

Short Report

Access this article online	
Quick Response Code:	Website: www.annalsafmed.org
	
	DOI: 10.4103/1596-3519.82070

Prevalence of malaria parasitemia amongst asymptomatic pregnant women attending a Nigerian teaching hospital

Page | 171

Aliyu Y. Isah, Momoh A. Amanabo¹, Bissallah A. Ekele

Departments of Obstetrics and Gynecology, ¹Medical Microbiology, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria

Correspondence to: Dr. A. Y. Isah, Department of Obstetrics and Gynecology, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. E-mail: isahay@yahoo.com

Abstract

Background: Malaria parasitemia among pregnant women is associated with complications to mother and the unborn fetus. There is paucity of data on asymptomatic malaria parasitemia, particularly in the northwest region of Nigeria. The objectives of this study were to determine the prevalence of malaria parasitemia in asymptomatic pregnant women and to estimate the packed cell volume (PCV) of this group of pregnant women.

Materials and Methods: This was a cross-sectional, descriptive study of only well pregnant women recruited consecutively at the time of booking for antenatal care. Thick film microscopy and qualitative immunoassay test for malaria parasite (MP) were performed for all the women. PCV estimation was also done using the micro-centrifuge method and comparison was made for women with parasitemia with those without MP. Some socio-demographic variables were also analyzed. Chi-square test was used to test for significance and a *P*-value less than 0.05 was considered statistically significant.

Results: Two hundred and twenty-five healthy pregnant women were studied. Seven women (3.1%) had MP by direct microscopy while 11 (4.8%) were MP positive with the qualitative immunoassay test. One hundred and eighty-five (82%) of the women were literate while 128 (57%) used insecticide treated mosquito nets in their homes. The mean PCV of the women with positive MP was 30.57 ± 2.26 as against 32.89 ± 2.45 for those without parasitemia ($P < 0.05$).

Conclusion: The prevalence of asymptomatic malaria parasitemia in the study group was low but there was associated anemia in those with parasitemia. The use of intermittent preventive treatment is recommended for all pregnant women including those who are asymptomatic to forestall complications like maternal anemia.

Keywords: Asymptomatic, malaria parasite, pregnant women

Résumé

Background: Le paludisme parasitémie chez les femmes enceintes est associée à des complications pour la mère et la foetus à naître. Il y a peu de données sur le paludisme asymptomatique parasitémie, particulièrement dans la région du Nord-Ouest du Nigéria. Les objectifs de cette étude étaient de déterminer la prévalence du paludisme parasitémie en asymptomatique les femmes enceintes et d'estimer le volume de la cellule emballés (PCV) de ce groupe de femmes enceintes.

Matériaux et procédés: Il s'agissait d'une étude descriptive transversale des femmes seulement bien enceintes recrutés consécutivement au moment de la réservation des soins prénatals. La microscopie d'épais fi lm et immunologique qualitative test for parasites du paludisme (MP) ont été réalisées pour toutes les femmes. Estimation PCV a également fait en utilisant le micro-centrifuge méthode et une comparaison a été faite pour les femmes avec la parasitémie avec ceux sans MP. Certains socio-démographiques variables ont été également analysés. Test du chi carré a été utilisé pour tester les signifi cance et un *P*-moins de 0,05 a la valeur considérée comme statistiquement signifi cant.

Résultats: Deux cents et vingt-fi ve saines femmes enceintes ont été étudiées. Sept femmes (3,1%) avaient MP par direct microscopie alors que 11 (4,8%) étaient MP positive avec l'essai d'immunologique qualitative. Cent et quatre-vingt-fi ve (82%) des femmes étaient alphabétisés tandis que 128 (57%) utilisé insecticide traité des moustiquaires dans leurs maisons. La moyenne PCV des femmes avec MP positif a été $30.57 \pm 2,26$ à l'encontre de 32.89 ± 2.45 pour ceux sans parasitémie ($P < 0,05$).

Conclusion: La prévalence du paludisme asymptomatique parasitémie au groupe d'étude était faible, mais il a été associé anémie chez ceux avec la parasitémie. L'utilisation d'un traitement préventif intermittent est recommandée pour tous les enceintes femmes, y compris ceux qui sont asymptomatiques afin de prévenir les complications comme l'anémie maternelle.

Mots clés: Asymptomatique, parasite de la malaria, les femmes enceintes

Introduction

Malaria is recognized as a serious public health problem in tropical and subtropical regions of the world with far reaching medical, social and economic consequences. Each year in sub-Saharan Africa, where 80–90% of world malaria cases occur, approximately 19–24 million women are at risk of malaria and its adverse consequences during pregnancy.^[1,2] This may be probably due to the increased susceptibility of pregnant women to infection by malaria parasite (MP).^[3] In regions where malaria transmission is stable, the vast majority of the infections during pregnancy are said to be asymptomatic, undetected and untreated with the attendant major impacts on the mother and the unborn fetus.^[4] Women in their first and second pregnancies are most susceptible to *Plasmodium falciparum* infection.^[5]

Early identification of pregnant women infested with the parasite and prompt treatment may provide an opportunity to prevent adverse effects of malaria in pregnancy.^[6,7] A study done at Abuja reported the prevalence among antenatal women at first antenatal visit to be 13%.^[8] There is, however, paucity of data on the prevalence of MP in pregnant women in the northwest region of Nigeria. This study was, therefore, carried out to determine the prevalence of malaria and the packed cell volume (PCV) in pregnant asymptomatic women at the time of initiating antenatal care. The other objective was to compare the PCV of those who were MP positive with those women without parasitemia.

Materials and Methods

This was a cross-sectional descriptive study. Healthy pregnant women with no complaints, attending the antenatal clinic for booking between 1st July and 31st August 2006 were consecutively recruited into the study after obtaining their consent. Exclusion criteria included those women with complaints of fever and body aches among other symptoms that may suggest malaria. Those who have had

malaria treatment within the last 2 weeks were also excluded. Information obtained included age, parity and educational status, previous or current use of antimalarial drugs, and use of insecticide treated mosquito nets, household spraying, among others.

Slides of thick film for MP and capillary tubes for PCV were prepared for each patient by a trained laboratory scientist. Blood sample of each patient was also independently tested by another laboratory scientist for MP using “Malaria Rapid test kit”, a qualitative membrane-based immunoassay test to detect the presence of *P. falciparum* (p.f.) antigens. The test utilizes gold conjugate to selectively detect p.f. antigens in whole blood. The incorporated membrane in the kit is pre-coated with p.f. antibody. During testing, the whole blood specimen reacts with the dye conjugate, which has been pre-coated in the test strip. The mixtures then migrate upward on the membrane chromatographically by capillary action and react with p.f. antibody on the membrane of the test tube. A positive test would be indicated by the presence of a red line in the test region, while its absence indicates that the specimen does not contain p.f. antigens. A red line always appears in the control region to serve as procedural control indicating that proper volume of specimen has been added and membrane wicking has occurred. The sensitivity and specificity of the kit is over 99.0% relative to blood smear.^[9]

Ethical permission for the study was obtained from the Ethical and Scientific Committee of the teaching hospital.

Results

A total of 225 (57.1%) women out of 394 who came to register for antenatal care during the study period between 1st July and 31st August 2006 satisfied the inclusion criteria. Majority of the women who were excluded had clinical features suggestive of malaria at the time of booking.

Among the women in the study group, 7 women

were positive for MP (3.1%) on using direct microscopy, while 11 women (4.8%) were positive on using the rapid test kit.

Fourteen women (6.2%) in the study group were teenagers, while 192 women (85%) were aged between 20 and 34 years. Primigravidae and those in their second pregnancies were 96 in number which constituted about 43% of the study group. One hundred and forty-two women (54%) admitted to using insecticide treated nets in their homes. Most of the women in the study group (184; 82%) had formal education. Thirty-two (14.2%) women were already on chemoprophylaxis as at the time of recruitment, using weekly pyrimethamine.

The mean PCV of all the 11 women who were MP positive by the rapid test kit was 30.5 ± 2.26 , which was significantly lower than 32.9 ± 2.45 for the women without malaria parasitemia (RR = 1.73, 95% CI = 0.52–5.80, $P < 0.05$).

Discussion

All the seven women who were MP positive by the direct microscopy method were also positive by the rapid test method. There were four other women who were MP positive with the rapid test method only. If we use the higher figure of 11 to calculate the prevalence of malaria parasitemia in the study group, it will give us a parasitemia rate of 4.8% which is still low when compared with the 13% reported from Abuja in northern Nigeria.^[8] The figure is also much lower than the 58% reported in urban pregnant women as reported by Nwagha and co-workers^[10] and the 59.9% reported by Ogbodo *et al.* for some rural women in southeastern Nigeria.^[11] Interestingly, another study conducted in southeastern Nigeria by Nwonwu and his colleagues^[12] reported a prevalence of 29% among a group of urban, asymptomatic pregnant women, while Lamikanra^[13] reported 2.9% parasitemia in a group of pregnant women in Lagos. A recent publication from Kano in northern Nigeria, where all pregnant women in some primary health care facilities were recruited, reported a prevalence of 39%.^[14] There is, therefore, a very wide variation in reported prevalence even within the same region.

Many reasons could be advanced for the very wide variations in the reported prevalence of MP in pregnant women, chief among them being the group of pregnant women that were studied (all pregnant women attending a clinic or only healthy pregnant women who had no complaints). In this study, very strict inclusion criteria were used to recruit women who were asymptomatic. The high literacy rate in the study group and the widespread use of insecticide

treated mosquito nets could have also contributed to the low prevalence. Again, in this study, women were consecutively recruited. Nwagha *et al.*^[10] recruited their women by random sampling, while the method employed by Nwonwu *et al.*^[12] was the systematic sampling method. It is, therefore, possible that the sampling method of recruitment could also affect the results. Finally, we postulate that pregnant women in the southeast region of the country are perhaps better prepared to “accommodate” the parasite without any manifestation of symptoms than their counterparts in the northwest. The same hypothesis may also apply to pregnant women in the southwest of Nigeria where 89% MP prevalence in asymptomatic women has been reported.^[15] The probable cause of this “relative intolerance” by our women to the parasite can only be speculative and might be a subject for another research.

Primigravidae and secondigravidae constituted about 43% of the women studied, but analysis for those with parasitemia along the line of parity was not feasible because of the small number of those who were MP positive. However, workers like Opare Ado *et al.* had observed that primigravidae alongside those women in their second pregnancy were more vulnerable to malaria parasitemia.^[16] Anorlu *et al.* found a prevalence of 44% amongst primigravidae compared with 33% for multiparae.^[17] Ogbodo and co-workers also found an inverse relationship between parity and parasitemia.^[11]

The mean PCV of the study group was $31.9 \pm 2.45\%$. Malaria parasitemia often causes anemia, increased uterine activity and low birth weight, among others.^[18,19] The presence of anemia in those who were MP positive in this study was demonstrated by the significant difference between the mean PCV of women with malaria parasitemia (30.57 ± 2.26) and those without parasitemia (32.81 ± 2.24) ($P < 0.05$). Chemoprophylaxis during pregnancy has been shown to significantly reduce the risk of malaria infection in pregnant women.^[20]

In conclusion, the prevalence of malaria parasitemia among asymptomatic mothers in this study was low but the mean PCV among the MP positive mothers was lower than those without the parasite. Use of effective chemoprophylactic agent is recommended to prevent untoward complications like anemia in pregnancy. A well-designed, multicenter study with the same methodology is also advocated to reassess the real situation of asymptomatic malaria in pregnant women in Nigeria.

Acknowledgment

We appreciate the contributions of Dr. H. M. Saudaki

and Dr. Nma M. Jiya for their constructive comments and criticisms.

References

1. Guyatt HL, Snow RW. The epidemiology and burden of *Plasmodium falciparum* related anaemia among pregnant women in sub-Saharan Africa. *Am J Trop Med Hyg* 2001;55:1-106.
2. Steketee RW, Wirima JJ, Slutsker L, Hymann DL, Breman JG. The problem of Malaria and Malaria Control in pregnancy in sub-Saharan Africa. *Am J Trop Med Hyg* 1996;55:2-7.
3. Kuile FO, Terlouw DJ, Phillips-Howard PA, Hawley WA, Friedman JF, Kariuki SK, *et al.* Reduction of malaria during pregnancy by permethrin – treated bed nets in an area of intense perennial malaria transmission in western Kenya. *Am J Trop Med Hyg* 2003;68:50-60.
4. Desowitz RS, Alpers MP. Placenta *Plasmodium falciparum* parasitaemia in East Sepick (Papua New Guinea) women of different parity: The apparent absence of acute effects on mother and foetus. *Ann Trop Med Parasitol* 1992;86:95-102.
5. Bouyou-Akotet MK, Issifou S, Meye JF, Kombila M, Ngou-Milama E, Luty AJ, *et al.* Depressed natural killer cell cytotoxicity against *Plasmodium falciparum*-infected erythrocytes during first pregnancies. *Clin Infect Dis* 2004;38:342-7.
6. Shulman CE. Malaria in pregnancy: Its relevant to Safe motherhood programmes. *Ann Trop Med Parasitol* 1999;93:559-66.
7. Shulman CE, Marshall T, Dorman EK, Bulmer JN, Cutts F, Peshu N, *et al.* Malaria in pregnancy: Adverse effects on hemoglobin levels and birthweight in primigravidae and multigravidae. *Trop Med Int Health* 2001;6:770-8.
8. Agbogboroma OC, Elegba OY, Ladipo OP, Umezulike AC, Efele RE, Tabansi S. Prevalence of asymptomatic malaria parasitaemia in pregnant women at first antenatal visit in Abuja. Makurdi. Book of abstracts of 38th annual scientific conference of the Society of Gynecology and Obstetrics of Nigeria (SOGON) 2002;21:S36.
9. Cooke AH, Chiodini PL, Doherty T, Moody AH, Ries J, Pinder M. Comparison of a parasite lactate dehydrogenase-based immunochromatographic antigen detection assay (optimal) with microscopy for the detection of malaria parasites in human blood samples. *Am J Trop Med Hyg* 1999;60:173-6.
10. Nwagha UI, Ugwu VO, Nwagha TU, Anyaehie BU. Asymptomatic plasmodium parasitemia in pregnant Nigerian women: Almost a decade after Roll Back Malaria. *Trans R Soc Trop Med Hyg* 2009;103:16-20.
11. Ogbodo SO, Nwagha UI, Okaka AN, Ogenyi SC, Okoko RO, Nwagha TU. Malaria parasitaemia amongst pregnant women in a rural community of eastern Nigeria; Need for combined measures. *Niger J Physiol Sci* 2009;24:95-100.
12. Nwonwu EU, Ibekwe PC, Ugwu JI, Obarezi HC, Nwagbara OC. Prevalence of malaria parasitemia and malaria related anemia amongst pregnant women in Abakaliki, Southeast Nigeria. *Nig J Clin Pract* 2009;12:182-6.
13. Lamikanra OT. A study of malaria parasitemia in pregnant women, placenta, cord blood and newborn babies in Lagos, Nigeria. *West Afr J Med* 1993;12:213-7.
14. Gajida AU, Iliyasu Z, Zoakah AI. Malaria among antenatal clients attending primary health care facilities in Kano state, Nigeria. *Ann Afr Med* 2010;9:188-93.
15. Falade CO, Olayemi O, Dada-Adegbola HO, Aimakhu CO, Ademowo OG, Salako LA. Prevalence of malaria at booking among antenatal clients in a secondary health care facility in Ibadan, Nigeria. *Afr J Reprod Health* 2008;12:141-52.
16. Opare-Addo HS, Odoi AT. Malaria in pregnancy. In: Kwawukume EY, Emuveyan EE, editors. *Comprehensive obstetrics in the tropics*, 1st ed. Accra, Ghana: Asante and Hittscher Printing Press Publishers; 2002. p. 250-60.
17. Anorlu RI, Odum CU, Essien EE. Asymptomatic malaria parasitemia in pregnant women at booking in a primary health care facility in a peri-urban community in Lagos, Nigeria. *Afr J Med Med Sci* 2001;30:39-41.
18. Massawa SN, Urassa EN, Mmari M, Ronquistte, Lindmark G, Nystrom LS. The complexity of pregnancy anaemia in Dar-es-salaam. *Gynecol Obstet Invest* 1999;47:76-82.
19. Egwunyenga OA, Ajayi JA, Popova-Duhlinska DD, Nmorsi OP. Malaria infection of the cord and birth weights in Nigerians. *Cent Afr J Med* 1996;42:265-8.
20. WHO. A strategic framework for malaria prevention and control during pregnancy in the African region Brazzaville, World Health Organisation, 2004.

Cite this article as: Isah AY, Amanabo MA, Ekele BA. Prevalence of malaria parasitemia amongst asymptomatic pregnant women attending a Nigerian teaching hospital. *Ann Afr Med* 2011;10:171-4.
Source of Support: Nil, **Conflict of Interest:** None declared.