DETERMINANTS OF PREVENTION AND TREATMENT OF MALARIA AMONG PREGNANT WOMEN IN BAUCHI METROPOLIS, NIGERIA.

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C50F/30673/2015

A THESIS SUBMITTED TO THE SCHOOL OF HUMANITIES AND SOCIAL SCIENCES IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN SOCIOLOGY OF KENYATTA UNIVERSITY

APRIL, 2021

DECLARATION

I, Gambo Suleiman, hereby declare that this thesis is my original work and has not been submitted in this form in any other institution for examination purpose. Any quotation has been referenced accordingly.

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DEDICATION

I dedicate this work to my late parents Hafsat Yakubu and Suleiman Umar Saraki for giving me proper guidance and orientation to become a better person. I also dedicate this work to my wife Safiya Isyaku Baraza and my daughters Aisha and Fatima for their useful advice and patience.

ACKNOWLEDGEMENTS

I thank the Almighty God for making this work possible. My sincere appreciation to my late parents Hafsat Yakubu and Suleiman Umar Saraki for believing in me and investing in my education. My sincere thanks go to my siblings Muhammed Saraki, Garba S Saraki, Indo Saraki, Lami Saraki, my late brother Umar Saraki, Yakubu Saraki, Barr Hassan Saraki, Barr Hussaini Saraki and Abdulaziz Saraki. Their moral support has led me to aim for the highest; nothing can ever compare to what they have invested in me. Thank you for the sacrifice you made to shape my future.

I also express my most sincere appreciation to my supervisors Dr Francis Kerre, Dr George Evans Owino. My appreciation also goes to my overseer Dr Jane Wangaruro. Am also grateful to Dr Gladys Nyacheo, Dr Geraldine K. Musyoki and prof. Lucy W Maina of the Department of Sociology, Gender and Development Studies Kenyatta University, for their dedicated support and professional guidance. My sincere appreciation also go to Babagana Abba, Musa Saleh and Sulaiman Ahmad. Their suggestions and observations have been instrumental in this study. Similarly, am grateful to the Chairperson Department of Sociology, Gender and Development Studies and the entire staff of Kenyatta University.

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ACRONYMS

ANC:	Antenatal Care
BACATMA:	Bauchi State Agency for the Control of HIV & AIDS, Tuberculosis, Leprosy and Malaria
BSMOH:	Bauchi State Ministry of Health
EM:	Explanatory Model
FMOH:	Federal Ministry of Health
HIV:	Human Immunodeficiency Virus
IPTP:	Intermittent Preventive Treatment for Pregnancy
ITNS:	Insecticides Treated Nets
LLINS:	Long lasting Insecticides Impregnated Nets
MIP:	Malaria in Pregnancy
NMCP:	National Malaria Control Programme
NPC:	National Population Commission
NPME:	National Plan for Malaria Elimination
NVBDCP:	National Vector Borne Disease Control Programme
PMI:	President Malaria Initiative
RMB:	Roll Back Malaria
SPSS:	Statistical Package of Social Sciences
UBOS:	Uganda Bureau of Statistics
UNICEF:	United Nation Children Emergency Fund
WB:	World Bank
WHO:	World Health Organization
WOHFW:	Ministry of Health and Family Welfare India

ABSTRACT

Malaria in pregnancy has remained a public health challenge in Bauchi Metropolis Nigeria, leading to stillbirths, low birth weight, spontaneous abortion, and maternal deaths. This study investigated the determinants of prevention and treatment of malaria among pregnant women in Bauchi Metropolis, Nigeria. The target group were pregnant women between the ages of 15-49 years old. The study had the following specific objectives: To examine how demographic characteristics of the pregnant women influence malaria prevention and treatment; to establish the prevalence of malaria among pregnant women in Bauchi Metropolis; to examine factors influencing malaria prevention and treatment among pregnant women; and to determine pregnant women's knowledge, attitudes, and perceptions of treatment and preventive measures against malaria. The study guided by Kleinman's (1980) Explanatory Model (EM) and Health Belief Model (HBM) by Becker (1976). It was a cross-sectional survey research design that adopted a quantitative method of data collection and data analysis. The study used a simple random technique to collect data from respondents during antenatal sessions in Bauchi Specialist Hospital. The study used Krejcie and Morgan (1970) formula and arrived at the sample size of 317 respondents. Data was collected using a closed-ended questionnaire and was analyzed and managed using Statistical Package for Social Sciences (SPSS ver. 22). The study established that maternal age influenced malaria prevalence because more than half of the respondents infected with the disease fall within the age bracket 20 to 29. Poverty was also among the prominent factors that influence malaria prevention and treatment among expectant mothers. On the knowledge of malaria preventive measure usage of insecticide treated nets among the respondents were very low. The study recommends collaboration between line ministries such as Health, Education, Environment, religious leaders, community leaders, and healthcare affiliated NGOs to create awareness and advocacy around malaria, its prevention, treatment and the importance of mosquito treated nets. The study also recommends that pregnant women should be given free ITNs with free malaria treatment as practice in other states of Nigeria.

OPERATIONAL DEFINITION OF SIGNIFICANT TERMS

Cultural Beliefs In this work, cultural beliefs mean, the beliefs, traditions and perceptions that reflect health or illness promoting practices among pregnant women in the Bauchi Metropolis, particularly about malaria, its causes symptoms, prevention, and treatment.

Determinants Determinants are factors or causes that makes something happen or lead directly to a decision. Similarly, in this study determinants simply means those elements that affect expectant mothers' knowledge of malaria prevention and treatment either positively or negatively.

Education The procedure of passing on learned knowledge, expertise, reasoning, and thoughts, whether officially or unofficially. In this research education simply means the pregnant women's level of formal education attained. The gaining of general knowledge about malaria may be connected with one's levels of formal education for example primary, secondary or tertiary. It is assumed that the higher the educational level of someone, the greater the awareness the person may have when it comes to malaria prevention and treatment. Additionally, in this study education also involves sensitization and awareness on how malaria can be prevented and treated among pregnant women.

Income Money one earns by working or by capitalizing on the work of others. In this study income is the total amount received by the pregnant women from their monthly wages, salaries or other forms of earnings received at a given time.

Malaria A mosquito-borne disease in which plasmodium, a protozoan, multiplies in the blood every few days. Malaria is easily defined in this study as a contagious diseases transmitted to women who are pregnant by mosquito vectors.

Poverty The quality or state of being poor, lack of money. Poverty in this research can influence individual choices for malaria prevention and treatment. In this study, poverty is measured among pregnant women by assessing their employment status and income level.

Pregnancy The condition of carrying an evolving fetus or embryo within a woman's body. In the study pregnancy simply means a woman who is carrying fetus in her womb from the day of conception until the termination of the pregnancy.

Prevalence The quality or condition of being a prevalent, wide extension or spread. While in this study, prevalence means the total figure of malaria infections amongst expectant mothers in the study area. The incidences of the disease among the expectant mothers including the deaths causalities for a given period in Bauchi Metropolis,

Prevention	The act of attempting to prevent or impeding action, access, or approach. In this study prevention of malaria comprises shielding pregnant women against mosquito bites and taking anti-malaria1 medicines to avoid malaria infection.
Socio-economic	Of or about to a combination of social and economic factors. In this work socio-economic implies an economic measure of a person's work characteristics or social and economic position in comparison to others, related to income, vocational training, cultural status, skill set, and how it influences pregnant women's behavior toward malaria prevention and treatment.
Treatment	The process or manner of treating someone or something, medical care for an illness or injury. In this study treatment simply means, medicinal care given to a pregnant woman who is infected with ma1aria.
Traditional healer	A person who treats people using prepared herbal medicine. In this study, traditional healer is any person or persons with indigenous knowledge of herbs who are consulted to prevent or cure malaria disease within a community. They administer plant-based herbal products in their trade.
Traditional herbal medicine	Herbal drugs or the practice of using herbs to treat medical conditions. These are plant-based herbal products used to treat diseases and improve one's health in this study. They contain parts of the plant as ingredients, as well as other plant materials or combinations, and are typically in the form of liquids, powder, capsules, tablets, or ointments. Most are pre-packaged, while others are processed as requested and are used in the treatment of malaria in women who are pregnant.

CHAPTER ONE

1.1 Background of the Study

Malaria is a common disease predominant within tropical areas of the globe. Globally, around 216 million people are infected by malaria yearly killing about 445,000 persons with pregnant women bearing the highest burden of the infection (UNICEF 2017; WHO 2017). Usually, malaria in pregnancy causes distress poor persons in endemic nations, the poorest and most relegated individuals. Most malaria cases and deaths in pregnancy happen within low and middle-income nations, particularly Sub Saharan Africa (PMI 2015). A quite substantial number of pregnant women die unjustly of malaria because of their inability to buy Hospital recommended drugs especially where free malaria pills are not available (WHO 2010).

According to WHO (2007), the consequences of malaria infection during pregnancy for the mother and the fetus may include but not limited to maternal anaemia, spontaneous abortion, premature birth, low birth weight, stillbirth, and intra-uterine growth retardation. Expectant mothers are encouraged to adhere strictly to the three malaria preventive measures recommended by the WHO especially in their first trimester of pregnancy.

South Asia is also an endemic region for malaria transmission with about 1.4 billion persons at threat of contracting malaria. In spite of the improvement in dropping the weight of malaria in pregnancy within the area, pregnant women from deprived social groups or poor households are exposed because they live in poorly built houses

that are absorbent for the entry of mosquitoes (Rijken et al., 2012). India, the nation with the maximum number of persons suffering from poverty, has a grave malaria problem among expectant mothers. A report by MOHFW (2014) found that pregnant women from poor households in India with low immunity to malaria were also more vulnerable to maternal anaemia and maternal deaths and those who survived had newborns with low birth weight or stillbirths.

However, in Brazil malaria in pregnancy is connected with poverty and this further makes disease treatment and management very expensive amongst the less privileged persons (Desai et al., 2007). The specified medical concerns of malaria during pregnancy are spontaneous abortion, cerebral malaria, maternal anaemia, low-birth weight, sti1lbirth, and (Guyatt & Snow 2004). According to Sachs and Malaney (2002) opined that apart from medical liability, malaria is a substantial economic problem in Brazil. Malaria, if it remains unmanaged or not well treated, has grave clinical concerns for a pregnant woman. The vulnerability and chances of death from malaria upsurges significantly as expectant mothers infected with malaria are probable to experience many health complications (Dellicour et al., 2010; WHO 2004).

Malaria during pregnancy is a significant public health issue, particularly in Sub-Saharan Africa where pregnant women pay the bill for anti-malarial drugs, bed nets, and transportation to health facilities (Dellicour et al., 2010). Malaria threatens approximately 25 million pregnant women in Africa, resulting in over 10,000 maternal and 200,000 neonatal deaths each year (WHO 2014). Malaria typically affects pregnant

mothers residing in rural communities where access to medical care and effective malaria treatment is severely hampered by poverty and the state of the formal medical system (GMAP 2008). Despite the preventive and curative measures in place to tackle malaria in Sub Saharan Africa, in country like the former Gold Coast (Ghana), death due to the disease is common amongst children aged five years and expectant mothers (Adefioye et al., 2007; Alassane et al., 2005; Owusu et al., 2009; WHO 2001).

Filmer (2005) stated that malaria treatment costs can result to interruptions in treatment-seeking behaviour amongst pregnant women in Africa. The costs of malaria in pregnancy are extremely costly, with some households spending a considerably greater amount of their earnings on malaria detection and cure throughout pregnancy than others. Richer households can manage, and spend more on malaria prevention (Chuma et al., 2006). Winch (1996) report that financial burden, poor environmental sanitation are the major impediments to malaria treatment and control during pregnancy.

Malaria has continued to be Nigeria's most common parasitic infectious disease amongst pregnant women. Despite the involvement by government and international interventions to eliminate malaria amongst pregnant women, the infection remains quite rampant because of environmental and social factors coupled with unsuccessful intervention plans (PMI 2015). Malaria prevalence is high among low-income families living in rural communities devoid of access to primary health care that accounts for

11% of maternal deaths amongst pregnant women in Nigeria (Peter 2013; FMOH 2015).

Research in Enugu State, Nigeria had shown that the treatment of malaria among pregnant women constitutes a significant problem to families and the health sector. According to Obinna (2013), the financial weight of malaria treatment is high and households bear a larger percentage of this amount because of a high level of indirect costs. To some families, this can be devastating. Similarly, another research in Kwara State, Nigeria also shown that in families controlled by jobless people, expectant mothers find it problematic to show up in health-related centres and to take care of the medical bills for treatment of malaria infection compared to those families controlled by people who had job (Usman et al., 2011).

Bauchi State Agency for the control of HIV & AIDS, Tuberculosis, Leprosy, and Malaria (BACATMA) has been distributing free ITNs to the general public every year to shrink the problem of malaria (BSMOH 2015). Nevertheless, this effort has done little to decrease the load of the infection because considerable importance is given to HIV&AIDS and Tuberculosis. This study, therefore, investigated the determinants of prevention and treatment of malaria amongst pregnant women in Bauchi Metropolis, Nigeria.

1.2 Statement of the Problem

Malaria to a pregnant woman is a grave disease that affects not only the mother but also her unborn child leading to substantial health complications. Previous studies conducted in Nigeria, have neglected the prevention aspect of malaria while investigating its prevalence predominantly in Kwara State in North Central and Enugu State in South-East part of the country. Bauchi Metropolis alone, among the twenty local government areas (sub-counties) of the Bauchi State, carries the highest burden of infection and vulnerability to the effects of malaria with more than 150 maternal deaths occurring in the area between 2017 and 2018 due to the infection. In 2019 alone around 32,000 cases of malaria were reported in Bauchi with about 200 maternal 600 neo-natal deaths (BSMOH 2020; BACATMA 2019).

As such, the potential vulnerability to malaria in the Bauchi Metropolis cannot be only discussed from a bio-medical perspective without looking at the other essential factors that increase vulnerability among people. In an attempt to decrease the weight of malaria incidence rate in the Bauchi Metropolis, it is important to acknowledge the presence of other essential determinants such as economic, socio-cultural settings, and religious beliefs of individuals, especially expectant mothers.

However, scholars have consistently neglected pregnant women in their study of malaria in Bauchi by given much emphasis on other diseases such as HIV&AIDs and tuberculosis even though malaria among pregnant women causes more harm than the two diseases combined. Additionally, because malaria infection among expectant

mothers could harmfully impact the well-being of the fetus and his mother, it is significant to examine factors that affect malaria treatment and prevention amongst expectant mothers. This study, therefore, sought to examine the determinants of malaria treatment and prevention amongst expectant mothers in Bauchi Metropolis, Nigeria from a Sociological perspective.

1.3 Purpose of the Study

The objective of this study was to look into the factors that influence of prevention and treatment of malaria amongst women who are pregnant in Bauchi Metropolis, Nigeria. The rationale behind this study was to understand if such determinants influence expectant mothers' malaria treatment and prevention. Additional goal of this work was to fill in the gap identified in this research.

1.4 Objectives of the Study

The general objective of the work is to examine the determinants of prevention and treatment of malaria amongst pregnant women in Bauchi Metropolis. The specific objectives are:

1. To examine how demographic characteristics of pregnant women influence malaria prevention and treatment in Bauchi Metropolis.
2. To establish the prevalence of malaria among pregnant women in Bauchi Metropolis.

3. To examine factors that influence malaria prevention and treatment among pregnant women in Bauchi Metropolis.
4. To determine pregnant women's knowledge, attitudes, and perceptions of treatment and preventive measures against malaria in Bauchi Metropolis.

1.5 Research Questions

1. How do the demographic characteristics of pregnant women influence the prevention and treatment of malaria?
2. What is the prevalence of malaria among pregnant women in Bauchi Metropolis?
3. What are the factors influencing malaria prevention and treatment among pregnant women in the Bauchi Metropolis?
4. What knowledge, attitudes and perceptions of malaria prevention and treatment do pregnant women have in the Bauchi Metropolis?

1.6 Significance and Justification of the Study

This study was meant to interrogate how determinants of malaria came into play in the prevention and treatment of malaria amongst expectant mothers in Bauchi Metropolis, Nigeria. It is hoped that this study would inform the need to organize regular community meetings to educate the masses on health issues, particularly the risk of malaria in pregnancy and the need to attend ANC or health facilities when pregnant to protect both the mother and the unborn child from this deadly disease.

Malaria is the most common disease amongst women are pregnant that results in maternal morbidity, anaemia, low-birth weight and infant mortality. Thus, the present study is important since it would provide data on determinants or factors influencing prevention and treatment of malaria amongst expectant mothers in the Bauchi Metropolis. It will also shed light on the influence of pregnant women's knowledge on preventive measures and health-seeking behaviour concerning the healthcare services provided and their effectiveness so that problems arising from this disease could be recognized early and measures are taken to resolve them appropriately and in good time.

The study will also serve as additional literature to scholars while forming a strong base for researches in related fields.

1.7 Scope of the Study

The study was conducted in Bauchi Metropolis, the Federal Republic of Nigeria. This area of study was selected because it is one of the endemic regions for malaria infection in Nigeria. The study focused on expectant mothers between the ages of 15-49 years old because they are the most susceptible to malaria due to immunity suppression. Pregnant Women from 15 to 49 years of age were selected, and records obtained from hospital antenatal documentation did not include women over 49 years of age, hence women in this age bracket were excluded from the study. Bauchi specialist hospital was chosen for this study and during antenatal sessions at the hospital, data was collected from pregnant women.

The study examined how demographic characteristics of the pregnant mothers influence treatment and prevention of malaria in Bauchi Metropolis, established the prevalence of malaria among pregnant women in Bauchi Metropolis; examined factors influencing malaria prevention and treatment among pregnant women in Bauchi Metropolis; determined pregnant women's knowledge, attitudes, and perceptions of treatment and preventive measures against malaria in Bauchi Metropolis;

1.8 Limitations

Several limitations were encountered during the study. Firstly, convincing some of the study participants to engage in the research was challenging. Therefore, there was a collaboration with health workers which helped in ensuring that respondents were reached. Several respondents were unwilling to disclose confidential information; this also constituted another limitation to the research. This was minimized by convincing the respondents that any information they provided would be treated with the utmost discretion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This study reviewed more than 100 scholarly works. Much of the literature covers from Africa, and there were several studies also reviewed from the Asia and South American regions. In this section, the literature was organized based on the study objectives. The prevalence of malaria among pregnant women; factors influencing malaria prevention and treatment among pregnant women; determined pregnant women's knowledge, attitudes, and perceptions of treatment and preventive measures against malaria in Bauchi Metropolis; and also determined whether demographic differences such as age, marital, and educational status influence malaria prevention and treatment among pregnant women in Bauchi Metropolis. Similarly, it presents the theoretical and conceptual framework of the study.

2.2 Pregnant Women's Demographic Characteristics and the Prevention and Treatment of Malaria

Malaria is a grave disease transmitted to human by parasites due to bites from an infected female anopheles mosquito. Around 3 billion persons are vulnerable to malaria globally. The most susceptible groups are children, expectant mothers and non-immune persons. Even though malaria is a preventable and curable disease, its elimination has consistently become a challenge, particularly to the world endemic countries (WHO 2016). Among all the malaria-endemic regions, Sub Saharan Africa endures the highest

impact of the infection. In the year 2015, the region accounts for 88 percent of worldwide malaria cases and 90 percent of malaria deaths (WHO 2016).

Malaria in pregnancy remains one of the most delicate diseases affecting women for decades if not centuries. It is projected that 30 million women in endemic countries of Africa become pregnant every year (Dellicour et al., 2010). It is a general conviction that expectant mothers are susceptible to malaria infection, particularly between the first to the third trimester of pregnancy. Pregnancy reduces women's insusceptibility and increases vulnerability to malaria infection. They are prone to malaria infection compared to any woman that is non-pregnant and have a mortality of near 50% (WHO 2006).

Malaria has been related to negative health outcomes to the mother, her unborn child and the newborn baby (Mockenhaupt et al., 2006). This health complications include among other things; maternal anaemia, low-birth weight, unplanned abortion, renal failure and child death, behavioural problem, and poor development (Desai et al., 2007). More so, malaria if remain untreated during pregnancy, can be severe and affects brain development of the fetus.

Nigeria is the country with the highest cases of malaria among pregnant women with 97 percent of the population susceptible to infection, particularly expectant mothers and children (Agomo et al., 2009). Additionally, the increased in risk of malaria infection amongst expectant mothers is related to many factors; low education,

young maternal age, and income level (Houmsou et al., 2014; Millicent & Gabriel 2015). Some scholars believe that maternal age can play a vital role in determining which category of women are further vulnerable to malaria than others.

In this regard, a variety of factors could be to blame for the younger maternal age-related malaria. For example, the lack of acquired immunity to malaria and general immune suppression may be the reasons for this. However, (Fana 2015; Adam and Elbashir 2005) found that younger mothers are at the greatest risk of malaria and also having high parasite concentrations. Even though malaria can be fatal to all age groups, younger women who are pregnant are most vulnerable.

Malaria is more common in the first three months of pregnancy, and pregnant women infected with malaria in their first three months of pregnancy have a higher risk of having babies with low-birth weight rates (Gething et al., 2011). As a result, expectant mothers need protection from malaria at the early stage of their pregnancy. However, women are unlikely to get malaria during the second and third trimester, emphasizing the need for early malaria control and diagnosis right before even conception (Mcgready et al., 2012).

Young women in their early stage of pregnancy are highly susceptible to placental parasitic infections, which tends to cause low birth weights in babies because they're unable to acquire the greater levels of the immune system that develop with malaria exposure throughout subsequent pregnancies (Rogerson et al., 2007). As a

result, expectant mothers and women aged 20 are susceptible to malaria infection (RBM 2014).

Indeed, expectant mothers are by far the most vulnerable adult population in many malaria-endemic regions. Nevertheless, even this genetic predisposition is increased for young, and rural women in ways that the disease response doesn't effectively tackle the problem of pregnant women with malaria. As a result, significant investments in anti-malaria intervention strategies are necessary. As a result, the expected increase in anti-malaria interventions targeting expectant mothers while also identifying age-related, socioeconomic, and cultural factors that Increase vulnerability has the prospective to enhance our knowledge about the disease and target intervention strategies to the most susceptible and disadvantaged groups.

However, the Asian region, Latin America and the Middle East region are also at danger of malaria spread. The people susceptible to malaria include young children age 5, patients with HIV&AIDS and pregnant women (WHO 2015). A report by WHO (2015) showed there were 214 million incidences of malaria in that year and over 438,000 deaths. It is a reality that for the fight against malaria disease to succeed among the endemic countries, there is a need for unprecedented efforts geared toward malaria elimination from all stakeholders. The three malaria prevention control strategies recommended by the WHO must be strictly adhered to.

2.3 Prevalence of Malaria among Pregnant Women

Malarial infection is one of the world deadliest parasitic diseases transmitted to human by a vector called mosquito. Malaria is a severe life-threatening infection that was initially thought to be caused by fetid marshes, hence the name Malaria (Anvikar et al., 2016). However, it was scientists in 1880 who later discovered that the main cause of malaria in human is a parasite called plasmodium. There are many types of plasmodium that cause malaria which includes, plasmodium falciparum, vivax, ovale, and plasmodium malaria. Malaria is conveyed via the bite of a female anopheles mosquito that carries the parasite and needs human blood to nurture her eggs (Quan *e*t al., 2014).

Globally around 216 million people are infected by malaria yearly killing about 445,000 persons with women who are pregnant and children bearing the highest burden of the infection (UNICEF 2014; WHO 2017). Worldwide, malaria incidences among pregnant women are focused in the poorest countries on the planet, with 90 per cent of deaths from malaria happening in Sub-Saharan Africa (WHO 2017). As per the World Malaria Report published by the WHO (2019) eleven (11) million expectant mothers were diagnosed with malaria in 38 countries of Sub Saharan Africa. Even though the infection in reality affects all people, pregnant women are frequently affected typically due decreased immunity and the complications involved in the treatment of malaria among this vulnerable group of people (WHO 2016).

Internationally, worries about the risk of malaria infection among children and women have recently been augmented and call for collective efforts to eliminate malaria vector in endemic regions. Malaria is one of the main reasons for morbidity and high rate of mortality the world over (Adefioye et al., 2007; WHO 2012; Kyu et al., 2013). This is a great concern because it is estimated that around one billion persons or nearly 14 per cent of the total world population live in shantytown or slum communities (Salla et al., 2020).

In Asia, around 2.1 billion persons are at danger of malaria, and 90 million pregnant women are in danger of infection yearly. Typically, most of the malaria-related cases among pregnant women in India occur in Chhattisgarh, Pradesh, Orissa and Madhya. And the prevalence of malaria is evident within the slums areas of these communities (NVBDCP 2017). Malaria is considered by many as a disease that affects people who live in shantytowns most especially in the less developed countries of Africa, Asia and Latin America (WHO 2014; WHO 2017).

The majority of the world malaria incidences occur in Africa, South Sahara, where the infection also presents a problem to human and societal development, because it distresses not only individual's lives, but also their means of livelihoods. In Africa, nearly twenty five (25) million expectant mothers are at risk of contracting malaria annually due to decreased immunity and poor environmental sanitation especially in slum areas (WHO 2014; GMAP 2008). Sub Saharan Africa has the most

dangerous type of plasmodium which is plasmodium falciparum that is very difficult to manage compared to other types of plasmodium parasites.

Even though there is an improvement in the fight against malaria among pregnant women and children, yet millions of expectant mothers in Africa do not get the sufficient care they need (WHO 2013). In Sub-Saharan Africa in 2014 it was estimated that 15 million of the 28 million expectant mothers at danger of malaria infection lived in slums devoid of all necessary health facilities and infrastructural development, hence most of the households lack single insecticide-treated nets (ITNs) which increase their vulnerability to malaria infection.

The world over, Nigeria is the country with the highest cases of malaria diseases, with nearly 97% of its total population in danger of malaria infection (WHO 2018; Karderam et al., 2020). Malaria is accountable for the death of thousands of people every year, more than HIV &AIDS and other diseases in the country. Additionally, amongst those affected, expectant mothers and children bearing the highest number of causalities from malaria, with 11 percent of all maternal deaths in Nigeria are owing to malaria (FMOH 2016; Salihu & Sanni 2013). Malaria among expectant mothers is the main reason for adverse maternal and prenatal consequence in countries like Nigeria and is heightened by the unfavourable environment in which they live, which is characterized by poor sanitation and lack of an effective formal health system (FMOH 2018).

In an attempt to shrink the occurrence of malaria infection in Africa, many States and intercontinental engagements have been initiated. The most leading one among these efforts was the formalization of the Abuja Declaration in 2000 on Roll Back Malaria (RBM) with the sole target of combating malaria prevalence in Africa by the year 2010. The Abuja declaration was aimed at reducing the incidence of malaria by providing access to effective treatment while improving the conventional prevention strategies through the distribution of insecticide-treated net and uptake of anti-malarial drugs, especially among pregnant women (WHO 2015; Owusu et al., 2009)

Similarly, the United States Agency for International Development (USAID) has also invested millions of dollars in Nigeria to make sure that malaria is finally defeated in the country. USAID is donating millions of insecticide-treated nets (ITNs) annually as a way of ensuring that vulnerable people have access to conventional preventive measures. For several years, the Corporate Alliance on Malaria in Africa (CAMA) has also worked with the National Malaria Elimination Program (NMEP) in Nigeria to steer and motivate the corporate investors in support of the Nigerian Federal Ministry of Health's Malaria Elimination Strategy.

Additionally, at the state level, the United Nation Children Emergency Fund (UNICEF) is also distributing insecticide-treated nets to pregnant women annually to help reduce the burden of malaria in the Bauchi State. However, the Bauchi State Government in its effort to eliminate malaria, it created the Bauchi State Agency for the Control of HIV & AIDS, Tuberculosis, Leprosy and Malaria (BACATMA) aimed at

completely taking care of the issue of malaria. The main role of BACATMA is to distribute mosquito nets to the general public and ensures sensitization seminars are held at a regular interval in Bauchi to educate people about the correct application of preventive measures against malaria and its early signs or symptoms.

Despite these efforts by the Bauchi State Government and other stakeholders, this has done little to reduce the burden of malaria, this is because much emphasis has been given to other diseases such as HIV&AIDS and Tuberculosis even though malaria among pregnant women causes more harm than the two diseases combined. However, scholars have consistently written on other ailments while neglecting pregnant women in their study of malaria. For example, Uthman et al., (2018) wrote on malaria diagnosis and treatment practices by medicine vendors in Bauchi. However, Millar et al., (2014) wrote on the children under five with fever in Bauchi.

Thus, it is reported that between 2017 and 2019, more than 350 pregnant women died from malaria-related complications in Bauchi State, of which Bauchi Metropolis alone carries 32% of these causalities. Malaria causalities are high and unwanted in the Bauchi Metropolis, hence the need for a study to determine what influence the prevention and treatment of malaria among pregnant women become very important.

2.4 Factors Influencing Malaria Prevention and Treatment Among Pregnant Women

2.4.1 Economic factors

Malaria poses a severe health challenge to the global economy, particularly among malaria-endemic nations. In 2017, it was reported that approximately $12 billion was spent worldwide on malaria elimination and reduction by governments of malaria-endemic states and their international collaborators (WHO 2018). Malaria imposes an enormous economic drain on people, family, and national economies. The economic progress of many African countries has been affected by malaria, as gigantic developmental funds are annually channelled to solving this health problem (FMH 2015). Besides, immense man hours of work are lost resulting in huge imperceptible cost.

The world over, malaria harms African economic progress the most and preserves a spiteful sequence of poverty. Billions of dollars are spent every year on treatments and preventions (UNICEF 2011). Mosquito, the vector that transmits malaria, does not select who to bite based on sex or age but is highly devastative among the less privileged people (Dolie & Laishram. (2012).

It is widely believed that malaria is a poverty-related disease since wealth could prevent individuals from getting infected (Sachs & Malaney 2002). Wealthy individuals are much more likely to (a) have better prevention awareness and education, (b) they

have the financial means to procure hospital recommended pills, such as anti-malarial drugs, which can treat or decrease the occurrence of malaria infection, and(c) they could also afford better housing that is very difficult for the mosquito to enter or survive in and also have access to most improved health facilities (Messina et al., 2011). However, it is true that where malaria thrives the most, human communities thrive the least, implying that malaria and poverty are inextricably linked (Kyu 2013).

However, even when health centres are accessible, the costs of malaria prevention and treatment may deter people from seeking treatment (Reginald et al., 2003). Malaria prevention spending, such as the costs of insecticide-treated nets (ITNs) and medication, seems to be linked to individual's income or economic status, with people who are economically stable budgeting a greater amount of their income to malaria treatment and prevention (Ettling 2009). The burden of malaria treatment is enormous, and the treatment costs can be categorized into direct costs such as money spend on services at the health facility and indirect cost such as fees spend on transportation and income loss due to the time waste out of work.

The UNDP's (2010) report estimated that more than 70% of the global poor are women. Women are last in almost every economic and social pointer of well-being (Ricci 2012; Mavis et al., 2004). Poverty includes other types of deprivation, including education, economics, and access to services, health outcomes, resources and skills. Moreover, 58% of malaria mortalities occur in the Sub Saharan Africa with deflected

economy (Yusuf et al., 2010). As a result, the inequality of this distribution is greater than that of any disease of public concern.

However, malaria infection can be fatal, even among rich people, especially persons who do not use the recommended preventive tools. There is a belief among some expectant mothers that insecticide-treated nets produce heat, lead to bad dreams and make them uncomfortable. So it is a fact that malaria affects people of all categories irrespective of their social class or status. The rich can equally become vulnerable to malaria when the correct application of preventive measures are inadequately utilized. Therefore, this claim has contradicted the earlier postulations by other scholars who merely view malaria as a disease of poverty.

This study looked at malaria beyond the boundary of poverty as it is not the only determinant factor that influences malaria prevention and treatment among pregnant women. Other factors like treatment preference, attitude toward prevention and treatment, socio-cultural reasons, availability of medication, and the quality of health care service also influences malaria prevalence among people of different family background. Therefore, malaria in Bauchi Metropolis can be best understood by closely studying the above factors. Negligence and improper application of malaria preventive measures have also been reported even among wealthy people. Hence, this study aimed to objectively examine the determinants of prevention and treatment of malaria among pregnant women in Bauchi Metropolis from a Sociological perspective.

2.4.2 Social and Cultural Factors

(a) People attitude toward malaria: Social and cultural determinants could heavily effect some substantial characteristics such as acceptance of treatment and incorporation of treatment into everyday life (Sachs & Malaney 2014). Pregnant women's perception of the disease is paramount in understanding the success or failure of malaria intervention in any community. Some individuals may not even consider mosquito bite as harmful. It is highly unacceptable for people to perceive mosquito bite as non-harmful despite the available medical evidence that malaria is caused due to biting by female anopheles mosquito, and expectant mothers and children under the age of 5 are the most at risk.

(b) Religion: Society's religion, as one of the cultural factor, can affect people's capacity to utilize health-care services such as seeking malaria treatment and prevention. In some countries in Africa and Asia, restricted mobility amongst women, especially expectant mothers, hampered their right to attend health facility for malaria diagnosis. Some of the religious doctrines do not allow women to inter-mingling with men except on rare occasion. Women often have to seek permission from the household heads before going for a medical checkup. Hence this culture may prevent pregnant women from going to health centres for malaria diagnosis and treatment. Women suffered from all forms of social violence, including religious discrimination and harassment from their in-laws and husbands for the financial burden incurred concerning their malaria ailments (UNDP 2015)

(c) Population movement: It is impossible to overstate the significance of human population movements in malaria control. Indeed, such moves might aid in the spread of drugs resistant Plasmodium falciparum especially with chloroquine. In African states, individuals migrate to farming communities during the early months of the rainy season, when agriculture, sowing, and clearing occur. This movement of people is much higher among rural women who migrate from one village to another looking for jobs and farming land. Hence this increases the malaria spread, especially to the non-immune communities by those infected and who have immunity to the disease (Prothero 1996).

On a general note, these cultural and traditional practices might influence how society reacts to a particular disease, its treatment acceptance and prevention. Some pregnant women may not necessarily know the rationale behind sleeping under bed nets, mainly due to the influence of certain traditional beliefs that are detrimental to the efficient use of recommended malaria preventive controls. Society must understand the importance of malaria health education as a tool to fight malaria (Gerbert 2012). Most often, if the precise passage of malaria treatment is prescribed, people might not follow it due to a poor attitude, lack of financial means and caregiving obligations. These problems can lead to sharing pills, lower-dosing or not completing the course of treatment (Rugemalila et al., 2006).

However, to uncover the socio-cultural determinants of malaria in Bauchi Metropolis, there is a need to study malaria from many angles. Attitude of expectant

mothers towards treatment and prevention can serve as a significant vehicle to follow and achieve the fight against this deadly infection. To achieve that successfully, people's culture and society's norms must be put into consideration whenever the need to design malaria intervention arises. The success of malaria elimination depends solely on the realization of cultural norms and values of the society in question for proper application and implementation of the malaria elimination programmes. This study aimed not to leave any stone unturned in the fight against malaria, particularly the socio-cultural aspect of malaria.

2.4.3 Distance and the Quality of the Health Care System

Most of the health facilities in Africa are not well prepared to fight malaria infection even though billions of dollars are spent every year in the form of treatment and prevention. More so, proximity to health centres is a determinant factor influencing malaria treatment and prevention among people, especially women and children. Distance to a health facility where malaria treatment is offered may prevent pregnant women from seeking treatment which may further increase the risk of malaria complications among expectant mothers (Jombo 2010). Moreover, women living in malaria-endemic places who live a far distance from health centres may likely suffer more vulnerability to the effect of malaria compared to those who live close to the health facilities.

However, access to effective malaria treatment may also be a factor that determines malaria incidences amongst expectant mothers apart from distance to health

centres. A nearby health facility that lacks the required medical equipment, couple with untrained personnel, defective drugs source, and charges exorbitant fees for malaria treatment may be of title use to the public who find it challenging to deal with these kinds of problems (Mmbando et al. 2009). Malaria is a widespread infection among people who live in communities that often lack basic social amenities such as limited access to primary health-care where treatment and sensitization on malaria preventive measures are given (Lars 2005).

Additionally, a study in Kenya by Wendy (2008) stressed the importance of the primary health care system in decreasing the weight of malaria by around 66%. Therefore, this shows a significant connection between the prevalence of malaria and distance to health facilities. Lack of malaria health education, distance from primary health care, and absence of knowledge about risk factors may negatively affect health-related behaviour amongst pregnant women (Debo & Kassa 2016). Therefore, to succeed in the fight against malaria, there is a need to build new health centres close to people with all the necessary equipment while improving the existing health care centres.

2.4.4 Environmental Factor

Environmental influence such as the existence of unclean and stagnant water near homes, the presence of bushes, rainfall, and low temperature are favourable for the breeding of mosquitos that transmits malaria to human. Pregnant women with poor sanitary attitudes are more likely to become vulnerable to malaria. Abdullahi et al.,

(2009), opined that good hygiene, home cleanliness, and effective waste disposal reduces the chance of malaria infection. Persons who live in an unclean environment and do not use the recommended malaria preventive measures such as ITNs and mosquito repellents are more prone to malaria. Poor environmental sanitation and the nature of houses built in some part of Africa make it simple for mosquitoes to enter (Dolie &Laishram 2012).

2.4.5 Mass Media

Mass media has helped to sensitize pregnant women on the risk of malaria through various means of communications. These media outlets include billboard, digital television, religious institutions, posters, newspaper, and community drama. Radio served as the most effective way for the enlightenment on malaria health-related information amongst pregnant women and has been the focus of studies as the most vital health behaviour modification tool (Mai et al., 2018). The scarcity of information on vector control in most communities has been linked to the high malaria prevalence amongst expectant mothers. (Forero et al., 2014). Spreading essential information on the general knowledge of malaria causation and prevention strategies amongst women who are pregnant could significantly decrease the rate of prevalence among this vulnerable group (Debo & Kassa 2016).

Nigeria has the biggest malaria challenge globally, with about 150 million people, nearly the whole population at danger of contracting malaria annually (WHO 2015). Similarly, to reduce malaria prevalence, pregnant women's insufficient

knowledge and awareness concerning malaria need to be tackled critically by improving communication channels and circulating health-related news via the approved media outlet (Mozumder & Marathe 2017). Holistic measures should be adopted to improve the usage of malaria control measures, especially in endemic countries like Nigeria.

Ankomah et al., (2014) intimate that media houses in Nigeria have been used to educate expectant mothers on the importance of sleeping under insecticide-treated nets (ITNs). More so, Kimbi et al., (2014) opined that the utilization of malaria preventive control measures among pregnant women is related to the level of media exposure and people's beliefs. Print and electronic media should be utilized to channelled health behavioural change communications related to malaria issues, especially in less developed nations.

2.5 Pregnant Women's Knowledge, Attitudes, and Perceptions of Treatment and Preventive Measures Against Malaria

Malaria is a worldwide health problem, predominantly in Sub Saharan Africa, due to the existence of the most harmful type of plasmodium parasite (WHO 2015). It is a general conviction that the effective means of shrinking malaria transmission in pregnancy is to accept health-preventive practices. The strategic agenda for malaria control and treatment in pregnancy suggested by the World Health Organizations (WHO 2015) in areas of steady malaria spread include: the utilization of insecticides treated nets (ITNs), intermittent preventive treatment (IPT), and case management of

malaria infection and anaemia (WHO 2010). Globally, Millions of expectant mothers are infected with malaria annually, and 90 per cent of the worldwide burden from malaria is occurring in Sub-Saharan Africa (WHO 2015; Zelman et al., 2014).

The Asian region is only second to Africa when it comes to the high incidence of malaria and its liability among expectant mothers. According to Kochar et al., (2009) women's understanding of malaria and its ways of transmission, prevention and treatment are often low. The neglect of Southern Asia, predominantly very populous nations with a high incidence of malaria-like India, will lead to a substantial problem to the worldwide reduction of malaria among women and children.

In India, despite the determinations to decrease the weight of infection, there is insufficient knowledge of malaria prevention strategies amongst expectant mothers (Ravendra et al., 2015). A study conducted in East India on the availability of bed nets among pregnant women revealed that insecticide-treated nets (ITNs) were used even though other malaria preventive control strategies, like the use of anti-malarial drugs such as chemoprophylaxis, was not properly used as directed by medical professionals (Davidson 2009; Sabin et al., 2010).

After a series of debates by African Heads of States, Roll Back Malaria (RBM) was initiated in Nigeria's capital Abuja in (2000) intended at decreasing the problem of malaria, especially amongst expectant mothers and children (FMOH 2013). RBM advocated for improved accessibility to chemoprophylaxis and the use of insecticide-

treated nets (ITNs) by pregnant women. Insufficient health information about malaria infection has a relationship with the high cases of malaria amongst African children and women who are pregnant (Nkuo et al., 2005).

In Ethiopia, malaria is a national health challenge among expectant mothers. Pregnant women in Ethiopia have adequate information on malaria signs, but their general knowledge of transmission and preventive methods against malaria remained low (Deressa & Ali 2009). Therefore, the utilization of recommended preventive strategies against malaria was low. Furthermore, the misconception in many parts of Africa regarding the disease causation affects malaria treatment among pregnant women. According to Akaba et al., (2013), the knowledge and attitudes toward malaria control among expectant mothers in Africa were not encouraging.

In Burkina Faso, pregnant women's perception was stated to affect their preference for malaria treatment. Some of the manifestations of malaria were investigated by traditional approaches, and patient were habitually self-treated at home (Beiersmann et al., 2007). This indicated a low and inadequate understanding of the biomedical aspects of malaria. Additionally, certain social practices and superstitious beliefs about malaria infection delay operational biomedical treatment and can be fatal.

Despite the immediate desire for the elimination of malaria, the proper use of its preventive measures among the most vulnerable groups remains a problem in Nigeria, particularly concerning the three preventive measures suggested by Roll Back Malaria

(RBM) for expectant mothers (NMCP 2014). This action involves the utilization of insecticide-treated nets (INTs), acceptance of intermittent preventive treatment (IPT), immediate treatment and timely diagnosis. In the Northern part of Nigeria, most women who used insecticide-treated nets (ITNs) reported that it produced extreme heat, make them feel uncomfortable, and caused bad dreams. These beliefs are preventing many people from utilizing conventional malaria preventive measures in Nigeria.

Even though the majority of the health centres in the areas of high malaria transmission, including Nigeria have started the application of intermittent preventive treatment (IPT) and early diagnosis, only 5% of the pregnant women obtain the recommended preventive treatment with the condition reported to be high amongst women living in rural areas (WHO 2018). The absence of information and awareness about the infection, its ways of transmission, and prevention are the main reasons that affect the application of preventive measures directed toward reducing malaria (Maslove et al., 2009).

Rakhshani et al., (2013) confirmed that the understanding of malaria in Nigeria, especially among pregnant women, observed vulnerability and gravity of the infection, are essential preceding aspects for policymaking regarding control and medicinal actions. The Knowledge of the potential causes, ways of spread, and people's inclination and decision making about the acceptance of conventional control strategies differ from society to society and among families (Adongo et al., 2015).

In Calabar Nigeria, despite significant improvement in health education provided in the maternity department during each antenatal sessions across the state, the malaria incidence among pregnant women continue to surge (FMOH 2013). Reaffirming this finding, Houmsou et al., (2012) revealed that most of the women in Africa were not aware of recommended anti-malarial drugs such as Sulpadoxine and pyrimethamine (SP) as the medication suggested for pregnant women.

2.6 Research gap

Most of the literature viewed in this study mainly focused on the biomedical perspective of malaria among expectant mothers while neglecting some of the determinants that may influence malaria prevention and treatment among pregnant women. Such factors are economic, social, cultural, environmental, knowledge, attitudes, and perceptions, which can equally influence malaria treatment and prevention. For example Obeagu et al., (2019) studied the Impact of Malaria in Pregnancy and its Implications on the fetus and children.

Similarly, Dolie and Laishram (2012) investigated the complexities of malaria associated symptoms with a focus on asymptomatic malaria. Dellicour et al., (2010) conducted research on Quantifying the Number of Malaria-Risk Pregnancies. Guyatt and Snow (2004) investigated the effects of malaria throughout pregnancy on low birth weight in Sub-Saharan Africa. While Jombo (2010) investigated drug selection for self-treatment of malaria among adult women in a Nigerian city. More so, William et al.,

(2014) researched on Blood feeding induces hemolytic proliferation and activation in the African malaria mosquito, Anopheles Gambia.

However, Launiala and Honkasalo (2007) studied an ethnographic study of factors influencing compliance to intermittent preventive malaria treatment during pregnancy amongst Yao women in rural Malawi. Similarly, Khadivzadeh et al. (2012) investigated the use of complementary medicine in pregnancy in Mashhad, Iran. Mmbando et al., (2009) investigated the epidemiology of malaria in a clinical trial area in Korogwe, north-eastern Tanzania. Additionally, Peter (2013) investigated the effect of intermittent malaria preventive treatment on pregnancy outcomes in women attending the antenatal clinic of a new Nigerian teaching hospital in Ado-Ekiti, Nigeria.

However, the few studies conducted in Nigeria primarily focused on South-East and Southwest Nigeria particularly in Kwara, Enugu, Benue, Ekiti, and Lagos State. Additionally, most of these studies were done in places other than the area of the present study. This study, therefore, investigated the determinants of prevention and treatment of malaria among pregnant women in Bauchi Metropolis, Nigeria from a Sociological perspective.

2.7 Theoretical Framework

The study was guided by the Explanatory Model (EM) and the Health Belief Model (HBM). The rationale was to examine the determinants of prevention and treatment of malaria among pregnant women in Bauchi Metropolis, Nigeria.

2.8 The Health Belief Model:

The Health Belief Model (HBM) as postulated by Becker 1974 is a health model which recognizes human behaviour as a major factor that determines individual health or well-being and the success or consequences of particular action taken by such individuals. However, the model emphasizes a concept called “self-efficacy alongside the beliefs that people have for their health. According to Becker, these beliefs are further accompanied by extra stimuli called ‘cues to action’ which strongly determine actual acceptance of the behaviour.

The Health Belief Model's central focal point is a perceived threat to an illness because believing that an ailment can be fatal is often allied to an individual's willingness to take action about the health problem. This includes arrays of beliefs about people's apparent susceptibility to a specific risk and the negative concerns that may result. While the supposed benefits are connected to human behavior, it is his willingness to lessen the potential threat by taking all appropriate measures to deal with the illness while weighing the apparent cost of and consequences that might result from its potential obstacles, such as challenges in medication.

However, the Health Belief Model (HBM) described two kinds of ‘cue to action. The first one is an internal cue to action which deals with disease symptoms, while the external cue to action emphasizes the need for campaigns in the media about health-related problems. Additionally, these internal and external cues determine or affect an individual’s perception of threat about their health and can elicit or maintain behaviour.

In a nutshell, Health Belief Model claimed that for human behaviour to change, individuals must on their own feel insecure and vulnerable to a particular health threat. Similarly, people should consider the immediate consequences very serious, believing that taking required action may likely reduce or prevent threat at an affordable cost with some few barriers. More so, the sick person must be ready and have confidence (have self-efficacy) to maintain and execute the new behaviour. When individuals perceive a threat lightly or themselves as not susceptible to it, they are improbable to accept moderating behavior. Low benefits and high costs can have the same effect.

2.8.1 Weaknesses of Health Belief Model

There are many problems that the Health Belief Model has failed to address in this study. Some of these weaknesses are:

The Health Belief Model failed to explain emotion as well as social and environmental influence such as cultural influence on people's actions. It only gives much emphasis on individual behaviour while forgetting that people's culture can equally influence and determine individual action and inaction concerning their health-seeking behaviour. The Health Belief Model by dwelling so much on behaviour which is an inner part of a human being is neglecting the society's role and importance on its members. Because it is society's culture that provides an individual with the accepted norms and values that every member is expected to abide by. Therefore, this present study deal with not only individual behaviour but also culture, tradition, and religion

about malaria among pregnant women. This weakness gives way for the incorporation of another theory known as the Explanatory Model by (Kleinmann 1980).

Additionally, the Health Belief Model overlooked the importance of economic influence concerning decision making on when and how an individual should seek medical intervention. The Model ignores the fact that it is a general conviction that many people who are economically disadvantaged display diverse sets of behaviour that are often detrimental to health. Ignoring the role of the economy in discussing health-related behaviour by this model thus led to the introduction of the Explanatory Model which adequately addresses the holistic factors: social and illness.

2.9 The Explanatory Model (EM)

The Explanatory Model was advocated by Kleinman (1980) to provide explanations on how to manage illness and assist people to attach social meaning to the understanding of their health problem. Most importantly, the Explanatory Model mainly provides explanations on health aspect such as the origin of sickness, signs, and its management.

The Explanatory Model is greatly directed by personality and social elements. Individuals use the Model to manage certain health-related problem among themselves. The Model can also be comprehended by observing the exact context in which they are employed. Such context consists of economic, societal settings and the religious practiced by the patient's society. For example, the realization of how serious an

infection is and how it will affect their health may not only be determined by its origin but also by other social factors such as kind help available or accessible, and whether the sick person can manage to pay for the treatment expenses among other factors. The model believes that the social and economic setting of a patient's society influence the kind of treatment he/she may likely receive from his community.

2.9.1 Relevance of Explanatory Model to the Study

This Model is very relevant in explaining the variables of this study, it is significant because it is one of the theories in medical Sociology that provide a clear understanding of human behaviour concerning health and critically discuss how people perceive sickness the way they do and how they organized themselves toward it management and control. This Model adequately considers many factors that are likely to influence disease perception and its management into account. These factors include among others, religion, tradition, socio-cultural, economic and ideological factors.

Most importantly, this model attaches much significance to human culture as the main determinant factor that regulates human thoughts and behaviour. Because culture is a social heritage and it is shared by members of a society, it is logical to say that how expectant mothers understand malaria infection and how they organize themselves towards its management and control strategies are based on and shaped by their cultural inhibitions. Therefore, the explanatory model has adequately described how these factors influence the treatment and prevention of malaria among expectant mothers women in Bauchi Metropolis, Nigeria.

2.10 Conceptual Framework

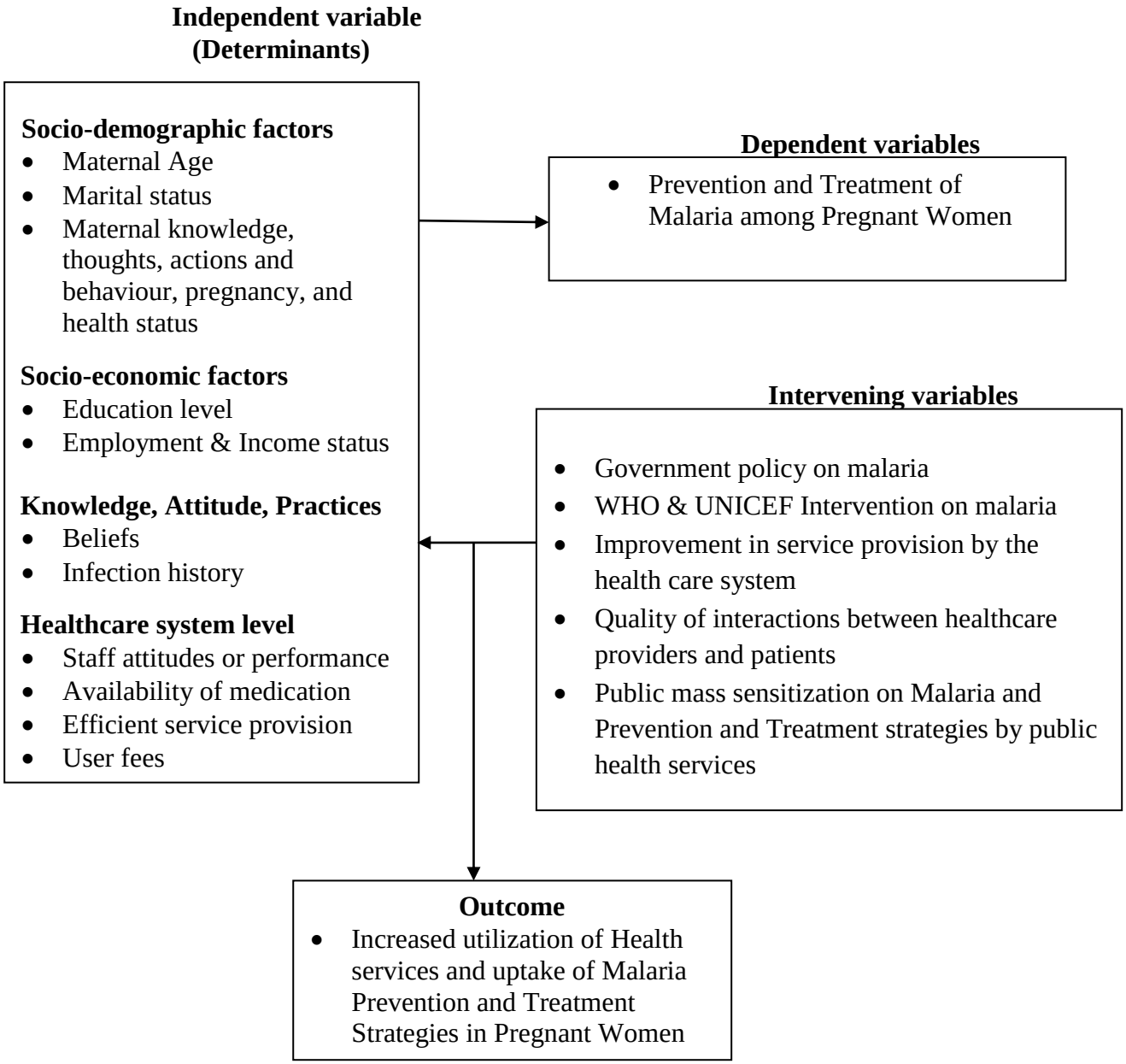

Figure 2.1: Utilization of Health services and uptake of Malaria Prevention and Treatment Strategies in Pregnant Women

In figure 2.1, the different variables showed how they interact and influence each other in the study. The independent variables are categorized into four sections, which include demographic factors, socio-economic factors, attitude, knowledge and practice, and the quality of the health care system. These independent variables serve as determinants that influenced the dependent variables treatment and prevention of malaria amongst expectant mothers. More so, the intervening variables include Government policy on malaria, WHO and UNICEF intervention on malaria, improvement in service provision by the health care system, quality of interactions between healthcare providers and patients, and Public mass sensitization on Malaria and Prevention.

These intervening variables could help in improving the general well-being of pregnant women concerning malaria. Additionally, it will increase the utilization of health services and uptake of malaria treatment and prevention amongst expectant mothers in Bauchi Metropolis, Nigeria.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 Introduction

This chapter explains the methodology the researcher used in accomplishing the research work. This chapter consists of research design, method and procedures, location of the study, target population, sample procedures and sample size, pilot study, validity and reliability, data collection procedures, data analysis procedure, data management, and ethical considerations.

3.2 Research Design

This work adopted a cross-sectional survey research design. A survey research design that is cross-sectional is very suitable for this type of study because it is good for population based study or survey and access the incidences or prevalence of diseases. A cross-sectional survey is simple and easy to conduct because multiple data can be collected at some time. It is also not expensive to use, does not necessarily require a lot of time, and the data from a cross-sectional survey can be used for various types of research.

The study used a quantitative method of data collection and data analysis. According to Creswell (2013) quantitative study endeavors to quantify, collect and analyze statistical information, and emphasizes the relations amongst a smaller number of characteristics across several cases. The study relied on primary data. The primary data was collected from the respondents during antenatal sessions in Bauchi Specialist

Hospital through the use of a closed-ended questionnaire. Data are forms of information sensibly gathered based on the guidelines of science. It can be described as “hard or non-hard data” (Neuman 2011).

3.3 Location of the Study

The study was conducted in Bauchi Metropolis, the Federal Republic of Nigeria. Specifically, the work took place in Bauchi Specialist Hospital the biggest public health facility in Bauchi State. Bauchi Metropolitan is located at the Northern edge of Plateau State covering 7, 259, 01 square kilometres of landmass and a population of 493,730 people (NPC 2006). The town is the state capital of Bauchi State. Most of the population are Muslims while Hausa, Fulani, Jarawa, and Gerawa are the major languages. Malaria, pneumonia, and flu are the major diseases in this area (National Bureau of Statistics 2011).

In Bauchi State, agriculture dominates the economy, and millet, sorghum, maize, rice, cassava tomatoes, groundnuts, and vegetables are major agricultural production products in the state. Similarly, Bauchi is one of the country’s main cotton-producing States. Cattle, goats, and sheep are also raised. The State’s industries include meat factory, peanut processing, vegetable-oil milling, and cotton ginning. The climate in Bauchi is viewed as tropical. Summers receive a lot of rain, while winters receive very little. The average temperature in this area is 25.3 °C. The annual rainfall average is 1009 mm. The Gross Domestic Product (GDP) in Bauchi is estimated at USD 4,713.

The State is governed by an elected governor but also a traditional leader called Sarki (king) a very powerful leader who commands the respect of his people.

3.4 Target Population

The study population was 1806 expectant mothers between the ages of 15 and 49 who were receiving antenatal care at Bauchi Specialist Hospital. These respondents were selected because they were considered vulnerable as pregnancy suppress women's immunity and further making them susceptible to malaria infection. However, pregnant women have always been the victims of malaria as thousands of pregnancy are aborted every year due to complications caused by malaria.

3.5 Sample Size and Sampling Techniques

The sample size for this study was 317 based on the Krejcie and Morgan (1970) formula. A simple random sampling technique was used to obtain the required number of respondents. A table of random numbers designed as a guide and the pregnant women were selected based on the randomized number created until the required number was reached. Simple random sampling offers the basis from which the other more difficult sampling procedures are arrived (Kanupriya 2012). Therefore, the lists of all pregnant women attending antenatal care in Bauchi Specialist Hospital were collected from the maternity section and randomly selected 317 respondents out of the total population of 1806.

The following formula was used to arrive at the sample size.

$$s = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

SOLUTION

$$s = \frac{(1.96)^2 \times 1806 \times 0.5(1-0.5)}{(0.05)^2(1806-1) + (1.96)^2 \times 0.5(1-0.5)}$$

$$= \frac{3.8416 \times 1806 \times 0.25}{0.0025 \times 1805 + 3.8416 \times 0.25}$$

$$= \frac{1734.4824}{4.5125 + 0.9604}$$

$$= \frac{1734.4824}{5.4729}$$

= 316.92 Therefore, S= **317**

Table 3.1: Table for determining the sample size of a known population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	**1800**	**317**	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is the population size, S is sample size **Source: Krejcie & Morgan, 1970**

3.6 Research Instruments

A questionnaire-guided survey was used in the study which was mostly self-administrated to a section of the pregnant women aged between 15-49 years of age attending antenatal care at Bauchi Specialist Hospital. Some of the respondents were assisted in the administration of the study questionnaire because they could not read English. The study chooses to use questionnaire-guide because it is fairly easy to use in field surveys in a time-efficient manner. The study used a closed-ended questionnaire and collected data from the target respondents. The similarity of the questions ensures that the acquired data is more identical, correct and standard. The questionnaires also ensure respondents' anonymity thus enabling them to share information more easily. The input generated in the study was used to find answers to the research questions developed in this study. Besides, the questionnaire also captured the demographic information of respondents such as age, occupation, income educational background, religion, tribe, and marital status.

3.7 Pilot Study

To establish the validity and reliability of the instruments of data collection for this research which is the questionnaires, a pilot study was conducted. The reason was to check if it could answer the research questions or if it needed adjustment to improve the standard of the instruments. Mugenda and Mugenda (2003), postulated that a pilot study is a method that is used to test a design or instrument before the main research to ensure the instruments of data collection are free from errors. The pilot study was conducted at the Bayan Fada maternity clinic within the Bauchi Metropolis. Some fifty

(50) sample questionnaires were administered to pregnant women that had the same characteristics as those sampled in the main study. The process for the piloting involved the same procedures that were used in the primary or main study. After the piloting, the findings were used to revise and reframe some parts of the instrument for the main study.

3.8 Validity and Reliability

For the research instruments to be used, it is necessary to validate it to estab1ish whether the answers can be reliable measure of the research concepts used in this study. Validity denotes to the level of accuracy of concept measurements. It tells if the instrument measures what it is designed to measure (Golafsheni 2013). It is essential to have a validity test because several reasons interna1 or external can influence the study for which the researcher is responsible for the accuracy and reliability of data obtained. Hence the questionnaire was validated through the result of the preliminary test, using the test of validity enabled by the Statistical Package of Social Sciences (SPSS version 22).

3.9 Data Collection Procedures

The main source of data collection in this study was primary. Primary data was collected through the use of a close-ended questionnaire. The questionnaires were distributed to the respondents by the researcher and his research assistants. The research assistants helped in distributing and collecting the answered questionnaires. The data were collected throughout February 2019, because the respondents going for antenatal

care there, were divided into batches by hospital management to make it easier for the health workers to attend the expectant mothers effectively during each antenatal session. Therefore, the health facility was visited twice. However, some of the respondents who could not read and understand the questionnaire were guided. In this regard, questions were reads to them and translated into their local language (Hausa) because some of them could not understand the English language. And this aided the respondents in answering the questions as accurately as possible.

3.10 Management and Data Ana1ysis Procedures

The responses from the questionnaire were sorted, cleaned and coded. The study used the Statistical Package for Social Sciences (SPSS ver. 22) and analyzed the data collected from the respondents. Simple descriptive statistical tables with percentages, frequency counts and graphs were used to summarize the results. Additionally, the Chi-square test was used to demonstrate the relationship between certain variables in the study that influence malaria prevention and treatment.

3.11 Ethical Consideration

Ethical matters are important for the realization of any research and most importantly in the field of social science (Ahmed et al., 2011). This research was conducted per the research procedures, rules, and regulations. An approval letter was issued from the Graduate School and Ethics Review Committee of Kenyatta University before proceeding with the study. Similarly, a clearance letter from the Bauchi State

Ministry of Health was obtained, and access to the health facility was granted by the management of the Hospital.

During the visit to the hospital, health workers in charge of the antenatal services were made aware of the study's purpose and its objectives. Thus, the health workers gathered pregnant women and told them about the importance of the study. Additionally, informed consent of the respondents was obtained individually and willingly accepted to participate in the study before engaging them. Similarly, their right to privacy and anonymity were highly respected and treated with the utmost confidentially.

3.12. Inclusion Criteria of the Study were as follows:

I. The participants must be a pregnant woman and attending antenatal care in Bauchi Specialist Hospital during the study period

II. Pregnant women must have a minimum age of 15 years and must not be more than 49 years of age.

III. The respondents must also be residing in Bauchi Metropolis during the study.

3.13. Exclusion Criteria

I. Pregnant women not residing in Bauchi Metropolis were excluded from the study.

II. Women who were not at their reproductive age were also excluded from

III. Women over the age of 49 were also excluded from the study.

CHAPTER FOUR

DATA ANALYSIS, DISCUSSION AND PRESENTATION OF FINDINGS

4.1 Introduction

This chapter is about data analysis, discussion, and presentation of findings. The findings from the data obtained were presented and discussed in the form of figures, tables and graphs. It gives an overview of the demographic characteristics of pregnant women and how they influence malaria prevention and treatment in Bauchi Metropolis. It looked at the prevalence of malaria; factors influencing malaria prevention and treatment; it assessed pregnant women's knowledge, attitudes, and perceptions of treatment and preventive measures against malaria.

4.2 Demographic Characteristics of Pregnant Women and how they Influence Malaria Prevention and Treatment.

This section emphasizes on characteristics of the expectant mothers sampled in this study. These include; occupation, marital status, educational level, employment status, religion, tribe, and age. The demographic information of the respondents is an essential element of any modern research. Additionally, this information is vital because it can help in understanding whether malaria prevention and treatment are influenced by any of the aforementioned characteristics. The demographic features of the respondents are presented in tab1e 4.1 below for a proper understanding of their respective backgrounds.

Table 4.1: Demographic characteristics of the respondents

Age (years)	**Frequency**	**Percent**
15 - 19	13	4.1
20 – 24	71	22.4
25 – 29	102	32.3
30 – 34	92	29.0
35 – 39	35	11.0
40—44	3	0.9
45—49	1	0.3
Total	**317**	**100**
Marital status		
Married	232	73.2
Widowed	28	8.8
Divorced	31	9.8
Never married	26	8.2
Total	**317**	**100**
Religion practiced		
Christianity	101	31.9
Islam	211	66.6
Others	5	1.6
Total	**317**	**100**
Ethnic group		
Hausa	141	44.5
Fulani	84	26.5
Gerawa	71	22.4
Jarawa	21	6.6
Total	**317**	**100**
Education level		
Primary	36	11.4
Secondary	68	21.5
Diploma	102	32.2
University	111	35.0
Total	**317**	**100**

Among the sampled women, the majority were young adults of 25 – 29 years of age 32.3%. These women were mainly married (73.2%) and were mostly Muslims (66.6%). The majority of them (44.5%) belong to the Hausa ethnic group. On establishing the occupation of the expectant mothers, the study found out that 69.7% of the women were housewives, 23.0% were civil servants while 7.3% were

businesswomen. The majority of these women were educated with 35.0% having a degree and 32.2% having diploma level of education as shown in table 4.1.

4.2.1 Age and marriage and their influence on malaria

This section sought to find if malaria has any connection with the age of pregnant women. It also sought to understand the role of the spouse in helping them cope with the financial burden of the diseases. The result is presented in table 4.2 below.

Table 4.2 Age, marital status and their influence on malaria

How old are you when infected with malaria?	**Frequency (N = 317)**	**Percentage**
15 – 19	61	19.2
20 – 24	108	34.3
25 – 29	57	18.0
30 – 34	49	15.4
35 – 39	22	6.9
40 – 44	11	3.4
45 – 49	9	2.8
Total	317	100
Who paid for your treatment?		
My partner	**51**	**16.1**
I paid by my self	**24**	**7.5**
My relatives	**9**	**2.8**
I did not pay	**223**	**73.6**
Total	**317**	**100**

The findings here indicated that the majority of respondents (34.3%) were infected with malaria (ages 20-24) which is the highest percentage of all the categories. While 19.2% affirmed that they were infected at the age 15-19 years. However, 2.8% of the respondents age 45-49 constituted the group with the least case of infection among

pregnant women. This result is corroborated with a previous study by (Erhabor et al., 2019; Uneke 2007) which indicated that pregnant women age 21-25 were most affected with malaria than older women age 40 and above.

Additionally, 16.1% affirmed that it was their partners that settled the cost of treating their malaria ailment. While 7.5% of the respondents paid for their treatment by themselves. More so, 2.8% of the women stated that it was their family relatives that shoulder the financial burden of paying for the malaria treatment. However, a staggering 73.6% reported that they did not pay for the treatment. Nevertheless, referring to the 16.1% of the women whom their husband/partners take care of their malaria expenses, it is a clear indication that in some households where the husband has no work or source of income, pregnant women will still face some difficulties while trying to pay for their medical bill. This is much more likely if the case is acute and requires hospitalization.

4.3 Prevalence of Malaria among Pregnant Women in Bauchi Metropolis

This objective focused on the malaria incidences among pregnant women in Bauchi Metropolis. Therefore, it looked at the usage of insecticides treated nets (ITNs) and determined the number of pregnant women infected by malaria.

Table 4.3: Malaria prevalence and the use of ITNs among pregnant women in Bauchi Metropolis

Prevalence of malaria and the Use of ITNs	Sample Population		Infected pregnant women		Non-Infected pregnant women	
	Freq. Count	%	Freq. Count	%	Freq. Count	%
Yes	**98**	30.9	35	11.0	63	19.9
No	**219**	69.1	120	37.9	99	31.2
Total	**317**	**100.0**	155	48.9	162	51.1

This objective sought to discover the prevalence of malaria among the respondents. In the process, it also looked at the ITNs usage among pregnant women. Despite huge attempts to make insecticide-treated nets (ITNs) obtainable to expectant mothers in the Bauchi Metropolis, the usage is still low and that may be connected to the high incidence of malaria amongst the respondents in the study area. The results indicated that 48.9% of the respondents reported that they were infected with malaria during pregnancy. Among them were those who reported having used the ITNs represented at 11.0%. However, it was also found that a massive 69.1% reported that they did not use ITNs as a preventive measure against mosquito bites, while only 30.9% affirmed that they used ITNs as indicated in table 4.3 above.

These findings corroborated with the work of Adefioye et al., (2007) In Southwestern Nigeria, where pregnant women had a high malaria prevalence rate of infection, expectant mothers and children living in slum areas with poor living conditions are at a higher risk of malaria in malaria-endemic areas. Reference has been made to that (11.0%) who had used the ITNs yet still reported to be infected. These could be attributed to the livelihood that and indoor spraying mainly prevent toward

mosquito bites when individuals are in bed and indoors, but not when they are outside. Shifts in nocturnal feeding and scavenging preferences have been observed in mosquitoes feeding outside of the hours when ITNs can protect people (Ellie et al., 2019).

It is evident that mosquito exhibit a wide range of behaviors in which is unknown, and the share of bites did receive outside may be higher after long-term vector control (Ellie et al., 2019). Therefore, the high rate of malaria prevalence amongst expectant mothers in the study area necessitates an immediate review of the existing control measures, with the possibility of redesigning the control programs. Health Belief Model as a guiding theory in this work positioned that most often individual behaviours and actions are detrimental to people's health. Therefore, it is high time for pregnant women to adjust their health behaviours when outdoors particularly after realizing that mosquito vectors that transmit malaria may have probably changed their biting patterns by targeting their victims outside.

The 2014 National Malaria Control Strategic Plan (NMCP) identifies federal government health and economic priorities, including Nigeria's Roll Back Malaria goals. Its main priority is to increase possession and use of insecticide treated nets (ITNs) particularly amongst children under 5 years and women who are pregnant. One of the NMCSP's three core interventions is malaria prevention and treatment in pregnancy. As evidenced above, in spite of the recognized health benefits of using ITNs during pregnancy, its application is not encouraging which results to yearly increase in malaria incidences in Bauchi Metropolis.

4.4 Factors influencing Malaria Prevention and Treatment among Pregnant Women in Bauchi Metropolis.

This objective captured the factors influencing malaria treatment and prevention amongst expectant mothers in Bauchi Metropolis. These factors range from economic, environmental, a distance of health facility, the influence of mass media, and social-cultural factors.

4.4.1 Socio-economic characteristics of the study participants

The social and economic discussed in this study include among others; employment status, environmental sanitation, distance to a health care facility, role of media, health workers attitudes performance as well as income level of the respondents and how it influences malaria prevention and treatment. The results showed that the majority of the study women are employed and only a few of them reported to have engaged in some income-generating activities. The results are presented below.

Table 4.4: Distribution of study participants by Employment

(N=317)	**Freq. Count of Participants (n)**	**Percentage (%) distribution**
Employment status		
Employed	73	23
Not employed	244	77
Total	**317**	**100**

The findings in this section revealed that 77% of the respondents were unemployed while 23% affirmed that they were engaged in some income-generating activity. The Explanatory Model by Kleinman (1980) perceived the economic settings of the patient's society as the determinant factor that influences health-care-seeking behavior. In this regard, it is a fact that most of the economic settings in third world

countries favour few to the detriment of many. When this happens, those who are economically disadvantaged are marginalized in every aspect of life, including health marginalization, because they could not afford better and improved health services for themselves as the rich people could afford.

Table 4.5 Distribution of study participants by occupation status

(N=317)	**Freq. Count of Participants (n)**	**Percentage (%) distribution**
What type of occupation do you do?		
House wife only	221	69.7
Civil servant	73	23
Business	23	7.3
Total	**317**	**100**

This finding revealed that civil servants were represented at 23.0%, while those engaged in some form of trade/business were represented at 7.3%. Those in trade/business included casual labourers, artisans, road-side food vendors and general household merchandise. Similarly, the majority of the respondents at 69.7% were housewives with no particular engagement in any form of employment be it private or public. Regarding the high rate of employment among the respondents, a study by Usman et al., (2011) buttressed this finding when it revealed that in households headed by people who have no work, pregnant women find it difficult to attend health facilities and to cover the direct and indirect costs of malaria treatment compared to those households headed by people who have work.

4.4.2 Income status of the respondents and how it influences malaria prevention and treatment

This section observed the financial aspect of pregnant women by looking at their income and how it influences malaria prevention and treatment. This income was measured on monthly basis and compared with the cost of complete malaria treatment per respondent. The findings were presented in table 4.6 below.

Table 4.6: Distribution of study participants by income and a cost complete malaria treatment

	Sample (N = 317)	
Do you have any source of income?	**Freq. Count**	**%**
Yes	96	30.3
No	221	69.7
Total	**317**	**100**
How much is your monthly income?		
$0---------- $20	233	73.8
$21----------$40	4	1.2
$41---------- $60	5	1.5
$61---------- $80	3	0.9
$81---------- $100	2	0.6
$101---------- $200	28	8.9
$201---------- $500	36	11.3
$501----------$1000	4	1.2
$1001 and above	2	0.6
Total	317	100
How much does a complete treatment of malaria cost?		
$10----------$30	33	10.4
$31---------- $50	158	50.1
$51---------- $70	77	24.2
$71---------- $90	29	9.1
$91---------- $100	17	5.3
$101 ---------- $200	3	0.9
$201---------- $500	0	0.0
$500 and above	0	0.0
Total	**317**	**100**

The finding indicated that 30.3% of the respondents affirmed that they engaged in some income-generating activities, while the majority 69.7% confirmed that they did not partake in any revenue-generating activities. Even though the majority of the respondents are educated, the redundancy rates among them are high, and most of the pregnant women did not involve in other business. However, among the 30.3% of respondents who have a source of income, 11.3% of them reported having an income of $201 to $500 per month, while 8.9% affirmed that they have an income of $101 to $200 monthly. Additionally, a staggering number of pregnant women 73.8% fall within the category of women that have a monthly income of $0 - $20. More so, respondents with an income of $501-$1000 are 1.2%, while 1001 and above constituted 0.6%.

However, these findings showed that pregnant women in Bauchi Metropolis face a serious lack of income that further denied them the opportunity to enjoy malaria treatment and preventive measures. However, this corroborated with another study by Chuma et al. (2009) that households with limited resources spend a considerably greater percentage of their earnings in the treatment of malaria during pregnancy than their wealthier equivalents who can manage and spend more on malaria prevention.

Additionally, when the study women were asked how much treatment of malaria costs, the majority of the 50.1% reported that the cost of complete malaria treatment ranges from $31 to $50 per person. This was followed by 24.2% who affirmed that malaria treatment costs around $51 to $70 per person, while 10.4 reported $10 to $30 per treatment. This finding showed that malaria treatment is a significant economic

challenge to pregnant women given that a complete malaria treatment per person as indicated by the majority of the respondents is $50 (NGN 18,900) with a present exchange rate of NGN378 per USD. Nevertheless, the respondents who are at a greater risk of the financial burden of malaria are those whose monthly income is less than even NGN11, 340 (30 USD).

Therefore, this result is in agreement with one by Chijioke et al., (2020) where they found that malaria was an economic burden to the pregnant women in Rivers State, Nigeria with a reported treatment cost per woman stands at 50.75 USD (NGN18, 271) with the exchange rate than at NGN360 per 1 USD. Similarly, The According to the United Nations Development Program (UNDP 2010), women account for 70% of the global poor. Furthermore, women lag behind men in almost every economic and social well-being predictor (Ricci 2012). According to the Explanatory Model, people find it difficult dealing with the economic aspect of a disease. It's a general conviction that if patients do not get the needed treatment, his/their condition may likely deteriorate or worsen.

4.4.3 Ownership of insecticide-treated nets among pregnant women

This part sought to ascertain the availability of insecticide-treated nets (ITNs) among the respondents. The analysis of the ownership of ITNs among pregnant women in the Bauchi metropolis is presented in table 4.7 below.

Table 4.7: Ownership insecticide -treated net

Ownership of insecticide treated nets (ITNs)	**Sample Population (N=317)**	
	Freq. Count	**%**
Yes	98	30.9
No	219	69.1
Total	**317**	**100.0**

The pregnant women were asked whether they owned insecticide-treated nets (ITNs) or not. The finding revealed that more than two-thirds (69.1%) of the respondents did not own insecticide-treated nets (ITNs), while 30.9% affirmed having ITNs. This result suggests that nets possession in the study area is very low because the number of ITNs among the respondents is highly discouraging. This can increase malaria incidence among this vulnerable group as the use of insecticide-treated nets is one of the recommended malaria preventive measure outlined by the WHO.

However, the lack of ITNs among the majority of the respondents clearly shown how the socio-economic burden is hindering the effective application of malaria control measures amongst expectant mothers pregnant women as indicated previously in table 4.4 where 73.8% of the expectant mothers have a monthly income of $0 - $20. Moreover, to buttress this finding, Hanson et al., (2002) found that there is some evidence to support the idea that net possession is higher in families where women have a source of cash income.

4.4.4 Association of ownership of insecticide-treated nets and education levels of the respondents.

The Chi-square test was used to investigate if ownership of insecticide-treated nets has any connection with the education level of pregnant women. The Chi-square test determined that there was a substantial correlation between the ownership of the ITNs and the education level of the respondents ($\chi 2 = 9.742$, $P = 0.021$) as illustrated in the table below.

Table 4.8: Association of respondents owning insecticide treated nets with their education levels

Education level	**Freq. count (N=317)**	**Own insecticide treated nets**	**Do not own insecticide treated net**
Primary	36	2 (5.6%)	34 (94.4%)
Secondary	68	5 (5.9%)	63 (94.1%)
Diploma	102	30 (29.4%)	72 (70.6%)
University	111	61 (55.0%)	50 (45.0%)
χ^2 value		9.742	
P- value		0.021*	

*indicate Chi square value is significant at $P \leq 0.05$

The majority of the respondents with a university level of education represented 55.0% owned ITNs than those who had diploma, secondary and primary education levels at 29.4%, 5.9% and 5.6% respectively. Women with a high level of education typically have better knowledge about the means to prevent themselves from malaria. Additionally, this result is corroborated with the study by Obeagu et al., (2019) where it showed that education increases one's ability and skills to relate with health workers, seek urgent medical care when sick and benefits from many health-promoting behaviours.

Similarly, according to Ricci (2012), low levels of awareness about malaria treatment and control strategies may also be linked to a lack of education. However, table 4.6 above also indicates high percentages of 94.4%, 94.1% and 70.6% among women respondents with respective primary, secondary and diploma levels of education. The expectant mothers' ($\chi2 = 0.468$, $P = 0.926$), Occupation ($\chi2 = 4.086$, $P = 0.252$), marital status ($\chi2 = 0.166$, $P = 0.983$), religion ($\chi2 = 3.114$, $P = 0.211$), ethnic group ($\chi2 = 4.252$, $P = 0.235$) did not show any association with owning insecticide-treated nets. Based on this result, it is assumed that improving the education status of the women in Bauchi Metropolis will increase their awareness level on malaria preventive measures, and subsequently reduces the malaria prevalence or incidences among expectant mothers.

4.4.5 Ability of respondents to pay for last malaria drugs prescribed by a doctor

This part sought to find out whether the respondents have the economic power to take care of the financial burden of their malaria treatment. This is important in understanding how the economic differences among expectant mothers work to influence their malaria treatment behaviour. This finding is presented in table 4.9 below.

Table 4.9: Ability to pay for last malaria drugs prescribed by doctor

Able to pay	**Frequency (N = 317)**	**Percentage**
Yes	84	26.4%
Not able to pay	223	73.6%
Total	317	100%

The majority of the expectant mothers were not able to pay for their last malaria drugs prescribed by a doctor as indicated by 73.6% of the respondents. This finding is consistent with the WHO's report (2010) which stated that many pregnant women have died of malaria due to their inability to acquire hospital recommended drugs, particularly where free malaria pills are not available. This result is also corroborated with the report GMAP of (2008) malaria mainly affects expectant mothers residing in rural communities, where access to medical care and appropriate malaria treatment is severely hampered by poverty and the state of the formal healthcare sector. The study also established that among the few respondents that we're able to pay for their last malaria drugs represented at 26.4% were mainly those employed as civil servants.

It is clear evidence that the treatment of malaria among pregnant women is being hindered by a lack of financial capability to buy the recommended drugs prescribed by a doctor. The staggering 73.6 % that were not able to pay for the drugs was enough evidence that poverty is one of the economic determinants influencing the treatment and prevention of malaria amongst the respondents in the Bauchi Metropolis. Moreover, this is further supported by that fact 73.8% of the respondents fall within the category of women that have monthly income of $0-$20 as compared to the per-person cost of malaria treatment at $50 (NGN18, 900).

4.4.6 Cost of malaria treatment and the propensity of patients to seek treatment

Respondents were asked if the cost of malaria treatment can be a barrier for seeking immediate treatment, the respondents at 65% answered in the affirmative as presented in figure 4.1 below.

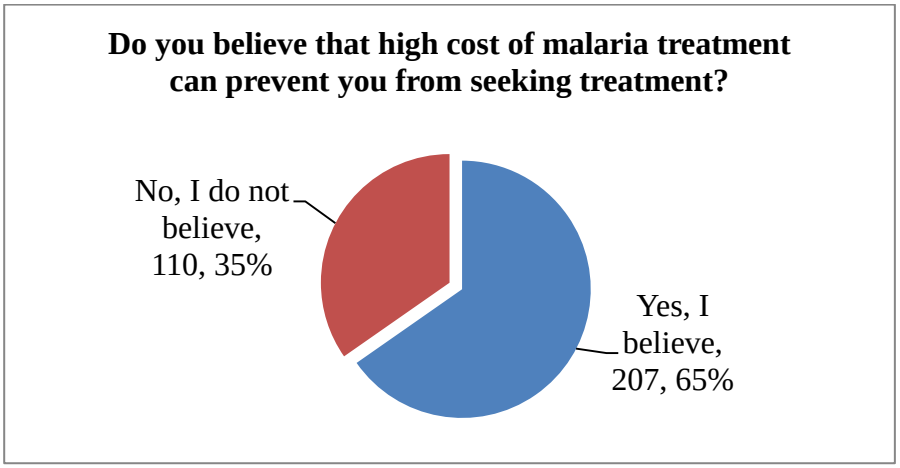

Figure 4.1: Cost of malaria treatment and the propensity of patients to seek treatment

The high cost of malaria treatment can prevent one from seeking immediate treatment as indicated by 65% of the respondents. The rest 35% of the respondents do not believe that the high cost of malaria treatment can prevent them from seeking immediate treatment. As a result of the financial burden involved, many pregnant women may choose not to seek care from health facilities. Similarly, some respondents may resort to herbal medication, which is relatively cheaper. Based on this finding, it is evident that the high cost of malaria treatment amongst pregnant women in the Bauchi Metropolis serves as a barrier to malaria treatment among the respondents.

Additionally, this finding is consistent with that of Obinna et al. (2013) where they found that the cost of malaria treatment was high and households endure a larger percentage of this amount owing to a high level of indirect costs. National Vector Borne Disease Control Programme (2007) reported that for any sustainable measure toward malaria control among pregnant women to yield a positive result, efforts should be channelled toward poverty eradication within households of the most vulnerable groups. However, the study analysis revealed a significant association between the occupation and education levels in malaria treatment-seeking behaviour among the respondents as explained in the table below.

Table 4.10: Belief that the high cost of malaria treatment prevents respondents of various occupations and education levels from seeking treatment

	Can prevent seeking treatment	**Cannot prevent seeking treatment**	**Total**
(i) Occupation			
House wife	165 (74.6%)	56 (25.4%)	221(100%)
Civil servant	4 (5.6%)	69 (94.4%)	73(100%)
Business	17 (73.4%)	6 (26.6%)	23(100%)
χ2 value	12.564		
P value	0.006	317	
(ii) Education levels			
Primary	27 (75.0%)	9 (25.0%)	36 (100%)
Secondary	49 (72.1%)	19 (27.9%)	68 (100%)
Diploma	56 (45.1%)	46 (54.9%)	102(100%)
University	36 (32.4%)	75 (67.6%)	111 (100%)
χ2 value	7.985		
P value	0.046		317

The study established that 73.4% of the respondents engaged in business and housewives 74.6% respectively do believe that the high cost of malaria treatment can

prevent them from seeking immediate treatment. While 94.4% of civil servant affirmed that the cost of malaria treatment could not stop them from immediate treatment. This showed a significant association in the respondents' occupation ($\chi 2 = 12.564$, $P = 0.006$). Likewise, majority of the study women with primary school level education (75.0%) and those with secondary school level education (72.1%) also believed that the high cost of malaria treatment can prevent them from seeking immediate treatment. While the majority of the respondents having University education 67.6% held that cost of malaria treatment could not prevent them from seeking treatment ($\chi 2 = 7.985$, $P = 0.046$).

This finding is in agreement with other studies by Chuma et al., 2006; Ettling et al., 1994; and Russell et al. 2010 demonstrated that cost is a substantial challenge for health care access, particularly for low-income families. According to Filmer (2012), high costs of malaria treatment can result in interruptions in treatment amongst pregnant women in Sub Saharan Africa. Consequently, it is safe to state that the study observed that the belief that the cost of malaria's preventive and curative measures amongst women of childbearing age in Bauchi Metropolis reduced respectively with the upsurge in their educational level, hence the strong link between education level and malaria.

Agomo et al., (2009) found that education was not strongly correlated with parasitic infections among women who are pregnant in a previous study conducted in Lagos. Nevertheless, the results of this study indicate that education plays a critical role in the overall success of malaria control programs in Bauchi Metropolis. There is

therefore a need to improve the education statuses among the most vulnerable populations through government policies and more so, health education intervention on the knowledge, attitude and malaria control practices amongst expectant mothers in the study area. This is due to the fact that education has a positive effect on the uptake of malaria services.

4.4.7 Sources of information on malaria among the pregnant women

This section sought to understand the source through which the respondents get information on the malaria enlightenment campaign. The responses are presented below.

Table 4.11: Sources of information on malaria among the pregnant women

Where do you get information on malaria?	**Frequency (N = 317)**	**Percentage**
Community service worker	11	3.4
Hospital/clinics	142	44.7
Radio	91	28.7
Television	39	12.3
Mosques	13	4.1
Church	21	6.6
Total	317	100
User fees	171	54.1
Total	**317**	**100**

The result revealed that 44.7% of the expectant mothers indicated that they got information on malaria from Hospital/Clinics, while 28.7% got it from Radio channel and 12.3% from Television. Additionally, other respondents cited community service worker, Mosques, and Church 3.4%, 4.1%, and 6.6% respectively. This is corroborated

with the work of Yaya et al., (2018) where they found that mass media usage such as television and radio has worked well in the dissemination of information on malaria preventive measures especially among people living in rural communities.

However, on the other hand, lack of information on vector control has found to be related to the high increase of malaria infection Forero et al., (2014). Similarly, Debo et al., (2016) stated spreading vital information on the knowledge of malaria causation and preventive strategies among expectant mothers could considerably shrink the rate of malaria prevalence. Ankomah et al., (2014) in Nigeria, mainstream media are often used to educate expectant mothers about the positive effects of using Bed nets on a daily basis. Similarly, Kimbi et al. (2014) observe that the use of malaria prevention methods among pregnant mothers is closely linked to people's level of media exposure, knowledge, and belief.

4.4.8 Things that are likely to affect malaria prevention and treatment among pregnant women

This part sought to understand things that are likely to affect the respondent's desire to seek help in a health care facility. Thus, the result showed that the study participants cited financial burden as a barrier that will prevent them from utilizing the available malaria treatment and preventive measures.

Table 4.12 Things that likely to affect malaria prevention and treatment

Which of the followings affects the effective application of malaria prevention and treatment?		
People's attitudes towards the disease	47	14.8
Health workers attitudes and performance	38	11.9
Lack of good medication	61	19.2
User fees	171	54.1
Total	**317**	**100**

More so, a significant number of the study women, 54.1%, pointed out that fees related to malaria treatment serve an impediment to them. While 19.2% mentioned lack of good medication and 11.9% pointed health workers attitudes and performance. Few of the respondents (14.8%) stated that people's attitudes towards the disease serve as a major factor that hinders the effective application of malaria prevention and treatment among the respondents. Referring to 14.8% of the respondents who believed that People's attitudes towards malaria also affect the application of conventional malaria preventive measures. Health Belief Model rightly postulated that human behaviour is a factor that determines individual health or well-being and the success or consequences of particular actions taken by such individuals.

In reference to the 11.9% of the respondents who stated that health workers attitudes and performance as a major problem affecting malaria prevention and treatment, According to the Asian Development Bank (2001), health workers mostly in African and Asian countries are hesitant to work in remote and rural health centers. Furthermore, health services especially in remote locations frequently face scarcity of

medical services and materials, leading to low care and a lack of trust in healthcare services.

Additionally, 19.2% of the respondents cited lack of good medication and this is supported by the Millennium Development Goals report in Manila (2005) where it found that lack of a consistent supply of anti-malarial drugs, coupled with interrupted diagnosis and treatment, deterred the local community from seeking immediate malaria treatment. Moreover, malaria deaths in the Philippines are linked to delayed consultation, inconsistent access to anti-malarial drugs for emergency cases in peripheral health centres, and ineffective medication from hospital's doctors.

4.4.9 Distance to a health care facility and its influences on malaria treatment-seeking

Distance to health care centres are believed to be some of the factors influencing malaria infection among pregnant women. More so, the finding has revealed that a staggering number of respondents believed that distance to health care centres can hinder malaria prevention and treatment.

Table 4.13 Distance to a health care facility and its influences on malaria treatment-seeking

Do you think the distance to a health facility can prevent you from seeking treatment?	**Frequency (N = 317)**	**Percentage**
Yes	203	64.0
No	114	36.0
Total	**317**	**100**

On the distance to health facility, majority (64.0%) of the respondents believed that distance to health centres can prevent people from seeking help in health care units, while 34.6% stated that distance to health care centres could not stop them from going to health centres. Thus, this result is consistent with that of Debo and Kassa (2016) where they found that distance to health facility affects health-related behaviour among expectant mothers and consequently inadequate knowledge about malaria treatment and prevention.

Distance to health care centres where treatment is offered may prevent pregnant women from seeking instant treatment which may lead to delay in tackling complications caused by malaria among pregnant women (Jombo 2010). A near-by health centre that has poor and unprofessional personnel, defective malaria drugs source and charges exorbitant fees for the direct cost of malaria treatment may be of no use to the general public who find it very difficult to deal with this kind of in practicable problems Bruno, Method, Hamisi et al., (2009).

Table 4.14: Environmental sanitation and malaria

Does poor environmental sanitation attract mosquitoes?	**Frequency (N = 317)**	**Percentage**
Yes	249	78.5
No	68	21.5
Total	**317**	**100**

This finding indicated that 78.5% of the respondents affirmed that poor environmental sanitation can attract mosquitos the vector that transmits malaria to a human while 21.5% did not believe that poor sanitation can entice mosquitos. Home

cleansing, hygienic practices, adequate ventilation, refuse disposal, and drainage systems, according to Abdullahi et al., (2009), influence malaria transmission and prevention. People in areas with poor sanitation and lack good malaria control techniques, such as the use of insecticide-treated nets (ITNs), good window and door nets, and mosquito repellents, are more likely to contract malaria. Going by this finding, it is clear that the women in Bauchi Metropolis are well aware that lack of proper hygiene or sanitation is one of the major reasons for mosquito breeding.

4.5. Pregnant Women's Knowledge, Attitudes, and Perceptions of Treatment and Preventive Measures Against Malaria in Bauchi Metropolis.

This objective focused on the knowledge, attitudes, and perceptions of treatment and control measures against malaria in Bauchi Metropolis as exercised by the study women. It sought to assess the expectant mothers' knowledge of malaria prevention.

4.5.1 Knowledge about the main cause of malaria

This section aimed to test the respondents' knowledge of malaria causation. This is an important part of the study because the first step to tackling malaria among pregnant women is to understand the ways through which malaria is transmitted. The findings are presented in table 4.15 below.

Table 4.15: Knowledge about the main cause of malaria

Main cause of malaria	**Freq. Count (N=317)**	**%**
Mosquito bite	244	77.0
Evil spirits	12	3.8
The cold during rainy season	25	7.9
Associating with another person who has it	16	5.0
Age of younger mothers	20	6.3
Totals	**317**	**100**

A significant number of the respondents (77.0%) correctly associated mosquito bites with malaria transmission, while 7.9%of the pregnant women opined that cold during raining causes malaria. Others cited evil spirit, associating with another person who has malaria, and the age of the younger mother (3.8%, 5.0%, and 6.3% respectively). The result of this study contradicted the one by Deressa and Ali (2009) in rural Ethiopia where it found that women who are pregnant had adequate information about malaria symptoms and treatment; but their general knowledge of transmission and preventive methods against malaria was low. Therefore, it is assumed that pregnant women in Bauchi Metropolis are aware that the mosquito is the vector that transmits malaria to human.

4.5.2 Effective ways of preventing malaria

This part sought to assess the respondent's knowledge of the effective ways of preventing malaria. Many options were given to them all of which are part of the recommended malaria preventive measures. However, a significant number of pregnant women prefer using insecticide-treated nets (ITNs) as a way of preventing malaria infection.

Table 4.16: effective ways of preventing malaria

What is the effective way of preventing malaria?	**Frequency (N = 317)**	**Percentage**
Taking anti-malarial drugs including Sulphadaxine Pyrimethamine	69	21.7
Clear bushes in the surroundings	32	10.0
Malaria vaccination	41	12.9
Use of Insecticide Treated Nets (ITNs)	122	38.8
Draining stagnant water in pool and containers	34	10.7
Indoor and outdoor spraying of insecticides	19	5.9
Total	**317**	**100**

The finding of this study suggests that only 38.8 % of the respondents affirmed that malaria can be best prevented by sleeping under insecticide-treated nets, while those who perceived taking anti-malaria drugs including Sulphadoxine and Pyrimethamine (SP) as a suitable way of preventing malaria infection are 21.7%. Others include those who believe that malaria can best be prevented through malaria vaccination, clearing of bushes in the surroundings, draining stagnant water in pool and containers, and indoor and outdoor spraying of insecticides are at 12.9%, 10.0%, 10.7%, and 5.9% respectively. Looking at the table above, it is very obvious that pregnant women in Bauchi Metropolis have a divergent views when it comes to the effective ways of preventing malaria.

However, the majority of the respondents are in favour of using ITNs as indicated by 38.8% of pregnant women. This is consistent with a study by Joseph et al., (2017) where they reported that pregnant women usage of insecticide-treated nets (ITNs) in the Democratic Republic of Congo is very high as they recognize it as the most effective way of preventing malaria as indicated by 78.4% of the respondents who were in favour of sleeping under ITNs. Houmsou et al., (2010) shown that most of the women in Africa were not aware of recommended anti-malarial drugs such as Sulphadoxine and pyrimethamine (SP) as the medication suggested for pregnant women.

4.5.3 ITNs Utilization Among Pregnant Women

The aim was to ascertain the level of ITNs utilization and to know the reasons behind using or not using it among the respondents. Many of the respondents did use ITNs as indicated below and have provided different reasons for not using the insecticide-treated nets. While others who stated that they have used ITNs also mentioned their reasons for the utilization of ITNs. The finding is presented below.

Table 4.17: Reasons for ITNs utilization among the pregnant women

	Sample (N = 317)	
Have you ever used ITNs while pregnant?	**Freq. Count**	**%**
Yes	98	30.9
No	219	69.1
Total	317	100
If yes what is the reason for using ITNs?		
To prevent malaria	86	87.8
To prevent mosquito bites	5	5.1
To prevent mosquito nuisance at night	7	7.1
Total	**98**	**100**
If No, what is your reason for not using ITNs?		
Net is not available	118	53.8
I do not know how to hang the net	13	5.9
I heard that it's too hot sleeping under ITNs	81	36.9
They are only for children	7	3.1
Total	**219**	**100**

The result presented here suggests that only 30.9% of the study women affirmed to have used insecticide-treated nets (ITNs), while a massive 69.1% did not. When 30.9% were asked the reason for using ITNs, 87.8% reported that they used it to prevent a malaria infection, while others cited the need to prevent mosquito bites and to prevent mosquito nuisance at night at 5.1% and 7.1% respectively. However, among the 69.1%

of the respondents who did use ITNs, 53.8% stated that the nets are not available for use that is why they were not using it, more so, 36.9% of the confirmed that they heard from people that sleeping under the insecticide-treated nets emit heat. While 5.9% of the respondents reported that they did not how to hang the nets.

More so, very few of the respondents at 3.1% stated that the ITNs available is only for children to use. However, another study in middle belt Ghana, it was reported by Manu et al., (2017) that the chemical attached to the nets made many pregnant women uncomfortable to extent of even vomiting due to unpleasant smell of the chemical and also leads to difficulty in breathing. In the Northern part of Nigeria, most women who used insecticide-treated nets (ITNs) reported that bed net produced extreme heat, makes them feel uncomfortable and, caused bad dreams. These beliefs are preventing many people from applying conventional malaria preventive measures in Nigeria.

4.5.4 Treatment of malaria regimen and location of the treatment

This section sought to understand the type of treatment the pregnant women prefer and the location for their treatment. A significant number of respondents pitted conventional hospital medicine, while others prefer traditional medicine as it is less expensive and looks natural than orthodox medicine.

Table 4.18: Treatment of malaria regimen used

Where do you go for malaria treatment?	Sample (N = 317)	
	Freq. Count	%
Traditional medicine because it's less expensive	94	30.0
Self-treated at home with orthodox medicine	35	11.0
Hospital	188	59.0

The study established that the respondents represented 30.0% used traditional medicine because it is relatively less expensive and not time-consuming as compared to hospital and orthodox medicine. Often people indeed complain that the waiting time at orthodox medical facilities may exacerbate and complicate their condition. While others still reported having self-medicated at home at 11%. They obtained their over-the-counter medication from shops, kiosks, commercial pharmacies or chemical shops because it was relatively difficult to afford drugs prescribed for them.

Referring to the 30.0% of the respondents who prepared traditional medicine, this result is consistent with the finding of David 2009; WHO 2015 that the treatment and prevention of malaria amongst women are pregnant poses a grave challenge in sub-Saharan Africa due to cultural and superstitious beliefs associated with malaria. Some manifestations of malaria are misdiagnosed by traditional methods and they were often self-treated at home (Beiersmann & Sanou 2016).

However, this demonstrated that the bio - medical notion of malaria is not well comprehended by some of the respondents as indicated by 30.0% of the responses. Moreover, traditional malaria treatment stalls efficient bio - medical treatment and can

be deadly. However, 59.0% of the pregnant women responded that they go to the hospital for malaria treatment whenever the need arises. This is corroborated with the work of Aderonke et al., (2015) where they found that pregnant women in Oyo State, Nigeria prefer going to the hospital and accept Intermittent Preventive Treatment in pregnancy (IPT) which is the use of Sulphadoxine-Pyrimethamine as a malaria treatment for pregnant women recommended by the WHO.

Table 4.19: Usage of anti-malarial drug among the pregnant women

Have you ever used anti-malarial drugs to prevent infection?	**Frequency (N = 317)**	**Percentage**
Yes	155	48.9
No	162	51.1
Total	317	100
If yes, did you finish the course of your last treatment?		
Yes, I finished the course of my last treatment	124	80.0
No, I did not finish the treatment	31	20.0
Total	155	100
If no, why did you not finish the course of your last treatment?		
Because I could not afford the complete expenses	24	77.4
Malaria medication is not available	1	3.2
I turn to traditional medicine	6	19.4
Total	**31**	**100**

The findings suggest that only 48.9% of the respondents had ever used anti-malarial drug to treat malaria, while the majority at 51.1% confirmed that they have never used anti-malaria. This is in agreement with the work of Akaba et al., (2013) that acceptance of anti-malarial drugs among pregnant women in Abuja Federal Capital territory was low.

Out of the 124 respondents (48.9) that have used anti-malaria drugs 80% of them reported that they have finished the course of the treatment. However, among the 31 respondents (20%) that did not finish the course of the treatment 77.4% of them maintained that they could not afford the complete expenses of malaria treatment. Even when the proper treatment is recommended, women may be unable to adhere to it due to the lack of funds and caregiving obligations, which can often result in lower dosing, drugs sharing, and/or failure to complete treatment (Rugemalila et al., 2006).

Additionally, some stated that malaria medication is not available, some turned to traditional medicine for treatment at 3.2% and 19.4% respectively. In reference to those respondents who turned to traditional medicine for treating malaria, Becker (1974) one of the proponents of the Health Belief Model postulated that individual behaviour often plays a vital role when it comes to deciding for their health. Certain people are influenced by their behaviour which in most cases are even contrary to the conventional health practices may have massive consequences at the end. But most of the time, the health care system in many underdeveloped nations is not well equipped to handle the challenges of modern illness. It is believed that when people have no confidence in the health system they can resolve to any means available to regain health even if it takes to accept traditional medicine over the conventional one.

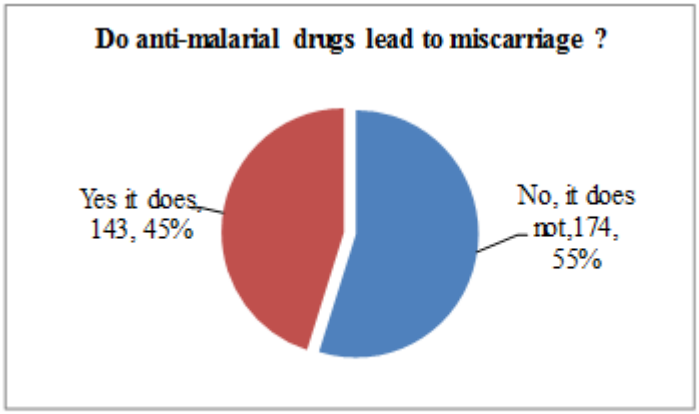

Figure 2.2: Belief that anti-malarial drugs lead to miscarriage

The result indicated that the majority (55%) of the study women believed that anti-malaria drugs do not lead to miscarriage, while 45% affirmed that using antimalarial drugs during pregnancy can lead to miscarriage. However, the finding of this study is inconsistent with a study by Tolhurst et al. (2008), where he found that pregnant women in Malawi recognized bitter drugs including SP that is used to prevent malaria as a reason for miscarriage and stillbirth. Therefore, going by this finding it is obvious that the majority of the women perceived anti-malarial drugs such as sulpothamine as a drug recommended for the treatment of malaria among women who are pregnant.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This part offers a short explanation of the results, summary, Conclusion and recommendations prepared out of the findings of this study. The main aim of this work was to understand the determinants of prevention and treatment of malaria among pregnant women in Bauchi Metropolis, Nigeria. The study was aimed at achieving the following specific objectives: to identify the demographic characteristics of the pregnant women and how they influence malaria prevention and treatment in Bauchi Metropolis; to establish the prevalence of malaria among pregnant women in Bauchi Metropolis; to examine factors influencing malaria prevention and treatment among pregnant women in Bauchi Metropolis; and to determine pregnant women's knowledge, attitudes, and perceptions of treatment and preventive measures against malaria in Bauchi Metropolis;

5.2 Summary of the key Findings

This part discussed the summary of the key findings based on the research objectives. The findings from each objective are presented in a summary form for easy comprehension.

5.2.1 Summary of the First Objective

The first objective sought to identify the demographic characteristics of the respondents and how they influence malaria prevention and treatment in Bauchi

Metropolis Nigeria. The major demographic characteristics that had been found to influence malaria prevention and treatment are maternal age, education, and occupation. The study had shown that younger maternal age determined the incidence of malaria amongst women who are pregnant in Bauchi Metropolis. This is because when the respondents were asked at what age they were first infected with malaria, the majority of them at (34.3%) stated that they were infected between the ages of 20-24 years. While 19.2% cited age 15-19 years and 18.9% reported 25-29 years as the age they were infected with malaria.

More so, 16.1% affirmed that the cost of malaria treatment incurred by them was paid by their spouses. While 7.5% of the respondents paid their medical bills by themselves. Additionally, 2.8% claimed that the treatment cost was settled by their relatives, and a massive 73.6% were unable to pay for the treatment. However, most of the women are educated with 35.0% of them having a degree and 32.2% having a diploma. Additionally, the education level was found to also influence the respondent's ownership of the insecticide-treated nets (ITNs). This is because the Chi-square test showed that 55% of the respondents with University education own ITNs. And it is a well known fact that malaria decreases with the increase in education status as education comes with knowledge including awareness on malaria prevention and treatment.

5.2.2 Summary of the Second Objective

The second objective sought to establish the prevalence of malaria in Bauchi Metropolis among pregnant women. The finding revealed that 48.9% of the respondents reported that they were infected with malaria during pregnancy. Among them were those who reported having used the ITNs represented at 11.0% and yet got infected with malaria. This result indicated that the malaria prevalence in Bauchi Metropolis is alarming and worrisome. Additionally, looking at the importance of ITNs in understanding the disease prevalence, this objective also asked question concerning the usage of insecticide-treated nets (ITNs). However, the result indicated that a staggering number of respondents at 69.1% reported that they did not use ITNs as a preventive measure against malaria. This might not be unconnected with the high incidence of malaria amongst expectant mothers in Bauchi Metropolis.

5.2.3 Summary of the Third Objective

The third objective intended to examine factors influencing malaria treatment and prevention amongst women are pregnant and living in Bauchi Metropolis. From the economic view point, this work established that significant number of the expectant mothers were unemployed and unable to pay for their last malarial drugs prescribed to them by a doctor. Overall, 69.7% of them did not engage in any income-generating activity and 65.0% of them affirmed that the high cost of malaria treatment can prevent them from seeking immediate treatment. This is because the cost of complete malaria treatment is exorbitant as most of the respondents stated that it costs around 50USD (NGN 18,900) including the cost of the consultation, blood test, file opening, and drugs.

While the majority of the pregnant women at 73.8% fall within those who have a monthly income of $0-20 (NGN7, 560), hence poverty and malaria prevalence are inter-related.

However, on the influence of mass media, the respondents revealed that 44.7% of them got information on malaria from hospital/clinics, while 28.7% cited Radio as their source of information regarding malaria enlightenment. While some of them stated Television, Mosques, Church, and community service workers at 12.3%, 4.1%, 6.6%and 3.4% respectively. More so, in another finding 14.8% of the pregnant women believed that people's attitudes towards the disease are affecting the use of preventive measures against malaria, while others cited health workers attitudes and performance at 11.9%. Similarly, lack of good medication was reported at 19.2% and user fees 54.1%.

Another factor reported having influenced malaria prevention and treatment was the distance to a health facility. As indicated by this finding 64.0% of the pregnant women believed that distance to a hospital or clinic can prevent them from seeking malaria treatment. However, poor environmental sanitation was also mentioned as a factor hindering malaria prevention and treatment by giving the mosquitos a favourable atmosphere to nurture their eggs and spread malaria. A massive 78.5% though believe that poor environmental sanitation attracts mosquitos that cause malaria to human.

5.2.4 Summary of the Fourth Objective

The fourth objective sought to determine pregnant women's knowledge, attitudes, and perceptions of treatment and prevention against malaria in the Bauchi Metropolis. On the main cause of malaria, the study established that the respondents know about the main cause of malaria with 77.0% of the study women cited mosquito bite as the reason for malaria infection. On effective ways of preventing malaria, 38.8% affirmed that malaria can be best prevented through insecticide-treated nets (ITNs). While 21.7% of the study women believed that talking anti-malarial drugs including Sulphadaxine-pyrimethamine should be used to prevent malaria.

However, others cited clearing the bushes, malaria vaccine, draining stagnant water in pool and containers, and indoor and outdoor spraying of insecticides at 10.0%, 12.9%, 10.7%, and 5.9% respectively. That means the majority of the women were in favour of using ITNs. In another finding, pregnant women who have never used ITNs cited several reasons. Respondents at 53.8% affirmed that ITNs was not available to them, while a significant number (36.9%) of the expectant mothers reported that insecticide-treated nets produce heat and make a woman uncomfortable to sleep. More so, it was found that 5.9% of the respondents did not know how to hang the nets, while 3.1% stated that the nets available was only for children to use.

Nevertheless, on the location of treatment of malaria, the study revealed that a substantial number of women at 59.0% go to the hospital for malaria treatment. While 11.0% resolved to self-medication at home with over counter drugs they buy from

chemist and available medicine vendors. Similarly, 30.0% reported that they make use of traditional medicine as it is less expensive compared to orthodox medicine. More so, it was found that among the pregnant women that used orthodox medicine 80% of them had finished the course of the treatment, while 20% did not finish the treatment and the majority citing the financial problem as the reason for not completing the treatment.

5.3 Conclusions of the Study

The conclusions of the study were reached based on the results found in this research objectives as established below.

5.3.1 Conclusions of the Study

On the demographic characteristics of the study women, the study concluded that malaria amongst expectant mothers in Bauchi Metropolis was established to be related to maternal ages. The disease burden is much higher among the younger age group of 15-29 years with 53.5% of those who were infected falling within this age bracket. It was also concluded that education influences malaria prevention and treatment in Bauchi Metropolis. Educated women have been found to have a higher capacity to seek out healthcare and use modern forms of malaria prevention strategies compared to those with less education.

Thus, education, as evidenced by the findings of the study, has a significant effect on the uptake of malaria services. Concerning establishing the cases of malaria in Bauchi Metropolis amongst the pregnant women, this study stresses that the level of the

disease prevalence found in Bauchi Metropolis is worrisome as almost half the respondents were found to be infected with malaria.

However, on the determinants influencing the prevention and treatment of malaria amongst women who are pregnant, the study concluded that socio-economic factors were found as the major determinant hindering the effective application of malaria prevention and treatment. In particular, poverty was found to be higher among the respondents as more than two-thirds of them had an income of $0-$20 per month. When comparing this with the current cost of malaria treatment at $50 (NGN18, 900) per person, it is very obvious that poverty has so much influence on malaria infection in Bauchi Metropolis. Additionally, the study also concluded that distance to the health facility and poor environmental sanitation were found to influence malaria treatment. While health workers attitudes and performance were not found to influence malaria treatment.

However, on the pregnant women's knowledge, attitudes, and perceptions of treatment and prevention against malaria, the study concluded that the respondents have adequate knowledge on malaria transmission with more than two-thirds of the study women citing mosquito bite as the reason for malaria infection. More so, on the effective ways of preventing malaria, the study established a combined 60.5% of the respondents preferred using ITNs and taking anti-malarial drugs including Sulphadaxine-pyrimethamiine as the most effective ways of preventing malaria among expectant mothers.

Likewise, the research work concluded that the use of ITNs among respondents in Bauchi Metropolis was not encouraging as the substantial number of the study women did not use ITNs. On the location of malaria treatment, it was concluded that two-third of the respondents choose the hospital as their location of malaria treatment.

5.4 Recommendations

As a result of the above-mentioned conclusions, several recommendations are given to the various stakeholders at different levels. These recommendations if strictly adhered to will help tremendously in addressing the challenges posed by malaria to pregnant women in the Bauchi Metropolis.

5.4.1 Recommendations for the First Objective

The study recommends that pregnant women of younger age 15-29 should be given more attention when they present themselves for antenatal as the study revealed that malaria infection is higher among this age bracket. It is also recommended that government should also prioritize the girl's child education as education has a positive impact on malaria prevention and treatment.

5.4.2 Recommendations for the Second Objective

The second objective sought to establish the prevalence of malaria in Bauchi Metropolis amongst expectant mothers. The study recommends that the Bauchi State Ministry of Health, through the Bauchi State Agency for the Control of HIV&AIDS, Tuberculosis, Leprosy and Malaria (BACATMA) should double its commitment by

increasing funding on the fight against malaria in Bauchi Metropolis, Nigeria. The government should never relent in its efforts to see that malaria is eliminated particularly by ensuring that all three malaria preventive measures in pregnancy recommended by the WHO are strictly adhered to.

Referring to the 48.7% of pregnant women who were infected with malaria, the fight against the infection in Bauchi needs unquestionable collective efforts from all those concerned. However, there is an urgent need for the government of Bauchi State to also involve women organizations, community leaders, religious leaders, and NGOs in awareness and advocacy around the Malaria problem to reduce the disease prevalence. Additionally, there is a need for collaboration between the Ministry of Health and the environment to spray all the sewages and stagnant water bodies regularly in Bauchi Metropolis to reduce the number of mosquitos that spread malaria.

5.4.3 Recommendation for the Third Objective

The third objective meant to consider determinants influencing malaria treatment and prevention amongst women who are pregnant and loving in Bauchi Metropolis. The study recommends that, since the majority of the pregnant women were unemployed and most of them unable to pay for their last malarial drugs prescribed by a doctor, this study suggests that pregnant women in the Bauchi Metropolis be given free malaria treatment as practiced in other States of Nigeria. Additionally, the government should try and build more health centres close to the people as the distance to

hospitals/clinics had been found to influence malaria treatment among pregnant women in Bauchi Metropolis.

5.4.4 Recommendation for the Fourth Objective

The fourth objective aimed to assess pregnant women's knowledge, attitudes, and perceptions of treatment and prevention against malaria in Bauchi Metropolis. As a way of recommendation, pregnant women need to be sensitized more on the regular use of ITNs. As the finding showed that the usage of ITNs among the respondents was not encouraging. It is therefore recommended that government should ensure both malaria treatment and ITNs are given free to all pregnant women that come for antennal care in all public hospitals. Similarly, the study recommends that pregnant women should also be enlightened regularly on the dangers of self-medication as such practices could lead to health implications for both the woman and her fetus.

5.4.5 Other Recommendations Include the Following:

1. Also, there is a need to create awareness in the masses of the life cycle of mosquitoes and how to break it as a way of removing the breeding sites of the mosquito vectors that transmit this and other diseases.
2. To tackle the prevention and treatment of malaria in Bauchi Metropolis, there is a need for a concerted multi-disciplinary and multi-sectoral approach given that there are other confounding factors that militate against malaria prevention measures during pregnancy.

3. Foregoing literature has shown that the degree of malaria upsurges with a proportionate reduction in the use of ITNs. It is assumed that the findings and recommendations from this work will create awareness to the general masses and the pregnant women in the use of ITNs.

5.5 Suggested Areas for Further Research

1. This research was solely a quantitative study of pregnant women in Bauchi Metropolis, Nigeria. Therefore, there is a need for mixed study research to study a larger population of pregnant women across the Bauchi State.
2. The future study in Bauchi Metropolis should try and find out why some pregnant women are infected with malaria even though they reported having using insecticide-treated nets (ITNs). Probably the mosquitos might have changed the patterns of their biting to deceive their victims.

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APPENDICES

Appendix I: Formal Consent

My name is Gambo Suleiman. I am a M.A. student from Kenyatta University, Kenya. I am conducting a study for my thesis examination titled "*Determinants of prevention and treatment of malaria among pregnant women in Bauchi metropolis, Nigeria.*". The information will be used for academic purposes. You may ask questions related to the study at any time.

Your participation in the study is voluntary. Participation in this study will require that I ask you some intimate questions which may be embarrassing or make you uncomfortable. If this happens, you may refuse to answer these questions if you so choose. You can also terminate the interview if you feel unable to continue at any time without any consequences.

The information you give in this study will help others have a better understanding of factors that present opportunities or hindrances to the prevention and treatment of malaria among pregnant women. This information will have broader benefits in guiding the development of policies and programmes related to reducing incidences of maternal morbidity and mortality due to malaria infection and also to better serve your community.

During the interview, I will record your answers to my questions in a questionnaire-guide/interview schedule. Your identity and all your responses will be anonymous on the questionnaire-guide/interview schedule and in the report.

If you have any questions about this research, you may contact the Commissioner, Government of Bauchi State and the Ministry of Health Ethical Review Committee Secretariat on bauchomoh@gmail.com

Participant's statement

I confirm that I understand the information for the above study. I understand that my records will be anonymous and that I can leave the study at any time with any consequences. I also understand that my participation in this study is entirely voluntary and that I agree to take part in it.

_____	_____	_____
Name of participant (optional)	Signature or thump-print	Date

Investigator's statement

I, the undersigned, have explained to the volunteer the procedures to be followed in the study and the risks and benefits involved in a language s/he understands.

_____	_____	_____
Name of participant	Signature or thump-print	Date

Appendix II: Map of Africa showing Nigeria and Bauchi metropolis

Map of Nigeria

Bauchi

Map of Africa

Map of Bauchi state

Bauchi metropolis

Appendix III: Questionnaire Administered to Pregnant Women in Bauchi Specialist Hospital

SECTION A: Demographic information

Please tick the appropriate box below ( )

1. What is your age?

(a) 15 – 19 ( ) (b) 20 – 24 ( ) (c) 25 - 29 ( ) (d) 30- 34 ( ) (e) 35- 39 ( ) (f) 40 – 44 ( ) (g) 45- 49 ( )

2. Are you married?

(a) Married ( ) (b) Widowed ( ) (c) Divorced ( ) (d) Never married ( ) (e) Others……

3. Which Religion do you practice? (a) Christianity ( ) (b) Islam ( ) (c) Others……..

4. What ethnic group do you belong to?

(a) Hausa ( ) (b) Fulani ( ) (c) Gerawa ( ) (d) Jarawa ( ) (e) Other……

5. What is your educational level?

(a) Primary school ( ) (b) Secondary School ( ) (c) Diploma ( ) (d) University ( ) (e)
Other……

SECTION B.

Prevalence of malaria among pregnant women in Bauchi Metropolis

1. Do you use insecticide treated nets

(a) Yes ( )

(b) No ( )

2. Have you ever suffered from malaria?

(a)Yes ( )

(b) No ( )

SECTION C

Factors influencing malaria prevention and treatment among pregnant women in Bauchi Metropolis

3. Are you employed?

(a)Yes ( )

(b) No ( )

4. What type of Occupation do you do?

(a) House wife only ( )

(b) Civil servant ( )

(c) Business ( )

5. Do you have any source of income?

(a) Yes ( )

(b) No ( )

6. How much is your monthly income?

(a) <$0----------$20

(b) $21----------$40

(c) $41---------- $60

(d) $61---------- $80

(e) $81---------- $100

(f) $101---------- $200

(g) $201---------- $500

(h) $501----------$1000

(i) $1001 and above

7. How much does a complete treatment of malaria cost?

(a) $10----------$30

(b) $31---------- $50

(c) $51---------- $70

(d) $71---------- $90

(e) $91---------- $100

(f) $101 ---------- $200

(g) $201---------- $500

(i) $500 and above

8. Do you own insecticide treated nets

(a) Yes ( )

(b) No ( )

9. Where you able to pay for your last malarial drugs prescribed by a doctor?

(a) Yes ( )

(b) No ( )

10. Do you believe cost of malaria treatment can prevent you from seeking treatment?

(a) Yes ( )

(b) No ( )

11. Which among the followings affects the effective application of malaria prevention and

treatment?

(a) People's attitudes towards the diseases
(b) Health workers attitudes and performance
(c) Lack of good medication
(d) User fees

12. Where do you get information on malaria?

(a) Community service worker
(b) Hospital/Clinic
(c) Radio
(d) Television

(e) Mosques
(f) Church

13. Does poor environmental sanitation attract mosquitoes?

(a) Yes

(b) No

14. Do you think distance to health facility can prevent you from seeking malaria treatment?

(a) Yes

(b) No

SECTION D

Pregnant women's knowledge, attitudes, and perceptions of treatment and prevention

15. What is the main cause of malaria?

(a) Mosquito bite ( )
(b) Evil spirits ( )
(c) The cold during rainy season ( )
(d) Associating with another person who has it ( )
(e) Age of younger mothers ( )

16. What is the effective way of preventing malaria?

(a) Taking anti- malarial drugs including Sulphadoxine-Pyrimethamine ( )
(b) Clear bushes in the surroundings ( )
(c) Malaria vaccination, ( )
(d) Use of Insecticide Treated Nets (ITNs) ( )
(e) Draining stagnant water in pools and containers ( )
(f) Indoor and outdoor spraying of insecticides

17. Have you ever used ITNs while pregnant?

(a)Yes ( )

(b) No ( )

18. If yes, what is your reason for using ITNs?

(a) To prevent malaria, ( )
(b) To protect from mosquito bites ( )
(c) To prevent mosquito nuisance at night ( )

19. If No, what is your reason for not using ITNs?

(a) Nets are not available ( )
(b) I do not know how to hang the net ( )
(c) I heard that it's too hot sleeping under ITNs ( )
(d) They are only for children ( )

20. If you have suffered from malaria, where do you go for treatment?

(a) Hospital ( )
(b) Self-treated at home ( )
(c) Traditional healers ( )

21. Have you ever used drugs to prevent malaria infection?

(a) Yes ( )

(b) No ( )

22. If yes, did you finished the course of your last malaria treatment?

(a) Yes ( )

(b) No ( )

23. If no, why did you not finished the course of your last treatment?

(a) Because I could not afford the complete expenses
(b) Malaria medication is not available
(c) I turn to traditional medicine

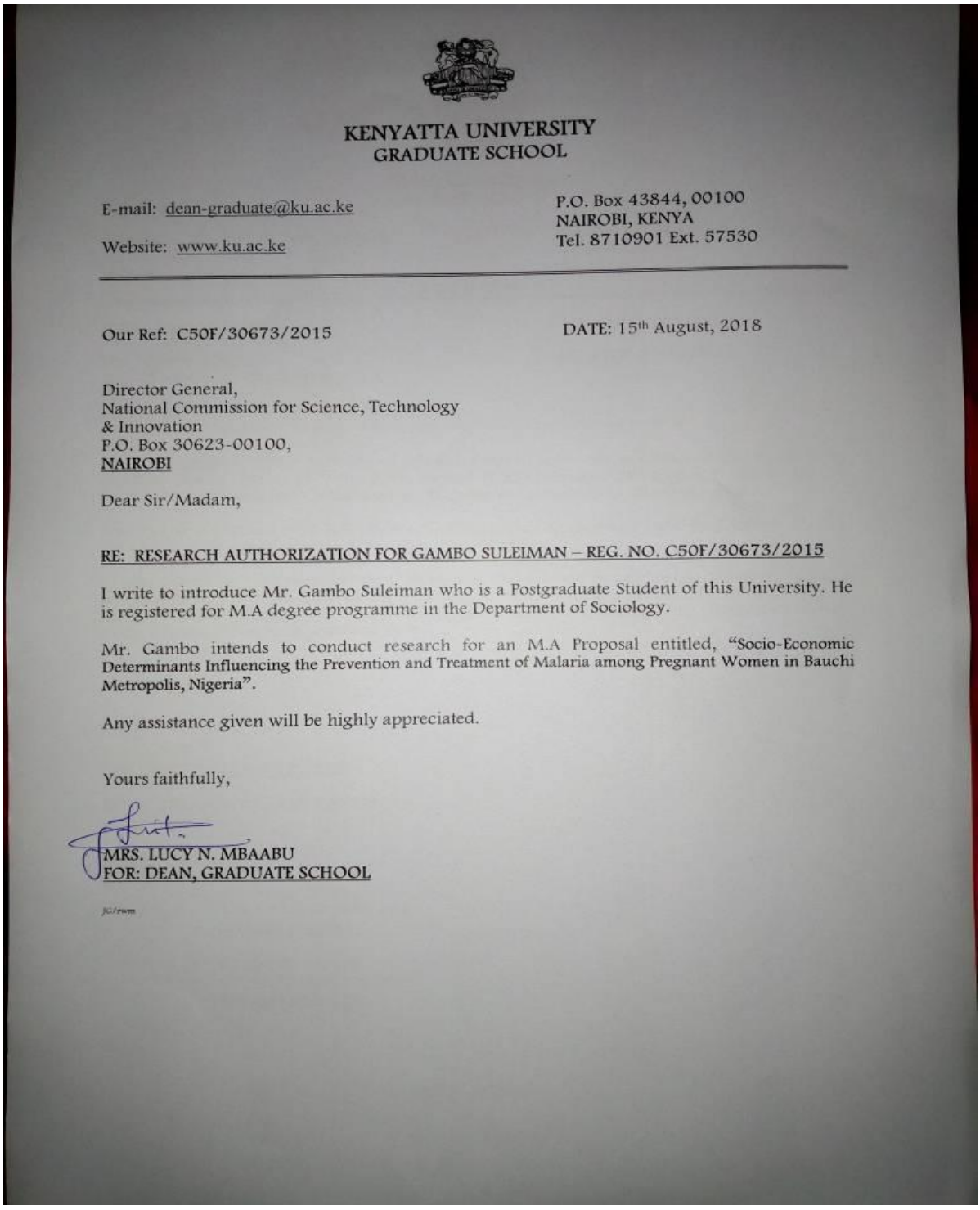
24. Do you believe that anti-malarial drugs lead to miscarriage?

(a) Yes ( )

(b) No ( )

Thank you for your input and time

Appendix IV: Research Authorization Letter



KENYATTA UNIVERSITY
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Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: C50F/30673/2015

DATE: 15th August, 2018

Director General,
National Commission for Science, Technology
& Innovation
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR GAMBO SULEIMAN – REG. NO. C50F/30673/2015

I write to introduce Mr. Gambo Suleiman who is a Postgraduate Student of this University. He is registered for M.A degree programme in the Department of Sociology.

Mr. Gambo intends to conduct research for an M.A Proposal entitled, "Socio-Economic Determinants Influencing the Prevention and Treatment of Malaria among Pregnant Women in Bauchi Metropolis, Nigeria".

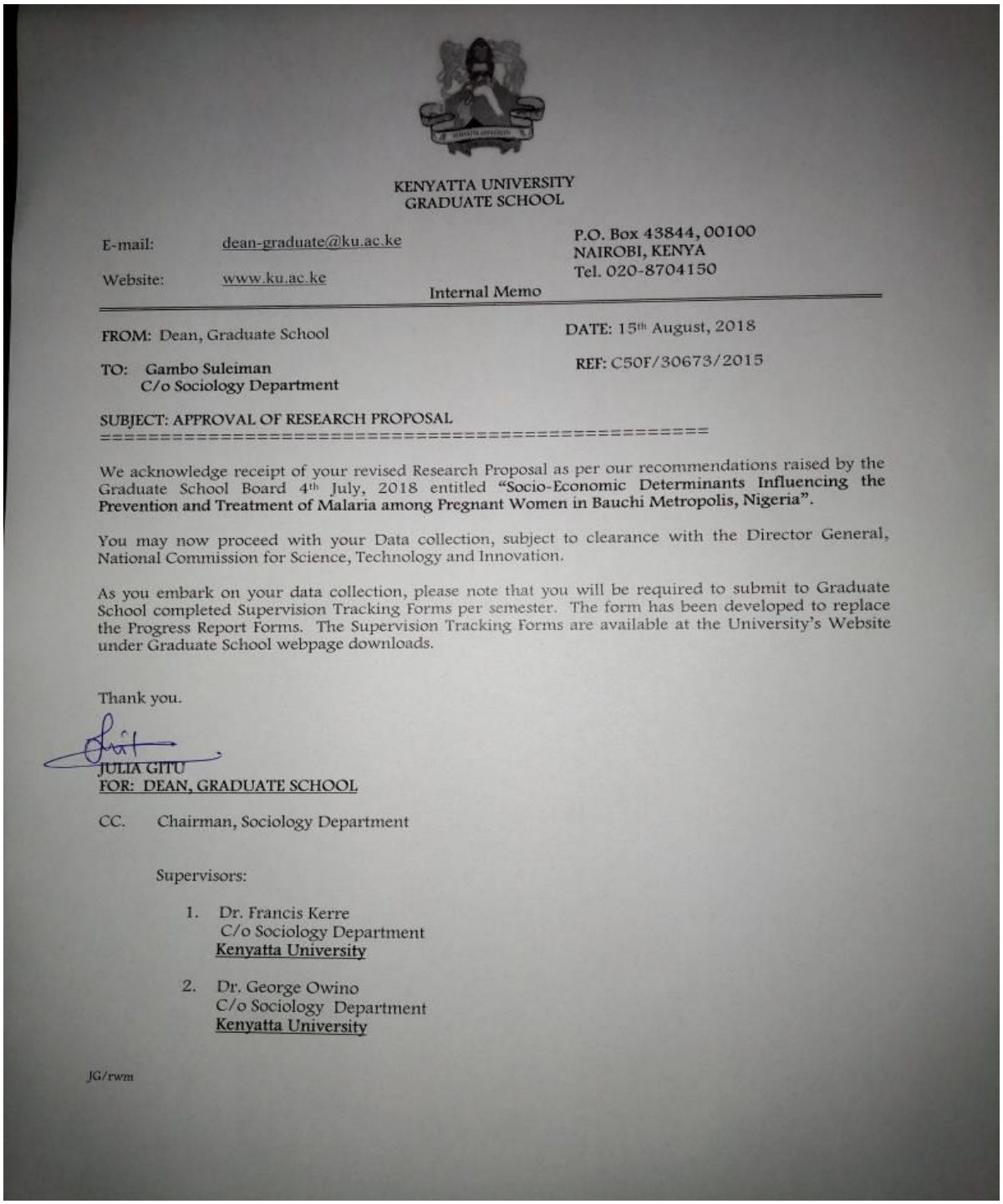
Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

jg/rwm

Appendix V: Research Approval Letter



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Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Internal Memo

FROM: Dean, Graduate School

DATE: 15th August, 2018

TO: Gambo Suleiman
C/o Sociology Department

REF: C50F/30673/2015

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board 4th July, 2018 entitled **"Socio-Economic Determinants Influencing the Prevention and Treatment of Malaria among Pregnant Women in Bauchi Metropolis, Nigeria".**

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

JULIA GITU
FOR: DEAN, GRADUATE SCHOOL

CC. Chairman, Sociology Department

Supervisors:

1. Dr. Francis Kerre
   C/o Sociology Department
   Kenyatta University
2. Dr. George Owino
   C/o Sociology Department
   Kenyatta University

JG/rwm

Appendix VI: Ethical Clearance Letter

SECRET

GOVERNMENT OF BAUCHI STATE
MINISTRY OF HEALTH

Bello Kirfi Road, Off Murtala Mohammed Way,
P.M.B. 065, Bauchi

E-mail: bauchismoh@gmail.com

Reference: MOH/GEN/S/1409/I

Date:- 4th February 2019

PROTOCOL REG. N0: BSMOH/NREC/02/2019
PROTOCOL APPROVAL N0: NREC/12/05/2013/2019/02

Gambo Sulaiman,
Department of Sociology,
Bauchi State University Gadau,
Bauchi Campus.

ETHICAL CLEARANCE FOR SUBMITTED PROTOCOL:
"Socio-economic Determinants Influencing the Prevention and Treatment of Malaria Among Pregnant Women in Bauchi Metropolis''

The Bauchi State Health Research Ethics Committee (HREC) under the State Ministry of Health has received the above named protocol for ethical clearance and approval in line with the guidelines set by the Committee. The protocol was reviewed and the committee noted that the research does not entails clinical trials or any invasive procedures.

2. Consequently, the Committee hereby granted expedited approval for the research to be conducted. However, you should share with us your workplan clearly indicating the start date, where and when to visit the research site(s) and also **the final results of your findings**.

3. The Committee requires you to comply with all Institutional Guidelines, Rules and Regulations and with the tenets of the National Health Research Ethics Committee Code including that all adverse events are reported promptly to the Committee. **No changes are permitted in the research without prior approval by the Committee** except in circumstances outlined in the Code. The Committee reserves the right to conduct compliance visit to your research site without prior notice.

3. Thank you.

(Usman U. Muhammad)
For: Hon. Commissioner.