INCIDENCE OF MALARIA AMONG PREGNANT WOMEN ATTENDING CHIRANCI PRIMARY HEALTHCARE AT KUMBOTSO, KANO STATE, NIGERIA

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ABSTRACT

Aim: Malaria infection during pregnancy is a major public health problem in tropical and sub-tropical regions throughout the world. In most endemic and areas of the world including Nigeria, they are struggling with the cases of this infection. The present study was carried out with the aim of establishing incidence and possible risk factors for malaria in pregnant women attending Chiranci Primary Healthcare at Kumbotso, Kano State, Nigeria.
Place and Duration of Study: The research study was conducted between August and September 2017 in diagnostic laboratory, Chiranci Primary Healthcare. The hospital is located at Kumbotso Local Government area of Kano State, Nigeria.
Methodology: For this study, incidence of malaria fever among pregnant women aged 15-above was determined. The research was carried out at Chiranci Primary Healthcare, in which a total of 120 blood samples were collected from prim-gravid and multi-gravid pregnant women from August to September, 2017. Diagnosis was made by microscopy using thin and thick blood film smears to determine the incidence of malaria parasite infection.
Results: Of the total 120 blood samples examined, only 38 samples were positive recording to about 31.7%. Thus, proved their awareness with regards to malaria infection. For gravidity, it was shown that prim-gravids were more susceptible to malaria infection than multi-gravids and hence, age might not be a factor that influences malaria infection.
Conclusion: Previous history of malaria during pregnancy represents a risk factor for current infection and lack of knowledge of early diagnosis of malaria for prim-gravid women at first and second trimesters was an important risk factor associated with malaria during pregnancy.

Keywords: Malaria fever, Pregnancy, Incidence/ prevalence and Gravidity.

INTRODUCTION

Malaria infection during pregnancy remains a serious public health problem in the world. More than 50 million women residing in malaria endemic areas become pregnant every year (WHO, 2004; Terkuile *et al.,* 2003; Menendez *et al.,* 2000). A survey carried out shows that every year at least 24 million pregnancies occur among young women in malicious areas of Africa, yet less than 5% of pregnant women have access to effective interventions (Rogerson *et al.,* 2007). Although malaria during pregnancy might be asymptomatic due to the development of some degree of immunity by mothers residing in areas with stable transmission, it is still associated with unfavorable effects on the mother or the child (Kayentao *et al.,* 2005; Adegnika *et al.,* 2006; Uddenfeldt *et al.,* 2007; Enato *et al.,* 2009; Paulo *et al.,* 2012). For this reason, abortions, stillbirths, premature deliveries and maternal deaths are common phenomena among human population (Feresu *et al.,* 2004; Marchant *et al.,* 2004). Many cases of maternal and perinatal death can be prevented (Hinderaker *et al.,* 2003)

In malaria transmission areas, pregnant women in particular primigravidae are known to be susceptible to malaria and to have higher prevalence and densities of parasitaemia than are non-pregnant women from the same population (Desai *et al.,* 2007). Malaria is a disease transmitted to people by infected female anopheles mosquitoes. The parasites are specifically *Plasmodium species* (*P. sp*ecies) which includes *P. falciparum, P. vivax, P. ovale and P. malariae. Plasmodium species* infection during pregnancy increases the chances of maternal anemia, abortion, still birth pre-maturity and infant low birth weight which is the greatest single risk factor for death in the first month of life (Harrison, 1982; Marguadt and Demaree, 1985; FMH, 2000). Although, four species of Plasmodium can infect human and cause illness, only malaria caused by *P. falciparum* is potentially life threatening and the specie is predominant in Africa (Noston *et al.,* 2005).

The impact of malaria associated with anemia on pregnant women (the risk of death) and fetuses (i.e., low birth weight) has been enormously acknowledged during the last decades, keeping in mind that anemia does not necessarily have to be symptomatic to become a risk factor during pregnancy (Shulman *et al.,* 2002; Menendez *et al.,* 2000). The size of the excess risk varies with the age of the pregnant woman, reflecting cumulative exposure to malaria over a lifetime, and with parity, as a result of pregnancy-specific immunity acquired after exposure to malaria in previous pregnancies. From literatures, other risk associated factors are; nutrition, use of prophylaxis, genetics of the host, genetics of the parasite and level of anti-parasitic immunity (Tako *et al.,* 2005; Paulo *et al.,* 2012).

Several studies were reported in African countries with high indices/ prevalence of malaria transmission (Rogerson *et al.,* 2000; Ladner *et al.,* 2002; Dafallah *et al.,* 2003; Adam and Elbashir, 2005). However, to date, few data were documented for Kano, Nigeria about information regarding malaria during pregnancy. In view of the foregoing, the present study was aimed to assess and analyze the incidence of malaria fever and its possible associated risk factors in pregnant women who attended Chiranci antenatal Healthcare at Kumbotso Kano State.

2.0 MATERIALS AND METHODS

2.1 Blood sample collection and Microscopic examination

A total of 120 samples of blood were collected from the pregnant women through digital or venous puncture between the ages of 15years to above. The study was carried out August, 2017 to determine the incidence of malaria parasite infection in *thin* and t*hick* blood films. Samples were prepared for parasite detection and estimation of parasitemia. Blood smear and thick drop assays were prepared according to the protocol described by the World Health Organization (WHO, 1991). For each sample, a separate clean and grease-free slide, sterile lancets, 70% ethanol and water absorbent Cotton wool, soft lead pencil, record or register for each sample and detail concerning age, gravidity and name were recorded. Blood smear and thick drop assays were stained with 10% Giemsa dye. Smears were fixed with methanol for one minute before staining. Smears were rated negative when there were no parasites in 200 fields of a thick drop smear in immersion oil (Shute, 1988).Generally all the samples were examined microscopically using x100 objective after thin and thick films staining techniques were carried out.

3.0 RESULTS AND DISCUSSION

The data were collected from a total of 120 pregnant women who attended Chiranci Primary Healthcare at Kumbotso Kano city based on age and gravidity i.e. whether prim gravid (*first Pregnancy)* or multi-gravid (*More than one pregnancy*). The result profiles were summarized in Tables 1 and 2. Briefly, the ages of the women ranged between 15 and above; most women were multiparous (55%), and more were in the first trimester of pregnancy than were in either the second or third trimesters. The results in Table 1 revealed that only 38 samples were positive recording about 31.7% of the total samples.

Table 1: Shows incidence of malaria fever among Pregnant Women based on their age

Age Group	Number of Positive Sample	Percentage (%) of Positive Sample	Number of Negative Sample	Percentage (%) of Negative Sample	Total Sample	Percentage (%) of Total Sample
15-20	5	4.2%	11	9.2%	16	13.4%
21-26	13	10.8%	25	20.8%	38	31.6%
27 Above	20	16.7%	46	38.3%	66	55%
TOTAL	38	31.7%	82	68.3%	120	100%

Based on gravidity, the results in Table 2 have shown that prim-gravids were more susceptible to malaria infection than multi-gravids women recording about 9.2% for prim gravids out of 30 samples and 15.8% for multigravids out of 90 samples. This shows that gravidity as a factor contributes in the distribution of malaria among pregnant women.

Table 2: Shows the highest incidence of Malaria Fever based on Gravidity (Prim gravid and multigravid)

Gravidity	No of Positive Sample	No of Negative Sample	(%) Positive Sample	(%) Negative Sample	Total Sample	(%) Total Sample
Prim gravid	11	19	9.2%	15.8%	30	25%
Multi-gravid	19	71	15.8%	69.2%	90	75%
TOTAL	30	90	25%	75%	120	100%

TABLE 3: Frequency distribution of malaria parasite infection relative to age group among pregnant women

Age Group	Frequency of Positive Sample	Cumulative Frequency of Positive Sample	Frequency of Negative Sample	Cumulative Frequency of Negative Sample
15-20	5	5	11	11
21-27	13	18	25	36
28-Above	20	38	46	82
TOTAL	38	61	82	129

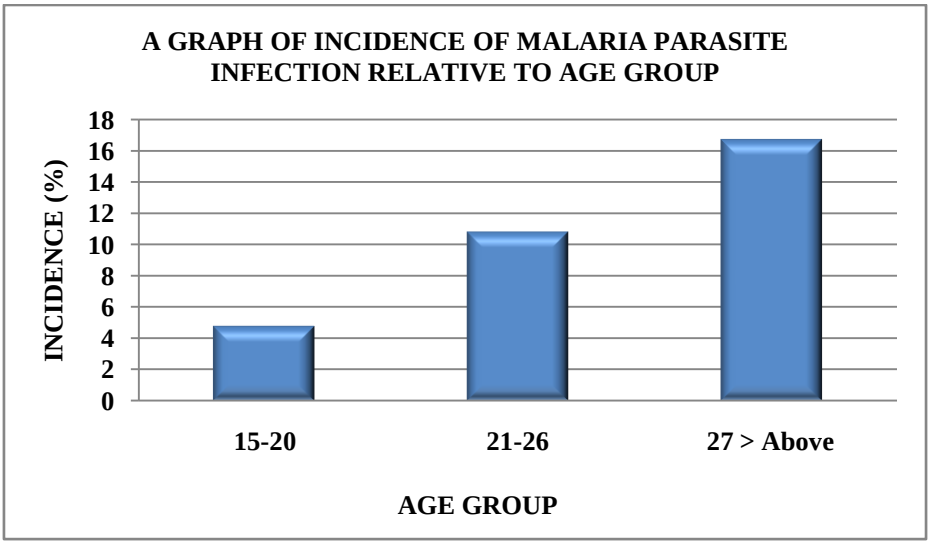

Figure 1: A Graph of incidence of malaria parasite infection relative to age group

Table 3 and Figure 1 showed the frequency distribution of the infection which represent the incidence/ prevalence rate, and from the results obtained it was clear that the prevalence rate

of malaria infection at Chiranci Primary Healthcare was very low with only 31.7% as it was may be due to the awareness of the pregnant women attending the hospital.

Discussion

Malaria is an avoidable cause of maternal and fetal mortality or morbidity. However, the international community has gone far from implementing the necessary interventions to drastically reduce the impact of malaria infection in endemic areas (Vallely *et al.,* 2007). Early diagnosis and adequate treatment are vital requirements for minimizing the incidence of deaths and must be the main components of anti-malaria intervention in many underdeveloped countries (Uddenfeldt *et al.,* 2007; Enato *et al.,* 2009; Vallely *et al.,* 2007).

From the results obtained in the present study, it is clear that the pregnant women attending Chiranci primary healthcare were quite aware of dangers of malaria infection by preventing themselves or taking appropriate preventive measures, this is evidenced by the number of samples and the ones that were diagnosed as positive ones. Of the total 120 blood samples examined, Table 1 shows that the incidence of malaria during pregnancy was 31.7% of the total samples. This shows that the pregnant women have proved their awareness with regards to malaria parasite infection.

Based on gravidity, it was shown that prim-gravids were more susceptible to malaria infection, this means that prim-gravid women are the most affected than are multigravid ones, and this is similar to what have been reported by Rogerson *et al.,* (2000) and Dicko *et al.,* (2003). In this study, ages of infected women shows no association with malaria. Thus, age might not be a factor that influences malaria parasite infection and this agrees with some findings in the literature (Ladner *et al.,* 2002; *Bouyou et al*., 2005). However, other research works documented in Sub-Saharan Africa reported a significant association between maternal age and malaria during pregnancy (Rogerson *et al.,* 2000; Okoko *et al.,* 2002).

Moreover, women who attended antenatal care during the first and second trimesters of pregnancy were found to exhibit higher incidences/ prevalence of malaria infection. This agrees with the findings of Dicko *et al.,* (2003) in which he named the first trimester as the major risk factor (or period). However, several studies have reported that the second trimester, along with the beginning of the third trimester, as the peak of prevalence (Brabin *et al.,* 1983; Brabin, 1991; Dafallah *et al.,* 2003). Many researches deduced that certain factors were responsible in the distribution of malaria which includes the following; changes to cellular immune responses that would otherwise offer protection, but this increased attractiveness of the pregnant women to mosquitoes. Another risk factor is due to persistent exposure to mosquito bites, adults living in endemic areas develop natural immunity which is mediated through hormonal and immunologic mechanisms is especially useful in pregnancy (Lindsay *et al.,* 2000). Furthermore, lack of knowledge during early diagnosis (i.e. first trimester) of pregnancy is another important factor, this is why prim gravids are more susceptible because more often they lack the knowledge of the signs of early pregnancy

which leads to a late diagnosis and before, the infection reaches some level (*Rogerson et al.*, 2007).

4.0 CONCLUSION AND RECOMMENDATIONS

For this study, it can be concluded that the incidence of malaria fever among the pregnant women was very low (31.7%) and it was shown that years or age does not contribute in the distribution of malaria. Therefore, our results suggest that *P. falciparum* is common in pregnant women attending antenatal care at Chiranci primary healthcare. The first and second trimesters of pregnancy seems to represent the highest risk. The intermittent presumptive treatment of malaria during pregnancy recommended currently by the WHO for endemic areas of high malaria transmission was use of Sulfadoxine-pyrimethamine which has been reported as the drug of choice, for its effectiveness to completely eliminate the etiological agent of malaria (i.e. *P. falciparum*).

For this study, microscopy of Giemsa-stained smears was used for diagnosis. In areas where high transmission of malaria takes place, many *P. falciparum* infections during pregnancy stay undetected when only microscopy of Giemsa-stained smears of peripheral blood is used for diagnosis. Therefore, detection of circulating parasitic antigens or detection of parasite-specific DNA using conventional polymerase chain reaction (PCR), nested PCR, or the more recently developed real-time PCR were recommended for effective diagnosis of the parasites.

Recommendations

1. Government should adopt the policy of monitoring sanitation to clear bushes mosquito's breeding grounds surrounding houses to prevent rapid increase of the mosquitoes.
2. Adequate drainage facilities should be provided to avoid standing water
3. Government should make mosquito nets available at affordable prices or free for pregnant women.
4. Mosquitoes proof net should be used on windows and doors. Also farms should not be very close to our houses
5. Educational campaign on malaria parasite infection in schools, communities, mosques and hospitals should be carried out regularly.
6. Government and its various agencies and non-government organization (NGOs) should carry out regular and adequate vaccination programmes against malaria parasite infection.
7. Malaria drugs or Antimalarial drugs should be made at affordable and cheap prices.
8. Prompt access to treatment with the use of Sulfadoxine-pyrimethamine or combine therapies saves life. If we can apply these and other measures on a wide scale and monitor them carefully, then the burden of malaria infection would be significantly reduced.

CONFLICT OF INTEREST

We declared no conflict of interest

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