SURVEY OF DRUGS PRESCRIBED FOR THE TREATMENT OF MALARIA AND COMPLIANCE LEVEL AMONG PREGNANT WOMEN IN TERTIARY HOSPITALS IN ENUGU STATE, NIGERIA

BY

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PG/ M.Sc / 06 / 45577

M.Sc DISSERTATION

DEPARTMENT OF NURSING SCIENCES

UNIVERSITY OF NIGERIA, ENUGU CAMPUS

SUPERVISOR: DR. (MRS.) I. O. EHIEMERE

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APPROVAL

This dissertation; Survey of Drugs prescribed for the treatment of malaria and Compliance level among pregnant women in Tertiary Hospitals, Enugu State, Nigeria, has been approved for the award of Master of Science Degree in Nursing, in the Department of Nursing Sciences, Faculty of Health Science and Technology, University of Nigeria, Enugu Campus.

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DEDICATION

This work is dedicated to my lovely children, Nnenna and Ebube.

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My most profound gratitude goes to the Almighty God who gave me life, strength and all the resources needed to bring this programme to this point. To Him be all the glory, honour and adoration now and forever more in Jesus name!

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ABSTRACT

The purpose of this study was to survey antimalaria drug prescriptions and compliance to treatment among pregnant women attending antenatal clinic in the two tertiary hospitals in Enugu State. The study surveyed 92 doctors from UNTH and ESUTH Parklane, Enugu. 368 pregnant women from both hospitals (156 from ESUT and 212 From UNTH) who consented were surveyed. Purposive sampling was used to select the two tertiary hospitals. Proportionate stratified random sampling was used to select the pregnant women for the study. Convenience sampling was then used to reach the respondents. Questionnaire was used to identify the drugs prescribed by the doctors and their reason for prescription while the other questionnaire was used to elicit compliance level and factors affecting compliance from pregnant mothers. Descriptive statistics using frequency, percentages, means and standard deviations were computed for the demographic variables. Statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 15. The result revealed that the most frequently prescribed antimalaria drug for pregnant women was Artemisinin combined therapy, (76.3%), (73.1%) Artemether Lumefantrine 32.9%, 56.5%, Sulphadoxine Pyrimethamine 31.8% & 42.4% for first and second choice drug, Quinine 10.6% & 3.5% for first and second choice drug, Artesunate single therapy 5,9% & 2.4%. The least prescribed drug were Amodiaquine, Chloroquine, Proguanil and Halofantrine. Their major reason was gestational age of pregnancy 67.1%, severity of signs and symptoms 38.8%, past experience 28.2%. The least reasons were age of the woman, hospital policy, cost of drug, parity of the woman, availability of drug etc. The result also showed that pregnant women comply more to taking the number of prescribed drug not more 4.31, not less 3.91, mean values. The least in the compliance is timing, saving for future use, taking another drug in place of the prescribed one. The results suggest that there is high compliance only in number of dosage prescribed but low compliance in timing, completion and sticking to the particular antimalaria drugs. The major factors affecting compliance were forgetfulness, quick recovery, side effects. Doctors prescribed more of artemisinin combination therapy in both first and second choice drug and their reasons were to consider gestational age, severity of signs and symptoms. Hypothesis was tested using Spearmanôs rho correlation analysis; there was no significant association between the levels of education of women with their level of compliance. There is a relationship between doctorsô years of experience with their reasons for their choice of prescription shown using chi-square cross tabulation. It is therefore recommended that patient centred care will be vital to encourage compliance to new treatment algorithms developed in response to the changing malaria environment in Enugu. Efforts should be made by the Federal Ministry of Health and other stakeholders to organise training and refresher courses on the current and national antimalaria treatment guidelines. Lastly, behaviour change communication (BCC) programmes should be initiated to aid in awareness creation on the consequences of non compliance.

CHAPTER ONE

INTRODUCTION

Background to the Study

Malaria is a major public health problem in developing countries causing considerable morbidity and mortality (Menedez, 2006). It is endemic in 103 countries with 200 million people exposed to the infection (Onwuama, 2007). Today, due to the effect of globalization and increased transportation, it has become a worldwide disease which causes more than 300 million acute illnesses and at least one million deaths annually (Onwuama, 2007).

Malaria is acknowledged to be by far the most important tropical parasitic disease causing great suffering and loss of life. More than two billion people, nearly 40% of the worldôs population are at risk. The high burden of the disease is associated with morbidity and mortality despite the concerted effort of the Federal Government of Nigeria and the local partners to combat the disease. This has led to the development of newer drug regimen to keep the pace with the evolution of resistance acquired by malaria parasites. Malaria impedes human development and thus has a social consequence and is a heavy burden on economic development. Every year the nation loses over ₦132 billion from cost of treatment and absenteeism from work, school and farms (Pharmanews, 2007)

Malaria in pregnancy is an obstetric, social and medical problem requiring multi-dimensional solution. It is estimated that more than 50 million pregnancies occur in malaria endemic areas. 50% of these occur in sub-Saharan Africa (WHO, 2004). The incidence of malaria attacks is about 4.2 times higher during pregnancy than in non-pregnancy states (Ntadom, 2007). Four species of the parasite of the genus plasmodium are responsible for

malaria in man: plasmodium falciparium, plasmodium vivax, plasmodium Ovale and plasmodium malariae. Plasmodium falciparium causes 98% malaria in Africa while 80% of the deaths due to malaria in Africa occur in pregnant women (Fatumbi, 2007).

The reasons for increased malaria in pregnancy have been attributed to impaired immune system during pregnancy. Thus the physiological changes of pregnancy and the pathological changes of malaria have a synergistic effect on the course of each other, thus making life difficult for the pregnant woman, unborn child and even the healthcare provider. Placental parasitization is also common during pregnancy because the placenta is highly vascularized and a favourable site for parasite sequestration (Nwagha, 2007). Some pregnant women do not attend antenatal early in pregnancy and when they start, they avoid anti malaria chemoprophylaxis for fear that the fetus may be affected (Onwuama, 2007). The effect of malaria in pregnancy include high acquired immunity, anaemia, maternal morbidity, asymptomatic infections, less nutrient transmission, low birth weight, and higher infant mortality.

Medication compliance refers to how well a patient follows medical advice about his or her medication therapy. Patients who take their medications correctly as instructed by their health care providers are compliant while those patients who take their medications incorrectly or not at all are non-compliant. Medication compliance is one of the most important parts of medication therapy that is often overlooked. A medication is most effective in treating a patientôs condition if it is taken as prescribed by the health care provider.

Non compliance or failing to take medicine as prescribed is common, costly and deadly. Working with noncompliant patients is not easy, it takes an awful lot of compassion and patience and understanding (Osterberg and Terrence , 2005). It is the main reason medical therapy fails

and disease worsens. It may also result in costly preventable hospital admissions and loss of productivity due to illness. The bottom line is that if one does not take his\ her medications or do not take them as prescribed, they cannot do their job and the condition may not improve and may actually worsen.

There is no foolproof solution to the pervasive problem of medication non compliance, because it has no single cause. Some noncompliant patients have trouble affording medications, while others have difficulty remembering to take them. Many do not understand the medical benefit of the drugs or the nature of the conditions for which they are being prescribed. Some patients have personal beliefs that interfere with compliance. Thus Compliance has been described as a multi-dimensional phenomenon determined by the inter play of five sets of factors which are as follows: patient related factors, and is reflected on the understanding of the fact that a person is responsible for taking his/her medication. Therapy related factor which may be due to actually or perceived unpleasant side effects. Social and economic factor which may be due to low health literacy or medication cost. Condition related factor which may be due to the severity of the symptoms and lastly provider patient health care system factor which may be due to disparity between the health beliefs of the health care provider and those of the consumer/patients. (WHO, 2003)

There can be problems with antimalarial drug use particularly where there is inadequate training of people in the use of particular drugs resulting in emergence of resistance to these drugs. Even if drugs are obtained after consultation, the ways in which they are used depend on the understanding and health seeking behaviour of individual consumer. This means that understanding of the people, their attitude and knowledge of drug, that is, drug taking behaviours are fundamental to attempts to improve drug usage. In averting drug-resistance problem, people

need to be aware of the consequences of their drug use, since most malaria case-management usually ends at home.

Based on this, it is necessary to carry out a survey of drugs prescribed for the treatment of malaria and compliance among pregnant women in tertiary hospitals in Enugu State, Nigeria.

Statement of problem

Malaria in pregnancy accounts for 11% maternal deaths in Nigeria (WHO, 2005). Fatumbi (2007) observed that malaria and pregnancy are mutually aggravating conditions, consequently malaria in pregnancy becomes a serious problem with devastating effects and complications such as anaemia, abortions, low birth weight and stillbirths, among others. Therefore, lack of effectiveness of the drugs prescribed and partial or non compliance in taking these drugs in the treatment of malaria in pregnancy may compound the problems.

Currently in Enugu state in line with its free maternal health services in which one of the cardinal focus is management of malaria in pregnancy, Intermittent Preventive Therapy (IPT) drugs are distributed free to pregnant women from 20 weeks of gestation. This is expected to reduce the incidence of malaria in pregnancy to the lowest level. Yet from the records available in ESUT Teaching Hospital Parklane Enugu from January 2010 ï December 2010, 390 pregnant women were treated for different ailments and 169 had malaria representing 43% of the population that had different ailments in pregnancy (ESUTH 2010 RECORDS). In UNTH, out of 779 pregnant women that were treated for different ailments, 230 had malaria representing 30%of the total population that had problem in pregnancy. (UNTH 2010 RECORDS) What could be the problem? Could it be due to drugs prescribed or the compliance level to the prescribed drugs by pregnant women or both? Seeking answers to these pertinent questions led

to finding out the antimalaria drug of choice from the perspective of prescribers and compliance from the perspective of the consumers.

Purpose of the study

The purpose of the study is to survey antimalaria drug prescriptions and compliance to treatment among pregnant women attending antenatal clinic in the two tertiary hospitals in Enugu state.

The specific objectives are to:

1. identify the drugs prescribed for the treatment of malaria in pregnancy in the hospitals under study.
2. determine the prescribers reasons for choice of drugs in the treatment of malaria in pregnancy.
3. determine the compliance level of the pregnant women to treatment regimen, in the hospitals .
4. identify the factors that influence the pregnant womenôs compliance to the prescribed antimalaria drugs in the hospitals under study.

Research questions

- What are the anti-malaria drugs prescribed for treatment of malaria in pregnancy in the hospitals under study?
- What are the prescriberôs reasons for choice of drugs in the treatment of malaria in pregnancy?
- Do these pregnant women comply to the treatment regimen ?

- What factors influence the pregnant womenôs compliance to antimalaria drugs prescribed for them in the hospitals under study?

Research hypotheses

- There is no significant relationship between the level of education and compliance to taking antimalaria drugs by pregnant women in the hospitals under study.
- There is no significant relationship between the years of experience of prescribers and their reason for choice of antimalaria drugs prescribed for pregnant women in the hospitals under study.

Significance of the study

The findings from the study will give evidence based information which when published can guide the prescribers in their prescriptions of anti-malaria drugs in the treatment of malaria in pregnancy. When the effective drugs for malaria in pregnancy are prescribed, problem of frequent attacks will be reduced and patientôs recovery will increase. This will reduce work load burden on the nurses who provide direct care for these patients, thereby giving the nurses more time and opportunity to adequately care for the patients with more critical conditions in pregnancy.

It will also guide the nurses on the importance of giving enough information about drugs prescribed and how to take them, so as to avoid problems of non compliance. It will also be beneficial to consumers ie pregnant women because if it is identified that they do not comply to prescribed drugs, adequate education will be given to them on the importance of compliance. This will reduce the incidence of malaria attacks. In order words, it will improve behavior

change communication which will aid awareness creation on the consequences of non compliance.

When the relationship between anti-malaria drugs prescribed and consumed is identified, changes can be effected. The result will also help to confirm the effectiveness of those anti-malaria drugs in Nigeria population and thereby promote their use.

The findings will also motivate policy makers in providing both financial and material resources to ensure regular supply of the identified effective drug for the treatment of malaria in pregnancy. This will control or reduce the devastating effects of malaria in pregnancy. The findings of this study will also add to the already existing body of knowledge in this area of study.

Scope of the Study

All the tertiary hospitals which render antenatal services in Enugu State were included in the study. These are ESUT Teaching hospital and University of Nigeria Teaching Hospital (UNTH) Ituku-Ozalla, Enugu. The study is delimited to the identification of antimalaria drugs prescribed for the treatment of malaria in pregnancy, determine the prescribers reasons for choice of antimalaria drug prescription, determine the compliance of pregnant women to the prescribed antimalaria drugs and factors that influence their compliance.

Operational definition of terms

Survey ï Survey in this study is to look at antimalaria drug, choice of prescription by prescribers, pregnant womenôs compliance and factors that influence them in order to form an opinion.

Tertiary hospitals - in this study refer to all Federal and State government owned Teaching Hospitals that render antenatal care services in Enugu State. These are University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu and ESUT Teaching Hospital Parklane, Enugu.

Antimalaria Drugð in this context is the medicine or medicinal used to treat or prevent malaria in pregnancy.

Pregnancy ï the physical condition of a woman carrying an unborn offspring inside her body from fertilization to birth. These women are already booked and receiving antenatal care at the two study centres.

Prescribers - in this context refers to doctors who prescribe antimalaria drugs.

Compliance ï in this context is the correct use of antimalaria in terms of right timing, right dosage, right drug, completing prescribed dose.

Consumer – in this context is the pregnant women who take antimalaria drugs.

CHAPTER TWO

LITERATURE REVIEW

This chapter presents the review of literature relevant to the study from books, journals, Internet materials, abstracts and international conference proceedings under the following headings:

- Conceptual Review
- Theoretical Review
    - Theory of Reasoned Action (TRA)
- Empirical Review
- Summary of literature review

Conceptual review

Malaria disease burden

Malaria is a life threatening parasitic disease transmitted by mosquitoes. It was once thought that the disease came from fetid marshes ï hence the name malaria (bad air). In 1880, scientists discovered the real cause of malaria, a one celled parasite called plasmodium (WHO, 2005). Later, they discovered that the parasite is transmitted from person to person through the bite of a female anopheles mosquito which requires blood to nurture her eggs.

Pregnant women, children under 5 years and HIV infected patients are more vulnerable than others to malaria attacks. Pregnant women are susceptible because there is transient depression of cell mediated immunity that allows fetal and graft retention but interferes with resistance to other infections. Immunodepression is more marked during the first 24 weeks than

the third trimester. The prevalence of parasitaemia is 2times higher and the parasite density is 1.5 times higher during pregnancy than in non-pregnancy state (Ntadom, 2007).

Linday (2000) in Onwuama (2007) opined that pregnant women have increased attractiveness to malaria vectors. It was also attributed to cytoadherence to the chondroitin Sulphate A in the placenta according to (Fried and Duffy, 1996) in (Onwuama, 2007). It could also be associated with the fact that malaria is more atypical in presentation due to hormonal, immunological and haematological changes in pregnancy.

The symptoms and complications of malaria in pregnancy vary according to the intensity of transmission and level of acquired immunity (epidemiological setting). In areas of lower epidemic (unstable transmission, there is little or no immunity. The risk of developing severe malaria is 2 ï 3 times higher in pregnant women than non-pregnant women in the same area. The disease may lead to severe complications and maternal death due to hypoglycaemia, cerebral malaria, severe haemolytic anaemia, disseminated intravascular Coagulopathy, acidosis, renal failure, pulmonary oedema and circulatory collapse, still birth, spontaneous abortions, low birth weights and neonatal deaths due to congenital malaria are also prevalent (Onwuama, 2007).

In areas of high or moderate (stable) transmission, Nigeria and most parts of Africa belong to this epidemiological group. In these areas, acquired immunity is high, but despite the immunity, infection is not prevented but the only thing is that risk of severe illness is reduced.

National policy on malaria treatment

Anti-malaria drugs are designed to prevent or cure malaria. Some anti-malaria agents particularly chloroquine and hydroxychloroquine are also used in the treatment of rheumatoid arthritis and lupus associated arthritis. There are many of these drugs currently in the market but

Quinine is the oldest and most famous anti-malaria drug. The two types of anti-malarial drugs are to be distinguished: Type one, taken for prevention (called prophylactic drugs). This first one is taken as preventive and requires continuous administration to reduce the risk of infection.

The second type, called therapy drugs are taken once the person is already infected. According to FMOH (2005), National malaria and Vector control programme, Training manual for management of malaria in Nigeriaâ there are anti-malaria treatment policy.

These two types of anti-malaria drugs come under essential anti-malaria drugs which by definition are those drugs that meet the needs of appropriate anti-malarial treatment in the vast majority of people. They should therefore be available at all times, in adequate amounts and appropriate dosage forms, and should be affordable to the people. (FMOH, 2008).

The following are the criteria for selecting those drugs for treatment of malaria in pregnancy. These include:

The drug should satisfy the anti-malaria treatment needs of the vast majority of the people. They should be drugs for which there is sufficient evidence of efficacy and safety from local and global controlled clinical studies and from experience in general use. The preferred dosage form should be those which have reasonable shelf life and are able to withstand adverse environmental conditions unavoidable in our distribution chain. They should be registered for wide distribution in the country. They should be drugs for which quality certification can be readily obtained from local institutions. They should be drugs that can either be manufactured locally using locally produced or imported raw materials or can be imported in bulk cheaply. They should be drugs with known side effects but with acceptable risk / benefit ratio considering the severity of the situation in which they are to be used.

These drugs are classified under: Current drugs for uncomplicated malaria, example Artemether Lumefantrine, Amodiaquine Artesunate, Artesunate Mefloquine. Use of the different components of these drugs as monotherapy is not recommended.

- Current drugs for severe malaria, example: quinine, artemether, artesunate.
- Other drugs for multi-resistant malaria, example: amodiaquine, halofantrine, dihydroartemisinin.
- Older drugs for treatment of uncomplicated malaria, example: Sulphadoxine Pyrimethamine, chloroquine,
- Adjunctive drugs

The treatment policy for all these essential anti-malaria drugs, aims at reducing morbidity, halting the progression of uncomplicated disease into severe and potentially fatal disease; and thereby reduce malaria mortality; to minimize the development of anti-malaria drug resistance. And lastly, to reduce the impact of placental malarial infection and maternal malaria associated anaemia through Intermittent Preventive Treatment (IPT). The drug of choice for Intermittent Preventive Treatment (IPT) is Sulphadoxine Pyrimethamine (SP) according to (WHO, 2004).

Common antimalaria drugs prescribed in pregnancy:

Sulphadoxine Pyrimethamine (SP) (Fansidar)

This drug contains 25mg/kg of sulphadoxine and 1.25mg/kg of pyrimethamine. It is schizontal in action. Itôs route is oral and parenteral and it has a peak plasma concentration in 2-6 hrs. It is not concentrated in red cells. The components have high protein binding, sulphadoxine 88% and pyrimethamine 93% and has wide tissue distribution. The half life of sulphadoxine is 9-

10 days and pyrimethamine is 3-4days. It has no antipyretic effect. It is safe in 2nd and 3rd trimesters of pregnancy. It is the drug of choice recommended by WHO for intermittent preventive therapy which has been used and shown to be effective in parts of Africa for several years (WHO, 2004). It is used in uncomplicated malaria.

IPT is an evidence based approach that involves the administration of a full therapeutic course of Sulphadoxine Pyrimethamine (SP) (Fansidar or Maloxin) at least two times following quickening because of its effectiveness in pregnancy (WHO,2004). It is given based on the assumption that every pregnant woman living in an area of high endemicity has malaria parasites in her blood or placenta whether or not she has symptoms of malaria,. The reason is because malaria infections in most endemic regions occur without symptoms. Also there is no evidence to show that prompt treatment of cases will reduce anaemia and low birth weight coupled with wide spread resistance to malaria drugs.

IPT is one of the four key elements of Roll back malaria strategy. Roll back malaria is a global initiative that has set specific deadlines for attainment of explicitly defined milestones one of which is the reduction of malaria burden everywhere by 50% by the year 2010 and beyond (WHO, 2005). This was initiated by the consensus reached by 44 out of the 50 malaria affected countries of Africa in April 2000. Some of those malaria endemic countries have started implementing this intermittent preventive therapy for women in their countries. It is said to have so many advantages such as:

i. Good safety profile in pregnancy

ii. Efficacious in reproductive age women in most areas

iii. Good compliance and high level of acceptance

iv. It ensures that placenta is cleared of parasite at a time of rapid fetal growth

v. Cost effectiveness as it is a directly observed therapy under the supervision of a health provider. It also prevents or reduces the biomass of new malaria infections (WHO, 2005).

The drug has demonstrated efficacy, safety and effectiveness in preventing maternal anaemia, low birth weight following studies conducted in Malawi, Kenya and Angola using small number of randomized controlled trials and prospective studies in 1990. Many countries in sub Saharan Africa have subsequently introduced this IPT ï SP into malaria control programmes. Studies conducted in Tanzania showed significant decrease in malaria in the treated group. This study was done with infants where some were given Sulphadoxine Pyrimethamine and others were given placebo. The drug reduced the expected number of clinical cases of malaria in the first year of life by 59%. However the effect declined significantly with time after the final dose of SP from the blood stream. The clinical case rates among infants in the control group who had not previously contracted clinical malaria were indistinguishable and remained so until the end of the follow up period.

Currently, Sulphadoxine Pyrimethamine is used at therapeutic dose especially in 2nd trimester and once or twice in third trimester, HIV positive women need more doses. The theoretical risk of Sulphadoxine displacing bilirubin from albumin binding site and causing jaundice should not be a deterrent.

Artemisinin

Artemisinins compound which include Arthemeter, artesunate, dihydroartemisinin are derived from Sweet wormwood (artemisaannua), a herb which has been used in traditional Chinese medicine for over 2000 years (Novartis, 2005). All are potent rapid acting schizonticides

with elimination half lives from 40 minutes to several hours. WHO (2003) reported that artemisinin analogues are associated with embryotoxicity over a narrow dose range in the rat and rabbit where embryo lethality, late reporting and morphological abnormalities such as abnormal development of the cardiovascular system, axial skeleton and limbs have been reported. There is also some evidence from animal models that artemisinins given later in pregnancy have adverse effects on foetal body weight and survival. The mechanism of developmental toxicity in animals is unclear.

Mefloquine

Mefloquine hydrochloride is a 4 quinoline methanol derivative with a chemical structure related to that of quinine. In healthy non pregnant human volunteers, peak plasma concentrations of around 250Ng/l are observed 6-24 hrs following a single 250mg oral administration (Roche 2004). It has a mean elimination half life of 2-4wks in healthy adults and is excreted in the bile following hepatic clearance from plasma. It can be detected in low concentrations in human breast milk following a single 250mg dose. In animal toxicity studies, mefloquine was teratogenic in mice and rats at a dose of 100mg/kg / day and rabbits at 80mg /kg day. At high doses (160mg / kg / day) mefloquine was embryo toxic in rabbits (Roche 2004). It has been used alone for prophylaxis in the pre-conception period in all trimester of pregnancy and used for the treatment of chloroquine and multidrug-resistant falciparium malaria in pregnancy and in combination with other anti-malarials, particularly artemisinins. Mefloquine at standard prophylactic doses of 250mg/week appears safe and effective when taken before conception and during all trimesters of pregnancy.(Bounyasong, 2001)

Artemether-lumefantrine eg coartem

The only fixed dose artemisinin combination therapy (ACT) currently available is artemether-lumefantrine (coartem) which is available at subsidized cost to malaria endemic countries following a special pricing agreement established in 2001 between WHO and the manufacturer Novartis. Artemether-lumefantrine is now first line treatment for uncomplicated falciparium malaria in adults and children in 19 countries in sub-saharan Africa and 56 countries worldwide (WHO, 2006).

The benefit of using arthemether- lumefantrine is that it has prompt and effective active and quick resolution of the illness. It reduces progression of illness to complicated malaria thereby reducing the malaria burden. It will also delay development of resistance to either of the components of the drugs. The prophylactic effect conferred by this is not sufficient due to its relatively short half life compared to others.(WHO, 2004).

Proguanil

Proguanil is another drug of choice for prophylaxis treatment of malaria. The pharmacokinetics of proguanil and cycloguanil are significantly altered in pregnant women with malaria compared to healthy volunteer and children with uncomplicated falciparium malaria (Na Bachang, Manyanolo, RuengweerayutKioy, 2006).

It is Schizonticidal and Sporontocidal. It is used for prophylaxis 100mg dly in children and 200mg dly in adults. The elimination half life of proguanil is 12-21hrs. itôs peak plasma concentration is 2-4hrs and it is concentrated in red cells. It is metabolized by a cytochrome P450 iso-enzyme to an active metabolite cycloguanil responsible for antimalarial activity (WHO, 2005). Late pregnancy and use of oral contraceptives impair formation of the active metabolite

probably due to inhibition of the metabolizing isoenzyme as a result of elevated oestrogen levels. The pharmacokinetics of proguanil and cycloguanil are significantly altered in pregnant women with malaria compared to healthy volunteers and children with uncomplicated falciparium malaria (WHO, 2005). Proguanil has been used extensively for malaria chemoprophylaxis in travelers.

Amodiaquine

It is also Schizonticidal and the strength is 200mg (153/kg base). There is no information on its use in pregnancy (WHO, 2005). It is Schizonticidal and the dose is 25mg/kg base over 3days. It is similar to chloroquine but may also cause hepatitis, leucopenia, agranulocytosis on long use.

Chloroquine

Chloroquine is another drug of choice for the treatment of malaria but is older than other drugs and has inadequate efficacy and therefore no longer recommended for prophylaxis in pregnancy. The dosage is 25mg /kg base over 30 days. The use of chloroquine for prophylaxis in pregnancy is no longer effective because some of these monotherapies efficacy levels have been highly undermined by the parasite resistance trend observed (WHO, 2005). Pregnancy involves two lives and sometimes more; and also predispose a pregnant woman to frequent attacks of malaria due to reduced immunity.

It is Schizonticidal in action. It is also gametocidal against immature gametocytes of plasmodium falciparium and mature forms of other species. The dose is 25mg/kg base over 3days. It has rapid absorption. The peak plasma concentration is 1-3 hrs after oral administration. The plasma protein binding is 55% and has wide tissue distribution. Half life of elimination is 6-10days. It is metabolized to desethyl and bisdesethyl chloroquine. Clearance is 51% renal and

45% hepatic. It has both antipyretic and anti-inflammatory effect. It is safe in pregnancy. Plasmodium falciparium resistance to chloroquine has spread rapidly through, South America, South East Asia to East Africa and eventually to all endemic countries of the continent (WHO, 2005) (Dellicour,Terkuile,Stergachis, 2008)

Artemisinin base combination therapies

Amodiaquine and Artesunate or Artesunate and mefloquine. These combination takes advantage of rapid blood Schizonticidal action of the artemisinins and the long duration of action of the partner compound to effect rapid cure with low level of recrudescence. It has been argued that with the limited number of antimalarial drugs available and the growing resistance of parasites to these drugs, better responses to drug treatment and a slowing down of the rate of development of resistance can be achieved by combining anti malarial drugs. (Falade et al, 2005)

Quinine

This is another drug in the treatment of malaria in pregnancy. It is safe in pregnancy. However, it is recommended that use should be judicious. The dosage is 10mg/kg 8 ï 12 hrly for 5 ï 7 days (WHO, 2004)

Mefloquine hydrochloride is a 4-quinidine methanol derivative with a chemical structure related to that of quinine. It has been used alone for prophylaxis in the pre-conception period and in all trimesters of pregnancy and the treatment of chloroquine and multi-drug resistant faciparium malaria in pregnancy. It is used both as monotherapy and in combination with other anti malaria particularly artesimins (Skeketee, Wirina, Slustster, 1996) in(Onwuama, 2007)

Prescribers' reasons for choice of anti-malaria drugs they prescribe during pregnancy

According to National Health System Choice Report (2009), taking malaria treatment depends on the general practitionerôs advice and prescription. The type of anti-malaria drug prescribed is determined by the type of malaria one has and where one caught the malaria since it is known that the parasites that cause malaria vary around the world. Therefore it is expected that the doctor will have up-to-date information about the most effective anti-malaria medication for the clientôs destination if travelling or resident. This implies that anti-malaria prescription in malaria endemic area is different from a non malaria endemic area.

It is also determined by the severity of the symptoms. A doctor may recommend using a combination of different anti-malaria to overcome strains of malaria that have become resistant to single type of medication, whether the pregnant woman took preventive anti-malaria tablets or not. The age of the woman is also considered. This was explained by a baseline survey about malaria in pregnancy carried out in Mubende district, (Mutabingwa, Malle, Osting, 2004). The result showed that some pregnant women interviewed have taken preventive treatment against malaria, while some did not take. For these groups, their prescription of anti-malaria may depend on if they have taken preventive measures or not. Also revealed is that older women with higher parities tend to be complacent and overly confident that they have enough experience with pregnancy and are subsequently not at risk. This also can determine the doctorôs reason for prescription of specific anti-malaria drug during pregnancy.

Reviewed literature indicated a number of factors that pose challenges to effective and prompt case management of malaria during pregnancy by doctors. These challenges may be part of the reasons why some doctors prescribe specific anti-malaria drugs during pregnancy. They include distance to the source of drugs, expectations of low cost of drugs, advice from friends,

steady availability of drugs, rate of successful treatment with the antimalaria drugs. The knowledge of the availability of drugs distributors and drugs for free treatment in pregnancy may also influence their reasons. Some of caretakers are generally poor and may find it very difficult to pay for the cost of some anti-malaria drugs and this affects the doctorôs prescription.

The issue of periodic stock out of recommended drug therapy especially at public health facilities. This often results in delay in treatment. Lack of knowledge of signs and symptoms of severe malaria on the side of consumers of care can be part of the doctorôs reasonôs in prescribing drugs for treatment of malaria. Sometimes, these pregnant women do not come to hospital on time and some of them resort to traditional medicine which causes the parasite to develop resistance. This will have great influence on doctorôs views and judgment.

Revealed in the study by Mutabingwa,Malle and Osting (2004) also is that some consumersô preference of injections to tablets may directly or indirectly influence doctorôs opinion in prescription. Some pregnant women believe that injections are most effective means of treatment for malaria. This will now influence the doctorôs prescription because all other anti-malaria drugs that are in tablet forms are cancelled out to look for injectable ones.

The clinical experience of the doctor may as well form part of his opinion because some of the drugs when tested may not be effective and tolerability may be limited. The gestational age of the women is always considered. Some of the drugs may be harmful to the baby at certain gestational age. Nigeria national Antimalaria Guidelines and Treatment Policy(2005). Example in a study of 65 pregnant women treated in Kilifi Hospital in Kenya, 25mg/kg of chloroquine in divided doses over 3 days, showed that 46% of all the plasmodium falciparium infections were resistant to chloroquine, although chloroquine has been the drug of choice for treatment of

malaria in pregnancy the efficacy of treatment now is unacceptably low because of increased prevalence of chloroquine resistant falciparium strain. Therefore induction of drug resistance will influence their opinion. (National Institute for Medical Research, 2006).

+ Knowledge of the doctor on the side effects of the drugs and whether the drug can impair or boost the development of natural immunity can also influence their opinion. Studies in Tanzania and Kenya by the National Institute for Medical Research (2006) revealed that there was no reduction in birth weight or hemoglobin level of secundigravidae who received chemoprophylaxis during their first pregnancy compared with controls. This was a result of acquisition of antibodies during primigravidae period that interfered with the binding of plasmodium falciparium to chondroitin sulfate in the placenta following chemoprophylaxis period. It is also determined by the patientôs past experience or compliant about the drug prescribed etc.

In order words, malaria treatment given on a regular basis to pregnant women must be extremely safe. Their reason may also depend on whether the anti-malaria is for prevention or for treatment proper. Some of the anti malaria drug can be for both prevention and for treatment proper. This may influence the doctorôs opinion in prescribing anti-malaria drugs during pregnancy.

The prescriberôs reason may as well be determined by the type of medication that the pregnant woman is currently taking and whether the pregnant woman has any other underlying diseases e.g. HIV patients will receive higher dose of IPT during pregnancy than non HIV patients. In a HBM baseline (2001) and follow up survey (2003) reveal statistically significant increase in the use of appropriate anti-malaria drugs in all the HBM districts, while the changes in the non HBM

districts were low (2%) and insignificant. The HBM (2003) follow-up reports that advice was commonly given on the dose and length of time to give drugs. The implication is that doctors influence and opinion may largely depend on the hospital policy and guideline (Betega, 2004).

Some funder agencies and non governmental agencies may provide some anti-malaria drugs in some areas and that can determine greatly the prescription given by doctors who attend to the pregnant women in such areas. Example the government of Enugu State has been providing some intermittent preventive therapy drugs for pregnant mothers.

Compliance to Drug Taken and its Importance

Compliance means an act or process of complying with official requirements and recommendations. In all aspects of life we find rules telling us what is right and wrong. Compliance with medical recommendations, especially with drug therapy has been recognised to represent a complex challenge since its first mentioning by Hipprocrates about 2400yrs ago. Non compliance or failing to take medicine as prescribed is common, costly, and deadly.(Osterberg and Terence, 2005).75% of patients sometimes fail to take their prescription as directed , 33% of prescriptions are never filled, 50% to 60% of the time ,patients with chronic conditions do not take their medicines, 33% to 69% of medication related hospitalizations are linked to drug non compliance. 125,000 deaths each year are linked to drug non compliance and $290 billion is spent on care needed because of medication non compliance(NEHI ,2009)

In general, the term compliance describes the extent to which a personôs behaviour coincides with medical advice. With respect to drug therapy, compliance is defined as the degree of correspondence of the actual dosing history with the prescribed drug regimen. The measurement of compliance to treatment depends on the dosage, the clinical situation and the therapeutic goal of pharmaco therapy and the drugs different duration of action.

Patient who take their medications correctly as instructed by their health care provider are compliant while those patients who take their medications incorrectly or not at all are non compliant. This compliance is always overlooked but it is very important. Once the medication is prescribed the health care provider may forget to ask how the patient is taking the medication and the patient may not talk about how he/she is feeling.

Moreover, variable compliance has a significant impact on the outcome of drug treatment in almost every area of medicine that has been looked at. Thus, poor compliance is a significantð if not the single most importantð contributing factor in transplant rejection. Another well-documented example illustrating the ubiquitous significance of the compliance issue in drug therapy of patients with HIV infection. While antiretroviral combination therapy is known to be effective in slowing disease progression, the long-term benefit of these therapies can only be sustained if resistant strains of HIV do not emerge. Among the factors that can result in the emergence of resistance, variable compliance has been shown to play a key role. (Caspard, Chan, Walker, 2005).

Studies show that not many patients practice medications compliance. It is estimated that most patients do not take their medications, 50% of the time as prescribed by their health care provider. Not being compliant with medication therapy can have consequences or effects.

This depends on the medical condition being treated. Some medications are used to treat symptoms and some are used to prevent more serious medical events. Non compliance is the main reason why medical therapy fails and disease worsens. It may also result in costly preventable hospital admissions and loss of productivity due to not taking the medications at all or not taking them as prescribed, they cannot do their job and patients condition may not improve and may actually worsen. The non compliance can be inform of stopping before

completion, skipping part of the dosage, delaying in taking the medication to save it for future use (eg in case the condition it is used to treat reoccurs) when the patient feels better it may be to give part of the patients dosage to another to help her in her own sickness.

The ways to be more compliant with medication therapy include

- Having the correct information about the medication eg generic and brands names of the medication why you are taking the medication, how it is supposed to be taken, how often and time of the day, the duration of the treatment, the possible side effects and what to do if it occurs.
- Incorporate taking medications into daily routine eg one can take certain medication after brushing the teeth every day.
- If one is experiencing bothersome side effects, he or she can notify the prescriber immediately so that he/she can evaluate the situation to see if there are other options or things that can be done to minimize those side effects.

In summary, being compliant does not mean just taking the medication for medication to do the job properly, one needs to take the right dose, right time, and for the proper length of therapy and days. Osterberg and Terrence(2005) in his studies opined that forgetfulness may contribute 30%,other priorities(16%),decision to omit doses(11%), lack of information(9%)and emotional factors(7%), while 27% of the respondents did not provide any reason for poor compliance to their regimen. Physicians contribute to patients non compliance by prescribing complex regimen , failing to explain the benefits and side effects of a medication adequately, not considering the cost of the medication and having poor therapeutic relationships with their patients .

Factors that influence compliance

Compliance is a multidimensional phenomenon determined by the interplay of five sets of factors, termed "dimensions" by the World Health Organization.

- **Social/economic factors**
- **Provider-patient/health care system factors**
- **Condition-related factors**
- **Therapy-related factors**
- **Patient-related factors**

Social and economic dimension

These are factors like unstable living conditions, homelessness, difficulty or inability in accessing pharmacy, medication cost, cultural and lay beliefs about illness and treatment, limited English language proficiency, Low health literacy, Lack of family or social support network, Unstable living conditions; homelessness, Burdensome schedule, Limited access to health care facilities, Lack of health care insurance, etc.

Health care system dimension

Under these dimensions, we have the following collection of factors:

Provider-patient relationship, Provider communication skills (contributing to lack of patient knowledge or understanding of the treatment regimen), Disparity between the health beliefs of the health care provider and those of the patient, Lack of positive reinforcement from the

health care provider, Weak capacity of the system to educate patients and provide follow-up, Lack of knowledge on compliance and of effective interventions for improving it, Patient information materials written at too high literacy level, Restricted formularies; changing medications covered on formularies, High drug costs, Poor access or missed appointments, Long wait times, Lack of continuity of care are as well included in this dimensions.

Condition-related dimension

The factors include the following: chronic conditions, Lack of symptoms, Severity of symptoms, Depression, Psychotic disorders, Mental retardation/developmental disability can affect compliance or non compliance.

Therapy related dimension

The factors under therapy related dimension include the following: complexity of medication regimen (number of daily doses; number of concurrent medications), Treatment requires mastery of certain techniques (injections, inhalers), Duration of therapy, Frequent changes in medication regimen, Lack of immediate benefit of therapy, Medications with social stigma attached to use, Actual or perceived unpleasant side effects, Treatment interferes with lifestyle or requires significant behavioral changes. All these affect compliance or non compliance

Patient related dimension

These include the following sub factors:

Physical factors

Visual impairment, Hearing impairment, Cognitive impairment, Impaired mobility or dexterity, Swallowing problems.

Psychological/Behavioral Factors

Knowledge about disease, Perceived risk/susceptibility to disease, Understanding reason for medication is needed, Expectations or attitudes toward treatment, Perceived benefit of treatment, Confidence in ability to follow treatment regimen, Motivation, Fear of possible adverse effects, Fear of dependence, Feeling stigmatized by the disease, Frustration with health care providers, Psychosocial stress, anxiety, anger, alcohol or substance abuse.

Patient-related factors are just one determinant of compliance behavior (World Health Organization, 2003). The common belief that a person is solely responsible for taking their medications often reflects a misunderstanding of how other factors affect people's medication-taking behavior and their capacity to comply with treatment regimens.

It is clear that compliance is a complex behavioral process, strongly influenced by the environments in which people live, health care providers practice, and health care systems delivering care. Compliance is related to people's knowledge and beliefs about their illness, motivation to manage it, confidence in their ability to engage in illness-management behaviors, and expectations regarding the outcome of treatment and the consequences of poor compliance

(World Health Organization, 2003).

It is important to recognize that a person may have multiple risk factors for medication non compliance. Also, factors that can influence a person's medication-taking behavior may change over time. Therefore, it is important to continually assess a person's compliance throughout the course of therapy. In addition, because there is usually no single reason for medication non-compliance, there can be no single best approach to improving compliance.

Many of the interventions used to improve compliance focus on providing education to increase knowledge; simplifying the medication regimen (fewer drugs or fewer doses); or making it easier to remember. However, simplifying a dosage regimen is unlikely to affect a person who does not believe that taking medications is important or that the therapy will improve his or her health, and the available evidence shows that knowledge alone is not enough for creating or maintaining good compliance habits (World Health Organization, 2003).

Based on published studies, it is evident that single interventions are less successful than multiple, long-term interventions in affecting compliance. Studies have shown that the most successful interventions have some follow-up component and address the underlying reason(s) for non compliance .

The ideal time to initiate compliance interventions is when therapy first begins. Interventions that are initiated early in the course of therapy can support older persons through a period when they are most likely to have questions or to experience side effects from therapy.

Theoretical Review

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) is a model that finds its origin in the field of social psychology. This model developed by Fishbein and Ajzein (1975) defines the links between beliefs, attitudes, norms, intentions, and behaviours of individuals. According to this model, a personôs behaviour is determined by its behavioural intention to perform it. This intention is in itself determined by the personôs attitudes and his subjective norms towards the behavior. Fishbein and Ajzein (1975) defined the subjective norms as ñthe personôs perception that most people who are important to him think he should or should not perform the behavior in questionò.

According to TRA, the attitude of a person towards a behaviour is determined by his beliefs on the consequences of this behaviour, multiplied by his evaluation of these consequences.

Behavioural Intention = Attitude x *Subjective norms.*

Beliefs are defined by the personôs subjective probability that performing a particular behaviour will produce specific results. This model therefore suggests that external stimuli influence attitudes by modifying the structure of the personôs beliefs.

Behavioural intention is also determined by the subjective norms that are themselves determined by the normative beliefs of an individual and by his motivation to comply to the norms.

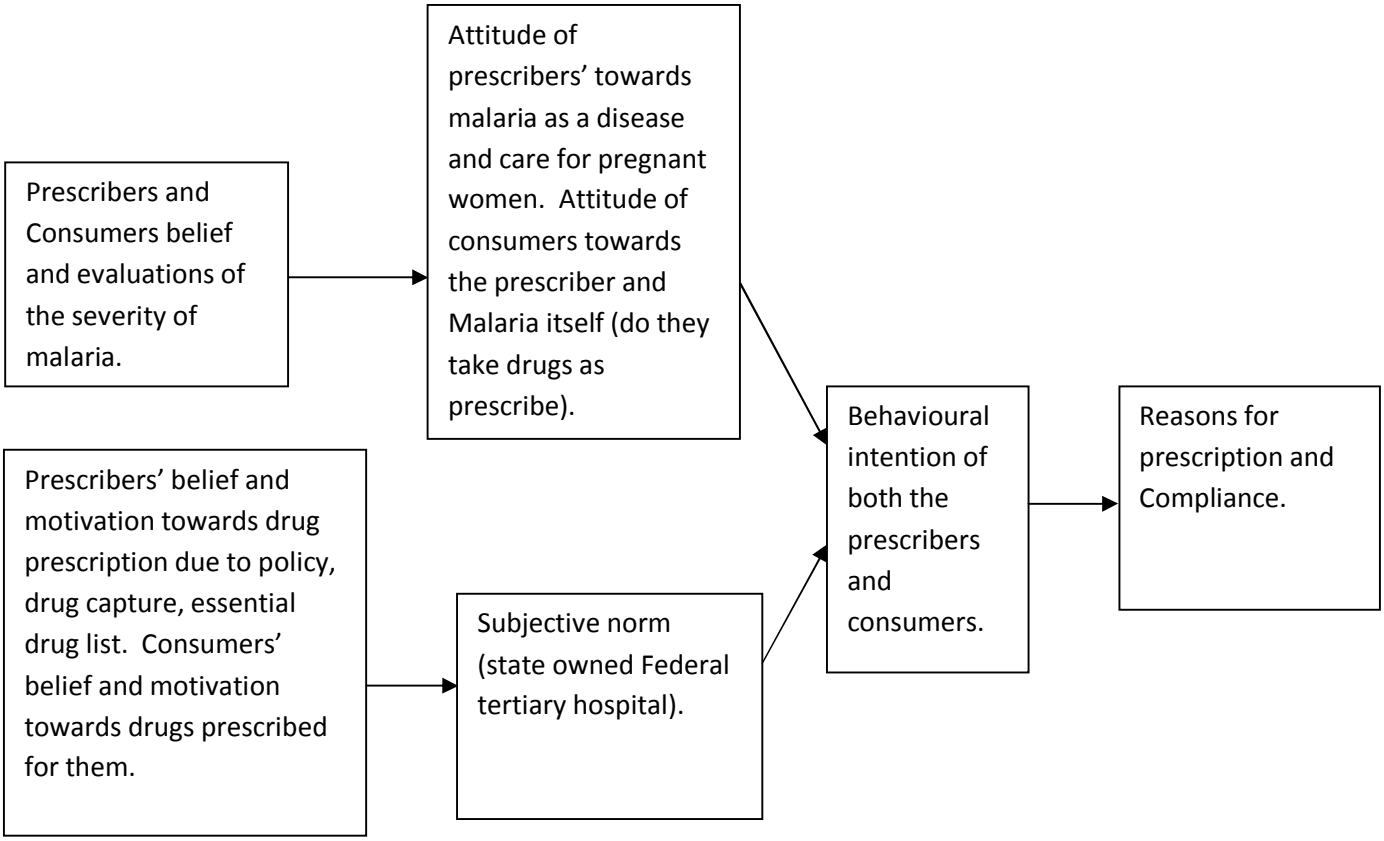

Fig. 1: Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975)

Application of the theoretical framework to the study

The reasons and opinions of Prescribers on their choice of drugs prescriptions in the treatment of malaria in pregnancy may either be influenced by their knowledge of effectiveness of the drug in current use for malaria in pregnancy treatment; or their motivation through hospital policy in purchase of drugs from pharmaceutical companies despite knowing the current drugs in use for the treatment of such conditions. The symptoms presented by the patients could also influence their choice of prescription. How regular Prescribers are in attending seminars, workshops, symposia and conducting research work could also influence their choice of prescription. Their interest in evidence based medical information, their years of experience could also influence their choice of drugs and opinions in prescriptions.

In other words, this model will guide the doctorsô behaviour in the prescription of drugs for the treatment of malaria in pregnancy as their behavior is an outcome of both their expert /

professional norms and motivation to comply, combined with their personal belief and evaluations made over malaria in pregnancy. The pregnant womenôs attitudes toward taking of antimalria drug is determined by their belief that compliance is very important and will prevent consequences of non compliance and bad effects of malaria in pregnancy.

If they comply with treatment, they will take it at the right time, right drug

and right dosage. This therefore means that factors like forgetfulness, saving some drugs for future use, skipping the drugs, stopping the drugs before completion will not affect her if she has behavioural intention to comply. It will cause her attitude to change to always taking the doctorsô prescribed drugs for malaria as required despite all the hindering factors that affect correct intake of the antimalaria drugs prescribed for her. Thus making her compliant.

Empirical studies

In a study carried out by Sangare, Weiss, Brenttinger, et al (2010), with a sample of 500 pregnant women in Uganda who were interviewed on the antimalaria used by them. The result showed that 334 out of the 500 participants reported on, showed that 67% of the participants reported malaria during early pregnancy. The use of currently recommended treatment in the first trimester was uncommon (5.6%) and the use of sulphadoxine pyrimethamine/ artemether ï lumefantrine in the 1st trimester episode of malaria were 70%. The use of recommended anti malaria drug according to the guidelines was only 30% of all second and third trimester episodes. Conclusion drawn was that overuse of antimalaria drugs especially one that are no longer recommended undermines malaria control efforts by fueling the spread of drug resistance and delaying appropriate treatment of non malaria febrile illness. Self reported malaria was

extremely common in the population and compliance to treatment guideline for the management of malaria in pregnancy was poor.

Study carried out by Wobo, Akinboroyo, Anosike and Adewale (2006) on the knowledge and practice of malaria management measures among pregnant women. The survey enrolled 1400 pregnant women in semi-urban communities of Akomoje, Iberekodo, Osiele and Sabopapamaru of Abeokuta, Nigeria. 68% of them utilize herbs for treatment of symptoms associated with malaria due to its effectiveness and suitability and not due to financial conditions or lack of access to health facility. 32% of them believed on the use of anti malaria drugs. Sulphadoxine / Pyrimethamine was the most preferred drug among women in Osiele (68%) and Iberekodo (48%). Chloroquine was the most preferred drug in Akomoje (44%). While Daraprim was preferred in Sabopapamaru (52%).

It was observed that 54% of respondents used herbal drugs daily, which they said was to forestall attack of malaria and keep the fetus in good condition. The utilization of anti-malaria drugs during the 2^{nd} and 3^{rd} trimesters had the second highest value of 19%. This was an indication that some respondents combine both the herbal regimen and sulphadoxine pyrimethamine.

Oxford Tropical Medicine research unit in 2009 carried out a study on population pharmacokinetics of Lumefantrine in pregnant women treated with Artemether-Lumefantrine for uncomplicated plasmodium falciparium malaria. The sample size was 103 pregnant women with uncomplicated multidrug resistant plasmodium falciparium on the north western border of Thailand. In this prospective study, women were treated in the second and third trimesters of pregnancy with artemeter-lumefantrine (80 / 480 mg) twice daily for 3 days.). Following two

expert consultations in 2002, WHO recommended that artemisinins should not be used in the first trimester except in life threatening situations where other antimalarias were not suitable and that it should be used with caution in the second and third trimesters and that further research be conducted to establish the pharmacokinetics during pregnancy.(Tarnning, McGready, Lindegardh, Niklas et al, 2009).

In a prospective cohort study of 236 pregnant travelers who took a variety of prophylactic regimens, the risk of adverse maternal and fetal outcomes among those exposed to mefloquine in the first trimester was not greater than that observed in women who took other antimalaria or background population estimation.

Some authors have suggested that SP should be combined with artemisinins or with cheaper and more readily available alternatives such as chloroquine and amodiaquine to maintain the effectiveness SP-IPT or other drug (White, 2005). Several antimalarials notably chloroquine, proguanil, mefloquine and proguanilatovaquone have been evaluated for malaria chemoprophylaxis in pregnancy but few clinical trials have attempted to evaluate alternatives to SP-IPT regimens. A phase III clinical trial among 900 pregnant women in Ghana conducted with SP was effective in treating uncomplicated falciparium malaria but concerns about safety and tolerability of amodiaquine in pregnancy and widespread resistance particularly in East Africa are likely to hinder development of amodiaquine containing combinations IPT (EANMAT, 2003).

In a study by Omole and Onademuren (2010) on survey of Antimalaria drug use practices among urban Dwellers in Abeokuta, Nigeria a sample size of 350 respondents were drawn ,questionnaire was the instrument for data collection.Data retrieved were analysed using SPSS

version 10 window. Result revealed that Sulphadoxine/Pyrimethamine (SP) combination was frequently purchased by 115 (35.86%) respondents. This was followed by Artesunate which was bought by 90 (25.71%) patients, while 55 (15.71%) patients frequently purchased Chloroquine as anti malarias. Greater number of the studied population 129 (36.86%) preferred choice of anti malaria because they could afford the prize. This was followed by 60 (17.14%) patients who preferred anti malarias when recommended.56 (16.9%), because it was once daily dosage, 42 (12.0%) because of the past experience of anti malaria usage, 40 (11.43%) because they felt better with it and 23 (6.57%) because fewer tablets are required at once. The result of this study reveal that Sulphadoxine / Pyrimethamine (SP) combinations such as Amalar, Fansider, Maloxine, Ritadar are the frequently purchased antimalaria drugs followed by Chloroquine (CQ) while Artesunate monotherapy is the most frequently purchased of the arthemisinin derivative. This monotherapy is not likely to improve cure rates of uncomplicated malaria or reduce the speed at which resistance could develop.

The survey also revealed that despite the change in the National guidelines for treatment of malaria in Nigeria, Sulphadoxine / Pyrimethamine and Chloroquine were the most frequently purchased anti malarial drugs in this community. This could be due to the cost implication of these newer antimalarial compared to the older ones. But, it is alarming that resistance has been reported to these antimalarials in the six geo-politcal zones in Nigeria (FGN,2005). They should not be used as first line treatment of uncomplicated malaria. It is now widely used in combination with other class of antimalarials to bring about a synergistic effect on the malaria parasites. Most malaria treatments are based on ñpresumptiveò treatment with indication of treating uncomplicated malaria with these groups of drugs. Sulphadoxine / Pyrimethamine (SP)

chemoprophylaxis is no longer in use or recommended for treatment of malaria as monotherapy because of emergence of antimalarial drug resistance and its adverse effect.

This drug resistance to older antimalarial drugs used as monotherapy is known to be the key factor contributing to increasing rate of morbidity and mortality as a result of malaria episode. In response to widespread resistance to older antimalarial drugs, WHO has recommended Artemisinin Combination Therapy (ACTs) as first line therapy for the treatment of uncomplicated malaria, but it is alarming that the use of this drug is limited among the respondents as only (12.29%) of respondents indicated that they frequently purchased this combination. Artemisinin derivatives used as monotherapy is no longer encouraged by WHO in order to preserve the efficacy of artemisinin as an essential component of life-saving ACTs, has called for a ban on the use of oral artemisinin monotherapies at various levels including manufacturers, international drug suppliers, National health authorities and funding agencies involved in the funding of essential antimalarial medicine (WHO, 2005; FGN report, 2004)

The low level of awareness on the use of ACTs among the studied communities could be as a result of cost implications and low level of literacy of respondents. ACTs cost up to twenty-times as much as older medications and remains unaffordable for the majority in many malaria ï endemic regions (Oreagba et al, 2005). Reasons for the preferred choice of antimalarial among the respondents include once daily dosage, fewer tablets at once, feel much better with the drug of choice, past experience with the drug while a larger percentage indicated affordable cost of the antimalaria.

It has been reported that people with malaria episode are often the poor and low socio-economic class who cannot afford the best treatment for malaria (Oreagba et al, 2005). They often do not have the financial means to purchase such highly effective antimalaria drugs.

Bege, in (2009) carried out a study on antimalaria drug prescriptions and doctorsô perception on malaria in hospitals. The pilot study was carried out in the metropolitan town of Kaduna. Data were collected on type of Antimalaria prescribed to patients. Questionnaires were issued out to the doctors which highlighted their perception about malaria, knowledge of National antimalaria Drug Policy and daily practices in hospitals. A total of 256 records were examined out of which 51% (n = 131)were from Yusuf Danstoho Memorial Hospital (YDMH) and 49% (n = 125) were from Gwamna wan General Hospital (GAGH). Combinations of Artemisinin combination Therapies (ACTs) were the most common Antimalaria prescription (77%) followed by the traditional chloroquine (15%), Sulphadoxine Pyrimethamine (5.5%) and Artemisinin monotherapy(2.0%).

The median year of practice as doctor was four years (Range 1 ï 30yrs). The hospitals type showed that 53% work in public hospitals while 47% were in private hospitals. There was an association between those that have seen or read a copy of National Antimalaria Drug Policy and knowledge of the main goal of NADP ($p<0.0001$). The association between knowledge of the recommended drug for treatment and preferred first line drug showed a gradient of ACTôs use among those that have a good knowledge of the recommended drug.

In addition, in a study by Mbonye, Bygbjerg and Magnussen(2007) on Intermittent Preventive treatment for malaria in pregnancy: a new delivery system and its effect on maternal and pregnancy outcomes in Uganda. The objective was to assess whether traditional birth

attendants, drug shop vendors, community reproductive health workers or adolescent peer mobilizers could administer intermittent preventive treatment (IPT_p) for malaria in pregnancy with sulfadoxine pyrimethamine to pregnant women. The method used was a non randomized community trial implemented in 21 community clusters (intervention) and four clusters where health units provided routine IPT_p (control). The primary outcome measures were assessed and adherence to $IPT_{p,}$ number of malaria episodes, prevalence of anaemia and birth weight, number of live births, abortions, still birth and maternal and child death were secondary end points.

Findings showed 1404 (67.5%) of 2081 respondents with the new delivery system received 2 doses of sulfadoxine - pyrimethamine versus 281 (39.9%) of 704 with health unit ($P<0.0001$). The prevalence of malaria episodes decreased from 906(49.5%) of 1830 to 160(17.6%) of 909($P<0.001$) with the new delivery system and from 161 (39.1%) of 412 to 13 (13.1%) of 99 ($P<0.001$) with health units. Anaemia was significantly less prevalent in both arms. There was a lower proportion of low birth 6.0% with the new delivery system versus 8.3% with health units ($P<0.03$). few abortions and still births were recorded in either arm. Fewer children and women who accessed $IPT_{p,}$ with health units died than in the intervention group. It was concluded that the new approaches were associated with early access and increased adherence to $IPT_{p.}$ Health units were, however more effective in reducing parasitaemia and malaria episodes.

In a study by Chedi , Abdu-aguye and Kwanashie (2010) on Anti malarial drug utilization in public health facilities in Kano, Nigeria; result showed that a total of 1398 encounter, comprising 1050 and 348 pre and post interventions respectively were investigated. Out of 7 highest number of prescribed drugs found in a single encounter and 8 in the control and study

groups respectively, chloroquine was the most prevalent ant-malaria drug prescribed. It was administed in 47% of malaria encounter pre-intervention and 50.2% post intervention while artemisinin derivatives accounted for 7.1% pre-intervention and 21.0% post intervention malaria encounters. Halofantrine was the least prescribed antimalaria drug in all the groups.

According to the WHO (2010) guidelines for treatment of malaria, it recommended that Artemisin-based combination therapies (ACTs) are the recommended treatments for uncomplicated plasmodium faciparum malaria. It emphasized that Artemisinin and its derivatives should not be used as monotherapy. In treatment for uncomplicated plasmodium falciparium in pregnancy, quinine plus clindamycin for 7 days is indicated. If this treatment fails, an Artemisinin Combination Therapy is indicated if this is the only treatment immediately available, or if treatment with 7 day quinine plus clindamycin fails or uncertainty of compliance with a 7 day treatment. ACT should be used in preference to sulfadoxine pyrimethamine (SP) plus Amodiaquine (AQ) for the treatment of uncomplicated plasmodium falciparium malaria. It is strongly recommended for moderate quality evidence.

According to Onyango Ayodo, Watsierah, Were, et al (2012) in a study on the factors asscociated with non adherence to Artermisinin based Combination therapy (ACT) to malaria in a rural population from holoendemic region of Western Kenya, their sample size was 297 household. Questionnaire was the instrument for data collection for household member who has had malaria episode within that period. The results revealed that ACT prescription is low among individuals 13 years and less than 13 years respectively. Stratification by demographic and socio economic characteristics in relation to ACT adherence revealed that age, education level, ability to read and household monthly income significantly affected the level of ACT adherence. Consistently, logistic regression model demonstrated that low age, higher education level, ability

to read and higher income were associated with ACT adherence. In addition, about 52.9% of the respondents reported that ACT was not always available at the source and that drug availability and distance to drug source significantly affected accessibility. It was demonstrated that more than half of those who got ACT prescription do not take recommended dose and that accessibility is of concern. The findings of this study suggest a potential need to improve accessibility and also initiate programmatic interventions to encourage patient-centred care.

In another study by Okoro and Nwambu (2012) on the Evaluation of Physicians prescribing patterns of antimalaria during pregnancy in Maiduguri, 311 medical case files were used for study. Results showed that the age range of 14 ï 42 years with mean age of 24.93 ± 5.434. It was also revealed that sulphadoxine pyrimethamine was the most frequent antimalarrial drug prescribed 75.9%. This was due to the higher population of study participant in the second and third trimesters receiving sulphadoxine pyrimethamine as Intermittent Preventive therapy (ITP). Chloroquine (0.3%) was the least prescribed drug due to its widely documented resistance.

The prescription pattern was evaluated based on the trimester of pregnancy. The antimalaria drug prescribed was significantly associated with the trimester of pregnancy. It was observed that physicians were very cautious in prescribing for these pregnant women during the first and third trimesters especially the first trimester. Drugs are usually administered in -the first trimester if the benefit outweighs the risk of withholding drugs. This is because the first trimester is when the foetus vital organs such as the kidney, bones, lungs, brain, and circulatory system are formed. Certain drugs when administered can lead to teratogemic effects. It also revealed that Artemisinin derivatives alone / combinations were the most prescribed antimalaria drugs for treatment. It was concluded that the physicians adhere to WHO guidelines and the Nigerian Federal Ministry of Health policy on prescribing antimalaria drugs.

Mazigo, Obasy, Mauka, et al (2010) in their study on the knowledge, attitude and practices about malaria and its control in Rural North West Tanzania, it was revealed that malaria cases and deaths have been increasing in the country mainly due to injudicious use of antimalaria drugs. In that study, it was reported that the common antimalaria drug used by respondents were Arthemether Lumefantrine (21.2%) Sulphadoxine pyrimethamine (19.3%), metakelfin (16.9%), amopdiaquine (15.5%), paracetamol (13.3%), quinine (4.4%) and chloroquine (1,7%). There was also significant association between education level and selection of the type of antimalaria drug. 56.4% of the respondents also said in their opinion that Arthemeter Lumefantrine was good for treating malaria, 9.5% reported that the full dose had too many tablets, 10.4% of the respondents reported that the drug had severe side effects. In line with the report, Arthemeter Lumefantrine is the first line treatment policy in Tanzania. The ministry of Health has decided that malaria patients should be treated with Arthemeter Lumefantrine. This will increase the effectiveness of malaria treatment and also help slow down the development of resistance.

In a study by Harrison, Olufunlayo and Agomo (2012) on the utilization of the current national antimalaria treatment guidelines among doctors in army hospitals in Lagos Nigeria, a descriptive study using a structured questionnaire was administered to 123 practicing doctors. 51% of them utilized the current national antimalaria treatment guidelines. Significant of the doctors used Artemisinin based combination therapy as first line treatment of uncomplicated malaria in adults. Chloroquine was the commonest drug for first line treatment of uncomplicated, malaria in pregnancy.

In a study by Akinleye, Falade and Ajahi (2009) on the knowledge and utilization of Intermittent Preventive Treatment for malaria among pregnant women attending antenatal clinics

in primary health care centres in rural South West, Nigeria precisely Ekiti state. A cross sectional study was carried out. The sample size of 209 pregnant women was selected. The instrument used was interviewer administered questionnaire. 109 of the 209 respondents have heard about IPT_P; almost half 43.9% of those who had used IPT_P during index pregnancy expressed concern about possible adverse effect of SP on their pregnancies. Periodic shortages of SP in the clinic were also reported. It was therefore concluded that IPT_P use among pregnant women was very low and there was poor adherence to the Directly Observed Therapy (DOT) scheme. The compliance rate was 77.4%. There was no significant relationship between gestational age, and age of respondent to IPT_P use ($P>0.05$). It also revealed that the reason for poor adherence could be patient or health worker related. Low compliance with the use of SP was partly attributed to health care providers and users fear of side effects of SP and their inadequate knowledge of the correct dose. They could be harmful to the pregnant women and the unborn children.

Summary of literature review

From the literature, the concepts of malaria in pregnancy were discussed, effects of malaria in pregnancy in areas of stable transmission, intermittent preventive treatment and roll back malaria concept and common anti-malaria drugs used in pregnancy were also discussed. The compliance of pregnant women and its importance was also looked at. The factors affecting compliance were considered. The theory of reasoned action propounded by Fishbein & Ajzen(1975) was used to discuss the reasons for the prescribers choice in prescribing anti-malaria drugs to pregnant women, compliance and factors affecting compliance to antimalaria drug consumption.

The aspect which deals with the doctorôs reason is attitude and subjective norms which leads to their actions in making their prescription to the patient which may either be influenced by education, symptoms and medical information. These factors that influence them include the knowledge of the prescribers on current drugs in treatment of such conditions, past experience

,hospital policy in purchase of anti-malaria drugs, the symptoms presented by patients and how regular they are in updating their knowledge through seminars, workshops and symposia. Furthermore pregnant womenôs behavioural intentions towards taking antimalaria drugs prescribed to them is influenced by the attitudes and belief that compliance is very important and factors that affect compliance is a subjective norm

Lastly the doctorôs interest in following evidence based medical information could also motivate their choice of anti-malaria drugs to prescribe for the treatment of pregnant mothers. Some empirical studies relevant to the study were discussed as well. From the literature search, it was discovered that a lot of researches has been carried out on malaria prevention and treatment but none has been carried out in this direction in different parts of the world. Few studies done either identified the antimalaria drugs for treatment in pregnancy or World Health Organization recommendation about intermittent preventive therapy. No study was carried out in this topic in Nigeria how much more Enugu State. Most of the studies concentrated on the patterns of treatment by pregnant women and their health seeking behaviours, knowledge and practice of anti-malaria treatment etc. None considered surveying anti-malaria drugs prescription and compliance among pregnant women in tertiary hospitals in Enugu State. This has created a gap which this research work is expected to fill.

CHAPTER THREE

RESEARCH METHODS

This chapter presents the research design, the study area, the population of study, sample and sampling procedure, instrument for data collection, ethical consideration, procedure for data collection and method of data analysis.

Research design

A cross sectional descriptive design was used to achieve the set objectives because the study intends to describe and document aspects of a situation or phenomenon as they occur at the time of study. This was successfully used by Omole and Onademuren (2010) in a study on ñSurvey of antimalaria use practices among Urban Dwellers in Abeokuta, Nigeriaò. Hence it is considered appropriate for use in this study to survey drugs prescribed for treatment of malaria and compliance by pregnant women in tertiary hospitals in Enugu state.

Area of study

Enugu is the capital of the old Eastern Region. It is resting on the hilly plains of the geographical zone (hence the name of óEnu-Ugwuô meaning hill top). This state has four tertiary health institutions viz: National Orthopaedics Hospital, Enugu, Neuro-Psychiatric hospital, Enugu, University of Nigeria Teaching hospital Ituku-Ozalla and ESUT Teaching hospital, Parklane, Enugu. Out of the four, only two provide maternal and child health care services hence the use of ESUT Teaching Hospital Parklane, Enugu and University of Nigeria Teaching hospital Ituku Ozalla. ESUT Teaching Hospital is located in Government Residential Area of Enugu North Local Government Area.

This hospital is under the State Ministry of Health; it is behind Polo Park; it is bounded in the East by Golf Course Estate which is part of GRA; and at the South by Enugu State College of Education Technical. The Antenatal clinic of ESUT Teaching Hospital is an outpatient clinic that attends to average of 24 pregnant women per day. They work from Monday to Friday except that Thursday is specifically for booking.

University of Nigeria Teaching Hospital is located at Ituku-Ozalla along Enugu Port Harcourt express road. It is between Nkanu West Local Government Area, and Awgu Local Government Area. It is bounded in the North by Ozalla town, in the South by Ituku town which is part of Awgu Local Government Area, in the West by Enugu Agu town of Ozalla and Amigbo Ozalla. They have antenatal clinic that work from Monday to Friday and attend to average of 20 pregnant women per day. UNTH has 41 main departments and 3 outposts, in Obukpa in Nsukka which is in Enugu state, Abagana in Anambra State and Isuochi in Abia State. The hospital has a small market and church within the area. These geographical areas are characterized by swampy, bushy environment, making them malaria endemic. They are mixed community with people from all works of life and diverse ethnicity with common denominator of poverty and ignorance.

These two institutions provide not only highly specialized care but also planning and management skills and training for health staff majoring in different areas of specialty. These tertiary levels of care serve as referral to both the primary and secondary levels of care. However, due to the fact that the majority of the population are ignorant and malaria in pregnancy is always severe, many pregnant women jump primary and secondary levels of care in district health centres and hospitals to teaching hospitals where they expect to get the best and expert care, thus the appropriateness of using these tertiary hospitals. These prescribers are

supposed to be experts or expert in-making It is expected that they would offer current best evidence based practice in malaria treatment, more so for the pregnant women.

Population of the study

The population of study were all doctors who were working in maternity sections of both UNTH Ituku-Ozalla and ESUT teaching hospital Parklane at the time of the study. There were 64 doctors in the maternity sections of UNTH Ituku-Ozalla and 28 from ESUT Hospital Parklane, Enugu totaling 92. The number of pregnant women treated for malaria were 230 in UNTH and 169 in ESUT Teaching Hospital in a year giving a total of 399 (Hospital records of both UNTH and ESUT Teaching Hospital Enugu: 2010)

The target population for Antenatal women to be used were all the women who attend antenatal clinic in a year both at UNTH Ituku-Ozalla and ESUT Teaching Hospital Parklane. The antenatal attendance in UNTH is approximately 4800 and in ESUT is 4608 giving a total of 9408 per annum.

Inclusion criteria

The targeted population consists of all doctors both males and females who are consultants and residents in the maternity units of both hospitals and also women who have had malaria during pregnancy and were treated in the hospitals under study and those who have had deliveries in the hospitals under study. The number of target population is 399..

Sample size

All the 92 doctors from both institutions were included in the study since the size is small. A sample of 368 pregnant mothers was calculated for the study using the formula by Cochrane Formula and the prevalence of malaria by (Ekejindu et al, 2006),

$$n = \frac{Z^2pq}{d^2}$$

Where n = sample size

Z = value for selected alpha level of .05 = 1.96

P = possible proportion or prevalence rate from previous study = 39.8% q = 1 ï p

d^2 = acceptable margin of error = 0.05

$$= \frac{(1.96)^2 \times 0.398 \times 0.602}{(0.05)^2}$$

n = 368

Source: Cochrane (1977) in (Naing, Winn and Rusli, 2006).

Sampling technique

Purposive sampling was used to select the two hospitals.

A proportionate stratified random sampling technique was used to select the pregnant women for the study. The stratification were the two tertiary hospitals, and then the sample size was allotted to them using proportional allocation formula:

$$\frac{n \times N_h}{N}$$

Where n = sample size,

N = total population of pregnant women with malaria per annum

N_h = Stratum weight (total population of pregnant women with malaria per annum for each hospital).

The allocation is as follows:

Hospital	Total no. of pregnant women with malaria per annum	Sample size allocation
ESUT Teaching Hospital Enugu	169	156
UNTH	230	212
Total	399	368

. Hereafter, a convenience sampling technique was used to select the samples.

Instrument for data collection

A researcher developed questionnaire for both doctors and pregnant women was used for data collection. It was developed from information gathered from reviewed literature which covered drugs prescription for malaria in pregnancy and compliance among pregnant women. Questions to identify prescribed drug were asked for both prescribers and consumers. The two instruments have two sections, A and B. Section A of the two questionnaires elicited information on the socio-demographic data of the respondents and has 3 items each. Section B of doctorôs questionnaire contained 4 items. Items 1 and 2 identify the drugs prescribed for treatment of malaria in pregnancy while items 3 and 4 determined the reasons for their choice of drugs. Section B of pregnant womenôs questionnaire measured their compliance and factors affecting their compliance and also identified the drugs prescribed for them. This part has 11 items, items 1 identified the number of time they had malaria in pregnancy while item 2 identified the drug

prescribed for them when they had malaria in pregnancy to authenticate the drug of choice identification. Item 3 ï 10 is 5 points Likert scale of self report questionnaire to elicit information on the compliance of pregnant women to taking antimalaria drugs prescribed for them. The 5 point Likert scale indicates the degree at which people always fail or never fail to take the drugs prescribed for them accordingly. Always is the highest degree of compliance and is scored 5, whereas Never is the lowest degree of compliance and is scored 1. Usually is scored 4, Sometimes is scored 3 while Rarely is scored 2 which are all moderate degrees of compliance. Item 11 measures the factors that affect compliance. (see Appendix II).

Validity of instrument

The questionnaire was submitted to the supervisor and two other lecturers, one majored in Measurement and Evaluation and the other one is a Community Health Specialist for face and content validity. Their observations were used to make adjustments and fine tune the instrument before final approval by the supervisor.

Reliability of the instrument

The reliability of the instruments were tested in a pilot study using test- retest method. The developed questionnaire were administered to 20 doctors of comparable characteristics at Ebonyi State Teaching Hospital. Then interval of 2 weeks was allowed before going back to administer the questionnaire to the same group who took the test previously.

A measure of reliability called cronbachôs alpha gave the correlation as 0.84, while the different parts gave 0.72 and 0.74. These large cronbachôs alpha values indicated that the instrument was reliable for the study.

Same pilot study using test retest was used to test the questionnaire for pregnant women. The instrument were administered to pregnant women of comparable group at Ebonyi State Teaching Hospital. Interval of 2 weeks were allowed before going back to administer the same test to the same group who took it previously.

A measure of reliability called cronbachôs alpha gave the correlation as 0.82, while the different sets gave 0.83 and 0.77. These large cronbachôs alpha values indicated that the instrument was reliable for the study. See appendix for the reliability results.

Ethical Consideration

Application for ethical clearance and abridged copy of the research proposal was presented to the ethical and Research Committees of UNTH and State Ministry of Health who approved and certified the researcher to conduct the study before data collection (see Appendices IV,V,VI). Informed consent of the respondents were obtained verbally and their willingness to participate was considered.

Procedure for Data Collection

With the ethical clearance from the research and ethical committees of UNTH and the State Ministry of Health and the letter from the Department of Nursing Sciences, the researcher sought permission with the heads of the maternity Units of both hospitals. They gave their permission for data collection. Four research assistants were trained and the researcher was as well involved in the administration of the questionnaire and collecting it.

The individual doctors studied were selected by obtaining a list containing their names. Their clinic days were collected from each of the hospitals and arrangement were made to

administer the questionnaire in their various Units at unit meetings and at their consulting rooms. The pregnant women who have had malaria in pregnancy in the two hospitals were identified by questioning and questionnaire administered to them on the antenatal days. Explanation were made to those who cannot understand and assistance rendered to them in completing the questionnaire. The exercise lasted for 2 weeks in each of the two tertiary hospitals respectively.

Method of data analysis

Data collated were coded and analyzed using descriptive statistics which includes frequency, percentages, means and standard deviations and results were presented in tables. Hypotheses were tested with inferential statistics which includes correlation and chi-square cross-tabulation analysis at 0.05 level of significance. Analysis was done using statistical package for social sciences version (SPSS)15.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

This chapter presents the analysis of the research data and interpretation of results. Out of 368 questionnaires shared for the pregnant women, 350 were returned giving a return rate of 95%. Out of 92 questionnaires administered to the doctors, 85 were returned giving a return rate of 92%.

Table 1: Demography of the respondents (pregnant women)n=350

		UNTH n=202		ESUTH n=148	
S/n	**Demography**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	**Age range**				
	15-19	2	1.0	1	0.7
	20-24	12	5.9	8	5.4
	25-29	57	28.2	44	29.7
	30-34	84	41.6	63	42.6
	35-39	35	17.3	23	15.5
	40+	12	5.9	9	6.1
2	**Educational level**				
	No formal education	14	6.9	13	8.8
	Primary	8	4.0	4	2.7
	Secondary	55	27.2	38	25.7
	Tertiary	125	61.9	93	62.8
3	**Occupation**				
	Unemployed	38	18.8	20	13.5
	Business	50	24.8	41	27.7
	Public servant	96	47.5	78	52.7
	Others	18	8.9	9	6.1

***Mean age for UNTH= 31.02, SD = 3.21; Mean age for ESUTH= 33.16, SD = 4.30**

Table 1 shows that in UNTH, 2 (1.0%) of the women are within the age bracket of 15 and 19 years while 12 (5.9%) are within 20 and 24 years. 57 (28.2%), 84 (41.6%), 35 (17.3%) and 12 (5.9) are within the age bracket of 25 to 29 years, 30 to 34 years, 35 to 39 years and 40 years or more respectively. Their mean age is 31.02 and standard deviation of 3.21 for (UNTH) and mean age of 33.16 and standard deviation of 4.30 for (ESUTH).The Table also shows that 14 (6.9%) of

the respondents have no formal education while 8 (4.0%) have primary education. 55 (27.2%) have secondary education whereas 125 (61.9%) have tertiary education. A good number of the pregnant women are employed. 96 (47.5%) are public servants, 50 (24.8%) are business women while 18 (8.9%) have other occupations not mentioned. In ESUTH, 1 (0.7%) of the women are within the age bracket of 15 and 19 years while 8 (5.4%) are within 20 and 24 years. 44 (29.7%), 63 (42.6%), 23 (15.5%) and 9 (6.1) are within the age bracket of 25 to 29 years, 30 to 34 years, 35 to 39 years and 40 or more respectively.

The Table also show that 13 (8.8%) of the respondents have no formal education while 4 (2.7%) have primary education. 38 (25.7%) have secondary education whereas 93 (62.8%) have tertiary education. 78 (52.7%) of the pregnant women were employed. 20 (13.5%) were unemployed, 41 (27.7) were business women, 78 (52.7%) were public servants while 9 (6.1%) have other occupations not mentioned.

Table 2 Demography of the respondents (Doctors)n=85(Total)

		n=59	**UNTH**	**n=26**	**ESUTH**
S/n	**Demography**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	**Age range**				
	31-35	20	33.9	5	19.2
	36-40	16	27.1	10	38.5
	40-45	10	16.9	6	23.1
	45-50	5	8.5	3	11.5
	50 & above	8	13.6	2	7.7
2	**Designation**				
	Consultant	11	18.6	5	19.2
	Senior registrar	20	33.9	1	3.9
	Registrar	28	47.5	20	76.9
3	**Years of experience**				
	1-2	1	1.7	1	3.8
	3-4	18	30.5	12	46.2
	5 & above	40	67.8	13	50

***Mean age for UNTH =35.1, SD = 3.0, *Mean age for ESUTH=37.3, SD = 2.4**

Table 2 shows that in UNTH, 20 (33.9%) of the doctors are of ages between 31 and 35 years. 16 (27.1%) lie between 36 and 40 years while 10 (16.9%) have ages between 40 and 45 years. Doctors with ages within 45 and 50 years are 5 (8.5%) while those between 50 years and above are 8 (13.6%). There are 11 (18.6%) consultants, 20(33.9%) senior registrars and 28 (47.5%) Registrars. There are 40 (67.8%) doctors with 5 or more years of experience, 18 (30.5) with 3 to 4 years of experience and 1 (1.7%) with 1 to 2 years of experience. In ESUTH, 5 (19.2%) of the doctors have ages between 31 and 35 years. 10 (38%) lie between 36 and 40 years while 6 (23.1%) have ages between 40 and 45 years. Doctors with ages within 45 and 50 years are 3 (11.5%) while those between 50 years and above are 2 (7.7%). There are 5 (19.2%) consultants, 1 (3.9%) senior registrar and 20 (76.9%) Registrars. There are 13 (50%) doctors with 5 or more years of experience, 12 (46.2) with 3 to 4 years of experience and 1 (3.8%) with 1 to 2 years of experience.

Research question 1: What are the anti-malaria drugs prescribed for treatment of malaria in pregnancy in the hospitals under study?

Table 3: Anti-malaria drugs prescribed for treatment of malaria in pregnancy in the hospitals under study

n=59(UNTH) n=26(ESUTH) (Total n=85)

S/n	Drugs	UNTH				ESUTH			
		1st choice		2nd Choice		1st choice		2nd Choice	
		F	%	f	%	F	%	f	%
1	Sulphadoxine pyrimethamine	19	32.2	24	40.7	8	30.8	12	46.2
2	Artesunate single therapy	3	5.1	1	1.7	2	7.7	1	3.8
3	Artemisinin combined therapy	45	76.3	32	54.2	19	73.1	14	53.8
4	Mefloquine	2	3.4	1	1.7	1	3.8	1	3.8
5	Artemether lumefantrine	18	30.5	34	57.6	10	38.5	14	53.8
6	Proguanil	0	0	0	0	0	0	0	0
7	Amodiaquine	2	3.4	0	0	0	0	0	0
8	Chloroquine	1	1.7	0	0	1	3.8	0	0
9	Halofantrine	0	0	0	0	0	0	0	0
10	Quinine	7	11.9	2	3.4	2	7.7	0	3.8

Table 3 shows that in UNTH 76.3% of first choice drugs prescribed for pregnant women with malaria was Artemisinin combined therapy. 32.2% was Sulphadoxine pyrimethamine followed by Artemether lumefantrine (30.5%), Quinine (11.9%), Artesunate single therapy (5.1%), mefloquine (3.4%), 3.4% for Amodiaquine and 1.7% for Chloroquine in that order. Drugs such as Proguanil and Halofantrine were never prescribed for treatment of malaria in pregnancy.

The Table also shows that 57.6% of second choice drugs prescribed for malaria treatment in pregnancy was Artemether lumenfantrine, followed by Artemisinin combined therapy (54.2%), Sulphadoxine pyrimethamine (40.7%), Quinine (3.4), and 1.7% for Artesunate single therapy and mefloquine in that order. None were prescribed of Proguanil, Amodiaquine,

Chloroquine and Halofantrine as a second choice drug. In ESUTH 73.1% of first choice drugs prescribed for pregnant women with malaria was Artemisinin combined therapy. 38.5% was Artemether lumefantrine followed by Sulphadoxine pyrimethamine (30.8%), Quinine and Artesunate single therapy (7.7%) each, mefloquine and Chloroquine 3.8% each, in that order. Drugs such as Proguanil, Halofantrine and Amodiaquine were never prescribed for treatment of malaria in pregnancy. The Table also shows that 53.8% of second choice drugs prescribed for malaria treatment in pregnancy were Artemether lumenfantrine and Artemisinin combined therapy (54.2%) each, followed by Sulphadoxine pyrimethamine (46.2%), Quinine, Artesunate single therapy and mefloquine (3.8%) in that order. None prescribed Proguanil, Amodiaquine, Chloroquine and Halofantrine as a second choice drug.

Table 4: antimalaria drugs prescribed for treatment of malaria in pregnancy in the hospitals under study from the perspective of the pregnant women

S/N	Drugs	UNTH	n=202	ESUTH	n=148
		f	%	F	%
1	Chloroquine	2	0.99	2	1.35
2	Halofantrine	0	0	0	0
3	Sulphadoxine Pyrimethamine	36	17.8	35	23.6
4	Quinine	3	1.49	2	1.35
5	Artesunate single therapy	2	0.99	1	0.68
6	Artemisinin combined therapy	154	76.2	106	71.6
7	Camoquine	5	2.48	2	1.35
	Total	**202**	**100**	**148**	**100**

Table 4 shows that in UNTH 76.2% of the drugs as identified by pregnant women was artemisinin combined therapy (coartem), 17.8% was sulphadoxine pyrimethamine, 2.48% was camoquine, 1.49% was quinine, 0.99% was chloroquine and and artesunate single therapy respectively. None wrote halfantrine which is 0%.

Then, in ESUTH 71.6% identified artemisinin combined therapy followed by sulphadoxine pyrimethamine 23.6%. 1.35% identified camoquine, quinine and chloroquine respectively. 0.68% identified artesunate single therapy. None identified halofantrine which is 0%.

Research question 2: What are the prescriberôs reasons for choice of drugs in the treatment of malaria in pregnancy?

Table 5 prescribers' reasons for choice of drugs in the treatment of malaria in pregnancy.

		UNTH(n=59)		ESUTH(n=26	
S/n	**Reasons**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	Cost of drug	2	3.4	1	3.8
2	Availability of the drug	5	8.5	3	11.5
3	Past experience	16	27.1	8	30.8
4	Hospital policy	1	1.7	1	3.8
5	Severity of the signs and symptoms	24	40.7	9	34.6
6	Parity of the woman	3	5.1	2	7.7
7	Age of the woman	0	0	0	0
8	Gestational age of the pregnancy	41	69.5	16	61.5
9	If the woman has taken some anti-malaria preventive therapy	6	10.2	3	11.5
10	Consumerôs preference	0	0	0	0
11	My knowledge of the side effects of the drugs	7	11.9	2	7.7
12	I prescribe drugs captured in the essential drug list	0	0	0	0

Table 5 shows that in UNTH, 41(69.5%) of the doctors made their choice of prescription based on gestational age of the pregnancy while 24(40.7%) based their prescriptions on severity of the signs and symptoms. 16(27.1%) prescribed based on past experience. 2(3.4%), 5(8.5%) and 1(1.7%) had reasons such as cost of drug, availability of drug and hospital policy respectively. 3(5.1%) considered parity, 6(10.2%) each based their choice on If the woman has taken some anti-malaria preventive therapy and 7(11.9%) for side effects of the drugs. None of the doctors based their choice of malaria drugs on reasons like consumerôs preference or drugs

captured in the essential drug list. In ESUTH, 16(61.5%) of the doctors made their choice of prescription based on gestational age of the pregnancy while 9(34.6%) based their prescriptions on severity of the signs and symptoms. 8(30.8%) prescribed based on past experience. 1(3.8%), 3(11.5%) and 1(3.8%) had reasons such as cost of drug, availability of drug and hospital policy respectively. 2(7.7%) each considered parity and knowledge of side effects, 3(11.5%) based their choice on If the woman has taken some anti-malaria preventive therapy while none of the doctors based their choice of malaria drugs on reasons like consumerôs preference or drugs captured in the essential drug list.

Research question 3: Do these pregnant women comply to treatment with antimalaria drugs prescribed for them?

Table 6 Pregnant women compliance to treatment with antimalaria drugs prescribed n=350(both UNTH and ESUTH)

S/n	Items	Always		Usually		Sometimes		Rarely		Never		Mean+SD
		F	%	F	%	F	%	F	%	F	%	
1	I take less number of doses of the drugs than prescribed	44	12.6	9	2.6	79	22.6	21	6.0	197	56.3	3.91±1.42
2	I take more number of doses of the drugs than prescribed	30	8.6	9	2.6	41	11.7	12	3.4	258	73.7	4.31±1.2
3	I forgot to take the drugs prescribed for me	185	52.9	48	13.7	61	17.4	20	5.7	36	10.3	2.07±1.36
4	I skip taking the antimalaria drugs prescribed for me	175	50.0	45	12.9	86	24.6	23	6.6	21	6.0	2.06±1.24
5	I have stopped taking the antimalaria drugs prescribed for me before completion	208	59.4	27	7.7	62	17.7	21	6.0	32	9.1	1.98±1.36
6	I do not remember to take the antimalaria drugs at the right time	181	51.7	51	14.6	71	20.3	23	6.6	24	6.9	1.02±1.27
7	I take another drug in place of the one prescribed for me	232	66.3	30	8.8	55	15.7	15	4.3	18	5.1	1.73±1.18
8	I keep some of the drugs prescribed for me for future use	268	75.1	18	5.1	27	7.7	15	4.3	27	7.7	1.65±1.25
		Grand mean										2.34±1.16

***Means greater than 3 = good compliance; Means less than 3 = poor compliance**

Table 6 shows that 44 (12.6%) pregnant women always take less number of doses of the drugs prescribed while 9 (2.6%) usually do. Whereas 79 (22.6%) sometimes take less, 21 (6.0%) rarely do. However, 197 (56.3%) never take less number of doses prescribed. A high mean value of 3.91 confirms compliance in that sense. Similarly, 30 (8.6%) pregnant women always take more number of doses of the drugs prescribed while 9 (2.6%) usually do. Whereas 41 (11.7%) sometimes take more, 12 (3.4%) rarely do. However, 258 (73.7%) never take more number of doses prescribed. A high mean value of 4.31 confirms compliance in that sense.

The Table also show that 185 (52.9%) of the respondents always forget to take the drugs prescribed for them while 48 (13.7%) usually do. 61 (17.4%) of them sometimes forget, 20 (5.7%) rarely forget while 36 (10.3%) never forget to take the prescribed drugs. A low mean value of 2.07 indicates lack of compliance in terms of remembering to take the drugs. Similarly, 175(50.0%) of the respondents always skip taking the drugs prescribed for them while 45 (12.9%) usually do. 86 (24.6%) of them sometimes forget, 23 (6.6%) rarely forget while 21 (6.0%) never forget to take the prescribed drugs. A low mean value of 2.06 indicates lack of compliance in terms of not skipping drugs. 208 (59.4%) of the respondents always stop taking the drugs prescribed for them before completion, 27 (7.7%) of them usually while 62 (17.7%) sometimes do. Whereas 21 (6.0%) of the respondents rarely stop before completing the prescription, 32 (9.1%) never stop. A low mean value of 1.98 confirms lack of compliance in that sense. 181 (51.7%) of the respondents always forget to take the antimalaria drugs at the right time, 51 (14.6%) of them usually forget while 71 (20.3%) sometimes forget to take the drugs at the right time. Whereas 23 (6.6%) of the respondents rarely forget to take the drugs at the right time, 24 (6.9%) never forget. A low mean value of 1.02 confirms lack of compliance in that

sense. The table further reveals that 232 (66.3%) of the pregnant women always take another drug in place of the one prescribed for them, 30 (8.8%) usually do while 55 (15.7%) do sometimes. Whereas 15 (4.3%) rarely take another drug in place of the prescribed drug, 18 (5.1%) never do so. A low mean value of 1.73 indicates lack of compliance. Similarly, 268 (75.1%) of the pregnant women always keep some of the prescribed drugs for future use, 18 (5.1%) usually do while 27 (7.7%) do sometimes. Whereas 15 (4.3%) rarely the drugs for future use, 27 (7.7%) never do so. A low mean value of 1.65 indicates lack of compliance in that sense. A general low mean value of 2.34 indicates that the pregnant womensô compliance to treatment with antimalaria drugs prescribed to them is poor.

Research question 4: What factors influence the pregnant womenôs compliance to antimalaria drugs prescribed to them in the hospitals under study?

(n = 350)Table 7: factors that influence compliance to antimalaria drugs

S/n	Factors	Frequency	Percent
1	I just forgot	189	54
2	Cost of the drug is high	45	12.9
3	I got well so I stopped	158	45.1
4	Side effects of the drug like vomiting was distressful	88	25.1
5	The duration of the drugs prescribed was too long	57	16.3
6	I kept the drug for future use	24	6.9
7	I was not getting better so I stopped	56	16
8	The drugs were not available	38	10.9
9	Gave out part of the drug to help another person with similar problem	30	8.6
10	I hate taking drugs	94	26.9
11	I did not understand the prescription	18	5.1
12	Fear that the drugs might affect my baby well being	86	24.6
13	No of doses were many so I took few	18	5.1

Table 7 shows that 189 (54%) of the pregnant women agree that forgetfulness is a factor that influenced their compliance to antimalaria drugs. Whereas 45 (12.9%) of them said that they could not afford the drugs, 158 (45.1%) said they stopped when they got well. 88 (25.1%), 57 (16.3%) and 38 (10.9%) agree that factors that affected their compliance were side effect of the drugs, prolonged duration of prescription and unavailability of drugs respectively. The Table also

shows that 24 (6.9%) of the women agree that saving the drug for future use influenced their compliance while 56 (16.0%) believed that not getting better was a factor. 30 (8.6%) said helping a friend with their drugs was a factor to their compliance while 94 (26.9%), 18 (5.1%), 86 (24.1%) and 18 (5.1%) of them said factors that influenced their compliance to antimalaria drugs were hatred for drugs, misunderstanding of prescription, fear that the drugs might affect the baby and so many doses respectively.

Table 8: How many times have you had malaria during pregnancy?

No of times patient had malaria during pregnancy	**UNTH**	**n=202**	**ESUTH**	**n=148**
	F	**%**	**F**	**%**
Once	22	10.9	18	12.2
Twice	90	44.6	72	48.6
Thrice	60	29.7	53	35.8
Four times	30	14.9	5	3.4

From Table 8, the result showed that from UNTH 44.6% of the pregnant women said they had malaria in pregnancy twice, 29.7% had malaria twice, 14 .9% had it four times while 10.9% had it once from ESUTH, 48.6% had malaria twice, 35.8% had malaria thrice, 12.2% had it once and 3.4% had it four times.

HYPOTHESIS TESTING

Ho1**:** There is no significant relationship between the level of education and compliance to taking antimalaria drugs by pregnant women in the hospitals studied.

Table 9: A spearman's rho correlation analysis table of educational level of pregnant women and their antimalaria compliance.

Correlations

			Educational level	Compliance
Spearmanôs rho	Educational level	Correlation Coefficient	1.000	.044
		Sig. (2-tailed)	-	.411
		N	350	350
	Compliance	Correlation Coefficient	.044	1.000
		Sig. (2-tailed)	.411	-
		N	350	350

Decision rule:

Since the significant value (0.4) of the Spearmanôs rho statistic is greater than 0.05 level of significance, we accept the null hypothesis. Therefore, there is no significant relationship between the level of education and compliance to taking antimalaria drugs by pregnant women in the hospitals studied. In other words, the pregnant womensô compliance to taking malaria drugs does not depend on their level of education.

Ho2: There is no significant relationship between the years of experience of prescribers and their reason for choice of antimalaria drugs prescribed to pregnant women in the hospitals under study.

Table 10: A chi-square cross tabulation of doctors' years of experience and their reason for choice of antimalaria drug prescription.

S/n	Reasons	1 – 2yrs n (%)	3 – 4 yrs n (%)	5 yrs & above n (%)	Total n (%)
1	Cost of drug	0 (0.0)	0 (0.0)	3 (100.0)	3 (100)
2	Availability	2 (25.0)	3 (37.5)	3 (37.5)	8 (100)
3	Past experience	0 (0.0)	12 (50.0)	12 (50.0)	24 (100)
4	Hospital policy	0 (0.0)	2 (100.0)	0 (0.0)	2 (100)
5	Severity of the signs & symptoms	0 (0.0)	11 (33.3)	22 (66.7)	33 (100)
6	Parity of the woman	0 (0.0)	0 (0.0)	5 (100.0)	5 (100)
7	The age of the woman	0 (0.0)	0 (0.0)	0 (0.0)	0 (100)
8	The gestational age of the pregnancy	0 (0.0)	11 (19.3)	46 (80.7)	57 (100)
9	If the woman has taken some anti-malaria preventive therapy	0 (0.0)	6 (66.7)	3 (33.3)	9 (100)
10	Consumers preference	0 (0.0)	0 (0.0)	0 (0.0)	0 (100)
11	My knowledge of the side effects of the drugs	0 (0.0)	2 (22.2)	7 (77.8)	9 (100)
12	I prescribe drugs captured in the essential drug list	0 (0.0)	0 (0.0)	0 (0.0)	0 (100)

***X^2 = 58.233, P= 0.002**

Table 10 shows that there is significant relationship between the years of experience of prescribers and their reason for choice of antimalaria drugs prescribed for pregnant women in the hospital (X^2 = 58.233, P= 0.002). Out of 57 doctors who prescribed antimalaria drugs based on gestational age as reason, 46 (80.7%) had 5 and above years of experience while 11 (19.3%) had 3 to 4 years of experience in the maternity unit. Similarly, Out of 33 doctors who prescribed antimalaria drugs based on Severity of the signs & symptoms, 22 (66.7%) had 5 or more years of

experience while 11 (33.3%) had 3 to 4 years of experience. For reason of past experience, 12 (50%) each had 3 to 4 years and 5 years and above respectively. Few insignificant number of doctors with 3 or more years of experience prescribed for other reasons whereas out of 8 that prescribed based on the reason of availability 2(25%) has 1 to 2 years of experience .

Summary of findings

The findings from the study were summarized under the following paragraphs: Less than half of the women (42%) were between 30 to 34 years while majority of them (62%) attained tertiary level of education. Approximately half of them are public servants (49.7%) while 16.6% are unemployed. Most of the doctors (69.4%) were within 31 to 40 years. There were 16 consultants, 21 senior registrars and 48 registrars. 62.4% of them had 5 or more years of experience.

From the findings, 75.3% of first choice drugs prescribed for pregnant women with malaria was Artemisinin combined therapy followed by Artemether lumefantrine (32.4%) and Sulphadoxine pyrimethamine (31.8%) in descending order. Similarly, 56.5% of second choice drugs prescribed for malaria treatment in pregnancy was Artemether lumenfantrine, followed by Artemisinin combined therapy (54.1%) and Sulphadoxine pyrimethamine (42.4%) in descending order.

The precribers major reason for choice of antimalaria drugs were gestational age (67.1%) and severity of signs and symptoms (38.8%). A general low level of compliance to antimalarias was found among the pregnant women as indicated by a low mean response value of 2.34 which is less than 3 cut off value. Factors responsible for default in compliance were forgetfulness, quick recovery, drug side effects, hatred for drugs and fear of drug effect on the unborn baby.

No significant relationship was found between pregnant womensô level of education and their compliance to antimalaria drugs ($P > 0.05$). Conversely, doctorsô years of experience is significantly associated with their reason for choice of antimalaria drugs ($p < 0.05$).

CHAPTER FIVE

DISCUSSION OF FINDINGS, SUMMARY, CONCLUSION AND RECOMMENDATIONS

Discussion of findings

Objective one

To identify the drugs prescribed for the treatment of malaria in pregnancy in the hospitals under study.

The study revealed that Artemisinin combined therapy was the first line antimalarial drug prescribed by doctor in the treatment of uncomplicated malaria in pregnancy followed by Arthemeter lumefantrine and thirdly Sulphadoxine pyrimethamine. This finding is in line with WHO (2005) recommendation that Artemisinin Combination therapy (ACTs) should be prescribed as first line therapy for the treatment of uncomplicated malaria. The results of the drug efficacy trials carried out in the six geo-political regions in Nigeria in 2004 by Federal Ministry of Health on two suitable Artemisinin based combination therapy, revealed that combination therapies were found to be highly efficacious and thus suitable for use in the treatment of uncomplicated malaria in pregnancy.

It was also found from the study that antimalaria drugs such as Artesunate single therapy, mefloquine, Amodiaquine, Chlroquine and Quinine were prescribed as first choice drugs by just few doctors while none prescribed Proguanil and Halofantrine as first choice drugs. This is in agreement with the findings of the 2002 Drug Efficacy Studies (WHO, 2005), which indicated that Chloroquine and SP were no longer adequate for national first line use and there is need to move from monotherapy to more effective combination therapy. It is contrary to the study by

Chedi, Abdu- aguye and kwanashie(2010) which revealed that chloroquine was the mostly used ,followed by artemisinin derivatives and halofantrine was the least used. According to the study, resistance to pyrimethamine has long existed in Nigeria (since the late 1950s), yet there is no convincing evidence that the drug has potent prophylactic efficacy in pregnancy. However, pyrimethamine in combination with sulphadoxine has been demonstrated to have markedly improved efficacy. No wonder a good number of doctors in this survey prescribed Sulphadoxine pyrimethamine too.

The study also revealed that Arthemeter lumefantrine, followed by Artemisinin combined therapy and Sulphadoxine pyrimethamine, were the second choice drugs prescribed by majority of the doctors for treatment of malaria among pregnant women. This finding conforms with WHO (2010) recommendations that combination therapies and quinine are efficacious in second-line treatment of malaria in pregnancy. However, the survey result shows that an insignificant number of doctors prescribed Quinine for malaria treatment ,may be because 0f the fact that use should be judicious.

This study conforms to the WHO recommendation (2004) and the studies by Bege (2009) Mazigo, Obasy, Mauka et al (2010)on the treatment guideline. The drug of choice for the treatment of uncomplicated malaria in pregnancy is artemisinin combined therapy and sulphadoxine pyrimethamine is the drug of choice for intermittent preventive therapy for malaria in pregnancy. It is in agreement with the doctorsô first and second choice antimalaria drug prescription. However, it is contrary to the studies done by Sangare et al (2010) where the use of antimalaria recommendation by WHO treatment guideline was not followed. The majority, prescribed sulphadoxine pyrimethamine. It is also contrary to the study by Wobo, Akinboroyo, Anosike and Adewale (2006) and Omole and Onademuren (2010) who identified

sulphadoxine pyrimethamine to be preferred, followed by chloroquine. Harrison, Olufunlayo and Agomo (2012) identified chloroquine as the commonest drug for first line treatment of uncomplicated malaria in pregnancy.

Objective two

Determine the prescribers' reasons for choice of drugs in the treatment of malaria in pregnancy

The survey revealed that most of the doctors considered gestational age as a major factor in choice of malaria treatment in pregnancy. This is because some of the anti malaria drug may be harmful to the baby at certain gestational age. Factors such as severity of the signs and symptoms and past experience were also considered by some of the doctors in making their choice of drugs for malaria treatment in pregnancy. When the signs and symptoms of malaria is severe, they prescribe differently, and when it is mild,they prescribe differently. Other factors like cost of drug, availability of the drug, hospital policy, parity of the woman, knowledge of the side effects, drugs captured on essential drug list and previous anti-malaria preventive therapy taken by the woman were less considered for making the treatment choice, while age of the woman and consumerôs preference did not determine the choice of prescription at all.

These findings were in conformity with the Nigerian National Antimalaria Guidelines and Treatment Policy (2005) which states that the first trimester of pregnancy carries the highest risk of fetal adverse reactions, and some women are exposed to medicines during this period because they are unaware that they are pregnant or do not declare their pregnancy. It also recommended oral Quinine as first line agent in all trimesters while ACT is considered safe second line agent in the second and third trimesters. However, in the first trimester the ACT can

be used where there are no suitable alternatives. The guideline stated that treatment based on clinical symptoms alone should be reserved for settings where diagnostic tests are not available.

Objective three

Determine the compliance of the pregnant women to treatment regimen, in the hospitals

The study showed a low level of compliance of pregnant women to prescribed antimalaria drugs. This is consistent with Akinleye et al, (2009), who found out that compliance with the recommended intermittent preventive treatment (IPTp) for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria was very low. Only about a third of the respondents who received IPT used SP in the clinic and only three of them were supervised by a health worker at the time of ingestion, giving a directly observed therapy (DOT) compliance rate of 14.3%. The finding was also consistent with the finding in a study in western Kenya (Onyango et, al, 2012), in which high non-compliance to ACT was reported.

Objective four

To identify the factors that influence the pregnant women's compliance to the prescribed antimalaria drugs in the hospitals

Based on the findings, the major factors for poor compliance to antimalarials were forgetfulness, patientôs recovery, side effects, hatred for drugs and fear that the drugs might affect the unborn baby. This is in conformity with two cross-sectional studies funded by the World Health Organization in Muheza district and Mpwapwa district in Central Tanzania cited by Mubyazi et, al. (2005), where low compliance with the use of SP was partly attributed to

health care providers' and users' fear of side effects of SP and their inadequate knowledge of the correct dose. Similarly, findings in another study by Akinleye et al (2009) in Ekiti State and Mazigo, Obasy, Mauka,et al (2010) conducted in Tanzania reported 74% of respondents were said to have believed that antimalarial drug when taken during pregnancy could be harmful to the pregnant women and the unborn babies.

The study revealed that the majority of the pregnant women had malaria twice, thrice and four times. This is in line with the report of Caspard, Chan Walker(2005) that among the factors that can result in the the emergence of rsistance that the variable compliance has been shown to play a key role. Osterberg and Terance (2005) also reported that 33% to 69% of medication related hospitalizations are linked to drug non compliance. NEHI (2009) revealed that 125,000 death each year are linked to drug non compliance and $290 billion is spent on care needed because of medication non compliance. It is also in line with the result of finding by Sangare, Weiss, Brenttinger, et al (2010) where the majority of the participants reported malaria during early pregnancy. Mazigo, Obasy, Mauka et al (2010) in their study revealed that malaria cases and deaths have been increasing in the country due to injudicious use of antimalaria drugs.

Hypothesis one

To elicit the relationship between the level of education and compliance of pregnant women to prescribed antimalaria drugs in the hospitals

The findings revealed that level of education of the pregnant women was not significantly associated with their compliance to the antimalarials. In other words, their level of compliance was not attributed to their level of education. This result is in line with Dimatteo (2004) who found that even highly educated patients may not understand their conditions or believe in the benefits of being compliant to their medication regimen. It is at variance with the findings in western Kenya where factors associated with non-compliance to Artemisinin-based combination

therapy (ACT) to malaria was examined and the level of education was found to be significantly associated with ACT compliance (Onyango et al, 2012) and (Okuno et al, 2001).

Hypothesis two

To ascertain the relationship between the years of experience of prescribers and their reason for choice of antimalaria drugs prescribed

The results also show that the years of experience of the doctors were significantly associated with their reason for choice of antimalaria drugs. The findings revealed that doctors with more years of experience prescribed the antimalaria drugs based on reasons in the WHO guidelines such as gestational age, severity of the signs and symptoms and past experience while those with 1 to 2 years experience based their choice only on availability of the drugs. This implies that the more the years of experience of the prescribers the more their knowledge and adherence to antimalarial drug guidelines in pregnancy. This finding is consistent with Bege (2009), who studied antimalarial drug prescriptions and doctors perception on malaria in hospitals of Kaduna State, Nigeria where doctors years of practice was significantly associated with their reason for choice of first line antimalaria drugs.

Implications of the study to Nursing Practice

The result of this study is that the pregnant women generally showed poor compliance to drugs prescribed to them for malaria treatment. Nurses are responsible for checking non-compliances. Therefore, they should include the importance of compliance in the health education sessions with the pregnant women. This will increase their knowledge base and enable them to comply better.

There should also be improved nurse patient relationship through focused antenatal care and individualized care to help the patients to comply better. The result also showed that the major factor affecting compliance is forgetfulness. There is need for nurses to improve their responsibilities through behavior change and communication to all pregnant women under their care.

The result also revealed that the pregnant womenôs level of education does not affect compliance. This implies that all pregnant women should be health educated on the importance of compliance and effect of malaria in pregnancy.

Limitation to the study

This study was carried out in only two tertiary hospitals in Enugu, hence cannot be generalized for the whole country. This is a hospital-based study. A community-based study will better capture compliance of women who have not been exposed to health facilities especially antenatal clinic. Tracking down the doctors to fill the questionnaire was difficult because they have different work schedules. There was also dearth of empirical studies on this topic

The information gotten from the respondents may lack, objectivity and sincerity.

Suggestion for further study

The following areas were recommended for further research.

1) Antimalaria drug compliance among women in other geopolitical zones.
2) A community based study of the topic.

Summary of the study

The main purpose of the study was to survey the antimalaria drug prescriptions and compliance among pregnant women attending antenatal clinic in the two tertiary hospitals in

Enugu state. The specific objectives were to identify drugs prescribed for malaria in pregnancy,, determine prescribers reason for choice of drugs, determine compliance level among pregnant women and factors affecting their compliance .Literature were reviewed and theory of reasoned action was used to anchor the study. A proportionate Stratified random sampling was used to select a sample of 368 women from both UNTH and ESUT Teaching Hospitals Enugu, Questionnaires were used for data collection, All analysis was done using statistical package for social sciences version(SPSS) 15

The findings of the study has shown that Artemisinin combination therapy (ACTs) were the most commonly prescribed first and second line choice drugs in pregnancy in the hospitals studied. However, factors such as the gestational age of the pregnancy and severity of the signs and symptoms determined the choice of antimalaria drugs prescribed.

The study recorded a low level of compliance (mean value of 2.34)of pregnant women to prescribed antimalaria drugs. The pregnant women did not comply to the doses prescribed as at when due. Forgetfulness, quick recovery, side effects, hatred for drugs and fear that the drugs might affect the baby were found to be the cause of a default in adherence or compliance. Their level of compliance to antimalaria drugs could not be attributed to their level of education as no significant association was found.

Doctors with more years of experience made their choice of antimalaria drugs based on the standard set by WHO and national guidelines, putting gestational age and severity of the signs and symptoms into consideration . This was indicated by the significant relationship found between doctorsô years of experience and their reason for choice of antimalaria drug prescription.

Conclusion

Studies carried out in the past were done during the time when change of the policy was just implemented and most of such studies showed that chloroquine was still in use as the first line drug. Hence, this study has given a present portrayal of doctorsô acceptance and wide usage of the new policy recommended ACTôs. The doctors adhered to recommended combination therapy both in first and second choice drug prescriptions.

This study has also conformed to the fact that gestational age and severity of the signs and symptoms were factors that determined which antimalaria drug to prescribe. This practice was found among doctors with 3 or more years of experience, perhaps, those with fewer years of experience should be sensitized and necessary information about handling pregnant women with malaria should be passed on to them to avoid putting the mother or baby in danger.

A low level of compliance to prescribed antimalarias was found among the pregnant women and this could not be attributed to their level of education as both the educated and uneducated showed the same low compliance level. However, the women believed that forgetfulness is a major cause of default in compliance. Other factors such as fast recovery, side effects, hatred for drugs and fear of the effect on the baby were also not ruled out.

Recommendations

The following recommendations were made based on the study:

Efforts should be made by the Federal Ministry of Health and other stakeholders to organize training and refresher courses on the current national antimalaria treatment guidelines. In addition these guide- lines should be made available to all health care facilities and individuals through the Nigerian Medical Association and other medical professional associations.

Patient-centered care will be vital to encourage compliance to new treatment algorithms developed in response to the changing malaria environment in Enugu. Behaviour-change-communication (BCC) programmes should be initiated to aid in awareness creation on the consequence of non-adherence. Monitoring patient compliance is thus quite necessary to maintain ACT efficacy.

The health workers in the antenatal clinics 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 will be well informed. All the antenatal clinics should display posters educating their clients about IPTp and malaria in pregnancy.

Since this situation could be worse at the periphery and among the rural areas, it is recommended, therefore, that efforts should be made to improve anti-malarial intervention during pregnancy, through improved educational measures at the antenatal clinics, focused policies including non-government organizations and women groups.

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APPENDIX I

CALCULATION OF SAMPLE SIZE

$$n = \frac{Z^2pq}{d^2}$$

Where n = sample size

Z = value for selected alpha level of .05 = 1.96

P = possible proportion or prevalence rate from previous study = 39.8% q = 1 ï p

d^2 = acceptable margin of error = 0.05

$$= \frac{(1.96)^2 \times 0.398 \times 0.602}{(0.05)^2}$$

n = 368

DISTRIBUTION OF SAMPLE SIZE

$$\frac{n \times N_h}{N}$$

Where n = sample size,

N = total population of pregnant women with malaria per annum

N_h = Stratum weight (total population of pregnant women with malaria per annum for each hospital).

ESUT: $\frac{368 \times 169}{399} = 156$

N_h = 156

UNTH: $\frac{368 \times 230}{399} = 212$

N_h = 212

The allocation is as follows:

Hospital	Total no. of pregnant women with malaria per annum	Sample size allocation
ESUT Teaching Hospital Enugu	169	156
UNTH	230	212
Total	399	368

Reliability for doctors

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Part 1	Value	.717
		N of Items	48
	Part 2	Value	.743
		N of Items	48
	Total N of Items		20
Correlation Between Forms			.842

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Reliability for pregnant women

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Part 1	Value	.827
		N of Items	29
	Part 2	Value	.773
		N of Items	29
	Total N of Items		20
Correlation Between Forms			.819

QUESTIONNAIRE FOR DOCTORS

Department of nursing Sciences

Faculty of Health Science & Technology

University of Nigeria

Enugu Campus

Dear respondent,

I am an MSC student of the above named department conducting a research for my dissertation on the topic Survey of drugs prescribed for treatment of malaria in pregnancy and compliance among pregnant women in tertiary hospitals Enugu State Nigeria.

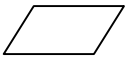
Kindly answer the question in this questionnaire. Your honest answer to each question will be highly appreciated.

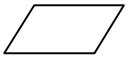
Thanks for your anticipated co-operation.

PART A: Socio Demographic Data

Fill in or tick (ã) in your appropriate option in the box provided

1. What is your age last birth day? é é é é é é é
2. What is your designation
   a. Consultant
   b. Senior Registrar
   c. Registrar
3. How many years have you been in the maternity unit
   a. 1 ï 2 years

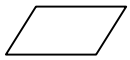
b. 3 ï 4 years 

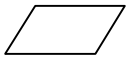
c. 5 years and above 

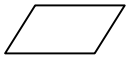
Part B: Questions on Objectives

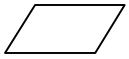
Tick as many as applies to you

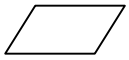
1. Which drug(s) do you prescribe as first (1^{St}) choice malaria drugs for pregnant women for treatment of malaria

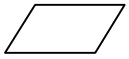
   a. Sulphadoxine pyrimethamine 

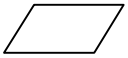
   b. Artesunate single therapy 

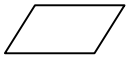
   c. Artemisinin combined therapy 

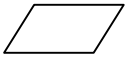
   d. Mefloquine 

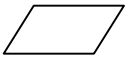
   e. Artemether lumefantrine 

   f. Proguanil 

   g. Amodiaquine 

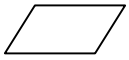
   h. Chloroquine 

   i. Halofantrine 

   j. Quinine 

   k. Others, please specify é é é é é é é é é é é é é é é é é é

2. What is your second (2^{nd}) choice malaria drug(s) prescribed for treatment of malaria during pregnancy?

   a. Sulphadoxine pyrimethamine 

   b. Artesunate single therapy 

c. Artemisinin combined therapy

d. Mefloquine

e. Artemether lumefantrine

f. Proguanil

g. Amodiaquine

h. Chloroquine

i. Halofantrine

j. Quinine

3. What are your reasons for first (1st) choice treatment of malaria in pregnancy?

a. Cost of drug

b. Availability of the drug

c. Past experience

d. Hospital policy

e. Severity of the signs & Symptoms

f. Parity of the woman

g. The age of the woman

h. The gestational age of the pregnancy

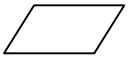
i. If the woman has taken some anti-malaria preventive therapy

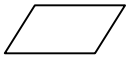
j. Consumers preference

k. My knowledge of the side effects of the drugs

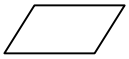
l. I prescribe drugs captured in the essential drug list

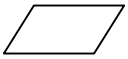
m. Other reasons please specify é é é é é é é é é é é é é é é é é é

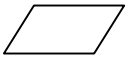
4. Do you prescribe the same drug used for first episode if there is a repeat? (a.) Yes 

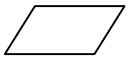
(b.) No 

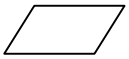
5. What are your reasons?

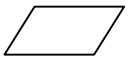
a. Cost of drug 

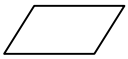
b. Availability of the drug 

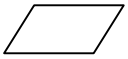
c. Past experience 

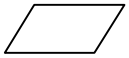
d. Hospital policy 

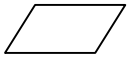
e. Severity of the signs & Symptoms 

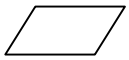
f. Parity of the woman 

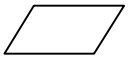
g. The age of the woman 

h. The gestational age of the pregnancy 

i. If the woman has taken some anti-malaria preventive therapy 

j. Consumers preference 

k. My knowledge of the side effects of the drugs 

l. I prescribe drugs captured in the essential drug list 

m. Other reasons please specify é é é é é é é é é é é é é é é é é

QUESTIONNAIRE FOR PREGNANT WOMEN

Department of nursing Sciences
Faculty of Health Science & Technology
University of Nigeria
Enugu Campus

Dear respondent,

I am an MSC student of the above named department conducting a research for my dissertation on the topic Survey of drugs prescribed for the treatment of malaria in pregnancy and compliance among pregnant women in tertiary hospitals in Enugu State Nigeria.

Kindly answer the questions in this questionnaire. Your honest answer to each question will be highly appreciated.

Thanks for your co-operation.

PART A: Socio Demographic Data

Fill in or tick (√) in your appropriate option in the box provided

1. What is your age range a. 15-19 ☐ b. 20-24 ☐
   c. 25-29 ☐ d. 30-34 ☐ e. 35-39 ☐ f. 40+ ☐

2. What is your educational level
   a. No formal Education ☐ b. Primary school ☐
   c. Secondary school ☐ d. Tertiary institution ☐

3. What is your occupation

a. Business ☐ b. Artisan. ☐ c. Civil servant ☐

Others please specify é .

PART B: Questions on Objectives

Tick the one that applies to you

1. How many times have you had malaria during pregnancy?

   a. Once ☐ b. Twice ☐ c. Thrice ☐ d. 4 times ☐

2. Which of these drugs was prescribed for you?

   a. Chloroquine ☐

   b. Halofantrine ☐

   c. Sulphadoxine pyrimethamine eg Amalar, Fansidar etc ☐

   d. Quinine ☐

   e. Artesunate single dose ☐

   f. Artemisinin Combined Therapy (ACT) eg coartem, cotexin ☐

   g. Camoquine ☐

   h. Others please specify é é é é é é é é é é é é é é é ...

The purpose of this section of the questionnaire is to determine the compliance of pregnant women to taking their antimalaria drugs. Read the list of response choices one at a time, decide how well each statement describes your compliance in accordance with the question on objective

3. If the statement describes your response very well circle 1, indicating that you always fail. If the statement does not describe your usage, then tick 5 indicating that you never fail. Select 4, 3 or 2 to indicate the degree of correct usage or non-usage

1. ï Always 2. ï Usually / Frequently 3. ï Sometimes 4. ï Rarely 5. ï Never

Do you take the doctor's prescribed drugs for malaria as required?

1. Always, 2. Usually, 3. Sometimes, 4. Rarely, 5. Never

3. I have taken less number of doses of the drugs than prescribed 1, 2, 3, 4, 5

4. I have taken more number of doses of the drugs than prescribed 1, 2, 3, 4, 5

5. I have forgotten to take the drugs prescribed for me 1, 2, 3, 4, 5

6. I have skipped taking the antimalaria drugs prescribed for me 1, 2, 3, 4, 5

7. I have stopped taking the antimalaria drugs prescribed for me before completion 1, 2, 3, 4, 5

8. I have neglected taking the antimalaria drugs at the right time 1, 2, 3, 4, 5

9. I have taken another drug in place of the one prescribed for me 1, 2, 3, 4, 5

10. I have saved drugs prescribed for me for future use 1, 2, 3, 4, 5

Tick as many as applies to you

11. In your own opinion, what factors affect your correct intake of antimalaria drugs prescribed for you?

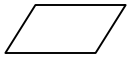
a) Forgetfulness ☐

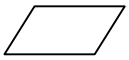
b) Unable to afford money to buy and complete the dose ☐

c) I got well so I stopped ☐

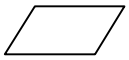
d) Side effects of the drug I am given were distressful ☐

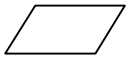
e) The duration of the drugs prescribed were prolonged ☐

f) I saved the drug for future use 

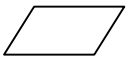
g) I was not getting better so I stopped 

h) Unavailability of the drugs 

i) Gave out part of the drug to help another person with similar problem 

j) I hate taking drugs 

k) Did not understand the prescription 

l) Fear that the drugs might affect my baby 

m) No of doses were many so I took few