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## **PREVALENCE OF MALARIA INFECTION IN PREGNANT WOMEN ATTENDING BAMALLI NUHU MATERNITY SPECIALIST HOSPITAL, KANO, NIGERIA**

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### **ABSTRACT**

***This study was conducted to determine the prevalence of malaria parasites in pregnant women attending Bamalli Nuhu Maternity Specialist Hospital Kano. A total of 250 blood samples of pregnant women were tested using field stain method and the parasites were identified using the standard identification keys. Out of which, 180 (72%) were found to be malaria parasite positive. The result of the present study revealed that Plasmodium falciparum had the highest rate of infection with about 68.8% while Plasmodium ovale was found to have an infection rate of 3.2%. The result revealed a highly significant difference within the means levels between the observed species (P. falciparum and P. ovale) (0000.1904\*\*\*). Based on parity 94 (78.33%) Primigravidae, 61 (72.62%) Secundigravidae and 25 (54.35%) Multigravidae were infected respectively. The result of the findings also reveals that there is a significant difference within the levels of pregnant women Parity (0.01719\*). It was concluded that more than half of the pregnant women were infected with malaria infection and P. falciparum was the predominant species then P. ovale. The findings of the study further proved that Primigravidae and Secundigravidae are more susceptible to malaria infection. More effort should be made in order to control malaria infection by providing better clinical management of the disease that includes curative and preventing measures.***

***Keyword: Prevalence, Parity, Plasmodium, Pregnant Women, Infection rate.***

### **INTRODUCTION**

The small flying blood sucking insect called anopheline mosquito transmit malaria parasite. Presence of malaria parasite (Mp) in the blood of the host is called malaria parasitaemia (WHO, 2004). *Plasmodium* parasite is responsible for disease malaria in both man and animals, and this parasite belongs to Class Sporozoa of Phylum Apicomplexa under Kingdom Animalia (Smyth, 1994). There are four species of the genus *Plasmodium*, which cause malaria in man these are *Plasmodium falciparum*, *Plasmodium ovale*, *Plasmodium malariae* and *Plasmodium vivax*. Comparatively *Plasmodium vivax*, *Plasmodium malariae* and *Plasmodium ovale* cause disease, which although debilitating and often not lethal. In contrast, *P. falciparum* causes severe disease in man which if untreated is habitually Fatal (Gutteridge and Combs, 1997). All forms of human malaria are transmitted in nature by the bite of the Female Anopheline mosquito. Artificial infection may result from passage of infected blood containing the erythrocytic phase of the parasite. It may also be achieved experimentally by injection of blood containing sporozoites (within 30 - 60 minutes of infective mosquito bite) (Woodruff, 1974). Malaria remains endemic in some 102 countries with more than half of the world's population at risk (Smyth, 1994). There are over 150 million cases of malaria disease in the world each year. In tropical Africa alone, malaria is liable each year for the death of more than one million children under the age of 14

years and pregnant women. The areas in the world where malaria is endemic include most of tropic Africa, South America, large part of the Middle East, part of India, Srilanka and whole of South-East Asia (WHO, 1992). The World Health Organization estimates 300-500 malaria cases annually with 90% of this burden being in Africa. More over the predictable annual death certified to malaria ranges from 700,000 to 2.7 million globally and greater than 75% of them are African children and their pregnant women (Bezalwer *et al.*, 2014). The burden of infection during pregnancy is caused chiefly by *Plasmodium falciparum* which is the most common species in Africa that causes malaria. Malaria in pregnancy leads pre natal death, low birth weight and maternal anemia (Desai, 2007). Malaria imposes enormous socio-economic burden on humanity and with six diseases (Diarrhea, HIV/AIDS, tuberculosis, hepatitis B and Pneumonia), accounts for 85% of worldwide communicable disease trouble. The aim of malaria control in most areas is to diminish the disease lower the level of public health significance which will be well-matched to economic and social well being of the people. Malaria is restricted by reducing the parasite pool in human population and by creating a gap in the chain of infection through reducing the vector population using suitable strategies. These strategies are consequential from familiarity of the biology of the malaria parasites and the Anopheline vectors (RBM, 2010).

**MATERIALS AND METHODS**

**The Study Area**

The study was carried out at antenatal clinic of the Bamalli Nuhu Maternity Specialist Hospital which was part of Kano metropolis (Kano Municipal) along Emir Palace Kofar Nassarawa road. This area was characterized with densely populated houses where found scattered and reflect the primitive design of an ancient city (Olofin, 1987). Most of the people living in this area are Hausa Fulani that practice Islamic religion and engaged them selves in different businesses that may fit their environment. This includes dying, trading, fishing and rare civil servants (Olofin, 1987). The hospital is frequently attended by very low and fair socioeconomic groups and therefore, it is affordable and easily accessible to Yakasai, Shahuci, Zage, Kofar mata, Durumin Zungura, Tudun Wazirci, Galadanci, Kofar Nassarawa e.t.c.

**Study Subject**

The study was carried out within hot - rainy season between August to September 2008. A total of 250 pregnant women were selected for the study. The age and parity of each pregnant women were recorded, after which then blood samples was observed to confirm the presence of the malaria parasite and finally identify the parasite species present (Monica, 2005).

**Collection of Blood Samples**

The capillary or venous blood samples was collected by puncture method this was done by cleaning the thumb using cotton wool which was soaked in the spirit (75% alcohol) to remove dirt and grease. It was then dried with clean cotton and the thumb was punctured with sterile lancet where a little pressure was applied to the punctured finger to ensure a free flow of blood. The first drop of blood was wiped away while the next drop was collected directly on the slide (Bakers *et al.*, 1998).

**Field Staining Procedure**

Field stain consists of two field stain solution (i.e. A and B) in which both A and B was used. The air- dried thin film was dipped into methanol for 5- second (fixing stage) afterward were dipped into field stain B for 5- second and allowed to drain. Sequentially the

thin film was dipped in tap water with pH 7.2 for 5-second time and allowed to drain soon later it was dipped in field stain A for acute 5-second and allowed drain. Moreover the thin film was dipped in tap water again with pH7.2 and allowed to drain and finally it was allowed to stand vertically, to dry using drying rack (Monica, 2005; Sunee Teerasaksilp *et al.*, 2005; Noppadon Tangpukdee *et al.*, 2009).

**Microscopy of Malarial Parasite**

The stained slide was placed on the stage in the microscope, the stage was lowered to the maximum distance from the objective revolver with the aid of coarse adjustment, a drop of oil immersion was placed on the slide and the results were observed and recorded (Woodruff, 1974; Monica, 2005).

**Statistical Analysis**

The data obtained in this study was subjected to statistical software (R version 2013) to conduct one way analysis of variance (One Way Anova) in order to see if there is significance difference between the rates of infection of the observed species and different parities of pregnant women.

**RESULTS**

The general prevalence of malaria infection among pregnant women attending BNMH was 72% (Table 1), i.e. Among 250 pregnant women examined 180 were 'MP' positive. Out of 180 cases of infection two *Plasmodium species* were detected (*P. falciparum* and *P. ovale*). *P. falciparum* was found to be the predominant species with 68.8% rate of infection, while *P. ovale* had only 3.2% of infection rate. This shown a highly significance difference between the species rate of infection (00000.1904\*\*\*)(Table 1). The distribution of malaria infection in relation to parity/age is shown in (Table 2). The percentage of pregnant women infected was greater among Primigravidae aged 20 - 27 (78.33%) and Secundigravidae 28 - 35 (72.62%) than among the Multigravidae aged 36 - 43 (54.35%) which is the group that had the least cases of infection. These differences in infection rates between the three parities/age groups were found to be significance (0.01719\*).

Table 1: Prevalence and species of *Plasmodium* observed in pregnant women attending BNMH Kano, August to September, 2008.

S/No	Species of <i>Plasmodium</i>	Frequency	Rate of infection (%)	P. value
1	<i>P. falciparum</i>	172	68.8	
2	<i>P. ovale</i>	8	3.2	
<b>Total</b>		180 (mpcases)	72% (General prevalence of malaria infection)	00000.1904***

Table 2: Distribution of malaria parasites in relation to parity/age of pregnant women examined.

Parity	Age Group	Number Examined	Number Infected	Rate of Infection (% Infected)	P. value
Primigravidae	20 - 27	120	94	78.33	
Secundigravidae	28 - 35	84	61	72.62	
Multigravidae	36 - 43	46	25	54.35	
<b>Total</b>		250	180		0.01719*

## DISCUSSION

Among the plausible explanations of these result is that pregnant women are more vulnerable to malaria infection (72%). This result (72%) reflects the findings of Taura and Oyeyi (2009) which showed a high prevalence of malaria infection among pregnant women (51.7%) out of 300 pregnant women tested. The high level of the malaria infection from this study could be to the time of the study as rainy season provides abundant sites for the vector proliferation and a suitable temperature required WHO(1994).

The current finding provides evidence that *Plasmodium falciparum* was found to be the predominant infecting species. It accounted for 68.8% of infection followed by *P. ovale* that account for 3.2%. This support the finding of Nigerian National Malaria and vector control division of Federal Ministry of Health (FMH)(2001) that stated that *P. falciparum* is the commonest species in virtually all parts of Africa accounting up to 98%. More over this also agrees with the research carried out in Gambia by Okoko *et al*, (1997) in which out of 160 cases of malaria among pregnant women examined 98.6% of the *Plasmodium* species were *P. falciparum* and the remaining 1.4% are of *P. ovale* infection. This could be attributed to the fact *P. falciparum* required higher temperature for optimal development and hence it is more commonly found in tropical areas of Africa which Kano isamong.

The highest rate of infection was among Primigravidae aged 20 - 27 years, which accounted for 78.33% of the incidence; this was followed by Secundigravidae aged 28 - 35 years, which accounted for 72.62% of the incidence and lastly the group with the least infection in the population was the Multigravidae aged 36 - 43 years, which accounted 54.35%. This agrees with the findings ofSuleiman(1998), Taura and Oyeyi, (2009), Raimi and Kanu (2010), Ivoke *et al.*, (2013),who said immunity against malaria increases with age and parity as well. Furthermore WHO (2004), revealed that in highly endemic areas infection was uncommon among Multigravidae and more common in Primi - and Secundigravidae. This may possibly be attributed due to progressive fall down of folic acid and iron as a result of high need of it by the foetus during pregnancy. Furthermore, malaria prevalence decreased with the increase of parity. This isbecause the Primigravidae are innovative to pregnancy as such they have zero immunity withmalaria infection. However, Secundi – and Multigravidae have acquired immunity during pregnancy which helps their bodies to have ready made antibodies against malaria parasite. Conversely, incidence of malaria was considerably associated with level of education and socioeconomic status. It is well known that the Multiparous are experience peoples that are well trained and full equipped with advices on how to take care of them selves during their antenatal not like Primigravidae that are empty headed.

## Conclusion

The intended aim and objectives of this work have been delivered to the expected height. It was found that more than half of the pregnant women tested

were infected with malaria parasite (72%) and *P. falciparum* was the predominant (68.8%) species, then *P. ovale* (3.2%) but *P. vivax* and *P. malariae* were not seen. Moreover the result of one way analysis of variance (One Way Anova) revealed a highly significant difference within the means levels between the observed species (*P. falciparum* and *P. ovale*) (00000.1904\*\*\*). The findings of the study further proved that primigravidae (78.33%) and secundigravidae (72.62%) are more susceptible to malaria infection among all parities followed by multigravidae (54.35%) which is the least group (WHO, 1994). The result of the findings also reveals that there is a significant difference within the levels of pregnant women Parity (0.01719\*).

## Recommendation

Following the findings of this work, the under listed recommendations were made:

1. This study should be simulated to judge against the prevalence of malaria infection among pregnant women.
2. Further research should be conducted to confirm the severe infection and predominant characters caused by *Plasmodium falciparum*.
3. An additional work should be conducted to determine the differences on the most susceptible group in parity among pregnant women.
4. More effort should be made in order to control malaria infection by providing better clinical management of the disease by both curative and preventing measures. Moreover more efforts should be made to expand and improve the intermittent preventive treatment in order to reduce the infection of pregnant women.

## Author's contributions

Aminu Isma'il Yola participated in conducting research Dr. Aisha Ahmad Dantata participated in research designing

Dr. Zainab Tukur participated in research supervision

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