

Epidemiology of Malaria Parasites Infection among Pregnant Women in Some Part of Nasarawa State, Nigeria

Alaku I.A, Abdullahi A.G. Kana H.A

Department of Basic Sciences College of Agriculture, P.M.B 33, Lafia. Nasarawa State, Nigeria

Abstract

The study was carried out to determine the prevalence of malaria parasites infection among pregnant women in some selected areas of Nasarawa State. It was assessed from April to September, 2014 (period of high malaria transmission). Both thick and thin films were made and stained using parasitological standard procedures. Of the 360 samples examined, 316 (88%) had malaria in their blood. Age group 25 – 28 years recorded the highest prevalence rate and mean parasite density of 93.5% and 999 dl⁻¹ and the difference between the pregnant women and age groups were statistically significant ($P < 0.05$). Illiterate pregnant women had the highest mean parasite density of 840 dl⁻¹ with (97.3%) prevalence rate. Drugs used were also considered in which local herbs had 100% sensitive to plasmodium falciparum than orthodox curative drugs.

Keywords: Malaria, parasite, pregnancy, plasmodium falciparum

INTRODUCTION

Every year, approximately 25 million African women become pregnant in malaria endemic areas (WHO, 2004), these women are at the risk of most especially plasmodium falciparum, the most virulent of the malaria parasites. Most of those women reside in area of relatively stable malaria transmission, where the principal effects of malaria are associated with malaria-related anaemia in the mother and presence of parasites in the placenta.

The presence of parasites in the placenta results in impaired foetal nutrition, which may contribute to low birth weight, which has been identified as a leading cause of poor infant survival and development in Africa (Guyatt *et al*, 2001, and Luxemburgar, C, 2001). The symptom and complications of malaria during pregnancy differ with the intensity of malaria transmission and thus with level of immunity the pregnant woman has acquired (WHO, 1993).

The burden of malaria infection during pregnancy is caused mainly by plasmodium falciparum the most common malaria species in Africa (WHO, 1993, and Moluneaix, L. *et al* 1980). About 90 percent of all malaria deaths occurs in Africa south of sahara, these numbers are on the rise due to insecticides resistance, anti malaria drug resistance and environmental changes (NIH, 2001).

Malaria vector control in Africa mainly relies on the use of insecticide treated-nets targeted at endophilic adult anopheline vectors (Annon, 2003). Correct analysis of the distribution of specific malaria vectors is one of the prerequisite for meaningful epidemiological studies and for planning and monitoring of successful malaria control or eradication programmes. Pregnant women form a high risk group for malaria infection which may cause abortions, still births and premature labour. Malaria in pregnancy is significant health problem in Nigeria, particularly some parts of Nasarawa State, Nigeria. Almost all the published literature on the topic refers to African, which presents data referring principally to plasmodium falciparum – the commonest cause of infection.

This study is aimed at determining the prevalence and intensity of malaria parasite infections in pregnant women in relations to their behavior and social pattern of living as they affect their exposure to malaria parasite infection.

MATERIALS AND METHOD

Study Area

This research was carried out in three selected areas of interest in Nasarawa State. These include; Lafia, located at the south part of the state on latitude 8° 3' N and longitude 7° 3' E. It is located in the regional road confers on its good linkage with Makurdi (capital of Benue State). Doma in Doma Local Government of Nasarawa State is located in the western part of Lafia on latitude 7° 31' N and longitude 6° 31' E. Obi in Obi Local Government is located in the southern part of Lafia on latitude 7° 31' North and longitude 6° 31' East. The mean monthly temperature in these areas range between 30° C in March and about 25° C in December. The mean annual rainfall is about 1270 – 1540mm received over seven to eight months (April to October) of rainy seasons with four months old dry season. The main socio-economic activities of the people are farming and trading with some in public services.

Ethical Clearance

The protocol for this study was approved by the three hospitals used. The approval was on the agreement that patient anonymity must be maintained, good laboratory practices quality control ensured, and every finding would be treated with utmost confidentiality and for the purpose of this research only.

Laboratory Analysis

The hospitals used for laboratory analysis and collection of results include; Dalhatu Araf Specialist Hospital Lafia, Doma and Obi General Hospitals.

The study subjects consisted of 360 pregnant women who came for their ante-natal visit at the hospitals of the respective areas of study, between August – September 2014. They were selected randomly with the prior knowledge of their clinical and family history. The women were of varying age ranging from 18 – 40 years and also of different status.

Blood Collection

Careful procedures were adopted in the collection of finger-prick blood samples by swabbing the area to be sampled with 70% alcohol and allowed to dry before collection. The thick and thin blood films were made on clean slides and labeled accordingly as recommended by WHO (Agomo, P.U., *et al* 2001).

Microscopic Examination

The thin films were fixed with methanol and all films were stained with 3% Giemsa stain of pH 7.0 for 30 minutes as recommended by WHO (Agomo, P.U., *et al*, 2001). Taking the numbers of leucocytes per micro liter of blood as 6,000, parasite density of blood using the thick film express as: parasite count x 6,000 divided by number of WBC counted (Agomo, P.U., *et al.*, 2001). The thick films were used to determine the parasite densities while thin films were used to identify the parasite species and infective stages. Stained slides were examined under the light microscope using X 100 objective lens (immersion oil) (Meeusen, E.N., *et al.*, 2001).

A questionnaire concerning age, sex, occupation, drug used, attitude to use of mosquito net were distributed. The statistical analysis for significance were done using chi-square.

RESULT

Table 1: Prevalence of malaria parasite pregnancy relation to location

Local	No. exam	No. infected	% prevalence	Mean parasite
Lafia	200	174	87	788
Doma	100	88	88	800
Obi	60	54	90	870
Total	360	316	588	2,458

Table 2: Prevalence of malaria parasite in pregnancy according to age

Age group (years)	No. exam	No. infected	% prevalence	Mean parasite Density (MPD)
18 – 21	25	21	84	900
22 – 24	68	64	0.9	840
25 – 28	77	72	93.5	999
29 – 32	70	63	90	908
33 – 36	76	71	93.42	984
37 – 40	44	39	88.6	880
Total	360	330	92	5511

Table 3: Prevalence of malaria parasite according to educational status of patients

Occupation	No. exam	No. infected	% prevalence	Mean parasite Density (MPD)
Educated	48	28	58.3	550
Semi-educate	116	112	96.5	709
Illiterate	196	192	97.3	840
Total	560	319	89	2099

Table 4: Prevalence of malaria parasite in pregnancy based on drugs used.

Drug used	No. exam	No. infected	% prevalence	Mean parasite Density (MPD)
Prophylaxis	138	89	64.5	800
Malariaacidia	62	42	67.74	801
Indigenous drugs (herbs)	16	0	0	300
Take no drugs	14	113	78.47	100
Total	360	254	25.4	2901

The prevalence of malaria parasites in pregnant women in relation to location is shown in table 1 of the 360 samples examined, 316 (88%) had malaria in their blood. The location Obi recorded the highest prevalence rate and mean parasite density of (90%) and 870 parasites d1-1, respectively, followed by Doma 88% prevalence rate and 800 mean parasite density and Lafia with the least prevalence rate of 87% and mean parasite density

($P < 0.05$).

Table 2 shows the distribution of malaria parasites according to age group of the patients. The age group 25 – 28 years recorded the highest prevalence rate and mean parasite density of 93.5% and 999 parasite d1-1, respectively. Followed by age group 33 – 36 years 93.4% prevalence rate and 984 mean parasite density. The least prevalence rate 0.9% was recorded for age group 22 – 24 years and 840 mean parasite density ($P < 0.05$).

Prevalence of malaria parasite in pregnant women based on educational status is shown in Table 3. The illiterate pregnant women have the highest prevalence rate of (97.3%) and mean parasite density of 840d1-1. The least prevalence rate was recorded among educated patients (58.3%) with 550 mean parasite density.

Table 4 shows the prevalence of malaria parasite in pregnant women based on drugs used. The patients who refused to take drug due to certain belief had the highest prevalence rate of (78.48%), followed by those on malariacida (67.74%), while those who use to take herbs (Indigenous drugs) had no malaria attack.

DISCUSSION

The prevalence of malaria parasite in pregnant women in some selected areas of Nasarawa State were investigated. The prevalence distribution suggests that the effect have sympatric distribution (Gillilies M.T. *et al.*, 1987). This agrees with (Bruce-Chaware, L.J., 1951) that malaria parasite is omnipresent in Nigeria because of its indiscriminate breeding habit such as, domestic water containers animal drinking places and any other breeding places created by man.

In highly endemic malarious areas where semi-immune adults usually have substantially acquired resistance to local strains of plasmodia, the prevalence of clinical malaria is higher and its severity greater in pregnant women than non-pregnant women (Uko, E.K., *et al.*, 1998). This supports this study in which prevalence rate of (88%) of parasite was recorded. This did not correlate with report of Uko *et al.* (Uko *et al.*, 1998) who recorded low prevalence rate of (6.8%). This may be due to the fact that the study was carried during wet season. The prevalence rate which was high in accordance with report of (Marielle *et al.*, 2003) in pregnant women in Gadon and was higher in primigravidae than multigravidae; and in women within the age group (25 – 28 years. This also support the existing knowledge that higher ages are due to the existence of natural immunity to infectious disease including malaria (Oduola *et al.*, 1992; Rogerson *et al.*, 2000, Bouyon Akotel *et al.*, 2003) which the pregnant women acquire the age increase. Lnder *et al* 92002) however reported no significant association between malaria infection and material age.

Analysis of malaria in pregnancy in Africa revealed that parasitemia is significantly common and heavier in primigravidae than multigravidae (McGregor, 1984). This showed high level of infection in (Table 2).

In areas endemic for malaria, plasmodium falciparum infection during pregnancy increases the likelihood of maternal anemia, abortion, still birth, prematuring, intrauterine growth retardation and low birth weight (Mocken hanpt, *et al.*, 2000).

Intermittent treatment with curative anti-malaria drug should be administered at least twice during pregnancy in order to reduce the incidence of low birth and anemia.

This study also discovered that illiterates pregnant women had the highest prevalence rate due to fact that they are more exposed to malaria parasites because of their lifestyle. The use of indigenous drugs (herb) by some pregnant women proved 100% sensitive to plasmodium falciparum, which means herbs is highly effective for treating malaria if the normal dose can be taken.

RECOMMENDATIONS

1. Government should provide subvention for ministry of health incorporating National Agency for food and drug administration and control (NAFDAC) to go into research in local herbs to develop new and more effective drugs for prevention and control.
2. Regular chemoprophylaxis where necessary in combination with stand-by treatment should be recommended for travelers
3. The use of insecticide-treated nets decrease both the number of malaria cases and malaria cases and malaria death rates in pregnant women
4. It is also advisable to avoid stagnant water and poor environmental condition which encourage the breeding of mosquitoes

CONCLUSION

The epidemiological factor to plasmodium falciparum infection in pregnant women should be considered in relation to the endemic malaria condition under which women are living when pregnant is also one of the factors affecting the rate of malaria parasite infection in women living in malaria endemic communities. Malaria should therefore be recognized as global issue in health care more so in pregnancy.

REFERENCES

- Agomo, P.U., C.A. Okonkwo, O.O. Asinanya, H.I. Okoh, and O.J. Nebe, 2001. Comparative evaluation of Immuno-chromatographic Test (ICT) and parasight (2)-f for the rapid Diagnosis of facilparum malaria in Nigeria Afr. J. Clin Exp. Microbial., 2:45.
- Anon (2003). Africa malaria reports. Executive summary <http://www.rbm.who.int.>3pp5>.
- Bouyou-Akotel M.K., Lonete-Collard DE, Mabika-Manfumbi M, Kendjo E, Matsiegui PB, Mavoungou E, Kombila M. (2003). Prevalence of plasmodium falciparum Infection in pregnant women in Gabon *Malar. J.*, 2:18.
- Guyatt, H.L. and snow, R.W. (2001). The epidemiology and burden of plasmodium falciparum-related anemia among pregnant women in sub-sahara Africa. *American journal of tropical medicine and hygiene*, 64 (1-2 suppl): 36-44.
- Lander J, Leroy V, Simonon A, Karita E, Bogaerats, J, Clercq A.D, Vande perre P, Dabis F. (2002). HIV infection, malaria and pregnancy: A prospective cohort study in Kigah, Rwanda *Am. J. Trop Med. Hyg.*, 66:56-60.
- Lexemburger, C., Mc ready, R., Kham, A. (2001). Effects of malaria during pregnancy on infant mortality in an area of low malaria transmission. *American Journal of Epidemiology* 154:459 – 465.
- Malarielle, K.B.A., E.I.C. Denisa, M.M. Modeste, K. Eric, B.M. Pierre, M. Elie and K.
- Maryyome (2003). Prevalence of plasmodium falciparum infection in pregnant women in Gabon *Malaria J.*, 2;1-17.
- Mockenhaupt, F.P., B. Rong, M. Gunther, S. Beck, H. Till, Ekohn, W.N. Thompson and U.Bunzle, (2000). Anemia in pregnant Ghanian women: Importance of malaria, Iron deficiency and haemoglobinopathies. *Trans. R. Soc. Trop. Med Hyg*; 94:477
- Moluneaix, L and C. Cramicra, 91980). Research on Epidemiology and control of malaria in the Sudan Savannah of West Africa. The Garth project. WHO Geneva.
- National Institutes of Health (2001). NIH News release-malaria research and training benefits Global community.
- Oduola A.M., Sowunmi W.R, Kyle DE, Martin R.K., Walker O, Salako LA (1992). Innate resistances to new anti-malaria drugs in plasmodium falciparum from Nigeria. *Trans. Royal Soc. Trop med. Hyg.*, 86:123-126.
- Rogerson S.J., Van den Brock N.R, Chaluluka e, Qongwanec, Mhango C.G., Moleneuk M.E. (2000). Malaria and anaemia in antenatal women in Blantyre, Malawi: A twelve-months survey. *Am.J. Trop Med. Hyg*; 62:335-340.
- Uko, E.K., A.O. Emeribe and G.C. Ejezie (1998). Malaria infection of the placentas and neo-Natal low birth weight in Calabar, *J. med. Lab Sci.*, 7:7-10.
- World Health Organization (2004). A strategies framework for malaria prevention and control in African region. WHO Document AFR/MAL/04/01:1-3.
- World Health Organization (1993). Implementation of the global malaria control strategy. Report of a WHO study Group. General: ISBN 9241208392.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:

<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Academic conference: <http://www.iiste.org/conference/upcoming-conferences-call-for-paper/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

