant women in the Ablekuma Sub-Metropolis and its highly patronised. It is a Government facility established in 1992 with now a bed capacity of 53 and operating as a polyclinic under the management of Ghana Health Service, Ministry of Health. A total of 24,254 pregnant women were recorded at the antenatal clinic and 4,216 deliveries were attended to in the year 2011(Annual report of Ablekuma sub-metro).

3.2 Study Population

Post-natal mothers at the Mamprobi polyclinic within the Accra metropolitan district

3.3 Study Design

A descriptive cross sectional study design was used for the research. Women who have delivered and within the 12 weeks postnatal period were eligible for the study. Antenatal care books for mothers were reviewed and data on the number of visits or contacts and the number of SP doses taken.

3.4 Sample Size estimation

The following assumptions informed the sample size estimation. The goal was to estimate contact coverage (uptake of SP) following the introduction of an intervention over a four-year period. With reference to Boateng's study that reported a contact coverage of IPT5 of 14.5%, this was assumed as the 'baseline' coverage given the study was conducted shortly after the policy was introduced. In line with the primary hypothesis, a 2-fold increase in contact coverage is expected. **With these assumptions and using STATA formula:**

Power two proportions 0.15 0.30, test (chi2) power (0.80) alpha (0.05)

A total sample size of 242 would be sufficient to detect a 2-fold increase in contact coverage with 80% power and 5% significance for the primary hypothesis. With this sample size, a 15% refusal rate was used based on similar previous studies that reported similar refusal rates thus, was aimed to approach and interview approximately 280 mothers who have recently delivered within 12 weeks.

3.5 Sampling Method

Sample selected from a population helps data collection within the parameters of interest and these sample statistics are used to estimate the population parameter (Shlomo, et al. 2013).

Consecutive sampling method was used for the study. All postnatal mothers present at the clinic from birth to 12 weeks were involved in the study except for those who fall within the exclusion criteria i.e. Mothers with babies older than 12 weeks, mothers who did not attend antenatal clinic during their time of pregnancy, mothers with G6PD deficiency who are not required to take SP and mothers who recieved cotrimoxazole prophylaxis throughout pregnancy. Their ANC cards

were reviewed to rule out the exclusion and the first eligible participant selected. Participants who refused were replaced with the next participant until the required sample size was achieved.

3.6 Variables

3.6.1 Dependent variables

IPT-SP uptake (≥5 (optimal)/<5 (sub-optimal))

3.6.2 Independent variables

ANC visit timing (trimester at first visit to ANC), ANC visit frequency (monthly/not-monthly), number of ANC visits.

3.6.3 Potential confounders

Age, educational level, marital status, religion, parity.

3.7.1 Inclusion Criteria

Postnatal mothers within 12 weeks of delivery, at 18 years and above

3.7.2 Exclusion criteria

Mothers who did not attend antenatal clinic during their time of pregnancy are excluded

Mothers with G6PD deficiency who are not required to take SP are excluded from the study

Mothers receiving cotrimoxazole prophylaxis throughout pregnancy are excluded.

3.7 Ethical Consideration

Approval was sought from all the relevant authorities ie. Ghana Health Service, University of Ghana before the study was conducted in the clinic.

Provision of Information and consent for Participants

Prior consent was sought from every participant. A copy of the information sheet and consent form was given to participants after it had been signed.

Potential risk and Discomfort

Participants were told that the research does not come with any physical risk to the participant.

Possible Benefits

Participants were adequately informed that the study will help them gain knowledge on the benefits and the importance of the IPT-SP program at the hospital to help improve knowledge and adherence for your next pregnancy. Also, findings from this study will be shared with hospital authority which may help inform policy that improves the IPT-SP program along with the new WHO antennal policy. In terms of costs to participants, participants were told that the research does not come at any monetary cost to them. Furthermore, it was made clear to participants that they will not be compensated financially or in kind.

Confidentiality

Participants were assured of confidentiality. Informed consent was obtained for this exercise after fully explaining the research topic and its purpose to participants. The participants were also assured about the protection of their individual identities.

Personal information that will lead to identification of participants were not included in the questionnaire. The filled-out questionnaire did not bear names of participants so participants could not be identified. Participant information was kept on a computer with a secured password. Filled questionnaires were kept securedly, with access to only the principal investigator.

Voluntary Participation and Right to Leave the Research

Participation in the research was voluntary. Refusal to participate involved no penalty. Participants were given the chance to decide to discontinue or withdraw from the study. Participants were assured of not waiving any legal claims, rights or remedies because of their non-participation in this research study.

Outcome and Feedback to Participants

Given the largely retrospective nature of the study, there was no feedback to participants after study.

Funding Information

The principal investigator solely funded this study.

Conflict of interest

The principal investigator and the supervisor declared no conflict of interest.

3.8 Limitations of the Study

This study potentially faced some challenges which could affect the outcome. There were issues of time constraints. I didn't have the laxity of time to include every post-natal mother with a child less than twelve weeks hence the sample size. This is explained by the limited nature of timelines for the study. I also anticipated and encountered the unwillingness and uncooperative disposition of some the potential respondents.

Additionally, this study used only information from the respondents within the sample population.

According to Cooper and Schindler, (2003), an inclusive and participative environment within which the research can be conducted is vital. This will mean that once the dynamics are different in another environment, the findings of this study will not apply.

3.9 Validity and Reliability

The questionnaires were carefully designed in such a way as to ensure they produced valid results that can be relied upon. The questionnaires were tested at Dansoman polyclinic among post natal mothers who were up to 12 weeks of delivery. Modifications were made where necessary to ensure they meet these standards.

3.10 Quality control

To expedite data collection, 4 research assistants were employed and trained to help in the data collection. The principal investigator supervised the process and ensured adequate translation into other dialects to enable participants who could not read English to be able to answer the questionnaire and also with the entry of the data collected to ensure no information was lost.

3.11 Data presentation and analysis

Data collected was entered into Epi Data Software version 3.1 and later exported to Stata/IC 15.0 for data cleaning and analysis. In order to ensure data quality and accuracy, the data was entered twice into Epi Data Software 3.1. Simple descriptive statistics such as mean, frequency, standard deviation, graphs and percentages were used to report on socio demographic characteristics and level of ANC visits among postnatal women in Mamprobi. A Chi square test was used to determine the association between the number of ANC visits, some socio-demographic characteristics such as age, educational level, marital status, ethnicity and SP intake. Logistic regressions (Univariate and Multivariate logistic regressions) was used to control for confounders in determining factors associated with uptake of the new 5-dose SP policy. A p-value of <0.05 was considered statistically significant.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents results of analysis based on data collected from the field. The results was presented in four major sections. The first section shows socio-demographic characteristics of postnatal attendees. Section two presents graphs and tables of proportion of postnatal attendees making less than and above four ANC contacts, the number of SP received by postnatal attendees and association between the number of ANC visits and SP intake. The third section presents the level of uptake of SP within the scope of two new potentially complementary WHO policies, thus eight (8) ANC visits target and 5 doses SP. The last section presents binary logistic regression assessing factors associated with uptake of the new 5-dose SP policy as well as health worker factor and health systems factors responsible of the uptake of the new SP policy.

4.2 Background characteristics of postnatal attendees

Table 4.1 present background characteristics of postnatal attendees. The mean age of postnatal attendees was 29.86 years ±5.24. Half of the postnatal attendees 143 (50.3%) surveyed were between the ages of 20-29 years whiles 9 representing 3.2% each were less than 20 years and between age group 40-49 years. Less than half 123 (43.3%) were between age group 20-39. At the time of the study, majority 262 (92.3%) of the postnatal attendees were married. Only 22 (7.7%) were single. Most of the postnatal attendees 220 (77.5%) were Christians. Only 64 (22.5%) were Muslims A little above half 145 (51.1%) of the postnatal attendees attained JHS level of education, 73 (25.7%) had SHS level of education and 21 (7.4%) had tertiary level of education. Approximately 15.9% had no formal education. Approximately 52% 51.7%) of the participants

had their first ANC visit when they were in their second 105 (37.0%) in their 1st trimester and 32 (11.3%) in their 3rd trimester. According to the postnatal attendees, 215 (75.7%) rarely experience malaria infection whiles 13 (4.6%) frequently experience malaria infection after birth. Approximately 75.7% of the postnatal attendees experienced severe malaria complications. The major malaria prevention method used by the participants during pregnancy was LLIN 90 (31.6%), Spray 67 (23.6%), and Coil 74 (26.1). Only 28 (9.9%) never used any malaria prevention method. Out of the 284 postnatal attendees, a little above half reported current pregnancy to be the second whiles 78 (27.5%) reported current pregnancy to be their third. Less than half 130 (45.8%) received optimal dose of 5 SP, 119 (41.9%) received 5 doses, 32 (11.3%) received 3 doses while 3 (1.1) received 2 doses. Out of all the participants who received SP, majority 278 (97.8%) received SP under Direct Observed Therapy.

Table 4.1 Background characteristics of postnatal attendees

Variable	Frequency N=[284]	Percentage (%)
Age		
>20	9	3.2
20-29	143	50.3
30-39	123	43.3
40-49	9	3.2
Mean(SD)	29.86 (5.24)	
Marital status		
Married	262	92.3
Single	22	7.7
Educational level		
No formal education	45	15.9
JHS	145	51.0
SHS	73	25.7
Tertiary	21	7.4
Religion		
Christian	220	77.5
Muslim	64	22.5
Traditional		
First ANC Contact		
1st trimester	105	37.0
2nd trimester	147	51.7
3rd trimester	32	11.3

Variable	Frequency N=[284]	Percentage (%)
Frequency of malaria infection		
Frequently	13	4.6
Not often	56	19.7
Rarely	215	75.7
Suffered severe malaria before complications		
No	198	69.7
Yes	86	30.3
Number of Pregnancies		
1	37	13.0
2	150	52.8
3	78	27.5
4	15	5.3
≥5	4	1.4
Malaria prevention methods		
No	28	9.9
LLIN	90	31.6
Repellent	25	8.8
Spray	67	23.6
Coil	74	26.1
Number of SP doses taken during pregnancy		
2	3	1.1
3	32	11.2
4	119	41.9
5	130	45.8
Took SP under DOT		

Not directly observed	6	2.1
Directly observed	278	97.9

4.3 Proportion of SP intake based on the new WHO policy of 5 dose

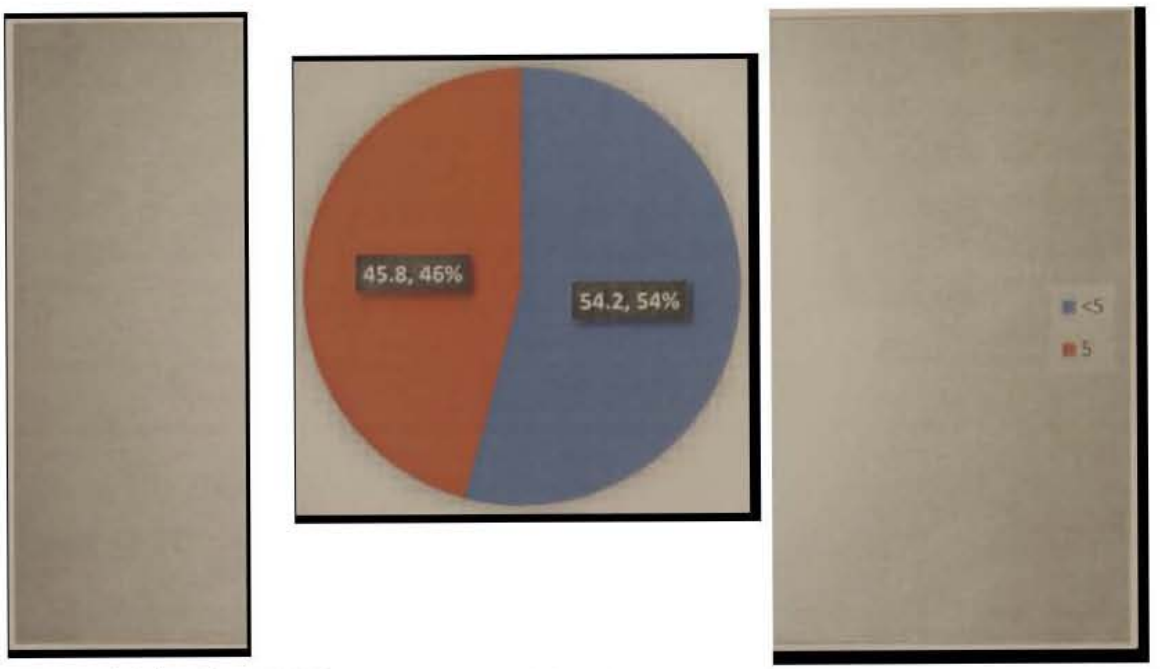

Figure 4.3 Intake of SP dose among participants

Figure 4.3 depicts proportion of SP intake among postnatal attendees. Out of the 284 postnatal attendees surveyed, less than half (45/284) representing 45.8% received the optimal 5 doses of SP in their previous pregnancy.

4.4 Level of SP uptake stratified by ANC visit among postnatal attendees

Figure 4.4 represents proportion of SP doses made at the time of the survey based on the new WHO 8 contacts of ANC. Out of the number of participants who made less than 8 visits, 30.3% %

received 5 doses of SP. Among the participants who made 8 and more visits, 69.7% received 5 doses of SP.

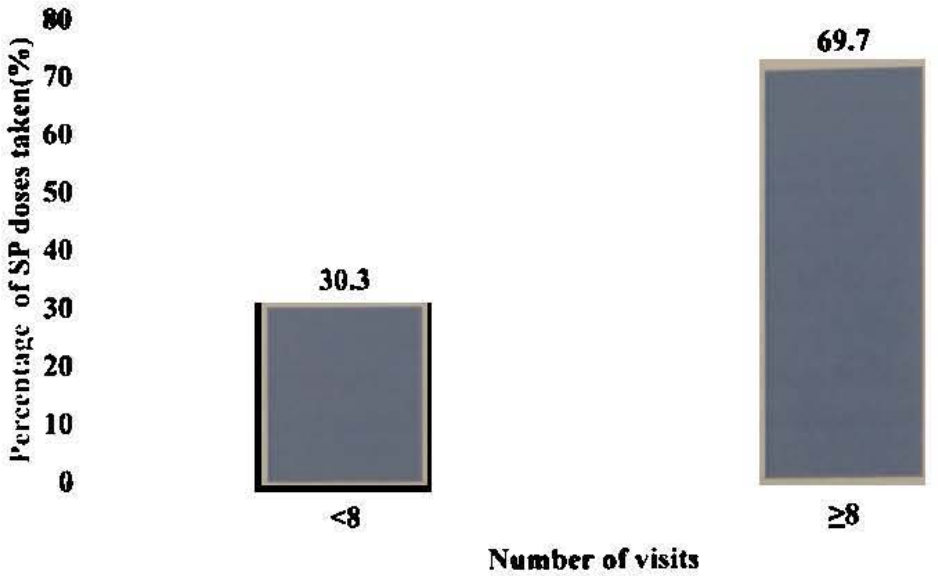

Figure 4.4 SP intake and ANC attendance

4.5 Relationship between the number of ANC visits and SP intake

There is a significant relationship between number of ANC (χ^2 =3.83, p= 0.005, α=0.05), number of pregnancies (χ^2 =2.301 , p=0.041, α=0.05) and the number of SP intake. There was however no significant relationship between age, marital status, religion, educational level, malaria prevention methods, frequency of malaria infection, previous malaria complications and uptake of SP. As shown in Table 4.5 below.

Table 4.4 Relationship between background characteristics and uptake of SP dose

Variable	Number of SP Dose		Chi-square (p-value)
	Less than five N=[154]	Five N=[130]	
Age			
>20	5 (3.3)	4 (3.1)	
20-29	74 (48.0)	69 (53.1)	
30-39	70 (45.5)	53 (40.8)	
40-49	5 (3.2)	4 (3.1)	0.723 (0.868)
Marital status			
Married	143 (92.9)	119 (91.5)	
Single	11 (7.1)	11 (8.5)	0.171 (0.679)
Educational level			
No formal education	24 (15.6)	21 (16.2)	
JHS	76 (49.5)	69 (53.0)	
SHS	41 (26.6)	32 (24.6)	
Tertiary	13 (8.4)	8 (6.2)	0.815 (0.846)
Religion			
Christian	117 (76.0)	103 (79.2)	
Muslim	37 (24.0)	27 (10.8)	0.428 (0.513)
Traditional			
First Contact /visit			
1st trimester	58 (37.7)	46 (35.4)	
2nd trimester	80 (52.0)	66 (50.8)	
3rd trimester	16 (10.3)	18 (13.8)	0.822 (0.663)
Frequency of malaria infection			

Frequently	8 (5.2)	5 (3.9)	
Not often	22 (14.3)	34 (26.2)	
Rarely	124 (80.5)	91 (70.0)	6.346 (0.042)
Previously suffered severe malaria complications			
No	100 (64.9)	98 (75.4)	
Yes	54 (35.1)	32 (24.6)	3.645 (0.056)
Number of pregnancies			
1	24 (15.6)	13 (10.0)	
2	78 (50.7)	72 (55.4)	
3	41 (26.6)	37 (28.5)	
4	9 (5.8)	6 (4.6)	
≥5	2 (1.3)	2 (1.5)	2.301 (0.041)
Malaria prevention methods			
No	45 (29.2)	44 (34.1)	
LLIN	14 (9.1)	11 (8.5)	
Repellent	40 (26.0)	27 (20.9)	
Spray	42 (27.3)	32 (24.8)	
Coil	42 (27.3)	32 (24.8)	2.196 (0.700)
Total number of ANC contacts			
<8	68 (44.2)	40 (30.3)	
≥8	86 (55.8)	90 (69.7)	3.83 (0.005)

4.5 Factors associated with uptake of the new 5-dose SP policy

4.5.1 Unadjusted logistic regression

Participants with their second pregnancy were 1.70 times more likely to receive 5 dose of SP compared to women with their first pregnancy [COR= 1.70 (95% CI: 0.81-3.59); p=0.006]. Also,

participants with their 5th or more pregnancy were 0.23 less likely to receive 5 dose SP compared to those with their first pregnancy [COR=0.23 (95% CI: 0.25-14.7); p=0.001]. Participants making 8 and above ANC visits were 2.23 times more likely to receive 5 dose of SP compared to those making less than 8 ANC visits [COR=2.23 (95% CI: 1.11-1.33); p=0.017] (Table 4.5.1)

Table 4.5.1 Binary logistic regression of factors influencing the uptake of the new 5-dose SP policy

Variable	Unadjusted COR (95% CI) p-value
Age	
>20	
20-29	1.16 (0.30-4.51) 0.825
30-39	0.94 (0.24-3.69) 0.937
40-49	1.00 (0.155-6.42) 1.00
Marital status	
Married	
Single	1.20 (0.50-2.86) 0.679
Educational level	
No formal education	
JHS	1.03 (0.54-3.03) 0.914
SHS	0.89 (0.42-1.88) 0.764
Tertiary	0.70 (0.24-2.02) 0.514
Religion	
Christian	
Muslim	0.83 (0.47-1.45) 0.513
First ANC Contact	
1st trimester	
2nd trimester	1.04 (0.62-1.73) 0.879
3rd trimester	2.41 (0.65-3.08) 0.378

Frequency of malaria infection	
Frequently	
Not often	2.33 (1.23-4.45) 0.734
Rarely	2.47 (0.71-8.53) 0.152
Previously suffered severe malaria complications	
No	
Yes	0.60 (0.36-1.01) 0.057
Pregnancy	
1	
2	1.70 (0.81-3.59) 0.006
3	1.67 (0.74-3.73) 0.216
4	1.23 (0.35-4.22) 0.742
≥5	0.23 (0.25-14.67) 0.001
Malaria prevention methods	
No	
LLIN	0.84 (0.35-1.98) 0.703
Repellent	0.68 (0.23-3.01) 0.487
Spray	0.58 (0.24-1.43) 0.237
Coil	0.66 (0.27-1.58) 0.706
Total number of ANC contacts	
<8	
≥8	2.23 (1.11-1.33) 0.017

**COR= Crude Odds Ratio*

4.5.2 Adjusted logistic regression

After controlling for confounders in the unadjusted logistic regression, participants with their second pregnancy were 1.68 times more likely receive 5 dose of SP compared to women with their first pregnancy [AOR=1.68 (95% CI: 0.79-3.50); p=0.003]. However, those with their 5th more

pregnancy were 0.19 less likely to receive 5 dose of SP compared to participants with their first pregnancy [AOR=0.19 (95% CI: 0.11-15.34); p=0.011]. In addition participants making 8 ANC visits were 1.22 times more likely to receive 5 dose of SP compared to women making less than 8 visits[AOR=1.22 (95% CI: (0.45-1.12) p=0.008] (Table 4.5.2)

Table 4.5.2 Adjusted logistic regression

Variable	Adjusted AOR (95% CI) p-Value
Pregnancy	
1	
2	1.68 (0.79-3.50) 0.003
3	1.71 (0.75-3.85) 0.196
4	1.16 (0.33-4.01) 0.813
≥5	0.19 (0.11-15.34) 0.011
Total number of ANC contacts	
<8	
≥8	1.22 (0.45-1.12) 0.008

**AOR= Adjusted Odds Ratio*

4.6 Health facility factors influencing the uptake of SP among postnatal attendees

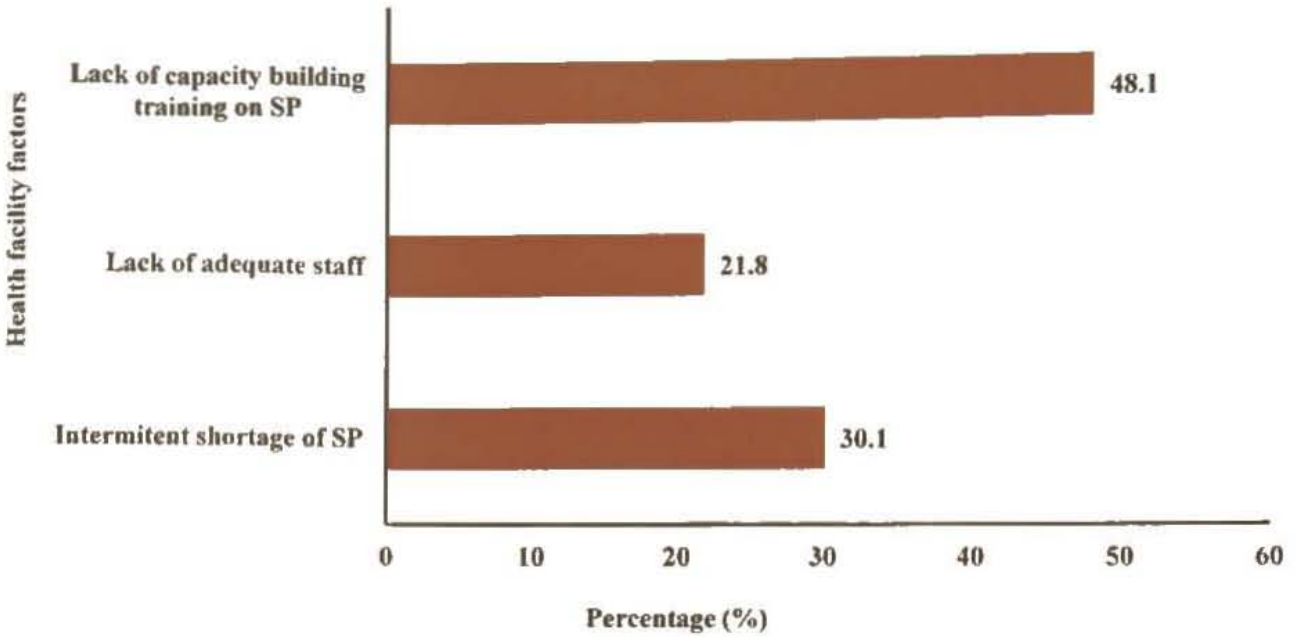

Figure 4.6 Health facility responsible for the uptake of SP-Health worker's perspective

Fifteen health workers were interviewed to determine health facility factors affecting the uptake of SP. Most (48.1%) mentioned lack of capacity building training on SP. Approximately 21.8% mentioned inadequate lack of adequate staff to be another reason influencing uptake of SP. Intermittent shortage of SP staff (30.1%) was also mentioned as a factor influencing the uptake of SP.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Uptake of SP within the scope of two new potentially complementary WHO policies

The burden of malaria is not only limited to children under five. Pregnant women form vulnerable population who are susceptible to malaria infection. Malaria in pregnancy is considered to be an entrenched global health challenge which could result in maternal anaemia, prematurity, stillbirths and low birth weight and it is a major determinant of neonatal death (Exavery et al., 2014). As a strategy to curb this burden and reduce the immense impact of malaria on this vulnerable population, SP was introduced and found to be an effective in reducing malaria episodes hence subsequently reducing maternal, neonatal and infant mortality (Hajira, 2015). Despite this intervention, malaria continues to be endemic in some communities in Ghana and pregnant women are mostly affected (Owusu-Boateng & Anto, 2017). This current study examined the impact of the new eight ANC contact policy on the uptake of SP as well as identified some factors responsible for the uptake of five SP dose among postnatal mothers.

The current study identified an increase in optimal five SP dose of 26.3% compared to what was reported by Owusu-Boateng & Anto a year after the introduction of the policy, which was 14.5%. Although there was an increase, it leaves more than half of the population of post-natal mothers with missed opportunity, especially women who received only dose of SP. This finding was contrary to what was reported by Ibrahim and colleagues in Sunyani, Ghana where about 71% of pregnant women received optimal (at least 3) of SP and in Tanzania where 43.6% of the women received optimal (at least two dose) of SP (Hajira et al., 2017; Exavery et al., 2014). Also a study carried by Amos Buh and colleagues revealed that, as high as 93.2% of the women received at least 3 dose of SP (Buh, Kota, Bishwajit, & Yaya, 2019). A major reason for the discrepancy in

the uptake of optimal SP in this study and other comparable studies could be attributed to the fact that, the current study focus on optimal 5 dose whiles previous study have optimal dose of at least 2 and 3 dose. However, similar pattern of results were observed in a latest study conducted in Ghana were it was observed that, as low as 14.5% of pregnant women received five dose of SP (Owusu-Boateng & Anto, 2017). Reasons for the low uptake of the 5 optimal SP dose in this study could be explained by the fact that, health workers in the Mamprobi polyclinic enumerated lack of capacity building training for SP for health workers, inadequate staff and the intermittent shortage of SP to be some health facility factors that hinders the optimal uptake of SP among this vulnerable population. On the part of the pregnant women, although not documented may be as a result of distance to health facility and perceived side effects of the drug. Lastly, most of the participants in this study who started their ANC in the latter part of the second trimester and third trimesters making it quite impossible to receive all five dose since they are taken four weeks apart.

Association between the number of ANC visits and SP intake

Prompt ANC visit among pregnant women is vital in the identification and early treatment of pregnancy related ailments, unfortunately, many women are not given such care particularly countries in Sub-Saharan Africa (Thogarapalli, Mkandawire, Kangmennaang, Luginaah, & Arku, 2016). Similarly, ANC attendance enable pregnant women to receive the care they need for safe delivery and SP adherence since it's a directly observed therapy, among other cares and this helps reduce malaria episode and burden (Ayubu & Kidima, 2017). The current study identified a significant association between the number of SP intake and number of ANC visits. Similar pattern was observed among pregnant women in Ghana where ANC visit was found to be associated with the uptake of optimal five dose of SP intake (Hajira et al., 2017). A study conducted by Buh and colleagues showed that, there was a positive association between ANC visits and adequate dose of

In addition, women making four visit and above were more likely to receive the optimal five dose of SP in this study. This was similar to what was reported by Owusu-Boateng & Anto in Ghana where women making four and above visits were more likely to receive the optimal dose of SP. Similarly, this pattern was observed in studies conducted by Amon Exavery and colleagues in Tanzania, Buh and colleagues in Sierra Leone and in Burkina Faso (Gies et al., 2008). Explainable reason for the observed pattern could be that, ANC serve as the medium responsible for the delivery of health intervention from the healthcare provider to postpartum or pregnant women. As a result, more visit to ANC increases the number of SP dose she would have received as compared to not visiting ANC clinic that was indicative in this study as most of the women made up to 8 visits. This is supported by a study conducted by Antos, which reported that, increase number of ANC increase a high dose of SP.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The WHO, new recommended five (5) dose of SP uptake in Mamprobi was very low in the study population despite the high number of ANC visits. Frequency of malaria infection, history of severe malaria complications, number of pregnancies and number of ANC visits were significantly associated with the optimal five (5) SP dose. Number of pregnancies and increased number of ANC visits has increased odds for the uptake of SP. However, women with more children has a lower chance of receiving five dose of SP. At health facilities, lack of capacity building activities on SP for ANC staff, inadequate staff and intermittent shortage of SP were identified to be predictors for the uptake of SP.

Recommendations

- Public health nurses and midwives in the Mamprobi District Health Directorate should should increase public education to ensure early initiation of ANC visit among pregnant women in order to increase the number of SP dose.
- The Mamprobi District Health Directorate should organize capacity-building workshops on IPT-SP for healthcare providers in order to increase their knowledge on it.
- The Mamprobi Health Directorate and the hospital management should increase the number of healthcare providers at ANC clinics in order to reduce the workload.
- The Disease Control Department should consistently make SP available for the ANC in order to avoid intermittent shortage.

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APPENDICES

APPENDIX 1

PARTICIPANTS INFORMATION SHEET

UPTAKE OF THE SULFADOXINE–PYRIMETHAMINE FIVE DOSE POLICY IN GHANA FOLLOWING FOUR YEARS OF IMPLEMENTATION: A CROSS-SECTIONAL SURVEY AMONG POSTNATAL CARE ATTENDEES IN MAMPROBI POLYCLINIC

Principal Investigator: Eunice Osei Bonsu

Address: School of Public Health

Department of Social and Behavioural Sciences

University of Ghana, Legon

Email: Eunice.oseibonsu.eob*a*gmail.com

Phone No. 02441428238

General Information about the Research

My name is Eunice Osei Bonsu I am a graduate student of University of Ghana School of Public Health undertaking a research on "Uptake of the sulfadoxine–pyrimethamine five dose policy in Ghana following four years of implementation: a cross-sectional survey among postnatal care attendees in Mamprobi polyclinic.

Background and purpose of research

This survey seeks to collate information on your experience with the intermittent preventive treatment of malaria with sulphadoxine pyrimethamine (IPT-SP) program during your pregnancy. The (IPT-SP) is the three tablets that were given every month to take at the clinic during pregnancy in order to prevent malaria during pregnancy. It is to help understand the uptake of the IPT-SP program on the fight against malaria especially among

pregnant and expectant mothers as well as their babies which is in line with the new WHO policy on antenatal schedule. It will also help to inform any change that will help improve the IPT-SP program

Nature of Research

This is a cross sectional study that aims to determine the uptake of the Sulfadoxine–Pyrimethamine five dose policy in Ghana following four years of implementation along with the new WHO antenatal schedule.

Participants Involvement

- **Duration**

If you agree to take part in this study you would be required to answer a self-administered questionnaire containing questions related to the uptake of the sulfadoxine-pyrimethamine five dose policy in Ghana following four years of its implementation. This will be at your own free will in IPT-SP private/confidential setting.

It will take about 20 minutes of your time. You do not have to answer any questions you do not want to. This is a one-time survey and will need no follow up.

- **Potential risk and Discomfort**

This research does not come at any physical risk or discomfort to you or anyone.

- **Possible Benefits**

Participating in this study affords you an opportunity to gain knowledge on the benefits on the drug you are given at the hospital to help improve adherence for your next pregnancy. Also, findings from this study will be shared with hospital authority which may inform policy that improves the overall support for screening of breast cancer among female health care professionals.

- **Cost**

The research does not come at any monetary cost but your valuable time will be required to fill out the questionnaire.

- **Compensation**

Participants will not be compensated financially or with any other physical item.

- **Confidentiality**

Personal information that will lead to identification of participants will not be included in the questionnaire. The filled-out questionnaire will not bear names of participants so you will not be identified. Be assured that your privacy and confidentiality will be respected.

Participant information will be kept on a computer with a secured password. Filled questionnaires will be kept under lock and key, with only the principal investigator having access.

- **Voluntary Participation and Right to Leave the Research**

Your participation is voluntary. Your refusal to participate will involve no penalty. You may decide to discontinue or withdraw. Nobody will be upset if you decide to discontinue/ withdraw at any time while answering the questionnaire. You are not waiving any legal claims, rights or remedies because of your participation in this research study.

- **Outcome and Feedback to Participants**

There will be no feedback to participants after study.

- **Funding Information**

The principal investigator will solely fund this study.

- **Provision of Information and consent for Participants**

A copy of the information sheet and consent form will be given to you after it has been signed to keep.

For Further Clarification/Question on the research

Please contact

Eunice Osei Bonsu (Principal Investigator)

University of Ghana

School of Public health

Department of Social and Behavioural Science

E-mail: eunice.oseibonsu.eob@gmail.com

- +233242142838

For further clarification on ethical issues and your right as a participant

Hannah Frimpong (Administrator)

GHS Ethics Review Committee (ERC)

+233507041223

Office opening hours (7:30am-3:00pm)

APPENDIX 2
CONSENT FORM

UPTAKE OF THE SULFADOXINE–PYRIMETHAMINE FIVE DOSE POLICY IN GHANA FOLLOWING FOUR YEARS OF IMPLEMENTATION: A CROSS-SECTIONAL SURVEY AMONG POSTNATAL CARE ATTENDEES IN MAMPROBI POLYCLINIC

A STUDY CONDUCTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE AT THE UNIVERSITY OF GHANA

PARTICIPANTS' STATEMENT

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

I voluntarily agree to be part of this research.

Name or Initials of Participant..... ID Code .....

Participants' Signature .....

Date.....

INVESTIGATOR STATEMENT AND SIGNATURE

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

Researcher's name.....

Signature .....

Date.....

APPENDIX 3
QUESTIONAIRE

UPTAKE OF THE SULFADOXINE–PYRIMETHAMINE FIVE DOSE POLICY IN GHANA FOLLOWING FOUR YEARS OF IMPLEMENTATION: A CROSS-SECTIONAL SURVEY AMONG POSTNATAL CARE ATTENDEES IN MAMPROBI POLYCLINIC

Kindly tick the bracket space next to the answer you want to select and write on the dotted line in areas that demand a write-up in response.

BACKGROUND OF PARTICIPANT

1.Age

( ) 18-25 ( ) 26-30 ( ) 31-35 ( ) 36-40 ( ) 40+

2 . Highest Level of Education:

( ) NONE ( ) JHS/JSS ( ) SHS/SSS ( ) TETIARY

3. Religion:

( ) NONE ( ) CHRISTIAN ( ) MUSLIM ()TRADITIONAL ( ) OTHER

4. Marital status

SINGLE ( ) ( ) MARRIED ( ) DIVORCED ( ) WIDOW ( ) OTHER

5. How many pregnancies have you previously had?

( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5+

KNOWLEDGE ON MALARIA IN PREGNANCY

6. How well did you know about malaria?

( ) Not at all ( ) Have a faint idea ( ) Quite well ( ) Very well

7. How often have you had malaria in the past?

( ) Rarely ( ) Quite often ( ) Very frequently

9. Have you suffered severe pregnancy complications from malaria before?

( ) No ( ) Yes

10. Do you think malaria is a threat to the health of pregnant women and their unborn babies?

( ) No ( ) Yes

11. Do you think Ghanaian health facilities are doing enough to fight malaria among pregnant women?

( ) No ( ) Yes

12. What other steps did you take to prevent malaria while you were pregnant? (*Tick as many as are appropriate)*

( ) Use treated bed nets	( ) Use of mosquito coils	( ) Use of insecticide spray	( ) Use of mosquito repellent creams	( ) None

ANTENATAL ATTENDANCE

13. When did you start antenatal?

( ) 1st trimester ( ) 2nd trimester ( ) 3rd trimester

14. At what time of the pregnancy (weeks) did you start your IPT-SP?

( ) 16 – 20 weeks ( ) 21 – 24 weeks ( ) 25 weeks and above

15. How many times did you visit the clinic for antenatal?

( ) 1 - 3 times ( ) 4 - 6 times ( ) 7 - 9 times ( ) 10 times and above

KNOWLEDGE OF ITPt-SP

16. How well did you know about SP before your pregnancy?

( ) Not at all ( ) Had a faint idea ( ) Quite well ( ) Very well

17. How did you get to know about the ITPt-SP program?

( ) TV/Radio ( ) Internet ( ) Health Workers ( ) Friends ( ) I didn't know before I came to the hospital

19. What level of education did the health workers give you about the program prior putting you on it?

( ) None ( ) Scanty ( ) Fair information ( ) Full information

20. Did you fully understand the import of the ITPt-SP treatment program?

( ) Yes ( ) No

USE OF ITPt-SP

21. Was the SP drug given to you to swallow at the hospital or it was given to you to be taken home?

No, I took it home ( ) Yes, it was taken at the hospital ( )

22. At what time of pregnancy did you start SP?

( ) 1ST Trimester ( ) 2nd Trimester ( ) 3rd Trimester

23. How many doses of SP were you given throughout your pregnancy?

( ) 1 Dose ( ) 2 Doses ( ) 3 Doses ( ) 4 Doses ( ) 5 Doses

24. How helpful were the health professionals in helping you follow the program?

( ) Not at all ( ) Fairly helpful ( ) Quite helpful ( ) Very helpful

25. How well did the health workers monitor your adherence to the course?

( ) Not at all ( ) Fairly well ( ) Quite strictly ( ) Strictly

26. Did you pay for ITPt-SP drug at the hospital?

( )No	( ) Yes

IMPACT OF ITPt-SP

27. Have you had a prior pregnancy without being put on the ITPt-SP program?

( ) Yes ( ) No

28. To what extent do you think the ITPt-SP positively affect your health status throughout your period of pregnancy?

( ) Not at all ( ) Average effect ( ) Significant effect

29. To what extent do you think the ITPt-SP positively affect the health of your baby during the pre-natal and post-natal stages?

( ) Not at all ( ) Average effect ( ) Significant effect

30. Did you have any side effects to your health due to the program?

( ) Yes ( ) No

31. What do you think can be done to improve the ITPt-SP program?

.....

.....

.....

APPENDIX 4

QUESTIONAIRE FOR HEALTH WORKERS

QUESTIONAIRE

Kindly tick the bracket space next to the answer you want to select and write on the dotted line in areas that demand a write-up in response

BACKGROUND OF PARTICIPANT

1.Age

( ) 18-25 ( ) 26-30 ( ) 31-35 ( ) 36-40 ( ) 40+

2. Highest Level of Education:

( ) NONE ( ) JHS/JSS ( ) SHS/SSS ( ) FIRST DEGREE ( ) POSTGRADUATE

3. Religion:

( ) NONE ( ) CHRISTIAN ( ) MUSLIM ( ) ATR ( ) OTHER

INFORMATION ON IPTt- SP

4. Have you had any formal training on the administration of SP ?

   Yes ( ) No ( )

5. If yes, how often?

   Very often ( ) seldom ( )

6. Do you usually run out of stock for SP?

   Yes ( ) No( )

7. Where do you get your supplies from?

   .....

8. What are some of the challenges you encounter with the administration of SP?

   .....

   .....

   .....

APPENDIX 5

SCHEDULE OF ACTIVITY

The schedule of work was summarized in the table below.

Table 1: Schedule of activity

ACTIVITY	WEEKS ALLOCATED	DATE
Pre-testing and revision of questionnaires	2 weeks	18th January – 31st January, 2019
Preparatory visits	1 week	1st April – 5th April, 2019
Data collection and write up	4 weeks	3rd June – 30th June 2019
Submission to supervisor for clearance for viva voce	1 week	1st July – 6th July, 2019
Viva voce	1 day	13th July, 2019
Submission of revised dissertation to department	1 week	17th – 22nd July, 2019

APPENDIX 6
BUDGET

The budget needed to carry out the study and the budget justification are summarized below.

Table 2: Proposed budget for the research

ACTIVITY OR ITEM	AMOUNT
Communication and internet data	GH 300
Stationery and secretarial services	GH 300
Data Entry Clerk	GH 300
Printing, Photocopying and Binding	GH 500
Transportation	GH 300
Miscellaneous:	GH 300
TOTAL :	**GH 2,000**

5.1 Budget justification

An estimated amount of two thousand Ghana cedis (GHc 2,000). The justification for this budget is as follows:

Transportation: GHc 300 was used as transport fee for myself and the research assistants to and from the study sites.

Stationery and Secretarial services: An amount of GHc 300 was used to purchase stationery and pay for other secretarial services.

Printing, Photocopying and Binding: To print the questionnaires and consent/assent forms, and the final printing and binding of the completed work, an amount of GH 500 was used.

Communication internet data: An amount of GH 300 was used for purchasing airtime for phone calls and data bundle for access to internet services during the study period. An effective communication is necessary for fast and easy dissemination and sharing of information among the study team

Data Entry Clerk: A data entry clerk was needed to assist me in data entry to ensure consistency of the result. This required an amount of GHc 200.

Miscellaneous: An amount of GH 300 was used for unexpected expenses.

APPENDIX 7 ETHICAL CLEARANCE

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

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

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
GPS Address: GA-050-3103
Tel: +233-302-681109
Fax: + 233-302-684424
Email: ghsercg@gmail.com

8th July, 2019

Eunice Osei Bonsu
School of Public Health
University of Ghana
Legon

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

GHS-ERC Number	GHS-ERC 081/04/19
Project Title	Update of the Sulfadoxine-Pyrimethamine Five Dose Policy in Ghana Following Four Years of Implementation: A Cross Sectional Survey among Postnatal Care Attendees in Mamprobi Polyclinic.
Approval Date	8th July, 2019
Expiry Date	7th July, 2020
GHS-ERC Decision	Approved

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months.
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings
- Please note that any modification of the study without ERC approval of the amendment is invalid

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED .....
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

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