USE OF MALARIA PREVENTIVE MEASURES BY PREGNANT WOMEN IN ENUGU

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November, 2015

DECLARATION

I, AnekeVitalisIkenna, hereby declare that this thesis is my original work. I also declare that I have not previously submitted this dissertation in part or full for any examination or publication.

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APPROVAL PAGE

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DEDICATION

This research is dedicated to all pregnant women in Enugu.

ACKNOWLEDGEMENT

I thank God Almighty for the grace, strength and knowledge to undertake this study. My sincerest thanks go to my project supervisors; Prof.(Mrs) M.N.Aghaji for are invaluable guidance and supervision during the study. I would also like to thank Rev. Sis. (Dr) Okafor, the Chief Medical Director of Mother of Christ Specialist Hospital Enugu.

My gratitude also goes to the entire ante-natal care (ANC) staff of Mother of Christ Specialist Hospital and Polly Clinics both in Enugu who provided all the support I needed during the data collection period. I must say that without them data for the study could not have been gathered.

I am highly indebted to OgochukwuOkafor, Ezeagu Jacinta and Mrs.OdoFideliafor their assistance during the data collection. I also want to thank MrNnaemekaOnuchukwu for the data analysis.

Finally, I am grateful to my wonderful family for their encouragement and support throughoutthe period of my mastersô program. I wish to particularly thank my parents Mr. and Mrs.VincentAneke.

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ABSTRACT

Malaria in pregnancy is a major public health problem in Nigeria leading to increase in the risk of maternal mortality, low birth weight and infant mortality. Malaria accounts for about 11% of all maternal deaths in Nigeria, and indirectly contributes to additional 11% of maternal deaths mainly by being a leading cause of anaemia in pregnancy.Prevention tools such as use of insecticide-treated nets (ITNs) and intermittent preventive treatment in pregnancy (IPTp) with Sulphadoxine-pyrimethamine (SP) has been shown to be effective in preventing malaria in pregnancy.This study was carried out to assess the use of malaria preventive measures by pregnant women in Enugu. It was a descriptive cross-sectional study involving pregnant women at two ante-natal clinics in Enugu namely; Mother of Christ Specialist Hospital and Polly Clinics.

A total of 330 pregnant women were recruited for this study by systematic random sampling. Data was collected using well structured close-ended questionnairesused to elicit information on socio-demographic characteristics,knowledge of malaria disease,ownership of insecticide treated nets (ITN), and ITN use in pregnancy, as well as the knowledge and uptake of intermittent preventive treatment in pregnancy (IPTp) and barriers to the use of these malaria preventive measures in pregnancy.

At the end of the study, it was observed that Majority 94.5 % of the women were aware of the mode of malaria transmission. A very high knowledge of malaria preventive measures like insecticide treated nets (ITNs) and the intermittent preventive therapy in pregnancy (IPTp) was also observed in this study. A total of 65.5% of the respondents possess insecticide treated nets (ITNs). About 83.6% of the respondents use insecticide treated nets (ITNs) , while 63.7% of the respondents have received intermittent preventive therapy in pregnancy (IPTp).There was no significant association between parity and use of ITNs and parity and uptake of intermittent preventive treatment in pregnancy (IPTp)

The use of these preventive measures use was still found to be poor.Non-availability, cost, erroneous belief and late booking for antennal care were also found to be affecting the use of these malaria preventive measures in pregnancy.

CHAPTER ONE

1.1 INTRODUCTION

Malaria is a parasitic infection caused by the five species of *Plasmodium* that infect humans.[1] The infection is primarily transmitted by the bite of an infected female *Anopheles* mosquito, but infections can also occur through exposure to infected blood products (transfusion malaria) and by congenital transmission.[2]

Malaria has a worldwide distribution, affecting people of all ages, with an enormous burden amounting to 300-500 million clinical cases per year, 80% of which occur in Africa.[3] Sub-Saharan Africa has the largest burden of malarial disease, with over 90% of the worldôs malaria-related deaths occurring in this region.[4, 5] In all malaria-endemic countries in Africa, between 20% and 50% of all hospital admissions are a consequence of malaria.[6, 7] Every year, Malaria is said to cost Africa an estimated 12 billion dollars (US$ 12b) in lost productivity.[6] It has been reported that malaria places a heavy burden on the African poor,this is becauseboth direct and indirect costs associated with a malaria episode represent a substantial burden on the poorer households. [7, 8]

Malaria infection during pregnancy is an enormous public health problem due to its adverse effects on the mother as well as the fetus. It is a major, preventable cause of maternal morbidity, mortality, and poor birth outcomes in sub-Saharan Africa.[11, 12] Pregnant women are at increased risk of more frequent and severe malaria, compared with non-pregnant women. In areas endemic for malaria, it is estimated that more than 30 million pregnant women are threatened by malaria annually and at least 25% of pregnant women are infected while about 10, 000 maternal deaths are attributed to the disease each year.[3,9,10,12]

Recent World Malaria Report indicates that Nigeria accounts for a quarter of all malaria cases in the 45 malaria-endemic countries in Africa, this clearly shows the challenge of malaria in Nigeria.[13] Malaria is transmitted throughout Nigeria with 97% of the population at risk. It is endemic and is responsible for annual economic loss of N132 billion according to the National Malaria Control Programme.[14] It is also responsible for 60% of outpatient visits to health facilities and 30% of hospitalizations. In addition, at least 50% of the population has at least one episode of malaria annually.[15] In Enugu State, for example, malaria is responsible for 70% of outpatient attendance at the secondary healthcare facilities and over 80% of all diseases reported by primary healthcare facilities.[16, 17]

Malaria directly accounts for about 11% of all maternal deaths in Nigeria, and indirectly contributes to additional 11% of maternal deaths mainly by being a leading cause of anaemia in pregnancy.[18, 19]Pregnant women in Nigeria, are mostly infected with *Plasmodium falciparum*, the most virulent Plasmodium with serious health consequences including anaemia, still- birth, and premature delivery.[19] This explains why national efforts to reduce the high maternal and infant mortality place high premium on effective control of malaria in pregnancy.[18, 20] Recent studies have shown that among pregnant women, primigravidae are at highest risk of malarial infection and serious complications.[20] Younger maternal age (particularly adolescence) carries a higher risk of infection and adverse effects. Second trimester is also known to carry one of the highest risks of infection.[20, 21]

In line with the recommendation of the World Health Organization (WHO), the Nigerian national strategy for malaria control in pregnancy focuses on three approaches:

i. Use of insecticide-treated bed nets
ii. Intermittent preventive treatment (IPTp) (for women in high transmission areas).
iii. Effective case management (diagnosis and treatment of illness).

Insecticide-Treated Bed Nets

Insecticide-treated bed nets (ITNs) are now a major intervention for malaria control in pregnancy. They are a form of personal protection that has been shown to reduce malaria illness, severe disease, and death due to malaria in endemic regions.Bed nets treated with an insecticide

are much more protective than untreated nets. The insecticides that are used for treating bed nets kill mosquitoes, as well as other insects. Insecticide-treated nets should be provided as early in pregnancy as possible to all pregnant women living in malarious areas, including epidemic and disaster situations, according to the perceived need in the locality. Their use should be encouraged for women throughout pregnancy and postpartum. Long lasting insecticide treated nets (LLINs/ITNs) can be provided in the antenatal clinic or through other sources in the private and public sectors.[22, 23]

Intermittent Preventive Therapy in Pregnancy (IPTp)

Intermittent Preventive Therapy in Pregnancy (IPTp) entails administration of a curative dose of an effective antimalarial drug to all pregnant women whether or not they are infected with the malaria parasite. Sulphadoxine-pyrimethamine (SP) is the drug currently recommended by the World Health Organisation (WHO). The drug is administered under supervision during antenatal care visits,starting in the second trimester (after quickening).[24]

The Federal Ministry of Health in Nigeria in its National Strategic Plan for the control of malaria in 2001 recommended early case management, two doses of SP during the second trimester and early in the third trimester of pregnancy against the adverse consequences of malaria in pregnancy.[19, 23,25]

Intermittent preventive therapy with Sulphadoxine-Pyrimethamine has been shown to reduce the risk of maternal anaemia, placental parasitaemia and low birth weight. In a study carried out in Ibadan, southwest Nigeria, IPTp-SP was found to be highly effective in preventing maternal and placental malaria among parturient women as well as in improving pregnancy outcomes such as delivery of bigger babies and lower prevalence of preterm deliveries and maternal anaemia.[26]

A study in Malawi evaluating intermittent preventive therapy in pregnancy showed a decline in placental infection from 32% to 23% and in the number of low birth weight babies from 23% to 10%.[27, 28]Intermittent preventive therapy with sulphadoxine-pyrimethamine, given 2 or 3 times during pregnancy to women residing in areas of stable malaria transmission reduces the risk of low birth weight (LBW) in babies and hence increases the probability of child survival. Intermittent preventive therapy in pregnancy can reduce neonatal mortality by more than 60%. IPTp-SP is currently health policy in several African countries, and is being deployed and scaled up through reproductive health programmes[3]. However, scale-up of intermittent preventive

therapy in pregnancy (IPTp) continues to be a challenge in Nigeria. The 2008 demographic health survey (DHS) reported that 5% of pregnant women received two or more of the recommended doses of IPTp, with an increase to 13% in the 2010 malaria information survey (MIS). A number of factors contribute to the low uptake of intermittent preventive therapy in pregnancy IPTp including sporadic availability of sulfadoxine-pyrimethamine, low antenatal care attendance, and poor quality of antenatal care service delivery.[29]

Effective Case Management for Malaria Illness in Pregnancy

Quinine is the most effective of the drugs considered safe for women with uncomplicated malaria in the first trimester and for severe malaria throughout pregnancy.[21, 30] In the second and third trimesters, the artemisinin-based combination therapies (ACTs) that include artemisinin and its derivatives may be given.[21] Case management of malaria should also include diagnosis and treatment of accompanying anemia according to national guidelines[23]Effective case management of malaria illness for all pregnant women in malarious areas must be assured. Iron/folate supplementation for anaemia should be given to pregnant women as part of routine antennal care package.[21, 23, 31]

Other malaria preventive or control measures in pregnancy include:

a. Environmental control

b. Personal protection

c. Indoor residual spraying

d. Community mobilization,education and counseling

e. Surveillance for malaria control and elimination.[2, 32]

Environmental Control

Involves the techniques to reduce mosquito breeding sites such as filling and draining areas of impounded water,prevent water logging, destroy unwanted water collections, keep water containers closed, clearing of vegetation around the houses.[2]

Personal Protection:

Personal protection measures include protection against mosquito bites and chemoprophylaxis against malaria. People living in endemic areas as well as travellers to such areas should be educated and encouraged to use protective measures against mosquito bites. These include; using mosquito-repellant lotions, creams, or mosquito coils and regular use of bed nets.[2]

Indoor Residual Spraying (IRS):

Indoor residual spraying with liquid insecticide, usually dichlorodiphenyltrichloroethane (DDT), kills mosquitoes that come into contact with the sprayed surface and, in the case of DDT, reduces the number of mosquitoes entering indoor spaces.The most common insecticides used are DDT29 and pyrethroids. IRS is appropriate in epidemiological settings where vectors mainly stay indoors and in countries where the necessary logistical capabilities can be deployed.[32]An insecticide for Indoor residual spraying (IRS) is selected in a given area on the basis of data on resistance, the residual efficacy of the insecticide, costs, safety, and the type of surface to be sprayed.[33]

Community Mobilization, Education and Counselling:

As part of antenatal care, skilled providers give women information and counselling on the dangers of malaria, as well as the steps they can take to help protect themselves, their newborns and their children under five. Also, communities should be educated on the mode of transmission and on the means of controlling mosquitoes and reducing mosquito-man contact. Information about the symptoms of malaria should also be provided to the people so that they can seek prompt treatment for all cases of the disease.[2, 34]

Surveillance for Malaria Control and Elimination:

Information on the number and distribution of malaria cases and deaths is critical for the design and implementation of malaria control programmes especially in pregnancy. Information on the incidence of disease in relation to past levels is needed to alert programmers about epidemics, so that control measures can be intensified.[32]

Prevention of malaria in pregnancy is a major public health challenge and a priority for the Roll Back Malaria (RBM) Partnership.[33,35] Current prevention tools such as use of insecticide-treated nets (ITNs) and intermittent preventive treatment in pregnancy (IPTp) with Sulphadoxine-pyrimethamine (SP) though available, face a number of important limitations to their uptake in Nigeria. The Roll Back Malaria (RBM) African Summit held in Abuja, Nigeria in 2000 set a target of having at least 60% of children under-five years of age and 60% of pregnant women use insecticide-treated nets (ITNs) by 2010. [34,36]The Nigerian government is also scaling up efforts at providing free insecticide-treated nets (ITN) to vulnerable groups, as part of the attainment of the millennium development goal, and the recognition by the Nigerian government that access to insecticide-treated nets (ITN) and other malaria preventive and curative services is a right to all vulnerable Nigerians, especially the pregnant women. On the other hand, Nigeria adopted intermittent preventive treatment in pregnancy (IPTp) as a strategy in 2005 to replace weekly prophylaxis.[35,37]

Despite these interventions in place to prevent malaria in pregnancy, the question is now to what extent are the pregnant women in Nigeria taking advantages of these malaria preventive measures in pregnancy? Moreover, malaria control still remains a challenge in Africa where 45 countries, including Nigeria, are endemic for the disease. Despite considerable improvement in healthcare delivery services in the African continent, the control of malaria in pregnant African women, one of several child survival strategies applied through antenatal care, continues to be particularly challenging.[38, 39]

The new policy of the Nigerian Federal Ministry of Health on malaria in pregnancy indicates the strategies for malaria prevention in pregnancy which include; focused antennal care, early detection and prompt appropriate case management of women with symptoms and signs of malaria.[40] Furthermore it was pointed out that integrated vector management including environmental management should be taken into consideration and that effective health education programs should be observed.

1.2 PROBLEM STATEMENT

In areas of stable malaria transmission, pregnant women are particularly vulnerable to malaria infection. In Nigeria, 11% of maternal deaths are attributed to malaria, and 70.5% of morbidity in pregnancy is caused by malaria.[14] Malaria in pregnancy is believed to contribute up to 15% of maternal anaemia in Nigeria.[19] Malaria in pregnancy is also associated with significant degree of intrauterine growth restriction, 36% of preterm deliveries, 30% of preventable low birth weight deliveries, 14% of low birth weight deliveries and 15% of maternal anemia. Maternal malaria is associated with 3-8% of infant mortality in Nigeria.[41] Parasite prevalence in pregnant women in Nigeria could be as high as 60-70%.[19] A study by Ekejindu et al also reported a 21.3% prevalence rate of malaria among the 108 ante-natal women studied in Enugu State.[42] Being a killer disease, malaria kills our poor pregnant mothers and children, hence the increase in maternal and child mortality in Nigeria.[40]

1.3 JUSTIFICATION/RATIONALE

Malaria in pregnancy is an important cause of morbidity and mortality among pregnant mothers. This is because they are the main adult risk group for malaria.[28]Therefore pregnant women in endemic areas should be protected in order to avoid adverse outcomes.Scientific studies have documented high prevalence of malaria parasitaemia among pregnant women in Enugu.[42, 43]

Preventive measure like the use of long lasting insecticide treated nets (LLINs) is one of the best interventions for malaria vector control around the globe.[2]

Intermittent preventive therapy using sulphadoxinepyrimethamine (SP) is another important preventive measure available free of charge for pregnant women at antenatal care clinics in public and private health facilities using the strategy of directly observed therapy (DOT). [2, 44]

Researches have identified that adherence to these preventive measures in pregnancy helps in reducing the adverse consequences of malaria in pregnancy such as reducing the risk of maternal anemia, placental parasitaemia and low birth weight.[23,41]

In recognition of the importance of protecting the vulnerable group against malaria infection,the Enugu State government together with its Roll Back Malaria partners commenced mass distribution of long-lasting insecticide-treated nets (LLINs).[45]This free distribution has no doubt helped to substantially increase mosquito net ownership in Enugu state.Also with the increased awareness of the intermittent preventive treatment in pregnancy (IPTp) services in antenatal care

services as well as through the mass media, the trend of poor usage of malaria preventive measures in pregnancy is expected to have changed.

An important reason for this study will be to assess whether the mass distribution campaign of insecticide treated nets embarked upon by the state government and other roll back malaria partners was effective in achieving a substantial increase in its use among pregnant women. It will also seek to ascertain the effects of increased awareness of intermittent preventive treatment in pregnancy (IPTp) in the attitude of pregnant women towards its uptake.

Judging from the enormous challenge of preventing malaria in pregnancy,adequate assessment and evaluation of the utilization and uptake of these preventive measures is very important. It will also go a long way in providing base line data for malaria control programs with emphasis on malaria prevention and control in pregnancy.

There is a critical dearth of information on the knowledge of the mode of transmission of malaria in pregnancy, as well as the knowledge on the dangers of malaria in pregnancy among pregnant women in Enugu.Similarly,there is also paucity of information on the practice of environmental sanitation aimed at preventing the breeding of mosquitoes. Although there have been many previous studies on malaria preventive measures use by pregnant women in Enugu, these reports are scanty on the actual practice of malaria prevention in pregnancy, hence this research.

The result of this study will present a true picture on malaria preventive measures utilization in pregnancy and also suggest ways of improving access and utilization of these preventive measures.

1.4 RESEARCH OBJECTIVES

General Objective: This research is aimed at assessing the use of malaria preventive measures by pregnant women in Enugu.

Specific Objectives:

1. To ascertain the level of knowledge on malaria among pregnant women in Enugu.

2. To determine level of knowledge of various malaria preventive measures.
3. To assess the use of preventive materials by pregnant women in Enugu
4. To identify barrier(s) to the use of malaria preventive measures.

CHAPTER TWO

LITERATURE REVIEW

2.1 LEVEL OF KNOWLEDGE AND AWARENESS STUDIES ON MALARIA IN PREGNANCY.

In Nigeria, the malaria preventive health behaviours among pregnant women as well as the knowledge about malaria and the treatment-seeking behaviours in the rural communities have been found to be generally poor across the six geopolitical zones in Nigeria.[46,47] Consequently, the symptoms of uncomplicated malaria are easily missed in pregnancy at the home and community level, and this leads to a lot of poor outcomes of pregnancy.

Several studies have suggested that both adherence to malaria treatment and uptake of malaria prevention activities are linearly associated with knowledge of the adverse health effects of malaria especially in pregnancy.[48]A study carried out by Sabin et al in Eastern India on the attitudes, knowledge, and practices regarding malaria prevention and treatment among pregnant women indicated that most respondents viewed malaria as one of the most important health issues affecting pregnant women in their area.[49]Nearly all respondents demonstrated some correct knowledge of malaria transmission and prevention. However, misconceptions on methods of malaria transmission were also observed among the respondents. Some connected malaria infection with an unclean living environment.[49]Many pregnant women do not perceive malaria to be dangerous to pregnancy and the foetus according to a survey by Boene et al. in Mozambique. [50] However, 74 % of the pregnant women studied, perceived mosquito bite as the main mode of malaria transmission.

A number of studies have shown that variations exist in the knowledge of the source of malaria by pregnant women. Obol et al noted in their study in Gulu, Uganda, that majority of the pregnant women 571 (80%) knew that mosquito bite was the mode of malaria transmission. This demonstrated a good level of knowledge on malaria transmission. However, this study also revealed evidence of knowledge gaps about malaria transmission by some pregnant women who reported that malaria is transmitted through cold weather and from dirt.[51]Another study in Tanzania by Ambrose et al also reported a goodunderstanding of malaria transmission in pregnancy and effective means of preventing it. About 65% of the women reported being worried about contracting malaria and reported using bed nets to prevent malaria.[52]These studies agree with yet another study carried out in Omdurman, Sudan on 579 pregnant women which also indicated a good level of knowledge about malaria and its consequences in pregnancy. Despite this level of knowledge about malaria, it was however discovered that the use of preventive measures against malaria was low among these women.[53]

In Nigeria, variations in the knowledge of the source of malaria by pregnant women, has been demonstrated by several studies. A study in Abuja, Nigeria carried out by Akaba et al found that the knowledge of the cause of malaria was excellent as 93% of the women correctly attributed it to mosquito bites.[47] This is similar to the findings of 89% in a study in the mid-western part of Nigeria.[54] This finding is also consistent with findings in community surveys in south western Nigeria.[55] More variations were also noted by various studies on the level of knowledge about malaria and its consequences in pregnancy. In Uyo South-South Nigeria, Abasiattai et al. observed 71.2% knowledge level about malaria and its adverse effects in pregnancy.[56]Iriemenamôs study conducted in Lagos Nigeria, reported that 78.9% of the pregnant women responded correctly to the cause of malaria which was attributed to mosquito bites .[46] This study is in contrast to another study done by Idowu et al which showed a low level of knowledge of malaria transmission in pregnancy.[57]Good level of knowledge about the source of malaria transmission was evidenced in the work by Aniebue et al in Enugu.[58] However, the study also noted the belief in other causes of malaria apart from mosquitoes as widely held by the women and this could cause a diversion of attention to preventive measures from mosquito bites and may also be unwilling to embrace malaria preventive practices.[58]

2.2 USAGE OF MALARIA PREVENTIVE MEASURES BY PREGNANT WOMEN IN NIGERIA

A study by Ugwu et al on the Utilization of insecticide treated nets among pregnant women in Enugu in 2012 discovered that 39.1% of the women used (ITNs). This figure is rather too poor considering that this strategy has been shown to hold the key to malaria prevention in pregnancy. Even though the use of insecticide-treated nets (ITNs) in this population is much greater than the 5% overall estimated national use according to the Nigerian Demographic and Health Survey (DHS) of 2008, the figure still falls highly short of the World Health Assembly (WHA) target of 80% use among pregnant women by the end of 2010.[36] However, a study by Aluko noted high knowledge of Malaria in Pregnancy but poor positive attitude towards the use of long lasting insecticide treated nets [LLINs/ITNs].[37] This also is in line with the study done by Auta which also recorded low usage of long lasting insecticide treated nets (LLINs/ITNs) among pregnant women studied.[14]

In their study in southï west Nigeria, Oladokun et al shows a disturbing gap between knowledge and practice. Although most of the women were aware of the protective nature of ITNs, it was observed that very few of them were actually using these long lasting insecticide treated nets (LLINs/ITNs).[59]On the contrary, a study carried out by Wogu et al in port Harcourt, Rivers state, discovered that the overall compliance rate of pregnant women to long lasting insecticide treated nets (LLINs/ITNs) use was 79% while those who did not use long lasting insecticide treated nets (LLINs/ITNs) was 21%. The study also showed that pregnant women who were long lasting insecticide treated nets (LLINs/ITNs) compliant had lower malaria prevalence rates than those who were not long lasting insecticide treated nets (LLINs/ITNs) compliant.[60] This is also in

agreement with the study carried out in Uganda by Sangare et al, 73% of the women studied reported either always sleeping under the net during all trimesters of pregnancy, or always sleeping under the net after they acquired one during pregnancy. The primary reason for not always sleeping under the net was as the heat.[61]

A study in Gabon reported that intermittent preventive treatment in pregnancy (IPTp) with Sulphadoxine-pyrimethamine (IPTp-SP) coverage is over 80%. Bed net coverage is still low, it was found to be below 60%.[62]A research undertaken by Onwujekwe et al in Enugu in 2012, observed that the intermittent preventive treatment (IPTp) coverage was low. Only 18% pregnant women received an antimalarial drug for the prevention of malaria during the pregnancy, 11% received at least one dose of SP and 7% received two or more doses.[35]

Another study carried out by Onoka et al in Enugu state reported that the Overall IPTp coverage for the first and second doses was 13.7% and 7.3% respectively. Coverage was observed to be higher in the urban areas compared to rural areas. Amongst women who could have received IPTp based on the timing of their attendance, only 14.1% and 14.3% were offered the first dose based on national and WHO guidelines, while 7.7% and 7.5% were offered the second dose respectively giving significant missed opportunities. Only 13.6% and 21.5% of these clients reported taking the drug under direct observation.[19]Other forms of anti-vector measure commonly used include; Mosquito screens on windows, insecticide sprays, mosquito coils, herbs, and mosquito repellants.[60]

2.3 BARRIERS TO THE USE MALARIA PREVENTIVE MEASURES IN PREGNANCY IN NIGERIA

Malaria in pregnancy still exerts its toll on pregnant women and their unborn babies. Implementation of strategies to curb this menace has been the focus of numerous programmes. However, the widespread implementation of effective programmes remains a considerable challenge. Despite the strong evidence on the safety of long lasting insecticide treated nets (LLINs/ITNs) in pregnancy, a good proportion of our women still have reservations in its use

because of unfounded fear of deleterious effects on their unborn babies. Many of them complains of heat, discomfort and fear of the chemicals used in treating the net.[36]

Cost and availability are other factors identified to hinder the use of long lasting insecticide treated nets (LLILs/ITNs) by our women. Long lasting insecticide treated nets (LLINs/ITNs) are meant to be readily available and distributed free of charge to people at risk particularly the pregnant women and children. The study by Ugwu et al in Enugu also reported that someof the women that used long lasting insecticide treated nets (LLINs/ITNs) in the population bought them from the open market which implies that ITNs that are meant to be distributed free of charge by the Government/Roll Back Malaria partners are still being hijacked by some unscrupulous personnel for selfish purposes.[36]

Successful deployment of intermittent preventive treatment in pregnancy (IPTp) is dependent on the utilization rates of antenatal care (ANC) services amongst pregnant women. Most of the women pay the first visit in the 3rd trimester. This may affect the impact of ante-natal care (ANC) and IPTp related services as delivery of the second dose of SP is substantially reduced and envisaged protection for mother and foetus is lost.[19] Apart from failure to attend ANC clinics, other identified barriers to use of IPTp include poor acceptance of Sulphadoxine-pyrimethamine (SP) because of perceived association of Sulphadoxine-pyrimethamine (SP) with side effects, abortions and foetal deformities as well as poor understanding of the protocol among health care providers and the community.[33]

The safety of mosquito coils and insecticides spray is highly questionable as it is often associated with cough, catarrh and other respiratory symptoms, and their effectiveness have not been well studied. Similarly, the effectiveness of window screen on the other hand is poor as it only serves as barrier to mosquitoes and does not kill the vectors.[36]

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study area is Enugu, the capital of Enugu State in Nigeria. It is located in south eastern Nigeria. The city has a population of 722,664 according to the 2006 Nigerian census. Enugu is largely urban. It is made up of three local governments: namely; Enugu- North, Enugu-South and Enugu- East. The population of Enugu is predominantly Christian. Most people in Enugu speak English and Igbo. Enugu is located in a tropical rain forest zone. The city has a tropical savannah climate. Enugu's climate is humid and this humidity is at its highest between March and November. For the whole of Enugu State the mean daily temperature is 26.7 °C (80.1 °F).The average annual rainfall in Enugu is around 2,000 millimetres (79 in). Malaria transmission in the area is stable and holoendemic.[35]

The stateôs health delivery is through a network of private and public health facilities. Some notable hospitals in Enugu include; the ESUT Teaching Hospital, Polly Clinics, University of Nigeria, Teaching Hospitaland the Mother of Christ Specialist hospital and maternity among others. Enugu is also full of industrial and commercial activities, the main industrial area of the city is Emene, located at the North-Eastern part of the city while the major market is Ogbete main market, located close to the Nigeria prisons, Enugu. Notable and popular residential areas include: Independence Lay-out, New Haven, Achara Layout, Zik-Avenue, Uwani, Trans-Ekulu, Abakpa-Nike, Emene and Awkunanaw.

3.2 Study Design

The study is a descriptive cross-sectional study to assess the ñUse of malaria preventive measures by pregnant women in Enuguò. In this study, pregnant women that presented for antenatal care visits were interviewed using well structured questionnaires in line with the objectives of this study.

3.3 Study Population

Inclusion criteria: All pregnant womenin their second or third trimesters thatattended ante-natal clinics in the two health facilities selected namely- Mother of Christ specialist hospital and Polly clinics fromFebruaryto April 2015.

Exclusion criteria: All pregnant women in their second and third trimestersthat failed to give their consent to participate in the study wereexcluded from the sample population.

3.4 Sample Size Determination

Based on the study carried out byAnkomah et al on the Determinants of insecticide-treated net ownership and utilization among pregnant women in Nigeria, the use of Insecticide-treated net (LLINs/ITN) was found to be at 25.7%.[18]This value was used as the sample proportion obtained in a previous study P

The sample size was calculated using the formula: $n = Z^2pq/d^2$ where,

n = minimum sample size,

Z = standard normal deviation at 1.96 (95%) confidence level

p = sample proportion from a previous study= 25.70% (0.257)

Where q = 1-p, d = Degree of precision at 5% or 0.05

Therefore, $n = \frac{1.96^2 \times 0.257\ (1-0.257)}{(0.05)^2}$

$= \frac{3.842 \times 0.257 \times 0.743}{0.0025}$

n=293.45 =294

10% of 294were added to the calculated sample size to compensate for the anticipated non-respondents.

10j 294

100 = 29.4

Therefore the minimum sample size is; 29.4 + 294 = 323.4

This figure was rounded off to 330 for convenience.

3.5 Sampling Method

The population of pregnant women attending ante-natal care clinicsobtained for the three months duration of the study was used as the sampling frame.The average number of pregnant women for one month in the health facilities was;Pollyclinic (114) and Mother of Christ Specialist Hospital (220) respectively. The sampling interval was calculated as follows.

Sampling population=114+220 = 334 × 3=1002(Total population for 3 months)

Sample size=330,Therefore,the sampling interval=1002/330=3.036å 3

Using systematic sampling method, every third pregnant woman that booked for ante-natal careon a booking day in the selected health facilities (165 from each facility) wasselected provided that they meet the inclusion criteria.

3.6 Instrument for Data Collection

Information was obtained from respondents using a closed-ended pre-tested structured questionnaire which was administered to consenting pregnant women presenting themselves for ante-natal care. The questionnaire was used to obtain information on the socio-demographic and economic characteristics of respondents and their households,knowledge about malaria and preventive measures, use of malaria preventive measures and barriers to the use of preventive measures. The questionnaire covered all the specific objectives of this research.

3.7 Data Organization and Analysis.

Data collected in this study wasentered using Census Survey Processing System and then analyzed using Statistical Package for Social Sciences (SPSS).The relationship between variables was tested using Chi-square at 5% confidence level.

Determination of knowledge levelof the respondents.

Respondentsô knowledge about *mosquito breeding environment,symptoms of malaria infection,adverse effects of malaria in pregnancy* and *means of malaria prevention during pregnancy*were assessed to determine the knowledge level of the respondents.Each of the variables consisted of correct options. A point was given to each correct option chosen.Knowledge of mosquito breeding environment was assessed with 3 correct options,scores of (0-1) were considered as inadequate knowledge while scores of (2-3) were considered as adequate knowledge,also knowledge of adverse effect of malaria in pregnancy was assessed using 4 correct options,scores of (0-2) were considered as inadequate while scores of (3-4) were considered as inadequate.Similarly, symptoms of malaria and means of malaria prevention during pregnancy were assessed using 6 correct options each,scores of (4-6) were taken as adequate knowledge while scores of (0-3) were considered as inadequate knowledge.

3.8 Ethical Approval.

Approval for this research was granted by the Research Ethics Committee of the Enugu State Ministry of Health,Enugu. Individual informed consent was also obtained from all participants following a verbal and written explanation of study aims and procedures.

CHAPTER FOUR

RESULT AND ANALYSIS:

4.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS:

Table 1: Socio Demographic Information

Variables	Frequency	Percent (%)
Ethnic group		
Yoruba	11	3.3
Ibo	311	94.2
Hausa	5	1.5
Others	3	0.9
Total	**330**	**100**
Level of Education		
No formal education	4	1.2
Primary	10	3
Secondary	124	37.6
Higher institution	190	57.6
Others	2	0.6
Total	**330**	**100**
Religion		
Christianity	323	97.9
Islam	6	1.8
Traditional	1	0.3
Total	**330**	**100**
Marital status		
Single	8	2.4
Married	318	96.4
Divorced	1	0.3
Widowed	3	0.9
Total	**330**	**100**
Occupation		
Civil/public servant	69	20.9

Business/trade	118	35.8
Artisan	25	7.6
Unemployed	55	16.7
Students	63	19.1
Total	**330**	**100**

A total of 330 pregnant women participated in the study. The ages of the participants ranged from 15 years to 46 years. The mean age of the participants was 27.73 (Standard error=5.053). Most of the women 311(94.2%) are from the Ibo ethnic group. A large proportion of the respondents 190(57.6%) had higher educational qualifications (attended higher institutions).

Majority of the respondents 323(97.9%) were Christians. A total of 318 (96.4%) women were married. On the occupation of the respondents, 118 (35.8%) women were in business or trade (Table 1).

Table 2: Parity and Antenatal care (ANC) Use during pregnancy

Variables	Frequency	Percent (%)
Parity of respondents		
Primigravidae	80	24.2
Primipara	112	33.9
Multigravidae	135	40.9
Grand multipara	3	0.9
Total	**330**	**100**
Pregnancy age of the respondents		
4-6 months (2nd trimester)	132	40.0
6-9 months (3rd trimester)	198	60.0
Total	**330**	**100**
Time of commencement of Antenatal visit.		
1-3 months (1st trimester)	134	40.6
4-6 months (2nd trimester)	166	50.3
6-9 months (3rd trimester)	30	9.1
Total	**330**	**100**

Multigravidae constituted 135(40.9%) of the respondents. About 198 (60%) of the respondents were women in their third trimester. Also 166(50.3%) of the women commenced their antenatal visit in their second trimester (Table 2).

4.2 KNOWLEDGE OF THE DANGERS OF MALARIA IN PREGNANCY

Table 3: Knowledge on Malaria Disease.

Variables	Frequency	Percent (%)
Mode of transmission of malaria		
Mosquito bite	312	94.5
Eating too much palm oil	12	3.6
Too much sunlight	6	1.9
Total	**330**	**100**
Do pregnant women suffer from malaria more than non-pregnant?		
Yes	249	75.5
No	31	9.4
Don't know	50	15.2
Total	**330**	**100**
Pregnant women suffer malaria as a result of:		
Weight	26	10.4
Decline in immune system	161	64.7
Bigger stomach	8	3.2
I do not know	45	18.1
Others	9	3.6
Total	**249**	**100**

Majority of the respondents 312(94.5%) knew that malaria is transmitted by mosquito bites. However, there were some misconceptions observed on the mode of transmission of malaria. On the knowledge of malaria in pregnancy, 249(75.5%) knew that pregnant women suffer malaria more than the non-pregnant women (Table 3).

Determination of Respondents' Level of Knowledge on Mosquito Breeding, Adverse Effect of Malaria in Pregnancy, Symptoms of Malaria and means of Malaria Prevention during Pregnancy.

Table 4: Knowledge Level on the mosquito breeding environment.

Variables	Frequency	Percent (%)
Knowledge score of mosquito breeding environment.(0-3)		
Inadequate Knowledge (0-1)	222	67.3
Adequate Knowledge (2-3)	108	32.7
Total	**330**	**100**

Among the respondents, 222(67.3%) had inadequate knowledge while 108(32.7%) had adequate knowledge of the mosquito breeding environment (Table 4).

Table 5: Knowledge Level on the adverse effect of malaria in pregnancy.

Variable	Frequency	Percent (%)
Knowledge score of the adverse effect of malaria on pregnant women (0-4).		
Inadequate knowledge (0-2)	233	70.6
Adequate knowledge (3-4)	97	29.4
Total	**330**	**100**

Among the pregnant women studied, 233(70.6%) had inadequate knowledge and 97(29.4%) had adequate knowledge of the adverse effect of malaria in pregnancy(Table 5).

Table 6:Knowledge Level on the symptoms of malaria.

Variable	**Frequency**	**Percent (%)**
Knowledge score of the symptoms of Malaria (0-6).		
Inadequate knowledge (0-2)	211	63.9
Adequate knowledge (3-6)	119	36.1
Total	330	100

About 211(63.9%) had inadequate knowledge while 119(36.1%) had adequate knowledge of the symptoms of malaria(Table 6).

Table 7:Knowledge level on the means of malaria prevention during pregnancy.

Variable	**frequency**	**Percent (%)**
Knowledge score of the means of malaria prevention during pregnancy (0-6).		
Inadequate knowledge (0-2)	220	66.7
Adequate knowledge (3-6)	110	33.3
Total	**330**	**100**

About 220(66.7%) had inadequate knowledge and 110(33.3%) had adequate knowledgeof means of malaria prevention during pregnancy (Table 7).

4.3 VARIOUS MALARIA PREVENTIVE MEASURES USED BY THE PREGNANT WOMEN.

Table 8:Respondents' ITNs Awareness and Ownership.

Variables	Frequency	Percent (%)
knowledge of insecticide treated net (ITNs)		
Yes	325	98.5
No	5	1.5
Total	**330**	**100**
Insecticide Treated Nets are		
Used for treating malaria	27	8.3
Used for preventing mosquito bites	296	91.1
Used for giving birth	2	0.6
Total	**325**	**100**
Safety of insecticide treated net in pregnancy		
Yes	311	95.7
No	14	4.3
Total	**325**	**100**
Ownership of insecticide treated net (ITN)?		
Yes	213	65.5
No	112	34.5
Total	**325**	**100**
Did you pay for the ITN		
Yes	20	9.4
No (Free)	193	90.6
Total	**213**	**100**
If 'No'(Do not have ITN), why?		
I cannot afford it	8	7.1
I was not given during free distribution	66	58.9
I don't know where to get one	32	28.6
I don't think I need it	6	5.4

Total	**112**	**100**

Of the 330 pregnant women studied, 325(98.5%) said that they knew about insecticide treated nets (ITNs). Majority of the women 296(91.1%) answered correctly the use of ITNs which is the prevention of mosquito bites. Most of the women 311(95.7%) admitted that ITNs use is safe in pregnancy. About 213(65.5%) reported that they have ITNs.

Furthermore, a majority of the women 193(90.6%) who have ITNs said they got it free during the mass distribution (Table 8).

Table 9: IPTp Awareness by the Pregnant Women

Variables	Frequency	Percent (%)
Are you currently aware of Intermittent Preventive Therapy in Pregnancy (IPTp)		
Yes	245	74.2
No	85	25.8
Total	**330**	**100**
Intermittent Preventive Therapy (IPTp) can be given to?		
Men	6	2.4
Pregnant women	234	95.5
Aged people	5	2
Total	**245**	**100**
Where do pregnant women get Intermittent Preventive Therapy (IPTp) drug?		
Antenatal clinics	228	93.1
Pharmacy shops	6	2.4
At home	9	3.7
Others	2	0.8
Total	**245**	**100**
Do you know how many tablets of IPTp drug is being used at once as a dose?		
1 tablet	31	12.7
2 tablets	66	26.9
3 tablets	121	49.4
4 tablets	16	6.5
5 tablets	11	4.5
Total	**245**	**100**

On the other hand, this study observed that 245(74.2%) of the pregnant women were aware of intermittent preventive therapy in pregnancy.

Also, 234(95.5%) answered that IPTp is for pregnant women only,while 228(93.1%) responded that the IPTp drugs can be received at the ante-natal clinics. About 121(49.4%) responded that only 3 tablets are taken as a single dose of IPTp drug (Table 9).

4.4 ASSESSING THE USE OF PREVENTIVE MATERIALS BY PREGNANT WOMEN IN ENUGU.

Table 10 : Use of ITN in Pregnancy

Do you use your insecticide treated net (ITN) currently?		
Yes	178	83.6
No	35	16.4
Total	**213**	**100**
If you use ITNs currently, when last did you use one?		
The night before	77	43.3
A week ago	17	9.6
More than a week ago	13	7.3
A month ago	8	4.5
More than a month ago	46	25.8
Others	17	9.6
Total	**178**	**100**
What is your most important influence to use insecticide treated nets (ITNs)?		
Because it is given free	15	8.4
Advised by a doctor or nurse	65	36.5
Advert on radio or poster	14	7.9
Hearing from other pregnant women	3	1.7
Know its importance	81	45.5
Total	**178**	**100**

Majority of the respondents 178(83.6%) said that they currently use their ITNs. A good number of the respondents 77(43.3%) who used ITNs reported to have used it the night before this study. About 81(45.5) of the respondents used ITNs because they knew its importance(Table 10).

Table 11; Use of Intermittent Preventive Therapy in Pregnancy (IPTp) in Pregnancy

When is Intermittent Preventive Therapy (IPTp) doses recommended to be used during pregnancy?		
Never	3	1.2
Anytime	43	17.6
Between 16 weeks and 32 weeks	123	50.2
I don't know	76	31
Total	**245**	**100**
Since you have been coming to this Antenatal Care Center, have you received Intermittent Preventive Therapy (IPTp)?		
Yes	156	63.7
No	68	27.8
I donât know	21	8.6
Total	**245**	**100**

Did you take the drug under observation by a health worker?		
Yes		
No	112	71.8
Total	44	28.8
	245	**100**

Table 11 aboveshows that 123(50.2%) of the women knew that IPTp drugs are recommended to be used between 16 weeks and 32 weeks. About 156(63.7%) said that they have received IPTp since coming to the antenatal clinic. Among the women that have received IPTp , 112(71.8%) admitted taking the drug under observation of a health care worker.

4.5 BARRIERS TO THE USE OF PREVENTIVE MEASURES.

Some of the women 14(4.3%) believed that ITNs are not safe in pregnancy. About 27(77.1%) of them said that ITNs it causes excessive heat. Among those who did not have ITNs, 66(58.9%) said they did not collect during the free distribution of ITNs in the state, 8(7.1%) said that they cannot afford it (Table 8)

Some pregnant women 30(9.1%)started their antenatal care visit in their third trimester (Table 2).

Table 12. Relationship Between Parity and Knowledge of the mode of Malaria Transmission

Variable	Parity		Chi-Square (p-Value)
	Primigravidae/Primipara	**Multigravidae/Grand multipara**	
Mode of transmission of malaria			
Mosquito bite (correct)	182 (94.8)	130 (94.2)	
Others (incorrect)	10 (5.2)	8 (5.8)	
Total	**192 (100.0)**	**138 (100.0)**	**0.054 (0.816)**

Among the pregnant women who were aware of the mode of transmission of malaria i.e312(94.5%), primigravidae and women of lower parity were more knowledgeable than multigravidae. However,there was no statistically significant association between knowledge of malaria transmission and parity. (X^2= 0.054, P= 0.816) (Table 12).

Table 13. Relationship Between Parity and Use of ITNs.

Variable	Parity		Chi-Square (p-value)
	Primigravidae/Primipara	**Multigravidae/Grandmultigravidae**	
Use of ITNs			
Yes	87 (82.9)	91 (84.3)	
No	18 (17.1	17 (15.7)	
Total	**105 (100.0)**	**108 (100.0)**	**0.076 (0.782)**

In the group of women that use ITNs 178 (83.3%),women with lower parity and the primigravidae were less likely to use ITNs than women of higher parity although the association was not statistically significant.(X^2= 3.649, P= 0.065) (Table 13).

Table 14.Relationship Between Parity and Use of IPTp

Variable	Parity		Chi-Square (p-value)
	Primigravidae/Primipara	Multigravidae/Grand multigravidae	
Use of IPTp			
Yes	87 (61.3)	69 (67.0)	
No	55 (38.7)	34 (33.0)	
Total	**142 (100.0)**	**103 (100.0)**	**0.845 (0.358)**

Similarly, there was no statistically significant association between parity and the use of IPTp. However, women with higher parity 69 (67%) have received IPTp more than the women of lower parity and the primigravidae.(X^2= 0.845,P= 0.358) (Table 14).

DISCUSSION

The knowledge and use of malaria preventive measures among pregnant women are very important factors, which are pivotal to the realization of the targets of the Roll Back Malaria program.[47]The more knowledgeable the pregnant women are about the dangers of malaria in pregnancy, the more likely they will use preventive measures against malaria.

In this study, there is a high level of knowledge of the mode of transmission of malaria. Majority of the respondentsknew that malaria is transmitted by mosquito bites. This is similar to the findingsof 93% in a study in Abuja, Nigeria on knowledge and utilization of malaria preventive measures among pregnant women.[47]This high level of awareness suggests that a lot of these women will embrace preventive measures against malaria. However, the knowledge of the symptoms of malaria, mosquito breeding environment and the adverse effects of malaria in pregnancy was found to be generally poor.

Awareness of the use of insecticide treated nets (ITNs) was quite high in this study.This high knowledge is supported by a report of 93% knowledge of the use of ITNs from a previous study in Anambra state,South East Nigeria [63]and implies that most of the pregnant women in this study were well informed on ITNs use which suggests that some level of health education on malaria has already taken place in the area.

On the other hand, a good number of the pregnant women was found to be aware of intermittent preventive therapy in pregnancy (IPTp), this is higher than 52.2% awareness level of IPTp observed in a study done in Southwestern Nigeria on the utilization of IPTp for malaria among pregnant women.[33] This suggests an improvement in the awareness campaign in Enugu. The level of knowledge that the pregnant women have about IPTp will inform them on whether

to regularly attend the antenatal clinic (ANC) to receive sulphadoxine-pyrimethamine (SP) or not and this will affect the uptake of IPTp.

In this study, a good number of the pregnant women have ITNs. This is not consistent with the study done in Enugu which observed that 43.1% of the pregnant women studied have insecticide treated nets.[36] This increase in ITNs ownership was no doubt brought about by the free distribution of insecticide treated nets in Enugu State by the Roll Back Malaria partners in the recent past. Use of ITNs was found to be very high in this study. However, lesser number of women were found to have used ITNs the night before this study although this is higher than 18% observed in the National Demographic Health Survey (NDHS) of 2013.[64]This study, also found that a good number of the pregnant women have received IPTp drug but this is still grossly lower than the expected WHO target of reaching at least 80% of pregnant women with IPTp by the end of 2010.[33]This scenario observed almostfive years away from the target year of 2010 shows that this target was not realized. There was no statistically significant relationship between parity and the use of ITNs in this study and this agrees with another study in south south, Nigeria.[65] On the other hand no statistically significant relationship exists between parity and uptake of IPTp among the respondents.

Barriers also exist in the use of preventive measures against malaria in pregnancy in this study.Some misconceptions were observed on the mode of transmission of malaria and these wrong beliefs no doubt will have negative implications on malaria control programs as energy and resources would be channelled wrongly toward control and prevention of malaria by these women. They may also be unwilling to embrace malaria preventive practices.[47]It is worrisome to note that some womenbought their own ITNs from the market or pharmacy stores. Insecticide treated nets are meant to be distributed free of charge to people at risk particularly the pregnant women and children which is the aim of the Roll back malaria partnership free ITNs distribution. The sale of these ITNs will deny some of these women the benefits of malaria prevention as some of them may not be able to afford ITNs. This finding of the availability of these ITNs in the market is consistent with another study done in Enugu, on the utilization of insecticide treated nets among pregnant women.[36]

Another observation from this study found that some of the respondents did not take the IPTp drug under observation of the health care workers. The implication of this is that the drug may not be taken afterall as past study have reported that some women do throw away the drugs when they take it home or take the dosage wrongly.[66] This is contrary to the guidelines for IPTp administration which stipulate the use of directly observed treatment (DOT).

Furthermore, this study shows that some pregnant women still book late for antenatal care. Late booking for antenatal care prevents women from getting the maximum benefits of antenatal care, including improving their knowledge on malaria and its preventive measures as well as the utilization of these measures in pregnancy especially the IPTp using SP.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

This study noted that there is a high level of knowledge of the cause of malaria among pregnant women in Enugu. Similarly, high level of knowledge of preventive measures was also observed in this study.

However, the use of these preventive measures for malaria among these women was found to be poor compared to the level of awareness observed in this study.This scenario is quite worrisome as many of these women are missing out on the protection derived from these malaria preventive measures.

Non-availability, cost, erroneous belief and late booking for antennal care were also found to be among the factors affecting the use of these malaria preventive measures in pregnancy in this study.

RECOMMENDATIONS.

The following recommendations have been made based on the findings of this study.

1. Improved awareness on malaria disease which will aim at increasing the knowledge about malaria transmission and target mostly the less educated women e.gtraders,artisans etc.

2. Government should ensure that the free ITNs distribution in the future gets to the people which it is intended for and prevent its use for selfish gain by some individuals.

3. Correction of erroneous belief on the safety of insecticide treated nets through awareness campaigns needs to be carried out.

4. Health education which will aim at increasing the uptake and utilization rate of malaria preventive measures should be carried out

5. Late booking of pregnant women for antenatal care should be discouraged.

6. Use of directly observed treatment (DOT) in IPTp administration should be emphasized and maintained in all health facilities.

7. Similar study should be carried out in the rural areas for comparison.

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APPENDIX1

QUESTIONNAIRE

USE OF MALARIA PREVENTIVE MEASURES BY PREGNANT WOMEN IN ENUGU.

Dear Respondent,

This questionnaire is prepared by AnekeVitalisIkenna, an MPH Student of the Department of Community Medicine, College of Medicine, University of Nigeria, Enugu Campus. This questionnaire is designed to obtain information on the ó**USE OF MALARIA PREVENTIVE MEASURES BY PREGNANT WOMEN IN ENUGU'**. All information would be treated confidentially. Please kindly ensure that you answer all questions truthfully.

Thanks for your cooperation.

Date: é é é é é é é é é é é é

Tick [√] *the most appropriate response.*

SECTION A: SOCIO DEMOGRAPHIC INFORMATION

1. **What is your age? ……**

2. **Which Ethnic group do you belong?**

Yoruba [1] Ibo [2] Hausa [3] Others Please Specify [4] .....

3. **What is your level of education?**

[1] No formal education
[2] Primary
[3] Secondary
[4] Higher Institution
[5] Others Please Specify.....

4What is your religion?

[1]Christianity
[2] Islam

[3] Traditional
[4] Other Please Specify).....

5. What is your marital status?

[1] Single
[2] Married
[3] Divorced
[4] Separated
[5] Widowed

6. What is your Occupation? .....

SECTION B: KNOWLEDGE ON MALARIA DISEASE AND PREVENTIVE MEASURES

7. How is malaria transmitted?

[1] Through mosquito-bites
[2] Eating too much palm oil
[3] Too much sunlight
[4] Others, please specify é é é é é é

8. The following encourages mosquito breeding/malaria transmission.

[1]Presence of stagnant water
[2] Lakes, pits, gutters
[3]Overgrown weeds/bushes.

9.Which is/are symptoms of malaria?

[1] Fever
[2] Headache
[3] Body Pains
[4] Shivering
[5]Vomitting
[6] Loss of apetite

10. Do pregnant women suffer from malaria more than non pregnant women?

Yes [1] No [2]. Donôt know [3]

11. What makes pregnant women suffer from malaria more?

[1] Weight gain
[2] Decline in immune system
[3] Bigger stomach

[4] Others.Please Specify.....

12. Which is/are the adverse effect of malaria in Pregnancy?

[1] Miscarriage
[2] Still birth
[3] Low birth weight
[4] Maternal death.
[5]Others please Specify.....

13. How can malaria be prevented during pregnancy?

[1] Use of mosquito coils
[2] Use of ITNs(Insecticide treated nets)
[3] Use of intermittent preventive therapy in pregnancy(IPTp)
[4] Environmental sanitation
[5] Use of windows/door nets.
[6] Insecticide spray
[7] Others please specify.....

SECTION C:HISTORY OF MALARIA DURING PREGNANCY

14. How many times have you been pregnant that you carried to term?.....

15. How old is your Pregnancy?

[1]4-6 months (2^{nd} trimester)
[2]7-9 months (3^{rd} trimester)

16. When did you start antenatal visit?

[1]1-3 months (1^{st} trimester)
[2]4-6 months (2^{nd} trimester)
[3]7-9 months (3^{rd} trimester)

17. Haveyou ever had malaria during this pregnancy?

Yes [1] No [2]

18. During the illness, what was your first treatment?

[1] Did you go to the Hospital?
[2] Did you use herbal medicine?

[3] Did you treat yourself at home?
[4] Did you use any drug bought in the chemist?
[5] Any other treatment, please specify .....

SECTION D: PRACTICE OF MALARIA PREVENTION IN PREGNANCY

19. Do you know about Insecticide treated Nets (ITNs)?

Yes [1]. **No** [2].

20. If YES, Insecticide Treated Nets (ITNs) is

[1] Used for treating Malaria
[2] Used for preventing mosquito bites
[3] Used for giving birth.

21. Do you think Insecticide treated Nets (ITN) is Safe in Pregnancy?

Yes [1] No [2]

22. Do you have Insecticide treated Net (ITN)?

Yes [1] No [2]

23.Where did you get your Insecticide treated Net (ITN)? .....
24. How much did you get your Insecticide treated Net (ITN)? .....

25. If NO, in 22above,Why? .....

[1] I cannot afford it
[2] I was not given during free distribution
[3] I donôt know where to get one
[4] I donôt think I need it

26. Do you use your Insecticide treated Nets (ITN) currently?
Yes [1] No [2]

27.What is your most important influence to use Insecticide treated Nets (ITNs)?
[1] Because it is given free
[2] Advised by a doctor or nurse
[3] Advert on radio or poster
[4] Hearing from other pregnant women
[4] Having an extra net for kids
[5] Know its importance

28. If 'YES', (in 26 above), when last did you use one?

[1] The night before
[2] A week ago
[3] More than a week ago
[4] A month ago
[5] More than a month ago

29. If 'NO', (in 26 above) what is/are your reason(s) for not using Insecticide treated Nets (ITN)?

[1] Torn/damaged
[2] Smells bad
[3] It causes excessive heat
[4] Difficulty in setting up the net
[5] Fear of chemical poisoning ,
[6] Causes itching
[7] No bed
[8] Not enough
[9] Others please specify.....

30. Are you currently aware of Intermittent Preventive Therapy (IPT)?

Yes [1] No [2]

31. Intermittent Preventive Therapy (IPTp) can be given to?

[1]. Men
[2]. Pregnant Women
[3]. Aged People
[4]. Boys

32. From where did you hear about Intermittent Preventive Therapy (IPTp)?

[1] Friends
[2] Husband
[3] Radio or Television
[4] Hospital posters
[5] Antenatal clinic
[6] Others, please specifyé é é é é é é .

33. Where do pregnant women get Intermittent Preventive Therapy (IPTp)?

[1] Antenatal clinics
[2]Pharmarcy shops
[3] At Home
[4]Others Please Specify.....

34.Do you know how many tablets of Intermittent Preventive Therapy (IPTp) drug is being used at once as a dose?

[1]. 1 tablet
[2]. 2 tablets
[3]. 3 tablets
[4]. 4 tablets
[5]. 5 tablets

35. When is Intermittent Preventive Therapy (IPT) doses recommended to be used during pregnancy?

[1] Never
[2] Anytime
[3] Between 16 weeks and 32 weeks
[4] I do not know

36. Since your coming to this Antenatal care centre, have you received Intermittent Preventive Therapy (IPT) drug?

Yes [1]. No [2] Donôt know [3]

37. If YES,were you being observed by a health care worker while taking the drug?

Yes [1] No [2]