Prevalence of Malaria and Hepatitis B Virus Infections among Pregnant Women Attending Federal Medical Center, Owerri

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Authors’ contributions

This work was carried out in collaboration among all authors. Authors AEA and FIA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors HO and FIA managed the analyses of the study. Author HO managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Malaria and Hepatitis B virus (HBV) infections in pregnancy are of great public health importance, jeopardizing the outcome of pregnancy, affecting mother, foetus and new-born babies.

Objectives: This cross-sectional study was to determine the prevalence of malaria and hepatitis B virus infections among pregnant women attending the Federal Medical Center, Owerri.

Methods: Three hundred maternal blood samples were collected into anticoagulant bottles. Blood samples collected were used to determine malaria parasitaemia and HBV. Malaria parasitaemia was determined using thick and thin films stained with Giemsa staining techniques while HBV was determined using Labcon Hepatitis B surface antigen (HBsAg) test strip.

Results: Out of a total of 300 blood sample examined, 110(36.66%) were positive for malaria while 17(5.67%) were positive for HBV and 10 (3.33%) had co-infection. The age group 15-24 yrs had the highest prevalence of infections (45.76%) of malaria followed by 35-44 yrs (38.33%) while 45-54ys had least (30.43%). Although there was a difference in prevalence, it was not statistically significant.
1. INTRODUCTION

Pregnancy is probably the most hazardous normal physiological state of women, increasing the risk of infections and altering maternal immunity [1]. There is also increased susceptibility to nutritional disorders as the growth of both fetal and maternal tissues increases the requirement for energy and nutrients [2]. The adverse effects of infections and malnutrition are greater in the third world countries, where maternal ill-health is worsened by dietary deficiencies, frequent pregnancies and poor maternal health services [3]. Approximately 125 million pregnant women are exposed to the risks of malaria pregnancy annually resulting in about 200,000 infant deaths globally [4, 5]. Pregnant women are more susceptible to Plasmodium infections than their non-pregnant peers in malarious regions, especially the primigravidae [6, 7], although women of all gravidae are equally at risk in areas of unstable malaria transmission. The pathological and physiological changes during malaria have a synergistic effect on the course of each other [8], and pregnancy aggravates malaria through a non-specific hormone-dependent depressing of the immune system [9].

Chronic hepatitis B virus (HBV) infection affects about 380 million persons globally, with about half acquiring the infection perinatally [10]. Acute or chronic HBV infection has similarity to pregnancy and common to the general adult population, with no increase in mortality or morbidity and congenital defects. Nevertheless, there is an increased occurrence of low birth weight and prematurity during HBV infections in pregnancy than in the general population [10]. Liver Cirrhosis aggravates maternal and fetal in about 50%, with increased fetal mortality.

Cirrhosis-associated risks to the mother include rupture of oesophageal varices and consequent bleeding (20-50%), hepatic condensation, jaundice and rupture of the splenic aneurysm [11].

Malaria and hepatitis B virus (HBV) infections are endemic in most parts of Nigeria [12]; Malaria and Hepatitis co-infection in pregnancy are mutually aggravating conditions. Pregnancy increases the risk of infections in women than in their non-pregnant women due to the adverse effects pregnancy brings to women's body physiology and immunity, increasing the clinical manifestation of malaria, and this results in low birth weight, anaemia maternal and fetal mortality. Majority of the world’s HBV children-carriers acquired the infection perinatally [10,12], with 80-90% greater chance of advancing into a chronic state and then liver failure [13]. About 15-40% of infected persons develop cirrhosis, liver failure or hepatocellular carcinoma [14]. This study aimed to evaluate the prevalence and co-infection of malaria and hepatitis B virus among pregnant women attending the ante-natal clinic in Federal Medical Centre, Owerri, Nigeria.

2. MATERIALS AND METHODS

2.1 Study Design

This was a cross-sectional survey involving 300 pregnant women out of 372 attending antenatal care in Federal Medical Centre (FMC) Owerri, Imo State who gave their consent.

2.2 Study Area

The study was conducted in Owerri, which lies on Latitude 5.48ºN and Longitude 7.03ºE at an elevation of 159 m above Sea level. Owerri is the
capital of Imo State and consists of three Local Government Areas which includes: Owerri Municipal, Owerri North and Owerri West Local Governments. The average annual temperature is 26.4°C and is approximately 100 Square kilometre (100 sq mm) in area. It has an estimated population of 1,401,873 as of 2016. Owerri has a tropical wet climate; rainfalls for most the year with a brief dry season.

2.3 Subject Selection
All pregnant women attending antenatal at the FMC at the time of the study without other complications were eligible for the study. Healthy mothers who disagreed to the collection of their samples were excluded. Participation was voluntary and participants gave their consent verbally. Ethical approval for this study was obtained from the Department of Phlebotomy, FMC Owerri.

2.4 Sample Collection and Processing
Five millilitres (5 ml) of blood was obtained into an empty EDTA bottle by venipuncture.

2.5 Malaria Test
Malaria test was carried out by making thin and thick films, which were stained with Giemsa Stain and air-dried. Afterwards, drops of immersion oil were applied and viewed with x100 magnification microscope lens to assess the plasmodium as described by Cheesbrough [15].

2.6 Hepatitis B Test
Hepatitis B virus infection diagnosis was done by allowing the blood in the EDTA bottles settle and the plasma was carefully collected and used for the detection of hepatitis B Antigen. Part of the plasma collected was tested for hepatitis B surface antigen (HBsAg) using latex rapid agglutination slide kit (Cal-TechDiagnostic Inc USA) as described by Blumberg [16].

2.7 Statistical Analyses
Data obtained was analyzed using the SPSS soft version 20. The difference was considered significant if \( P < 0.05 \). After which the result was presented in tables.

3. RESULTS
Out of 300 blood samples collected, 17(5.67%) tested positive to hepatitis B while 110 (36.67%) were positive to malaria as shown in Table 1. The age group 15-24 yrs had the highest prevalence of infections (45.76%) of malaria followed by 35-44 yrs (38.33%) while 45-54ys had least (30.43%). Although there was a difference in prevalence, it was not statistically significant (\( \chi^2=4.178, \ p=0.243, \ df=3 \)). In Hepatitis B infection, age group 15-24 yrs (16.95%) had the highest prevalence of infection, followed by 25-34 yrs (4.17%) while 45-54yrs recorded no infection, and there was a statistically significant difference in prevalence across the age groups (\( \chi^2=18.581, \ p=0.000, \ df=3 \)) (Table 2). The prevalence of malaria and HBV co-infection based on age indicated that 15-24yrs had the highest prevalence 8.47% followed by 35-44yrs (2.67%) while 25-34 yrs (1.67%) had the least prevalence (Table 3).

Table 1. Overall prevalence of Malaria and Hepatitis B virus infection among pregnant women at the FMC Owerri

<table>
<thead>
<tr>
<th>Infections</th>
<th>No. examined</th>
<th>No. infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria</td>
<td>300</td>
<td>110(36.67)</td>
</tr>
<tr>
<td>HBV</td>
<td>300</td>
<td>17(5.67)</td>
</tr>
</tbody>
</table>

Table 2. Prevalence of Malaria and Hepatitis B infections based on age among pregnant women at the FMC Owerri

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>No. examined</th>
<th>Malaria</th>
<th>HBV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. infected (%)</td>
<td>No. infected (%)</td>
</tr>
<tr>
<td>15-24 yrs</td>
<td>59</td>
<td>27(45.76)</td>
<td>10(16.95)</td>
</tr>
<tr>
<td>25-34 yrs</td>
<td>120</td>
<td>46(38.33)</td>
<td>5(4.17)</td>
</tr>
<tr>
<td>35-44 yrs</td>
<td>75</td>
<td>23(30.66)</td>
<td>2(2.67)</td>
</tr>
<tr>
<td>45-54 yrs</td>
<td>46</td>
<td>14(30.43)</td>
<td>0(0)</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td></td>
<td>4.178</td>
<td>18.581</td>
</tr>
<tr>
<td>( P )-value</td>
<td></td>
<td>0.243</td>
<td>0.000</td>
</tr>
</tbody>
</table>

3
Table 3. Prevalence of Malaria and Hepatitis B virus co-infections based on age among pregnant women at the FMC Owerri

<table>
<thead>
<tr>
<th>Age group</th>
<th>No examined</th>
<th>No infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24 yrs</td>
<td>59</td>
<td>5(8.47)</td>
</tr>
<tr>
<td>25-34 yrs</td>
<td>120</td>
<td>2(1.67)</td>
</tr>
<tr>
<td>35-44 yrs</td>
<td>75</td>
<td>2(2.67)</td>
</tr>
<tr>
<td>45-54 yrs</td>
<td>46</td>
<td>1(2.17)</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>10(3.33)</td>
</tr>
</tbody>
</table>

4. DISCUSSION

In the current study, the prevalence of 36.67%, 5.67% and 3.33% of malaria, HBV and co-infections respectively was recorded. The prevalence of malaria in this study was lower than that of Isa, et al. [17], Oliver, et al. [18] and Adefioye [19] who reported a higher prevalence of 48.1%, 42% and 76.9% respectively in similar studies. The difference could be attributed to awareness and better compliance with preventive measures against infection, such as procurement/availability of and the use of insecticide-treated bed nets (ITNs), diagnostic tool use, compliance to intermittent preventive treatment, good personal environmental hygiene and general health awareness in the study area compared to the earlier study areas. The high malaria prevalence in the current study and previous researchers could be because malaria is an endemic infection in Nigeria.

Though the prevalence of hepatitis B and its co-infection with malaria was low in this study (3.3%) when compared with 5.5% in Ilorin [20], the co-infection of both infectious diseases is detrimental to the life of pregnant women and the unborn baby. Majority of babies delivered with mothers having HVB will become chronically infected at birth if there is no prevention [21]. The prevalence obtained from the current study was higher than 3% recorded in Oshogbo [22] but lower than 18.6% of Kolawole, et al. [23] in another study. The difference in prevalence could be due to the variation in diversity of patients attending the health institution in the present study, compared to a local comprehensive health centre that is mainly patronized by the people within the community. The higher number of infection amongst the youthful age group could be attributed to their higher-risk behaviour to contracting malaria and HBV such as failure to use bed-nets, failure to complete the recommended drug doses, unrestricted sexual activities without protection, a greater tendency for drugs abuse, indulgence in fashionable tattooing and body piercing.

5. CONCLUSION

There is a high prevalence of malaria among pregnant women in the study area and the effects could be fatal to mother, foetus and the new-born. HBV infection, Malaria and HBV co-infection were found to be relatively high. Therefore, there is a need to ensure malaria interventions such as the provision of ITNs and intermittent Preventive treatment in pregnancy for malaria during pregnancy. Also, regular HBV vaccination, especially for the sexually active young ones, is advocated in the state.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES