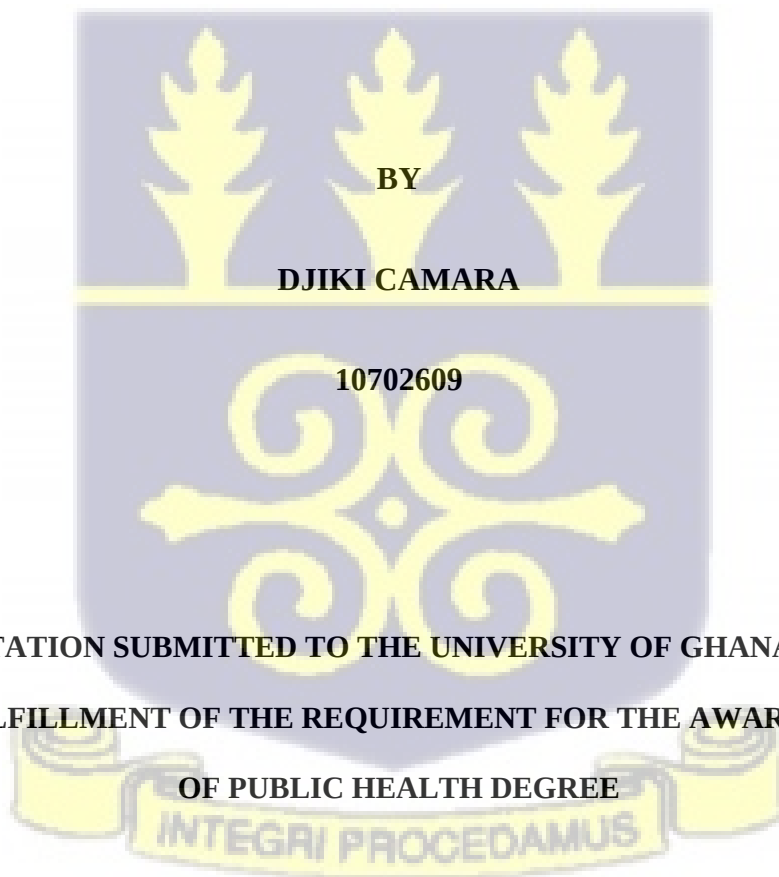


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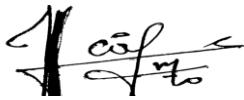
**LOW UPTAKE OF INTERMITTENT PREVENTIVE TREATMENT (IPT) FOR
MALARIA AMONG PREGNANT WOMEN IN SELECTED HEALTH FACILITIES
IN SHAI-OSUDOKU DISTRICT, GREATER ACCRA, GHANA.**



DECEMBER, 2019

DECLARATION

I, Djiki Camara, hereby declare that this proposal is the outcome of my original research except for references made to other peoples' work and textbooks which have been duly acknowledged. The study is undertaken under the guidance and supervision of Dr. Anthony Danso-Appiah of the School of Public Health, University of Ghana. This work has not been partly or fully submitted for any other degree, neither has it been submitted concurrently in candidature for any other degree.



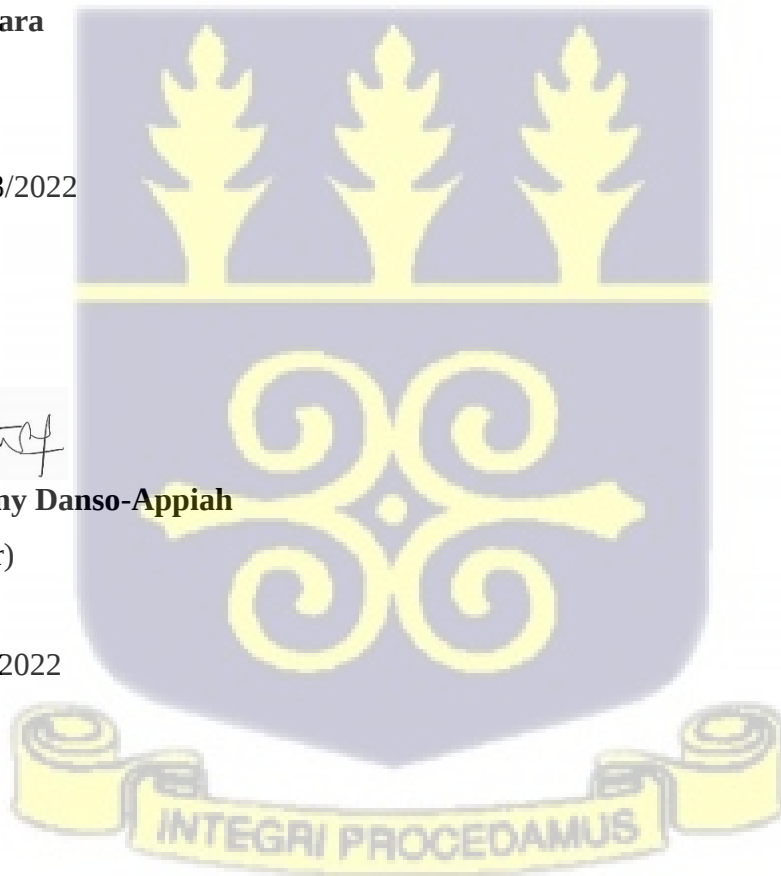
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Date: 31/3/2022



DEDICATION

I dedicate this work to Almighty God for the protection and strength, to my mother Fatoumata Traore and my sister Aminata Camara for their support and encouragement.



ACKNOWLEDGEMENT

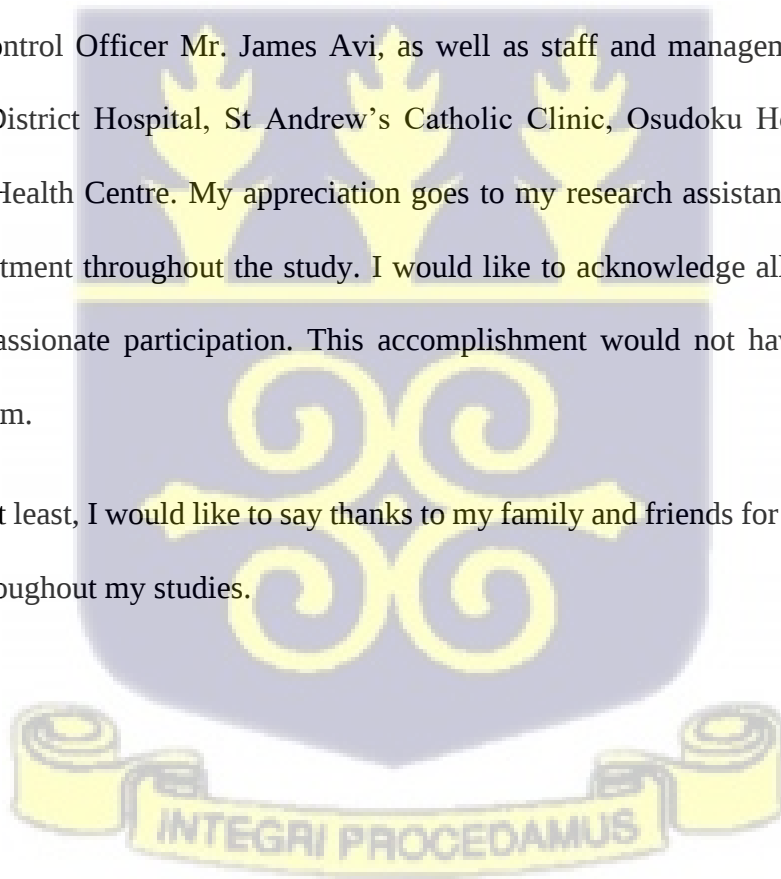
My gratitude goes to God Almighty for giving me life and strength to complete this work.

I am particularly grateful to my supervisor, Dr. Anthony Danso-Appiah for his invaluable contribution towards this research work and for the moral support given to me.

My sincerest gratitude goes to TDR/WHO for awarding me a scholarship to pursue my Master of Public Health (MPH) degree at the University of Ghana and to staff at the Office of Research Innovation and Development (ORID) for their support and guidance throughout the course.

I am grateful to the district director of Ghana Health Service in Shai-Osudoku and the Disease Control Officer Mr. James Avi, as well as staff and management of the Shai-Osudoku District Hospital, St Andrew's Catholic Clinic, Osudoku Health Centre and Agomeda Health Centre. My appreciation goes to my research assistants for their effort and commitment throughout the study. I would like to acknowledge all the respondents for their passionate participation. This accomplishment would not have been possible without them.

Last but not least, I would like to say thanks to my family and friends for their support and prayers throughout my studies.



ABSTRACT

Background:

Malaria remains a global public health issue despite increased efforts to control its transmission. In sub-Saharan Africa where malaria is endemic, incident malaria infection during pregnancy has been reported to account for 20% of stillbirths and about 11% of the deaths of newborns. Since October 2012, Sulphadoxine-Pyrimethamine has been recommended by the World Health Organization for treatment of malaria infection during pregnancy using the intermittent preventive treatment (IPT) approach. Despite its effectiveness, uptake of Intermittent Preventive Treatment of Malaria in Pregnancy using Sulphadoxine-Pyrimethamine (IPTp-SP) is usually low. In the Shai-Osudoku District where the current study was conducted, uptake of three doses of IPT (IPT3) in pregnant women was as low as 37.9% with only 6.4% of registered ANC attendants receiving five doses of IPTp-SP in 2018. The present study therefore sought to evaluate the factors underpinning the prevailing low rates of IPTp-SP uptake in selected health facilities in the Shai-Osudoku.

Methods:

A cross-sectional study was conducted and included 400 registered mothers who had their antenatal care (ANC) in the four selected health facilities. Health staff stationed at the ANC clinics were also included in the study. Between July and August 2019, data was collected from ANC records for all nursing mothers included in the study and a structured questionnaire was used to assess participants' knowledge on IPTp-SP. Univariate analysis was conducted using the Chi-Square tests and logistic regression models were fitted to assess the association of predictor variables (factors) with low IPTp-SP uptake.

Results

Of the 400 registered mothers included in the study, only 11% received five doses of SP during the recent pregnancy as recommended by the Ghana Health Service while less than 61% received a minimum of three doses. In the adjusted logistic regression model, results showed that women who initiated ANC late in pregnancy or had fewer number of visits, experienced untoward effects after taking the medication and resides in urban areas had increased odds of low IPTp-SP uptake. Major predictors of low uptake of SP identified in this study were, knowledge on SP-IPTp, previous experience of side effects of SP-IPTp, age of pregnancy at ANC initiation and total number of ANC visits.

A high proportion of nursing mothers in the study sample showed 'very good' knowledge of malaria (75%, 95% CI: 70.7% -79.4%) with an even higher proportion (81.7%, 95% CI: 77.2%-85.6%) having 'good' knowledge. For ANC health staff, 85.7% showed 'very good' knowledge on the effects of incident malaria in pregnant women. Over 57% knew the meaning of IPTp-SP but all knew that Sulphadoxine-Pyrimethamine is the recommended drug for preventing malaria infection during pregnancy.

Conclusion:

Only 11% of the registered mothers in the present study received the recommended five doses of SP during pregnancy. Such a low rate of uptake could have severe consequences given the effects incident malaria infection during pregnancy. Though the findings of this study suggest that knowledge on malaria and IPTp-SP is high among women and ANC health staff, efforts have to be intensified to rectify the disconnect between what is known and what is practiced.

TABLE OF CONTENTS

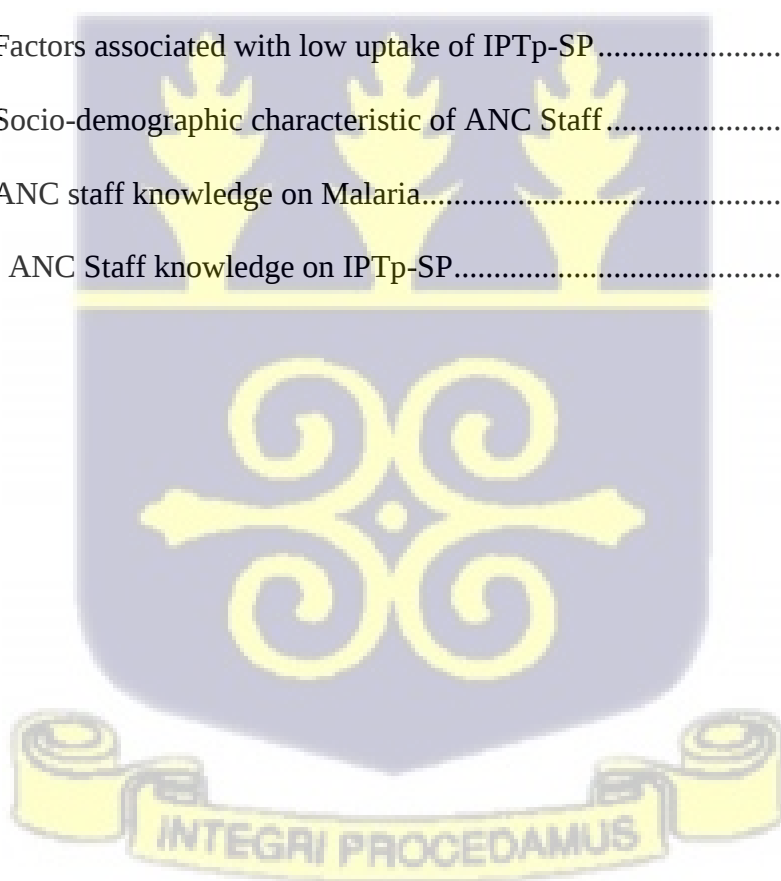
DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT.....	iv
TABLE OF CONTENTS	vi
LIST OF TABLES.....	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background	1
1.1.1 Burden of malaria.....	3
1.1.2 Malaria in Pregnancy.....	4
1.1.3 Malaria in pregnancy treatment using the Intermittent Preventive Treatment approach	6
1.2 Problem Statement	8
1.3 Justification	9
1.4 Conceptual Framework	11
Figure 2: Conceptual Framework showing the interplay between socio-demographic, individual, and health system factors and ANC characteristics in relation uptake of IPTp-SP	11
1.5 Research Questions	12
1.6 Objectives.....	12
1.6.1 Overall Objective	12
1.6.2 Specific Objectives.....	13
CHAPTER TWO	14
LITERATURE REVIEW	14
2.1 Introduction	14
2.2 Proportion of IPTp-SP utilization.....	14
2.3 Knowledge of pregnant women on malaria in pregnancy	15
2.4 Knowledge of ANC staff on malaria in pregnancy	16

2.5 Knowledge of pregnant women about IPTp-SP	16
2.6 Knowledge of ANC staff about IPTp-SP	17
2.7 Factors associated with IPTp-SP uptake	17
CHAPTER THREE.....	24
METHODOLOGY	24
3.1 Introduction.....	24
3.2 Study design	24
3.3 Study area.....	24
Figure 3: Shai Osudoku District Map	26
3.4 Study population	26
3.4.1 Inclusion Criteria.....	26
3.5 Sample size and Sampling technique:	27
3.5.1 Sampling Technique.....	28
3.6 Research Instrument.....	28
3.7 Variables for the Study.....	28
3.8 Data Analysis	33
3.9 Ethical Considerations.....	34
3.9.1 Ethical Approval.....	34
3.9.2 Approval from Study Areas	34
3.9.3 Participants' Consent.....	34
3.9.4 Privacy and Confidentiality.....	35
3.9.5 Potential Risk/Benefit.....	35
3.9.6 Compensation.....	35
3.9.7 Data Storage and Usage	35
3.9.8 Conflict of Interest Statement.....	35
3.9.9 Funding.....	35
3.10 Dissemination of Results.....	36
3.11 Study limitations.....	36
CHAPTER FOUR	37
RESULTS	37
4.1 Demographic characteristics	37
4.2 ANC attendance and IPTp-SP uptake	38
4.3 Nursing mothers' knowledge on Malaria	40
4.4 Nursing mothers' knowledge on IPTp-SP.....	42

4.5 Number of IPTp-SP doses taken by nursing mothers	44
4.6 Proportion of low uptake of IPTp-SP.....	44
4.7 Association between low uptake of Sulfadoxine-Pyrimethamine and Socio-demographic characteristics.....	45
4.8 Association between low uptake of SP, ANC attendance and Knowledge on Malaria and IPTp-SP	47
4.9 Factors associated with low uptake of SP	49
4.10 Socio-demographic characteristic of ANC staff.....	52
4.11 ANC staff knowledge on Malaria	53
4.12 ANC Staff knowledge on IPTp-SP.....	54
CHAPTER FIVE	55
DISCUSSION.....	55
5.0 Introduction	55
5.1 IPTp-SP utilization in the Shai-Osudoku District	55
5.2 Knowledge of nursing mothers and ANC staff on malaria in pregnancy.....	56
Knowledge of ANC staff on MiP.....	57
5.3 Knowledge of nursing mothers and ANC staff about IPTp-SP.....	58
Knowledge of ANC staff about IPTp-SP	58
5.4 Predictors of uptake of IPTp-SP in the Shai-Osudoku District.....	59
CHAPTER SIX	61
CONCLUSION AND RECOMMENDATIONS.....	61
5.1 Conclusion.....	61
5.2 Recommendations	61
REFERENCES	62
APPENDICES.....	67
Appendix 1: Consent Form for Nursing Mothers.....	67
Appendix 2: Consent Form for ANC Staff.....	71
Appendix 3: Questionnaire for Nursing Mothers.....	75
Appendix 4: Questionnaire for ANC Staff.....	80

LIST OF TABLES

Table 3.1: Variables.....	32
Table 4.1: Socio-demographic characteristic of nursing mothers	37
Table 4.2: ANC attendance characteristics and IPTp-SP uptake	39
Table 4.3: Nursing mothers' knowledge on Malaria	41
Table 4.4: Nursing mothers' knowledge on IPTp-SP.....	43
Table 4.5: Association between low uptake of IPTp-SP and Socio-demographic characteristics	46
Table 4.6: Association between low uptake of IPTp-SP ANC attendance characteristics and Knowledge on Malaria and IPTp-SP.....	48
Table 4.7: Factors associated with low uptake of IPTp-SP	50
Table 4.8: Socio-demographic characteristic of ANC Staff	52
Table 4.9: ANC staff knowledge on Malaria.....	53
Table 4.10: ANC Staff knowledge on IPTp-SP.....	54



LIST OF FIGURES

Figure 1: Conceptual Framework	11
Figure 2: Shai Osudoku District Map	26
Figure 3: Nursing mothers' knowledge on Malaria.....	42
Figure 4: Nursing mothers' knowledge on IPTp-SP	43
Figure 5: Number of IPTp-SP doses taken by nursing mothers	44
Figure 6: Proportion of low uptake of IPTp-SP	45



LIST OF ABBREVIATIONS

ANC	Antenatal Care
DHIMS	District Health Information Management System
DOT	Directly Observed Therapy
GHS	Ghana Health Service
IPT	Intermittent Preventive Treatment
IPTp	Intermittent Preventive Treatment of Malaria in Pregnancy
IPTp-SP	Intermittent Preventive Treatment of Malaria in Pregnancy using Sulphadoxine-Pyrimethamine
ITN	Insecticide-Treated net
LBW	Low Birth Weight
LLINs	Long-Lasting Insecticide-Treated Nets
MiP	Malaria in Pregnancy
NMCP	National Malaria Control Program
OPD	Out Patient Department
RDT	Rapid Diagnostic Test
SP	Sulphadoxine-Pyrimethamine
TV	Television
WHO	World Health Organization
VSA	Variant Surface Antigen



CHAPTER ONE

INTRODUCTION

1.1 Background

Malaria has remained one of the major public health problems in Low- and Middle-income countries (LMICs) and burdens susceptible populations such as pregnant women, children and immuno-compromised people, claiming the lives of million each year (Sachs & Malaney, 2002; WHO, 2020). The world malaria report (2018) stated that, an estimated 219 million of cases occurred worldwide in 2017, accounting for 435,000 deaths in 2017 alone. The African Region still carries the greatest burden of the effects of malaria, estimated at 93% (200 million cases) of the global total (The World Malaria Report, 2018). Ghana is one of the 15 African countries that contributed 80% of all cases to the global malaria burden (The World Malaria Report, 2018).

Plasmodium falciparum Malaria infection during pregnancy causes intrauterine growth retardation leading to low birth weight and early infant death (Roman, Wallon, Brieger, Dickerson, & Rawlins, 2014; Beaudrap et al., 2013; WHO, 2016). Malaria in Pregnancy (MiP) is also responsible for intrauterine death, stillbirth, premature delivery, maternal death, placental malaria and increased risk of miscarriage (Azizi et al., 2018). In high-risk areas, women are prone to asymptomatic infections, which could result in placental parasitemia and maternal anaemia, which are responsible for majority of low birth weight and infantile deaths (Chepkemoi, 2013).

In the quest of health organisations, countries and individual to help reduce and eradicate MiP, a multi-faceted approach including preventive and curative measures has been recommended by WHO to aid in the prevention and control of MiP (WHO, 2014). The Focused Antenatal Care approach by WHO recommends the use of Insecticide-Treated Nets (ITNs) especially during early stages of pregnancy and at least two doses of Sulphadoxine-Pyrimethamine (SP) as Intermittent Preventive pregnancy treatment (IPTp) (Owusu-Boateng & Anto, 2017; WHO, 2018). The adoption of Intermittent Preventive Treatment (IPT) started in 2012 when the WHO suggested that from the second trimester, each pregnant woman must be given IPT with sulfadoxine-pyrimethamine (WHO, 2012). The WHO further recommended that each pregnant woman should be given not less than 3 doses of SP, with each dose administered at least one month apart (Owusu-Boateng & Anto, 2017; WHO, 2018). However, in 2016, WHO published revised guidelines on antenatal care recommending an increased number of contacts between caregivers and pregnant women in order to offer more opportunities to expand IPTp –SP coverage in 2016 (World malaria report, 2017).

Ghana adopted a strategy for IPTp-SP in 2003 (Annual Report NMCP, 2018), and the antimalaria drug policy for Ghana was updated in 2004 to reflect WHO's guidelines on how IPT should be administered (Odjidja et al., 2017). Thus, these recommendations have been incorporated into Ante-natal Services (ANC), where 3 tablets of IPTp-SP are provided to pregnant women from the 2nd trimester (preciesly, 16th week) on a monthly basis till the point of delivery as a Directly Observed Therapy (DOT) (Owusu-Boateng & Anto, 2017; Annual Report NMCP,

2018). Long Lasting Insecticides Treated Nets was given to every ANC registrant. These are provided at no cost for pregnant women (Annual Report NMCP, 2018).

1.1.1 Burden of malaria

Malaria is a complex disease that poses a major public health threat on the global scale and endemic in many tropical and subtropical regions (Sachs & Malaney, 2002). In recent times, more than a 100 countries globally are confronted with the risk of malaria transmission (World Malaria Report, 2017) affecting tourists who visit these countries (WHO, 2014). Malaria is widespread in the tropics and subtropics, prevalent in countries around the equator, including most part of Sub-Saharan Africa, Asia, and the Americas (WHO, 2020).

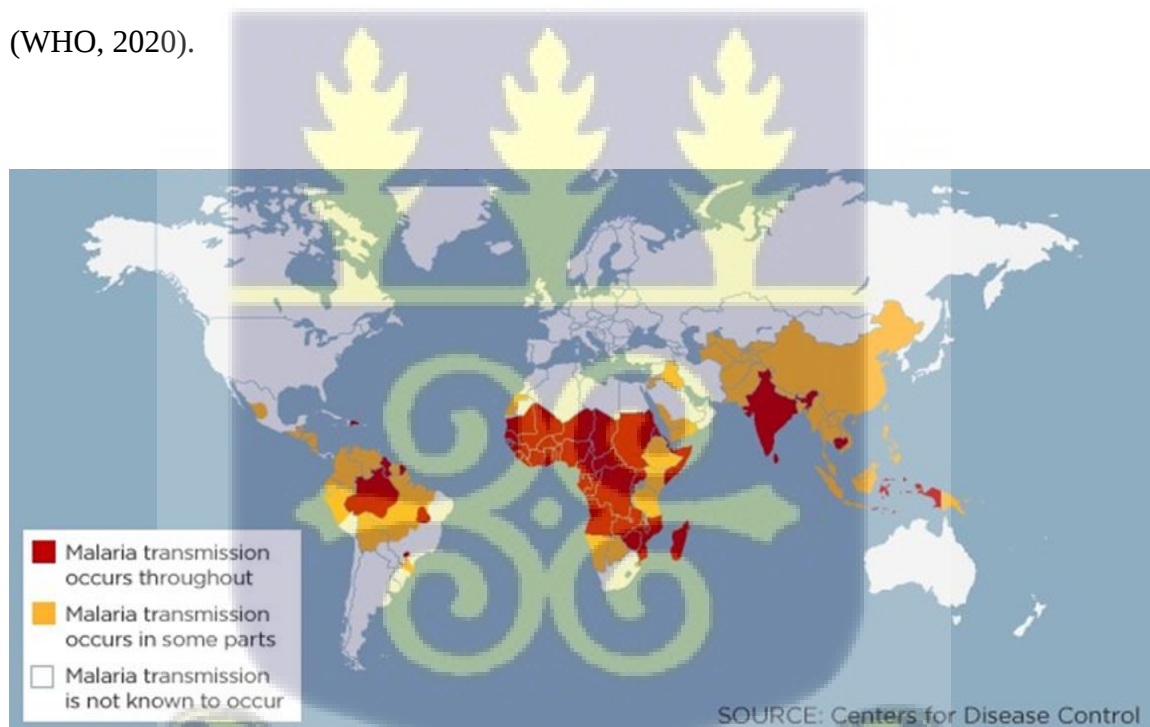


Figure 1: Global distribution showing the burden of malaria

Source: <http://edition.cnn.com/2016/04/25/health/world-malaria-day-funding/index.html>

The term malaria originated from Medieval Italian which means "bad air" (Zulfekar, 2017). Formerly known as 'ague' or 'marsh fever' due to its association with swamps and

marshland (Zulfekar, 2017), malaria was once endemic in Europe and North America. In recent times, apart from imported cases, countries in those parts no longer record cases of Malaria (Zulfekar, 2017).

Malaria is a communicable disease caused by parasites belonging to the genus *Plasmodium* and affects both humans and animals (WHO, 2020). Malaria transmission begins when a female Anopheles mosquito infected with the plasmodium parasites bites a person, introducing the organisms into the blood stream. Then, the parasites migrate to the liver where they reproduce, grow and mature (Makler & Gibbins, 1991). The most common symptoms are fever and headache although there are a lot of nonspecific symptoms such as anemia (Health & Malaria, 2014; Kamau et al., 2020). Out of the five Plasmodium species, *Plasmodium falciparum*, reportedly, is accountable for nearly 90% or more of severe malaria cases (Chico et al., 2015).

In the first quarter bulletin of Ghana's National Malaria Control Programme (NMCP) in 2017, it was reported that a total of 2.3 million suspected malaria cases were recorded at the Out Patient Department (OPD) which was 1.8% more than cases recorded in 2016 (GHS, 2017). This was confirmed by WHO in their report which concluded that, of the estimated 111 million cases in West Africa in 2016, Ghana, Nigeria, Côte d'Ivoire, Niger, Mali and Burkina Faso together contributed about 85% (WHO, 2018).

1.1.2 Malaria in Pregnancy

In sub-Saharan African countries, over 32 million pregnancies are put at risk each year, given that malaria is endemic in these parts (Dellicour et al., 2010). Each year, over 10,000 and 200,000 new-borns and infants respectively, are lost to incident antenatal malaria

infection (Roman et al., 2015). Major complications such as maternal anaemia and placental parasitaemia which often lead to miscarriage and low birth weight for the mother and child has been found to be associated with malaria infection during pregnancy (Kibusi et al., 2015).

Malaria among pregnant women accounts for about 28.1% of OPD attendance, 13.7% and admissions in hospitals and 9% result in deaths (Malaria in Pregnancy Training: Manual for Health Providers, 2010). Over the past few years, various measures and interventions have been implemented to address the situation in Ghana (GHS, 2018). To avert infection and complications due to severe malaria that pose serious risk to both a pregnant woman and her unborn child, preventive measures are not required but essential. The WHO in its quest to reduce maternal mortality and malaria in pregnancy has outlined the following strategies (WHO, 2014):

- Provision of “intermittent preventive treatment in pregnancy in regions with moderate to high transmission of malaria in Africa with SP during ANC”
- “Early diagnosis and treatment of malaria”
- “Utilization of long-lasting insecticidal bed nets (LLINs)”

In 2015, Ghana revised the national guidelines for malaria control to incorporate WHO’s recommendation of a three-pronged approach for the prevention and treatment of MIP (USAID, 2018). The Ghana NMCP adopts both broad and targeted communication techniques, through radio and Television to influence and improve the public’s acquaintance with and adoption of positive health behaviours, ensure the use and uptake of Rapid Diagnostic Test (RDT), SP, and LLINs. Such communications are delivered in

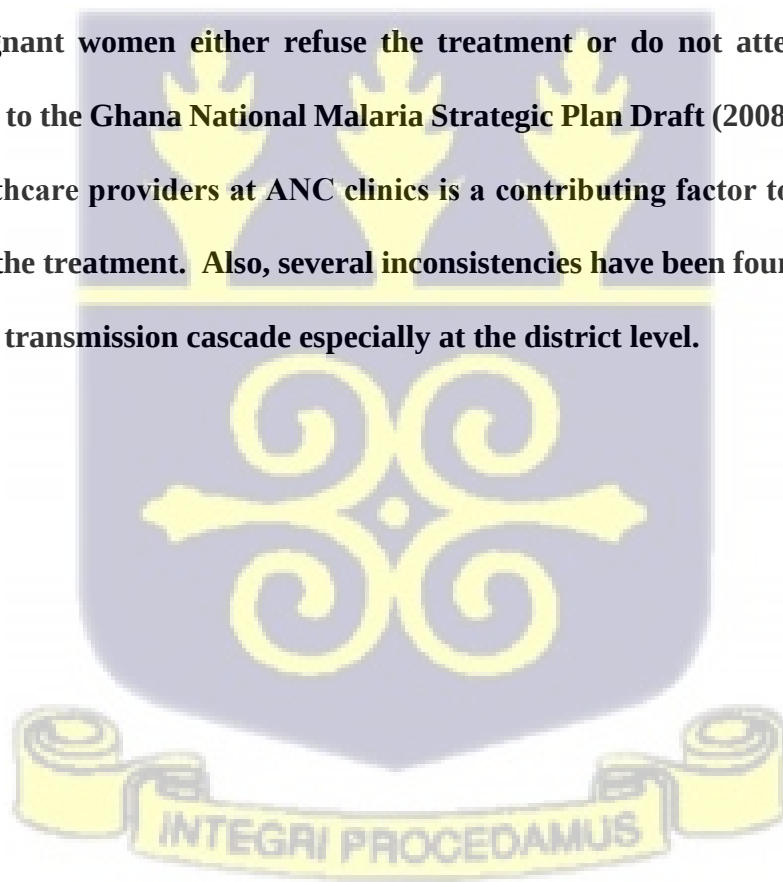
local languages, and also in English (GHS 2018). Despite the widespread of such strategies, prevention of MiP, coverage of LLINs and IPTp-SP among pregnant women in Africa is reportedly low (Were et al., 2013). Nevertheless, in 2016, more than 80% of Ghana's population had access to ITN (one of the highest in West Africa), made freely accessible to the entire public through mass campaigns and outreach programs (World Malaria Report, 2017).

1.1.3 Malaria in pregnancy treatment using the Intermittent Preventive Treatment approach

In 2000, the Heads of States of African representatives met in Nigeria and agreed to make IPTp-SP accessible to at least 60% of pregnant women living in malaria-prone areas by 2005. Most countries in SSA including Ghana implemented the IPTp-SP and ITNs as a means to prevent malaria during pregnancy (NMCP, 2013). The World Health Organization advocates that the SP in IPTp-SP be administered in all regions with moderate to high malaria transmission rates (WHO, 2014; Eisele et al., 2012; Stephen et al., 2016; WHO, 2019). This treatment is administered to ANC attendees during their ANC visits whether they test positive or negative for malaria (WHO, 2017).

According to the Revised Anti- Malaria Drug policy, SP was identified as the drug of choice for the prevention of malaria in pregnancy (NMCP, 2014). The policy further stated that in addition to the IPTp-SP provision, there should be an added antenatal care strategy with the following package, haematinics and anthelmintic drug administration. It was recommended that qualified healthcare providers administer the treatment with SP using the Directly Observed Therapy (DOT) approach (NMCP, 2014). It is recommended that a pregnant woman takes at least three doses of SP at a monthly interval (NMCP, 2014).

However, according to Akinleye et al (2009), in sub-Saharan African countries, less than 20% of pregnant women used SP for malaria prevention leading to increased morbidity and mortality. The treatment is however described as cost-effective, efficient and safe, posing no risk to the fetus and mother when administered in the second and third trimesters of pregnancy (WHO, 2014). This preventive treatment has several benefits including; reduction in the incidence of antenatal malaria and placental parasitaemia, low birthweight, infant and neonatal deaths among others (Takem & Alessandro, 2013). Due to the patronage of pregnant women for ANC attendance in Ghana, the IPTp-SP has been a very feasible initiative since it is incorporated as part of ANC (NMCP, 2007). **Though there have been some reports of patronage of the IPTp, it has been indicated that some pregnant women either refuse the treatment or do not attend ANC at all. According to the Ghana National Malaria Strategic Plan Draft (2008), the attitude of some healthcare providers at ANC clinics is a contributing factor to some women's refusal of the treatment. Also, several inconsistencies have been found to exist in the IPTp data transmission cascade especially at the district level.**



1.2 Problem Statement

Malaria still remains one of the global health concerns despite a massive increase in private and public efforts over the last several years to control it (Okeibunor et al., 2011). In Sub-Saharan Africa, MiP is responsible for 20% of stillbirths and 11% of all newborn deaths (WHO, 2018). **Till date**, Malaria still stands as a major cause of diseases with millions of suspected cases each year. It is responsible for 19% of OPD visits, and total attributable death of 2% in Ghana (Annual Report NMCP, 2018). The Greater Accra region, though with some reduction in MiP, still has some districts which fall below the target for IPTp-SP uptake.

Antenatal prevention of Malaria infection is crucial as it averts maternal and neonatal mortality and leads to a reduction in the risks of pregnancy complications (Oladimeji et al., 2019). Intermittent Preventive Treatment using Sulphadoxine-Pyrimethamine is the WHO's recommended method for treating and preventing incident malaria during pregnancy and prescribes the administration of one dose of Sulphadoxine-Pyrimethamine at each ANC visit in the second and third trimesters of pregnancy (WHO, 2014). Although there have been reports of high patronage of the IPT in Ghana, poor attitude of some health providers towards ANC attendants and inconsistencies in IPTp data transmission has been found to contribute to the low uptake of the intervention in recent years (USAID, 2018).

Studies have identified that despite the adoption of the IPTp- SP strategy, antenatal malaria remains a major problem in Ghana (Owusu-Boateng & Anto, 2017; USAID, 2018). The rate of IPTp-SP uptake has been described as stagnant in places such as the Shai-Osudoku District where uptake among pregnant women, according to Azizi et al (2018) was about 38% with only 6.4% of the ANC registrants receiving 5 doses of the regimen. The present

study aims to assess the factors that influence the low uptake of the new IPTp-SP in four healthcare facilities in the Shai-Osudoku District of the Greater Accra Region of Ghana.

1.3 Justification

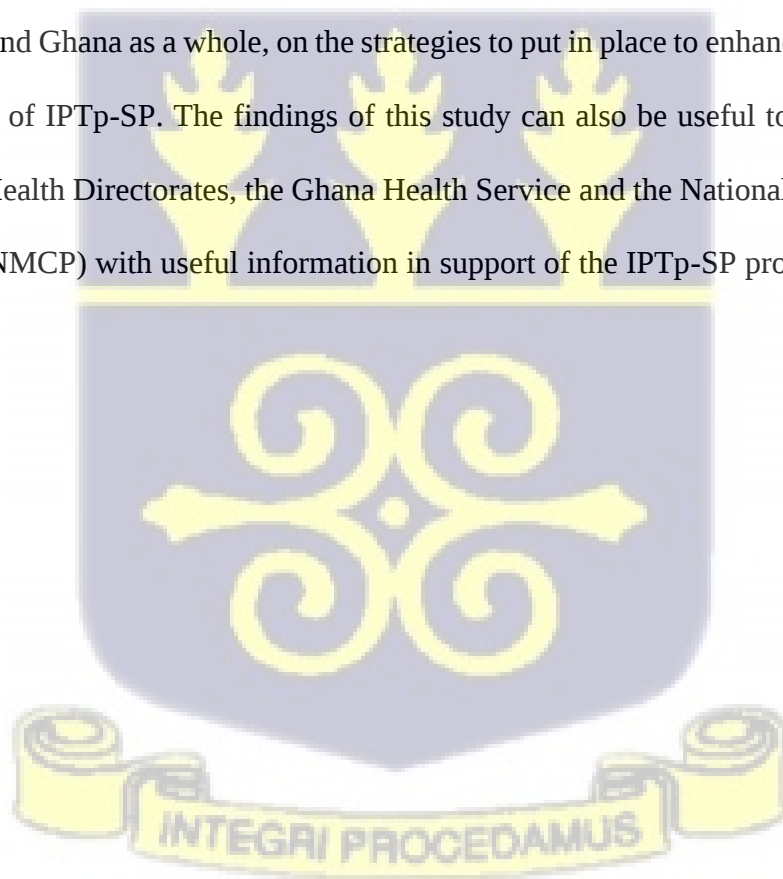
Over a hundred countries in the world face risks of malaria transmission in recent times (World Malaria Report, 2017), with several studies reporting the serious nature of the threat to women during pregnancy, and to the foetus or new-born baby (Nkoka et al., 2018; Roman et al., 2015; Azizi et al., 2018; Ibrahim et al., 2017). In Ghana, malaria in pregnancy is responsible for nearly 14% of visits made to the OPD, 11% of cases admitted and 9% of mortalities in health facilities. Malaria in pregnancy, therefore is an important public health issue. Ghana has widely adopted and implemented various measures and interventions to tackle this prevalent public health issue (GHS, 2018).

The World Health Organization in efforts to safeguard the health of women, foetuses and new-borns in areas of moderate and high malaria transmission in Africa, recommends “intermittent preventive treatment in pregnancy” (IPTp) with the antimalarial medicine sulfadoxine-pyrimethamine (WHO, 2019). Coverage and uptake of IPTp has stalled with only an estimated 19% of eligible pregnant women receiving the recommended three or more doses of IPTp in 2016, compared with 18% in 2015 and 13% in 2014, in 23 African countries (WHO, 2017). However, Intermittent Preventive Treatment of MiP is a highly cost-effective and an efficient intervention that substantially improves maternal and birth outcomes, and a wealth of other benefits (Chico et al., 2015; Takem & Alessandro 2013).

The use of IPTp has been found to decrease the risk of premature births and low birth-weight (Schuster et al., 2018). Women who received full malaria prevention with IPTp or

ITNs in their first or second pregnancy showed significantly decrease in risk of neonatal mortality (Eisele et al., 2012). It appears, though, that factors influencing the uptake of IPTp-SP have not been investigated sufficiently in Ghana.

The consequences malaria can have on pregnant women, their fetus or new-born babies are grave and since IPTp-SP is effective, there is the need to probe the reasons that account for the rather low uptake. The findings of this study can be used to bridge some of the knowledge gaps that exist around IPTp-SP use in pregnant women. It will be of an immense contribution to improving knowledge on the underlying factors to the uptake of IPTp-SP and help inform all relevant stakeholders in the Shai-Osudoku District, in particular and Ghana as a whole, on the strategies to put in place to enhance the acceptance and uptake of IPTp-SP. The findings of this study can also be useful to the District and Regional Health Directorates, the Ghana Health Service and the National Malaria Control Program (NMCP) with useful information in support of the IPTp-SP program at different levels.



1.4 Conceptual Framework

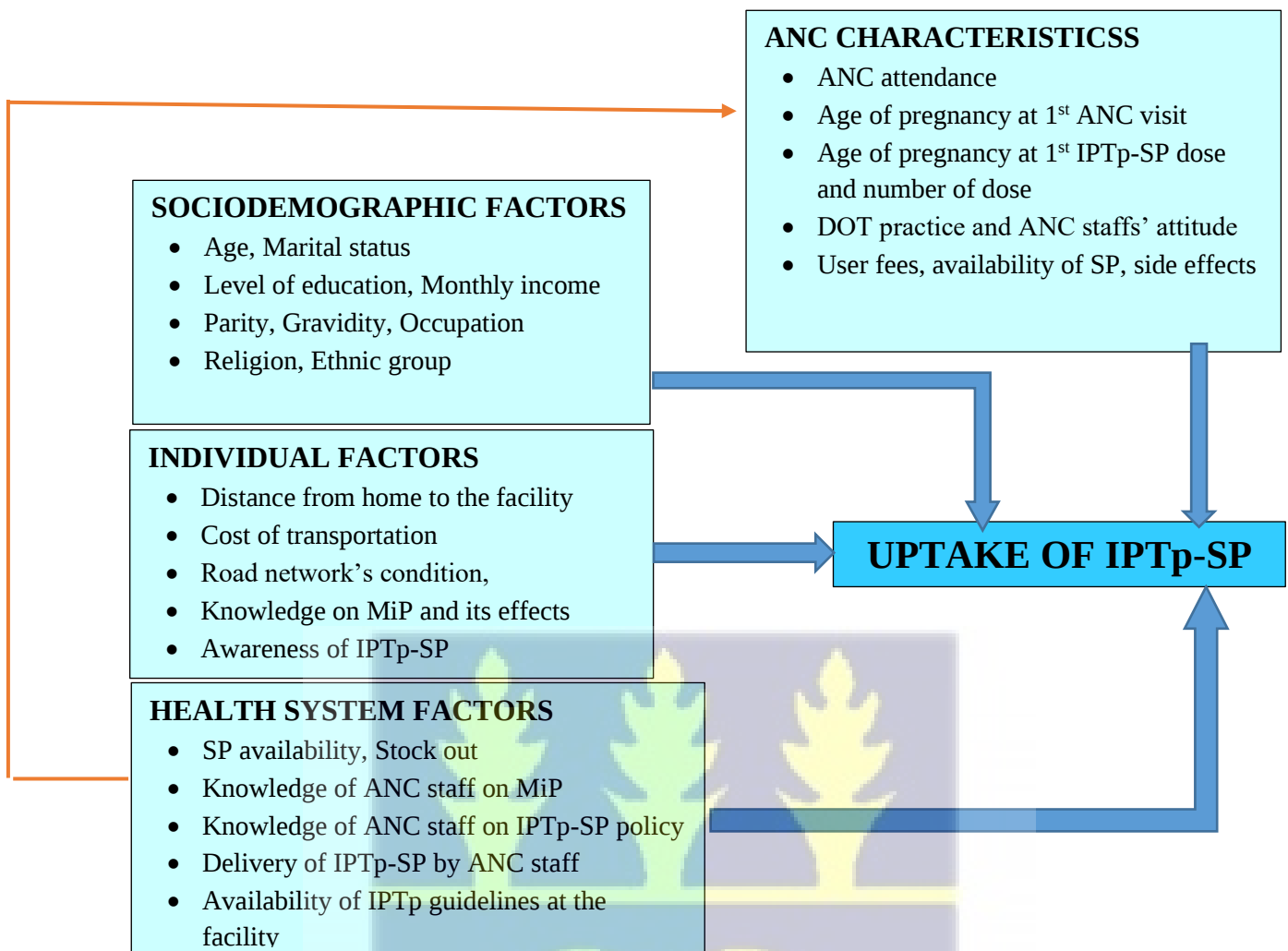


Figure 2: Conceptual Framework showing the interplay between socio-demographic, individual, and health system factors and ANC characteristics in relation uptake of IPTp-SP

Narrative of the conceptual framework

From the conceptual framework (figure 1), the main predictors are grouped as socio-demographic, individual factors and health system factors, and ANC characteristics.

Sociodemographic variables such as maternal age, marital status, educational level, monthly income, employment status, occupation, ethnic group, and religion, together with attitude of the ANC staff impact the health-seeking behaviour of pregnant women. Consequently, ANC attendance is affected, ultimately leading to low uptake of the

treatment. In addition, frequency of ANC visits, age of pregnancy at ANC initiation, availability of Sulphadoxine-Pyrimethamin, user fees, DOT practices may influence IPTp-SP uptake. Early initiation of ANC is likely to correlate with the number of IPTp-SP received by the pregnant woman. Knowledge of pregnant women and ANC staff on malaria in pregnancy, as well as IPTp-SP, may also influence the uptake of SP. The stock level **or the stock out** of SP in the health facility will ensure the continuity **or disruption** of the program, this will **also** influence IPT uptake. Availability of guidelines on IPTp-SP at the facility, caregivers' knowledge on MiP and IPTp-SP policy may influence IPTp-SP uptake as well.

1.5 Research Questions

1. What is the proportion of IPTp-SP utilization in the Shai-Osudoku District?
2. What is the level of knowledge of pregnant women and ANC staff on malaria in pregnancy?
3. What is the level of knowledge of nursing mothers and ANC clinic staff on IPTp-SP?
4. What are the underlying to the the low uptake of IPTp-SP in the Shai-Osudoku District?

1.6 Objectives

1.6.1 Overall Objective

To determine the factors that predict the low uptake of intermittent preventive treatment of malaria in pregnancy in the Shai-Osudoku District.

1.6.2 Specific Objectives

Specifically, the present study sought to;

1. Estimate the proportion of IPTp-SP utilization in the Shai-Osudoku District.
2. Assess the level of knowledge of pregnant women and ANC staff on malaria in pregnancy.
3. Assess the level of knowledge of pregnant women and ANC staff about IPTp-SP.
4. Identify the factors associated with the low uptake of IPTp-SP in the Shai-Osudoku District.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review existing literature in relation to the objectives of the present study. Proportion of IPTp-SP use, knowledge pregnant women have about malaria in pregnancy, knowledge of staff at the ANC on malaria in pregnancy, knowledge pregnant women have about IPTp-SP as well as factors associated with its uptake in pregnancy were examined and reviewed.

2.2 Proportion of IPTp-SP utilization

Use of IPT has generally been found to be high among women who are yet to give birth. A study in Senegal that assessed the impact of techniques used in malaria prevention found as many as 80.4% of the pregnant women had taken IPTp during their most recent pregnancy (Mbengue et al., 2017). Other studies elsewhere showed IPTp uptake was high in pregnant women, over 70% (Mwandama et al., 2015) and 94.8% (Buh et al., 2019).

Administration of at least 3 doses of IPTp during pregnancy has been reported to be high (Buh et al., 2019; Stephen et al., 2016). Buh et al (2019) recorded 93.2% and that of Stephen et al (2016) 91.5% of women who took 3 doses of IPTp, the number of doses required for pregnant women. In another study in Ghana, it was documented that pregnant women took three or four doses of IPTp-SP (Owusu-Boateng & Anto, (2017).

However, several other studies have reported lower numbers with regards to IPTp uptake in pregnant women (Ibrahim et al., 2017; Azizi et al., 2018; Chepkemai, 2013; Nkoka, Chuang, & Chen, 2018; Akinleye, Falade, & Ajayi, 2009). In one study the results showed

that only 56.5% had received two doses or more during pregnancy. Results from Akinleye, Falade, & Ajayi, (2009) showed unusually low uptake with only 27.3% of the study participants receiving at least one dose of IPTp, while research by Chepkemoi, (2013) showed 29.8% of study participants received three doses or more.

2.3 Knowledge of pregnant women on malaria in pregnancy

A study conducted in North-East Tanzania found that pregnant knew very well about the risks of malaria infection in pregnancy (Mubyazi et al., 2005). The responses from the participating women revealed their that malaria during pregnancy could lead to stillbirths, death before or whilst giving birth and profuse bleeding during childbirth and even afterwards. Also, they acknowledged that children born to mothers with malaria could get the infection from their mothers. However, notwithstanding the fact that women who were pregnant were aware about malaria, they did not have enough scientific knowledge about the disease and thus 60.4% not taking the appropriate preventive measures.

Research conducted by Akaba et al (2013) in a a Nigerian tertiary hospital on knowledge and utilization of techniques in malaria prevention among women who were pregnant yielded results that showed that many of the women had remarkable knowledge about malaria, as a preventable disease and the measures involved in prevention, with many of them stating ITNs an an effective preventive measure. Other studies involving pregnant women that examined knowledge about malaria including symptoms and effects of malaria in pregnancy showed that the women were well informed about the transmission and environmental dynamics of the disease (Ibrahim et al., 2017; Akaba, Otubu, Agida, & Onafowokan, 2013; and Mubyazi et al., 2005).

2.4 Knowledge of ANC staff on malaria in pregnancy

Knowledge of healthcare workers on malaria in pregnancy is as important as that of the pregnant women themselves as it helps them recognise and adequately differentiate between simple and complicated malaria, and thus influencing the type of treatment to be applied. Wunmi et al., (2018), found that in Primary Health Care, the proportion of health workers with adequate knowledge on malaria, mode of transmission, signs, symptoms and treatment was high. However, although they had adequate knowledge about malaria as a disease, their knowledge about simple and complicated malaria in terms of case definitions was not enough among these health workers. The reserach concluded that this lack of knolwedge about simple and complicated malaria could affect client managemebt and prognosis. Therefore, they recommended training health workers, especially for younger ones, in malaria case management, and increase in supervisory visits to health facilities in remote areas by experienced staff of the malaria control unit.

A study among healthcare workers in Ethiopia, 80% of the respondents were able to adequately name vector control techniques as part of national malaria prevention and control techniques. These techniques included the use of Indoor Residual Spraying (IRS), Long-Lasting Insecticide-Treated Nets (LLINs) and other environmental control measures. However, healthcare staff in private practice lacked knowledge and malaria case management practice (Argaw, 2015).

2.5 Knowledge of pregnant women about IPTp-SP

According to Akinleye et al., (2009), knowledge on IPTp-Sp by pregnant women is a major factor influencing in uptake. Chepkemoi (2013), also confirmed this finding that IPTp-SP utilization was significantly associated with knowledge of pregnant women. In

the Hohoe municipality in Ghana, it was found that pregnant women's knowledge on IPTp-Sp was very low, and that just 21% of study participants had adequate knowledge on the medication (Kweku et al., 2017). Findings from this study corroborated that from Akinleye et al. (2009) that showed women had poor knowledge, and practice about the drug used in the IPTp-SP strategy, with majority of respondents unable to indicate that sulfadoxine-pyrimethamine (SP) is the drug of choice for IPTp. Majority were also unaware that pregnant women are to be given IPTp. In contrast, Akaba et al., (2013) found that 84.4% of women had knowledge about IPTp against malaria.

2.6 Knowledge of ANC staff about IPTp-SP

Knowledge of IPTp uptake is as necessary among pregnant women as it is among the ANC staff who attend to the pregnant women to enable drug dispensation as and when necessary. In 2005, Mubyazi, Bloch, Kamugisha, Kitua, & Ijumba, (2005) published a paper in which the authors showed that knowledge among dispensary staff, as well as district level staff was satisfactory, with staff being able to adequately mention SP as the drug of choice for IPTp. Other studies have shown contrasting results where only 2 out of 6 ANC staff could correctly define IPTp (Stephen et al., 2016). Another study in found that midwives had very low level of knowledge about IPTp and recommended that training be organised to equip them with this information so as to be able to pass the information along to pregnant women in their care (Kweku et al., 2017).

2.7 Factors associated with IPTp-SP uptake

Several factors have been identified to be associated with use of IPTp-Sp. These factors include; ANC visits including number and timing, number of children the pregnant woman already have, socio-demographic characteristics, socio-economic class, knowledge about

IPTp-SP, educational level and knowledge on malaria in pregnancy. These factors have been explained in the subsequent sections.

Age

A study that investigated the effects of age on IPTp uptake the results showed that women in the age group 35-49 years were more likely to, and had higher IPTp use than their 20-year old counterparts (Mbengue et al., 2017). Assessment of IPTp in various studies and settings showed that pregnant women less than 39 years were more likely to use and complete IPTp than other age groups (Kibusi, Kimunai, & Hines, 2015; Nkoka et al., 2018). Two other studies in particular emphasized that being 24 or younger was more likely to complete IPTp uptake than any others (Nkoka et al., 2018; Stephen et al., 2016). On the other hand, Azizi et al., (2018) found that the probability of at least 3 doses of IPTp uptake being completed by 25-34 year old women was higher than by those in the 15-24 age bracket.

Marital status

A study by Chepkemai, (2013) showed that married women would probably take IPTp as compared to widows, or single women. Again, similar results were shown in the study by Exavery et al., (2014) where previously married women including divorcees and widows were less likely by as much as 60% to receive IPTp as compared to still married women. Kibusi, Kimunai, & Hines, (2015) also confirmed these findings from their research which showed that marriage, or co-habiting increases chances of IPTp uptake.

Income

Chepkemai, (2013) found that averagely, higher income increases probability of pregnant women taking IPTp2+. In Senegal, the middle and richer quintile of wealth recorded pregnant women who were significantly associated with higher IPTp-SP uptake (Mbengue et al., 2017), confirming similar studies by Kibusi et al., (2015). Mwandama et al., (2015) identified that compared to women in the poorest wealth qaurtile, women in the least poor quartile had increased chances of taking two or more doses of IPTp.

Educational level

Among pregnant women, educational level has been found to have a significant relationship with IPTp-SP utilization (Mwandama et al., 2015; Buh et al., 2019). Women with no education reported low uptake of IPTp-SP than women who had completed primary school, secondary or above were more likely to receive two or more doses of IPTp than women who had no education (Mwandama et al., 2015). Buh et al., 2019; Chepkemai, 2013; Kibusi et al., 2015). Women who had higher education with higher odds of taking of IPTp than with those with no education. These findings were confirmed by Azizi et al (2018) and Exavery et al (2014).

Employment status

In investigating the predictors of uptake of intermittent preventive treatment of malaria in pregnancy, Ibrahim et al (2017) reported that there was no significant association between employment status and IPTp-SP uptake. However, other studies (Kibusi et al., 2015; Stephen et al., 2016) found employment status to have a relationship. In the Kibusi et al (2015) study, the results showed that being unemployed or self-employed led to lower IPTp-SP uptake. In the Stephen et al., (2016) study, most unemployed participants had to rely on their husbands and relatives for transportation and other costs to attend ANC.

Therefore, the decision for uptake was influenced heavily by others, but not necessarily the pregnant women refusing the IPTp-SP.

Parity

Women with high parity were less likely to take IPTp compared with those with lower parity (Kibusi et al., 2015). However, Stephen et al (2016) found mothers who were multigravida to be positively associated with adequate IPTp uptake.) These findings were in contrast with that of Akaba et al (2013) that found no statistical association between the use of malaria preventive medicine in index pregnancy compared with parity of the study participants.

Timing of ANC visit

The timing of the first visit has also been found to influence IPTp-SP. Kibusi et al (2015) found that pregnant women who had their ANC visit in the third trimester had low level of uptake of IPTp-SP. Pregnant women who initiated ANC at least 6 weeks into pregnancy were more likely to use both ITN and IPTp than those who went for their first ANC after 6 weeks of pregnancy (Mbengue et al., 2017). Stephen et al., (2016) also found similar results by stating that pregnant women who had late first ANC visits were also found to have a relation with taking inadequate IPTp-SP and this was similar in the findings of Owusu-Boateng & Anto (2017). Nkoka et al (2018) asserted that initiation of ANC in the first and second trimesters significantly increases the odds of taking the recommended IPTp dose. Similarly, findings from a study conducted by Chepkemai, (2013) confirmed these findings where pregnant women starting ANC visits in the second month had an increased odds of taking IPTp2+ as those initiating ANC attendance in the sixth month of pregnancy.

Number of ANC visits

ANC visit influences the uptake of IPTp. The number of ANC visits by pregnant women was identified by Mbengue et al (2017) as a significant predictor of the uptake of malaria prevention methods during pregnancy. In their study, they observed that women who completed at least four antenatal visits or more were 1.46 times more likely to have an optimal uptake of malaria prevention methods during pregnancy. Just like Mbengue et al (2017)'s findings, Azizi et al (2018) also agreed with their finding that a pregnant woman who goes for at least 4 ANC visits had the probability of taking three or more doses than those making three or fewer visits, and this was similar to the findings of Owusu-Boateng & Anto (2017) and Nkoka et al (2018).

Age of pregnancy at first IPTp-SP

The time of the pregnancy at the woman's first IPTp-SP uptake is a key determinant. Owusu-Boateng & Anto (2017) reported that, in Ghana, women who have received the first dose of SP in the third trimester were less likely to receive either more or equal doses of SP compared to those who received the drug in the second trimester.

Direct Observed Treatment practice

Regarding DOT practice whereby a healthcare professional watches and a pregnant woman takes each dose of medication was also found to be an essential factor associated with the uptake of the recommended dose of IPTp-SP. Azizi et al (2018) asserted that pregnant women who took SP under the DOT approach each time had a higher likelihood of taking three or more doses compared to those who did not take SP under DOT at ANC visits.

Knowledge on malaria and IPTp-SP

Knowledge of malaria and IPTp-SP has been found to be one of the main factors associated with IPTp-SP utilization. Though researchers (Ibrahim et al., 2017; Mubyazi et al., 2005) found a significant relationship with knowledge levels and IPTp utilization, Akaba et al., (2013) argued knowledge of malaria and the use of malaria preventive drugs do not predict uptake of IPTp-SP. Nonetheless, Ibrahim et al., (2017) still argued with their findings that the knowledge of MiP and knowledge of IPT for MiP were found to have a positive effect on the uptake of optimal doses of SP.

Geographical location

Findings from other literature showed that IPTp utilization was influenced by the geographical location of pregnant women. Azizi et al., (2018) stated in their work that women who were in the rural areas were less likely to complete the recommended SP doses during pregnancy due to their daily activities. Kibusi et al., (2015) also showed in their findings that those who lived in the urban areas in Tanzania were associated with completing two or more doses. Onoka et al., (2012) confirmed this factor as a key determinant as they showed in their study that 16.9% of the women in urban areas and 8.6% in rural areas accessed IPTp-SP during their pregnancy.

Distance to the health facility

How long the pregnant woman takes to get to the health facility has also been found as a factor that affects the utilization of IPTp-SP. Azizi et al., (2018) showed in their study that the distance of the health facility led to ignorance of the recommended SP doses by pregnant women. This finding was corroborated by Chepkemai (2013) who also reported that women who lived in proximity (less than one hour walk) to a health facility had about

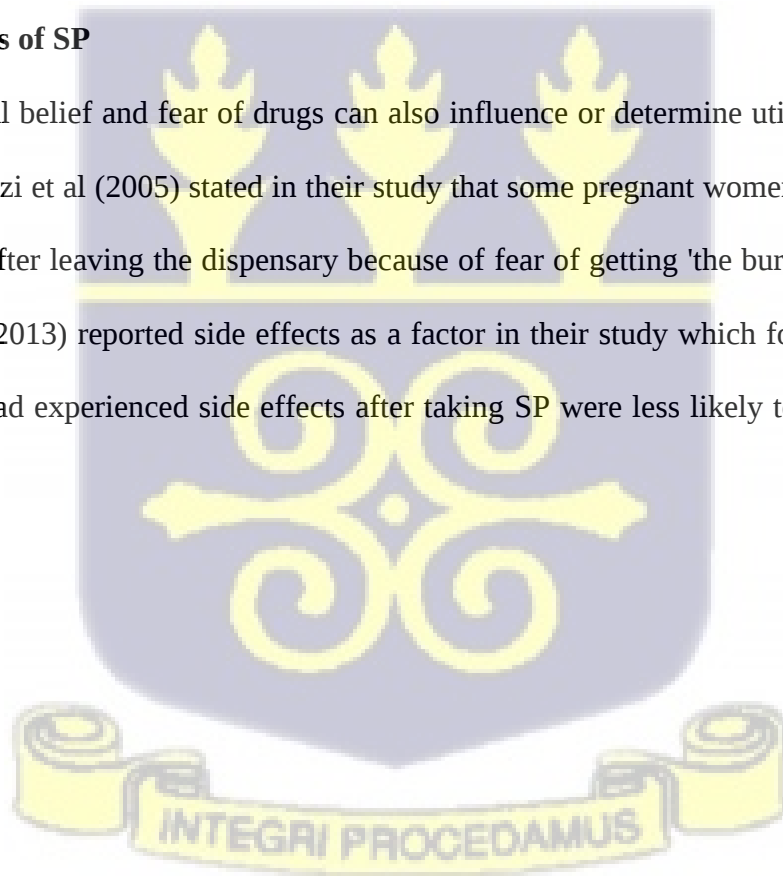
6.4 times the odds of taking IPTp2+ compare to those dwelling within a distance of more than 4 hour's walk. This made the researcher conclude that women who lived close to ANC facilities had a higher the odds of women taking IPTp2+.

Waiting time

The duration of stay of the women in the health facility also served as a factor. Chepkemoi, (2013) further stated that women who perceived the service delivery duration as short were 3.1 times as likely to take IPT2+ as with women who perceived the service delivery duration to be long.

Side effects of SP

The general belief and fear of drugs can also influence or determine utilization of IPTp-SP. Mubyazi et al (2005) stated in their study that some pregnant women threw away the SP drugs after leaving the dispensary because of fear of getting 'the burning of the skin'. Hill et al (2013) reported side effects as a factor in their study which found that women who had had experienced side effects after taking SP were less likely to take IPTp with SP.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter outlines the research methods that were used to collect data for this study, from the design stage to data analysis. The chapter begins by explaining the research designs, research setting, research population and sample size, research instruments variables, data analysis strategies and ethical issues.

3.2 Study design

A cross-sectional study was conducted at selected health facilities using a quantitative data collection technique by administering a questionnaire to ANC staff and postpartum women seeking postnatal care. The study was conducted between June and July 2019. The selected health facilities were:

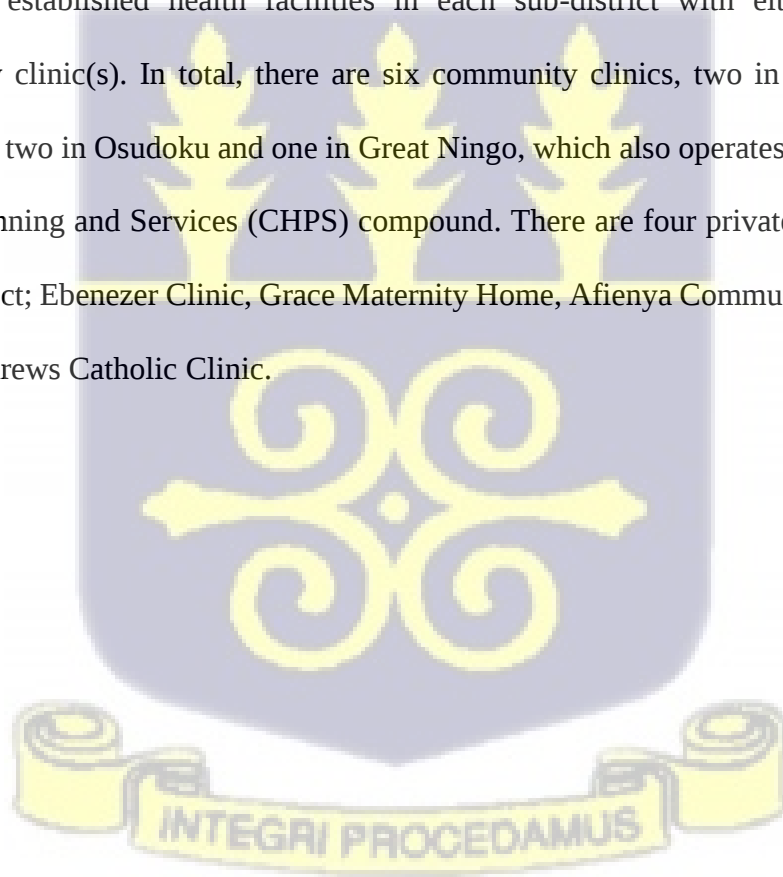
- Shai-Osudoku District Hospital
- Agomeda Health Centre
- Osudoku Health Centre
- St Andrews Catholic Clinic

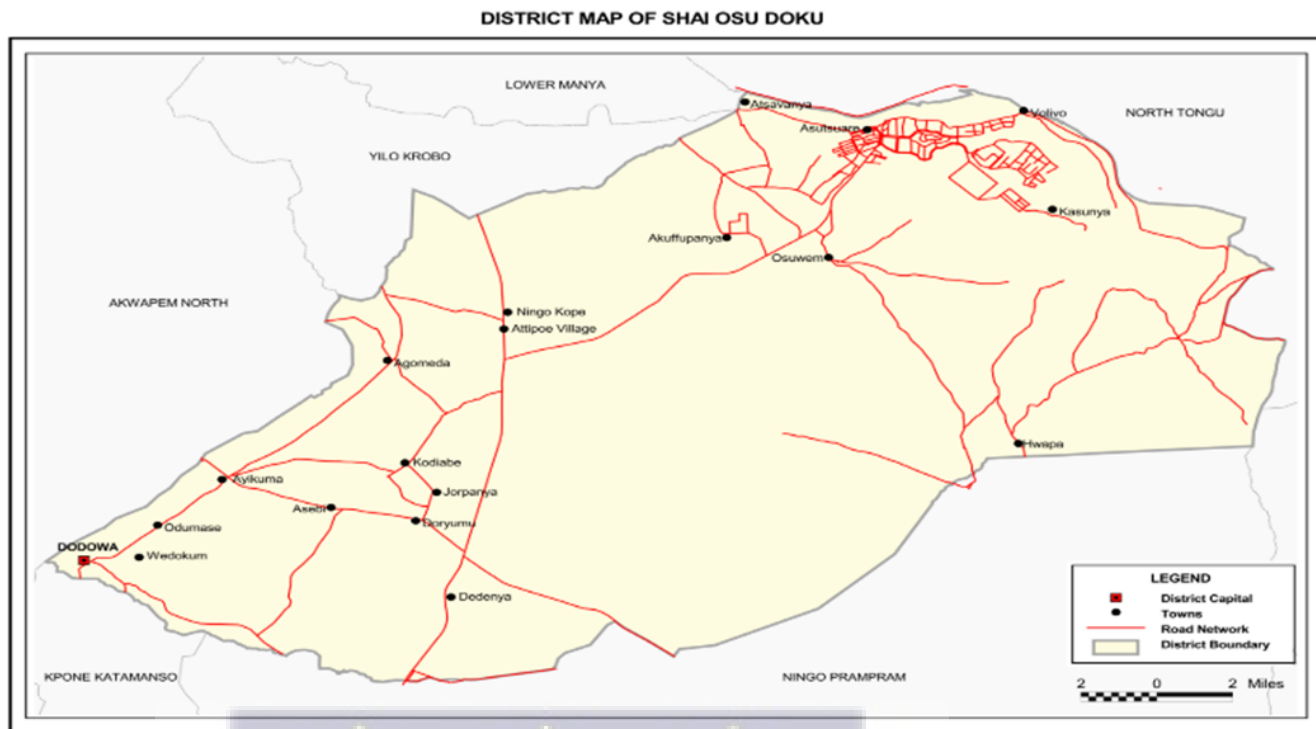
3.3 Study area

The Shai Osudoku District (formerly known as Dangme West district) lies in the South-eastern part of Ghana, between latitude 5° 45' south and 6° 05' North and Longitude 0° 05' East and 0° 20' West. The district was demarcated out of the former Dangme District in 1988 during a national re-demarcation exercise carried out in relation to decentralization reforms in the country. The District was established by Legislative Instrument (LI) 2039.

Shai Osudoku District is among the sixteen (16) metropolitan areas, municipalities, and districts assemblies in the Greater Accra Region and is bordered by Ada West on the east, Ningo-Prampram District on the south, Akwapim North Municipal on the west and Tema metropolitan on the north. The Administrative Capital is Dodowa. According to the 2010 population and housing census report, the population of the district is estimated at 51,913 with 25,292 males and 26,621 females.

There are four administrative sub-districts in the district; Dodowa, Prampram, Great Ningo (Formerly Old Ningo) and Osudoku sub-districts. The latter sub-districts (Great Ningo and Osudoku) have larger land masses compared to the Prampram and Dodowa sub-districts. There are established health facilities in each sub-district with either one or two community clinic(s). In total, there are six community clinics, two in Dodowa, one in Prampram, two in Osudoku and one in Great Ningo, which also operates as a Community Health Planning and Services (CHPS) compound. There are four private health facilities in the district; Ebenezer Clinic, Grace Maternity Home, Afiencya Community Based Clinic and St Andrews Catholic Clinic.





Source: Ghana Statistical Service, GIS

Figure 3: Shai Osudoku District Map

3.4 Study population

The study participants were nursing mothers attending PNC at the selected facilities who had delivered twelve weeks ago and health personnel at the ANC clinic.

3.4.1 Inclusion Criteria

The study included participants who satisfied the following criteria:

- Registered women who had their babies in the past three months and had their antenatal care at the selected facilities.
- Health personnel at the ANC clinic who had worked with the health facility for at least 12 months and present at the time of data collection.

3.4.2 Exclusion Criteria

The following potentially eligible participants were not included;

- Nursing mothers who did not wish to participate or were absent throughout the study period were excluded.
- Nursing mothers who met the inclusion criteria but were deaf and dumb, could not speak for themselves were excluded as there was no sign language expert to help.
- ANC staff who had worked at least twelve months but refused to consent or were absent at the time of the study.

3.5 Sample size and Sampling technique:

The number of participants (registered women) were estimated as follows;

$$n = \frac{z^2 p(1 - p)}{d^2}$$

n = number of participants required (sample)

Z = 1.96 at alpha = 0.05 (95% confidence level)

p = 37.91% = 0.3791 (IPT3 proportion in Shai-Osudoku District, DHIMS 2018)

d = desired precision level of 0.05

Therefore

$$n = \frac{1.96^2 * 0.3791(1 - 0.3791)}{0.05^2}$$

n = 362.

Thirty-eight (10%) more participants were added to the sample as a redundancy for non-response.

3.5.1 Sampling Technique

A consecutive sampling method was employed in selecting study participants. Every nursing mother who reported at the selected health facilities, met the inclusion criteria and consented to participate was recruited for the study. A structured questionnaire was used to collect data from included health personnel who were stationed at the ANC clinic in a selected health facility.

3.6 Research Instrument

Data on the study variables was collected through the administration of structured questionnaires, and face-to-face interviews with participants. **The questionnaire was developed in English then translated into different local dialects to suit the preference of each participant. Data on sociodemographic variables including age, marital status etc; ANC service; knowledge on malaria in pregnancy and IPTp-SP, were collected from nursing mothers. The part of the questionnaire asking questions on ANC staff, had three sections: sociodemographic characteristics, knowledge on MiP and IPTp-SP. All questionnaires were administered.** The questionnaires were administered by the principal investigator and two research assistants.

3.7 Variables for the Study

Outcome variable:

The outcome variable was low uptake of IPTp-SP, defined as uptake of fewer than 3 doses of SP during pregnancy.

Predictor variables:

Classification of predictor variables;

- **Socio-demographic characteristics:** age, marital status, level of education, occupation, place of residence, religion, ethnic group, monthly income, number of pregnancies
- **ANC services:** age of pregnancy at first ANC, number of ANC visits, age of pregnancy at first IPTp-SP dose, side effects, DOT practice, user fees
- **Individual factors:** knowledge of malaria during pregnancy and IPTp-SP, cost of transportation, road network's condition, distance from home to health facility
- **Health system factors:** Accessibility of SP, knowledge of ANC staff on malaria in pregnancy, IPTp administration, the attitude of ANC providers, availability of IPTp guidelines at the facility.

Nursing mothers' knowledge on malaria infection during pregnancy

This study evaluated nursing mothers' knowledge on malaria in pregnancy on the following areas: malaria transmission, malaria risk factors, main signs/symptoms of malaria, complications of malaria in pregnancy and prevention methods for malaria in pregnancy. For each question answered correctly, 1 mark was awarded while a wrong answer was awarded no mark (0). For each section, the following number of questions were asked; malaria transmission – 1 question, malaria risk factors – 2 questions, main signs/symptoms of malaria – 4 questions, complications of malaria in pregnancy – 5 questions, prevention of malaria in pregnancy – 2 questions, overall knowledge – 14 questions. The total marks awarded under knowledge on malaria in pregnancy were computed and later categorized as follows:

- Poor knowledge (0-6 points) and
- Good knowledge (7-14 points).

Level of knowledge on IPTp-SP among nursing mothers

This study assessed nursing mothers' level of knowledge on IPTp-SP in the following areas: benefit of IPTp-SP, time to start IPTp-SP, the interval of IPTp-SP administration, doses required, under each area there was only one question asked making a total of 5 questions. For each question answered correctly, 1 mark was awarded while a wrong answer was awarded no mark (0). The total of points scored under knowledge on malaria in pregnancy was computed and later categorized as follows:

- Poor knowledge (0-2 points) and
- Good knowledge (3-5 points).

Knowledge about malaria in pregnancy among health personnel at the ANC clinic in the selected health facilities

The knowledge of ANC clinic health workers was evaluated on the following; malaria transmission and its effects on pregnant women and the unborn baby, the population most at risk of malaria, and prevention of malaria in pregnancy. For each section, the following number of questions were asked; malaria transmission – 1 question, effects of MiP on pregnant women – 4 questions, effects of MiP on the unborn baby – 5 questions, population most at risk of malaria – 3 questions, MiP prevention – 3 questions, overall knowledge – 16 questions. The total marks awarded under knowledge on malaria in pregnancy was computed and later categorized as follows:

- Poor (0-2 points),
- Moderate (3-5 points),
- Average (6-8 points),
- Good (9-11 points) and
- Very Good (12-16 points).

Level of knowledge of IPTp-SP among health personnel at the ANC clinic in the selected health facilities

This study evaluated the knowledge of staff at the ANC clinic on IPTp-SP on; IPTp definition, drug used for IPTp-SP, time to start IPT-SP, interval of IPTp-SP administration, doses required, number of tablets, under IPTp definition, drug used for IPTp-SP, interval of IPTp-SP administration, doses required, number of tablets there was only one question, under time to start IPT-SP there 2 questions asked, making a total of 6 questions. For each question answered correctly, 1 mark was awarded while a wrong answer was awarded no mark (0). The total of points scored awarded was computed and later categorized as follows:

- Poor (0-2 points),
- Average (3 points) and
- Good (4-6).



Table 3.1: Variables

Variables	Name of variable	Operational definition	Measurement scale
Uptake of IPTp-SP	Low uptake of IPTp-SP	<3 doses of IPTp-SP	Binary
Sociodemographic	Age	Age of the respondent in years	Continuous
	Marital status	Married or single	Categorical
	Level of education	Highest level of formal education attained	Categorical
	Monthly income	Monthly income of the respondent	categorical
	Occupation	Employed, unemployed, self-employed	Categorical
	Gravidity	Number of pregnancies	Continuous
	Parity	Number of live births of the respondent	Continuous
	Ethnic group	Ethnic group of respondents	Categorical
	Religion	Religion of respondent	Categorical
ANC variables	Number of visits	Number of times the respondent went for ANC during the last pregnancy	Continuous
	Age of pregnancy at ANC initiation	Stage of pregnancy in weeks at which first ANC visit was made	Continuous
	Age of pregnancy at first IPTp-SP dose	Stage of pregnancy in weeks at which the first dose of IPTp-SP was received	Continuous
Individual factors	Knowledge on MiP and its effects	Knowledge of respondent on malaria in pregnancy and its effects on pregnancy.	Categorical
	Knowledge on IPTp-SP	Knowledge of respondent on IPTp-SP	Categorical
	Distance from home to health facility	Not far, far, very far	Categorical
	Road network condition	Poor, good	Binary
Health system factors	Availability of SP	Availability of SP at the time of the study	Binary
	Knowledge of ANC staff on MiP	Knowledge of ANC staff on MiP	Categorical
	Knowledge of ANC staff on IPTp-SP	ANC staff knowledge on IPTp-SP current policy	Categorical
	DOT practice in the facility	Application of DOT when delivering IPTp-SP services	Binary
	Training of ANC health workers on IPTp	ANC health who had formal training on IPTp-SP	Binary
	IPTp guidelines	Availability of IPTp guidelines at the facility	Binary

Training of Co-investigators and Piloting of study instruments

People who were fluent (both written and spoken) in English and the local languages (Ga-Dangme, Ewe, and Twi) which are prominently spoken in the study location were recruited trained in how to conduct interviews before commencing fieldwork. They were also sufficiently informed on the purpose of the study. The data collection instruments were piloted and then reviewed with the team of investigators to ensure standardization and coherence.

Data collection and management

Data was collected from 15th July to 3rd August 2019 using structured questionnaire. Each participant was informed sufficiently on the aim and relevance of the study and then asked to endorse an informed consent statement before given the questionnaire. Hard copies of all completed questionnaires were kept in locked office cabinets with access restricted to only the principal investigator. Electronic copies of the collected data was saved on a password-protected computer, with secure backups on Google Drive in the cloud.

3.8 Data Analysis

Data was entered into Excel and then exported to STATA 15 for statistical analysis. Descriptive statistics presented for categorical data were frequencies and percentages while means with standard deviations were presented for continuous variables for normally distributed or transformed data. In univariate analyses, the Chi-Square test of association was used to evaluate the relationship between the outcome variable and the various predictor variables. In multivariate analyses, binary logistic regression models were fitted to evaluate the variables (factors) that predict the outcome (low uptake of IPTp-

SP). For all analyses, the confidence level was set at 95% ($\alpha = 0.05$). Binary effect estimates were presented with their 95% confidence intervals (CIs).

3.9 Ethical Considerations

In line with best scientific practices, ethical considerations for aspects of primary research involving humans were strictly adhered to.

3.9.1 Ethical Approval

The Ethics Research Committee of the Ghana Health Service vetted the proposal for this study and granted ethical approval. The registration number for this study is **GHS-ERC 065/04/19**.

3.9.2 Approval from Study Areas

The principal investigator presented and contacted the Regional Health Directorate (Greater Accra) and the District Health Directorate (Shai-Osudoku) to obtain the requisite permission to enable data collection from the health facilities.

3.9.3 Participants' Consent

Consent of the participants was sought before they could be included in the study. The aim of the study, guarantee of privacy, discretion and the right to withdraw were explained. Eligible individuals for the study were enrolled after they have reviewed and authorized a printed informed consent document before they could respond to the questions in the questionnaire.

3.9.4 Privacy and Confidentiality

Data was collected using identifiers rather than the names of participants to ensure confidentiality. Only the PI and supervisor could access the data.

3.9.5 Potential Risk/Benefit

The participants were assured that the study was un-invasive and unlikely to cause any harm. The study involved only the administration of the questionnaire to the participants and except the time that they used to complete the questionnaire, there were no risks or benefits (direct or indirect) of participation in the study.

3.9.6 Compensation

There was no remuneration or compensation given to study participants.

3.9.7 Data Storage and Usage

All gathered information was electronically stored on a password-protected personal computer and on Google drive with data encryption enabled, with access was limited to only the principal investigator and the supervisor. Both electronic data and hard copies will be stored for at least five (5) years post-completion of the study.

3.9.8 Conflict of Interest Statement

The principal investigator, supervisor or research assistants all declare that there are no conflicting interests in the conduction of this study.

3.9.9 Funding

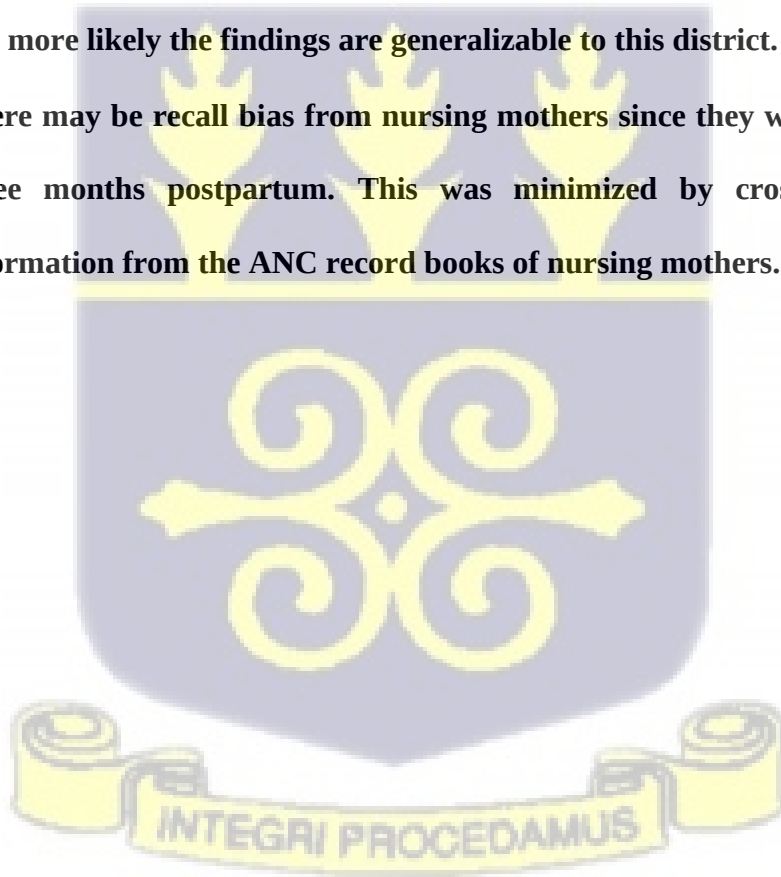
The WHO/TDR provided funding for this study.

3.10 Dissemination of Results

The researcher will make available the study results to the Ministry of Health (MoH), National Malaria Control Program, other stakeholders and the health facilities where the study was conducted. A manuscript will be submitted to an open-access peer-reviewed journal for publication.

3.11 Study limitations

- The present study was conducted only in one district of the Greater Accra region, hence the findings may not be representative for the whole region. However, given that the study has covered a number of facilities in the district, it is more likely the findings are generalizable to this district.
- There may be recall bias from nursing mothers since they were interviewed three months postpartum. This was minimized by cross-checking the information from the ANC record books of nursing mothers.



CHAPTER FOUR

RESULTS

4.1 Demographic characteristics

Four hundred nursing mothers with the mean age of 26.9 ± 7.71 were involved in this study. More than half (53.5%) were aged 25-34 years with only (10.3%) aged between 35 and 44 years. More, 213/400 (53.3%) of the mothers were married with 13.7% being single parents. With regards to education, 8.3% did not have any formal education, 15.5% had primary education, majority 45.2% had JHS education and only 9.2% had tertiary education. Almost half (47.0%) were self-employed (seamstress, hairdressers, petty traders, subsistent farmers etc.), followed by those working in the public sector (41.5%) with (6.3%) being unemployed. Majority (89.8%) of the mothers lived in rural settings, and 90% were Christians. The most dominant ethnic group was Ga-Dangme (50.5%) followed by Ewe (26.8%) and Akan (15.2%). Most (57.8%) of the mothers have had between 2 and 4 pregnancies and 45% indicated that they had 2 to 3 children. The vast majority (71.8%) of the nursing mothers earned less than GHS300 per month.

Table 4.1: Socio-demographic characteristic of nursing mothers living in the Shai-Shai-Osudoku District who participated in the study

Characteristic	Frequency (n=400)	Percentage (%)
Mean age in years $\pm$ SD: 26.9 ± 7.71		
15-24	145	36.2
25-34	214	53.5
35-44	41	10.3
Marital Status		
Single	55	13.7
Married	213	53.3
Cohabitant	132	33.0
Educational Level		
None	33	8.3
Primary	58	15.5
JHS	181	45.2
Secondary	91	22.8

Tertiary	37	9.2
Employment Status		
Employed Public sector	166	41.5
Employed Private Sector	21	5.2
Unemployed	25	6.3
Self-Employed	188	47.0
Place of Residence		
Rural Setting	359	89.8
Urban Setting	41	10.2
Religion		
Christianity	360	90.0
Islamic	36	9.0
Traditional	4	1.0
Ethnic Group		
Ga-Dangme	202	50.5
Ewe	107	26.8
Akan	61	15.2
Others	30	7.5
Number of pregnancies		
1	134	33.5
2-4	229	57.3
5+	37	9.2
Number of children		
1	138	34.5
2-3	180	45.0
4+	82	20.5
Income (GHS)		
<300	287	71.8
300-500	70	17.5
>500	43	10.7

SD = Standard deviation

4.2 ANC attendance and IPTp-SP uptake

Antenatal care attendance and uptake of IPTp-SP are summarized in Table 4.2 below.

Almost half, 199/400 (49.8%) of the mothers specified they started ANC in their first trimester whilst 29/400 (7.2%) had their first ANC attendance in their third trimester. More 253/400 (63.2%) had less than 8 ANC contacts with their health care provider while 42/400 (10.5%) said they did not receive any dose of Sulfadoxine-Pyrimethamine during their last pregnancy. More than half, 264/358 (73.7%) were given the first dosage of

Sulfadoxine-Pyrimethamine in the second trimester. Among those who took Sulfadoxine-Pyrimethamine, 354/358 (98.9%) were taken under the supervision of a midwife. Majority 253/358 (70.7%) of those who took the drug indicated they experienced some side effects. More than half, 237/400 (59.3%) stated health facilities were far from their place of residence, another 222/400 (55.5%) indicated waiting time to see a health professional was long. With regard to the road network, 227/400 (56.7%) opined the road network to health facilities was good and 153/400 (38.2%) indicated that the transportation cost to health facilities is expensive.

Table 4.2: ANC attendance and IPTp-SP uptake of mothers in the Shai-Osudoku District who were interviewed in this study

Characteristics	Frequency (n=400)	Percentage (%)
Age of pregnancy at ANC initiation		
1 st trimester	199	49.8
2 nd trimester	172	43.0
3 rd trimester	29	7.2
Number of ANC visits		
<8	253	63.2
≥8	147	36.8
Receive SP		
No	42	10.5
Yes	358	89.5
Age of pregnancy at first dose of SP (n=358)		
First trimester	19	5.3
Second trimester	264	73.7
Third trimester	75	21.0
Number of doses received (n=358)		
None	42	10.5
1 dose	47	11.7
2 doses	69	17.3
3 doses	111	27.8
4 doses	86	21.5
5 doses	43	10.7
6 doses	2	0.5
Distance to the health facility		
Not far	163	40.7
Far	237	59.3
Waiting time		
Not long	178	44.5
Long	222	55.5
Road network		
Poor	173	43.2
Good	227	56.8
Transportation expensive		

Yes	153	38.2
No	247	61.8
Keeping appointment		
No	94	23.5
Sometimes	69	17.2
Yes	237	59.3
DOT practice (n=358)		
Took drug under supervision	354	98.9
Did not take the drug under supervision	4	1.1
Experienced side effects (n=358)		
No	105	29.3
Yes	253	70.7
Side effects prevented you from taking subsequent doses (n=253)		
Yes	16	6.3
No	237	93.7

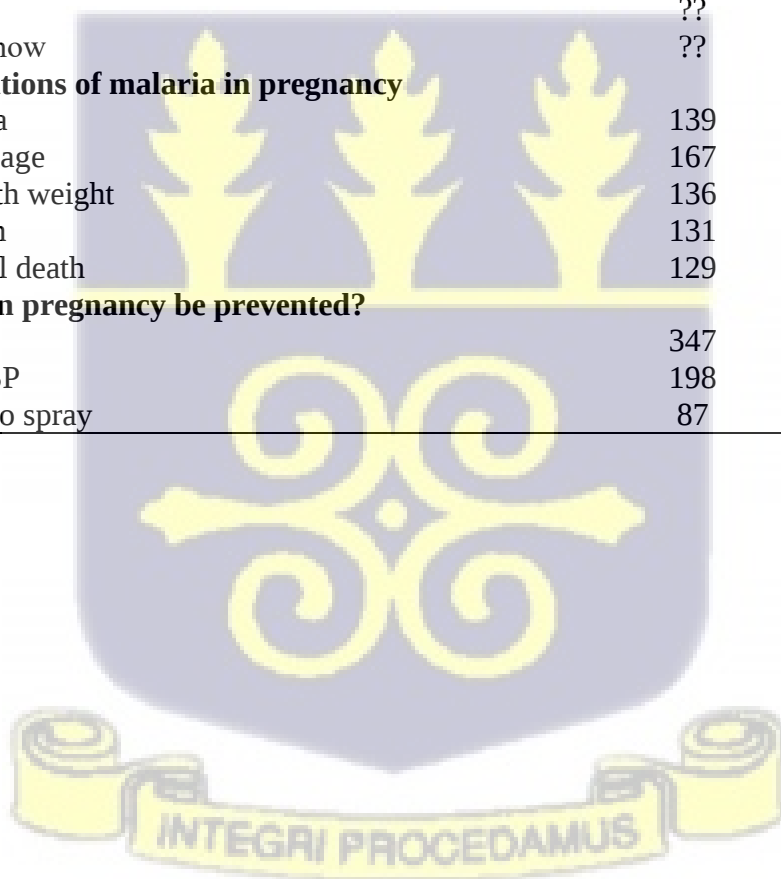
4.3 Nursing mothers' knowledge on Malaria

A large proportion (98.0%) of the nursing mothers had heard about malaria and 381/400 (97.2%) knew it was caused through a mosquito bite. With respect to presentation of malaria, participants identified fever 261/400 (66.8%), vomiting 228/400 (58.2%) and headache 205/400 (52.3%) as the main signs and symptoms. Majority-372/400 (94.9%) said malaria during pregnancy poses a serious health risk. Miscarriage 167/400 (42.6%), Anaemia (35.5%, 139/400), low birth weight 136/400 (34.7%) and maternal health 129/400 (32.9%) were stated as the major adverse events or complications associated with MiP. The vast majority associated use of LLIN 347/400 (88.5%) as the main preventive measure of malaria whilst half 198/400 (49.5%) knew SP use was a preventive measure of malaria in pregnancy.



Table 4.3: Nursing mothers' knowledge on malaria including cause, presentation, risks to mother and child and preventive measures

Variable	Frequency (n=400)	Percentage (%)
Heard about malaria		
No	8	2.0
Yes	392	98.0
Cause of malaria		
Bite from infected female anopheles mosquito	381	97.2
Sun	3	0.8
Housefly	4	1.0
Do not know	4	1.0
Symptoms of malaria		
Headache	205	52.3
Fever	261	66.8
Vomiting	228	58.2
Malaria during pregnancy a serious health risk		
Yes	372	94.9
No	??	??
Don't know	??	??
Complications of malaria in pregnancy		
Anaemia	139	35.5
Miscarriage	167	42.6
Low birth weight	136	34.7
Stillbirth	131	33.4
Maternal death	129	32.9
Malaria in pregnancy be prevented?		
LLIN	347	88.5
Use of SP	198	50.5
Mosquito spray	87	22.2



In total, 75.3% (95% CI: 70.7%-79.4%) of participants had good knowledge on malaria.

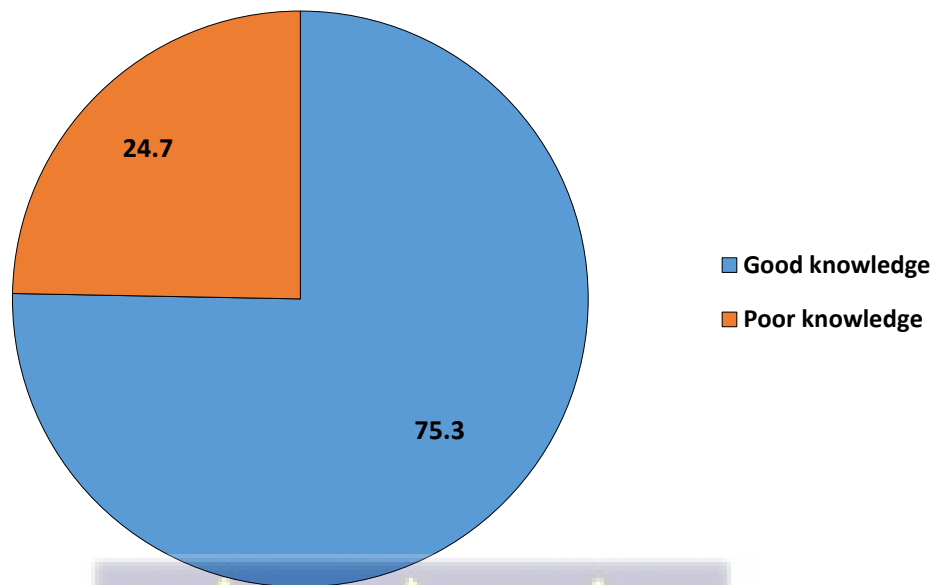


Figure 4: Nursing mothers' knowledge on Malaria

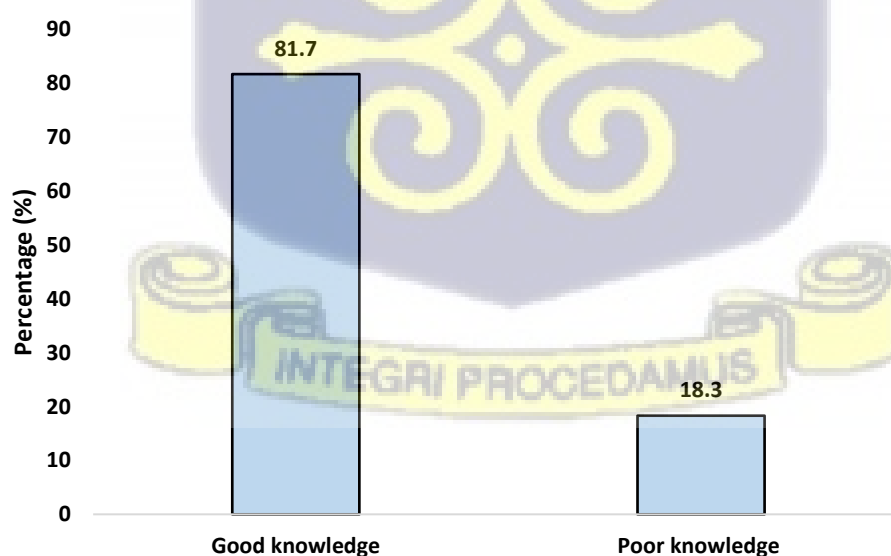
4.4 Nursing mothers' knowledge on IPTp-SP

With respect to the nursing mother's knowledge, most, 344/400 (86.0%) knew about IPTp-SP and 306/400 (76.5%) knew the benefits of the drug. More of the mothers stated the recommended time for a pregnant woman to begin taking SP was the second trimester, 147/400 (36.8%) indicated they did not know when. A large proportion, 268/400 (67.0%) of the mothers specified SP is given at monthly intervals and 111/400 (27.7%) did state they did not know the interval at which SP is administered. Close to half, 181/400 (45.3%) stated the minimum dose of IPTp-SP was 3.

Table 4.4: Nursing mothers' knowledge on IPTp-SP

Variable	Frequency (400)	Percentage (%)
Know of IPTp-SP?		
Yes	344	86.0
No	56	14.0
Know the benefits of IPTp-SP		
No	94	23.5
Yes	306	76.5
When is the treatment started?		
First trimester	95	23.7
Second trimester	144	36.0
Third trimester	14	3.5
Do not know	147	36.8
Interval for SP administration		
Weekly	1	0.3
Every 2 weeks	3	0.7
Monthly	268	67.0
Every 2 months	1	0.3
Every 3 months	16	4.0
Don't know	111	27.7
Minimum doses of IPTp-SP required		
One	6	1.5
Two	51	12.7
Three	181	45.3
Four	10	2.5
Five	22	5.5
Do not know	130	32.5

Overall, 81.7% (95% CI: 77.2%-85.6%) of the mothers had good knowledge on IPTp-SP.


Figure 5: Nursing mothers' knowledge on IPTp-SP

4.5 Number of IPTp-SP doses taken by nursing mothers

The number of SP doses taken by nursing mothers during their last pregnancy is summarized in Figure 5 below. Only 42/400 (10.5%) of nursing mothers indicated they had not taken SP during their pregnancy, 111/400 (27.8%) reported they had taken the recommended 3 doses of the drug and 43/400 (10.7%) indicated they had taken 5 doses of SP.

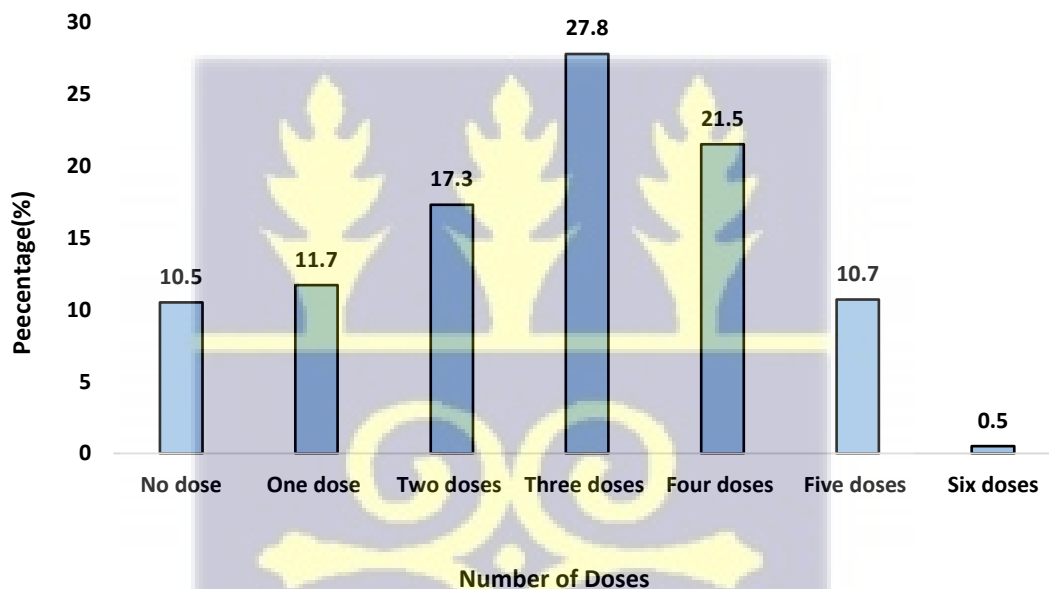


Figure 6: Number of IPTp-SP doses taken by nursing mothers in the Shai-Osudoku District

4.6 Proportion of low uptake of IPTp-SP

Overall, low uptake of Sulfadoxine-Pyrimethamine was estimated at 39.5% (95% CI: 34.7% - 44.5%).

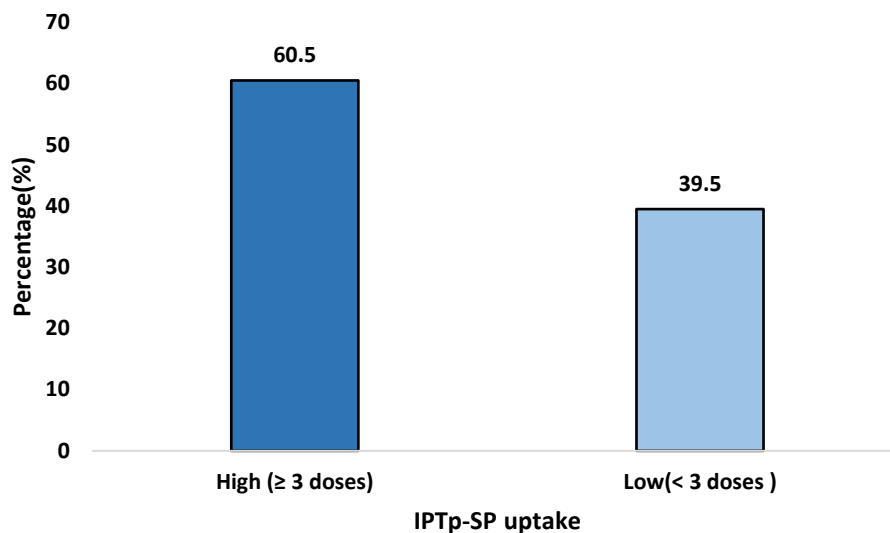


Figure 7: Proportion of low uptake of IPTp-SP

4.7 Association between low uptake of Sulfadoxine-Pyrimethamine and Socio-demographic characteristics

From chi-squared analysis (unadjusted), there were statistically significant differences between marital status ($\chi^2 = 12.28$, $p=0.002$, $\alpha=0.05$), level of education ($\chi^2 = 15.20$, $p=0.004$, $\alpha=0.05$), employment ($\chi^2 = 10.75$, $p=0.013$, $\alpha=0.05$), place of residence ($\chi^2 = 14.25$, $p<0.001$, $\alpha=0.05$) and low uptake of SP.

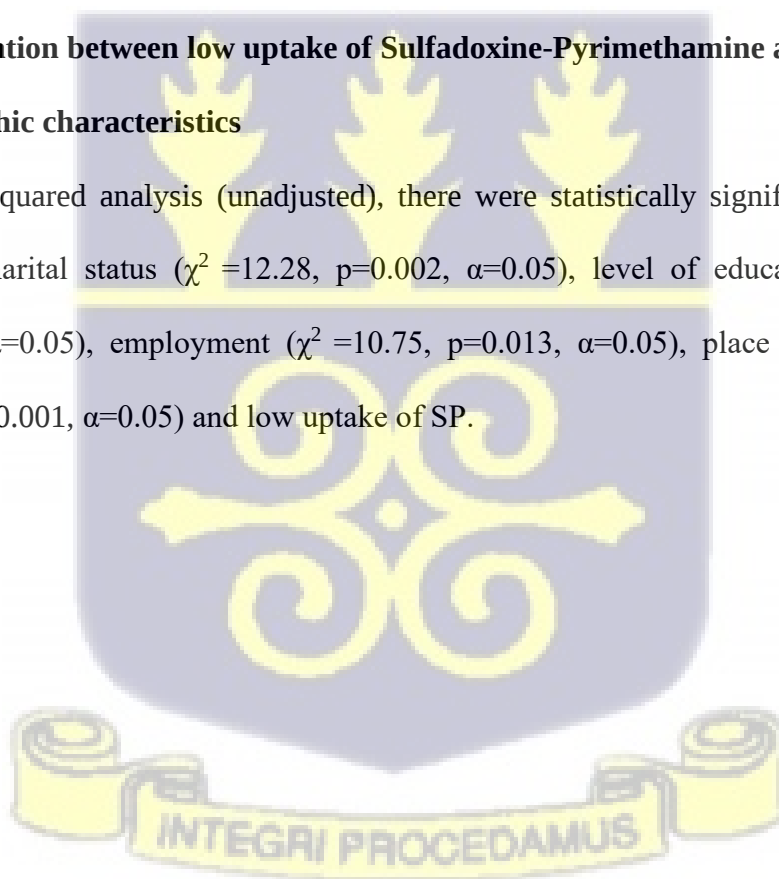


Table 4.5: Association between low uptake of IPTp-SP and Socio-demographic characteristics

Sociodemographic variable	Low uptake n (%) (n=158)	High uptake n (%) (n=242)	χ^2	p-value
Age			5.49	0.064
15-24	68 (43.0)	77 (31.8)		
25-34	74 (46.8)	140 (57.9)		
35-44	16 (10.1)	25 (10.3)		
Marital Status			12.28	0.002**
Single	30 (19.0)	25 (10.3)		
Married	68 (43.0)	145 (59.9)		
Cohabitant	60 (38.0)	72 (29.8)		
Educational Level			15.20	0.004**
None	18 (11.4)	15 (6.2)		
Primary	26 (16.5)	32 (13.2)		
JHS	80 (50.6)	101 (41.7)		
Secondary	22 (13.9)	69 (28.5)		
Tertiary	12 (7.6)	25 (10.3)		
Employment Status			10.75	0.013*
Employed Public sector	81 (51.3)	85 (35.1)		
Employed Private Sector	8 (5.1)	13 (5.4)		
Unemployed	7 (4.4)	18 (7.4)		
Self-Employed	62 (39.2)	126 (52.1)		
Place of Residence			14.25	<0.001***
Rural Setting	153 (96.8)	206 (85.1)		
Urban Setting	5 (3.2)	36 (14.9)		
Religion			0.36	0.833
Christianity	143 (90.5)	217 (89.7)		
Islamic	14 (8.9)	22 (0.1)		
Traditional	1 (0.6)	3 (1.2)		
Ethnic Group			2.93	0.403
Ga-Dangme	87 (55.1)	115 (47.5)		
Ewe	41 (25.9)	66 (27.3)		
Akan	21 (13.3)	40 (16.5)		
Others	9 (5.7)	21 (8.7)		
Number of pregnancies			2.54	0.281
1	53 (33.5)	81 (33.5)		
2-4	86 (54.4)	143 (59.1)		
5+	19 (12.0)	18 (7.4)		
Number of children			4.13	0.126
1	54 (34.2)	84 (34.7)		
2-3	64 (40.5)	116 (47.9)		
4+	40 (25.3)	42 (17.4)		
Income (GHS)			5.84	0.054
<300	124 (78.5)	163 (67.4)		
300-500	21 (13.3)	49 (20.2)		
>500	13 (8.2)	30 (12.4)		

*p < 0.05; **p < 0.01; ***p < 0.001; %: row percentage

4.8 Association between low uptake of SP, ANC attendance and Knowledge on Malaria and IPTP-SP

Age of pregnancy at ANC initiation ($\chi^2=24.75$, $p<0.001$, $\alpha=0.05$), age of pregnancy at first dose of SP ($\chi^2=55.58$, $p<0.001$, $\alpha=0.05$) and the number of ANC visits ($\chi^2=32.02$, $p<0.001$, $\alpha=0.05$) showed a significant association with low uptake of Sulfadoxine-Pyrimethamine. Furthermore, there were significant differences between knowledge on malaria ($\chi^2=16.03$, $p<0.001$, $\alpha=0.05$), knowledge on IPTp-SP ($\chi^2=15.10$, $p<0.001$, $\alpha=0.05$) and low uptake of SP. Road network ($\chi^2=3.98$, $p=0.046$, $\alpha=0.05$) and keeping an appointment ($\chi^2=32.34$, $p<0.001$, $\alpha=0.05$) were associated with low uptake of Sulfadoxine-Pyrimethamine.



Table 4.6: Association of ANC attendance and Knowledge on Malaria and IPTp-SP with low uptake of IPTp-SP

Characteristic	Low uptake n (%) (n=158)	High uptake n (%) (n=242)	χ^2	p-value
Age of pregnancy at ANC initiation			24.75	<0.001***
1 st trimester	63 (39.9)	136 (56.2)		
2 nd trimester	72 (45.6)	100 (41.3)		
3 rd trimester	23 (14.6)	6 (2.5)		
Number of ANC visits			38.02	<0.001***
<8	129 (81.7)	124 (51.2)		
≥8	29 (18.3)	118 (48.8)		
Distance to the health facility			0.24	0.620
Not far	62 (39.2)	101 (41.7)		
Far	96 (60.7)	141 (58.3)		
Waiting time			0.02	0.887
Not long	71 (44.9)	107 (44.2)		
Long	87 (55.1)	135 (55.8)		
Road network			3.98	0.046*
Poor	78 (49.4)	95 (39.3)		
Good	80 (50.6)	147 (60.7)		
Transportation			1.37	0.242
Yes	66 (41.8)	87 (35.9)		
No	92 (58.2)	155 (64.1)		
Keeping appointment			32.34	<0.001***
No	58 (36.7)	36 (14.9)		
Sometimes	32 (20.3)	37 (15.3)		
Yes	68 (43.0)	169 (69.8)		
Age of pregnancy at first dose of SP			55.58	<0.001***
First trimester	6 (5.1)	13 (5.4)		
Second trimester	59 (50.9)	205 (84.7)		
Third trimester	51 (44.0)	24 (9.9)		
DOT practice			0.57	0.449
Took drug under supervision	2 (1.72)	2 (0.8)		
Did not take drug under supervision	114 (98.3)	240 (99.2)		
Experienced side effects			0.25	0.616
No	32 (27.6)	73 (30.2)		
Yes	84 (72.4)	169 (69.8)		
Knowledge on Malaria			16.03	<0.001***
Poor	56 (35.4)	43 (17.8)		
Good	102 (64.6)	199 (82.2)		
Knowledge on IPTp-SP			15.10	<0.001***
Poor	34 (29.8)	29 (12.6)		
Good	80 (70.2)	201 (87.4)		

*p<0.05, ***p<0.001, %: row percentage

4.9 Factors associated with low uptake of SP

Binary logistic regression was performed to determine factors that were associated with low uptake of IPTp-SP. Age of pregnancy at first ANC visit, place of residence, number of ANC visits and knowledge on IPTp-SP were associated with low uptake of SP.

The logistic regression model showed that women in urban settings were 83% less likely to experience low uptake of SP (AOR=0.17; 95% CI: 0.04-0.69; $p=0.013$). Women who began ANC in their second trimester were 2 times more likely to have low uptake of SP (AOR=2.27; 95% CI: 1.21-4.27; $p<0.011$).

The model also predicted that nursing mothers who had 8 and more ANC visits were 60% less likely to have low uptake of SP (AOR=0.40; 95% CI: 0.21-0.77; $p=0.006$). Additionally, nursing mothers who indicated side effects of the SP prevented them from taking subsequent doses were more likely to have low uptake of SP (AOR=10.06; 95% CI: 2.74-36.92; $p=0.001$). Furthermore, nursing mothers who had good knowledge on IPTp-SP were 56% less likely to experience low uptake of SP (AOR=0.44; 95% CI: 0.22-0.88; $p=0.021$).

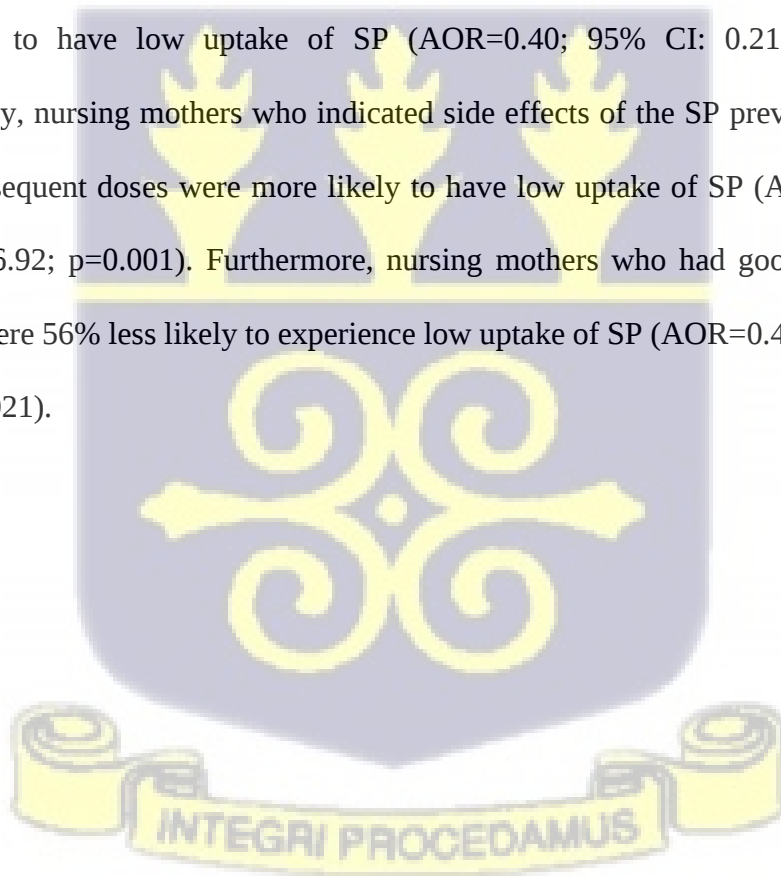


Table 4.7: Factors associated with low uptake of IPTp-SP among nursing mothers in the selected health facilities at Shai-Osudoku District.

Characteristic	Crude Odds Ratio		Adjusted Odds Ratio	
	UOR (95 % CI)	p-value	AOR (95 % CI)	p-value
Age in years				
15-24	Reference		Reference	
25-34	0.60 (0.39-0.92)	0.020*	0.71(0.35-1.150)	0.307
35-44	0.72 (0.36-1.47)	0.372	0.74(0.26-1.82)	0.581
Marital Status				
Single	Reference			
Married	0.39 (0.21-0.71)	0.002**		
Cohabitant	0.69 (0.37-1.30)	0.258		
Educational Level				
None	Reference		Reference	
Primary	0.68 (0.28-1.60)	0.373	0.42(0.11-1.54)	0.191
JHS	0.66 (0.21-1.39)	0.275	0.81(0.27-2.43)	0.703
Secondary	0.26 (0.11-0.61)	0.002**	0.64(0.19-2.16)	0.471
Tertiary	0.40 (0.15-1.06)	0.064	1.14(0.24-5.42)	0.863
Employment Status				
Employed Public sector	Reference		Reference	
Employed Private Sector	0.64 (0.25-1.64)	0.358	0.67(0.13-3.47)	0.633
Unemployed	0.41 (0.16-1.03)	0.057	0.51(0.13-1.95)	0.324
Self-Employed	0.52 (0.33-0.79)	0.003**	0.78(0.40-1.54)	0.476
Place of Residence				
Rural Setting	Reference		Reference	
Urban Setting	0.19 (0.07-0.49)	0.001**	0.17(0.04-0.69)	0.013*
Religion				
Christianity	Reference			
Islamic	0.97(0.47-1.95)	0.922		
Traditional	0.51(0.05-4.91)	0.557		
Ethnic Group				
Ga-Dangme	Reference			
Ewe	1.21(0.75-1.97)	0.420		
Akan	0.85(0.44-1.63)	0.615		
Others	0.69(0.29-1.65)	0.404		
Number of pregnancies				
1	Reference			
2-4	0.92(0.59-1.42)	0.706		
5+	1.61(0.78-3.35)	0.200		
Number of children				
1	Reference			
2-3	0.86(0.54-1.35)	0.513		
4+	1.48(0.85-2.57)	0.163		
Income (GHS)				
<300	Reference			
300-500	0.56 (0.32-0.99)	0.045*		
>500	0.57 (0.28-1.14)	0.111		
Age of pregnancy at ANC initiation				
First trimester	Reference		Reference	
Second trimester	1.55 (1.01-2.37)	0.042*	2.27(1.21-4.27)	0.011*
Third trimester	8.27 (3.21-21.33)	<0.001***	2.30(0.63-8.33)	0.206
Number of ANC visits				
<8	Reference		Reference	

≥8	0.24 (0.15-0.38)	<0.001***	0.40(0.21-0.77)	0.006**
Distance to the health facility				
Not far	Reference			
Far	1.11 (0.74-1.67)	0.620		
Waiting time				
Not long	Reference			
Long	0.97 (0.64-1.45)	0.887		
Road network				
Poor	Reference			
Good	0.66 (0.44-0.99)	0.046	0.60 (0.32-1.11)	0.106
Transportation				
Yes	Reference			
No	0.78 (0.52-1.18)	0.242		
Keeping appointment				
No	Reference			
Sometimes	0.54(0.28-1.01)	0.053	0.73 (0.29-1.81)	0.493
Yes	0.25 (0.15-0.41)	<0.001***	0.31 (0.14-1.20)	0.054
Age of pregnancy at first dose of SP				
First trimester	Reference		Reference	
Second trimester	0.62 (0.23-1.71)	0.359	0.38 (0.11-1.29)	0.122
Third trimester	4.60 (1.56-13.59)	0.006**	2.30 (0.59-8.90)	0.225
DOT practice				
Did not take the drug under supervision	Reference			
Took drug under supervision	0.48 (0.007-3.41)	0.459		
Experienced side effects				
No	Reference			
Yes	1.13 (0.69-1.85)	0.616		
Side effects prevented you from taking subsequent doses				
No	Reference		Reference	
Yes	6.86 (2.16-21.87)	0.001**	10.06 (2.74-36.92)	<0.001***
Knowledge on Malaria				
Poor	Reference		Reference	
Good	0.39 (0.25-0.63)	<0.001***	1.29 (0.62-2.71)	0.495
Knowledge on IPTp-SP				
Poor	Reference		Reference	
Good	0.34 (0.19-0.59)	<0.001***	0.44 (0.22-0.88)	0.021*

AOR: Adjusted odds ratio, UOR: Unadjusted odds ratio, CI: Confidence interval,

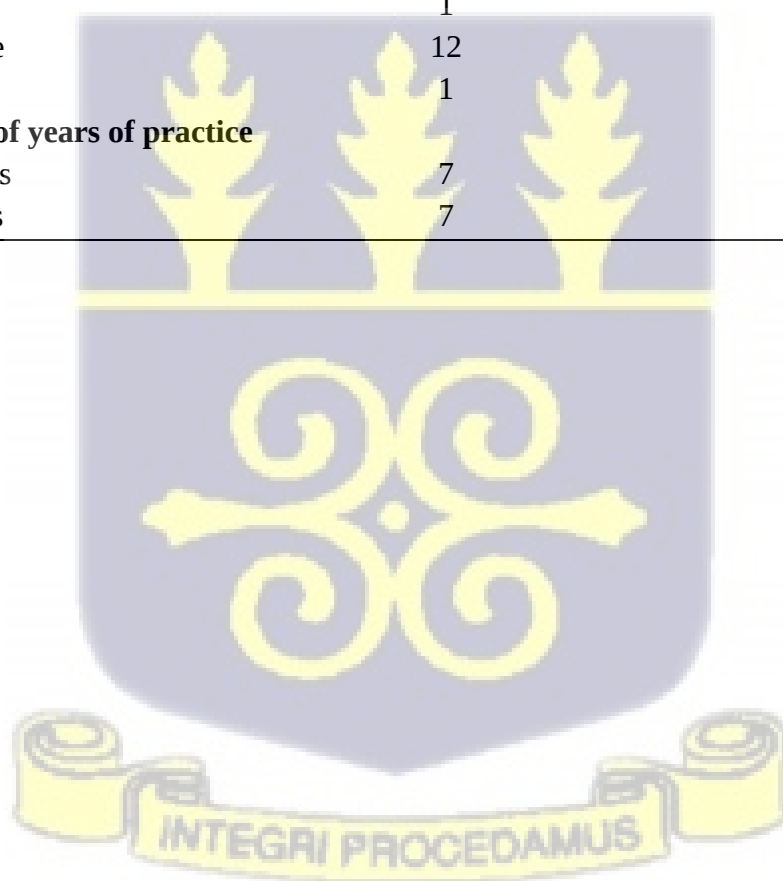
*p<0.05, **p<0.01, ***p<0.001

4.10 Socio-demographic characteristic of ANC staff

With respect to the ANC staff, half (7/14) were aged between 25 and 30 years. Almost all 13/14 (92.9%) were females and 12/14 (85.7%) were midwives.

Table 4.8: Socio-demographic characteristic of ANC Staff

Characteristic	Frequency (n=14)	Percentage (%)
Age		
20-24	2	14.3
25-30	7	50.0
>30	5	35.7
Sex		
Female	13	92.9
Male	1	7.1
Designation		
RCN	1	7.1
Midwife	12	85.7
Nurse	1	7.1
Number of years of practice		
< 5 years	7	50.0
5+ years	7	50.0



4.11 ANC staff knowledge on Malaria

The knowledge of health personnel at the ANC clinic was also assessed in this study. Though all personnel knew the cause of malaria, 12/14 (85.7%) had very good knowledge on its consequences on pregnancy. Additionally, the knowledge of 3/14 (21.4%) and 2/14 (14.3%) of the consequence of malaria on the baby was very good and good respectively. Almost all 13/14 (92.9%) showed very good knowledge on malaria prevention.

Table 4.9: ANC staff knowledge on Malaria

Variable	Frequency (n=14)	Percentage (%)
Cause of malaria		
Bite from infected female Anopheles mosquito	14	100.0
Effects of malaria on pregnancy		
Very good	12	85.7
Good	1	7.1
Poor	1	7.1
Effects of malaria on the baby		
Very good	3	21.4
Good	2	14.3
Average	6	42.9
Poor	3	21.4
The population mostly affected by Malaria		
Very good	1	7.2
Good	10	71.4
Average	3	21.4
Prevention of Malaria		
Very good	13	92.9
Good	1	7.1



4.12 ANC Staff knowledge on IPTp-SP

ANC staff was assessed on their knowledge of IPTp-SP. More than half 8/14 (57.1%) were able to explain what IPTp-SP meant and knew that SP is the drug of choice for preventing incident antenatal malaria. Majority 11/14 (78.6%) of the staff indicated pregnant women are to start receiving doses of SP at 16 weeks. Furthermore, 13/14 (92.9%) stated that it is recommended pregnant women receive 5 doses of SP (Table 4.10).

Table 4.10: ANC Staff knowledge on IPTp-SP

Variable	n= 14	Percentage (%)
Meaning of IPTp-SP		
True	8	57.1
False	5	35.7
Do not know	1	7.1
Recommended drug for IPTp in Ghana		
Sulphadoxine-pyrimethamine	14	100.0
Time recommended starting IPTp during pregnancy		
16 weeks	11	78.6
Quickening	2	14.3
Do not know	1	7.1
Recommended doses of IPTp-SP in Ghana		
5	13	92.9
Do not know	1	7.1
Recommended interval for IPTp-SP administration		
Monthly	13	92.9
Do not know	1	7.1



CHAPTER FIVE

DISCUSSION

5.0 Introduction

This section covers discussions on IPTp-SP utilization, knowledge level of nursing mothers and ANC staff on malaria in pregnancy (gestational malaria or placental malaria) and IPTp-SP in the Shai-Osudoku District, and the factors that predict low uptake of IPTp-SP.

5.1 IPTp-SP utilization in the Shai-Osudoku District

Malaria is considered by far, one of the devastating infectious, and the most important parasitic disease globally due to its high mortality rates. It claims millions of lives annually, of which children under five, expectant and postpartum mothers are widely affected (Buh *et al.*, 2019). Inability to control gestational or placental malaria could result in maternal anaemia, stillbirths and low birth weight (Exavery *et al.*, 2014). Despite these, persistent uptake of SP over the years has resulted in a major breakthrough in terms of malaria prevention among vulnerable mothers.

It was observed in the present study that, optimal use of Sulphadoxine Pyrimethamine among postpartum women was 60.5%. This percentage was much lower for 27.8% receiving 3 SP dose, which reduced to 21.5% for women receiving 4 doses, and 10.7% for 5 doses. Consequently, the optimal SP uptake recorded was contrary to what was reported by (Akinleye *et al.*, 2009), which had optimal SP intake being 20%. A much higher optimal SP intake was found in Sunyani, Ghana where the proportion of pregnant women receiving SP was 71% with one dose as the highest intake (Ibrahim *et al.*, 2017). This opposed reports in Tanzania which observed that only 43.6% of the women received an optimal

dose of SP (Exavery *et al.*, 2014). Amos Buh and colleagues reported a much higher proportion, where 93.2% had at least rounds of SP. Despite the record of 60.5% SP intake, this study noted that, approximately half of the women not receiving the optimal intake for malaria prevention were in their late second trimester. Inconsistency in the optimal dose of SP was associated to the discrepancies observed in the proportion pregnant women receiving doses of SP in various studies. This study therefore considered optimal dose to be at least 3 doses while others considered optimal dose to be at least 2 doses. **Furthermore, the low uptake of SP among pregnant women could be explained by the fact that more than half (63,2%) made less than 8 ANC visits and some of them (6.3%) could not take subsequent dose of SP due to the experience of the drug side effects; at least (10%) of postpartum women were under age 20, they stated being scared of the negative attitude of ANC staff toward them which could suggest fear of stigmatization.**

5.2 Knowledge of nursing mothers and ANC staff on malaria in pregnancy

Knowledge of nursing mothers on MiP

Knowledge of gestational malaria is key in adequately preventing malaria infection among pregnant women. This study aimed to find out the knowledge of nursing mothers on gestational malaria. It was realised that about 75.3% of the women had good knowledge on malaria in pregnancy. Similar findings were observed in North-East Tanzania where knowledge of malaria risks in pregnancy was high and encouraging among pregnant women (Mubyazi *et al.*, 2005). A much lower knowledge on gestational malaria was reported in Ibadan, Nigeria. In a study of 1373 women, only 54.2% had a good knowledge on malaria in pregnancy prevention (Oladimeji *et al.*, 2019). The nursing mothers also had good knowledge of some recommended malaria prevention methods. The reason for the

improved knowledge on malaria in pregnancy among the nursing mothers could be attributed to the fact that over 50% (n =400) of the nursing were multiparous women. This number could serve as reservoir of experience, translating into knowledge, on malaria in pregnancy acquired from previous pregnancies. In addition, about 33.5% of the women reported that their current pregnancy was their first. Out of anxiety and fear, this could have exposed them to wide range of information on complications in pregnancy. This made them prepare adequately. Another plausible reason could be due to the fact that, ANC staff have adequate knowledge on malaria in pregnancy as observed in this study. This gives an opportunity to create awareness of the cause, complications and prevention methods for the postpartum women.

Knowledge of ANC staff on MiP

Most of the ANC staff actually knew about malaria in pregnancy. The study found out that, ANC staff adequately know of the cause of malaria and its effect on pregnancy and baby as well as the population as a whole. This is similar to what Wunmi *et al.*, (2018), found in their study where a higher percentage of health-care workers in the PHC had good knowledge of the mode of transmission of malaria and signs and symptoms of simple malaria. They further stated that the health workers had a good knowledge regarding the mode of transmission of malaria. This is contrary to what was found in Ethiopia where healthcare practitioners in private practices had major gaps in knowledge and practice related to malaria case management. The reason for the high knowledge of ANC staff on MiP could be attributed to the fact that malaria is a common tropical disease dealt with it on a daily basis, with gives them the opportunity to know more about the disease.

5.3 Knowledge of nursing mothers and ANC staff about IPTp-SP

Knowledge of nursing mothers about IPTp-SP

Knowledge on Sulphadoxine Pyrimethamine intake is of utmost importance for both the staff and pregnant women. Treating these groups exclusively could create challenges of inadequate SP intake. This study observed that 81.7% of the women had high knowledge on IPTp-SP. This is contrary to what was reported in the Hohoe Municipality of Ghana where only 21.9% had high knowledge on IPTp-SP (Kweku et al., 2017). The reason for the high knowledge among the nursing mothers again could be due to the fact that the ANC staff actually know the contents of the IPTp-SP package which could translate into good knowledge. Similarly, the good knowledge could be due to the fact that about 57.3% of the women had 2-4 pregnancies, which is indicative that, half of the mothers in this study already knew the benefits and importance of IPT hence increasing their knowledge.

Knowledge of ANC staff about IPTp-SP

Just as nursing mothers, ANC staff also had adequate knowledge of IPTp-SP. The majority of the health workers knew of the benefits brought forth by the drug, the recommended drug by the WHO, the time interval for uptake and the minimum dosage as well. To add on, the high knowledge among the ANC staff could also be explained by the number of years and designation of the workers. This study found that half of the ANC staff had more than 5 and more years of working experience and majority, thus 85.7% were trained midwives. This predisposed them to highly qualified training packages that had the prospects of increasing their knowledge in the field of pregnancy and other issues relating to pregnancy.

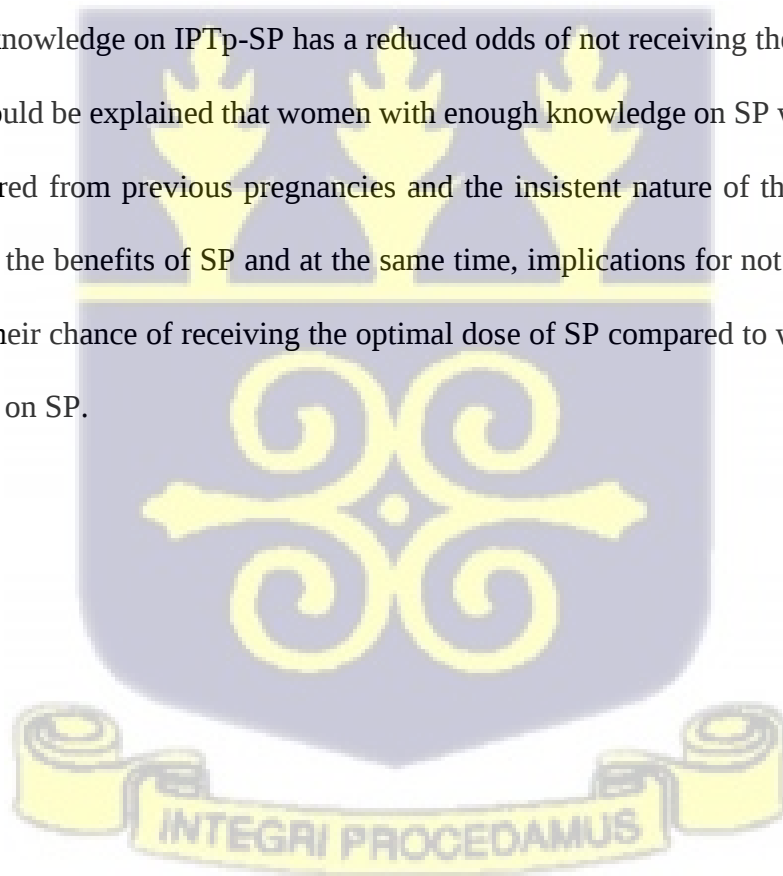
5.4 Predictors of uptake of IPTp-SP in the Shai-Osudoku District.

Although Ghana has adopted the WHO recommendations on the use of SP for IPTp, some communities in Ghana fall short of adequate enrolling pregnant women to receive the recommended or optimal dose of SP. This study is among many which seek to evaluate factors influencing the uptake of SP among pregnant women. The present study found that women living in an urban community were 0.17 less likely not to receive the optimal dose of SP compared to women in rural settings. This could be explained by reason that women living in urban settings usually have a busy work schedule which hinders their ANC visit. It might also be due to the fact that, unlike rural settings, community health nurses are able to do outreach services to attend to vulnerable groups at home. Similarly, it could be attributed to the fact that urban women are exposed to IPTp compared to rural women. Lastly, another reason for this observation could be due to the fact, the majority of the women interviewed in this study were residing in rural communities.

However, women in their second trimester were 2.27 times more likely not to receive the optimal dose of SP compared to women in their first trimester. The reason could be that, women in their second in this study did not attend ANC and also about 63.2% of the women had less than 8 ANC attendance. ANC, however, serves as a model for the delivery of health care intervention of which SP delivery is inclusive. With regards, more visits to ANC has the possibility of increasing their chance of receiving the optimal dose of SP compare to their counterparts in their first trimester. Also, women who experienced side effects from the uptake of SP were 10.06 more likely to have low uptake of SP. Many women complained of the side effects of SP which lead to the introduction of DOT. This is to ensure that, despite the side effects of the drug all women actually take in the drug under the supervision of a health worker. It is explainable that, pregnant women who for

any reason experienced side effects of the uptake of SP could deter subsequent uptake since she would not be ready to experience such side effects again.

In addition, women making 8 or more ANC visits were 0.40 less likely not to receive the optimal dose of SP compared to those making less than 8 visits. This was similar to what was observed where women making more ANC visits had increased odds receiving the optimal dose of SP (Owusu-Boateng & Anto, 2017). Also, a similar 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), who were making more ANC visits increases one's chance of receiving the optimal dose of SP. Lastly, this study found that good knowledge on IPTp-SP has a reduced odds of not receiving the optimal dose of SP. This could be explained that women with enough knowledge on SP which could have been acquired from previous pregnancies and the insistent nature of the health workers understand the benefits of SP and at the same time, implications for not taking SP which increases their chance of receiving the optimal dose of SP compared to women with poor knowledge on SP.



CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The optimal dose of SP intake in this study was satisfactory, but having almost half the women receiving less than three doses and just a tenth receiving 5 doses make the new WHO recommended five doses difficult to achieve. Regardless, postpartum women knew very well about malaria in pregnancy and IPTp-SP and about 95% of them recognized malaria during pregnancy as a serious health risk. Similarly, ANC staff were adequately knowledgeable on malaria in pregnancy as well as IPTp-SP. However, they were averagely knowledgeable on its effect on the unborn baby. Key predictors of the low uptake of SP identified were knowledge on SP-IPTp, previous experience of side effects of SP-IPTp, age of pregnancy at first SP dose, number of ANC visits and place of residence.

5.2 Recommendations

- The Ghana Health Service in collaboration with DHDs should encourage early initiation of ANC in order to increase the number of SP dose administered.
- The Ghana Health Service in collaboration with the DHDs should intensify outreach services in urban areas in order to educate women on incident malaria during pregnancy as well as on the importance of IPTp-SP.
- Antenatal Care providers should be offered an in-service training to keep them informed and updated on the IPTp-SP policy.
- Health promotion strategies that include pregnant adolescents should be employed by ANC staff to enable them receive care without any stigma.

REFERENCES

- 2017 Annual Report National Malaria Control Programme. (2018). In *Advances in Cancer Research*. [https://doi.org/10.1016/S0065-230X\(05\)94002-5](https://doi.org/10.1016/S0065-230X(05)94002-5)
- Akaba, G. O., Otubu, J. A. M., Agida, E. T., & Onafowokan, O. (2013). *Knowledge and utilization of malaria preventive measures among pregnant women at a tertiary hospital in Nigeria ' s federal capital territory*. 16(2), 201–206.
- Akinleye, S. O., Falade, C. O., & Ajayi, I. O. (2009). *BMC Pregnancy and Childbirth Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest , Nigeria : a cross-sectional study*. 9, 1–9. <https://doi.org/10.1186/1471-2393-9-28>
- Azizi, S. C., Chongwe, G., Chipukuma, H., Jacobs, C., Zgambo, J., & Michelo, C. (2018). Uptake of intermittent preventive treatment for malaria during pregnancy with Sulphadoxine-Pyrimethamine (IPTp-SP) among postpartum women in Zomba District, Malawi: A cross-sectional study. *BMC Pregnancy and Childbirth*, 18(1), 1–13. <https://doi.org/10.1186/s12884-018-1744-y>
- Beaudrap, P. De, Turyakira, E., White, L. J., Nabasumba, C., Tumwebaze, B., Muehlenbachs, A., Guérin, P. J., Ii, Y. B., McGready, R., & Piola, P. (2013). *Impact of malaria during pregnancy on pregnancy outcomes in a Ugandan prospective cohort with intensive malaria screening and prompt treatment*. 1–11.
- Buh, A., Kota, K., Bishwajit, G., & Yaya, S. (2019). *Prevalence and Associated Factors of Taking Intermittent Preventive Treatment in Pregnancy in Sierra Leone*. 1–14. <https://doi.org/10.3390/tropicalmed4010032>
- Case, G. F. O. R. (2014). *Management of MALARIA in Ghana*. July.
- Chepkemai, A. (2013). *Factors Influencing the Uptake of Intermittent Preventive Treatment for Malaria in Pregnancy : Evidence from Bungoma East District , Kenya*. 1(5), 110–123. <https://doi.org/10.12691/ajphr-1-5-2>
- Chico, R. M., Dellicour, S., Roman, E., Mangiaterra, V., Coleman, J., Menendez, C., Majeres-lugand, M., Webster, J., & Hill, J. (2015). Global Call to Action : maximize the public health impact of intermittent preventive treatment of malaria in pregnancy in sub-Saharan Africa. *Malaria Journal*, 1–6. <https://doi.org/10.1186/s12936-015-0728-x>
- Dellicour, S., Tatem, A. J., Guerra, C. A., Snow, R. W., & Kuile, F. O. (2010).

- Quantifying the Number of Pregnancies at Risk of Malaria in 2007 : A Demographic Study*. 7(1), 1–10. <https://doi.org/10.1371/journal.pmed.1000221>
- Eisele, T. P., Larsen, D. A., Anglewicz, P. A., Keating, J., Yukich, J., Bennett, A., Hutchinson, P., & Steketee, R. W. (2012). Malaria prevention in pregnancy, birthweight, and neonatal mortality: A meta-analysis of 32 national cross-sectional datasets in Africa. *The Lancet Infectious Diseases*, 12(12), 942–949. [https://doi.org/10.1016/S1473-3099\(12\)70222-0](https://doi.org/10.1016/S1473-3099(12)70222-0)
- Exavery, A., Mbaruku, G., Mbuyita, S., Makemba, A., Kinyonge, I. P., & Kweka, H. (2014). *Factors affecting uptake of optimal doses of sulphadoxine-pyrimethamine for intermittent preventive treatment of malaria in pregnancy in six districts of Tanzania*. 1–9.
- Gies, S., Coulibaly, S. O., Ouattara, F. T., Ky, C., Brabin, B. J., & Alessandro, U. D. (2008). *A community effectiveness trial of strategies promoting intermittent preventive treatment with*. 14, 1–14. <https://doi.org/10.1186/1475-2875-7-180>
- Health, I., & Malaria, R. B. (2014). Severe malaria. *Tropical Medicine & International Health : TM & IH*, 19 Suppl 1, 7–131. https://doi.org/10.1111/tmi.12313_2
- Hill, J., Hoyt, J., Eijk, A. M. Van, Mello-guyett, L. D., Kuile, F. O., Steketee, R., Smith, H., & Webster, J. (2013). *Factors Affecting the Delivery , Access , and Use of Interventions to Prevent Malaria in Pregnancy in Sub-Saharan Africa : A Systematic Review and Meta- Analysis*. 10(7). <https://doi.org/10.1371/journal.pmed.1001488>
- Ibrahim, H., Maya, E. T., Issah, K., Apanga, P. A., Bachan, E. G., & Noora, C. L. (2017). Factors influencing uptake of intermittent preventive treatment of malaria in pregnancy using sulphadoxine pyrimethamine in sunyani municipality, Ghana. *Pan African Medical Journal*, 28, 1–12. <https://doi.org/10.11604/pamj.2017.28.122.12611>
- Kamau, A., Mtanje, G., Mataza, C., Mwambingu, G., Mturi, N., Mohammed, S., Ong'ayo, G., Nyutu, G., Nyaguara, A., Bejon, P., & Snow, R. W. (2020). Malaria infection, disease and mortality among children and adults on the coast of Kenya. *Malaria Journal*, 19(1), 1–12. <https://doi.org/10.1186/s12936-020-03286-6>
- Kibusi, S. M., Kimunai, E., & Hines, C. S. (2015). *Predictors for uptake of intermittent preventive treatment of malaria in pregnancy (IPTp) in Tanzania*. 1–8. <https://doi.org/10.1186/s12889-015-1905-0>
- Kweku, M., Ofori, M., Takramah, W., Kudzo Axame, W., Owusu, R., Parbey, P. A.,

- Tarkang, E., & Adjuik, M. (2017). *Assessment of Coverage and Mothers' Knowledge on SP-IPTp Implementation and Factors Associated with High Knowledge in the Hohoe Municipality of Ghana*. 4, 120–131.
- Makler, M. T., & Gibbins, B. (1991). Laboratory diagnosis of malaria. *Clinics in Laboratory Medicine*, 11(4), 941–956. [https://doi.org/10.1016/s0272-2712\(18\)30529-8](https://doi.org/10.1016/s0272-2712(18)30529-8)
- Malaria in Pregnancy Training: Manual for Health Providers*. (2010). 51(3), 109–113.
- Malaria, N., & Programme, C. (2013). *GHANA MALARIA PROGRAMME REVIEW NATIONAL MALARIA*. June.
- Mbengue, M. A. S., Bei, A. K., Mboup, A., Ahouidi, A., Sarr, M., Mboup, S., & Gaye, O. (2017). Factors influencing the use of malaria prevention strategies by women in Senegal: A cross-sectional study. *Malaria Journal*, 16(1), 1–9. <https://doi.org/10.1186/s12936-017-2095-2>
- Mubyazi, G., Bloch, P., Kamugisha, M., Kitua, A., & Ijumba, J. (2005). Intermittent preventive treatment of malaria during pregnancy: A qualitative study of knowledge, attitudes and practices of district health managers, antenatal care staff and pregnant women in Korogwe District, North-Eastern Tanzania. *Malaria Journal*, 4, 1–10. <https://doi.org/10.1186/1475-2875-4-31>
- Mwandama, D., Gutman, J., Wolkon, A., Luka, M., Jafali, J., Ali, D., Mathanga, D. P., & Skarbinski, J. (2015). The use of intermittent preventive treatment in pregnancy and insecticide - treated bed nets for malaria prevention by women of child - bearing age in eight districts in Malawi. *Malaria Journal*, 1–10. <https://doi.org/10.1186/s12936-015-0840-y>
- Nkoka, O., Chuang, T. W., & Chen, Y. H. (2018). Association between timing and number of antenatal care visits on uptake of intermittent preventive treatment for malaria during pregnancy among Malawian women. *Malaria Journal*, 1–11. <https://doi.org/10.1186/s12936-018-2360-z>
- Odjidja, E. N., Kwanin, C., & Saha, M. (2017). Low Uptake of Intermittent Preventive Treatment in Ghana; An Examination of Health System Bottlenecks. *Health Systems and Policy Research*, 4(3:58), 1–5. <https://doi.org/10.21767/2254-9137.100079>
- Okeibunor, J. C., Orji, B. C., Brieger, W., Ishola, G., Otolorin, E., Rawlins, B., Ndekhehe, E. U., Onyeneho, N., & Fink, G. (2011). Preventing malaria in pregnancy through community-directed interventions: Evidence from Akwa Ibom

- State, Nigeria. *Malaria Journal*, 10, 1–10. <https://doi.org/10.1186/1475-2875-10-227>
- Oladimeji, K. E., Mahlako, J., Gwegweni, T., Ojewole, E., & Yunga, S. T. (2019). Knowledge of malaria prevention among pregnant women and non - pregnant mothers of children aged under 5 years in Ibadan , South West Nigeria. *Malaria Journal*, 1–12. <https://doi.org/10.1186/s12936-019-2706-1>
- OMS. (2018). *concernant les soins prénatals pour que la grossesse soit une expérience positive Mise en œuvre des programmes de paludisme pendant la grossesse dans le contexte des recommandations de l ' Organisation Mondiale de la Santé (OMS)*. 3099(07), 1–7. <https://doi.org/10.1093/cid/civ881.9>
- Onoka, C. A., Hanson, K., & Onwujekwe, O. E. (2012). Low coverage of intermittent preventive treatment for malaria in pregnancy in Nigeria : demand-side influences. *Malaria Journal*, 11(1), 82. <https://doi.org/10.1186/1475-2875-11-82>
- Owusu-Boateng, I., & Anto, F. (2017). Intermittent preventive treatment of malaria in pregnancy: a cross-sectional survey to assess uptake of the new sulfadoxine-pyrimethamine five dose policy in Ghana. *Malaria Journal*, 16(1), 323. <https://doi.org/10.1186/s12936-017-1969-7>
- Profile, S. E. E. (2017). *Technical Report · December 2012. September*.
- Roman, E., Ngindu, A., Orji, B., Zoungrana, J., Robbins, S., & Brieger, W. (2015). Evolution of malaria in pregnancy control : Jhpiego ' s 10-year contribution. *International Journal of Gynecology and Obstetrics*, 130, 62–67.
- Roman, E., Wallon, M., Brieger, W., Dickerson, A., & Rawlins, B. (2014). *Moving malaria in pregnancy programs from neglect to priority: experience from Malawi, Senegal, and Zambia*. 2(1), 55–71.
- Sachs, J., & Malaney, P. (2002). The economic and social burden of malaria. *Nature*, 415(6872), 680–685. <https://doi.org/10.1038/415680a>
- Schuster, K., Kremsner, P. G., Ramharter, M., Issifou, S., Kombila, M., Mombo-Ngoma, G., Nemeth, J., Schmits, K., Adegnika, A. A., Agnandji, S. T., Bouyou-Akotet, M. K., Onnas, I. N., & Afène, S. N. (2018). Malaria in Pregnancy Before and After the Implementation of a National IPTp Program in Gabon. *The American Journal of Tropical Medicine and Hygiene*, 77(3), 418–422. <https://doi.org/10.4269/ajtmh.2007.77.418>
- Stephen, A. A. I., Wurapa, F., Afari, E. A., Sackey, S. O., Malm, K. L., & Nyarko, K. M. (2016). Factors influencing utilization of intermittent preventive treatment for

- pregnancy in the Gushegu district, Ghana, 2013. *The Pan African Medical Journal*, 25(Supp 1), 4. <https://doi.org/10.11604/pamj.supp.2016.25.1.6169>
- Takem, E. N., & Alessandro, U. D. (2013). *Malaria in Pregnancy*. <https://doi.org/10.4084/MJHID.2013.010>
- USAID. (2018). President's Malaria Initiative - Ghana Malaria Operational Plan FY 2018. *Malaria Operational Plan FY 2018*, 1–95.
- Were, F., Afrah, N. A., Chatio, S., Manda-, L., Pell, C., Men, A., Hamel, M. J., Hodgson, A., Tagbor, H., Kalilani, L., Ouma, P., & Pool, R. (2013). *Factors Affecting Antenatal Care Attendance : Results from Qualitative Studies in Ghana , Kenya and Malawi*. 8(1). <https://doi.org/10.1371/journal.pone.0053747>
- WHO. (2014). WHO policy brief for the Implementation of Intermittent Preventive Treatment of Malaria in Pregnancy Using Sulfadoxine-Pyrimethamine (IPTp-SP). *WHO Press, October 2012*, 1–13. <https://doi.org/WHO/HTM/GMP/2014.4>
- WHO. (2018). *World Malaria Report. 2018*. ISBN 978 92 4 156469 4.
- WHO. (2020). Global trends in the burden of malaria. In *World Malaria Report 2020* (Vol. 1, Issue 1).
- World Health Organization. (2016). *Global technical strategy for malaria 2016–2030*.
- World Health Organization. (2017). *World malaria report 2017*.
- World Health Organization. (2019). *Malaria Intermittent preventive treatment in pregnancy (IPTp)*. 1–2.
- Wunmi, T., Akinyemi, L., Amoran, O. E., Ogunyemi, A. O., Okafor, O. J. K., & Onajole, A. T. (2018). *Knowledge and implementation of the National Malaria Control Programme among health - care workers in primary health - care centers in Ogun State ,.* 48–54. <https://doi.org/10.4103/jcls.jcls>



APPENDICES

Appendix 1: Consent Form for Nursing Mothers

PART I: PARTICIPANT INFORMATION SHEET FOR NURSING MOTHERS

Study Title: “Low Uptake of Intermittent Preventive Treatment (IPT) for Malaria among Pregnant Women in Selected Health Facilities in Shai-Osudoku District, Greater Accra, Ghana”

Introduction: My name is Djiki Camara and I am a post graduate student of the School of Public Health, University of Ghana, Legon, Accra. I’m carrying out a study on Factors Influencing Low Uptake of Intermittent Preventive Treatment (IPT) for Malaria among Pregnant Women in your District as partial fulfilment for the award of my Master Degree in Public Health and I would like to invite you to take part in the study.

I will explain the detail of this consent form to you so that it guides you before you make a decision to take part or not in the study.

Mobile: 0264003198

E-mail: mounnirib@gmail.com

Background of the study: Among the major public health issues malaria is one which affects pregnant women, children, and people with little or no immunization against malaria. The WHO in October 2012 recommended that all pregnant women be given the preventive treatment (IPT with sulfadoxine-pyrimethamine) from the second semester, with at least 3 doses during her pregnancy. Despite a massive increase in private and public effort over the last years, malaria still remains one of the global health concern, the rate of IPTp-SP compliance is moving slowly in places like the Shai-Osudoku District.

Purpose of the study: The purpose of this study is to determine the factors that influence the low uptake of Intermittent Preventive Treatment using Sulphadoxine-Pyrimethamine

for malaria prevention in pregnancy. The information you provide will help to improve malaria prevention in pregnancy in the facility.

Nature of the research: A cross-sectional study will be conducted at the facility using quantitative data collection technique. Data will be collected by administering questionnaire to ANC staff and nursing mothers who had delivered the past three months. This study will take place in Shai-osudoku District, 400 nursing mothers will be interviewed.

Participants' involvement:

- **Duration/what is involved:** I will be administering questionnaire for the interview which may not take more than 20 minutes of your precious time. Participants who cannot read or write will be given the necessary aid where the questions will be interpreted in a local language they understand and their responses written for them. The questionnaire is designed in a friendly form though some questions may seem a bit unfriendly. You are assured that their responses will not be used against them and it will be used solely for the purpose of the research.
- **Potential risks:** The participant will be assured that the research will not cause any harm to them. The study will involve only the administration of questionnaire to the participants.
- **Benefits:** Participants will benefit from policies that will be put in place to meet their health need especially towards the improvement of the uptake of Intermittent Preventive Treatment for malaria in pregnancy.
- **Cost:** In this study, no cost will be incurred on the part of the women.
- **Compensation:** There will not be any compensation package for the participants.
- **Confidentiality:** The information that I will collect from this study will be used for academic purpose and no information will be disclosed to anyone who is not part of

the study team. Anonymity will strictly be ensured in the dissemination of research finding since no name will be used as identifier.

- **Voluntary participation/withdrawal:** Your participation to this studying completely voluntary. You have the right to refuse to participate or to withdraw from the study at any time. If at any time you decide to withdraw from the study, your request will be granted and the information you will provide will not be used.
- **Outcome and feedback:** The result of the study will be made available to the Ministry of Health (MoH), Ghana Health Service (GHS), national Malaria Control Program, University of Ghana and the various health facilities where the study will be done. The findings of the study will be presented at scientific seminars where necessary, publish in peer reviewed journals, and a copy of the thesis made available at the University of Ghana School of Public Health's library for easy access.
- **Funding information:** This study will be funded by WHO/TDR
- **Sharing of participants information/data:** You are reassured that the data collected will not be shared with any individual or organization and will be used solely for research purposes by the Principal Investigator.
- **Provision of information and consent for participation:** A copy of the information sheet and consent form will be given to you after it has been signed or thumb-printed to keep.

For further clarification or questions, kindly contact me Djiki Camara, School of Public Health, University of Ghana, Legon on the following number 026 400 3198 or via email: mounnirb@gmail.com or contact my supervisor, Dr Anthony Danso-Appiah, Department of Epidemiology and Disease Control, School of Public Health, University of Ghana, Legon on 026 908 3789 or via email: tdappiah@yahoo.co.uk.

For ethical issues and right as a participant you can contact the Administrator of Ghana Health Service-Ethics Review Committee, Madam Hannah Frimpong on 050 704 1223.

PART II: CONSENT FORM FOR NURSING MOTHERS

Study Title: “Low Uptake of Intermittent Preventive Treatment (IPT) for Malaria among Pregnant Women in Selected Health Facilities in Shai-Osudoku District, Greater Accra, Ghana”

PARTICIPANT STATEMENT

I acknowledge that I have read or have had the purpose and content of the participants’ information sheet and that all questions have been satisfactorily explained to me in a language I understand (English ☐ Ga-Dagme ☐ Twi ☐ Ewe ☐). I fully understand the content and any potential implication 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 initial of participant:

ID code: Participant signature/Thumbprint.....

Date.....

INTERPRETERS’ STATEMENT

I interpreted the purpose and contents of the participants’ Information sheet to the afore name participant to the best of my ability in (English ☐ Ga-Dagme ☐ Twi ☐ Ewe ☐) language to her proper understanding.

All questions, appropriate clarifications sort by the participant and answers weer also duly interpreted to her satisfaction.

Name of Interpreter:

Signature of Interpreter:..... Date:

Contact details

STATEMENT OF WITNESS

I was present when the purpose and contents of the participant Information sheet was read and explained satisfactorily to the participant in the language she understood (Ga-Dagme ☐ Twi ☐ Ewe ☐)language.

I confirm that she was given the opportunity to ask questions/seek clarifications and same were duly answered to her satisfaction before voluntarily agreeing to be part of the research.

Name.....

Signature OR Thumb Print

Date:

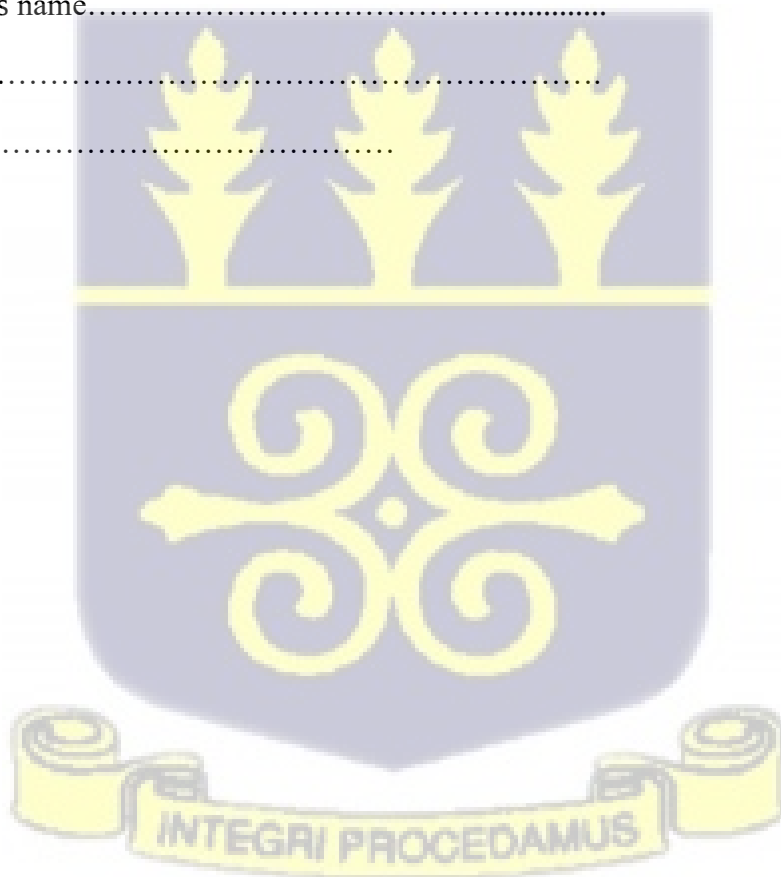
INVESTIGATOR STATEMENT AND SIGNATURE

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.

Researchers name.....

Signature

Date.....



Appendix 2: Consent Form for ANC Staff

PART I: ANC STAFFS' INFORMATION SHEET

Study Title: “Low Uptake of Intermittent Preventive Treatment (IPT) for Malaria among Pregnant Women in Selected Health Facilities in Shai-Osudoku District, Greater Accra, Ghana”

Introduction: My name is Djiki Camara and I am a post graduate student of the School of Public Health, University of Ghana, Legon, Accra. I’m carrying out a study on Factors Influencing Low Uptake of Intermittent Preventive Treatment (IPT) for Malaria among Pregnant Women in your District as partial fulfilment for the award of my Master Degree in Public Health and I would like to invite you to take part in the study.

I will explain the detail of this consent form to you so that it guides you before you make a decision to take part or not in the study.

Mobile: 0264003198

E-mail: mounnir1b@gmail.com

Background of the study: Among the major public health issues malaria is one which affects pregnant women, children, and people with little or no immunization against malaria. The WHO in October 2012 recommended that all pregnant women be given the preventive treatment (IPT with sulfadoxine-pyrimethamine) from the second semester, with at least 3 doses during her pregnancy. Despite a massive increase in private and public effort over the last years, malaria still remains one of the global health concern, the rate of IPTp-SP compliance is moving slowly in places like the Shai-Osudoku District.

Purpose of the study: The purpose of this study is to determine the factors that influence the low uptake of Intermittent Preventive Treatment using Sulphadoxine-Pyrimethamine for malaria prevention in pregnancy. The information you provide will help to improve malaria prevention in pregnancy in the facility.

Nature of the research: A cross-sectional study will be conducted at the facility using quantitative data collection technique. Data will be collected by administering questionnaire to ANC staff and nursing mothers who had delivered the past three months. This study will take place in Shai-osudoku District, ANC staff present at the time of the study will be interviewed.

Participants' involvement:

- **Duration/what is involved:** I will be administering questionnaire for the interview which may not take more than 20 minutes of your precious time. Participants who cannot read or write will be given the necessary aid where the questions will be interpreted in a local language they understand and their responses written for them. The questionnaire is designed in a friendly form though some questions may seem a bit unfriendly. You are assured that their responses will not be used against them and it will be used solely for the purpose of the research.
- **Potential risks:** The participant will be assured that the research will not cause any harm to them. The study will involve only the administration of questionnaire to the participants.
- **Benefits:** Participants will benefit from policies that will be put in place to meet their health need especially towards the improvement of the uptake of Intermittent Preventive Treatment for malaria in pregnancy.
- **Cost:** In this study, no cost will be incurred on the part of the women.
- **Compensation:** There will not be any compensation package for the participants.
- **Confidentiality:** The information that I will collect from this study will be used for academic purpose and no information will be disclosed to anyone who is not part of the study team. Anonymity will strictly be ensured in the dissemination of research finding since no name will be used as identifier.

- **Voluntary participation/withdrawal:** Your participation to this studying completely voluntary. You have the right to refuse to participate or to withdraw from the study at any time. If at any time you decide to withdraw from the study, your request will be granted and the information you will provide will not be used.
- **Outcome and feedback:** The result of the study will be made available to the Ministry of Health (MoH), Ghana Health Service (GHS), national Malaria Control Program, University of Ghana and the various health facilities where the study will be done. The findings of the study will be presented at scientific seminars where necessary, publish in peer reviewed journals, and a copy of the thesis made available at the University of Ghana School of Public Health's library for easy access.
- **Funding information:** This study will be funded by WHO/TDR
- **Sharing of participants information/data:** You are reassured that the data collected will not be shared with any individual or organization and will be used solely for research purposes by the Principal Investigator.
- **Provision of information and consent for participation:** A copy of the information sheet and consent form will be given to you after it has been signed or thumb-printed to keep.

For further clarification or questions, kindly contact me Djiki Camara, School of Public Health, University of Ghana, Legon on the following number 026 400 3198 or via email: mounnirlb@gmail.com or contact my supervisor, Dr Anthony Danso-Appiah, Department of Epidemiology and Disease Control, School of Public Health, University of Ghana, Legon on 026 908 3789 or via email: tdappiah@yahoo.co.uk.

For ethical issues and right as a participant you can contact the Administrator of Ghana Health Service-Ethics Review Committee, Madam Hannah Frimpong on 050 704 1223.

PART II: ANC STAFFS' CONSENT FORM/CERTIFICATE OF CONSENT

Study Title: "Low Uptake of Intermittent Preventive Treatment (IPT) for Malaria among Pregnant Women in Selected Health Facilities in Shai-Osudoku District, Greater Accra, Ghana"

PARTICIPANT STATEMENT

I acknowledge that I have read or have had the purpose and condition of the participants' information sheet read and that all questions have been satisfactorily explained to me in a language I understand (English). I fully understand the content and any potential implications as well as my right to change my mind (ie withdraw from the research) even if I have signed this form. I voluntarily agreed to be part of this research.

Name or initial of participant: ID Code.....

Participant's signature Date.....

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that I have explained the study information accurately to the participant. I confirm that enough time has been given to ask questions and all the questions asked by the participant have been answered correctly and to the best of my ability. The participant consent has been given freely and voluntarily.

Researcher's name: Signature:

Date:



Appendix 3: Questionnaire for Nursing Mothers

TITLE: Low uptake of Intermittent Preventive Treatment (IPT) for malaria among pregnant women in selected health facilities in Shai-Osudoku District

Date:

 / /

Interviewer:

Questionnaire no.:

Name of the facility:

SECTION 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS			
1	AGE OF RESPONDENT		
2	MARITAL STATUS	1 Married	[]
		2 Single	[]
		3 Cohabitant	[]
		4 Other: (please specify)	
3	LEVEL OF EDUCATION	1 No formal education	[]
		2 Primary	[]
		3 JHS	[]
		4 SHS	[]
		5 Tertiary	[]
		6 Koranic school	[]
4	OCCUPATION	1 Employed public sector	[]
		2 Employed private sector	[]
		3 Unemployed	[]
		4 Self-Employed	[]
		5 Other (please specify)	
6	PLACE OF RESIDENCE	1 Urban setting	[]
		2 Rural setting	[]
7	RELIGION	1 Christianity	[]
		2 Islamic	[]
		3 Traditional	[]
		4 Others (please specify)	
8	ETHNIC GROUP	1 Ga-Dangme	[]
		2 Ewe	[]
		3 Akan	[]

		4	Other (please specify)
9	How much do you earn per month?	1	Less than 300 GHS []
		2	300 GHS – 500 GHS []
		3	Above 500GHS []
OBSTETRIC HISTORY			
10	How many times have you been pregnant?	1	One []
		2	Two []
		3	Three or more []
11	How many children do you have?		
SECTION 2: ANC SERVICES			
1	Did you see anyone for antenatal care during your last pregnancy?	1	Yes []
		2	No []
2	Whom did you see?	1	Health personnel []
		2	TBA []
		3	Village health volunteer []
		4	Other: (please specify)
4	How will you describe the distance from your home to the ANC Clinic?	1	Not far []
		2	Far []
		3	Very far []
5	Would you consider the cost of transportation from home to the ANC Clinic expensive?	1	Yes []
		2	No []
6	How would you describe the road network to the ANC Clinic?	1	Good []
		2	Poor []
		2	Can't tell []
7	How would you describe the waiting time during ANC visits at the health facility?	1	Not long []
		2	Long []
		3	Very long []
8	How many weeks were you when you first visited the ANC?		
9	Were you told to visit ANC at regular interval?	1	Yes []
		2	No []
		3	Can't remember []
10	How often were you told to visit the ANC?	1	Each month []
		2	Each two months []
		3	Other: (please specify)
11	Did you always keep your appointments?	1	Yes []
		2	No []
		3	sometimes []

	If no or sometimes, why?		
12	How many ANC visits did you attend during the last pregnancy?		
13	Did you at any time receive medication?	1 Yes	[]
		2 No	[]
14	Did you know the medication you were given?	1 Yes	[]
		2 No	[]
		3 Other (please specify)	
15	Have you heard about IPTp-SP before?	1 Yes	[]
		2 No	[]
16	Did you at any time receive during your last pregnancy receive IPTp-SP?	1 Yes	[]
		2 No	[]
		3 Don't know	[]
17	Do you remember how many weeks were you when you were given first IPTp-SP?		
18	How many tablet were you given?	1 One	[]
		2 Two	[]
		3 Three	[]
19	How many did you use?		
20	Where were you using the drug?	1 Home	[]
		2 In the health facility	[]
		3 Outside the health facility	[]
	If using the drug in the facility: Was the drug taken under supervision?	1 Yes	[]
		2 No	[]
		3 Can't tell	[]
21	How many IPTp-SP doses were you given during the last pregnancy?		
22	Did you at any point pay to receive SP at the health facility?	1 Yes	[]
		2 No	[]
23	Was SP always available at the health facility?	1 Always	[]
		2 Not always	[]
24	Did you get any side effect with the drug?	1 Yes	[]
		2 No	[]
	If yes, did the side effects prevented you from taking subsequent doses?	1 Yes	[]
		2 No	[]
25	Did you experience any of the following side effects?	1 Nausea	[]
		2 Headache	[]
		3 Vomiting	[]
		4 Skin rash	[]

		5	Other: (please specify).....
26	Do health facility nurses give talks on malaria?	1	Yes []
		2	No []
27	How is the attitude of the ANC staffs?	1	Caring []
		2	Always polite []
		3	Takes good care of us []
		4	Always shout at []
		5	Other (please specify).....
SECTION 3: KNOWLEDGE OF MALARIA IN PREGNANCY			
1	Have you heard about malaria?	1	Yes []
		2	No []
2	If yes, Where do you get information on malaria in pregnancy?		ANC Clinic
			Media
			Family/Friends
			Other: (please justify).....
3	How is malaria transmitted?	1	Bites from infected mosquitoes []
		2	House flies []
		3	Too much exposure to the sun []
		4	Don't know []
		5	Other (specify)
4	What of the following encourage malaria transmission?	1	Dirty environment []
		2	Lake, pits, dams []
		3	Clean houses []
		4	Ill ventilated and ill lighted houses []
		5	Don't know []
		6	Other (specify)
5	What are the main signs/symptoms of malaria?	1	Headache []
		2	Fever []
		3	Vomiting []
		4	Loss of appetite []
		5	Don't know []
		6	Others (specify).....
6	Do pregnant women have malaria?	1	Yes []
		2	No []
		3	Don't know []
7	Is malaria during pregnancy a serious health risk?	1	Yes []
		2	No []
		3	Don't know []

8	What are the complications of malaria in pregnancy?	1	Anemia	[]
		2	Miscarriage	[]
		3	Low birth weight	[]
		4	Stillbirth	[]
		5	Death of the mother	[]
		6	Others (specify)	
9	How can malaria in pregnancy be prevented?	1	Using mosquito nets	[]
		2	Eating well	[]
		3	IPTp-SP	[]
		4	Proper sanitation	[]
		5	Using mosquito spray	[]
		6	Other: (please specify).....	
SECTION 4: KNOWLEDGE OF IPTp-SP				
1	Do you know of IPTp-SP?	1	Yes	[]
		2	No	[]
2	What are the benefits of IPTp-SP?	1	For treatment of malaria in children	[]
		2	To prevent malaria in pregnancy	[]
		3	To treat sexually transmitted diseases	[]
		4	Don't know	[]
		5	Other (specify)	
3	When is the pregnant woman supposed to start taking the drug?	1	During the first trimester (first 13 weeks)	[]
		2	Early in the second trimester (13 weeks to 16 weeks)	[]
		3	In the third trimester (29 weeks till delivery)	[]
		4	Other: (please specify).....	
4	At what interval should SP be given?	1	Weekly	[]
		2	Monthly	[]
		3	Every 3 months	[]
		4	Don't know	[]
		5	Others: (specify).....	
5	What is the minimum doses of IPTp-SP required?	1	One	[]
		2	Two	[]
		3	Three	[]
		4	Don't know	[]
		5	Others: (specify).....	

Appendix 4: Questionnaire for ANC Staff

TITLE: Low uptake of Intermittent Preventive Treatment (IPT) for malaria among pregnant women in selected health facilities in Shai-Osudoku District

Date:

Interviewer:

Questionnaire no.:

Name of the facility:

SECTION 1: GENERAL INFORMATION				
1	AGE			
2	SEX	1	Male	[]
		2	female	[]
3	DESIGNATION	1	Doctor	[]
		2	Midwife	[]
		3	Nurse	[]
		4	Other: (please specify).....	
4	NUMBER OF YEARS OF PRACTICE			
SECTION 2: KNOWLEDGE OF MALARIA IN PREGNANCY				
1	How is malaria transmitted?	1	Dirty environments	[]
		2	Bites from mosquitoes	[]
		3	Too much exposure to sun	[]
		4	Don't know	[]
		5	Other: (please specify).....	
2	What are the effects of malaria on pregnant woman?	1	Maternal anaemia	[]
		2	Spontaneous abortion	[]
		3	Preterm birth	[]
		4	Others (please specify).....	
3	What are the effects of malaria on the unborn baby?	1	Prematurity	[]
		2	Foetal anemia	[]
		3	Congenital malaria	[]
		4	Low birth weight	[]
		5	Others (please specify).....	
4	Which populations are most affected by malaria?	1	Young children	[]
		2	Pregnant women	[]
		3	Adults	[]
		4	Others (please specify).....	
5	How can malaria in pregnancy be prevented?	1	Intermittent preventive treatment	[]
		2	Administration of tetanus toxoid	[]

		3	Use of insecticide-treated nets	[]
		4	De-worming	[]
		5	Others: (please specify).....	
SECTION 3: KNOWLEDGE OF IPTp-SP POLICY				
1	What is Intermittent Preventive Treatment of malaria in pregnancy (IPTp)?			
	1	Use of anti-malarial drugs given in treatment doses at predefined intervals to treat symptomatic malaria.		[]
	2	Use of anti-malarial drugs given in treatment doses at predefined intervals to clear a presumed burden of parasites.		[]
	3	Use of artesunate combined treatment (ACT) to pregnant women when they have malaria		[]
	4	Don't know		[]
2	What drug is recommended for IPTp use in Ghana?		1 Lumether	[]
			2 Sulphadoxine-pyrimethamine	[]
			3 chloroquine	[]
			4 Others (please specify).....	
3	When is IPTp supposed to be started during pregnancy in Ghana?		1 10 weeks	[]
			2 16 weeks	[]
			3 36 weeks	[]
			4 After Quickening	[]
			5 Others (please specify).....	
4	How many times is it recommended to give IPTp during pregnancy in Ghana?		1 Once	[]
			2 Twice	[]
			3 Three times	[]
			4 Four times	[]
			5 Five times	[]
			6 Others (please specify).....	
5	How many tablet is recommended for each dose?		1 One	[]
			2 Two	[]
			3 Three	[]
			4 Don't know	[]
6	What interval is recommended for given IPTp?		1 Weekly	[]
			2 Monthly	[]
			3 Every three months	[]
			4 Don't know	[]
			5 Others (please specify).....	
7	Are you aware of the availability of IPTp guidelines in Ghana?		1 Yes	[]
			2 No	[]
	If Yes where did get the information?		1 School	[]
			2 Internet	[]
			3 Friends	[]
			4 Other (please specify).....	

8	Do you have a copy of the guidelines?	1	Yes	[]
		2	No	[]
9	Does the health facility have a copy the guidelines?	1	Yes	[]
		2	No	[]
		3	Don't know	[]
SECTION 4: DELIVERY OF IPTp-SP BY ANC STAFF				
1	Do you administer IPTp in your facility?	1	Yes	[]
		2	No	[]
2	Which drug is used in your facility for IPTp?	1	Lumeter	[]
		2	Fansidar (SP)	[]
		3	Chloroquine	[]
		4	Other: (please specify).....	
3	How is the drug administered at your facility?	1	Given to the pregnant women and use in the facility	[]
		2	Given to the pregnant women to take home	[]
		3	Prescriptions are written for the pregnant women to go and buy at the pharmacy	
		4	Prescriptions are written for the pregnant women to go and buy outside the hospital/clinic	[]
		5	Other: (please specify)	
4	Is the drug for IPTp available in your facility today	1	Yes	[]
		2	No	[]
5	Is the drug for IPTp always available in your facility?	1	Yes	[]
		2	No	[]
6	Do you supply water for the pregnant women to take the drug at the facility?	1	Yes	[]
		2	No	[]
	If yes, how do you supply it?	1	Bottle water	[]
		2	Sachet water (pure water)	[]
		3	Water from the stand pipe	[]
		4	Water dispenser	[]
5	Other (please specify).....			
7	Have you received any training in IPTp-SP before?	1	Yes	[]
		2	No	[]
8	Any challenges faced during IPTp-SP service delivery at your facility?			
9	What would you suggest to improve IPTp-SP use at the facility?			