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Parity and malaria parasitaemia among pregnant women attending ANC, UDUTH Sokoto

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Abstract
Malaria is a leading cause of morbidity and mortality among pregnant women and infants in Sub-Saharan Africa. Despite intervention by government and international agencies to tackle malaria among pregnant women in Nigeria, the infection remains endemic due to poor and ineffective intervention strategies. This study was aimed at determining malaria parasitaemia in relation parity and among women attending ante-natal clinic, Usmanu Danfodiyo University Teaching Hospital Sokoto. One hundred and twenty six (126) apparently healthy pregnant women who willingly consent to participate in the study were recruited and screened for malaria parasitaemia. A high prevalence of 83.3% was observed among the studied population, with women in primigravidae state having higher prevalence (90.91%) than those at multigravidae state (77.47%). Women in 2nd trimester recorded the highest prevalence (94.74%) followed by those in 1st trimester (84.62%), then 3rd trimester (71.43%) with *Plasmodium falciparum* as the most frequent cause of the infection. In relation to age, younger women (between 15 – 35 years) had a high prevalence of malaria parasitaemia (≥83.33%), while those above 35years had lower prevalence or no malaria infection. This study suggest that there is high prevalence of malaria among pregnant women in Sokoto, therefore rigorous sensitization and prophylaxis need to be undertaken to reduce the malaria morbidity and mortality during pregnancy.

Keywords: Parity, Malaria, Pregnancy, *Plasmodium falciparum*, Gravidity

1. Introduction
Malaria, a parasite based disease transmitted by infected *anopheles* mosquito remains the most prevalent parasitic disease in tropical and subtropical region of the world [1, 3]. The management of the disease has become increasingly difficult and controversial due to emerging multiple drug resistance [4, 5]. Eighty to ninety percent of malaria cases worldwide are recorded in sub-Sahara Africa, approximately 19-24 million women are at risk of malaria and its adverse consequences during pregnancy [6, 7]. Nigeria is said to be malaria endemic, with an estimated economic loss of up to ₦ 32 billion annually; as a cost of treatment, transportation and loss of manpower among other indirect costs [8].
Plasmodium infection has been implicated to be a cause of certain complications such as low birth weight, anaemia, splenomegaly and congenital transmission in pregnancy [9, 10]. Hormonal and immunological changes, increase nutritional need and immuno-depressant action of certain hormone (mainly cortisol) can lead to immuno-depression during pregnancy, thus, aggravates malaria [11, 12].
Despite elaborate campaign for use of mosquito nets, government and nongovernmental/ international interventions, as well as routine screening and free treatment of pregnant women, malaria remains a serious health burden [2, 3]. This necessitates more realistic feasible data based approached in tackling the menace of malaria. This study was aimed at determining effect of parity on prevalence of malaria parasitaemia among pregnant women attending Ante-Natal Clinic (ANC), Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto, Sokoto State.

2. Materials and methods
2.1 Study Area and Population
Between the month of April to October, one hundred and twenty six (126) pregnant women, attending ANC, UDUTH Sokoto (located in the Sudan Savannah belt of North–West zone of Nigeria; Lying between longitude $05^{0}11^{1}$ to $13^{0}03^{1}$ East and latitude $13^{0}00^{1}$ to $13^{0}06^{1}$ North, covering an area of 60.33 km^{2}), who willingly consent to participate in this study were recruited. Additional information of participants was obtained via administration of questionnaire.

2.2 Ethical approval
This research was approved by the Ethical Committee of Usmanu Danfodiyo University Teaching Hospital Sokoto, Sokoto State.

2.3 Sample Collection and Preparation
Blood samples (2 ml each) were collected into EDTA bottles (under aseptic condition) by venipuncture from patients, inverted 5-6 times to prevent clotting and subsequently used for this study.

2.4 Staining Technique and Microscopy
Within 30 minutes of sample collection, two drops of blood sample was placed onto a clean-grease free glass slides to make thick and thin blood films. Using Giemsa stain solution, the thick and thin blood films were stained adopting the method described by Warhurst and Williams [13].

3. Result and discussion

Table 1 shows the prevalence of malaria in relation to pregnancy history. The result of this study reveals a high prevalence of 83.33% was observed among the total population. The high prevalence may be attributed to compromise of immunity and malaria resistance during pregnancy. More so, Sokoto is malaria endermic [14], therefore the result agrees the report that about 80% of pregnant women are susceptible to malaria infection endermic areas [9]. Women in primigravidae state (i.e. first pregnancy) had higher malaria prevalence (90.91%) when compared to those in multigravidae state (77.47%). Malaria has been reported to be more frequent and severe during primigravidity than in multigravidae state, this is likely to be connected to the sudden physiological and immunological changes that occur in primiporous state [9, 15, 17].

Table 1: The prevalence of malaria parasitaemia in relation to parity of women attending ANC, UDUTH Sokoto

Parity	No. of Screened Subjects	No. of Malaria +ve Subjects	Prevalence (%)
Primigravidae	55	50	90.91
Multigravidae	71	55	77.47
Total	126	105	83.33

The prevalence of malaria based on gestation period is given in Table 2. The percentage prevalence is in the order of 2nd Trimester (94.74%) > 1st Trimester (84.62%) > 3rd Trimester (71.43%). This agrees with earlier reports suggesting occurrence of heavy parasitaemia during 2nd Trimester of pregnancy among women in endemic areas [9, 18, 20]. In the second trimester category, the multiparous groups shows slightly higher prevalence than the primiparous state, unlike the in the cumulative result (Table 1) which shows higher prevalence among primiparous women.

Table 2: The prevalence of malaria parasitaemia in relation to gestational period of pregnant women attending ANC, UDUTH Sokoto

Gestation Period Parity (%)		No. of Screened Subjects	No. of Malaria +ve Subjects	Prevalence
1st Trimester	Primigravidae	6	5	83.33
	Multigravidae	7	6	85.71
	Total	13	11	84.62
2nd Trimester	Primigravidae	31	29	93.55
	Multigravidae	26	25	96.15
	Total	57	54	94.74
3rd Trimester	Primigravidae	18	16	88.78
	Multigravidae	38	24	63.16
	Total	56	40	71.43

Prevalence of malaria based on *Plasmodium* species is given in Table 3. Of the 105 malaria parasitaemia positive patients, 90 participants (85.71%) were diagnosed with *Plasmodium falciparum*, 12 participants (11.43%) with *Plasmodium malariae*, while only 3 participants (2.86%) were found to be infected with other malarial parasites. The high prevalence of *Plasmodium falciparum* among the studied population was not surprising since the *falciparum* strain is most commons *Plasmodium* specie in Sub-Saharan Africa [21]. Also, this result is similar to the findings of Onyido *et al.* [22] who detected only *Plasmodium falciparum* strain among malaria infected population of Ogbunike, Oyi Local Government Area, Anambra State.

Table 3: The frequency of plasmodium species causing malaria parasitaemia in women attending ANC, UDUTH Sokoto

Plasmodium species	Frequency	Percentage Frequency (%)
Plasmodium falciparum	90	85.71
Plasmodium malariae	12	11.43
Anonymous	3	2.86

Table 4 shows the prevalence of malaria parasitaemia in relation to age group of women attending ANC, UDUTH. The highest prevalence of malaria was observed in age group of 26-30 years (25.40%), this was followed by age group of 21-25 years (20.63%), 15-20 years age group (11.90%) then 36-40 years age group (7.94%). While age groups of 41-45 years and 46-50 years had zero prevalence. The high prevalence among age group of15-20 years, 26-30 years and 21-25 years may be due to primigravidae state of pregnancy or lack of proper orientation/knowledge regarding effect of malaria on pregnancy, thus making them more prone/exposed malaria infection or mosquito bites respectively. This finding agrees with earlier reports that correlate malaria parasitaemia and age as well as higher parasitaemia among age group of 26 to 30 years [23, 26].

Table 4: Prevalence of malaria parasitaemia in relation to age group of the women attending ANC, UDUTH Sokoto

Age group	No. of Screened Malaria Subjects	No. of +ve Subjects	Prevalence (%)
15-20	18	15	83.33
21-25	30	26	86.67
26-30	36	32	88.89
31-35	26	22	84.62
36-40	15	10	66.67
41-45	1	0	0.00
46-50	0	0	0.00

4. Conclusion

It is evident from this study that there is high prevalence of malaria among the studied population, with *P. falciparum* as the most prevalent *Plasmodium* specie. Therefore, there is need for rigorous sensitization/awareness canpeing as well as prophylaxis need to be undertaken so as to reduce the malaria morbidity during pregnancy and the possibility of mortality.

5. References

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