



Prevalence of Malaria among Pregnant Women and Children Under Five Years in Abi Local Government Area, Cross River State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author SAI designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors JEE and JAI managed the analyses of the study. Author REN managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

This study was aimed at determining the prevalence of malaria among pregnant women and children less than five years in Abi Local Government Area, Cross River State, Nigeria. A cross-sectional descriptive study design was used for the study. Convenient sampling technique was used to select 59 pregnant women and 166 children (0-59 months) who presented in five selected Primary Health Centres between September 2016 to October, 2016. Blood samples were obtained from the respondent's left 4th finger with the aid of a sterile lancet and the Rapid Diagnostic Test cassette was used to examine for the presence of malaria parasites in the blood of each respondent. Data generated were presented in frequencies and tables and Chi-square was used to

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test for association between categorical variables at 0.05 alpha level. The result obtained showed that of the 59 pregnant women who were tested for malaria parasite, 24 (40.7%) were positive for malaria parasite while 35 (59.3%) tested negative. Malaria was found to be higher among pregnant women between the age bracket of 22-26 years 10 (16.9%), women in their primigravida 13 (22.0%) and among women in their second trimester 9 (15.3%). Out of 166 children that were tested for malaria, 110 (66.3%) had malaria parasite in their blood while 56 (33.7%) tested negative. Malaria infection was higher among children who were between 0-12 months and among males than their female counterparts. Gestational age was significantly associated with the presence of malaria parasite ($\chi^2= 9.273$; $p=0.000$). Hence, to curb malaria, the campaigns on malaria control and prevention should be re-designed in content and intensified in rural areas where the transmission rate is high. Regular screening and testing for malaria parasite should be institutionalized in all antenatal and postnatal outlets for prompt detection and management of malaria cases.

Keywords: Malaria; pregnant women; children under five years; prevalence.

1. INTRODUCTION

Malaria is still a major public health problem especially within the tropical and sub-tropical regions despite a clear decline in its incidence by 30% globally and by 34% in Africa [1-2]. This reduction has been attributed to the increasing interest in malaria related research, innovation, emergence of new chemo-preventive drugs and other control measures. Globally, malaria also account for 438,000 deaths where 90% of malaria cases is reported in Sub-Saharan Africa [3]. Among the different African countries, Nigeria is one of the two countries that bears the greatest burden where over 97% of the Nigerian population are at risk of malaria attack and account for 30% of the total malaria burden in Africa (51 million cases and 207, 000 deaths every year) [3].

Pregnant women and children below five years of age are the most vulnerable groups for malaria parasite. The holoendemicity of malaria increases their risk of continual malaria attack. This is because they have lower immunity compared to other category of individuals domiciling in the same environment. In Nigeria, malaria accounts for 11% of maternal mortality [4]. Prolong untreated complicated malaria cases in pregnancy can lead to low birth weight, severe anaemia, pre-term delivery, spontaneous abortion, still birth or even death [5].

Children under five years of age constitute one of the most-at-risk-groups for malaria. Globally, out of 429,000 of total malaria deaths, 303,000 under five children die from malaria [6]. In cases where malaria remains untreated, malaria in children can lead to cerebral malaria, hypoglycemia and

severe anaemia [6]. In Nigeria, malaria in under-five children accounts for 30% of under-five mortality and 25% of infant mortality [4,7].

The necessity of conducting prevalence studies and surveys on a yearly basis is to track the progress of achieving Sustainable Development Goal of combating malaria and other diseases as well as assess the impact and effectiveness of malaria control programmes. Evidence-based Nigerian studies have documented a high prevalence of malaria among pregnant women such as 52% reported in Lagos [8], 99% in Enugu [9], 40.6% in Abakalika [10] and 26% in Port Harcourt [11]. For children under five years of age, malaria prevalence was reported to be 58.2% in Anambra [12], 64% in Abuja [13], 48.06% in Jos [14] and 70.8% in Ogun [15]. Since, rural area report high malaria transmission such as the study area, it is pertinent to encourage more prevalence studies in rural settings. It was based on this premise that this study was aimed at determining the prevalence of malaria among pregnant women and children less than five years in Abi Local Government Area, Cross River State, Nigeria.

2. METHODOLOGY

The study was carried out in Abi Local Government Area of Cross River State, Nigeria. It is situated in the Central Senatorial District of Cross River State and has boundary with Yakurr Local Government Area to the South, Biase Local Government Area to the West, Obubra Local Government Area to the East, and Ikwo and Onitcha Local Government Areas of Ebonyi State in the North. The area has 10 political wards with a total population of 218, 734 persons

covering a landmass of approximately 334.43 square kilometres [16]. Most inhabitants of the area are mainly commercial farmers, petty traders and civil servants [17-18]. A cross-sectional descriptive study design was used for the study. Convenient sampling technique was used to select 59 pregnant women and 166 under-five children (0-59 months) who presented in five selected Primary Health Centres during routine immunisation days and antenatal clinic (ANC) days for children and pregnant women respectively in the study area. The study was carried out in September 2016 to October, 2016. All children (both healthy and sick) within the age interval (less than 5 years) and pregnant women were considered eligible. Blood samples were obtained from the respondent's left 4th finger with the aid of a sterile lancet. The Rapid Diagnostic Test cassette was used to examine malaria parasites and the results were recorded for each respondent. Long Lasting Insecticide Nets (LLINs) were distributed to those who tested positive as a form of malaria intervention. Community Health Extension Workers (CHEW) were recruited to assist in the collection of blood samples from the respondents. Data generated were presented in frequencies, tables and charts and Chi-square was used to test for association between categorical variables at 0.05 alpha level. Ethical consent was obtained from the Cross River State Health Research Ethics Committee (CRS-HREC) to carry out the study.

Respondents gave their informed consent verbally before participating in the study. No names were required during the process of data collection to maintain anonymity and information obtained were kept confidential throughout the period of research.

3. RESULTS

3.1 Prevalence of Malaria among Pregnant Women

Out of 59 pregnant women who were tested for malaria parasite, 24 (40.7%) were positive for malaria parasite while 35 (59.3%) were negative for malaria. Malaria was found to be higher among pregnant women between the age bracket of 22-26 years 10 (16.9%) followed by those aged between 17-21 years 5 (8.5%), though the association was statistically not significant ($P < .05$) (Table 1).

In terms of gravida status, malaria was higher among women in their primigravida 13 (22.0%) and least among those in their multigravida 4 (6.8%) and the association was statistically not significant ($P < .05$) (Table 2). In terms of gestation age, malaria was higher among women in their second trimester 9 (15.3%) and was least among women in their first trimester 7 (11.9%) and the association was statistically significant ($P < .05$) (Table 3).

Table 1. Prevalence of malaria among pregnant women according to age

Variable	Total number tested/examined (%)	Number of persons positive for malaria (%)	Number of persons negative for malaria (%)	Chi-square (p-value)
Age (in years)				0.519 (0.433)
17-21	13 (22.0)	5 (8.5)	8 (13.5)	
22-26	21 (35.6)	10 (16.9)	11 (18.6)	
27-31	13 (22.0)	4 (6.8)	9 (15.3)	
32-36	7 (11.9)	3 (5.1)	4 (6.8)	
37-41	5 (8.5)	2 (3.4)	3 (5.1)	
Total	59 (100)	24 (40.7)	35 (59.3)	

* $P < 0.05$

Table 2. Prevalence of malaria among pregnant women according to gravida status

Variable	Total number tested/examined (%)	Number of persons positive for malaria (%)	Number of persons negative for malaria (%)	Chi-square (p-value)
Gravid				3.748 (0.386)
Primigravida	26 (44.1)	13 (22.0)	13 (22.0)	
Secungravida	17 (28.8)	7 (11.9)	10 (16.9)	
Multigravida	16 (27.1)	4 (6.8)	12 (20.3)	
Total	59 (100)	24 (40.7)	35 (59.3)	

* $P < 0.05$

3.2 Prevalence of Malaria among Children under Five Years

Out of 166 children that were tested for malaria, 110 (66.3%) had malaria parasite in their blood while 56 (33.7%) were negative for malaria. Malaria infection was higher among children who were between 0-12 months 28 (16.9%) compared to other age groups, though the association was statistically not significant ($P < 0.05$) (Table 4). In terms of gender, males recorded higher malaria prevalence 62 (37.3%) than their female counterparts, though the association was statistically not significant ($P < 0.05$) (Table 5).

4. DISCUSSION OF FINDINGS

The prevalence of malaria infection among pregnant women in this study was 40.7% (Table 1-3). This was higher than 26% reported in Rivers State [11], but lower than 52% reported in Lagos [8], 72% reported in Osogbo [19], 80.9% reported in Imo State [20] and 99% reported in Enugu [9]. This high prevalence of malaria observed in the current study may be attributable to the fact that infected pregnant women domicile in areas where the female *Anopheles* mosquitoes proliferates and breeds thereby increase their vulnerability to repeated malaria

episodes. The study also showed that malaria parasitemia was higher among pregnant women aged 22-26 years than other age groups but the difference was statistically not significant ($P > 0.05$) (Table 1). This finding agrees with that of Ivoke et al. [21], in which malaria parasitemia was highest in 18-25 years old pregnant women but disagrees with Adefioye et al. [19], in which 36-39 years old pregnant women recorded the highest frequency rate of malaria. This implied that age is a significant determinant of malaria infection, transmission as well as prevention/control. Thus, it can be concluded that younger pregnant mothers are more susceptible to malaria infection than their older counterparts because of their diminished immune system during pregnancy. The older pregnant women tends to have stronger immune system due to their repeated exposure to malaria bouts, previous personal experiences and measures they adopt to prevent malaria. The primigravid women 13 (22.0%) were highest in malaria parasitemia as compared to secungravid and multigravid women and the difference was statistically not significant ($P > 0.05$) (Table 2). This was similarly reported in several cross-sectional studies carried out in Nigeria [8,11,20,22]. In areas of high malaria endemicity, secungravid and multigravid women seemed to have acquired a higher level of immunity against

Table 3. Prevalence of malaria among pregnant women according to gestational age

Variable	Total number tested/examined (%)	Number of persons positive for malaria (%)	Number of persons negative for malaria (%)	Chi-square (p-value)
Trimester				9.273 (0.000)*
First trimester	12 (20.3)	7 (11.9)	5 (8.5)	
Second trimester	29 (49.2)	9 (15.3)	20 (3)	
Third trimester	18 (30.5)	8 (13.5)	10 (16.9)	
Total	59 (100)	24 (40.7)	35 (59.3)	

* $P < 0.05$

Table 4. Prevalence of malaria among children according to age

Variable	Total number tested/examined (%)	Number of persons positive for malaria (%)	Number of persons negative for malaria (%)	Chi-square (p-value)
Age (in months)				2.304 (0.143)
0-12	50 (30.1)	28 (16.9)	22 (13.3)	
13-24	34 (20.5)	22 (13.3)	12 (7.2)	
25-36	35 (21.1)	22 (13.3)	13 (7.8)	
37-48	24 (14.4)	19 (11.4)	5 (3.0)	
49-59	23 (13.8)	19 (11.4)	4 (2.4)	
Total	166 (100)	110 (66.3)	56 (33.7)	

* $P < 0.05$

Table 5. Prevalence of malaria among children according to sex

Variable	Total number tested/examined (%)	Number of persons positive for malaria (%)	Number of persons negative for malaria (%)	Chi-square (p-value)
Sex				0.434 (0.211)
Male	90 (54.2)	62 (37.3)	28 (16.9)	
Female	76 (45.8)	48 (28.9)	28 (16.9)	
Total	166 (100)	110 (66.3)	56 (33.7)	

*P<0.05

malaria infection due to their repeated exposure compared to primigravid women who experience malaria attacks for the first time during pregnancy in their life. Consequently, they tend to be more susceptible to malaria infection than their secungravid and multigravid counterparts. It was reported in the current study that pregnant women in their second trimester 9 (15.3%) recorded highest malaria parasitemia than their counterparts (Table 3). This finding corroborates the findings of Raimi and Kanu [8] and Wogu et al. [11], in which women in their second trimester had highest level of malaria parasitemia with statistically significant difference (P<0.05).

For the under-five children, the study showed that the prevalence of malaria was 66.3% (Table 4-5). This was higher than 29% reported in Abuja [13], but lower than 80.5% reported in Ogun state [15]. The disparity observed in the prevalence rate of malaria in the above studies could be attributed to the study area and method of testing for malaria parasite. This high prevalence of malaria among under-five children in the current study was a clear indication that children are highly susceptibility to malaria infection. Malaria was found to be higher among children of 0-12 months than other age groups but the difference was statistically not significant (P>0.05). This finding disagrees with a Ghanaian study which revealed that children 12-23 months had highest malaria prevalence than those aged less than 12 months [23]. The high prevalence of malaria among children during their first year of life may be attributed to the lack of knowledge of malaria preventive measures and poor practices of malaria prevention among their mothers. Also in this study, male children recorded higher malaria prevalence than their female counterparts and the difference was statistically not significant (P>0.05) (Table 5). This result corroborates the study by Nwaorgu et al. [24], Nyarko et al. [23], Nmadu et al. [13], which indicated that male children were more vulnerable to malaria parasitemia than female children.

5. CONCLUSION AND RECOMMENDATIONS

Malaria endemicity continually threatens the health of the vulnerable population. Malaria significantly contributes to high disease morbidity and mortality among pregnant women and children less than five years of age in rural areas where access to basic health care is poorly reported. Findings in the current study show that a larger proportion of pregnant women and children less than five years of age are at increased risk of perpetual malaria attacks. This clearly shows that the target to eradicate malaria parasite is still far-fetched. Relevant stakeholders also should improve on their commitments in mitigating malaria transmission. Hence, to curb malaria, the campaigns on malaria control and prevention should be redesign in content to include recent strategies and intensified in rural areas where the transmission rate is high. Regular screening and testing for malaria parasite should be institutionalized in all antenatal and postnatal outlets for prompt detection and management of malaria cases.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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