



## “PREVALENCE OF MALARIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN GENERAL HOSPITAL SAMINAKA, LERE LOCAL GOVERNMENT AREA OF KADUNA STATE”

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### ABSTRACT

**Background:** Malaria is a mosquito-borne disease affecting human and other animals caused by parasitic single – called microorganism belonging to the plasmodium group. Malaria causes symptoms that typically include fever, malaise, vomiting, and headache, in severe cases it cause jaundice, seizures, coma or death. Malaria infection during pregnancy poses substantial risk to the mother, her fetus, and the neonate.

**Aim:** This study was aimed at determining the prevalence, predisposing and risk factors of malaria among pregnant women attending antenatal care in general hospital Saminaka, Lere Local Government Area, Kaduna State.

**Methodology:** Four hundred and eighteen (418) blood samples were randomly collected among the pregnant women attending ante natal care in General Hospital Saminaka and then taken to the laboratory for examination. The investigation was carried from November, 2018 to January, 2019. Thick and thin blood films were employed for the diagnosis.

**Results:** 88 (21%) had no malarial infection, 330 (79%) had malarial infection: of which 56 (17%) had anaemia as complication due malarial in pregnancy, 13 (4%) had miscarriage and 3 (1%) had hypoglycemia. Woman with age bracket of 15-20 has the highest prevalence 138(33.0%), followed by those with age bracket, 21-25(30.4%) and then those with age group of 26-30 (21.5%) respectfully, while age group of 31-35 and 36-40 had the lowest prevalence of 31 (7.4%) and 32 (7.7%). Respondents occupation shows Trader were the highest with the frequency 159(38%), Unemployed (house Wife) 112 (26.8%), Civil Servant 37(8.9%), Unskilled Labourers 16(3.8%) and Farmers 9(2.2%) respectfully. Respondents level of education shows Primary were the highest with frequency of 128(30.6%), Secondary 126(30.1%), Informal 77(18.4%) and Tertiary 44(10.5%) respectfully.

**Conclusion:** The ability to conduct a comprehensive evaluation of the prevalence of malaria infection among the pregnant women is a major challenge. Malaria is playing a considerable role in causing anaemia, miscarriage, hypoglycemia in pregnancy in this part of the globe. In most part of the developing world like Nigeria, maternal and child health services should be given utmost support at every level for the prevention and control of malaria in pregnant women.

**Keywords:** Malaria. Infection. Pregnant Women.

### INTRODUCTION

Malaria is a mosquito-borne disease affecting human and other animals caused by parasitic single – called microorganism belonging to the plasmodium group (WHO, 2014). Malaria causes symptoms that

typically include fever, malaise, vomiting, and headache. In severe cases it cause jaundice, seizures, coma or death (Caraballo, 2014). Symptoms usually begin ten to fifteen days after being bitten by infected mosquito.

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If not properly treated, people may have recurrences of the disease months later (WHO, 2014) in those who have infected, re-infection usually causes milder symptoms. This partial resistance disappears over months to years if the person has no continuing exposure to malaria (Caraballo, 2014).

The disease is most commonly transmitted by an infected female anopheles mosquito. The mosquito bite introduces the parasites from the mosquito saliva into a person's blood. The parasite travels to the liver where they mature and reproduce. Five species of Plasmodium can infect and be spread by humans. Most deaths are caused by *P. falciparum* because *P. vivax*, *P. ovale*, and *P. malariae* generally cause a milder form of malaria. The species *P. knowlesi* rarely causes disease in humans. Malaria is typically diagnosed by the microscopic examination of blood using blood films, or with antigen-based rapid diagnosis tests. Methods that use the polymerase chain reaction to detect the parasites' DNA have been developed, but are not widely used in areas where malaria is common due to their cost and complexity (Nadjim, 2012). Therefore the distribution of malaria in Africa may be classified broadly into four epidemiological areas: the hypo, meso, halo and hyper-endemic areas. The epidemiological location is made by several factors including the ecosystem, climate, and state of the environment, human behavior, vectors and parasite bionomics (WHO, 2005).

Malaria is ubiquitous in the tropical regions of the world. It is found in central America, the Island Hispaniola in the Caribbean, the Amazon region of south America, throughout most of sub-Saharan Africa, part of the Arabian peninsula, the near east, and in parts of the South Pacific. Many of these same regions also share heavy HIV/AIDS and TB burdens (NMIS, 2010). Malaria is endemic throughout most of the tropics, approximately 3.4 billion people worldwide

who are exposed annually, 1.2 billion are at high risk. The World Health Organization (WHO) states that more than 207 million developed symptomatic malaria cases in 2012. An estimated 655,000 persons died of malaria in 2010, out of which 86% of the victims were children under 5 years of age and about 91% of malaria-related deaths occurred in the WHO African region and approximately 300-500 million cases a year. Nigeria, the Democratic Republic of Congo, Burkina Faso, Mozambique, Cote d'Ivoire and Mali account for 60% or 390,000 of malaria deaths globally (WHO, 2010).

Malaria is transmitted throughout Nigeria. Five ecological zones define the intensity and seasonality of transmission and the mosquito vector species: mangrove swamps; rain forest; guinea-savannah; Sudan savannah; and Sahel-savannah. The duration of the transmission season decreases from year-round transmission in the south to three months or less in the north. Malaria accounts for 60% of outpatient visits and 30% of hospitalizations among children under five years of age. It is also responsible for estimated 300,000 deaths in children under five years of age each year and contributes to an estimated 11% of maternal mortality (WHO 2010).

Malaria poses a significant public health challenge with a high global burden. However, large regional disparities exist in the burden of malaria (WHO, 2015). Sub-Saharan Africa alone accounted for 90% of the malaria cases and 92% of malaria deaths worldwide (WHO 2016). The number of malaria cases declined by 42% while the malaria death rate declined by 66% in the African region.

Nigeria and the Republic of Congo are two major countries contributing to the high malaria burden, as 36% of the malaria cases worldwide occurred in these two countries (WHO, 2016). Poverty and geography play significant roles in the prevalence of malaria in the countries.

The mosquito species found in Africa have a long lifespan and prefer to bite human; a significant factor for the high prevalence of malaria in Africa furthermore, climatic conditions like rainfall, temperature and humidity affect the survival of mosquitoes, thus increasing the transmission rates of malaria (Yan, G. 2002)

Malaria infection during pregnancy poses substantial risk to the mother, her fetus, and the neonate. The prevalence of parasitemia appears greatest in the second trimester, and susceptibility of clinical malaria may persist into the early postpartum period. Due to the endemicity and high transmission rate of malaria in Nigeria, pregnant women have acquired immunity being resident in stable malaria area and are susceptible to sub-clinical infections, which may result in adverse effects to both mother and child. It significantly contributes to anaemia in pregnancy; increases the occurrence of low birth weight; is associated with pre-term deliveries, still births and prenatal mortality. It has been established that pregnancy quadruples a woman's risk of malaria illness and doubles her risk of death (WHO, 2016). Preventing severe anaemia caused by malaria will lead to fewer pregnant women requiring blood transfusion thereby reducing the risk of transfusion-related infection especially HIV and hepatitis B. The adequate control of malaria in pregnancy should lead to better outcome of pregnancy, improve survival of mothers and reduces prenatal mortality.

This large burden has led to the development and setting of several strategies and target aimed at malaria control, and where possible its elimination. The global strategy for malaria, 2016 to 2030 targets at 90% reduction in the incidence and mortality rates of malaria, as well as an elimination of malaria in 35 of its endemic countries by 2030 one of SDG target indicators it to end the epidemics of AIDS, tuberculosis, malaria and other neglected tropical disease by 2030 (WHO, 2016). Nigeria is currently a malaria

endemic country with its entire population (186 million) at risk of contracting malaria (WHO, 2015), and a whopping 76% of this population at high risk. In 2015, Nigeria contributes about 29% of malaria cases and 26% of the malaria deaths worldwide (WHO, 2016). These large figures imply that Nigeria success in tacking malaria control will play a large part in the actualization of the global goals.

Malaria infection during pregnancy is a major public health problem in tropical and subtropical regions through the world (NMSP, 2013). Thirty million African women in malaria endemic area become pregnant and are at risk of infection with *Plasmodium falciparum* (NMSP 2013) (FMOH 2005). An estimated ten thousand of these women and two hundred of their infant die as a result of malaria infections during pregnancy and severe malarial anaemia contribute to more than half of these deaths (RNM, 2008). Malaria infection in pregnancy is major risk for maternal and child health (WHO 2015) it increase the risk of miscarriage, stillbirth and low birth weight about 200000 neonatal death occur annually (WHO 2015).

Malaria in pregnancy account to 5 to 12% of all low-weight birth (Steketee *et al*, 1996). In low risk zones, episodes of severe malaria significantly associated with still births, spontaneous abortion, premature delivery and maternal death (WHO 2007). Intermittent preventive treatment in pregnancy (IPTP) is one of the key interventions recommended by WHO to bolster the prevention of asymptomatic infections among pregnant women living in moderate to high risk region (WHO, 2007). In 2012, thirty six sub-Saharan African countries had endorsed intermittent preventive therapy in pregnancy (IPTP) as part of antenatal care but coverage of IPTP has remained a challenge, with few women receiving adequate IPTP doses each of four recommended antenatal care visit.

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Among the African countries which provided this information, sixty per cent of pregnant women attending antenatal care had received at least one dose intermittent preventive treatment during pregnancy in 2012. Only 23% of them had received three doses (WHO, 2003). Malaria in pregnancy (MiP) contributes to maternal and neonatal mortality.

### **MATERIALS AND METHODS**

#### **Study Area**

The study was conducted in General Hospital Saminaka, Lere Local Government Area, Kaduna State, Nigeria.

#### **Study Population**

All pregnant women attending antenatal care in General Hospital Saminaka, Lere Local Government Area of Kaduna State.

#### **Sample Collection and Processing**

418 blood samples were randomly collected among the pregnant women attending antenatal care in General Hospital Saminaka and then taken to the laboratory for examination. The investigation was carried from November, 2018 to January, 2019. Thick and thin blood films were employed for the diagnosis.

#### **Preparation of Thick and Thin Blood Films**

According to Cheesbrough "a drop of blood was placed at a center of a clean grease free slide at an angle spread to the size of 3-8mm in diameter, the thickness was such that it is possible to see nero's print through it. It was allowed to air dry before staining" (Cheesbrough 2000).

#### **Two Staining Techniques were Employed**

Thick and Thin blood film using 1:10 dilution of Giemsa staining.

Thick blood film using field stain A and B.

#### **Staining**

According to Cheesbrough, "When a large number of thick films require staining, field's stain is preferred because it is very quick, stable, isotonic with malaria parasites and penetrates unfixed parasites rapidly and

gives particularly good result with fresh thick blood films" (Cheesbrough 2000).

Field's stain composed of two solutions, A and B. Field's solution A contains methylene blue, while solution B contains eosin. The solutions are kept in covered staining jars respectively: and holding the slide with the dried thick film facing downwards, dip the slide into field's stain A for 5 seconds, it then drains off the excess stain by touching a corner of the slide against side of the container.

It then washed gently for about 5 seconds in clean water and the excess water is drained off again

Dip the slide into field stain B for 3 seconds and drain off the excess stain.

The slide is then washed gently in clean water and then wipe the back of the slide and place it upright in a draining rack for the film to air-dry.

Examine the film under the microscope using an oil immersion and high dry lens to determine if parasites are present.

### **RESULTS**

In this study, the prevalence rate of respondents who had malaria was 67% compared with 33% of respondents who were not diagnosed with malaria.

Respondents occupation shows Traders were the highest with the frequency 159(38%), Unemployed (house Wife) 112 (26.8%), Civil Servant 37(8.9%), Unskilled Labourers 16(3.8%) and Farmers 9(2.2%) respectively. Respondents level of education shows Primary were the highest with frequency of 128(30.6%), Secondary 126(30.1%), Informal 77(18.4%) and Tertiary 44(10.5%) respectively, Table 1.

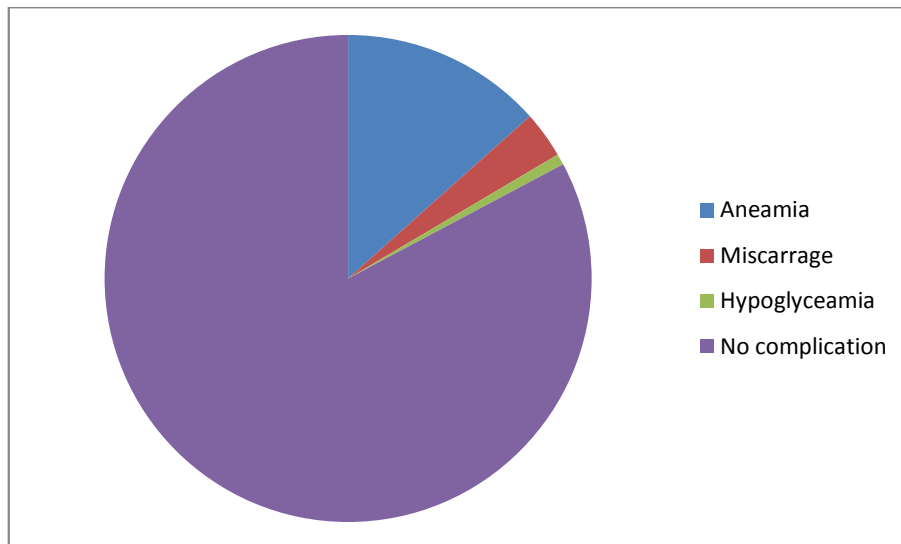
Among the four hundred and eighteen (418) women recruited into the study, 88 (21%) had malarial infection complications, 330 (79%) had no malarial infection complications: of which 56 (17%) had anaemia as complication due malarial in pregnancy, 13 (4%) had miscarriage and 3 (1%) had hypoglycemia, Fig.1.

Woman with age bracket of 15-20 has the highest prevalence 138(33.0%), followed by those with age bracket, 21-25(30.4%) and then those with age group of 26-30 (21.5%) respectfully, while age group of 31-35 and 36-40 had the lowest prevalence of 31 (7.4%) and 32 (7.7%), Fig 2.

Respondents level of education shows Primary were the highest with frequency of 128(30.6%), Secondary 126(30.1%), Informal 77(18.4%), Tertiary 44(10.5%) and Others 43(10.3%), Fig 3.

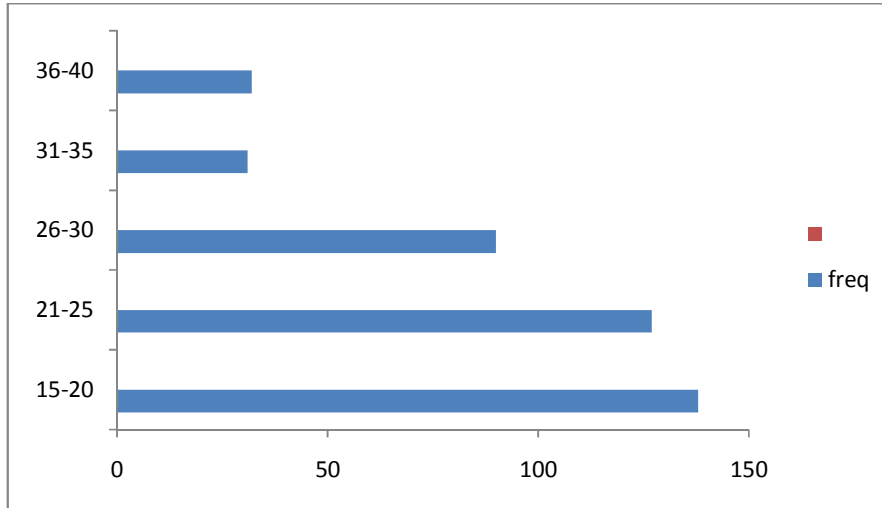
**Table 1:** Analysis of Respondents Occupation

	Frequency	Percent	Valid Percent	Cumulative
percent				
Valid Trader	159	38.0	38.0	38.0
Farmers	9	2.2	2.2	40.2
Civil Servant	37	8.9	8.9	49.0
Unskilled Labour	16	3.8	3.8	52.9
Pensioners	9	2.2	2.2	55.0
Unemployed House				
Wives	112	26.8	26.8	81.8
Others	76	18.2	18.2	100.0
Total	418	100.0	100.0	

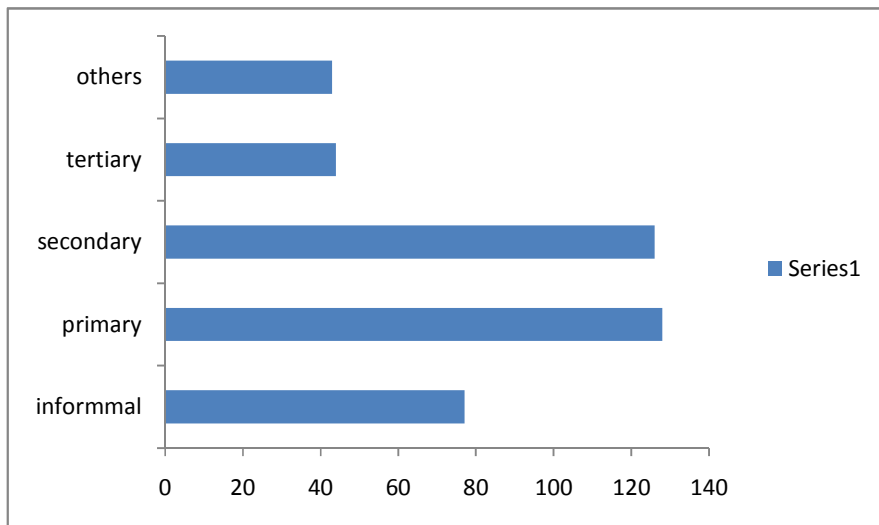


**Fig 1:** A Pie Chart Showing Complication Due To Malaria Among Pregnant Women

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**Figure 2:** A Bar Chart Showing Prevalence Of Malaria Among Pregnant Women Of Various Age Groups.



**Figure 3:** A Bar Chart Showing Respondents Level Of Education

**DISCUSSION**

This study was aimed at determining the prevalence, predisposing and risk factors of malaria among pregnant women attending antenatal care in general hospital Saminaka, Lere Local Government Area, Kaduna State. The study revealed that 418 pregnant women examined for the malaria parasite attending antenatal care in General Hospital, Saminaka 67% were infected with the parasite. This finding was correlating with similar study of (Adefioye *et al.*, 2007) who recorded high prevalence rate of 72%. This may be due to the fact that the study was carried out during

the end of rainy season with much breeding site of the mosquitoes available.

For the occupation of pregnant women, the Traders were observed to have the highest prevalence of 159 (38.0%) in this study. This is not correlating with similar report of (Clement *et al.*,2017), whose finding shows traders had prevalence of 11.5%. This could be as a result of traders spend most of their time in open places such as shops, open shade etc. which exposes them to vector bites and transmission of malaria parasite than other occupation.

Pregnant women with malaria complications had anaemia with the highest prevalence of 17.0%. This agrees with similar reports of (Naseem *et al.*, 2008), whose finding shows a prevalence of anaemia 48(38%); Lathika *et al.*, with a prevalence of microcytic anaemia combined with dimorphic anaemia to be 89.5% and Mennendez C, 1995, who stated that regardless of transmission level and pre-pregnancy level of malaria immunity, maternal anaemia remains the most frequent consequence of malaria during pregnancy.

Pregnant women with age of 15-20 years had the highest malaria parasite of 33.0%. This is correlating with a similar findings by (Clement *et al.*, 2017 and Ohalete *et al.*, 2011), who stated that age related prevalence showed a decreased in malaria parasite with increased in age, whose finding

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revealed that pregnant women with age less than 20 had the highest prevalence of 29.4%. In this study, pregnant women with primary level of education had the highest prevalence 128(30.6%) and prevalence decrease with increase in level of education. Although, those without education had the least prevalence. This is contradicting with previous study by (Alaku *et al.*, 2014) whose finding revealed that illiterate pregnant women had the highest prevalence 192 (97.3%).

## CONCLUSION

Malaria is endemic among pregnant women in Lere Local Government Area, Kaduna State, Nigeria. The continuous use of integrated management will help to reduce the burden in this area.

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