

# Prevalence, Risk Factors and Antimalarial Resistance Pattern of *Plasmodium falciparum* among pregnant women in Kaduna Metropolis, Nigeria.

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# DISCLOSURE OF INTEREST

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**None to declare**

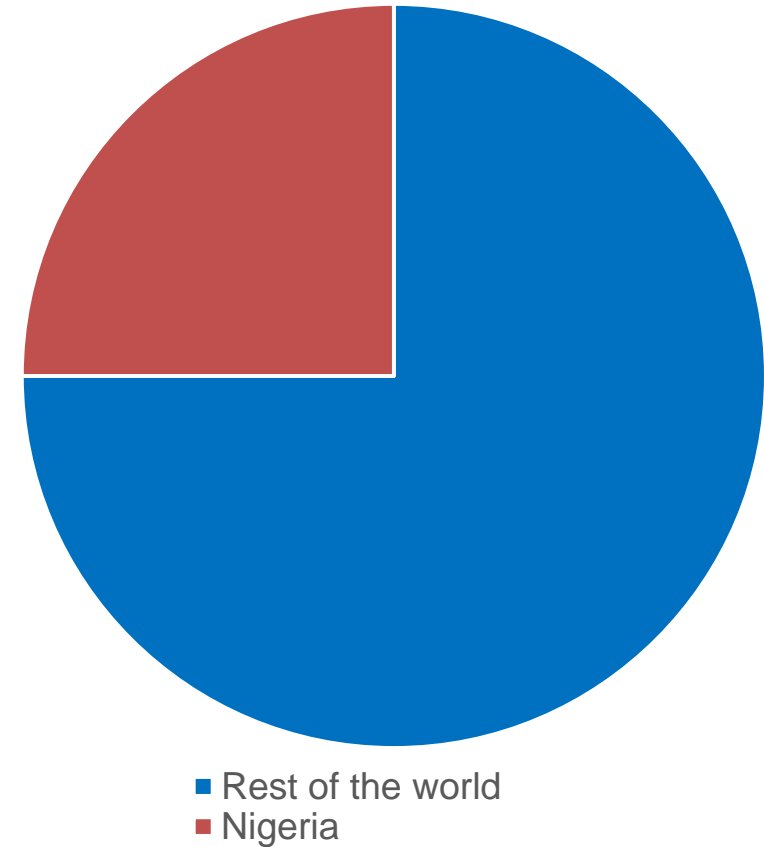
# BACKGROUND



In 2015

- 212 million cases of malaria worldwide and 429,000 deaths.
- Nigeria accounted for 25% (111,540) of the global malaria mortality.

Malaria mortality distribution in %



# Study site and Population



**Study sites:** 4 Secondary healthcare centres in Kaduna.

**Population:** 7,915,487 (2015)

**Climatic condition:** Mainly hot humid

# Subject recruitment and Data collection



## Subject

### Inclusion criteria

- Any gestational age
- Resident around the study area

### Exclusion criteria

- Subject with chronic debilitating diseases

## Data Collection

Interviewer-based structured questionnaires

Review of antenatal cards to ascertain information such as gravidity and gestation age of subjects.

# Laboratory Analysis



## Parasite density

- *Thick blood film (10% Giemsa stain solution for 10 minutes)*
- *Total number of parasite X 500*

## Parasite speciation

- *Thin blood film (Alcohol fixation )*



*10% Giemsa stain solution for 10 minutes*

## Haemoglobin concentration

- *Methaemoglobin method (Drabkin's solution)*

### OVERALL PREVALENCE

**Malaria parasitaemia - 22.4%**

**Anaemia - 5.2%**

**Malaria/HIV co-infection -  
3.8%**



## Laboratory Analysis

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Antimalarial susceptibility testing

**Schizont maturation inhibition technique** using 100mg/ml concentration of:

- *Chloroquine*
- *Artesunate*
- *Artemether*
- *Sulfadoxine-pyrimethamine*

The number of schizonts or gametocytes in the control tubes was compared with that in the other tubes containing different concentrations of the antimalarial drugs

## Socio-demographic variables - Age



Age (years)	No. (%) of Subjects tested (%)	No. (%) with malaria parasitaemia	No. (%) without malaria	<i>P-value</i>
$\leq 18$	13 (3.7)	7 (53.8)	6 (46.2)	
$\geq 19$	340 (96.3)	72 (21.2)	268 (78.8)	
<b>Total</b>	<b>353 (100)</b>	<b>79 (22.4)</b>	<b>274 (77.6)</b>	<b>0.0055</b>



## Socio-demographic variables - Trimester



Trimester	No. (%) of Subjects tested (%)	No. (%) with malaria parasitaemia	No. (%) without malaria	<i>P-value</i>
1st	7 (2.0)	1 (14.3)	6 (85.7)	
2nd	219 (62.0)	51 (23.3)	168 (76.7)	
3rd	127 (36.0)	27 (21.2)	100 (78.7)	
Total	353 (100)	79 (22.4)	274 (77.6)	0.795

## Socio-demographic variables - Place of Residence



Place of Residence	No. (%) of Subjects tested (%)	No. (%) with malaria parasitaemia	No. (%) without malaria	<i>P-value</i>
Rural	111 (31.4)	58 (52.3)	53 (47.7)	
Urban	242 (68.6)	21 (8.7)	221 (91.3)	
Total	353 (100)	79 (22.4)	274 (77.6)	<0.0001*

## Socio-demographic variables - Gravidity



Gravidity	No. (%) of Subjects tested (%)	No. (%) with malaria parasitaemia	No. (%) without malaria	<i>P-value</i>
<b>Primi</b>	<b>82 (23.2)</b>	<b>46 (56.1)</b>	<b>36 (43.9)</b>	
<b>Multi</b>	<b>271 (76.8)</b>	<b>33 (12.2)</b>	<b>238 (87.8)</b>	
<b>Total</b>	<b>353 (100)</b>	<b>79 (22.4)</b>	<b>274 (77.6)</b>	<b>&lt;0.0001*</b>

# Impact of preventive measures on malaria parasitaemia in pregnant women



S/No.	Preventive measures	No of Subjects Tested (%)	No. with Malaria parasitaemia (%)	P-value
1	No preventive measure	115 (32.6)	41 (51.9)	0.0028
2	3 doses of Intermittent preventive therapy (IPT)	45 (12.7)	18 (22.8)	0.2330
3	Use of Insecticide treated net (ITNs)	53 (15.0)	6 (7.6)	< 0.0001
4	Insecticide Residual spray	72 (20.4)	9 (11.4)	< 0.0001
5	More than 1 preventive measures	68 (19.3)	5 (6.3)	< 0.0001
	<b>Total</b>	<b>353 (100)</b>	<b>79 (100)</b>	<b>&lt; 0.0001</b>

# Impact of preventive measures on malaria parasitaemia in pregnant women



S/No.	Preventive measures	No. (%) of Subjects Tested	No. (%) Malaria parasitaemia	No. (%) without Malaria	P-value
1	Use of no or one preventive measure	285 (80.7)	74 (26.0)	211 (74.0)	
2	Use of >1 preventive measures	68 (19.3)	5 (7.4)	63 (92.6)	
	<b>Total</b>	<b>353 (100)</b>	<b>79 (22.4)</b>	<b>274 (77.6)</b>	<b>0.0009</b>

## In-vitro antimalarial resistance pattern in pregnant women infected with malaria



S/No.	Antimalarial	No. (%) resistant	No. (%) susceptible	P -value
1	Artemether	30 (38.0)	49 (62.0)	
2	Chloroquine	75 (94.9)	4 (5.1)	
3	Artesunate	28 (35.4)	51 (64.6)	
4	Sulfadoxine-pyrimethamine	29 (36.7)	50 (63.3)	
5	Resistant to $\geq 3$ antimalarial drugs (MDR)	32 (40.5)	47 (59.5)	0.092

## CONCLUSION

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- The prevalence of malaria was relatively high due to inadequate and/or ineffective preventive measures adopted by pregnant women.
- More so, significant isolates of *P. falciparum* exhibited multidrug resistance against antimalarial agents tested.

## LIMITATION

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This was hospital-based study and hence the prevalence of malaria parasitaemia may be under-estimated because there are several other pregnant women who do not seek ANCs especially in rural areas/villages.



## RECOMMENDATION

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Based on findings from this study, there is need for active and continues advocacy programs on the use and adoption of malaria preventive measures by pregnant women in Kaduna.

In addition, it is recommended that community-based studies be conducted in order to understand the genetic epidemiology of antimalarial resistance and their influence on the outcome of birth in Kaduna state.



**THANK YOU FOR LISTENING**