MALARIA PARASITAEMIA AND ASSOCIATED PREVENTIVE FACTORS AMONG PREGNANT WOMEN IN MISUNGWI AND NYAMAGANA DISTRICT, MWANZA REGION, 2012

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M. Sc (Tropical Diseases Control) Dissertation

Muhimbili University of Health and Allied Sciences

October, 2012

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By

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Tropical Diseases of the Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

October 2012

CERTIFICATION

The undersigned certifies that he has read and hereby recommend for examination of the dissertation entitled *"**Malaria parasitaemia and associated preventive factors among pregnant women in Nyamagana and Misungwi districts, Mwanza region, 2012"*** in fulfillment of the requirements for the degree of Master of Science in Parasitology and Medical Entomology of the Muhimbili University of Health and Allied Sciences.

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Prof. Zul Premji

(Supervisor)

Date: _____

DECLARATION

AND

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I, Maria Mgella Zinga declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature..... Date.....

AKNOWLEDGEMENT

Completion of this thesis would not have been possible without the invaluable assistance and support of different individuals. First, I thank the pregnant women for their willingness to participate in this study, the villages and district leadership for allowing this study to be carried out in their administrative areas. I am in debt to all the antenatal clinics nurses and laboratory technologist of health facilities and Bugando University.

Special thanks to Dr. Benson Kidenya and Dr.Humphrey Mazigo for assisting in data analysis and laboratory staff from Bugando University. My supervisor, Prof Premji and Dr Elia Mbaga for their guidance and unflagging confidence in my abilities will remain an inspiration for years to come. Many thanks to academic staff of Muhimbili University for their support in teaching which inspired me to this research.

My experience with this batch of TDC students at Muhimbili University has been made memorable through the support and friendship of many of my colleagues.

Finally, I must acknowledge the generosity and love provided by my family and my sponsor Catholic University of Health and Allied Sciences.

ABSTRACT

Background: Malaria is still a problem during pregnancy in Tanzania and is associated with maternal anemia, premature delivery, intrauterine growth retardation and low birth weight. Tanzania adopted The World Health Organization (WHO) recommendation that all pregnant women living in sub-Saharan Africa countries with stable malaria transmission to receive Intermittent Preventive Treatment during pregnancy (IPTp) using two doses of *Sulphadoxine Pyrimethamine,* use Insecticide treated bed nets (ITNs) and effective case management of malaria and anemia.

There is increased SP resistance and low uptake of IPTp-SP and unequal distribution of prevention tools like ITNs between rural and urban settings in the country. This study aims at determining preventive factors that are associated with presence of malaria parasitaemia and anemia among pregnant women.

Methods: A cross-sectional hospitalbased study was conducted between May and June 2012, where a pretested questionnaire was administered to 400 pregnant women at selected nine antenatal clinics in Misungwi and Nyamagana districts in Mwanza and blood samples were collected for determining malaria parasitaemia and anaemia. The antenatal booklets were inspected for timing and number of visits to the clinic, obstetric history and use and timing of IPTp-SP.

Data were entered, cleaned and analyzed using STATA software version 10. Data were summarized using frequency distribution tables for categorical variables and by calculating means and standard deviations for continuous variables. For categorical variables proportions were compared using X^2 test or Fisher's exact test, logistic regression were used to identify independent predictors of malaria and SP use.

Results: Of the 400 pregnant women studied, 5.5% (22/400) had *P.falciparum* malaria. The prevalence of anaemia was 48.6% (194/399). Coverage of SP for at least one dose was 40% and for second dose was 16%. About 98% of respondents reported to own and use ITNs. No significant association was observed between malaria parasitaemia and anaemia (OR=0.87,

95%CI, 0.36-2.02, P=0.7). Risk factors for malaria parasitaemia were primigravidae (AOR=2.53, 95%CI, 0.97-6.58, P=0.05) and non- use of SP (AOR=7.68, 95%CI, 1.74-33.75. P=0.007).

Conclusion: 5.5% of pregnant women had malaria parasitaemia, About 50% had mild anaemia. However given the health impact of the diseases in pregnancy, antenatal interventions such as IPTp-SP are needed to be improved to reach the recommended coverage.

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LIST OF ABBREVIATIONS

- ANC Antenatal clinic
- ACT Artemisinin based combination therapy
- BCC Behaviour Change Communication
- DOT Direct Observed Therapy
- FANC Focused antenatal care
- IPTp Intermittent Preventive Treatment in pregnancy
- ITN Insecticide Treated Nets
- LLIN Long lasting insecticide treated bed net
- MOH&SW Ministry of Health and Social Welfare
- MUHAS Muhimbili University of Health and Allied Sciences
- NMMTSP National Malaria Medium Term Strategic Plan
- NMCP National Malaria Control Program
- PHSDP Primary Health Services Development Program
- PMI President Malaria Initiative
- RBM Roll Back Malaria
- RMIFP Regional Malaria and IMCI Focal Persons
- SP *Sulfadoxine-pyrimethamine*
- TNVS Tanzania National Voucher Scheme
- THMIS Tanzania HIV/AIDS and Malaria Indicator Survey
- TSPA Tanzania Service Provision Assessment
- TDHS Tanzania demographic and Health Survey
- USAID Unites States Aids Organization
- WHA World Health Assembly
- WHO World health organization

DEFINITION OF TERMS

Coverage of IPTp: For this study it will mean the percentage of pregnant women interviewed who received one dose or two doses of SP by DOT during their most recent pregnant among all interviewed

DOT: The direct observation of a pregnant woman by a qualified health staff as they swallow Sulphadoxine-pyrimethamine at the antenatal clinic (ANC)

IPT: The administration of anti-malaria drugs in treatment doses at predefined intervals to clear a presumed burden of parasite. Intermittent preventive treatment for malaria during pregnancy (IPTp) is based on the assumption that every pregnant woman living in areas of high malaria transmission has malaria parasites in her placenta or blood, whether or not she has symptoms.

IPT1: The percentage number of respondents who received at least one dose of SP during their most recent pregnant.

IPT2: The percentage number of respondents who received two doses of SP during their most recent pregnancy.

Parity: number of previous pregnancies

Postpartum: period after labor

Primigravidae: a woman pregnant for the first time

Uptake of IPTp: The implementation of the IPTp program at the ANCs by service providers so that the pregnant women take two doses of *Sulphadoxine Pyrimethamine* Under direct observation by a qualified health personnel at the interval not less than a month.

CHAPTER ONE

Back ground

1.1. Malaria and anaemia

Malaria is still a public health problem in Africa, where most cases and deaths due to the disease occur. Approximately 74% of the population in Africa region lives in areas highly endemic for malaria and 19% in epidemic prone areas. Children under five and pregnant women are the most vulnerable groups due to their lower levels of malaria immunity (WHO, 2006).

Approximately 30 million African women in malaria endemic areas become pregnant and are at increased risk of infection with *Plasmodium falciparum* (Akinley et al. 2009), resulting in high prevalence of patent parasitaemia and clinical malaria in pregnancy(Okwa 2003). Causes up to 10,000 maternal deaths each year and contributes to high rates of maternal morbidity that is, fever and severe anemia especially in first time mothers (Savage et al. 2007), low birth weight and placental parasitaemia (Falade et al, 2007). Between 75,000 to 200,000 infant deaths annually are attributable to malaria infection in pregnant (Steketee et al. 2001).

Due to the level of malaria endemicity 38 million persons are at risk for the disease in Tanzania (Mubyazi et al. 2005). Over 40% of all outpatient attendances are attributable to malaria, resulting in approximately 16 million clinical malaria cases. National malaria Control Program estimates that 70,000 malaria deaths occur annually in Tanzania among all ages (Malaria Operational Plan (MOP) Tanzania, 2009).

During pregnancy complex physiological changes occur including hormonal and immunological alterations, making both the pregnant woman and the fetus more susceptible to malaria infection and its complications. Pregnancy is naturally accompanied by generalized immune suppression which may cause the loss of acquired immunity to malaria. Heavy placental sequestration may interfere with oxygen and nutrient transport to the fetus. High maternal susceptibility to malaria is responsible for high parasitaemia in pregnancy. Real hyperparasitaemia in pregnancy, that is parasite counts in the blood of pregnant woman, may be often offset by high parasite burden in placenta. This always has to be kept in mind even if the peripheral parasite counts are low.

In Tanzania areas of holoendemic transmission, more than half of pregnant mothers contact malaria(Tarimo 2007) . Study in North Tanzania showed that malaria was responsible for about 20% of all deaths among pregnant women , malaria related anaemia contributes to maternal deaths (Mubyazi et al. 2005).The enormity of this problem has over the years prompted the search for ways of reducing these effects to the minimum.

Anaemia (Hb<11g/dl) in pregnancy is serious problem and can results not only in increased maternal morbidity and mortality but also poor birth outcomes. In developing countries the cause of anaemia are multifactorial, it includes nutritional iron deficiencies and parasitic infections. In sub-Saharan Africa, the prevalence of anaemia in pregnant women is approximated to be more than 75%. In Kenya, it is estimated that 6000 primigravidae develop severe malaria-induced anaemia each year. Thus infection with *P. falciparum* malaria in pregnancy may cause severe health problems including severe anaemia.

However the epidemiology and associated morbidities of malaria in pregnant women living in endemic areas of Mwanza region are not known. Therefore this study aimed at investigating the prevalence of malaria, anaemia and associated preventive factors among pregnant women in Mwanza region.

1.2. Problem statement

Malaria during pregnancy causes up to 10,000 maternal deaths each year and contributes to high rates of maternal morbidity, that is : fever and severe anemia, especially in first time mothers (Savage et al. 2007), low birth weight and placental parasitaemia (Falade et al. 2009). Between 75,000 to 200,000 infant deaths are annually attributable to malaria infection in pregnant women (Steketee et al. 2001).

Lake zone region has been shown to have high levels of malaria prevalence, Mwanza being the second with 31% of under fives malaria prevalence (2007-2008 Tanzania HIV/AIDS and Malaria Indicator survey).

The rates could be lower if health facilities implement the preventive measures as advocated by Ministry of Health and social welfare. It is therefore important to investigate to what extent these

measures are implemented by the health facilities of Nyamagana and Misungwi disricts in Mwanza region regarding pregnant women.

The proportion of the pregnant women who received two or more SP doses, at least one during an ANC visit is 20.8% in Mwanza region (TDHS 2010). Pregnant women who slept under ITN were 74.5% and those who slept under long lasting insecticide treated bed nets were 18.3% (TDHS 2010).

There is limited information on prevalence of malaria among pregnant women in Mwanza region as well as use of malaria preventive services among pregnant women attending antenatal clinics.

Hence this study will add to the body of knowledge on the factors that are associated with low uptake of malaria preventive services during pregnancy so as to improve IPTp-Sp program implementation modalities and coverage.

1.3 Justification

Prevention of malaria during pregnancy is one of the major interventions in helping to reduce maternal and infant mortality and morbidity. Moreover this will help in contributing to achieving the fourth, fifth and sixth millennium development goals and give evidence that good uptake of the proposed maternal services has an impact on malaria and birth outcome.

In addition there is a need to strengthen the capacity of districts to further improve antenatal care and maternity services utilization and IPTp-Sp uptake.

The information from this study will help in assessing the determinants and the impact of low IPTp-Sp uptake on malaria infection and hence anaemia. The findings may help in improving the provision of reproductive and child health services especially IPTp-Sp in rural communities.

Hence information that will be gathered from the study will be used by the District Health Management Teams to improve programs dealing with prevention services against malaria in the country with the same setting as the study area.

1.4 Conceptual framework

Factors associated with P. falciparum malaria and anaemia ranges from individual demographic and socio-economic factors (Figure 1.1). Illiterate in a community may lead to poverty, which in turn tends to influence accessibility to malaria preventive services and this may influence *P. falciparum* malaria transmission. Poor people are vulnerable to malaria infection due to inadequate prevention, treatment and mitigation measures, limited access to public health education and inadequate vector control programmes. As the result enhances malaria transmission and predisposes pregnant woman to anaemia and other morbidities.

Thus, provision of simple health interventions such as ITNs, iron supplements and IPTp services during antenatal visits among pregnant women could help to reduce morbidities associated with malaria infection and anaemia during pregnancy.

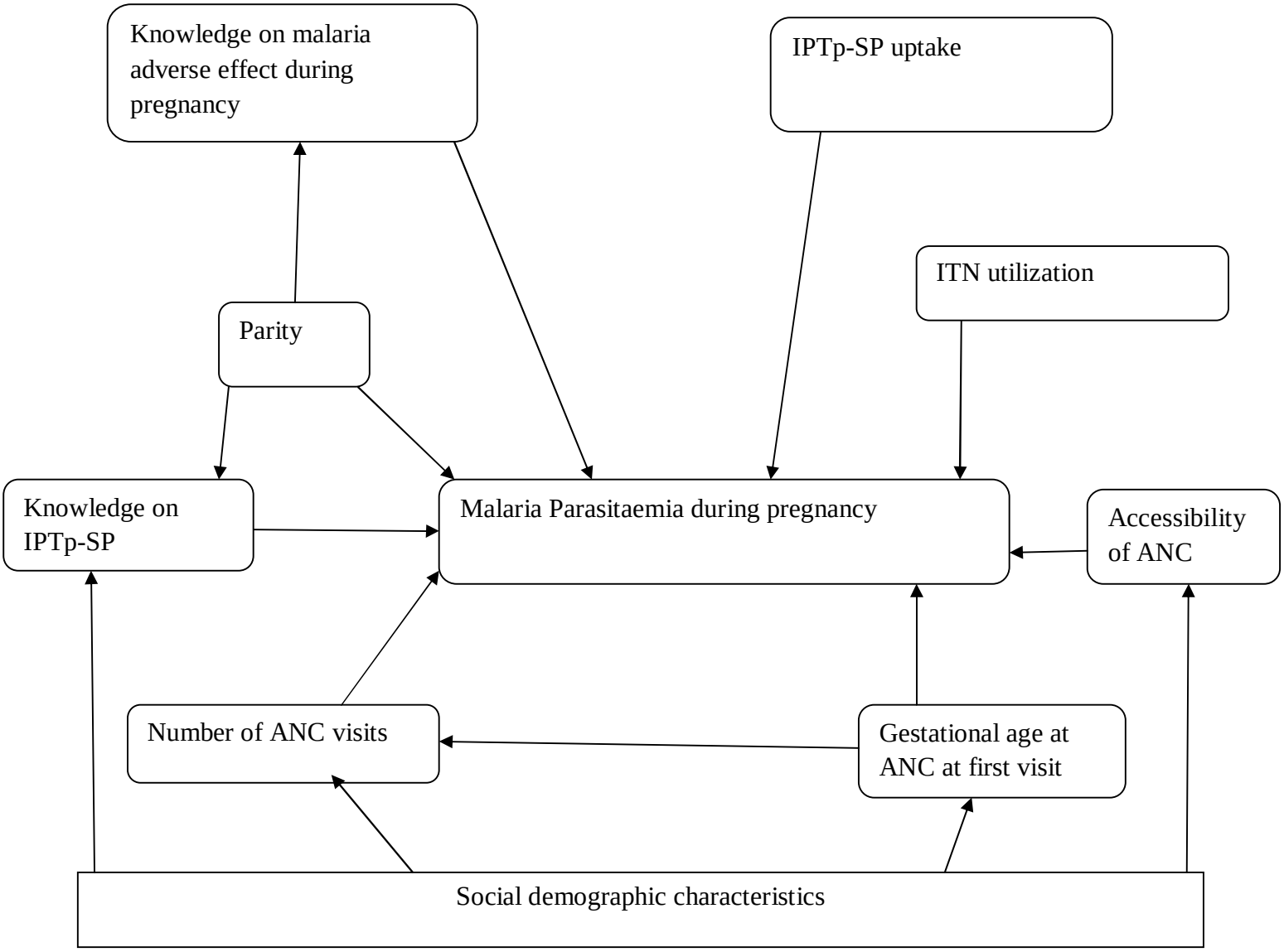


Figure1: The conceptual frame showing factors associated with malaria parasitaemia and anaemia among pregnant women and impact of interventions.

1.5. Hypothesis

There is a high rate of malaria parasitaemia and anaemia among pregnant women attending antenatal clinics in Mwanza region due to inadequate access and utilization of antenatal services on malaria prevention.

1.6. Research question

Is the prevalence of malaria among pregnant women related to access and utilization of antenatal services on malaria prevention during pregnancy?

1.7. General objective

To determine the level of utilization of ANC malaria preventive services and its impact on malaria parasitaemia and anaemia among pregnant women.

1.8. Specific objectives

1. To determine the proportion of pregnant women who sleep under an ITNs in the district.
2. To determine the proportion of pregnant women with malaria parasitaemia.
3. To determine the proportion of maternal anemia among pregnant women.
4. To determine proportion of pregnant women who have attended ANC clinic as recommended
5. To determine the coverage of intermittent preventive treatment for malaria during pregnancy among pregnant women.
6. To determine the association between utilization of malaria preventive services (ITN use, IPTp) and maternal malaria parasitaemia and anaemia among pregnant women in the district.
7. To investigate the determinants of utilization of malaria preventive services (ITN, IPTp) among pregnant women in the district.

CHAPTER TWO

Literature review

2.0 Introduction

This chapter shows relevant literatures to the study under the following topics

- Policies, strategies and targets of malaria prevention in pregnancy
- Malaria burden among pregnant women
- Factors associated with presence or absence of malaria infection during pregnancy
- Anaemia in pregnancy

2.1 Policies, strategies and targets of malaria prevention in pregnancy

2.1.1 Global vision for Malaria Control

The Roll Back Malaria (RBM) partnership's vision is that "by 2015, the malaria related Millenium Development Goal (MDGs) are achieved. This means that malaria no longer becomes a major cause of mortality as well as a barrier to social and economic development and growth anywhere in the world" (Feachem et al.2009) (RBM, 2008)

2.1.2 Global targets for Malaria control

Since the establishment of RBM Partnership in 1998, the main goal has been to reduce mortality by 50% by 2010. In 2005, the WHA determined to ensure a reduction in the burden of malaria at least 50% by 2010 and 75% by 2015 (Resolution WHA 58.2, WHO, 2005).

The initial targets for coverage with curative and preventive measures for malaria were set at 60% of all population at risk by 2005 (RBM/WHO, 2000) however a review in 2005 led the WHA to increase those coverage targets to 80% by 2010 (Resolution WHA 58.2, WHO 2005). By 2010;

- 80% of people at risk from malaria should be protected by locally appropriate vector control methods such as ITNs and where appropriate, indoor residual spraying (IRS) and, in some settings, environmental and biological measures;
- 80% of malaria patients should be diagnosed and treated with effective ant malarial medicines, such as artemisinin-based combination therapy (ACTs), within one day of the onset of illness and
- 80% of pregnant women in areas of malaria risk should receive IPTp and other appropriate preventive measures.

2.1.3 National drug policy for malaria control

Malaria endemic countries require an anti malaria drug policy so as to enable the population at risk have access to safe , good quality, effective and affordable drugs for the management of malaria. It needs to ensure that;

- There is a rapid and effective cure for those who get malaria.
- Death is prevented by halting the progression of uncomplicated to severe disease.
- Clinical episodes of malaria are shortened and malaria associated anaemia is reduced in those living in areas of high transmission.
- Consequences of malaria during pregnancy are reduced.
- The development and spread of drug resistance to the anti malaria drug is delayed (World malaria report, 2008).

In response to the recommendation from WHO, Tanzania NMCP and the RCH unit with the support from partners have developed guidelines for the implementation of IPTp-SP.

IPTp is one of the services recommended for user-fee exemption (MOH 2004) though lack of clear and enforceable guidelines act as limiting factors to the practice of exemption policy at most health facilities(Mubyazi et al. 2005).

The NMCP Malaria Medium-Term Strategic Plan 2008-2013 states that the burden of malaria morbidity and mortality will be reduced by 80% from current levels by end of 2013. The NMCP has adopted the WHO-recommended strategies to meet the following objectives:

- Timely and appropriate management of febrile episodes in homes and health facilities;
- Protecting pregnant women against malaria by IPTp;
- Integrated vector control, which includes distribution and consistent use of ITNs, spraying of houses with safe and efficacious insecticide, and environmental management, including larviciding.

Tanzania being one of signatories of the Abuja Declaration for IPTp implementation (Nganda et al.2004) through the National malaria control program, set the focused antenatal care guidelines suggesting IPTp implementation to be implemented both at private and public health facilities(Mubyazi et al. 2008).

In 2007 the ministry of health launched a new national ANC service package (Focused antenatal care) and recommended four antenatal visits.The national Focused Antenatal Care (FANC) guidelines identify administration of SP for IPTp doses to be given any time after 16 weeks of pregnancy as long as there is interval of 1 month apart is recommended in line with WHO standards (MOH 2004).

2.2 Malaria burden among pregnant women

In Tanzania in areas of holoendemic transmission more than half (63%) of pregnant mothers contract malaria.

Study done by Tarimo in Kibaha district showed that 27.3% had malaria parasitaemia and having hb<8gm/dl was associated with positive malaria parasitaemia.

Malaria epidemiology in the United Republic of Tanzania is of two different transmission settings: the Mainland and Zanzibar. On Mainland, 93% of the population lives in areas where *Plasmodium falciparum* is transmitted. Unstable seasonal malaria transmission occurs in approximately 20% of the country, while stable malaria with seasonal variation occurs in another

20%. The remaining malaria endemic areas in Tanzania (60%) are characterized as stable perennial transmission. P. falciparum accounts for 96% of malaria infection in Tanzania. The principal malaria vector in Mainland and Zanzibar is *Anopheles gambiae* (Malaria Operational Plan (MOP) Tanzania, 2009).

Due to the level of malaria endemicity 38 million persons are at risk for the disease in Tanzania (Mubyazi et al. 2005). Over 40% of all outpatient attendances are attributable to malaria, resulting in approximately 16 million clinical malaria cases. National malaria Control Program estimates that 70,000 malaria deaths occur annually in Tanzania among all ages (Malaria Operational Plan (MOP) Tanzania, 2009).

Clinical features of malaria appear around the fourteenth day after an infectious bite of Anopheles mosquito but may vary with the different species of Plasmodium parasite. Symptoms include; fever, headache, joint pains and flu like symptoms and others. Anaemia occurs due to break down of infected red blood cells and increased splenic sequestration of uninfected red blood cells as well as decreased erythropoiesis in the light of malaria disease. In pregnancy, haemodilution that occurs in addition to diminishing stores of iron and folate increases the rate of anaemia.

During pregnancy complex physiological changes occur including hormonal and immunological alterations, making both the pregnant woman and the fetus more susceptible to malaria infection and its complications. Pregnancy is naturally accompanied by generalized immune suppression which may cause the loss of acquired immunity to malaria. Heavy placental sequestration may interfere with oxygen and nutrient transport to the fetus. High maternal susceptibility to malaria is responsible for high parasitaemia in pregnancy. Real hyperparasitaemia in pregnancy, that is parasite counts in the blood of pregnant woman, may be often offset by high parasite burden in placenta. This always has to be kept in mind even if the peripheral parasite counts are low.

Malaria during pregnancy poses substantial risk to the mother, her fetus and the neonate. The infection contributes as much as 15% of maternal anaemia, 14% of low birth weight, 30% of preventable low birth weight during pregnancy (i.e. by antenatal interventions), 70% of intra

uterine growth retardation, 30% of premature deliveries and 8% of infant mortality(Steketee et al. 2001).

In areas of stable transmission where adult's women have considerable acquired immunity, *Plasmodium falciparum* infection during pregnancy typically does not cause symptoms but may lead to maternal anaemia and placental malaria, especially among women having their first and second children. The placental malaria may lead to low birth weight ,the single greatest risk factor for neonatal death and a major contributor to infant death. In areas of unstable transmission, women do not acquire substantial ant malarial immunity; malaria infection can cause severe clinical illness and even death and is also linked to poor birth outcomes, including stillbirth, miscarriages and premature deliveries(Sketee et al. 2001).

2.3 Factors associated with presence or absence of malaria infection during pregnancy

2.3.1 Socio-demographic factors of pregnant women

Socio-demographic factors are individual factors that tend to influence behaviour and choice of action in relation to a perceived problem. Factors like age, gravidity, parity, marital status, education level and occupation will be considered.

Research done in Kenya showed that uptake of IPTp-SP which is one among control measures for malaria during pregnancy to increased with higher level of formal education(Eijik et al. 2004). Study in Uganda showed that lack of post primary education was associated with failure to use at least one dose of IPTp-SP

But research done in Tanzania showed different results, showing no evidence of any individual factors being associated with second dose coverage beyond living in urban area (Marchant et al. 2008).

Shying away or fearing a pregnancy to be seen by the society members in the society members in the early stages limit early registration to ANC and others may not attend MCH without permission from their spouses (Ribere et al. 2007; Adam et al. 2002).

Study done in Uganda (Kiwuwa et al. 2008) showed primigravidae were more likely to sleep under a net compared to multigravidae, although this finding has not been consistent in studies done elsewhere(Marchant et al. 2002; Ter Kuile et al. 2003; Eijik et al 2004).

2.3.2 Gestational age at First ANC visit

The timing of IPTp is directly tied to when a pregnant woman start her ANC visit. Late ANC booking which is visiting clinic in the period outside the recommended gestational age or weeks of pregnancy for receiving the basic health care services. Late ANC attendance at rural setting contributes to low coverage of IPTp doses and late attendees usually receive one dose or none. Late booking (greater or equal to 20 weeks of gestation) could be due to lack of human touch by ANC workers and other socio-cultural barriers.

Studies have shown that women commonly present late for their first ANC visit, with nearly 25% of them presenting for the first time in their second trimester and for the second time in their third trimester, reducing effectiveness of ANC including IPTp services(Ndyomugyenyi et al. 2008). Late first ANC visit was found to contribute to incomplete IPTp(Eijk et al. 2004).

Reasons being given for late attendance include having no problem during the pregnancy hence no need for the visit, long distance from home to the health facility, inability to leave farm work to attend clinic, thinking to be early in pregnancy than she actually is (Anders et al. 2008). In this study 48% of all respondents had attended ANC at or before four weeks of gestation age, but 86% of these didn't receive IPTp at their first visit.

Primigravidae more likely to attend early to the clinic than multigravida (Anders et al. 2008),due to experience of knowing what is going when physiological changes start to take place.

Women may delay or decline to attend ANC if they ; appreciate comparative better service from the Traditional birth attendants who may be more friendly and devoting more time for listening to women's health and social problems(Katamanywa et al. 2008), get disappointed by the long waiting time at clinics, mishandling by nurses, lack of privacy and lack of diagnostic facilities (Mubyazi et al. 2005).

Study done in Tanzania showed that half of the women attend ANC during or before fourth month of gestation(Anders et al. 2008), this late registration has implications for the uptake of IPTp (unlikely to take the recommended two doses of SP).

2.3.3Level of knowledge of pregnant women on IPTp

Uptake of IPTp will be affected if the level of knowledge about IPTp is low among pregnant women since it will inform her how regularly they should attend ANC to receive SP.

Antenatal clinic is the best place to receive this knowledge where they are educated by trained health workers. Study done in Uganda showed only 21% of the pregnant women interviewed had been educated about the use of drugs to prevent malaria, 31.5% knew SP as the recommended drug in prevention of malaria in pregnancy, 4.5% knew the recommended doses of SP to take. 95% of the pregnant women reported no health education was given to them at ANC about IPTp. As the result coverage for IPT1 and IPT2 in 2008 found to be 61% and 31.5% respectively (Nankwanga et al. 2008).

Study by Tarimo et al., showed 90% of respondents were aware that SP is the drug of choice for IPT but more than half of didn't know the number of doses of SP supposed to receive before term. 70% not aware of timing of IPT with SP in accordance to gestation age. 77.2% held perception that IPT with SP has health benefits, of which half mentioned benefits of directly related to SP, 20% mentioned benefits directly related to SP.

Study done by Nganda et al, 2004 showed that knowledge of malaria by pregnant women influence the use of ITNs but not IPT. Attendance at health education sessions at MCH clinic was found to be only the determining factor for IPTp-SP use.

In order to adhere to the IPT, knowledge of malaria consequences to the mother and the baby by the pregnancy women is important. One study showed that there was poor level of knowledge about malaria consequences in a group of women attending health facilities. If malaria is perceived as a common condition by pregnant women, their uptake of IPTp will also be poor (Enato et al, 2007).

Previous studies in Uganda have revealed that perceiving malaria as an important factor in motivating pregnant women to participate in malaria control program (Mbonye, et al 2006).

Knowledge of the timing for IPTp by pregnant women also influences her regular attendance to the ANC and hence receives SP. One study showed that 90.1% of women interviewed were aware that SP was the drug for IPT and 77.2% held the perception that IPT with SP has health benefits; however, 70% were not aware of the timing for IPT. As the result poor and incomplete uptake of SP (Tarimo 2007)

2.3.4 Practice of DOT for IPTp at health facilities

Administering SP under direct observation by health workers is a way of ensuring that pregnant women take SP, and by recording it serves as the means of monitoring the numbers as well as the timing of SP administration which are important on IPTp coverage.

Study done in Tanzania showed that only 34.4%of the pregnant women took SP under direct observation by health workers (Mubyazi et al. 2005).

Health workers were found to give SP to pregnant women to take home due to water shortage, also understaffing lead to failure of DOT even if water would be available(Mubyazi et al. 2005)

Study by Tarimo in 2007 showed that 40% of those received SP didn't swallow the tablet at the health facility because of the empty stomach and sharing of water cups.

2.3.4 Use of ITNs

Sleeping under an insecticide treated bed net can reduce the risk of a pregnant woman being infected with malaria and reduce the risks of maternal anaemia and low birth weight (Hawley et al. 2003).

Study done in Uganda showed that 31.3% of women had slept under mosquito bed nets during their pregnancy and most nets were obtained from the commercial sector (Kiwuwa et al. 2008).

2.3.5 Coverage of IPTp

Operational effectiveness (practicability) of an intervention like IPTp is determined by the extent to which it is known and perceived by the target population (service-providers and recipients) and on the other hand by the way it is actually put into action or practice.

Given the records on national average ANC attendance rate of 80%-98% (WHO, UNICEF: The Africa malaria report WHO, Geneva (WO/CDC/MAL/2003.1093)). Tanzania extend the target for IPT coverage up to 80% by 2008, report from NMCP of 2005 showed IPT1 and IPT2 as 46% and 26% by 2001 to 78% and 44% by 2005 respectively.

Data on the estimates of IPT coverage for 2006 IPT1 and IPT2, 62% and 41.1% respectively, showing decreasing rates compared to 2005 records. This was due to stock out of SP in the number of districts (Malaria in pregnancy strategy within focused antenatal care. Dissemination meeting of survey results from 12 district, presenter Dr. Elizeus Kahigwa WHO-country office Tanzania and as reported by district CHMT.

Acute and persistent shortage of drugs, medical equipments and lack of enough skilled and motivated health workers are also important barriers to access(Mubyazi, et al. 2008). Shortage of SP at several health facilities noted in Malawi(Hill and Kazembe 2006) and Eastern Tanzania (Brieger 2008) severely impeded the IPTp implementation.

Factors influencing IPTp implementation include; perceived cost, quality and benefits of ANC as seen by pregnant women and social values on pregnancy(Hill and Kazembe 2006)

Though countries in Africa may have made important progress with IPTp implementation, coverage levels are reported to be still low. High antenatal clinic (ANC) attendance alone is not sufficient to ensure high IPTp coverage (Hill and Kazembe 2006). A study conducted in rural Uganda showed despite 94.4% attendance of ANC among postpartum women only 71.7% took one dose of SP and 35.8% took two or more doses(Kiwuwa and Mufubenga 2008). Community based study in rural Malawi also showed 75.5% receiving one dose and 43.7% receiving two or more doses (Holtz et al. 2004).

From 2010 TDHS data 66% of pregnant women took an ant malarial drug during pregnancy.60% at least took one dose of IPTp during ANC visit. However only 27% received the recommended two doses or more.

2.3.6 ANC attendance

Many studies in African countries with IPTp-SP policy implementation have indicated a high rate of antenatal care attendance and offers the potential for implementing the nationally recommended approaches to the prevention and control of malaria(Hill and Kazembe 2006; Kiwuwa and Mufubenga 2008)

2.4. Anaemia in pregnancy

Iron deficiency anaemia is common cause of anaemia which occurs due to nutrient deficiencies and is estimated to affect half of the population living in the developing countries. Approximately, 75% of the pregnant women are affected with iron deficiency anaemia. Iron deficiency anaemia is common during pregnancy due to the fact that the requirements of iron are high during pregnancy.

Anaemia contributes significantly to maternal morbidity and is estimated to cause almost 20% of all maternal deaths in sub-Saharan Africa. Community and hospital based studies from Tanzania have reported a significant association between anaemia and maternal mortality. In developing countries, the causes of anaemia are usually multifactorial ranging from nutritional deficiencies (iron and folate), parasitic infections (P. falciparum malaria, hookworm and schistosomiasis), viral infections (HIV) and other genetic related disorders such as sickle cell and thalassemias.

The contributions of P. falciparum malaria in causing anaemia in pregnancy have been reported from various endemic areas. Malaria infections contribute to low haemoglobin levels due to a number of mechanisms, principally through the destruction of parasitized RBCs, phagocytosis of parasitized and unparasitised RBCs, and autoimmune haemolysis. It is estimated that about 3-15% of anaemia and 25% of severe anaemia which occurs in pregnant women in developing countries are due to malaria. In areas with stable and unstable malaria transmission, P.

falciparum in pregnancy is reported to be greatest in primigravidae, with the prevalence and intensity of parasitaemia decreasing with increasing gravidity.

The association of *P. falciparum* malaria and anaemia in pregnant women has been shown by different studies. In the coast of Kenya, malaria is the leading cause of anaemia and severe anaemia among primigravidae, being associated with a reduction of mean haemoglobin level more than 2g/dl. In Tanzania, anaemia in pregnancy is a major cause of obstetric problems and malaria is reported to be significantly associated with anaemia in primigravidae.

CHAPTER THREE

Methodology

3.1. Study setting

The study was conducted in two districts where nine health facilities were included; this included Butimba designated district hospital and Makongoro dispensary in Nyamagana district. Misasi health center, Misungwi designated district hospital, Ng'ombe dispensary, Shilalo outreach clinic, Ukiriguru dispensary, Idete dispensary and Usagara dispensary in Misungwi district. The selection of health facilities was based on easy accessibility and number of antenatal attendance.

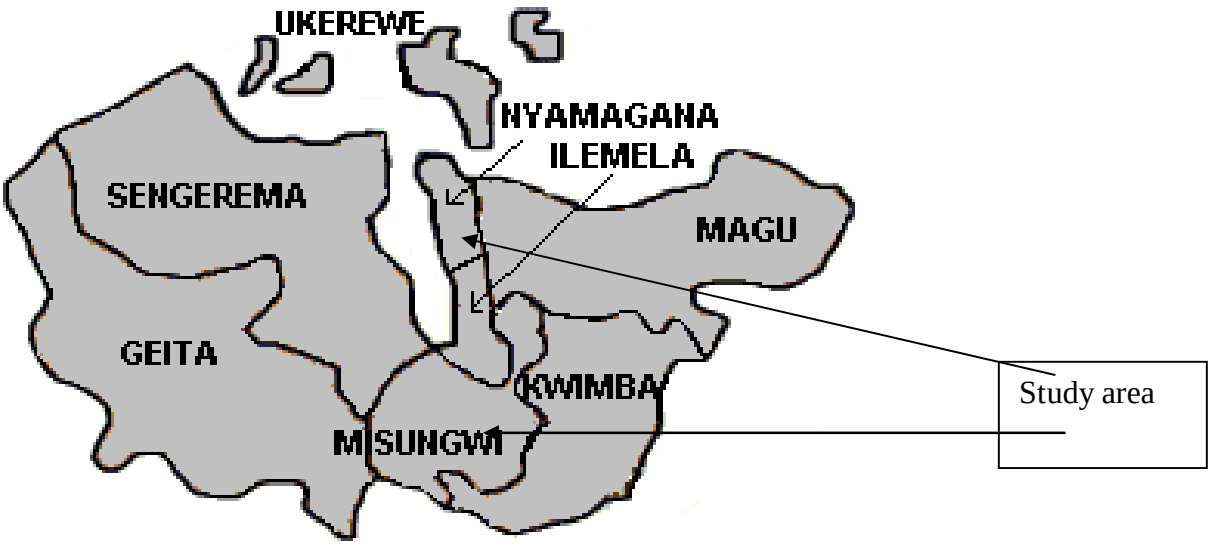
3.2. Study design

A quantitative cross sectional survey was conducted in Misungwi and Nyamagana district targeting pregnant women attending antenatal clinics in selected health facilities in June 2012.

3.3. Study population

Pregnant women at their various pregnancy trimesters who were visiting the ANC of the selected health centers for routine pregnancy were eligible for participation in the study.

Figure 2. A map showing Mwanza region



3.4. Sampling method

A convenient sampling technique was used and all pregnant women attending ANC at the health facilities and meeting inclusion criteria were included in the study.

3.5. Sampling Procedures

Misungwi and Nyamagana districts are located in Mwanza region were randomly selected out of eight districts.

In the first stage, nine health facilities were randomly selected from two districts. Seven facilities from Misungwi district and two from Nyamagana district based on number of pregnant women attending the antenatal clinic and accessibility.

In the third stage all the pregnant women attending routine antenatal clinics in the selected health facilities and meeting the inclusion criteria were included till the sample size of 400 was reached.

3.6.Sample Size

Sample size was calculated on the basis of prevalence of malaria in pregnancy 22% (NMCP 2008). Using the formula below, the sample size will be 395pregnant women.

The sample size is calculated from the following formula

$$N = \frac{z^2 p(1-p) * f}{d^2}$$

Where:

N- Total number of subjects required in the sample

Z= a standardized normal deviate value that correspond to a level of statistical significance equal to 1.96

F=design effect (1.5)

P= estimate of prevalence of malaria in pregnancy (22%)

d= margin of error which correspond to the level of precision of results desired

$$N = \frac{(1.96)^2 0.22(1-0.22) * 1.5}{(0.05)}$$

N= 395

3.7. Inclusion and Exclusion criteria

Inclusion criteria

The following inclusion criteria for including participants in the study were used:-

1. Pregnant women at any gestation age.
2. Residing within the study area.
3. Willing to participate and give consent.

Exclusion criteria

Conversely, participants were excluded from the study if:

1. They present with chronic debilitating diseases (e.g. leukemia, lymphoma).
2. They present with mental illness.

3.8. Data collection

Interviewer guided structured questionnaires designed by the investigator were administered to pregnant women after obtaining informed consent.

The questionnaire collected data on; socio-demographic factors, Obstetric history, Antenatal care service utilization, knowledge about IPTp and malaria consequences on mother and baby during pregnancy, ITN use, IPT intake as well as perceived efficacy and safety of SP for IPTp and ITNs.

We also reviewed the antenatal cards for those who attend Antenatal clinic to ascertain the information given by the respondents

Card information included; gravidity, gestation age at first ANC visit, gestation age at first and second SP doses.

Following the interviews, 5mls of the maternal venous blood sample was drawn by venous puncture technique into sterile EDTA container for malaria parasitaemia testing and estimating haemoglobin levels.

Laboratory procedure

- **Parasitological examination of P. falciparum malaria**

Thick and thin smears were prepared for all samples and stained a with 10% Giemsa stain for 10 minutes, washed in tap water, air dried and examined under oil immersion for malaria parasites using light microscopy at x100 magnification.

A thick blood smear was considered negative if 100 oil-immersion microscopic fields revealed no parasites.

Parasite densities were expressed per micro liter of blood. For each positive thick smear, the level of parasitaemia was estimated by counting asexual stages against 200 leucocytes. A second microscopist, who is unaware of the results of the earlier microscopist, checked the entire thick smears for quality assessment. Additionally a 10% randomly selected negative slides were reread.

- **Anaemia determination**

The haemoglobin level of each pregnant woman was determined at the time of interview using a portable β-haemoglobin photometer (HamoCue, Hemo Cue AB, Angelholm, Sweden). Anaemia was defined as Hb<11g/dl and severe anaemia was defined as <7g/dl(World Health 1993).

Table 1. Classification of anaemia based on measurement of haemoglobin (Hb) levels in blood(World Health 1993).

Classification	Hb levels
Normal	>_11g/dl
Mild anaemia	10.0-10.9g/dl
Moderate anaemia	7.0-9.9g/dl
Severe anaemia	4.0-6.9g/dl
Very severe anaemia	<_3.99g/dl

3.9. Data entry

Data was double entered into the computer using Microsoft office Excel 2007 and STATA computer software

3.10. Data analysis

Data were summarized using frequency distribution tables for categorical variables and by calculating means and standard deviations for continuous variables. For categorical variables proportions were compared using X^2 test or Fishers' exact test where appropriate, logistic regression was used to identify independent predictors of malaria at a p-value of <0.2 for inclusion in the final multivariate model. Odds ratios with 95% Confidence intervals were used to measure the strength of association at statistical significance level of P<0.05.

3.11. Study Variables

DEPENDANT- Positive for Malaria parasitaemia, presence of anaemia

INDEPENDENT: Age, education status, marital status, gravidity, occupation, attendance at ANC, gestation age at first ANC visit, SP swallowed at health facility and number of times, gestation age at first dose of SP,ITN use, level of knowledge of IPTp and malaria consequences.

3.12. Ethical issues

Permission and ethical approval to do this study was obtained from MUHAS institutional Ethical Review Committee.

Permission to conduct the study was sought from the Misungwi district and Nyamagana district authorities as well as in charge of selected health facilities. Meetings with district medical officers were held so that to explain to them about what my study was all about and to ask for their assistance during the research period and permission to conduct the study.

The meetings were held at the selected antenatal clinics with pregnant women on routine visit before the study to inform them about the study contents and its importance as well as asking for their cooperation. The information included right to withdraw from participation at any point during the research without negative consequences.

Verbal Informed consent was obtained from each respondent before the interview and for obtaining blood for malaria parasitaemia.

Oral consent by participants was recorded on the survey form.

Participants who were found with malaria parasitaemia were treated with SP, those with recommended gestation age to obtain IPTp-SP and hadn't received yet were provided with SP. Those with anaemia were given iron supplements and health education on risks and management of anaemia during pregnancy.

CHAPTER FOUR

4.0.Results

4.1. Demographic characteristics of the study participants

In total , 400 pregnant women in their various pregnancy trimesters were recruited for the study, pregnant women ages were between 15 and 50 years and mean age was 25.21± 6.92 (±SD). Of the recruited women, 70% were multigravidae, 11% were of first trimester, 75% in the second trimester and 14% in the third trimester. The majority of pregnant women were farmers 67%, 13 % did not receive any type of formal education.

The demographic characteristics are detailed in table 2

Table 2. Socio demographic characteristics of 400 pregnant women attending selected antenatal clinics in rural Misungwi district and urban Nyamagana district northwestern Tanzania.

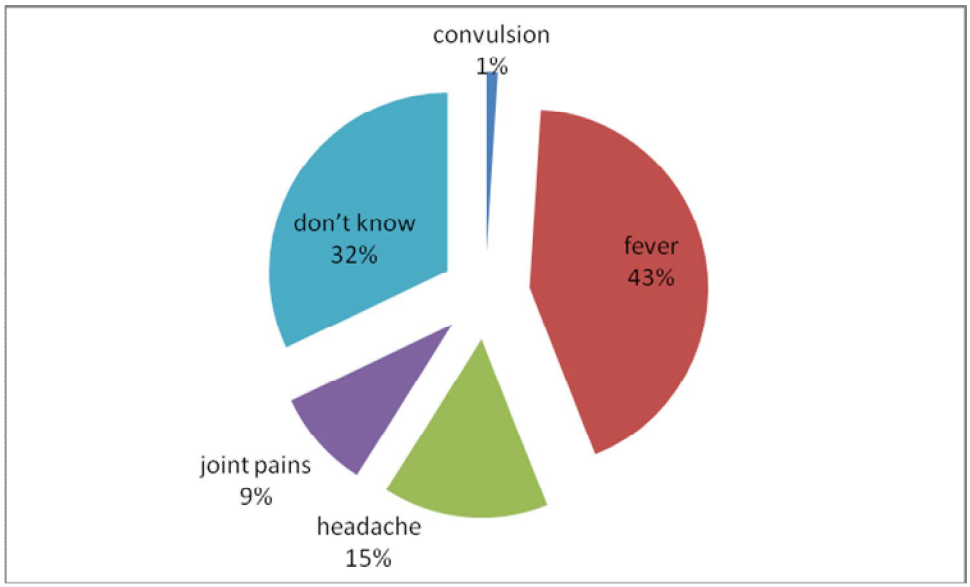
Variable	Nyamagana N=203	Misungwi N=197	Total N=400
Maternal age			
≤25	81	87	168
>25	122	110	232
Gravidity			
Primigravidae	67	54	121
Secundigravidae	95	29	124
Multigravidae	41	114	155
Education status			
Illiterate	24	27	51

Primary school	140	146	286
Secondary school/College	39	24	63
Occupation			
Farmer	97	169	266
Bussiness	84	25	109
Employee	22	3	25
Marital status			
Married	173	172	345
Single/divorced	30	25	55
ITN use			
Yes	199	192	391
No	4	5	9
Use of IPTp-SP			
Yes	87	74	161
No	116	123	239

4.2 Knowledge of pregnant women on malaria

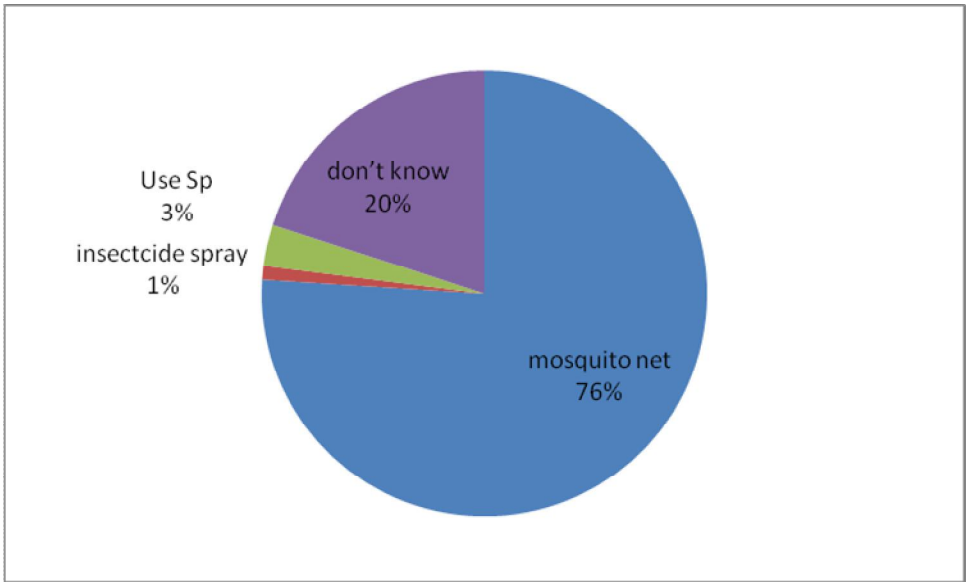
96% (378/400) of respondents had heard about malaria, 86% (351/400) knew malaria is transmitted by mosquito. 43% (171/400) knew malaria transmission peak during rainy season. Only 7% (27/400) knew Plasmodium causes malaria.

Figure 3. Symptoms of malaria as mentioned by pregnant women from the study area in Mwanza region



Majority of respondents, 43% mentioned fever as a symptom of malaria and 32% of respondents did not know symptoms of malaria.

Figure 4. Methods of malaria prevention during pregnancy as mentioned by pregnant women in the study area, Mwanza region.



Only 3% of respondents mentioned SP as one of the methods used to prevent malaria.

4.3. Knowledge of pregnant women about IPTp-SP

Out of 400 respondents only 47% (188/400) reported coverage of health education about malaria in pregnancy while attending routine antenatal clinics.

Only 2.5% (10/400) were able to correctly mention that pregnant woman is supposed to take SP two times for the entire pregnancy as IPTp.

Only 8% (31/400) of the respondents were able to identify the first dose of SP to be taken during the second trimester (20^{th} to 24^{th} weeks of pregnancy).

Only 52% (208/400) of the respondents knew SP was given to them to prevent malaria during pregnancy.

4.4 Knowledge of the pregnant women on malaria consequences during pregnancy

Figure 5. Effect of malaria on pregnancy as mentioned by pregnant women in Mwanza region.

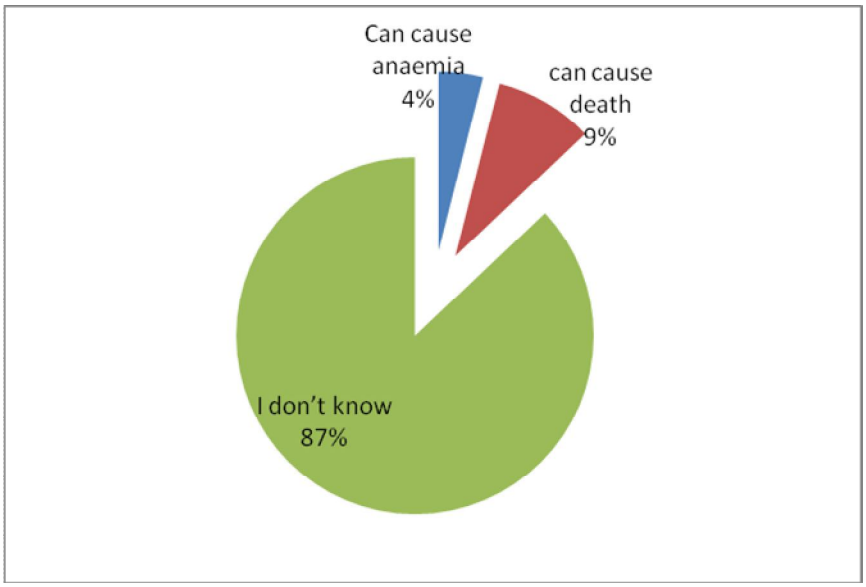
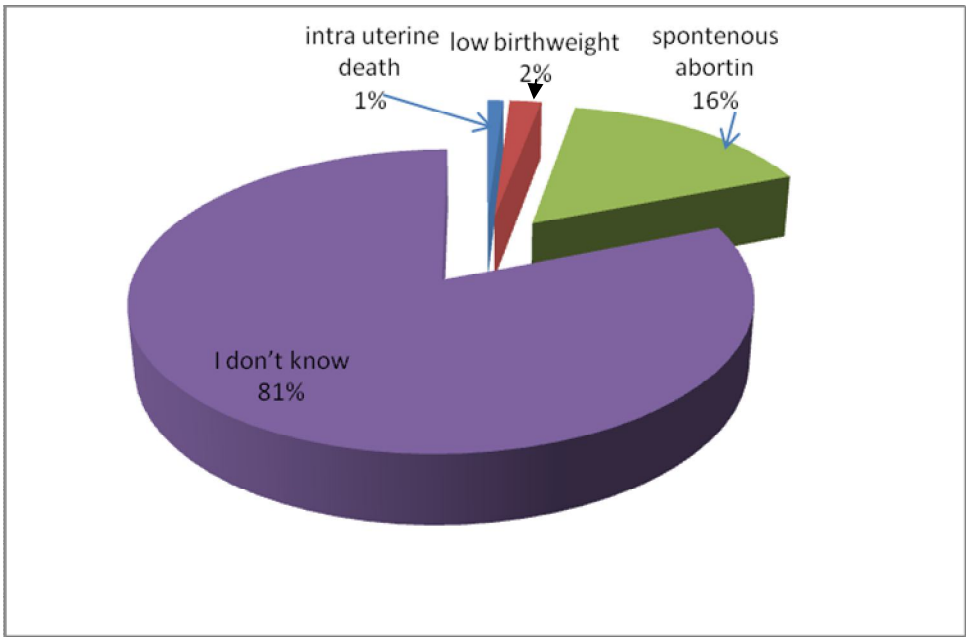


Figure 6. Effect of malaria on newborn as mentioned by pregnant women in Mwanza region.



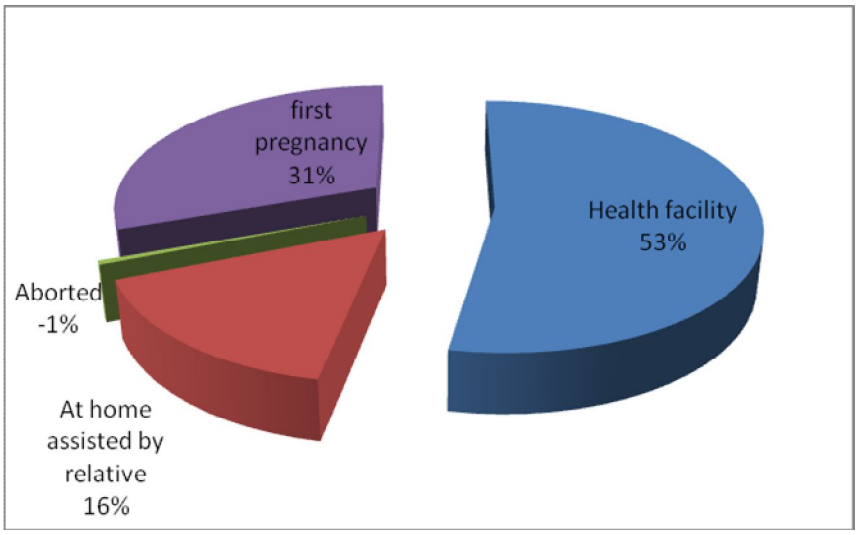
4.5 Prevalence of fever and its management among pregnant women

Out of 400 respondents 67.5% (130/400) reported to have suffered from fever during this pregnancy, of which 69% were treated at the health facilities, 28% bought drugs from the drug stores and 3% did not receive any treatment.

Table 3. Medication used for treatment of fever as mentioned by pregnant women in Mwanza region.

Medication used	Proportion of respondents N=130	Percentage (%)
SP	64	50
Quinine	5	4
ALU	18	14
Panadol	19	14
Amoxycillin	2	1
Herbs	2	1
Don't know	20	16

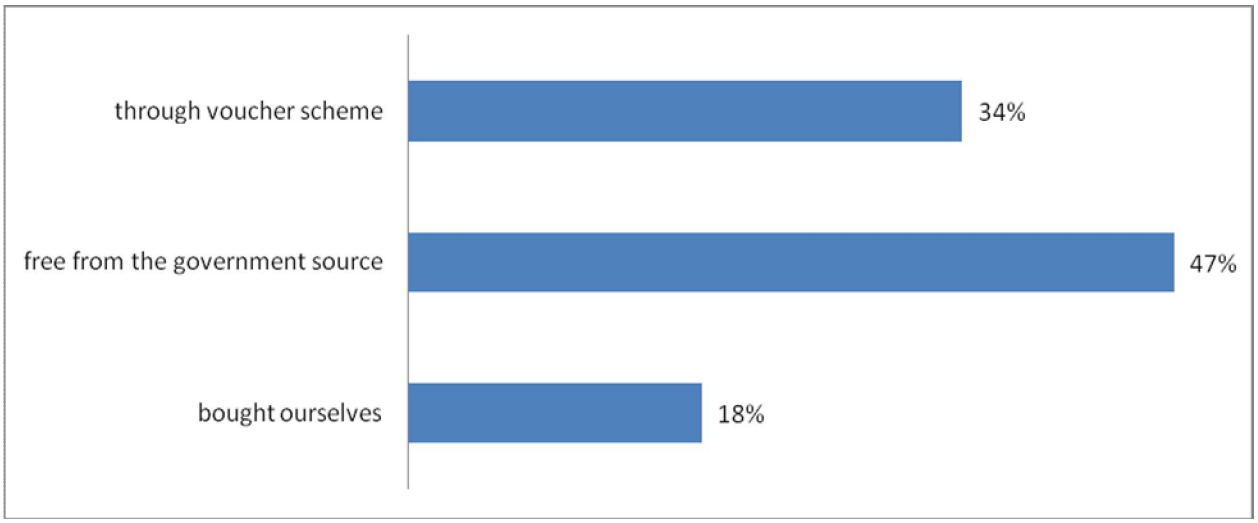
Figure 7. Delivery of the previous pregnancy by respondents in Mwanza region



4.7. Use of insecticide treated bed nets by pregnant women

Out of 400 respondents 98% (391/400) reported to have been sleeping under treated mosquito nets for a period from one month up to thirteen years from the day of the interview.

Figure 8. Source of ITNs as reported by pregnant women in Mwanza region.



4.8. Antenatal clinic attendance

Table 4. ANC attendance at selected health facilities in Mwanza region

Antenatal clinic attended	Proportion of respondents N=400	Percentages (%)
Butimba	115	29
Idete	5	1
Makongoro	88	22
Misasi	30	8
Misungwi	106	26
Ng'ombe	13	3
Shilalo outreach	14	4
Ukiriguru	21	5
Usagara	8	2

Table 5. Number of ANC visits by pregnant women in Mwanza region

ANC visits	Proportion of respondents N=400	Percentage
Once	134	34
Twice	138	35
Thrice	73	18
More than thrice	54	13

Out of 400 respondents 97% (389/400) reported to use less than three hours for their routine antenatal care services.

Only 32% of the pregnant women attended antenatal clinic before 20 weeks as recommended by FANC.

4.9. Coverage of intermittent preventive treatment for malaria during pregnancy among pregnant women

Out of 400 respondents 40% (161/400) reported to receive at least one dose of SP during their routine visits to ANC. Only 16% (25/161) took two doses of SP and 84% (136/161).

Table 6. Coverage of IPTp-SP by trimester of pregnancy in the study area, Mwanza

SP dose	Trimester	Number of respondents N=161(%)
First	Second trimester	121(75)
	Third trimester	40(25)
Second	Second trimester	10(40)
	Third trimester	15(60)

Out of 161 respondents who received SP for IPTp, 75% of respondents received the first dose of SP during the second trimester and 60% received the second dose during the third trimester. 60% (15/25) of respondents who received second dose of SP attended clinics in Nyamagana district

and 40% (10/25) attended clinics in Misungwi district; the observed difference is statistically significant (Fisher' exact= 0.008).

4.10. Prevalence of P.falciparum malaria in relation to demographic and obstetric parameters

Parasitological diagnosis of malaria parasites revealed that out of the 400 pregnant women, only 5.5% (22/400) had malaria infection. All the malaria positive cases were infected with P. falciparum. Of these 72.8% (16/22) were in the second trimester and 68% (15/22) were less than 25 years of age. Out of 22 pregnant women with malaria, 9 had high parasitaemia (parasites >1000/µl) which was observed on pregnant women less than 25 years of age 78%(7/9), on second trimester 78% (7/9) and prim gravid 56%(5/9) Table 7, shows the distribution of malaria in relation to demographic and obstetric parameters of the study participants.

Table 7. Prevalence of P. falciparum malaria in relation with demographic and obstetric parameters among N=400 pregnant women attending selected antenatal clinics in Mwanza region.

Variable	Number examined	Number with malaria parasitaemia	% of respondent with malaria parasitaemia
Age			
≤25	168	15	8.9
>25	232	7	3
Gravidity			
Primigravidae	121	11	9
Secundigravidae	120	4	3.3
Multigravidae	148	7	4.7

Pregnancy trimester			
First trimester	45	3	6.6
Second trimester	300	16	5.3
Third trimester	55	3	5.4

4.11. Prevalence of anaemia in relation to demographic and obstetric parameters

The prevalence of anaemia (<11g/dl) was 48.6% (194/399) and the distribution of anaemia by pregnant women's parameters are shown in table 8.Of these 61.3% (119/194) were less than 25 years of age, 71.6% (139/194) were on the second trimester. However observed difference of anaemia between age groups was not statistically significant (Fisher's exact=0.415), also difference among trimesters was also not statistically significant (Fisher's exact=0.656).Of 73.3% (11/15) those with anaemia 7.7% (15/194) had severe anaemia, majority were on second trimester 73.3% (11/15) and attended clinics in Nyamagana district 73.3% (11/15).

Table 8. Prevalence of anaemia in relation with demographic and obstetric parameters among pregnant women N=399 attending selected antenatal clinics in Mwanza region.

Parameter	Haemoglobin concentration (g/dl)				No. overall
	Severe anaemia n (%)	**Moderate anaemia n (%)**	**Mild anaemia n (%)**	**Normal n(%)**	
	<7	**7-8.9**	**9-10.9**	**≥11**	
Age in years					
>25	11(4.74)	9(3.88)	99(42.67)	113(48.71)	232
≤25	4(2.4)	4(2.4)	67(40.12)	92(55.09)	167
	Fisher' exact=0.415				
Gravidity					
Primi gravidae	3(2.47)	3(2.47)	63(52.06)	52(42.97)	121
Secundigravidae	6(4.83)	6(4.83)	49(39.51)	63(50.8)	124
Multigravidae	6(3.89)	4(2.59)	54(35.06)	90(58.44)	154
	Fisher' exact=0.110				
Pregnancy trimester					
First trimester	1(2.22)	2(4.44)	23(51.11)	19(42.22)	45
Second trimester	11(3.68)	10(3.34)	118(39.49)	160(53.51)	299
Third trimester	3(5.45)	1(1.82)	25(45.45)	26(47.27)	55
	Fisher' exact=0.656				

4.12 Association of malaria and anaemia

Of 22 pregnant women with malaria parasitaemia 54.5% (12/22) had no anaemia. On Univariate analysis, no significant association was observed between malaria and anaemia (Crude OR=0.87, 0.36-2.02 P=0.76).

4.13 Risk factors associated with P. falciparum malaria in pregnancy

Being primigravidae and not using SP on routine antenatal visits showed good associations with *P. falciparum* malaria (Table 9). Maternal age, gestation age and anaemia were the risk factors for P. falciparum malaria, but no effect was seen in the unadjusted or adjusted model.

Table 9. Associations between demographic and obstetric characteristics of 400 pregnant women with malaria in Mwanza region.

Risk factor		Unadjusted (univariate)		Adjusted (multivariate)		
	OR	**95%CI**	**P-value**	**OR**	**95%CI**	**P-value**
Age (years)						
≤25	1					
>25	0.62	0.25-1.57	0.32	0.85	0.31-2.32	0.75
Gravidity						
Primigravidae	2.43	1.02-5.78	0.044	2.53	0.97-6.58	0.05
Multigravidae						
Trimester						
First trimester	1					
Second trimester	0.78	0.22-2.82	0.71	1.009	0.27-3.77	0.98
Third trimester	0.8	0.15-4.21	0.8	1.33	0.24-7.53	0.74
Use of SP						
No	7.26	1.67-31.5	0.008	7.68	1.74-33.75	0.007
Yes	1					
Anaemia						
No	1					
Yes	0.87	0.36-2.07	0.76	0.85	0.34-2.07	0.72

4.13. Determinants of IPTp-Sp utilization by pregnant women in the study setting

Maternal age, education status of the pregnant woman, place of residence, gravidity, marital status, gestation age at first antenatal clinic visit as well as number of visits made to the clinic were factors for uptake of SP, but no association was seen in the adjusted or adjusted model as it is shown in table 10.

Table 10. Association between demographic characteristics and obstetric characteristics of 400 pregnant women with SP use.

Variable	SP use			Unadjusted		Adjusted		
	Yes (%)	No (%)	OR	95%CI	P-value	OR	95%CI	P.value
Age								
≤25	70(41.67)	98(58.33)	1					
>25	91(39.22)	141(60.78)	1.1	0.73-1.65	0.62	1.21	0.78-1.86	0.38
Education								
None	20(39.22)	31(60.78)	1					
Primary	112(39.16)	174(60.84)	0.75	0.43-1.3	0.31	0.76	0.43-1.34	0.35
Secondary/College	29(46.03)	34(53.97)	0.75	0.35-1.6	0.46	0.76	0.35-1.62	0.48
Gravidity								
Primigravidae	51(42.15)	70(57.85)	1.1	0.72-1.72	0.61	1.13	0.71-1.79	0.6
Multigravidae	110(39.43)	169(60.57)	1					
Marital status								
Single	24(43.640	31(56.36)	1.17	0.66-2.08	0.58	1.21	0.67-2.18	0.52
Married	137(39.71)	208(60.28)	1					
Place of residence								
Misungwi	74(37.56)	123(62.44)	1.24	0.83-1.86	0.28	1.22	0.81-1.82	0.33
Nyamagana	87(42.86)	116(57.14)	1					

CHAPTER FIVE

5.0.Discussion and Recommendation

5.1. Prevalence of *P. falciparum* malaria and anaemia

The prevalence of malaria parasitaemia observed in this study was 5.5%. The observed prevalence of malaria parasitaemia could be due to low coverage of SP in the study area which was below 16% for the recommended two doses or perhaps due to increased SP resistance. But compared to 90s the relatively lower prevalence rate of malaria observed among ANC attendees in this study and other study from malaria endemic areas could be a result of increased use of malaria prevention tools such as Insecticides Treated Nets (ITNs) (Marchant, et al. 2002)and Insecticidal Residual Sprays. In this study almost all pregnant women reported to own ITNs and slept under them the previous night before coming to ANC.

In relation to parity, the prevalence of *P. falciparum* malaria was significantly higher among primigravidae than multigravidae women. These results were were consistent with the findings from other similar studies in other malarious endemic areas in the tropics, which observed higher prevalence of *P. falciparum* malaria in primigravidae than in multigravidae (Van Eijk et al. 2007; Uneke et al. 2007). The decreased in malaria prevalence in multigravidae is associated with development of pre-immunity to malaria with increased parity whereas primigravidae remain susceptible to malaria due to partial development of immunity (Uneke et al. 2007).

Majority of pregnant women in their second trimester had higher prevalence of malaria compared to first and third trimesters. Similar findings have been documented by authors in sub-Saharan Africa, in which malaria prevalence and parasite density was reported to be highest among women in their second trimester (Rogerson et al. 2000; Uneke et al. 2007).

In this study the prevalence of anaemia was 48.6%.There was no significant difference between primigravidae and multigravida. Severe anaemia was found to be mostly in secundigravidae (9.8%) and multigravida (9.3%) while primigravidae had (4.3%). The prevalence of severe anaemia is much lower (7.7%) than reported by Tarimo 2007. Another study in Kisumu reported a much higher prevalence of 69.1%. Probably my findings are lower because in Mwanza they started Filariasis control program in 2010. When the whole population (>6/12 months) have been

periodically treated with Albendazole and Ivermectin thus this could be a contributing factor. Additionally the current antimalarial used is ALU which is highly efficacious and is perhaps being used unknowingly is early pregnancy, this may also contribute to low prevalence of anaemia.

5.2. Risk factors associated with *P. falciparum* malaria in pregnancy

In this study, the risk factors found significantly associated with *P. falciparum* malaria were parity using of SP and ITNs. Despite the low coverage of SP, I found it confers some protection. This observation has been seen in other study (Shulman, et al. 1999) . This could be spurious effect because overall malaria prevalence has gone down and in this study the prevalence of parasitaemia was very low. This cohort was effectively covered by ITNs. ITNs effectively reduce human-mosquito contact and thus reduce malaria transmission among those who use them. The ongoing distribution of ITNs among pregnant women attending ANC in Tanzania will help to reduce the transmission of malaria significantly (Marchant, et al. 2002; Hanson, et al. 2008).

5.3 Coverage of IPTp

The study findings show that only 40% of the women received at least one dose of SP during their routine antenatal visits and only 16% received the recommended two doses. This low uptake of recommended two doses of SP during route antenatal visits was also documented in studies done in Malawi, Central Uganda and Kenya (Guyatt, et al. 2004; Holtz, Patrick Kachur et al. 2004; Kiwuwa and Mufubenga 2008). Surprisingly in this study approximately 25% of pregnant women received their first dose of SP during the third trimester. The National guidelines recommended the first dose of SP to be taken during second trimester (20-24 weeks), hence the national guideline is not being followed.

In Tanzania found a number of combination factors such as lack of awareness, health worker behaviour, stock outs of SP and policy as possible explanations for low recorded coverage of IPT (Mubyazi, et al. 2005; Mubyazi, et al. 2008).

Coordinated support to the routine clinic and training of antenatal care workers were found to be enabling factors for high coverage of IPTp second dose (Steketee, et al. 2008).

5.4. ANC attendance

Attending ANC fully support the implementation of the IPTp program through the ANCs in the district. It does not explain why it is possible for only 40% of respondents received at least one dose of SP. Other studies also showed high attendance of ANC which does not usually reflect on high coverage of receiving two doses of SP (Tarimo 2007; Kiwuwa and Mufubenga 2008). Free maternal policy may have contributed to high ANC attendance as well as pregnant women appreciating the essence of attending the ANC. High attendance doesn't reflect SP coverage due to SP stock out. Only 14% of the pregnant women from this study made the recommended four visits compared to 37% from the study done in Uganda(Kiwuwa and Mufubenga 2008) this could also explain the low coverage of SP in the study area..

5.5. Socio-demographic factors

In this study socio demographic characteristics such as age, education, marital status, place of residence and gravidity had no association with IPT coverage. These findings are similar with other studies that found no association (Mbonye, et al. 2006; Marchant, et al. 2008). The reasons could be low coverage of SP in this study hence could not find association

Hence there is a need to look out for other factors outside socio-demographic factors that influence IPTp uptake like health system related factors as well as perception about SP intake and HIV.

5.6. Number of ANC visits

Only 14% made four or more visits to the ANC. This is not what is recommended by WHO or Tanzania FANC guidelines. Since at least three visits are required to be made after 16 weeks of gestation, then there was the decreased opportunity of the women receiving at least two doses of SP, as a result low IPT2 of 16% in this study. As other studies show this(Ndyomugyenyi and Katamanywa; Kiwuwa and Mufubenga 2008)

5.7. Knowledge of pregnant women about IPTp

This study has shown that knowledge of respondents about IPTp was just average. The knowledge of participants about the reason of taking SP at the ANC was 52% which is lower compared to the study done in Malawi and Eastern Tanzania (Holtz, et al. 2004; Tarimo

2007).Only 8% of pregnant women knew when to take the first dose of SP slightly similar to the study done by Tarimo in Eastern Tanzania. About 80% of the participants did not know the effect of malaria on pregnancy and knew born.

Good knowledge may have influenced her to return for subsequent doses of SP. One study showed attendance at the health education sessions at the MCH clinic was the only determining factor for IPTp-SP use among pregnant women(Nganda, et al. 2004).

Though no structured health education talks on IPTp-SP were available at the visited ANC clinics, 47% of respondents admitted to receive information about malaria from ANC. Education about the recommended number of doses to be received by pregnant women need to be stressed by health workers so that it encourages the women to receive all two doses. Since this important component of understanding is missing it is very likely that coverage will be low. My study observes that there was very little effort to include health education during ANC visit. Only two ANC clinics out of nine visited ANC had some educational message on IPT posted on the wall. Other study explained more than 50% displayed posters(Marchant, et al. 2008). This explains that in this study the knowledge regarding IPTp was low.

CHAPTER SIX

6.0. Conclusion, limitations and recommendation

6.1. Conclusion and recommendation

This study was conducted during the peak malaria season (May-June). The key findings of this study are as follow:-

- In this study area *Plasmodium falciparum* in pregnancy is relatively low but placental malaria show a more accurate measure.
- Severe anaemia was low but overall about half the women had mild anaemia.
- SP coverage was low.
- ITN use was >90%. This is likely to account to the low malaria parasitaemia revealed in this study.
- Knowledge especially regarding IPTp was poor.

In order to sustain the gain and continue efforts to reduce the burden of malaria in pregnancy it is necessary to address the following:

- Coverage of ITNs should be maintained. Free nets have been given but for how long?
- There is need to revisit the health education package. There should be regular supervision from the district health committee to make sure health education is being given.
- There is a need for research to be done on other drugs to replace SP as a drug for IPTp due to high resistance.
- Factors contributing to anaemia should be addressed; nutrition and helminthes

6.2. Limitation

- This was hospital based study and hence the prevalence of malaria parasitaemia may be underestimated.
- The study did not investigate other factors which could cause anaemia, such as helminth infections, red blood cells disorders and nutrition deficiencies.
- Inadequate funds and time. If funds and time were adequate, I might have been able to involve more facilities and hence higher coverage and different results.
- Language barrier could have led to misunderstanding and hence biased answers.

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Appendices

Appendix 1

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

INFORMED CONSENT FORM

ID-NO:

Dear participant,

Consent to participate in this study

Greetings! My name is Maria Zinga. I am a university student working on my thesis as a partial fulfillment of MSc (TDC) for academic year 2010/20102, with the objective to explore the prevalence of malaria parasitaemia, anaemia and factors that relate to the presence or absence of parasitaemia among pregnant women in Mwanza region, Tanzania.

Purpose of the study

This study aims to collect information on uptake of intermittent preventive treatment for malaria during pregnancy, Insecticide treated bed net utilization, access and utilization of antenatal services.

Venous blood samples will be collected to determine the presence of malaria parasite and haemoglobin levels.

You are being asked to participate in this study because you have criteria that may be important to this study.

Confidentiality

I assure you that all the information collected from you will be strictly confidential. Only people working in this study will have access to the information.

Risks

We will ask you a few questions concerning your socio-demographic characteristics, reproductive history, IPTp use, ITN use and ANC attendance. Some questions could make you uncomfortable. You may refuse to answer any particular question and may stop the interview at any time.

Right to withdraw and alternatives

Taking part in this study is completely voluntarily. You can stop participating in the study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled

Benefits

The information and samples which will be collected will help us make valid conclusions on the burden of malaria among pregnant women and which factors relate to its high or low occurrence. We do not anticipate that harm will occur to you or your baby

Those with parasitaemia will be referred to the health facility for treatment and those with appropriate gestation age to receive IPTp-SP and haven't received advised on the best way to receive the drugs.

Who to contact

If you ever have questions about this study, you may contact the study Coordinator or the Principal Investigator: **Maria Zinga, Muhimbili University of Health and Allied Sciences, P. O. Box 65015, Dar es Salaam, mobile phone number 0755 771107.** If you ever have questions about your rights as a participant, you may call **Prof: Z. Premji** – the Supervisor of this study, or write to Prof M.Aboud **Chairman of Senate Research and and Publications Committee, P. O. Box 65001, Dar es Salaam. Tel: 2150302-6.**

Signature

Do you agree to participate in this study?

Participant agrees---------- Participant disagrees----------

I, ----------have read/understood the contents in this form, my questions have been answered. I agree to participate in this study.

Signature of participants ----------

Signature of researcher assistant ----------

Date of signed consent ----------

Appendix 2.

Informed consent, Swahili version

CHUO CHA SAYANSI ZA TIBA MUHIMBILI
KURUGENZI YA UTAFITI NA MACHAPISHO
FOMU YA RIDHAA

Jina la mtafiti: Maria Zinga

Utafiti kuhusu: Kiasi cha maambukizi ya malaria na sababu zinazohusika na uwepo wa maambukizi hayo katika wamama wajawazito mjini Mwanza 2012.

Ridhaa ya kushiriki

Hujambo! Ninaitwa Dr. Maria Zinga mwanafunzi wa degree ya uzamini katika kukabiliana na magonjwa yanayopatikana katika nchi za kitropiki katika chuo kikuu cha afya Muhimbili.

Madhumuni ya utafiti

Utafiti huu unakusudia kuchunguza wadudu waenezao malaria kwa mama mjamzito na kiwango cha damu, tunafanya uchunguzi wa damu kutoka kwa mama mjamzito na pia kuchukua maelezo kuhusiana na matumizi ya dawa ya SP wakati wa ujauzito, chandarua ya kulalia ya dawa, upatikanaji na matumizi ya huduma za kliniki za wamama wajawazito.

Nini kinahitajika ili kushiriki: Uvumilivu na ustahamilifu wako katika kujibu baadhi ya maswali ambayo yameandaliwa ili kufanikisha zoezi hili.Kutoleawa damu kidoleni kwa wamama wajawazito ili kupima uwepo wa vimelea vya malaria kwenye damu.

Usiri

Maelezo yote yanayopatikana yatakusanywa na kuwekwa katika kompyuta kwa utaratibu wa kutumia nambari za utambulisho na zitaonwa na watafiti tu.

Hatari

Hakutakuwa na madhara yoyote yatakayotokea kwako na hata kwa mototo pia.

Haki ya kujitoa au vinginevyo

Kushiriki katika utafiti huu ni kwa hiari una haki ya kukataa au kujitoa pale ambapo hutokuwa tayari kushiriki au kuendelea kushiriki na hakutakuwa na adhabu yoyote kwa uamuzi utakaoufanya.

Faida

Ni faaraja kubwa kwa kushiriki kwako katika utafiti huu kwa vile kinachotakiwa kupatikana ni faida kwa jamii yote na pia itachangia kutoa uamuzi juu ya kutumia dawa ya kukinga malaria kwa akina mama wajawazito, matumizi ya chandarua na huduma za wamama wajawazito zitolewazo kliniki. Wamama wajawazito watakao patikana na vimelea vya malaria watapewa rufaa kwenda kupata huduma kwenye kituo cha afya na wale ambao umri wa mimba unaruhusu kupewa dawa za SP na bado hawajapata watashauriwa njia bora ya kupata hizo dawa baada ya mahojiano.

Mawasiliano

Endapo utakuwa na swali lolote kuhusu utafiti huu tafadhali wasiliana na mtafiti mkuu **Maria Zinga,Chuo Kikuu Kishiriki cha Sayansi za Afya, P.O.Box 65015,Dar es Salaam, simu namba 0755 771107.**

Endapo una swali lolote kuhusu haki zako kama mshiriki katika utafiti huu, wasiliana na **Prof: Z. Premj** msimamizi wa utafiti huu au Prof M.Aboud**, Kaimu Mwenyekiti wa Utafiti na Machapisho, SLB 65001, Dar es Salaam. Simu: 2150302-6.**

Je umekubali

Mshiriki amekubali----------Mshiriki hajakubali----------

Mimi----------nimesoma maelezo ya fomu hii, maswali yangu yamejibiwa. Nakubali kushiriki katika utafiti huu.

Sahii ya mshiriki----------

Sahii ya mtafiti msaidizi----------

Tarehe ya kutia sahihi ya kushiriki----------

Appendix 3.

QUESTIONNAIRE

Title; Malaria parasitaemia and associated factors among pregnant women in Misungwi district, Mwanza region 2012.

QUESTIONS

Questionnaire number_____
Date _____

Name of interviewer _____
Name of the Sub-village _____
Name of the village _____
Name of ward_____
Name of the Division _____
Time start: _____

DEMOGRAPHIC CHARACTERISTICS

1. **Age**

2. **Marital status**

[1]Married or living together

[2]Divorced / Separated

[3]Widowed

[4]Single

3. **What is the highest level of education you have attained?**

[1]None

[2]Primary

[3]Secondary

[4]Post Secondary

[-10]Other specify

4. **What is your main occupation?**

[1]Crop production

[2]Pastoralism/Animal production

[3]Business

[4]Employee (Wage employment)

[5]Casual labor

[-10]Others (Specify)……..

I. MALARIA AS A DISEASE

5. **Have you ever heard of malaria?**

[1] Yes

[2] No

[-9]Don't know

6. **How does someone acquire malaria? (Do not read answers, circle all that apply)**

[1] Mosquitoes bite
[2] Unclean environment
[-10] Other _____
[-9] Don't know

7. **In this village, when do most people get sick from malaria? (Read answers, circle only one)**

[1] Rainy season
[2] Dry season
[3] Throughout the year
[-9] Don't know

8. What causes malaria?

[1] Dirty water
[2] Unclean environment
[3] Plasmodium
[-9] I don't know
[10] Others……..

9. Does reducing the population of mosquitoes help to reduce malaria?

[1] Yes
[2] No
[-9] I don't know

10. What are the symptoms/ signs of malaria? (Do not read answers, circle all that apply)

[1] Fever
[2] Headache
[3] Joint pains
[4] Convulsions
[5]Anaemia
[-10] Others_____
[-9] Don't know

II. MALARIA TREATMENT AND PREVENTION

11. What can you do to prevent malaria during pregnancy?

[1] Use a mosquito net
[2] Spray insecticides inside
[3] Burn local plants/herbs
[4] Drain stagnant water
[5] Clear grass and bushes around the home
[6]Use SP
[-10]Other: _____
[-9] Don't know

12. Are there any community-based malaria interventions organized by the village government/Health Committee?

[1] YES, mention……..

[2] NO

13. Do you have treated mosquito nets in this household?

[1] Yes,

i. How many ITNs do you own

[1] One

[2] Two

[3] Three

[4] More than three

ii. How long have you had the net ……

iii. Who is sleeping under the ITN

[1] Children under five years of age

[2]Children 0 to 13 years of age

[3] Pregnant woman

[4] Everyone in the house hold

iv. Did you sleep under the ITN last night

[1] Yes

[2]No/ why not……..

v. What time did you go to bed last night ……

vi. Do you have any activities that requires you to wake up at 6am

[1] Yes

[2] No

14. How did you get the mosquito nets?

[1] Free from the government source
[2] Through a voucher scheme
[3] Bought ourselves

[-10] Others_____

15. How effective are mosquito nets in preventing malaria to members of your household?

[1] Very effective
[2] Effective
[3] Moderate
[4] Poor
[-9] Don't know

III. ANTENATAL CARE

16. How far is the closest health facility with pregnancy services from your home?

[1] Name, if known _____
[2] Kilometres: _____
[3] Walking time in minutes: _____
[-9] Don't know

17. Have you attended the ANC during this pregnancy?

[1] Yes (If answer is YES, go to question number 18)
[2] No (if answer is NO, go to question number 22)

18. How many hours do you spend on average for ANC visit including travel, waiting and service?

[1] Less than 3 hours

[2] 3-4 hours

[3] 5-6 hours

[4] 7-8 hours

[5] >8 hours

19. How many times have you attended the clinic specifically for routine antenatal care in this pregnancy?

[1] Once

[2] Twice

[3] Thrice

[5] More than thrice

20. At what age of your pregnancy did you attend the clinic for the first time _____months?

21. If later than or during the five month, why did you attend your first ANC at that time?
[1] Did not have any problems during the pregnancy

[2] Did not have money for transportation

[3] I could not leave my farm work

[4]Was afraid to be tested for HIV

[5] I didn't see importance

[6] Long distance to the ANC deterred me

[-10] Other, specify ……..

22. If no to question 17, why didn't you attend ANC?

[1] Did not have any problems during the pregnancy
[2] Did not have money for transportation
[3] I could not leave my farm work
[4] I feared to be tested for HIV
[5]I didn't see its importance
[6]It was not important

[7] Long distance to the ANC deterred me
[-10] Other, specify ……..

23. Since you got this pregnancy, have you suffered/ been treated for malaria?

[1] YES

[2] NO

(a)If yes, where did you get treatment from?
[1] Health facility
[2] Traditional healer
[3] Buy drugs from drug store
[-10] Other, specify……..

(b)What medication did you use for treatment?
[1] Quinine
[2] ALU
[3] Herbs
[-10] Other, specify……..

24. Where did you deliver your child before this pregnancy?
[1] At the health facility
[2] At home assisted by my experienced relative
[3] At a traditional birth attendant
[-10] Other, specify……..

25. Did you receive information on malaria prevention and treatment at the antenatal clinics?
[1] YES

[2] NO

If yes which ones……..

26. What is the drug of choice for malaria prevention during pregnancy?

[1] SP

[-10] Other, specify……..

[-9] Don't know

27. How many doses of SP should a pregnant woman take during her ANC visits for IPT?

[1] One

[2]Two

[3]Three and above

[-10]Other, specify…….

[-9] Don't know

28. When should a pregnant woman take the first dose of SP for IPTp?

[1] 1st to 3rd month
[2] 4th to 6th month
[3] 7th to 9th month
[-10] Other, specify

29. (a) During ANC visit in your last pregnancy did the nurse give you SP to swallow while observing you?

[1] Yes

[2] No

(b)How many times during the last pregnancy did you swallow SP tablets at ANC?

[1] Once

[2] Twice

[3] Thrice

[4] Can't remember

30. (a) The first time these SP tablets were offered, did you accept them?

[1] YES (Go to question 31)

[2] NO (If NO, go to question number 30b)

(b) If NO to above, why not?

[1] No clean water in the clinic to take the treatment

[2] Did not know what it was for

[3] Did not think it would help

[4] Did not want to pay for it

[5] Believed it would have side effects

[-10]Other_____

31.(a) If you were offered SP the second time, did you accept them?

[1] YES(Go to question 32)

[2] NO (Go to question number 31b)

(b)If No to above, why not?

[1] Had a bad experience with the first dose

[2] Did not think a second dose was necessary

[3] Did not want to pay for it

[-10] Other_____

32. Do you know what the SP tablets given during ANC visits are for? (Circle what is appropriate)

[1] For weight gain

[2] To make me and my baby health

[3] To prevent me from getting malaria

[4] To cleanse my blood of disease

[-10] Other, specify ……..

[-9] Don't know

33. What are the effects of malaria on the pregnant woman?

[1] Can cause anaemia

[2]Can cause death

[3]Nothing

[-10] Others_____

[-9]Don't know

34. What are the effects of malaria on the unborn baby?

[1] Can cause spontaneous abortion

[2] Can cause intra uterine death

[3] Can cause low birth weight

[4] Can cause prematurity

[-10] Other, specify

[-9]Don't know

35. Do you think that SP can prevent malaria?

[1] Very effective
[2] Effective
[3] Moderate
[4] Poor

IV.INFORMATION FROM THE ANTENATAL CARD

ANC visit and IPTp intake

visit	**IPT-SP dose**	**Gestation age (Months)**
1		
2		
3		

4		

HIV status

[1] PMTCT I

[2]PMTCT 2

[3]No results

Haemoglobin level if recorded_____

Obstetric history

- **Parity**

  [1]0

  [2]1

  [3]≥2

- **Gravidity**

  [1]1

  [2]2

  [3]≥3

- **History of miscarriage/abortion**

  [1]Yes

  [2]No

V. SPECIMEN COLLECTION AND RESULTS

Specimen	**Results**	
	First leader	**Second leader**

Finger prick blood slide for malaria parasite	**[1]Positive** **[2]Negative**	**[1]Positive** **[2]Negative**
Haemoglobin level (g/dl)		

Appendix 4

DODOSO

Uchunguzi wa malaria na wingi wa damu kwa kina mama wajawazito hapa Mwanza na kuchukua taarifa kuhusu sababu zinazopelekea kupata au kutopata maambukizi ya malaria.

MASWALI

Namba ya dodoso_____
Tarehe _____

Jina la anayehoji _____
Jina la kitongoji _____
Jina la kijiji _____
Jina la kata_____
Jina la tarafa _____
Muda wa kuanza:_____

TAARIFABINAFSI ZA MSHIRI

1. Umri _____

2. Taarifa za ndoa
[1]Umeowa/Umeolewa

[2]Umeachika/Talakiana

[3]Mjane

[4]Sijaolewa/sijaoa

3.Kiwango cha elimu?
[1]Sijasoma

[2]Shule ya msingi

[3]Shule ya sekondari

[4]Kupita sekondari

[-10]Nyingine,eleza_____

4. Unafanya kazi gani?
[1]Mkulima

[2]Mfugaji

[3]Mfanyabiashara

[4]Mwajiriwa

[5]Mfanyakazi wa kawaida

[-10]Nyingine (elezea)_____

I. UGONJWA WA MALARIA

5. Umeshawahi kusikia kuhusu ugonjwa wa malaria?
[1]Ndiyo
[2] Hapana
[-9]Sijui

6. Malaria inaambukizwaje? (usisome majibu, zungushia jibu sahihi)
[1] Mbu
[2] Mazingira machafu
[-10] Nyingine _____

[-9] Sijui

7. Ni wakatigani watu hupata maambukizo ya malaria kwa wingi hapa kijijini? (Soma majibu ,zungushia moja)

[1] Wakati wa mvua
[2] Wakati wa kiangazi
[3] Mwaka mzima
[-9] Sijui

8. Je malaria inasababishwa na nini
[1]Maji machafu
[2]Mazingira machafu
[3]Vimelea vya malaria
[-9]Sijui
[10]Nyinginezo

9. Je kupungusha wingi wa mbu kunasaidia kupunguza malaria?
[1] Ndiyo
[2] Hapana
[-9] Sijui

10. Ni dalili zipi za malaria unazozijua? (Usisome majibu, zungushia jibu atakalosema)

[1] Homa
[2] Kuumwa kichwa
[3] Kuumwa viungo
[4] Degedege
[5] kupungukiwa damu
[-10] Nyingine_____
[-9] Sijui

II. KUTIBU NA KUZUIA UGONJWA WA MALARIA

11. Ni vitu gani unavyoweza kufanya ili kujikinga na malaria wakati wa ujauzito?
[1] Chandarua cha kuzuia mbu

[2] Kupulizia dawa ya kuua wadudu ndani ya nyumba
[3] Kuchoma miti shamba
[4] kuondoa maji yanayotuama
[5] kufyeka majani kuzunguka nyumba
[6] Kunywa dawa za SP
[-10]nyingine: _____
[-9] Sijui

12. Kuna njia zozote za kuzuia malaria ambazo zinasimamiwa na halmashauri ya kijiji katika jamii yako?

[1] Ndiyo, eleza _____

[2] Hapana

13. Je unachandurua cha kuzuia mbu ndani ya nyumba yako?

[1] Ndiyo

i) Je mnamiliki vyandarua vya dawa vingapi
[1]1
[2]2
[3]3
[4]≥4
ii) Ni kwa mda gani mmekuwa na vyandurua hivyo?.....

iii) Je ni nani anaelala ndani ya vyandarua
[1]Watoto umri wa chini ya miaka mitano
[2]Watoto umri miaka 0 mpaka 13
[3]Mama mjamzito
[4]Watu wote

iv)Je umelala ndani ya chandarua usiku wa kuamkia leo?
[1]Ndiyo
[2]Hapana (kwanini)……..

v) umelala saa ngapi jana usiku?.....
vi) Je unashughulika na kazi yoyote inayokufanya uamke saa 12 alfajili
[1] Ndiyo
[2] Hapana

13.[2] Hapana (nenda swali la 15)

14. Kama jibu la 14 ni ndiyo,uliikipataje chandarua hicho?
[1] Nilikipata bure kutoks kwenye huduma serikalini
[2] Kwakutumia hatipunguzo
[3] Nimenunua mwenyewe
[-10] Nyinginezo

15. Je unafikilia ni kwa kiasi gani chandarua cha mbu kinazuia malaria katika familia yako?
[1] Kwa kiasi kikubwa
[2] Kwa kiasi cha kawaida
[3] Kwa kiasi kidogo
[4] kwa kiasi kidogo sana

III. CLINIC YA MAMA MAJAWAZITO

16. Je kituo cha karibu cha afya chenye huduma za cliniki kwaajili ya mama wajawazito kiko umbali kiasi gani kutoka unapoishi?
[1] Jina la kituo kama analijua _____
[2] Kilometa: _____
[3] Muda wa dakika kwa kutembea: _____
[-9] Sijui

17. Je uliwahi kuhudhuria kliniki ya wajawazito wakati wa mimba yako hii?
[1] Ndiyo (Uliza swali la 18)
[2] Hapana (uliza swali la 22)

18. Huwa unatumia kwa kadri masaa mangapi kupata huduma za kliniki wakati unaujauzito,kuanzia usafiri,kusubiri mpaka kupata huduma?

[1]Chini ya masaa 3

[2]Masaa 3-4

[3]Masaa 5-6

[4]Masaa 7-8

[5]Zaidi ya masaa 8

19. Ni mara ngapi ulihudhulia clinic ya mama wajawazito kwaajili ya cliniki wakati wa mamba yako ya mwisho?
[1] mara moja

[2] Mara mbili

[3] Mara tatu

[5] Zaidi ya mara tatu

20. Je ulihudhuria kliniki ya wajawazito ukiwa na mamba ya miezi mingapi? (Miezi) _____

21. Kama ni wakati au baada ya miezi mitano, Kwanini ulichelewa kwenda kliniki?
[1] Sikuwa na matatizo wakati wa ujauzito huo

[2] Sikuwa na hela

[3]Sikuweza kuacha kazi za shamba

[4] Kliniki iko mbali

[-10] Nyingine, eleza _____

22. Kama jibu la 17 ni hapana, kwanini hukuhudhuria kliniki ya wajawazito?

[1] Sikuwa na matatizo wakati wa ujauzito wangu wa mwisho
[2] Sikuwa na pesa
[3] Sikuweza kuacha shughuri za shamba
[4] Niliogopa kupimwa ukimwi
[5]Sikuona umuhimu wake
[6] kliniki iko mbali
[-10] Nyingine, elezea _____

23. Je ulipata malaria/homa wakati wa mimba yako ya hii?

[1] Ndiyo

[2] Hapana

(a) Kama ndiyo, ulipata huduma wapi?
[1] Kituo cha afya
[2] Mganga wa kienyeji
[3] Nilinunua dawa dukani
[-10] Nyingine, eleza_____

(b)Ulitumia dawa gani kwaajili ya matibabu?
[1] Quinine
[2] ALU
[3] Dawa za mitishamba
[-10]Nyingine, eleza_____

24. Ulijifungulia sehemu gani mtoto wako wa mwisho?
[1] Katika kituo cha afya
[2] Nyumbani kwamsaada wa ndugu mwenye uzoefu
[3] At a traditional birth attendant
[-10] Nyingine, elezea_____

25.Je ulipata maelezo kuhusu jinsi ya kuzuia malaria katika cliniki ya wajawazito?
[1] Ndiyo

[2] Hapana

Kama ndiyo, zipi?.....

26. Je ni dawa gani inayopendekezwa kutumia mama mjamzito kwaajili ya kujikinga na malaria?
[1]SP
[-10]Nyingine_____
[-9]Sijui

27. Je inashauriwa mama mjamzito ameze vidonge vya SP mara ngapi wakati akihudhuria kliniki ya mama wajawazito kwa kipindi chote cha ujauzito?
[1]Mara moja
[2]Mara mbili
[3]Mara tatu au zaidi ya mara tatu
[-10]Nyingine

[-9]Sijui

28. Ni wakati gani mama mjamazito anatakiwa kunywa dozi ya kwanza ya SP kliniki ili kuzuia maambukizi ya malaria?

[1] Mwezi 1 mpaka 3
[2] Mwezi wa 4 mpaka 6
[3] Mwezi wa 7 mpaka 9
[-10] Nyingine, elezea

29. **(a) Ulipoenda kliniki ya wajawazito , je muhudumu wa afya alikupa vidonge vya SP umeze wakati anakuangalia**?
[1] Ndiyo

[2] Hapana

(b)Ni mara ngapi wakati wa ujauzito wako umepewa vidonge vya SP ulipoenda kliniki na ukameza ?

[1] mara moja

[2] Mara mbili

[3] Mara tatu

[4] Sikumbuki

30. **(a) Ulipopewa vidonge vya SP kwa mara ya kwanza ulivikubali?**

[1] Ndiyo (Uliza swali la 49)

[2] Hapana(Uliza swali la 48 b)

(b) Kwanini?

[1] Hakukuwa na maji masafi ya kunywea dawa kliniki

[2]Sikujua ni vidonge vya nini

[3] Sikujua kama vitasaidia

[4] Sikutaka kuvilipia

[5] Niliamini vinamadhara

[-10]Nyingine_____

31.(a) Kama ulipewa vidonge vya SP kliniki ya wajawazito kwa mara ya pili ulivikubali?

[1] ndiyo (Uliza swali la32)

[2] Hapana (uliza swali la 31b)

(b)Kwanini?

[1] Vidonge vya kwanza vilinileta matatizo

[2] Sikufikili kama dozi ya pili ni muhimu

[3] Sikutaka kuvilipia

[-10] Nyingine_____

32. Je unajua vidonge vya SP vinatolewa kwa wajawazito kliniki kwasababu gani?

[1] Kuongeza uzito

[2] Kumfanya mtoto wangu awe na afya

[3] Kuzuia nisipate malaria

[4] Kutoa magonjwa kwenye damu yangu

[-10] Nyingine, eleza _____

[-9]Sijui

33. Je malaria inamadhara gani kwa mama mjamzito?

[1]Inasababisha upungufu wa damu

[2]Inasababisha kifo

[3]Haina madhara

[-10] Nyingine_____

[-9]Sijui

34.Je malaria inamadhara gani kwa mototo wakati wa ujauzito?

[1] Kutoka kwa mimba

[2] Mtoto kufia tumboni

[3] Mtoto kuzaliwa na uzito mdogo

[4] Mtoto kuzaliwa kabla ya siku (Njiti)

[-10] Nyingine,eleza_____

[-9]Sijui

34.Je unafikilia ni kwa kiasi gani dawa ya SP inauwezo wa kuzuia malaria katika wakati wa ujauzito?

[1] Kwa kiasi kikubwa
[2] Kwa kiasi cha kawaida
[3] Kwa kiasi kidogo
[4] kwa kiasi kidogo sana

IV. MAELEZO KUTOKA GAMBA LA KLINIKI

Mahudhulio ya kliniki na upewaji wa dawa ya SP

Mahudhurio	**Dozi-SP kwaajili ya IPTp**	**Umri wa mimba (Miezi)**
1		
2		
3		

4		

Maambuzi ya Ukimwi

[1]PMCT1

[2]PMCT2

[3]Hamna majibu

Kiwango cha damu kama kilipimwa_____

Habari ya uzazi

- **Umezaa mara ngapi?**

[1]0

[2]1

[3]≥2

- **Hii ni mimba ya ngapi?**

[1]1

[2]2

[3]≥3

V. KUKUSANYWA KWA SAMPULI NA MAJIBU

Sampuli	**Majibu**	
	Msomaji wa kwanza	**Msomaji wa pili**

Damu ya kidole kupima vimelea vya malaria	**[1]Ndiyo** **[2]Hapana**	**[1]Ndiyo** **[2]Hapana**
Wingi wa damu (g/dl)		