Prevalence of Malaria Infection among Pregnant Women Attending Antenatal Clinics in Gombe State

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Abstract
Malaria during pregnancy continues to be a major health problem in endemic countries with clinical consequences including death of both mother and child. Statistics shows that 300,000 life's especially those of children and pregnant women are lost annually to malaria. This study was aimed at assessing the prevalence of malaria among pregnant women living in Gombe Metropolis characterized by seasonal transmission of malaria. 1000 pregnant women attending antenatal clinic at Federal University Teaching Hospital Gombe (FUTHG), and Hamdala Specialist Hospital Gombe were examined. This study was carried out from March to May 2013. Thick blood film was made and stained with Giemsa using parasitological standard procedures. The overall result shows that of the 1000 samples examined 92% (n=920) were positive and 8% (n=80) negative. The density of parasitemia reveals low density in 57%, moderate in 26% and high in 8%. Percentage infection in age group reveals that Age 18-23 had (37%), 24-28 (23.5%), 29-32 had (17.5%), 34-38 (13%) and 39 above (1%). Infection according to their gestational period reveals that 1st Trimester had 31.5%, 2nd Trimester 35.5%, and 3rd Trimester 26.0%. There was higher infection rate in the 2nd Trimester, although it was statistically not significant (P > 0.05). Since Malaria in pregnancy deserves a special attention, this research work has provided information at the local level on the spread of malaria parasites in pregnant women as a contribution towards the achievement of the millennium development goal for the control of water and sanitation related diseases in Gombe state.

Keywords: Malaria, Prevalence, Pregnant women, Parasitemia, Density and Trimester

Background to the Study
Malaria is a life threatening parasitic disease transmitted by female anopheles mosquitoes (W.H.O., 2001). Malaria is the most widespread and persistent disease which affects human populations throughout the world and especially in tropical countries. It is one of the biggest health problems in sub-saharan Africa (Snow et al, 2005) and its contribution to morbidity and mortality among people in Africa has been a subject of academic interest (Snow et al, 1999). In sub-saharan Africa alone 400 million persons are at risk, and nearly all the one million deaths per annum from malaria in the world occur in this region (Snow et al, 1999). Malaria kills a child in every 30 sec (Alswick, 2000). In addition, pregnant women are at immense risk of malaria due to natural immune depression in pregnancy (Fievet et al, 1997). Malaria in pregnancy has been reported to cause high rate of infant and maternal mortality and low-birth weight (Singh et al, 1999).
It is responsible for one in four deaths below the age of five years and could most times lead to miscarriage at the early stage of pregnancy (Bulter, 1997). In the endemic countries of Africa, children under the age of five and pregnant women bear the bulk of the burden of malaria disease, this is because they have lower immunity to the disease compared to other people in the same environment, the malaria situation is deteriorating as a result of environmental changes, including global warming, civil disturbance, increasing travel and increasing drug resistance (Greenwood, 1997a). Malaria mortality is twice in pregnant women than among non-pregnant patients with severe malaria (Brabin, 1998).

Pregnant women are also especially vulnerable about 125 million pregnant women are at risk of infection each year. In sub-saharan Africa, maternal malaria is associated with up to 200,000 estimated infant deaths yearly (Hertman et al., 2010).

Malaria in pregnant women is a subject of concern because of their low immunity and risk of the unborn. Although so much work has been published on the prevalence of malaria in major cities of Nigeria, such data are few in Gombe State and form the Millennium Development Goal (MDG) to achieved its goal of **Improve maternal health this work is very necessary**.

This research work is meant to provide information at the local level on the spread of malaria parasites in pregnant women as a contribution towards the achievement of the millennium development goal for the control of water and sanitation related diseases.

**Materials and Methods**

**Study Area**

The study was conducted in Gombe Metropolis the State Capital. Gombe State is located in the north-eastern region of Nigeria, it lies between latitude of 9°30' and 12°30’ North of the equator and longitudes 8° and 11°45’ East of the Greenwich Meridian, it is characterized with Sudan savanna vegetation with annual rainfall of 850mm and temperature of 30°C. The State has a population of about, 2,353,000 people as of 2006 (Nigerian population, 2006). The inhabitant of Gombe Metropolis comprise mostly of civil servants, some fulltime farmers and traders. The tribes are mixed but the predominant ones are Hausa, Fulani, Tangale, Waja, Tera, Bolawa.
Study Site
Federal University Teaching Hospital Gombe (F U T H G.) is located in federal low-cost Gombe, along Ashaka road, adjacent to the State Secretarial. It was chosen as the sampling centre simply because of the availability of the samples and basic facilities.
Hamdala Specialist Clinic Gombe is located in Tudun-WadanPantami, near Pantami Stadium, opposite police Station. Hamdala Clinic was chosen as the sampling centre because the Director is a specialist in gynecology, and attracts so many referred cases.

Sample Collection
Random blood sample collection of 1000 blood samples were collected from pregnant women of varying age ranging from 18 to 45 years, attending the two Clinics in Gombe.

Procedure of Sample Collection
The forearm of the patient was tight using tourniquet, to remove the vein very prominent, the arm was sterilized by using a swab. The fixed needle to the syringe with the cut edge of the needle facing upwards was gently and carefully inserted in to the ante-cubital vein and 2ml blood was withdrawn, according to the method of (Raimi and Kanu, 2010).

The tourniquet was losing simultaneously with the removal of the syringe. A dry cotton wool was used to cover the punctured site, the needle was detached and the sample transferred into the anticoagulant container (E.D.T.A), the container was labeled with the following information's age, investigation, sex, date of collection, name of the patient and the gestation period.

Laboratory Analysis
The collected samples were brought to the laboratory for film. Standard method for making a thick blood film was used as described by Chessbrough.

Procedure for Making a Thick Film
On a clean grease free-slide, a drop of blood sample was placed at the centre, using a spreader or applicator stick, the blood was smear in a circular form and a homogeneous film was made as recommended by WHO (Agomo et al, 2001). The film was not too thick or thin in which a hand of a wrist watch was seen through the film. The film was allowed to air dry on a drying rack, ready for staining.

Procedure for Staining and Examining
A prepared thick blood film was placed on a staining rack, the slide was flooded with 3% Giemsa stain of pH 7.0 and allowed to stain for 40minutes recommended by WHO (Agomo, 2001). The slide was wash with buffer water pH of about 7.2, the back of the slide was clean using a dry cotton wool and it was allowed to air drain and dry, ready for examination. A drop of oil emersion was put at the middle of the film and it was examined under microscope using x100 objective lenses (Meensen et al, 2001).
Result
The prevalence of malaria among pregnant women attending ante-natal care in Federal Medical Centre Gombe and Hamdala Clinic is shown in the Table 1. Among the 1000 sample examined 920 (92%) were positive while the remaining 80 (8%) were negative. The result in Table 2 shows that the density of parasiteamia was low in 575 patients, moderate in 265 patient and high in 80 patients with 57.5%, 26.5% and 8% respectively.

The result in Table 3 shows that, the age group 18-23years recorded the highest prevalence rate of infection followed by age group 24-28years and the least was the age group 39-43years. In Table 4 the result shows that, high prevalence rate of malaria infection is in the second trimester.

Table 1: prevalence of malaria among 1000 examined pregnant women.

<table>
<thead>
<tr>
<th>Infection</th>
<th>Result</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>80</td>
<td>8%</td>
</tr>
<tr>
<td>Positive</td>
<td>920</td>
<td>92%</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2: Density of parasiteamia in the blood samples examined.

<table>
<thead>
<tr>
<th>Density</th>
<th>Degree</th>
<th>Result</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>+</td>
<td>575</td>
<td>57.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>++</td>
<td>265</td>
<td>26.0</td>
</tr>
<tr>
<td>High</td>
<td>+++</td>
<td>80</td>
<td>8.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>920</td>
<td>92</td>
</tr>
</tbody>
</table>

Table 3: Prevalence of malaria infection, according to their age group

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number examined</th>
<th>Number infected</th>
<th>Percentage Examined</th>
<th>Percentage infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 23</td>
<td>395</td>
<td>370</td>
<td>39.5</td>
<td>37.0</td>
</tr>
<tr>
<td>24 - 28</td>
<td>260</td>
<td>235</td>
<td>26.0</td>
<td>23.5</td>
</tr>
<tr>
<td>29 - 33</td>
<td>205</td>
<td>175</td>
<td>20.5</td>
<td>17.5</td>
</tr>
<tr>
<td>34 - 38</td>
<td>130</td>
<td>130</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>39 - 43</td>
<td>10</td>
<td>10</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>920</td>
<td>100</td>
<td>92.0</td>
</tr>
</tbody>
</table>
Table 4: Prevalence of malaria infection among pregnant women according to their gestational period

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Number of subject</th>
<th>Number of infected</th>
<th>Percentage Subject</th>
<th>Percentage infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Trimester</td>
<td>335</td>
<td>315</td>
<td>33.5</td>
<td>31.5</td>
</tr>
<tr>
<td>2nd Trimester</td>
<td>375</td>
<td>345</td>
<td>37.5</td>
<td>34.5</td>
</tr>
<tr>
<td>3rd Trimester</td>
<td>290</td>
<td>260</td>
<td>29.0</td>
<td>26.0</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>920</td>
<td>100</td>
<td>92.0</td>
</tr>
</tbody>
</table>

Discussion

Malaria remains a major disease in tropical countries. Malaria infection during pregnancy can have advance effects on both mother and fetus, including maternal anaemia, fetal loss, premature delivery, intrauterine growth retardation and delivery of low birth weight infants (Brabin, 1998). Pregnancy appears to interfere with the immune process in malaria disease which itself alters immune reactivity (Bruce-chwatt et al, 1983). In highly endemic malarious area 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 et al, 1998). This is also true in this study in which prevalence rate of 92% of malaria parasite was recorded.

The 92% prevalence rate of malaria parasite (Plasmodium falciparum) found among the pregnant women in this study is higher than the 70.1% reported in Calabar, Nigeria by Okafor et al (2012) which studied the prevalence and types of Anemia in malaria infection among pregnant women Attending Antenatal Clinic in University of Calabar Teaching Hospital and also 72% previously reported in Osogbo, Southwest, Nigeria by Adefioye et al (2001) who studied the prevalence of malaria parasite infection among pregnant women. This could due to high human vector contact and rainfall, although this research was conducted during pre-raining season in the period of March to May it shows that malaria transmission may not be seasonal as many authors speculate.

The parasitemia density of malaria infection among pregnant women in this research, shows 57% low level, 26% moderate and 8% higher level. This could be attributed to the immune system which increases as trimester increases. Pregnant women within the age group bracket 18-23 years recorded the highest number of positive case while those of the age group 39-43 years recorded the lowest number of positive case. This result supports the existing knowledge that high prevalence at lower ages and low prevalence at higher ages is due to the existence of natural immunity to infections disease including malaria (Odoula et al, 1992; Rogerson et al, 2000; Bouyou-Akotet et al, 2003) which study the pregnant women acquires as the age increases. Lander et al (2002) however reported no significant association between malaria infection and...
maternal age. Also the high prevalence rate was in accordance with the report of Marielle et al. (2003) in pregnant women in Gabon who recorded high prevalence of infection among pregnant women under age of 20 years.

In this research women in the second trimester had the highest level of parasitemia (Table 4), this finding agree with those of Nair and Nair (1994), Menendez (1995), and Nosten et al. (1991), who reported higher frequency of malaria parasite infection in the second and early third trimester. Women in their third trimester of pregnancy were less likely to have parasitemia than did women in an earlier stage of pregnancy, this study was in accordance with the report of Christine et al. (2009) who study the epidemiology of malaria among pregnant women attending antenatal clinics in an area with intense and highly seasonal malaria transmission in northern Ghana.

This study illustrates high prevalence of malaria in pregnant women more common in first and second trimester. Malaria should therefore be recognized as a global priority in health care more so in pregnancy. Although presumptive malaria treatment has been recommended by WHO as a malaria control measures in endemic area (WHO, 2006), this strategy should be considered for malaria in pregnancy given the lack of available antimalarial drugs with acceptable safety profiles. This is especially critical during the first trimester and also, this finding recommend that, early registration for antenatal care and regular malaria check-up in order to identify complications early, should be encouraged.

References


