ASSESSMENT OF KNOWLEDGE AND UTILIZATION OF INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN JIGAWA STATE, NIGERIA

BY

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JANUARY, 2016

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A THESIS SUBMITTED TO THE POST GRADUATE SCHOOL OF AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE AWARD OF MASTERS OF PUBLIC HEALTH (MPH) IN FIELD EPIDEMIOLOGY

DEPARTMENT OF COMMUNITY MEDICINE,
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JANUARY, 2016

ATTESTATION

I declare that the work in the dissertation titled "Assessment of Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinic in Jigawa State, Nigeria" was performed by me in the Department of Community Medicine, Ahmadu Bello University, Zaria under the supervision of Dr A.U. Shehu. The information obtained from the literature has been duly acknowledged. No part of this dissertation was previously presented for another degree or diploma course at any university.

_____ _____

Adamu Isa **Date**

CERTIFICATION

I certify that the work for this dissertation entitled **"ASSESSMENT OF KNOWLEDGE AND UTILIZATION OF INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN JIGAWA STATE, NIGERIA" BY ISA ADAMU** meets the regulation governing the award of the degree of Masters of Public Health in Field Epidemiology of Ahmadu Bello University, Zaria would be approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work is dedicated to my beloved brother who died in my first year in University. It is also dedicated to my loving wife for her understanding throughout the period of this study.

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LIST OF ACRONYMS

ABU	-	Ahmadu Bello University
ANC	-	Antenatal clinic
FANC	-	Focus Antenatal Care
GHSB	-	Gunduma Health System Board
GHSC	-	Gunduma Health System Councils
HFs	-	Health Facilities
IPTp	-	Intermittent Preventive Treatment in Pregnancy
JAR	-	Joint Annual Review
JIMSO	-	Jigawa Medicare Supply Organization
LBW	-	Low Birth Weights
LGAs	-	Local Government Areas
LLIN	-	Long Lasting Insecticide Treated Nets
MDGs	-	Millennium Development Goals
MKS	-	Mean Knowledge Score
NMIS	-	Nigerian Malaria Indicator Survey
PHC	-	Primary Health Care Centres
RBM	-	Roll Back Malaria

SP	-	Sulphudoxine – pyrimethamine
SFH	-	Symphysio-fundal height
TBA	-	Traditional Birth Attendance
WHA	-	World Health Assembly
WHO	-	World Health Organization

SUMMARY

Malaria remains the most devastating human parasitic infection in the world today. In Nigeria, malaria during pregnancy is responsible for 11% of maternal mortality. There is low coverage and utilization of IPT services in Nigeria. This study was undertaken to investigate the knowledge and utilization of IPT among pregnant women attending ANC in Jigawa State.

A cross-sectional study was conducted and 420 respondents were recruited using multistage sampling technique. Semi-structured questionnaire was used to obtain information on socio-demographic and knowledge of malaria and IPT.

A total of 420 pregnant were interviewed with age ranged of 15 to 45 years (Mean 24.7±6.1). Majority 257 (61.2%) of the respondents were within age group 20-29 years. Sixty four (15.2%) were Primigravidae, 229 (54.5%) were multigravidae and 127 (30.3%) were grand multipara. Majority 413 (98.3%) were married with divorcee and widow making 7 (1.7%) none was single. Most respondents 307 (73.1%) were rural dwellers. Sixteen percent had at least secondary education; the majority either had Quranic (45.2%) or Non formal education (24.5%) at all. Most of the respondents (80.7%) were Hausa some 42 (10.0% were Fulani, Kanuri (6.4%) few 2.9%) is formed by other languages. Majority of the respondents were fulltime House wife, few were Civil servants others (18.3%) engage in some petty trading at home.

In general, after scoring respondents' knowledge of malaria transmission, consequences of malaria to pregnant women and her unborn baby and knowledge of malaria prevention in pregnancy. Majority 221 (52.6%) had poor knowledge of malaria. However, most of the

respondents have very good knowledge of how malaria transmitted and method of malaria prevention in pregnancy. Majority of those that used SP in their index pregnancy 64 (80.0%) had poor knowledge of SP. Participants that used two or more doses of SP was 1.4% this study found that there is poor IPT utilization among the pregnant women.

Gestational age at 1st ANC booking and marital status were found to be positvely associated with the number of SP doses received by pregnant women. Those women paying less than one hundred naira (N100) for transportation to clinic are 2 times more likely to recieve up to two (2) doses of SP compared to those paying one hundred and above. However, this was not statistically significant (OR 2.2 and p = 0.40). Rural residents were more likely not to receive up to two (2) doses of SP (OR 0.1 and p=0.04). primigavidas were also not likely to have good utilization of SP (OR 0.0 and p= undefined.) None of the socio-demographic variables was found to be a predictor receiving up to two more doses of SP

The IPTp program is been implemented in Jigawa State. However, its success is yet to be achieved as seen from the low IPT knowledge and very low IPT utilization accounting for 20% and 1.4% respectively.

A further research to assess health care provider's knowledge and training on IPT implementation including attitude of staff should be conducted by Jigawa State Ministry of health and partners in order to have more insight into reason for this lower coverage.

DEFINITION OF TERMS

Intermittent Preventive Treatment for malaria in Pregnancy is one of the malaria control strategy that involves the provision of a curative dose of an antimalarial drug as part of a routine service within a health system without prior clinical diagnosis provided to pregnant women as part of ANC package – IPTp

IPTp: The administration of anti-malarial drugs in treatment doses at predefined intervals to clear a presumed burden of parasites. IPT of 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 blood or placenta, whether or not she has symptoms of malaria.

$IPTp_1$: The percentage of respondents who received at least one dose of SP during their Index pregnancy.

$IPTp_2$: The percentage of respondents who received at least two doses of SP during their index pregnancy.

$IPTp_3$: The percentage number of respondents who received three doses of SP during their index pregnancy.

Good utilization of IPT: when a pregnant woman takes at least 2 doses of SP during pregnancy.

Poor utilization of IPT: when a pregnant woman takes less than 2 doses of SP during pregnancy.

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

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Malaria remains the most devastating human parasitic infection in the world today.[1] Currently, it is estimated that between 1-2 billion people throughout the world lives in areas at risk of malarial infection and each year up to 500 million people contract the disease out of which 1.7 million to 2.7 million people die.[1] Several recent reports indicate that more than 90% of these causalities are from Africa, south of the sahara where the most virulent species of the parasite Plasmodium Falciparum thrives.[2] Malaria is hyper endemic in all parts of Nigeria, which lies in the tropical region of Africa, with the entire population of an estimated one hundred and sixty million at risk. Transmission occurs all year round with seasonal variations during the rainy season. Malaria is the number one cause of morbidity in Nigeria accounting for ninety percent of all out-patient illnesses, sixty percent of all admissions and thirty-three percent of all deaths in children under five years.[2,3]

Clinical features of malaria appear around the fourteenth day after an infectious bite but may vary with the different species of the Plasmodium parasite. Common symptoms include fever, headache, vomiting, joint pains, diarrhea, flu-like symptoms and others. Anaemia occurs as a result of breakdown of the infected red blood cells, increased splenic sequestration of uninfected red blood cells as well as decreased erythropoesis 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. Complex physiological changes happening during pregnancy including hormonal and

Immunologic alterations make both the pregnant woman and 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. Pregnant women are particularly vulnerable to malaria as pregnancy reduces a woman's immunity to malaria, increasing her risk of illness, severe anemia, and death. It has been established that pregnancy quadruples a woman's risk of malaria illness and doubles her risk of death. The risk of spontaneous abortion, stillbirth, premature delivery, and low birth weight increases for the fetus whose mother has malaria.[4, 5]

WHO strategic frame work for malaria prevention during pregnancy in areas of stable malaria transmission recommends three pronged approach use of insecticide-treated bed nets (ITNs), intermittent preventive treatment in pregnancy (IPTp) and effective case management and treatment.[2,6] Intermittent preventive treatment with an antimalarial drug during pregnancy such as sulphadoxine-pyrimethamine (SP) is a cost-effective means of preventing malaria in pregnancy. Several studies have demonstrated its efficacy in causing a decline in placental infection, anemia, and low birth weight babies, [5, 7] despite reports of increasing resistance to it in some African countries. The Federal Ministry of Health in Nigeria in its National Strategic Plan for the control of malaria in 2010 recommended two doses of SP during the second trimester and early in the third trimester of pregnancy against the adverse consequences of malaria in pregnancy. In this regard, all pregnant women should receive the first dose of three tablets (IPTp1), which providers administer under their direct observation at the antenatal care (ANC) facilities within the 16th week of gestation. Recipients of IPTp1 should access subsequent doses during each of the scheduled monthly visits to ANC facilities.[8] Hence all pregnant women

should access the second dose (IPTp2) within the 20th week of pregnancy. WHO recommends a minimum of IPTp2 protection against malaria for women residing in high risk regions[9]. A third dose is recommended for pregnant women who are HIV positive.[10] However, in 2012 WHO evidence review group has set the indicator of IPTp as Proportion of pregnant women who received at least three or more doses of intermittent preventive treatment of malaria while attending antenatal care during their previous pregnancy hence three or more doses is now recommended for all pregnant women[11]. IPTp consists of administration of curative dose of an efficacious anti-malarial drug at least twice during the second and third trimesters of pregnancy during routinely scheduled antenatal clinic visits regardless of whether the woman is infected or not. [12,13,14] The drug is administered under supervision during antenatal care visits. Sulfadoxine-pyrimethamine (SP) is the drug currently recommended for the IPT strategy.[15, 16] It has a good safety profile and remains a good option for IPTp in endemic areas in Africa.[16,17] To reduce the risks of pregnant women getting malaria current National Malaria Treatment Guideline and Policy in Nigeria recommends SP as first line agent for IPTp and quinine for treatment of clinical malaria in all trimesters, Artemisinin based combination therapy (ACT) is considered safe second line agents in the second and third trimesters [18, 19] and may be used in first trimester where there are no suitable alternatives.

1.2 Problem Statement

Malaria infection during pregnancy is a major public health problem in tropical and subtropical regions throughout the world.[20] Thirty million African women in malaria endemic area become pregnant and are at risk of infection with plasmodium falciparum.[20,21] An estimated ten thousand of these women and two hundred thousand of their infants die as a result of malaria infection during pregnancy and severe malarial anaemia contributes to more than half of these deaths. [22]

Malaria infection in pregnancy is major risk factor for maternal and child health[23, 24] it increases the risk of miscarriage, stillbirth and low birth weight. [23,24] About 200,000 neonatal deaths occur annually.[23,25] Malaria in pregnancy accounts for 5 to 12% of all low-weight births.[26] In low risk zones, episodes of severe malaria significantly associated with stillbirths, spontaneous abortion, premature delivery and maternal death.[27,28] However, in high-risk areas, women are susceptible to asymptomatic infection, with potential results being maternal anaemia and placental parasitaemia. Both situations are conducive for low birth weight and subsequently, infant mortality.[26,28] In Nigeria, malaria during pregnancy is responsible for 11% of maternal mortality.[2] Intermittent Preventive Treatment in pregnancy (IPTp) is one of the key interventions recommended by WHO to bolster the prevention of asymptomatic infections among pregnant women living in moderate to high-risk regions.[28] In 2012, thirty six Sub-saharan African countries had endorsed intermittent preventive therapy in pregnancy (IPTp) as part of antenatal care but coverage of IPTp has remained a challenge, with few women receiving adequate IPTp doses at each of the four recommended antenatal care visits. Among the African countries which provided this information,[29] sixty four percent of pregnant women attending antenatal care had received at least one dose of intermittent preventive treatment during pregnancy in 2012. Only 23% of them had received three doses.[29] Due to low coverage and utilization of IPT services in

Nigeria as seen from the NDHS 2013, only 15% of pregnant women received IPTp during ANC with less than 10% of pregnant women received two or more doses of SP Jigawa State estimates is even lower than the national figure. The proportion of pregnant women attending ANC in public health facilities Jigawa State that receive 2 doses of IPTp is thirteen percent. There is need for increase efforts to expand coverage of preventive treatment for malaria among pregnant women. Knowledge about malaria and the treatment-seeking behaviors in the rural communities have been found to be generally poor across the six geo- political zones in Nigeria. [29], with 80% of pregnant women attending ANC at least once during their pregnancy in Jigawa state from the above, it is clear that Jigawa State has a long way to go to reach the Abuja target of 60% for IPT2.

1.3 Justification

Prevention of malaria in pregnancy is a major public health challenge and a priority of Roll Back malaria partnership.[30] The Global Malaria Action Plan called for rapid scale-up to universal population coverage for all people at risk for malaria.[32] Malaria prevention during pregnancy is one of the key interventions in helping to reduce maternal and infant morbidity and mortality with the aim of contributing to achieving the fourth (two-thirds reduction in child mortality rate), fifth (three-fourth reduction in maternal mortality rate) and sixth millennium development goals (MDG's).WHO has identified Potential core elements of monitoring studies of SP to include Review of ANC (number and timing of IPTp-SP doses) and birth weight data through routine health system records and cross sectional studies such as this. Jigawa State Ministry of Health in collaboration with other partners provided free IPTp pregnant to women during ANC across the state. However, four years after the implementation of the IPTp program in the state no study has been documented to assess the performance of the program and malaria in pregnancy remains high in the state with estimated proportion of pregnant women with at least one episode of malaria of thirty eight percent 2013.[2] There is the need to identify the factors that have influenced its uptake so far hence the need for this study. The study would help identify individual or client factors that contribute to IPTp uptake in the in Jigawa State

1.4 Research Questions

1. At what gestational age do pregnant women generally first attend ANC?
2. What do pregnant women in Jigawa State know about IPTp?
3. Is SP dispensed under DOT by the health workers in the ANCs?
4. What are the barriers to the use of intermittent preventive treatment among pregnant women in Jigawa State?

1.5 General Objectives and Specific Objectives

1.5.1 General objectives

To determine Knowledge and Utilization of Intermittent Preventive Treatment for Malaria among Pregnant Women attending Antenatal Clinics in Jigawa State

1.5.2 Specific objectives

1. To determine the mean gestational age at first ANC visit.
2. To determine level of knowledge of pregnant women on Malaria
3. To determine level of knowledge of pregnant women on IPTp?
4. To determine the level of utilization of IPT by pregnant women attending ANC
5. To identify Socio-demographic factors that influence utilization of IPT by the pregnant women.

CHAPTER TWO

LITERATURE REVIEW

2.1 Malaria Overview of Malaria in Pregnancy

An infectious disease caused by a parasitic protozoan a blood borne parasite the natural ecology of malaria involves malaria parasites infecting successively two types of hosts: humans and female *Anopheles* mosquitoes. Parasitic infection of red blood cells is caused by *Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae and Plasmodium ovale.*

Malaria remains a great human scourge. Pregnant women and children below 5 are among the most vulnerable groups. Considering the closeness between mother and child, effective measures put in place to protect the mother from malaria could also protect the child and hence reduce the morbidity and mortality related to malaria. The World Health Organization during its Global ministerial conference on malaria in 1992 in Amsterdam, approved a number of control measures which included early diagnosis and prompt effective treatment, chemoprophylaxis in susceptible groups, reduction of man vector contact, Information Education and Communication, surveillance and research.[33]

2.2 Malaria Transmission

The geographic location of Nigeria makes the climate suitable for malaria transmission throughout the country. It is estimated that up to 97 percent of the country's more than 150 million people risk getting the disease. The remaining three percent of the population who live in the mountains in southern Jos (the Plateau State) at an altitude ranging from 1,200 to 1,400 metres, are at relatively low risk for malaria.

2.3 Life cycle of malaria parasites

The malaria parasite life cycle involves two hosts. During a blood meal, a malaria-infected female *Anopheles* mosquito inoculates sporozoites into the human host. Sporozoites infect liver cells and mature into schizonts, which rupture and release merozoites. (Of note, in *P. vivax* and *P. ovale* a dormant stage [hypnozoites] can persist in the liver and cause relapses by invading the bloodstream weeks, or even years later.) After this initial replication in the liver (exo-erythrocytic schizogony), the parasites undergo asexual multiplication in the erythrocytes (erythrocytic schizogony). Merozoites infect red blood cells. The ring stage trophozoites mature into schizonts, which rupture releasing merozoites. Some parasites differentiate into sexual erythrocytic stages (gametocytes). Blood stage parasites are responsible for the clinical manifestations of the disease.[34]

The gametocytes, male (microgametocytes) and female (macrogametocytes), are ingested by an *Anopheles* mosquito during a blood meal. The parasites' multiplication in the mosquito is known as the sporogonic cycle. While in the mosquito's stomach, the microgametes penetrate the macrogametes generating zygotes. The zygotes in turn become motile and elongated (ookinetes) which invade the midgut wall of the mosquito where they develop into oocysts. The oocysts grow, rupture, and release sporozoites, which make their way to the mosquito's salivary glands. Inoculation of the sporozoites into a new human host perpetuates the malaria life cycle[34].

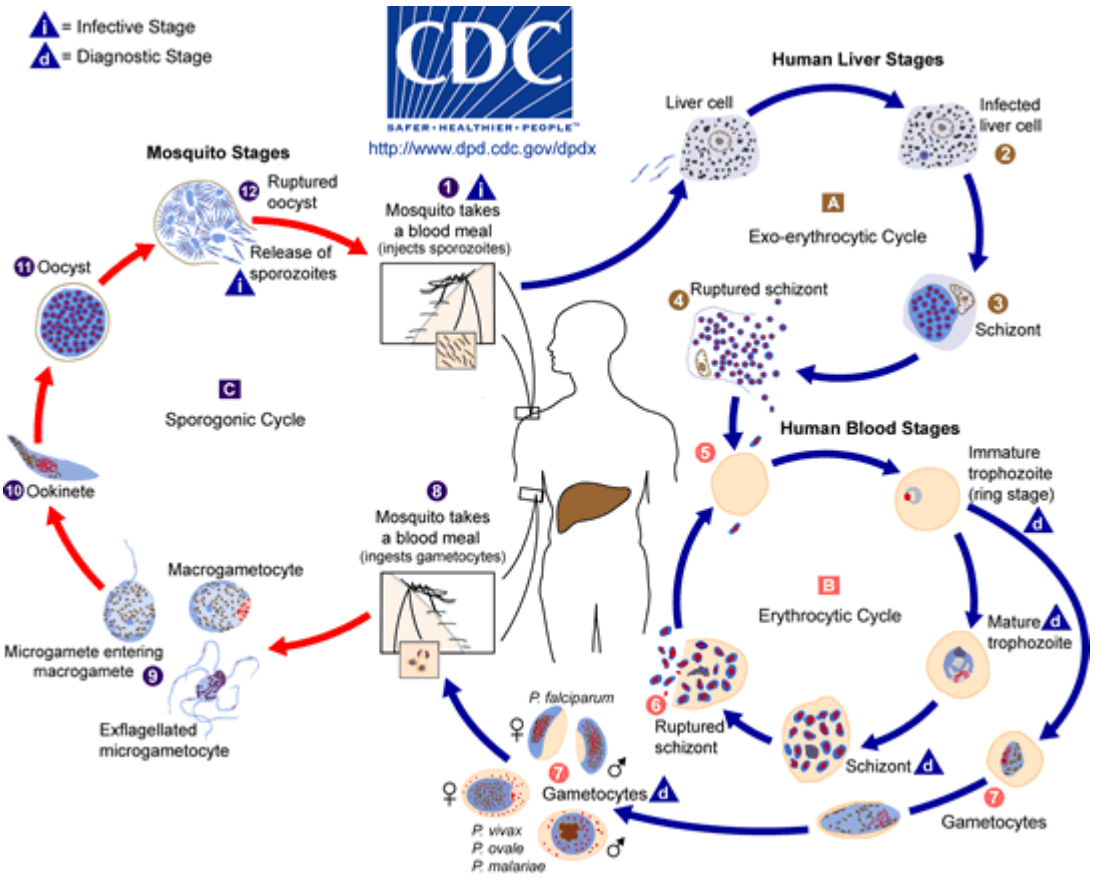

Figure 1: life cycle of mosquito parasite (Courtesy CDC)[34]

2.4 Epidemiology of Malaria

Malaria is ubiquitous in the tropical regions of the world. It is found in Central America, the Island of Hispaniola in the Carribbean, the Amazon region of South America, throughout most of Sub-Saharan Africa, parts of the Arabian peninsula, the near East, and in parts of the South Pacific. Many of these same regions also share heavy HIV/AIDS and TB burdens.[33]

Malaria is endemic throughout most of the tropics, approximately 3.4 billion people worldwide who are exposed annually, 1.2 billion are at high risk; the World Health Organization (WHO) states that more than 207 million developed symptomatic malaria in 2012.[33] Malaria is endemic in more than100 countries on 5 continents. Ninety-nine percent of these countries had on-going malaria transmission. An estimated 3.3 billion people were at risk of malaria in 2010. Of this total, 2.1 billion at low risk (1 case per 1000 population) were living mostly in the WHO African (47%) and South-East Asia Regions (37%). Out of 99 countries with on-going malaria transmission, 43 recorded decreases of > 50% in the number of malaria cases between 2000 and 2010. Another 8 countries recorded decreases of > 25%. An estimated 655 000 persons died of malaria in 2010 eighty six percent of the victims were children under 5 years of age, and 91% of malaria deaths occurred in the WHO African Region. Approximately 300-500 million cases a year. Six countries - Nigeria, the Democratic Republic of Congo, Burkina Faso, Mozambique, Cote d'Ivoire and Mali - account for 60%, or 390,000, of malaria deaths.

Malaria is transmitted throughout Nigeria. Five ecological zones define the intensity and seasonality of transmission and the mosquito vector species: mangrove swamps; rain forest; guinea-savannah; sudan-savannah; and sahel-savannah. The duration of the transmission season decreases from year-round transmission in the south to three months or less in the north. Malaria

accounts for 60% of outpatient visits and 30% of hospitalizations among children under five years of age. It is also responsible for an estimated 300,000 deaths in children under five years of age each year and contributes to an estimated 11% of maternal mortality[20]

2.4.1 Group susceptible to malaria

All are susceptible to malaria some develop immunity after many exposures, normally after 5 years of age in an areas with high transmission of malaria. The highest risk groups are Pregnant women and children under 5 yrs old. Pregnancy reduces a woman's immunity to malaria. Women can suffer from anaemia and give birth to low birth weight babies, which can contribute to increased infant mortality. Children under 5 have not developed enough immunity and are the most likely to suffer from cerebral malaria. Also, foreign visitors are at high risk since they have had little exposure to the disease.

2.5 Consequences of Malaria in Pregnancy

Malaria infection during pregnancy poses substantial risk to the mother, her fetus, and the neonate. The prevalence of parasitemia appears greatest in the second trimester, and susceptibility to clinical malaria may persist into the early postpartum period. Due to the endemicity and high transmission rate of malaria in Nigeria, pregnant women have acquired immunity being resident in stable malaria area and are susceptible to sub-clinical infections, which may result in adverse effects to both mother and child. It significantly contributes to anaemia in pregnancy; increases the occurrence of low birth weights; is associated with pre term deliveries, still births and perinatal mortality. It has been established that pregnancy quadruples a woman's risk of malaria illness and doubles her risk of death.[5] Preventing severe anaemia caused by malaria will lead to fewer pregnant women requiring blood transfusion thereby reducing the

risk of transfusion-related infections especially HIV and hepatitis B. The adequate control of malaria in pregnancy should lead to a better outcome of pregnancy, improve survival of mothers and reduce perinatal mortality.

2.6 Current Practices in Preventing Malaria in Pregnancy in Nigeria

Nigeria is currently implementing prevention of Malaria in Pregnancy intervention as a component of focused antenatal care services (FANC). Focused Antenatal Care provides the most practical platform for the delivery of these interventions. The key interventions that can be provided at the ANC for the prevention of malaria in pregnancy include administration of Sulphadoxine-pyrimethamine (SP) for intermittent preventive treatment (IPT) under direct supervision of skilled service providers, distribution of long lasting insecticidal nets (LLINs), and appropriate case management through prompt diagnosis and effective treatment with recommended medicines.

2.7 Overview of Intermittent Preventive Treatment for Malaria (IPTp)

Intermittent preventive treatment for malaria (IPTp) is the use of antimalarial medicines given in treatment doses at predefined intervals starting as early as possible in second trimester of pregnancy to clear a presumed burden of malarial parasitaemia in asymptomatic pregnant women. IPT is a curative dose of SP which clears the placenta of parasites. New evidence provides support for administering IPT at every scheduled ANC visit, beginning as early as possible after quickening and given not more frequently than monthly up until the end of pregnancy. This new recommendation reduces incidence of low birth weight by 20% compared to the earlier recommended two doses during pregnancy. IPT reduces the number of malaria parasites in pregnant women during the critical periods of greatest foetal weight gain. It also provides significant protection against maternal anaemia and low birth weight (LBW). IPT also reduce risk of abortion, stillbirth, pre-term deliveries and maternal mortality.[42]

Currently, Sulphadoxine-pyrimethamine (SP) is the single-dose antimalarial medicine with the best overall effectiveness for prevention of malaria in pregnancy in areas of Africa with stable transmission of *Plasmodium falciparum* malaria. It has good safety profile in pregnancy and a high level of acceptance by pregnant women with good programme feasibility.

2.8 Safety of Sulfadoxine-Pyrimethamine

Both sulphonamides and Pyrimethamine are generally considered safe in the second and third trimesters of pregnancy. Although there are concerns that sulfa drugs may be associated with jaundice when given to pre-term neonates, this problem has not been noted in studies of IPT where Sulfadoxine-Pyrimethamine (SP) has been administered to the mother. Studies examining the risk to the foetus in utero exposure to SP combinations have generally not found any

increased risk in spontaneous abortions or congenital defects.[36,37] One retrospective study of antifolate drugs given before and during pregnancy did find that there was an increased risk of birth defects when such drugs were taken during the first trimester, but it is safe if taken during the second or third trimester. [36, 38]

SP when given weekly as prophylaxis has been associated with rare severe cutaneous reactions such as toxic epidermal necrolysis (Stevens-Johnson syndrome). However, there is no evidence that the risk of severe cutaneous reactions is any greater in pregnant women or when SP has been used for treatment. Although sulfonamides are excreted in breast milk, the risk to healthy full-term neonates is believed to be minimal. Pyrimethamine is usually given in combination with sulfadoxine.

2.9 Use of SP for Intermittent Preventive Treatment

All pregnant women shall receive three or more doses of SP after quickening (onset of foetal movement) with each dose repeated at least one month apart. The IPT using SP should be provided as part of a comprehensive antenatal package with other components such as haematinics and antihelminthics to control maternal anaemia that is highly prevalent during pregnancy in the country.

2.10 Determining Gestational Age for SP Administration

In facilities where there are infrastructures and skilled manpower to appropriately estimate the gestational age, IPT can be administered from the thirteen week of pregnancy.The following steps should be followed to determine the gestational age of the pregnant woman before SP is administered: History of the last menstrual period; Palpation or use tape measure for fundal height to estimate gestational age; Onset of foetal movement (quickening); Ultrasonography

where the facility exists. However, contraindications to the use of IPT include; Pregnant women with known history of hypersensitivity to sulphonamides and HIV pregnant women on Cotrimoxazole chemoprophylaxis.

2.11 Dosage of SP

SP shall be given as single adult dose (3 tablets of 500mg Sulphadoxine and 25mg Pyrimethamine each) at scheduled antenatal care visits during the second and third trimesters.

The two doses of SP shall be given at least one month apart.1st. Dose: At the first antenatal visit after quickening (first fetal movement – from sixteen weeks) and 2nd. Dose: At least one month after the first dose. HIV positive pregnant women shall receive at least 3 doses of SP instead of two doses (subsequent doses shall be given atleast one month apart).

2.12 Gestational Age at First ANC Visit

Since IPT can only be given at four weeks intervals during pregnancy and should be given only after 16weeks (after quickening) and not after 36wks gestation to the pregnant woman according to the IPTp policy in Nigeria, a delay in starting to take SP will reduce the number of times a woman can receive IPT during pregnancy. The timing of IPTp is directly tied to when a Pregnant woman starts her ANC visits. The median week of pregnancy at which the first Ante-natal visit occurred was found to be 20 weeks (quartiles 16–24, n = 394) [11] in a study they conducted in rural Senegal where 95% received at least one dose and 70% two doses of SP. A study conducted in Port Hacourt [39] found that majority (66.8%) registered in the second trimester of pregnancy, while 28.8% registered earlier, in the first trimester. In the same vein [40] found that Majority of the mothers (77.6%) booked between the gestational ages of 3 and 6 months with 4 months being the most frequently preferred month for initiating antenatal care. The mean booking age of the women was 4.42 ± 1.7 months. Also [41] stated that onset of antenatal care (ANC) visits is a key factor in the uptake of IPTp, as shown by previous studies.[11,42] The results of this study indicated that 127 (45.7%) participants started their ANC visits within the fourth month of pregnancy, 65 (23.4%) started within the fifth month, while 48 (17.3%) indicated the third month. Overall, 209 (75.2%) participants started their ANC visits within the second trimester, while 5 (1.8%) initiated their attendance in the third trimester. On average, participants who had received IPTp2+ started their ANC visits at 3.79 months (SD = 0.877), while those who accessed less than IPTp2 initiated clinic attendance a little later at 4.55 months (SD = 1.024).

2.13 Knowledge on Malaria

A study conducted in Rivers[41] found that more than three quarters (76.4%) of the women had correct knowledge that malaria is caused by exposure to mosquito bites. There were however some respondents with misconceptions that malaria resulted from working in the sun (11.5%), eating too much of palm oil (4.7%) and witchcraft (1.5%). Most of the women (71.4%) equally had knowledge that malaria could cause some harm during pregnancy to the mother or fetus such as abortion, still births, or low birth weight.[41] Nigerian Malaria indicator survey (NMIS) found that knowledge of malaria is almost universal. Ninety-four percent of women have heard of malaria, a statistic that varies little by background characteristics. More than 90 percent of women in all groups have heard of malaria, except in North Central, where only 88 percent of women report having heard of malaria.[43] Also in the same study eighty-two percent of women knew that malaria is caused by mosquitoes, while 27 percent said malaria is caused by dirty surroundings, and 12 percent said malaria is caused by the presence of stagnant water. Six percent of women said that eating certain foods caused malaria, and eight percent of women responded that they did not know what caused malaria.[43]

2.14 Intermittent Preventive Treatment of Malaria in Pregnancy (IPTp)

Intermittent preventive treatment of malaria in pregnancy (IPTp) is a strategy where all pregnant women are given a full curative dose of sulphadoxine-pyrimethamine (SP) at least twice during pregnancy, regardless of whether they have malaria. Starting as early as possible in the second trimester, IPTp with SP remains effective in preventing the adverse consequences of malaria on maternal and fetal outcomes in areas where a high proportion of *Plasmodium falciparum* parasites carry quintuple mutations associated with *in vivo* therapeutic failure to SP; therefore, IPTp with SP should still be administered to women in such areas.[44] IPTp-SP is recommended by the World Health Organization (WHO) [45] for all pregnant women at each scheduled antenatal care (ANC) visit until the time of delivery, provided that the doses are given at least one month apart. Sulphadoxine-pyrimethamine should not be given during the first trimester of pregnancy; however, the last dose of IPTp-SP can be administered up to the time of delivery without safety concerns.[45]

2.15 Knowledge of Intermittent Preventive Treatment of Malaria in Pregnancy (IPTp)

The level of knowledge that the pregnant woman has about IPTp will inform her on whether to regularly attend the ANC to receive SP or not and this will affect the uptake of IPTp. Their best and most lively source of this knowledge is at the ANC where health workers are supposed to educate them. A study conducted in Uganda found that nearly all respondents (99.4%) had heard about SP prior to the interview. Regarding knowledge on the role of SP as used during pregnancy, 57% mentioned prevention of malaria in mother or unborn baby while 15.4% thought it was used to treat malaria. About 26% and 0.9% respectively, did not know its indication or cited other reasons not related to malaria[46]. It is estimated that in 2007, 25% of pregnant women received at least 1 dose of IPTp.[44] The importance of providing IPTp under direct observation, as directly observed treatment, was stressed. It was also suggested that WHO recommendations should state that all possible efforts should be made to avoid SP use as monotherapy for malaria treatment in order to protect its efficacy for IPTp. In another study,[47] it was found that some participants perceived malaria prevention as a component of ANC, but most did not. Very few participants in rural areas referred to receiving anti-malarial drugs, LLINs, or rapid diagnostic testing of malaria with ANC services. Participants did not appear to clearly understand the difference between chemoprophylaxis (prevention of malaria through medication) and the specific treatment they have to take in the event of an episode of malaria. A study conducted in south west Nigeria[48] found that about half [109 (52.2%)] of the respondents, said they have heard about IPTp. Twenty six of the 109 (23.9%) who have heard about IPTp were able to give a good definition of IPTp and sixty-three (57.8%) said IPTp can be given to pregnant women. About two thirds of those that have heard of IPTp (73/109; 67.0%) knew that SP is the recommended drug for IPTp. Using the different brand names of SP in the market, 13(17.8%) identified

Fansidar®, 18(24.7%) identified Amalar, 42(57.5%) identified malareich which was the major brand given to them in the ANC clinic as drug used for

IPTp. Forty nine (67.1%) of those who mentioned SP knew the correct dose of SP for IPTp.

A study from Kano[46] found that Majority 216 (90.4%) of the respondents said that they have heard about IPTp. The sources of information on IPTp included electronic media 193 (89.4%) and health workers during antenatal clinic 16 (7.4%). All respondents knew the local hausa name for malaria and they all knew that it was transmitted by mosquito bite. On whether there are different types of mosquitoes, only a few of the women who happened to be teachers or health workers knew that there are different types of mosquitoes transmitting different diseases. The majority thought that all mosquitoes transmit malaria. Using a combination of respondents' knowledge of malaria and IPTp, 75 (31.2%), 137 (57.6%), and 27 (11.2%) of the respondents had good, fair, and poor knowledge of IPTp, respectively.

2.16 Factors that influence IPT Utilization

The IPTp uptake is a subject that has attracted many empirical investigations, at the national and regional levels, particularly in Africa. In Kenya, for instance it was found that personal attributes such as marital status and education level influenced the IPTp uptake.[47] In Senegal[11] it was reported that the timing of IPTp directly linked to the onset of ANC visits. On the same note Van Eijk from Western Kenya found that delayed attendance of ANC contributed to non-completion of IPTp doses[42]. In this regard, 45% of the participants initiated ANC attendance in the third trimester and only 23.7% received IPTp2. The timing of first visits to ANC clinics also influences the IPTp uptake. In this regard,[49] found that even though 48% of the participants started ANC visits before the 16th week of pregnancy, up to 86% of this lot did not receive IPTp1 because the gestation period was below the recommended 16 weeks. Those who did not

receive proper explanation of this policy requirement were discouraged and failed to turn up for subsequent appointments The identified barriers to IPTp use are related to concerns about SP safety and poor understanding of the protocol among health care providers and the community.[4] In a study conducted in Tanzania, majority of respondents linked low compliance with IPTp to poor acceptance of SP because of perceived association of SP with side effects.[17] It was also reported that pregnant women throw away drugs after leaving the clinic. Other factors influencing compliance included late enrolment, periodic shortages of drugs and health workers underperformances.[50] A study done in western Nigeria found a major determinant of utilization of IPTp among the study population as the knowledge of prophylaxis for malaria prevention. For pregnant women to use IPTp properly they must be well informed about the dangers of pregnancy-related malaria and receive the appropriate therapy at the right time during pregnancy. The focus on community directed interventions in the design of preventive intervention is essential. This highlights the importance of health education at the community level in the delivery of health services in general, and preventive health measures in particular. Several studies have reported similar experiences[51-58]. While the involvement of community workers does not necessarily mediate socioeconomic differences within communities[59], the overall health improvements achievable through community based interventions appear large.[52,60] Health education of the community will increase IPTp uptake despite the regular drug stock out at the facility level.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted in Jigawa State. Jigawa is one of the 36 States in Nigeria. It was created in 1991 with Dutse as the state capital. It is located in the north-west geo-political zone of the country. The State lies between latitude 11^0 and 13^0 North and longitude 8^0 and 10^0 $15^{'}$ East . It is bounded in the north by Niger Republic, in the east by Yobe State, in the south by Bauchi State and in the west by Katsina & Kano States. The state has a total land area of approximately 22,410 square kilometres. Its topography is characterized by undulating land, with sand dunes of various sizes spanning several kilometres in parts of the State. The southern part of Jigawa comprises the Basement Complex while the northeast is made up of sedimentary rocks of the Chad Formation. The main rivers are Hadejia, Kafin Hausa and Iggi Rivers with a number of tributaries feeding extensive marshlands in north-eastern part of the State. Hadejia – Kafin Hausa River traverses the State from west to east through the Hadejia-Nguru wetlands and empties into the Lake Chad Basin.

Most parts of Jigawa lie within the Sudan Savannah with elements of Guinea Savannah in the southern part. It has a tropical climate which is characterized by a rainy season from May to September and dry dusty "harmattan" season November to April. It has 27 local government areas, 288 political wards. The projected population is 5,286,804 (based on 2006 census at growth rate of 2.83%). The State is ranked as the 8^{th} most populous State in Nigeria The major occupations are farming and trading with a small proportion of the population being civil servants.

The health system in Jigawa State has undergone some reform. The State Ministry of Health (SMOH) provides oversight function in terms of policy direction, resource mobilization and regulation of the health sector. The State operates a district health system called Gunduma Health System (GHS) which is saddled with the responsibilities of service delivery through the nine Gunduma Health System Councils (GHSC). The secondary and the primary health care services are integrated under a single line of authority- the Gunduma Health System Board (GHSB). There is an existing State Health Strategic Development Plan (2010 – 2015), which was reviewed during the 2012 Joint Annual Review (JAR). The State health sector has been witnessing progressive increase in budget allocation from 2007 to 2013. The percentage of the 2013 budget allocated to health is 14%. Drug supply and procurement in the State is also decentralized and is under an agency called Jigawa Medicare Supply Organization (JIMSO). The State has 661 health facilities consisting of 647 PHCs, 12 secondary health facilities and 2 tertiary hospitals. Of the 661 health facilities 8 are private and about 95% offer antenatal care with clinic days mostly Mondays Thursdays and occasionally Fridays for the busy secondary facilities and some PHCs due to market days in their communities.

3.2 Study Designs

A descriptive cross-sectional study was conducted among pregnant women in Jigawa State

3.3 Study Population

The main study population includes pregnant women aged 15-45 years attending Antenatal Clinics in five (5) selected Health facilities of Jigawa State at the time of the study.

3.3.1 Inclusion Criteria

Pregnant women who had at least one antenatal clinic visit during or before the date of interview

3.3.2 Exclusion Criteria

Pregnant women who were severely ill and or HIV positive on cotriomoxazole prophylaxis were excluded from the study as they may be too sick to respond to some questions and contraindication of SP to patient on cotriomoxazole.

3.4 Sample Size Determination

The minimum sample size was calculated using the formula:[22]

$$n = \frac{z_{\alpha}^2 pq}{d^2}$$

Where

n = minimum sample size,

Z = standard normal deviation at 1.96

p = prevalence of Knowledge IPTp (p=57%) [46]

q = (1-p), complimentary probability of p

d = the desired precision of the study, a precision of 5% was tolerated which corresponds to 0.05

$n = 1.96^2 \times 0.57 \times 0.43 / 0.05^2$

n = 376

a non response rate of 10% was added to give 418 (required sample size=N/1-f where f is 10%; 376/1-0.1= 418)

A total 420 questionnaires was administered to enhance representativeness

3.5 Sampling Technique

A multistage sampling technique was used to select the participants. Since the state is divided into 3 senatorial zones.

Stage 1: Selection of LGA

All the local government area (LGAs) in each of the three senatorial districts (consisting of 7–12 LGAs) were listed and one LGA from each of the three senatorial zones was selected by balloting.

Stage 2: Selection of Health Facilities

The list of the health facilities offering antenatal care in the selected LGAs was obtained from Health Management Information System (HMIS) Unit of Ministry of Health. A proportionate sampling was done to select five health facilities. This was done by stratifying the health facilities in the three selected LGA into two (2) strata. Stratum 1 consists of secondary health facilities and the tertiary hospital and stratum 2 consist of primary health care clinics and comprehensives health centres. To enhance representativeness, one health facility was selected by balloting from stratum 1 and in the stratum 2, four (4) health facilities were selected by simple random sampling (table of random numbers). A total of five health facilities were selected which include General Hospital Dutse, Guri PHC, Musari Basic Health Clinic,Taura PHC and Majia Basic Health Clinic

Stage 3: Selection of the respondent

The selection of pregnant women to participate in the study in each sampled HFs was done using a systematic sampling technique. Using the estimate of the average clinic attendance of the preceding month a sampling interval was determined for each HFs and applied accordingly; balloting was employed to determine the first enrollee. The sample size was distributed among the HFs based on proportionate to size allocation using the estimate of the average clinic attendance of the preceding year which is presented in the table below.

Table 1: Distribution of the study sample in each facility

Health facility	Average number of pregnant women/year	Number of pregnant women interviewed per facility
General Hospital Dutse	7798	272
Guri PHC	957	45
Musari Basic Health Clinic	897	32
Taura PHC	1435	50
Majia Basic Health Clinic	775	21
Total	11862	420

3.6 Study Instruments

A semi-structured interviewer administered questionnaire was used to collect information. The questionnaire consists of five sections A-E. Section A; is on socio-demographic information which include age, place of residence, gravidity, parity, number of live birth, number of weeks of gestation, occupation, ethnic group and religion. Section B contains questions on knowledge on malaria such as how is malaria transmitted; what are the effect of malaria on the pregnant woman and the unborn baby and method of malaria prevention in pregnancy. Section C asks questions on practice of IPTp at ANC such as month of pregnancy during first ANC visit, swallowing of SP at the clinic (DOTS); number of times SP was swallowed in the index pregnancy and availability of potable drinking water at the ANC clinics. Section D is on knowledge on IPTp; where question were ask on reason for taking SP; sources of information about SP; number of times pregnant should take SP and time interval between SP doses. Section E is on antenatal record information where information on total number of ANC visit, gestation recorded at first visit and number and date of SP doses were retrived. while Section F asked about the barriers to the use of IPTp such as distance from ANC clinic , mode cost of transportation to ANC clinic were asked.

3.7 Data Collection Methods

General information on the participants' socio- demographic data, knowledge on malaria, knowledge of IPTp, use of IPTp for malaria was collected by the interviewers using a questionnaire adapted and pretested prior to use to the study.[61] Twenty questionnaires were pre-tested i.e. administered and answered. (Translated into local dialect). The questionnaire was pretested in Kudai BHC settlement near Dutse metropolis which shares similarity in term of climatic, socio-cultural and economic activities.

Four (4) females' research assistants were recruited to assist in the data collection process. The assistant consisted of two nurses and two community health workers (CHEWs). All the assistants were trained for a day on basics data collection skills agreed approaches and understood confidentiality of the respondents. Two research assistant were assigned to specific health facility on clinic days each week. Data collection activities, supervision of the research assistants and other management of the research process and control of data quality were done by the researcher.

3.8 Data Management

3.8.1 Measurement of variables

3.8.1.1 The independent variables:

Includes age, place of residence, educational status, occupation, parity, marital status, timing of first ANC attendance, number of ANC visit, distance from health facility, mode of transportation to the clinics and the amount paid for transportation

3.8.1.2. Dependent variables

Use of IPTp (IPT Utilization)

- **IPTp use** was defined as those that used SP for at least once in pregnancy for prevention of Malaria.
- **Good utilization of IPT**: when a pregnant woman takes at least 2 doses of SP during pregnancy
- **Poor utilization of IPT**: when a pregnant woman takes less than 2 doses of SP during pregnancy

Knowledge on malaria infection in pregnancy was assessed as Good or Poor Knowledge. Scores were assigned to the responses in order to grade the knowledge of the pregnant women on Malaria these were determine by correct answer to set of 4 simple questions about how is malaria transmitted, effect of malaria on mother and her unborn baby and method of malaria prevention for pregnant women. Correct answer is scored 1 mark, while incorrect answer is score 0. The correct responses for each respondent were summed up and the mean knowledge score (MKS) for all respondents was calculated. Respondents were grouped into two groups based on their final score. Those with scores above the mean score were considered as having Good knowledge while those with scores equal or below mean score were said to have poor knowledge of malaria

Respondents knowledge on IPTp was also assessed as Good or Poor Knowledge. These were determine by correct answer to three (3)set of question on purpose of taking SP, number of doses of SP pregnant women should take during ANC and interval between doses of SP. Correct answer is scored 2 while incorrect answer is score 1. Respondent who scores above four (> 4) were rated Good Knowledge while those who scored less than or equal to four (≤ 4) were rated as having poor knowledge.

3.8.2 Statistical Analyses

Tables, proportions and percentages as well as charts were used to summarize data obtained from the study. Univariate analysis was conducted to compute frequencies and proportions. Bivariate analysis using Chi square test at 95% confidence interval was used to compare associations between the factors and the outcome variables. A p-value of ≤ 0.05 was considered significant. We also conducted a multivariate logistic regression analysis to determine independent association between some risk factors and the disease. The criteria used to consider a variable for

logistic regression are variables with p-value <0.05 to 0.2, confidence interval not passing through one and those variables that are consistently reported as being significant in previous literatures. Epi-Info version 3.5.4 November 2007(CDC-Atlanta) and Microsoft Excel were used for all the data analysis conducted.

3.9 Ethical Considerations

Permission was sought and obtained from the ethical review committee in Jigawa State and Ahmadu Bello University (ABU) Zaria. The three universal ethical principles, including respect for participants, beneficence and justice was observed. All participants were fully informed about the purpose of the study, potential benefits and the fact that their participation is voluntary. Written informed consent was obtained from all participants. Furthermore, information sourced will kept confidential and ensured the confidentiality of interviews, at least audibly. Participants were assured that the information would be use for research purpose only, with access limited to the investigators only and stored in a coded computer with password. Participants were made to know that the result of the research would be shared with the state Government and other stakeholders to support decisions aimed at making the IPTp intervention more responsive and sensitive to perceptions held by pregnant women.

3.10 Limitations

1. The biggest limitation of this study is that it recruited primarily from among women who were already accessing services, and so does not adequately capture barriers for women who may not be attending ANC. However, the primary interest of the study was to learn more about the Malaria infection in pregnancy and IPTp use, which was best accomplished by speaking to

women who are already accessing care. The issues preventing women from accessing ANC may be very different from those preventing ANC patients from receiving IPTp.

2. The respondents may not have recollected all that happened during their ANC visits leading to recall bias. However this was minimized by showing samples of SP to them in order for them to relate their responses to the drug in question. Also, the records of the pregnant women were compared to the history given and this was found to be comparable.

3. The number of weeks of gestation of the pregnant women was estimated using the symphysio-fundal heights (in centimeters) recorded in the ANC booklets. Since this measurement is prone to error, differences in the measurements would affect the gestation estimated.

CHAPTER FOUR

RESULTS

4.1: Socio-demographic characteristics

Table 2: Socio-demographic characteristics of the respondent's

Socio-demographic variables	Frequency n=420	Percent (%)
Age group		
<20	62	14.8
20-29	257	61.2
30-39	86	20.5
≥ 40	15	3.5
Parity		
0	64	15.2
1-4	229	54.5
≥ 5	127	30.3
Marital status		
Single	0	0.0
Married	413	98.3
Divorced	4	1.0
Widowed	3	0.7
Highest level of education		
Tertiary	13	3.1
Secondary	56	13.3
Primary	58	13.8
Quranic	190	45.2
None	103	24.5
Place of residence		
Urban	113	26.9
Rural	307	73.1

Table 2 (continued): Socio-demographic Characteristics of the Respondent's

Socio-demographic variables	Frequency n=420	Percent (%)
Occupation		
House wife	331	78.8
Trading	77	18.3
Farming	0	0.0
Civil servants	12	2.9
Ethnicity		
Fulani	42	10
Hausa	339	80.7
Kanuri	27	6.4
Others	12	2.9

Tables 2 above summarized the socio-demographic characteristics of the respondents. A total of 420 pregnant were interviewed with age ranged of 15 to 45 years (Mean 24.7±6.1). Majority 257 (61.2%) of the respondents were within age group 20-29 years. Sixty four (15.2%) were Primigravidae, 229 (54.5%) were multigravidae and 127 (30.3%) were grand multipara. Majority 413 (98.3%) were married with divorcee and widow making 7 (1.7%) none is Single. Most respondents 307 (73.1%) were rural dwellers. Sixteen percent had at least secondary education; the majority either had either Quranic (45.2%) or None formal education (24.5%) at all.

Most of the respondents (80.7%) were hausa some 42 (10.0% were Fulani, Kanuri (6.4%) few 2.9%) were formed by other languages. Majority of the respondents were fulltime House wife, few were Civil servants others (18.3%) engaged in some petty trading at home.

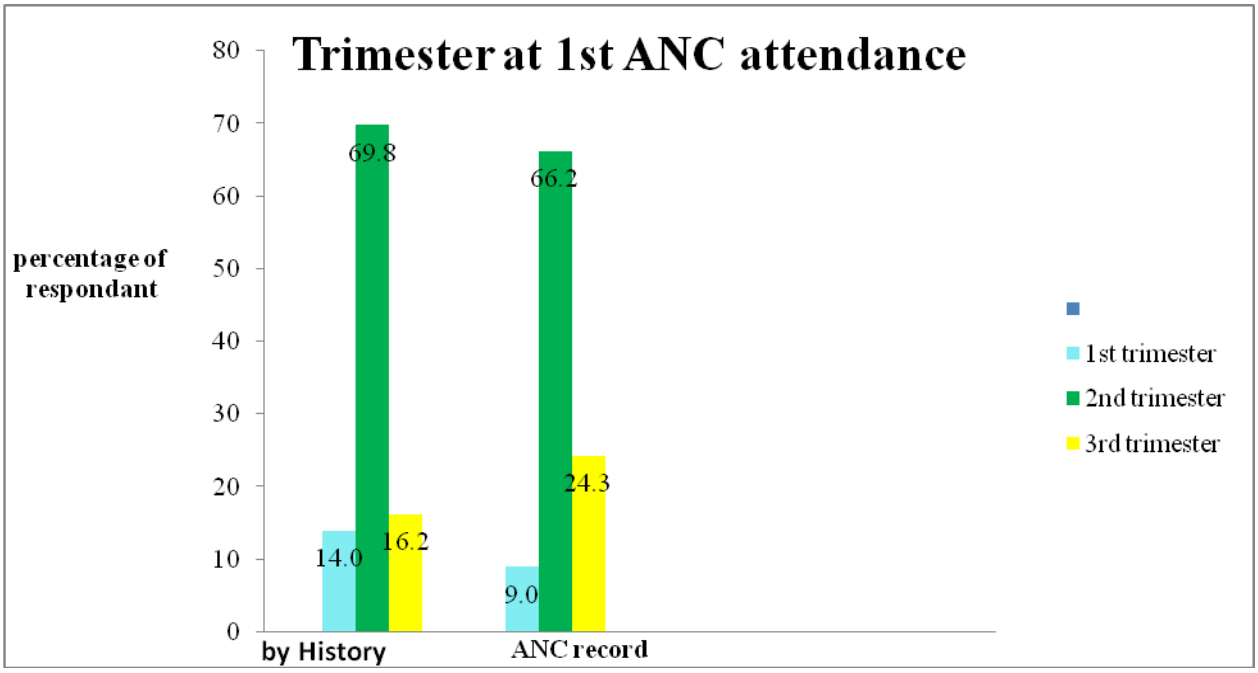

Figure 2: Gestational Age at first ANC booking

4.2 Gestational Age at First ANC Booking

Figure 2 above compares the gestational age at first ANC attendance by history from the clients and the symphysio-fundal height (SFH) measurement recorded on the ANC card. There is no significant difference in the data obtained from the history and ANC record of SFH. Majority of the pregnant women 293 (69.8%) (by history) and 278 (66.2%) (From ANC record) booked between 14-26 weeks with few 59 (14.0%) and 40 (9.0%) booking between 27-38 weeks from the history and ANC record of SFH respectively.

The median gestational age at booking from ANC record was 21 weeks (range 8-38). The mean number of ANC visit among the studied subject was 2.7. (range 1-6). Most of the women 51.2% having two (2) visits only 9.3% had four (4) visits.

4.3 Knowledge of Malaria

Table 3: Knowledge about Malaria among Respondent's

Variables	Number	Frequency
How is malaria transmitted (n = 409)		
Mosquito bite	405	99
Eating contaminated food	2	1
Drinking bad water	2	1
Effect of malaria on pregnant woman (382)		
Don't know	200	52.4
Anaemia	152	39.8
Death	20	5.2
Nothing	10	2.6
Effect of malaria on fetus (415)		
Don't know	279	67.2
Intra uterine death	55	13.3
Nothing	23	5.5
Prematurity	22	5.3
Spontaneous abortion	19	4.6
Low birth weight	17	4.1
Malaria prevention in pregnancy (420)		
Sleep under LLIN	367	87.4
Don't know	28	6.7
Mosquito repellent	18	4.3
Protective clothing at night	3	0.7
Chemoprophylaxis (SP)	3	0.7
Herbal preparations	1	0.2

Table 3 summarized the knowledge of pregnant women about malaria. Nearly all 405 (99.0%) had correct knowledge of how is malaria transmitted in the same time 367 (87.4%) of the women knew that malaria in pregnancy can be prevented by sleeping under long lasting insecticide treated net. However, only 152 (36.2%) knew that malaria has effect on the pregnant women and about one quarter (26.9%) had correct knowledge of effect of malaria on the unborn featus.

Table 3: Overall knowledge of Malaria

Rating of knowledge of malaria	Frequency n=420	Percentage (%)
Good knowledge	199	47.4
Poor knowledge	221	52.6

Mean Knowledge Score = 2.5

Scores were assigned to the responses in order to grade the knowledge of the pregnant women on Malaria. Correct responses were scored one (1) mark, while incorrect responses were scored 0". The correct responses for each respondent were summed up and the mean score for all respondents was calculated to be 2.5. Respondents were grouped into two groups based on their final score. Those with scores above the mean score were considered as having Good knowledge while those with scores equal or below mean knowledge score were said to have Poor knowledge of malaria. In general, after scoring respondents' knowledge of malaria transmission, consequences of malaria to pregnant women and her unborn baby and knowledge of malaria prevention in pregnancy. Most of the respondent 221 (52.6%) had poor knowledge of malaria.

4.4 Knowledge of IPTp

Table 4: Responses on Knowledge of IPTp with SP

Variables	Frequency n=80	Percentages (%)
Purpose of taking SP		
To prevent me from getting malaria	61	76.2
To make my baby and I strong and healthy	9	11.2
To make me gain weight	6	7.5
To give me a lot of blood	4	5.0
Number of doses of SP during pregnancy (80)		
Don't know	31	38.6
Once	29	36.3
Twice	11	13.8
Thrice	5	6.3
More than thrice	4	5.0
Interval of SP prophylaxis in pregnancy (80)		
Don't know	57	71.3
Monthly	13	16.3
Fortnightly	6	7.5
Weekly	4	5

Table 5 above shows the knowledge of the pregnant women on IPTp with SP. Among the respondents that gave history of taken SP (n =80). Sixty one (76.2%) knows why SP is given to pregnant women at ANC. Very few 11 (13.8%) had correct knowledge of doses of SP pregnant women should take during antenatal care visits. Most of the respondents 31 (38.6%) and 29 (36.3%) either don`t know or gave SP doses during pregnancy as only once with few 5 (6.3) and 4 (5.0%) saying SP is taking thrice or more than three times respectively. Majority 57 (71.3%) of the respondents do not know the regular interval at which SP should be taken during ANC with 13 (16.3%) having correct knowledge of monthly interval between doses.

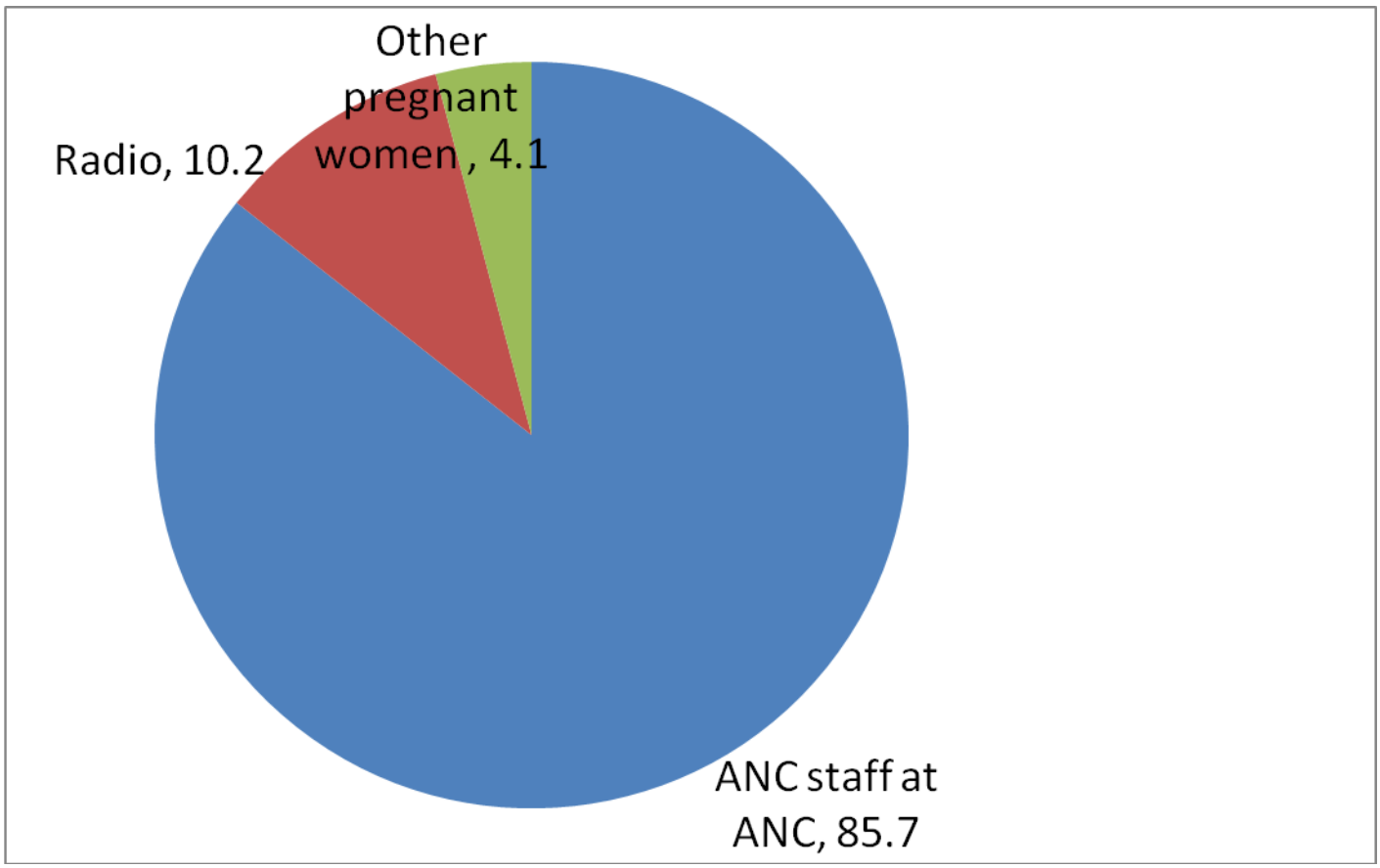

Figure 3: Respondent's sources of knowledge about SP

Figure 3 shows the sources of information on SP for the pregnant women with majority (85.7%) of the women getting to know about SP through ANC staff during Ante-antal clinic and only 10.2% understanding the use of SP through radio. None had reported any awareness from television.

Table 5: Level of knowledge of IPT with SP among respondents that had use SP in their index pregnancy

Rating of knowledge of IPT	Frequency	Percentages (%)
Good	16	20.0
Poor	64	80.0

Table 6 shows the level of knowledge of the respondents that had used SP in their index pregnancy. Majority of those that used SP in their index pregnancy 64 (80.0%) had poor knowledge of SP.

4.5 Utilization of SP among the studied subjects

Table 7: Utilization of SP among respondent

SP Uptake	Frequency	Percentage (%)
Uses SP in index pregnancy		
Yes	48	11.4
No	372	88.6
Number of doses SP administered		
O dose	372	88.6
1 dose (IPTp1)	42	10.0
2 dose (IPTp2)	6	1.4
Gestational Age 1st SP administered		
1st trimester (≤13 weeks)	5	10.4
2nd trimester (14-26 weeks)	26	54.1
3rd trimester (27-40 weeks)	17	35.4

Table 7 summarized the utilization of SP among the studied subject. Among the four hundred and twenty (420) studied subjects only 48 (11.4%) had record of SP on their antenatal card; fourty two (10.0%) had only 1st dose (IPTp1) and very few 6(1.4%) having up to 2 doses. Most doses of IPTp1 35.4% were administered in the 3rd trimester with few given in the 1st trimester. Good IPT utilization in this study is 1.4 % .

Table 8: Respondent socio-demographic characteristic and IPT utilization

Variables	**IPT Utilization**		**OR**	**95%CI**	**P-value**
	Good	Poor			
Age					
<30yrs	4 (1.3)	315 (98.7)	0.6	0.11-3.48	0.44
≥30yrs	2 (2.0)	99 (98.0)			
Parity					
Primigravidae	0 (0.0)	64 (100.0)	0.0	99-99*	0.37
Multigravidae	6 (1.7)	350 (98.3)			
Gestational age at 1st ANC booking					
1st &2nd trimester	5 (5.0)	313 (95.0)	1.6	0.18-13.97	0.55
3rd trimester	1 (1.1)	101 (98.9)			
Educational status					
Non formal	2 (0.7)	291(99.3)	0.2	0.38-1.69	0.07
Formal	4 (3.1)	123 (96.9)			
Place of residence					
Rural	2 (0.7)	305 (99.3)	0.1	0.32-0.99	**0.04**
Urban	4 (3.5)	109 (96.5)			
Marital status					
Unmarried	1 (14.3)	6 (85.7)	13.6	1.4-134.70	0.10
Married	5 (1.2)	408 (98.8)			

Table 8 summarized the relationship between the socio demographic characteristics of the pregnant women and IPT utilization. Gestational age at 1st ANC booking was found to be positively associated of the number of SP doses received by the pregnant women that is those pregnant women who booked in the 1st &2nd trimester are 1.6 times more likely to have good IPT utilization. However, this was not statistically significant p>0.05. So also the unmarried women (divorcee and widows) are 13 times more likely to have good IPT utilization. Rural resident more likely not to receive up to two (2) dose of SP which is statistically significant (OR 0.1 and p=0.04 95% CI 0.32-0.99). Primigavidas are also not likely to have good utilization of SP (OR 0.0 and p= no definite value given).

Table 9: Other factors and IPT Utilization

Distance from clinic					
≤ 5km	6 (1.8)	328 (98.2)	99*	99*	0.25
> 5km	0 (0.0)	86 (100.0)			
Number of ANC visit					
≥2 visit	3 (1.4)	212 (98.6)	0.9	0.19-4.77	0.60
>2 visit	3 (1.5)	202 (98.5)			
Cost of transportation					
< N100	5 (1.7)	287(98.3)	2.2	0.255-19.130	0.40
≥ N100	1 (0.8)	127 (99.2)			

** value undefined

Pregnant women paying less than one hundred naira N100 for transportation to clinic were two (2) times more likely to receive up to two (2) dose of SP compared to those paying one hundred and above. However, this was also not statistically significant (OR 2.2 and p =0.40).

Table 10: Multi Variable Analysis of some Determinants 0f IPT immunization

Variables	IPT Utilization		Crude OR (95% CI)	Adjusted OR (95% CI)	§P-value
	Good	Poor			
Gestation a 1st ANC visit					
1st & 2nd trimester	5 (5.0)	313 (95.0)	1.00	1.00	
3rd trimester	1 (1.1)	101 (98.8)	1.6 (0.18-13.97)	0.13 (0.02-0.08)	0.02
Educational status					
Non-formal	2 (0.7)	291(99.3)	1.00		
Formal	4 (3.1)	123 (96.7)	0.2 (0.38-1.69)	5.2 (0.93-30.16)	0.06
Place of resident					
Urban	2 (0.7)	305 (99.3)	1.00		
Rural	4 (3.5)	109 (96.5)	0.1 (0.32-0.99)	5.2 (0.83-32.36)	0.07
Cost of transportation					
<N100	5 (1.7)	287(98.3)	1.00		
≥N100	1 (0.8)	127 (99.2)	2.2 (0.25-9.13)	0.38 (0.04-3.6)	0.40

After the multivariate analysis (logistic regression) educational level and place of residence were found to be associated with the number of SP doses received, however, now was a predictor of receiving two or more doses of SP (P-Value≥0.05).

CHAPTER FIVE

DISCUSSION

The study was conducted to assess knowledge and utilization of intermittent preventive treatment for malaria among pregnant women in Jigawa State. A total of 420 pregnant women were recruited from five health facilities in the state.

The timing of booking of the first ANC visit is believed to be very crucial to the coverage of IPTp. Early registration increases one's opportunity of receiving the recommended doses of SP provided ANC is attended regularly and SP is available. Late first ANC attendance has been found to contribute to incomplete IPTp.[42] The median gestational age of first ANC visit was found to be 21 weeks in this study which is comparable to findings from Kano, North west Nigeria where in the index pregnancy, where majority the women booked in the second trimester (13–24 weeks)[46], and also in keeping with findings from Birnin Kwari in Kaduna State where most of the pregnant women began their antenatal care late with median booking gestation age of 24 weeks (range 12- 34 weeks); very small percentage of the studied women began the antenatal care in the first trimester[62] which is also similar to a finding in rural Senegal where the median gestational age of first ANC attendance was found to be 20 weeks.[11] A study conducted in Ghana found a median age of first ANC attendance as 12 weeks (R=4-36) by history and16 weeks (R=4-36) by records for the pregnant women. Approximately half of the pregnant women in the district registered their first ANC attendance in the first trimester while approximately two-third registered in their second trimester with some registering their first ANC attendance in the third trimester[63]. A large proportion of the late first ANC attendants in the pregnant women's, that is, those who first attended ANC in the third trimester of pregnancy, attributed it to the fact that they had had no problems during the pregnancy. This means that pregnant women in the

Jigawa State start attending the ANC early enough to allow them receive the recommended two doses of SP according to WHO but surprisingly less than two percent of the study subject received at least two doses of SP from this study. In a study in Kenya where about half of the women attended their first ANC in the third trimester, about one-quarter received two doses of SP.[42]

This study shows that most of the women interviewed were aware that exposure to mosquito bites predisposes them to malaria and use of long lasting insecticide treated nets can prevent them from acquiring malaria. This is not unexpected because causes of malaria and method of its prevention in pregnancy are often discussed by midwives while giving health talks in the antenatal clinic of the hospital. In addition following the Roll back malaria initiative (RBM) in 1998 and the United Nations Millennium declaration and Abuja declaration in 2000, there has been a lot of public enlightenment and campaign particularly concerning the use long lasting insecticide treated nets as a method prevention.

However, knowledge of harmful effects of malaria during pregnancy to the mother and the unborn baby were found to be low in this study which is in contrast to findings by Toin-weet et al who found that most women had knowledge that malaria could cause some harm during pregnancy to the mother or fetus such as abortion, still births, or low birth weight[39]. This provides the reason to intensify enlightenments campaign on consequences of malaria during ANC. The overall knowledge on malaria was also low. The knowledge exhibited by the women was at variance with a study from other part of Nigeria where it was found that more than three quarters of the women had correct knowledge that malaria was caused by exposure to mosquito

bites. This low level of knowledge may be attributed to low level of education among respondent compared to their counterpart in southern part of the country.[39]

Overall knowledge of IPT among the study subject was poor. Studies from Nigeria and other Sub-saharan countries have also shown low knowledge and practice of IPT among pregnant women attending formal antenatal clinics[17,64-66] The poor knowledge of IPTp documented by this study had earlier been documented by[67, 68] who reported knowledge gaps of malaria prevention strategies in pregnancy among healthcare providers studied. This is also corroborates a finding from a study in rural southwest Nigeria[48] where they found that majority of the pregnant women did not know sulfadoxine-pyrimethamine (SP) as the drug recommended for IPTp and were not aware that IPTp could be given to pregnant women. but unlike a finding from Kano where majority of the pregnant women had good knowledge of IPT. This finding is also at variance with the recent malaria indicator survey.[33] It is however, a far cry from the findings in Tanzania.[63] Some of these disparities noted from this study could be explained by variations in literacy levels, place of residence, methodology, or timing of the studies. This knowledge gap may also be due to lack of personal and institutional updates on new interventions in preventing malaria during pregnancy in the state. It may also be as a result of lack of budgetary support in making available copies of the National IPTp guideline and strategic documents available within health facilities.

Percentage of IPT utilization from this study is very low (1.4%) despite the mean ANC visit of 2.7 ± 1.08 which is an opportunity for the pregnant women to receive the recommended two or more doses of IPT. This finding is much lower than a findings from Ibadan south west Nigeria by Olukemi et al[69]; Kubwa, Abuja Nigeria[70]; 41% at University of Benin Teaching Hospital

(UBTH), Benin city, Nigeria[71]; 7.5% in Enugu, Nigeria[72] 5.4% recorded in South eastern Nigeria[73] and 36% in Malawi[74] and far in contrast from a study in Ghana which showed that at least 95% of the pregnant women and nursing mothers received at least one dose of SP during their most recent pregnancy and not less than three quarter received at least 2 doses of SP[61]. The poor utilization of IPTp among pregnant women in this study suggests that many pregnant women are not benefiting from the laudable initiative aimed at reducing the level of maternal and neonatal mortality associated with malaria in pregnancy, despite the fact that these women register early for ante- natal care. Bearing in mind that Nigeria rank high among countries with high maternal and neonatal mortality rate.[73] The poor utilization of IPTp with SP in this study was influenced by low level of education and lack of awareness of SP. This finding highlights the need for appropriate dissemination of the current intermittent preventive treatment for malaria guidelines and further scrutiny of the quality of the antenatal care services provided at the primary health care centers, especially in the rural communities. This is to ensure that opportunities for malaria prevention are not missed because of the weaknesses of the health care system. This position is particularly important because ANC attendance rates even in rural communities in Nigeria are usually high.[75]

In this study it was found that maternal age and multiparity were not associated with IPT utilization. This finding is in contrast to a study in Kano by Iliyasu et al[46] and Akinleye et al.[48] who reported increasing uptake of IPTp with increasing parity (up to the third pregnancy), their study didn't found association between IPTp uptake and respondent age which is similar to the finding from this study. A study done in Tanzania also showed that age was not associated with second dose coverage of SP.[76] Gestational age at 1st ANC booking was found to be positively associated with the number of SP doses received by the pregnant women this similar to from

Ghana.[61] Marital status, educational level and occupation were expected to be predictive of receiving more doses of SP[61] however this was not so from this study. Marchant T et al[76] also showed from their study that marital status, educational level of the woman and household socio-economic status were not associated with a second dose of SP. This was in agreement with previous study in Tanzania where individual or client factors were not found to be associated with second dose SP administration.[77] This study had also noted same findings. The free maternal health care policy being enjoyed in the state could have helped overcome these factors as barriers to accessing healthcare through the ANCs. The pregnant women may no longer solely depend on their spouses or family heads for money for ANC services and may access health services more easily than they would if they had to wait for money. Probably it is time to look out for other factors outside socio-demographic factors that influence IPT utilization. The distance, means of transport, and cost of transportation to the antenatal clinic differs considerably however, these were comparable with reports from other centers.[48] Pregnant women paying less than one hundred naira as a cost of transportation to clinics are two times more likely to receive up to two doses of SP compared to those paying one hundred naira and above. This finding corroborates a study in Kano, northwest Nigeria who found that those who walked to the clinics were more adherent to IPT than those who were convened with private or commercial vehicles.[46] This highlighted the needs to expand ANC services to the door steps of the community for easy accessed.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The IPTp program is being implemented in Jigawa State. However, the desired success is yet to be achieved as seen from the poor knowledge IPT and very low IPT utilization of 20% and 1.4% respectively.

The high antenatal attendance of pregnant women; early ANC booking; and their good knowledge of causes of Malaria are golden opportunities available for improvement for full IPTp program in order to achieve good IPTp utilization that can be a success in reducing malaria in pregnancy.

6.2 RECOMMENDATION

The Jigawa State Ministry of Health in collaboration with the Malaria support program in the state should:

1. Ensure adequate and regular supplies of SP to the health facilities.
2. Provide technical support to health facilities on IPTp implementation through training and re-training of staff in the health facilities.
3. The Jigawa State Ministry of Health in collaboration with the Malaria support program should intensify support for radio jingles on IPT with SP in all the radio station in the state and the sub-station in the LGAs.
4. The health workers in the ANCs should have well planned health education schedules for the year and this should include malaria in pregnancy and IPTp. Schedules should be followed religiously so that the pregnant women are well educated. Emphasis should be made on consequences of malaria to pregnant women and their unborn baby.
5. The health workers in the ANCs should be encouraged to ensure detailed documentation of service delivery at ANC.
6. A further research to assess health care provider's knowledge and training on IPT implementation including attitude of staff should be conducted by Jigawa State Ministry of Health and partners in order bring out more information concerning IPT implementation.

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APPENDICES

Appendix 1: Questionnaire

QUESTIONNAIRE ON KNOWLEDGE AND UTILIZATION OF INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN JIGAWA STATE, NIGERIA 2015

INTRODUCTION AND CONSENT FORM

My name is Dr Isa Adamu; I am from the Jigawa State Ministry of Health, master's student with the Department of Community Medicine, Ahmadu Bello University, Zaria. I am conducting a research on "Knowledge and Utilization of Intermittent Preventive Treatment of Malaria (IPTp) among Pregnant Women attending Antenatal Clinic (ANC) in Jigawa State. This research will help to assess the knowledge of women on IPTp and factors that influence the utilization of antimalarial prophylaxis given during ANC. The information obtained from the study will help to advice the state government on how best to improve the distribution of these drugs to pregnant women.

The study will involve asking you some questions on your pregnancy and what you know about drugs given to pregnant women to prevent them and their fetus from malaria.

Information obtained in this study will be treated with utmost confidentiality and only be used for research purposes. Participation is entirely voluntary and free. Refusal to participate will not in any way affect your management in this facility. I will appreciate if you will give consent to go ahead with the questions.

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

Questionnaire No: ☐ LGA: ……

Health facility……

SECTION A: SOCIO-DEMOGRAPHIC FACTORS.

1. Age (in years):
2. Place of residence: Urban [ ] Rural [ ]
3. Gravidity:
4. Parity:
5. No of live births:
6. No. of weeks gestation:
7. Marital Status: Married [ ] Single [ ] Widowed [ ] Divorce [ ]
8. Highest level of education:

   Tertiary [ ] Secondary [ ] Primary [ ] Quranic [ ] None [ ]
9. Occupation: House wife [ ] Trading [ ] Farming [ ] Civil servants [ ]
10. Ethnic group: Hausa [ ] Fulani [ ] Kanuri [ ] Others (Specify)……
11. Religion : Islam [ ] Christianity [ ] Traditional [ ]

SECTION B: (KNOWLEDGE ON MALARIA)

12. How is Malaria transmitted?

Mosquito bite [ ] Drinking bad water [ ] eating contaminated food [ ] bad breath [ ] others (specify)……

13. What are the effects of malaria on the pregnant woman? Can cause anaemia [ ]
Can cause death [ ] Nothing [ ] Don't know [ ]
Other, specify……

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

Can cause spontaneous abortion [ ] Can cause Intra Uterine Death [ ] Can cause low birth weight [ ] Can cause prematurity [ ] Nothing [ ] Don't know [ ] Other,specify……..

15. How can a pregnant woman prevent herself from getting malaria?

Take herbal preparations [ ] Sleep under an insecticide treated net [ ]

Use mosquito repellent [ ] Wear protective clothing, especially at night [ ]

Don't know [ ] Use of Drugs such as SP [ ] Other, specify……..

SECTION C: PRACTICE OF IPTp AT ANC

16. How many months into your pregnancy did you first attend ANC? [ ]

17. If later than the 6months, why did you attend your first ANC at this time?

Did not have any problems during the pregnancy [ ]

Did not have money for transportation [ ] I could not leave my farm work [ ]

Long distance to the ANC deterred me [ ] Wanted pregnancy to show first [ ]

Wanted pregnancy to be established culturally [ ]

Attended the herbalist/spiritualist's clinic first [ ]

Was being seen by the TBA [ ]

Other, specify……

18. Did the nurses give you some medicine to swallow for them to see on the first

Visit? Yes [ ] No [ ]

19. If no to question 18, have you ever been given any medicines to swallow for the

Nurses to see on your subsequent visits? Yes [ ] No [ ] **If No go to section D (Q 28)**

20. If yes to question 18 or 19, how many tablets were they?

One [ ] Two [ ] Three [ ] Four or more [ ]

21. Did the medicine look like this one? (**Please show a sample of SP)** Yes [ ] No [ ]

22. If no, how did it look like? .....

23. How many times during this pregnancy have you swallowed these same tablets at

the ANC? Once [ ] Twice [ ] Thrice [ ]

More than three times [ ] Can't remember [ ]

24. Were you served with free, clean water to take the medicine? Yes [ ] No [ ]

25. If no, how did you get the water to take the medicine?

Bought water at the ANC [ ] Fetched water from the tap [ ]

Bought water at the health facility [ ] Had my own water [ ]

Other, specify …….

26. If yes to question 23, were you served in a cup that was commonly used by other pregnant women? Yes [ ] No [ ] other, specify……

27. If yes, was this practice of sharing cups acceptable to you? Yes [ ] No [ ]

SECTION D: KNOWLEDGE OF IPTp

28. Did the nurses give you some medicine like this (**please show a sample of SP**) for you to swallow at home during any of your Visit? Yes [ ] No [ ] if No go to Section E (Q 34)

29. Do you know what the tablets are for? Yes [ ] No [ ] [If No, skip Q30 & 31]

30. If yes, what are the tablets for?

To make me gain weight [ ] To make my baby and I strong and healthy [ ]

To prevent me from getting malaria [ ] To give me a lot of blood [ ]

To cleanse my blood of diseases [ ] other, specify ……

31. What is the source of your knowledge about the above mentioned medicine?

ANC staff at ANC [ ] Radio [ ] Television [ ]

Other pregnant women [ ] Other, specify ……

32. How many times during a pregnancy does a woman have to swallow the tablets at the ANC? Once [ ] Twice [ ] Thrice [ ] More than Three times [ ]

Don't know [ ]

33. At what regular interval does the pregnant woman have to take the medicine at the ANC? Weekly [ ] Monthly [ ] Fortnightly [ ] Don't know [ ]

Don't know [ ] Other, specify……

SECTION E: ANTENATAL RECORD INFORMATION

34. Total number of visits including this one

35. Gestation (weeks) recorded at first visit

36. Number of doses SP recorded (given)

37. SP administration

	Date of visit	Gestational age at which it was given
1st		
2nd		
3rd		

SECTION F: BARRIERS TO USE IPTp

38. How far is your house from this Health facility?

< 1km [ ] 1-2km [ ] 3-4km [ ] >5km [ ]

39. What mode of transportation did you use to come to ANC?

foot [ ] motorcycle [ ] Taxi [ ]

40. How much did you pay for the transportation to the ANC Clinic

< N100 [ ] N200-300 [ ] N400-500 **[**]

41. Was there any time when you are given SP but you didn't take it?

Yes [ ] No [ ]

42. What do you think prevents pregnant women from taking their IPTp with SP?

Not sick during pregnancy [ ] Fear of loss of pregnancy [ ] Cultural reason [ ]

Fear of side effect [ ] Don't know [ ]

General Hospital
Potiskum
P.M.B. 1010,
Potiskum,
Yobe State,
19 February 2015.

The Honourable Commissioner

Jigawa State Ministry of Health

Through :

The Chairman

Operational Research Advisory Committee

Jigawa State ministry of Health

New secretariat, Dutse.

Sir,

REQUEST FOR AN ETHICAL CLEARANCE

I am a student of masters in Public Health (Field Epidemiology) at Ahmadu Bello University, Zaria, doing my field attachment with the Jigawa State Ministry of Health under the Epidemiology unit. My admission number is MPH/MED/40740/2012-2013 and supervised by Dr A.U. Shehu and Dr M. N. Sambo.

I wish to apply for an ethical clearance to conduct a survey titled **"Knowledge and Utilization of Intermittent Preventive Treatment for Malaria among pregnant women attending Antenatal clinics in Public Health Facilities in Jigawa State ".**

Attached is the thesis proposal for your consideration.

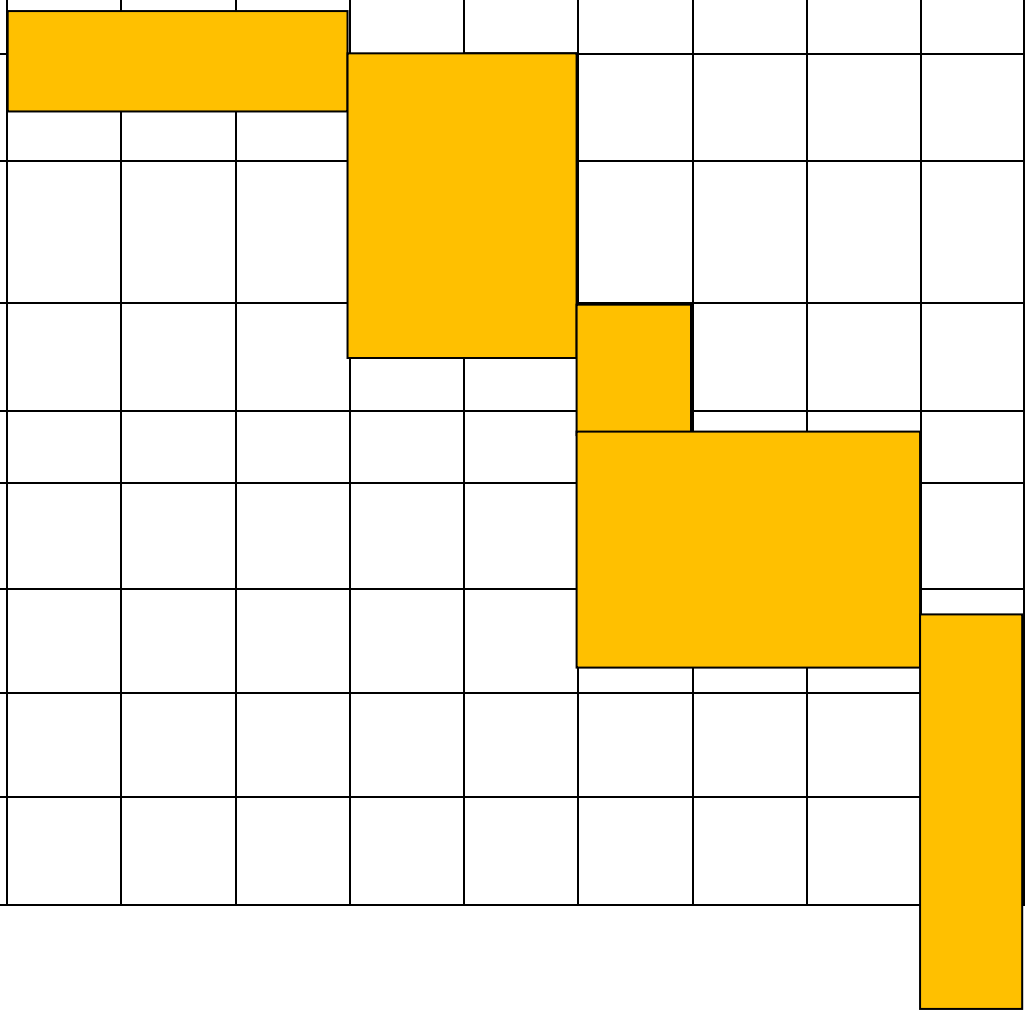
Hope my letter will be given due attention.

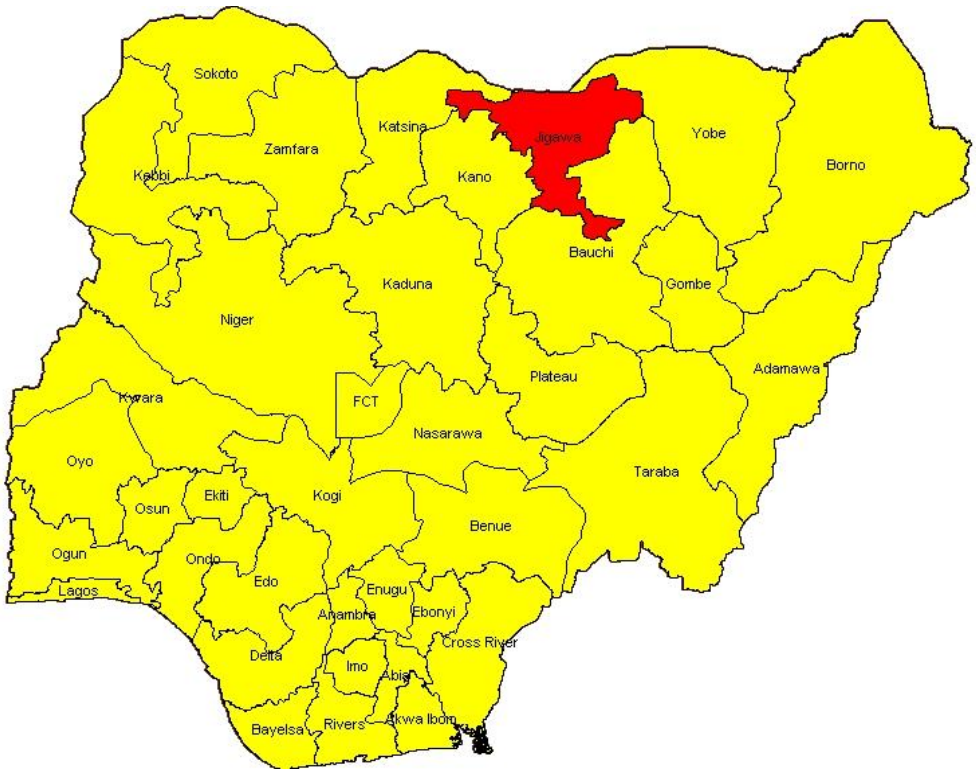
Yours sincerely

.....

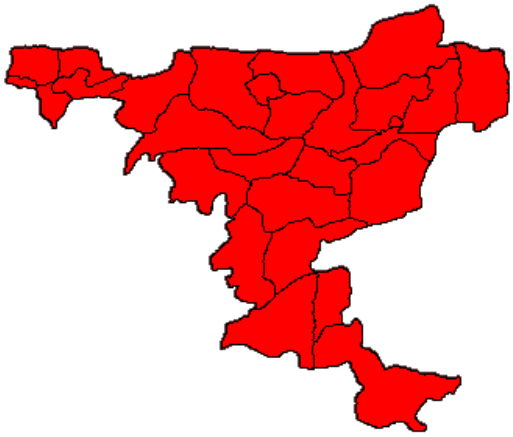
Dr Isa Adamu

Name of Activity	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015
Development of Thesis Proposal									
Approval of Ethical and Scientific Committee, JSMoH									
Approval of Ethical and Scientific Committee, ABUTH, Zaria									
Training of interviewers and Pretest									
Data Collection and Analyses									
Report Writing and Review by Supervisors									
Internal Thesis Defense									
External Thesis Defense									
Dissemination of Information to Stakeholders									





Map of Nigeria showing Jigawa State



JIGAWA STATE HEALTH RESEARCH ETHICS COMMITTEE

STATE MINISTRY OF HEALTH

MOTTO: FOSTERING CHANGE THROUGH HEALTH RESEARCH

Registration number NHREC/10/11/2011

JHREC/A/R/06/2015

Tuesday, March 10, 2015
19 Jumada Auwal 1436 AH

Dr. Isa Adamu
Department of Community Medicine
Faculty of Medicine, Ahmadu Bello University Zaria

ETHICAL CLEARANCE TO CONDUCT A SURVEY ON KNOWLEDGE AND UTILIZATION OF INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA AMONG PREGNANT WOMEN ATTENDING ANCs IN PUBLIC HEALTH FACILITIES IN THE STATE

With reference to your study proposal submitted to the office of the Chairman of Jigawa Health Research and Ethics Committee(JHREC) on the above topic, and pursuant to your request for Ethical approval to conduct the study in the state. I wish on behalf of JHREC to notify you that the committee has examined your proposal and was satisfied with your methodology, consent of the participants, their benefits and that of the state.

Considering the fact that your research study is basically intended to determine knowledge, experiences and utilization of intermittent preventive treatment among pregnant women attending antenatal clinics in the state, I wish to convey clearance on behalf of the Ethics Committee for you to undertake the study in accordance with the specifications outlined in your protocol.

Please note that JHREC reserve the right to conduct monitoring visits to your research sites without prior notification and to have copy of the study findings at the end of the research. I wish you a successful and hitch free exercise in the state.

Thank you and Best Regards.

Pharm. Usman Abubakar Tahir
Chairman, Jigawa Health Research Ethics Committee