PREVALENCE OF MALARIA PARASITAEMIA AMONGST ASYMPTOMATIC PREGNANT WOMEN IN SAGAMU.

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ABSTRACT

Background: Malaria in pregnancy is an important contributor to adverse maternal and perinatal outcome. Early identification of the infected pregnant woman and prompt treatment may provide an opportunity to prevent these adverse effects.

Objective: To determine the prevalence of asymptomatic malaria parasitaemia amongst pregnant women attending their first antenatal clinic at OlabisiOnabanjo University Teaching Hospital, Sagamu, OgunState Nigeria.

Methods: This was a prospective cross-sectional study involving 468 pregnant women. A data capture sheet was used for recording information on the socio-demographic characteristics of the subjects.Blood samples were collected from the women and examined for malaria parasite. The packed cell volumewas also estimated. Statistical analysis was done using IBM-SPSS Windows version 20.

Results: The mean age of study participants was 26.7 ± 5.1 years and the age range was 17- 42 years. The prevalence of asymptomatic malaria parasitaemia was 49.6%. Nulliparity and anaemia (PCV <30%) were associated with increased prevalence of malaria parasitaemia although not statistically significant. However, factors such as low maternal age and low gestational age at booking were significantly associated with increased prevalence of asymptomatic malaria parasitaemia.

Conclusion: The prevalence of asymptomatic malaria parasitaemia was high in Sagamu. Women below 20 years of age and those in their first trimester were the most significant risk groups. It is recommended that relevant authorities should ensure universal implementation of malaria control strategies such as use insecticide treated nets and intermittent preventive treatment.

Keywords: Malaria, Parasitaemia, Pregnancy, Asymptomatic, Prevalence

INTRODUCTION

Malaria is a major cause of infectious disease-related death in the world[1]. Sub-Saharan Africa has the largest burden of the disease with over 90% of the world's malaria-related deaths in this region[1]. Malaria is a parasitic infection transmitted by the female anopheles mosquito. The four species that are mainly responsible for human malaria infestation are

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Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale, and *Plasmodium vivax*. *Plasmodium falciparum*is responsible for up to 98% of cases in Nigeria and is associated with severe morbidity and mortality[2,3].Studies have shown that in areas endemic for malaria, the highest risk for infection and morbidity occurs in primigravidas, adolescents and those with Human Immunodeficiency Virus infection[4]. Pregnant women are three times more likely to suffer from severe disease as a result of malaria infection compared with their non pregnant counterparts, and may have a mortality rate from severe disease that approaches 50%[5-7]. The mechanism underlying this susceptibility is not fully understood. It has been suggested that despite the acquired antimalarial immunity of these pregnant women, the uteroplacental vascular space apparently provides a site for parasite sequestration and development[8].

Malaria presents with different symptoms and signs. Some common symptoms are intermittent fever, headache, body aches and pains, malaise and generalized body weakness. It is termed asymptomatic when there is malaria parasitaemia in the absence of these symptoms. Malaria in pregnancy is an important cause of anemia, miscarriages, intrauterine growth restriction, low birth weight, preterm delivery and still birth[2]. Current prevention of malaria in pregnancy relies on two main strategies: providing pregnant women with insecticide treated nets and intermittent preventive treatment with antimalarial medications[1]. Early identification of the infected pregnant woman and prompt treatment may provide an opportunity to prevent the adverse effects of malaria in pregnancy. The aim of this study is to determine the prevalence of asymptomatic malaria parasitaemia at booking. Evaluation of the prevalence of asymptomatic malaria parasitaemia at booking will enable us to assess the burden of malaria at booking and implement strategies that will help in mitigating the adverse maternal and foetal effects.

METHODOLOGY

This was a prospective cross-sectional study conducted at the antenatal clinic of OlabisiOnabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria.The minimum sample size for the study was calculated to be 369 using a prevalence of 59.9% derived from a similar study[9]. A total of 468 women were however recruited to control for possible attrition. These subjects were recruited consecutively over a 5 month period from 1st August to 31st December 2012. The study population included all women who presented to the antenatal clinic for booking within the study period. Women who refused to give consent, HIV positive women and those who presented with signs and symptoms of malaria such as fever, chills, rigor, nausea, vomiting, headache and generalized body aches were excluded from the study.In addition women who had been treated for malaria within a period of two weeks were also excluded from the study. Every eligible and willing participant was given detailed information about the study and informed consent was obtained.

Data Collection

A data capture sheet was administered to the women by the authors. Information obtained included the age, occupation, level of education, parity and gestational age of study participants. The packed cell volume and blood film for malaria parasite results were also recorded on the data capture sheet.

Sample Collection and Processing

After aseptic procedure, a sterile lancet was used to pierce the palmar surface of the thumb. Thin and thick blood films were prepared and stained with Giemsa stain. The slides were read under oil immersion with x100 objective magnification by a trained Microbiologist. Parasite enumeration was done using the WHO approved method[10]. Quality

control was ensured using standard positive and negative films as well as standard operation procedures.Those diagnosed with asymptomatic parasitaemia were given antimalaria medication according to the Obstetrics and Gynecology departmental protocol.

DATA MANAGEMENT AND ANALYSIS

Data was analyzed using IBM-SPSS windows version 20. Continuous variables were summarized using descriptive statistics such as mean and standard deviation at 95% confidence interval. Categorical variables were summarized by frequencies and percentages. The influence of socio-demographic characteristics and packed cell volume of study participants on the prevalence of asymptomatic malaria parasitaemia was assessed using chi-square test and Fisher's exact test as appropriate. A p-value less than 0.05 was deemed statistically significant.

RESULTS

Out of the total of 468 pregnant women recruited for the study, 232 had asymptomatic malaria parasitaemia giving a prevalence rate of 49.6%. The mean age of study participants was 26.7 ± 5.1years and the age range was 17- 42 years. Table 1 shows the distribution of socio-demographic characteristics of study participants. Majority (69.2%) of the participants were in the 20-29 age group while only 7 (1.5%) were in the 40-49 age group. More than half of the respondents had tertiary level of education. Trading and teaching were the two most common occupations of the study participants accounting for 26.1% and 18.2 respectively. As regards parity, majority (57.9%) of participants were either para 1or 2, 18.4% were either para 3 or 4 and 23.7% were nulliparous. It is of note that none of the participants was agrandmultipara. Only 2.6% of the study participants had gestational ages below 14 weeks. Majority (58.3%) had gestational ages greater than 28 weeks while 39.1% had gestational ages between 14 and 28 weeks.

Table 2 shows the prevalence of asymptomatic malaria parasitaemia in relation to socio-demographic characteristics and packed cell volume of participants. The highest prevalence of asymptomatic malaria parasitaemia (66.7%) was found in women who were less than 20 years of age while the lowest prevalence (43.8%) occurred in women who were 20-29 years. The association between the age of participants and asymptomatic malaria parasitaemia was statistically significant (X^2=14.320; p = 0.003).The highest prevalence of asymptomatic malaria parasitaemia (51.5%) occurred in women who attained tertiary level of education while the lowest prevalence (32.6%) was in those that attained primary level of education. Nulliparous women had a higher prevalence of asymptomatic malaria parasitaemia than women who were para 1-4 (57.1% versus 47.2%). The level of education and parity of participants had no statistically significant association with the prevalence of asymptomatic malaria parasitaemia. Women with gestational ages less than 14 weeks had the highest prevalence of asymptomatic malaria parasitaemia (83.3%). Women with gestational ages between 14 and 28 weeks had a prevalence of 38.3% while those with gestational ages greater than 28 weeks had a prevalence of 55.7%. The association between the gestational age of participants and the prevalence of asymptomatic malaria parasitaemia was statistically significant (X^2 =18.924; p<0.0001). Women with packed cell volume of less than 30% had a prevalence of 54.4% for asymptomatic malaria parasitaemia while those with packed cell volume of 30% and above had a prevalence of 47.6%. The packed cell volume of study participants had no statistically significant association with the prevalence of asymptomatic malaria parasitaemia.

DISCUSSION

The prevalence of asymptomatic malaria parasitaemia at booking in this study was 49.6%. This value is comparable to the prevalence value reported in Ibadan (48%)[11]. It is however higher than prevalence value reported in Sokoto(4.8%)[12]and smaller than values reported in Awka (59.9%)[10] and Calabar (95.4%)[13]. This prevalence value is also higher than the value reported in a previous study done in Sagamuwhere a value of 24.8% was reported among parturients at delivery[14]. The large variation in the reported prevalence of malaria parasitemia may be multifactorial. One of the reasons which had been adduced for this wide disparity in prevalence is the disparity in the educational level of subjects in different obstetric populations[15]. It is believed that the women with high level of education may be better informed about antivector measures including use of window nets and insecticide spraying which may influence the exposure to the parasite and thus affect the prevalence of malaria parasitaemia[15,16]. The method of diagnosis is another factor that may explain the large variation in the reported prevalence of asymptomatic malaria parasitemia. The blood sampling site, the rapidity of blood films preparation and the type of stain used may all affect the level of diagnosis[17]. Other factors may include the study design, the targeted obstetric population, and the intensity of transmission[12,17]. The highest prevalence of asymptomatic malaria parasitaemia was found in women who were aged less than 20 years. The association between the age of participants and the prevalence of malaria parasitaemia was noted to be statistically significant. This is similar to findings in Nnewi and Ibadan[16,18]. The reason for this trend may be related to the fact that pregnancy associated acquired immunity is lower in younger women than in older ones who may have obtained immunity from repeated exposure to malaria infection[12]. There was no statistically significant association between the level of education of study participants and the prevalence of asymptomatic malaria parasitaemia. Similar finding was reported in Ibadan[16]. Asyrmptomatic malaria parasitaemia was also found to be commoner in nulliparous women than in women of higher parities. Although this finding wasnot statistically significant in this study, other similar studies have documented a higher prevalence of asymptomatic malaria parasitaemia in nulliparous women when compared to women of higher parities[9,16]. This may be due to acquisition of parity specific immunity which reduces susceptibility to malaria infestation during pregnancy as parity increases[19].The prevalence of asymptomatic malaria parasitaemia was noted to be highest in women who presented at gestational age of below 14 weeks when compared to women at higher gestational ages. This association was statistically significant. Similar findings were reported in other studies[9,20]. The prevalence of asymptomatic malaria parasitaemia was noted to be higher in women who had a packed cell volume less than 30% when compared with those with packed cell volume greater than 30%. Similar findings were reported in previous studies in Ibadan, Calabar and Awka[9,13,16]. In this study, the association between packed cell volume and the prevalence of asymptomatic bacteriuria was not statistically significant. This finding may be as a result of a possibly low parasite density in these patients since they were asymptomatic.

CONCLUSION

This study demonstrated a high prevalence of asymptomatic malaria parasitaemia among pregnant women in Sagamu.It has also shown that women who were below 20 years of age and those in their first trimesterwere the most significant risk groups. It is recommended that relevant authorities should ensure universal implementation of

strategies such as use insecticide treated nets and intermittent preventive treatment which have been advocated for control of malaria in pregnancy. Pregnant women should be encouraged to book early so as to benefit maximally from these strategies.

Table 1: Socio-Demographic Characteristics Of Participants

Characteristics		Frequency	Percentage
Age (years):	<20	39	8.3
	20-29	324	69.2
	30-39	98	21.0
	40-49	7	1.5
Educational level	Primary	43	9.2
	Secondary	163	34.8
	Tertiary	262	56.0
Occupation	Civil servant	74	15.8
	Teaching	85	18.2
	Trading	122	26.1
	Student	74	15.8
	Housewife	44	9.4
	Professionals	69	14.7
Parity	0	111	23.7
	1-2	271	57.9
	3-4	86	18.4
Gestational age	<14	12	2.6
	14-28	183	39.1
	>28	273	58.3

Table 2: The Prevalence Of Asymptomatic Malaria Parasitaemia In Relation To Socio-Demographic Characteristics And Packed Cell Volume Of Participants

Characteristics		Malaria parasite negative	Malaria parasite positive	Prevalence %	Chi square test	P value
Age (years):	<20	13	26	66.7		
	20-29	182	142	43.8	14.320	*0.003
	30-39	38	60	61.2		
	40-49	3	4	57.1		
Educational level	Primary	29	14	32.6		
	Secondary	80	83	50.9	5.498	0.064
	Tertiary	127	135	51.5		
Parity	0	48	64	57.1		
	1-4	188	168	47.2	3.375	0.083
Gestational age	<14	2	10	83.3		
	14-28	113	70	38.3	18.924	*0.000
	>28	121	152	55.7		
Packed cell volume	<30	62	74	54.4		
	=30	174	158	47.6	1.796	0.187

*P< 0.05 statistically significant

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