MALARIA PARASITAEMIA AMONG BLOOD DONORS IN A NIGERIAN TEACHING HOSPITAL

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**ABSTRACT**

This study was undertaken to assess the prevalence of malaria parasitaemia among blood donors at the Lagos University Teaching Hospital (LUTH), Lagos, Nigeria. A total of 396 individuals comprising 255 males and 141 females were randomly selected for the study over a period of 6 months between November 2013 and April 2014 using standard field and laboratory techniques. 184 (46.46%) individuals were positive for malaria parasitaemia, where 168 (42.42%) individuals had *Plasmodium falciparum* while 16 (4.04%) individuals had *Plasmodium malariae*. Sex prevalence showed 129 (32.58%) and 55 (13.89%) for males and females respectively, this was statistically significant (P<0.05). Individuals between the ages of 20-30 years, 31-40 years, 41-50 years and 51-60 years showed prevalences of 21.72%, 10.61, 7.83 and 6.31% respectively. This, however was not statistically significant (P>0.05). Prevalence according to donor types showed 29.29, 8.33 and 8.84% for commercial donors, relative donors and voluntary donors respectively. This was not statistically significant (P>0.05). These results showed that there is a high prevalence of asymptomatic parasitaemia in the study area. Hence, all blood samples should be screened for malaria parasites before such blood are transfused to avert its consequences on the recipients.

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**1. INTRODUCTION**

Malaria is the most widespread and most important single disease entity of the tropics with its morbidity and mortality at unacceptably high levels in the region [1]. It is estimated that the population at risk is about 2.6 billion with 100 million clinical cases [2] and about one million fatalities per year [3]. Most of the malaria cases in the world (about 90%) occur in Africa [4]. This has serious implications as it leads to loss of man-hours and decrease in national productivity.

There has been some debate among transfusion practitioners in the region as to whether donor blood for transfusion in the region should be screened for malaria.

The consensus so far has been not to do so [4]. This situation poses a particular risk to vulnerable blood recipients, which include visitors to the region, little children who have not acquired partial immunity, pregnant women who are not on routine malaria prophylaxis, probably HIV/AIDS patients [5] and other people with low immune status. Incidentally, a large proportion of blood recipients in the region fall among the malaria vulnerable groups mentioned above.

The administration of blood to a patient is potentially a lifesaving procedure and the demand for blood has greatly increased over the years. The prevalence of parasitic infections especially haemoparasites is a serious case which needs to be addressed. Infections resulting from these parasites during transfusion include but not limited to malaria. Transmission of malaria by blood transfusion is a significant problem in the disease endemic regions of the world [6].
According to [7] the presence of *Plasmodium falciparum* in the blood may lead to fatalities when the blood is transfused especially into children under 5 years, pregnant, accident victims and immuno-suppressed patients. The present study was carried out to assess the prevalence of malaria parasitaemia among blood donors and therefore determine the possible risk of transmission of malaria parasite to recipients of blood.

2. MATERIALS AND METHODS

The study was carried out at the Lagos University Teaching Hospital, Idi-Araba, and Lagos State, Nigeria. A total of 396 blood donors that presented themselves at the hospital’s blood bank between November, 2013 and April 2014 were randomly selected for this study, out of which 255 were males and 141 were females. A total of 175 were voluntary (non-remunerated) blood donors, 98 were replacement (family/relative) and 123 were commercial (remunerated) blood donors.

Venous blood was collected from each donor using standard field procedures. All samples were taken to the haematology and blood transfusion Department of the Lagos State University Teaching Hospital for laboratory analysis. Malaria parasites were identified using the procedures of the thick and thin films as prescribed by [8]. The films were examined at x100 oil immersion objective lens. An experienced technician did the microscopic examination. Data on donor type, age and sex of each blood donor were documented.

3. STATISTICAL ANALYSIS

Descriptive and inferential statistics were both used to analyze the data. The prevalence rates were expressed as a percentage of the total number of donors sampled while Pearson Chi-square was used to evaluate the relationships between the prevalence of infection with the respective variables studied. A P-value of P<0.05 was considered significant.

4. RESULTS

Out of 396 individuals examined, 184 were infected, indicating an overall prevalence of 46.46%. Out of this, 168 individuals were found to be infected with *Plasmodium falciparum* with a prevalence of 42.42%, while 16 individuals were infected with *Plasmodium malariae* showing a prevalence of 4.04% (Table 1).

In the same vein, 155 (39.14%) individuals between the ages 20-30 years were examined, out of these, 86 were positive for malaria parasite with a prevalence of 21.72%.

Similarly, 108 (27.27%) blood donors between the ages of 31-40 years were examined, 42 of them were positive for malaria parasite with a prevalence of 10.61%. As well, 70 (17.68%) blood donors between the ages 41-50 years were examined, out of which 31 were positive with a prevalence of 7.83%. Also, 63 (15.91%) blood donors between the ages 51-60 years were examined, 25 of them were positive with a prevalence of 6.31% (Table 2). There was no statistical difference (P>0.05) between malaria parasitaemia and age of the blood donors in the study area.

Sex prevalence showed that among the 396 individuals examined, 255 (64.39%) were males while 141 (35.61%) were females. Out of the 255 males examined, 129 were positive showing a prevalence of 32.58%. Among the 141 females examined, 55 were positive showing a prevalence of 13.89% (Table 2). There was a statistical difference (P<0.05) between malaria parasitaemia and sex of the blood donors in the study area.

Out of 396 individuals sampled, 116 individuals that represented those that were positive for malaria parasitaemia under commercial blood donors, the prevalence rate was 29.29% while for relative donors, 33 were positive, representing 8.84% and for voluntary donors, 35 were parasitaemic, representing 8.84%.

Donor prevalence indicated that 116 out of the 123 commercial blood donors were infected with a prevalence of 94.31%, while 33 out of the 98 relative donors were infected with a prevalence of 33.67% and out of the 175 voluntary donors, 35 were infected with a prevalence of 20.0% (Table 3).

There was no statistical difference (P>0.05) between malaria parasitaemia and blood donor types in the study area.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Numbers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number examined</td>
<td>396</td>
<td></td>
</tr>
<tr>
<td><em>Plasmodium falciparum</em> (+ve)</td>
<td>168</td>
<td>42.42</td>
</tr>
<tr>
<td><em>Plasmodium malariae</em> (+ve)</td>
<td>16</td>
<td>4.04</td>
</tr>
<tr>
<td>Total positive</td>
<td>184</td>
<td>46.46</td>
</tr>
</tbody>
</table>
Table 2 Sex and age distribution of malaria parasitaemia among the blood donors.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Total Number Examined (%)</th>
<th>Male</th>
<th>Female</th>
<th>Total Number Positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>155 (39.14)</td>
<td>102 (25.76)</td>
<td>64 (16.16)</td>
<td>64 (16.16)</td>
</tr>
<tr>
<td>31-40</td>
<td>108 (27.27)</td>
<td>65 (16.41)</td>
<td>28 (7.07)</td>
<td>43 (10.86)</td>
</tr>
<tr>
<td>41-50</td>
<td>70 (17.68)</td>
<td>51 (12.88)</td>
<td>19 (4.80)</td>
<td>19 (4.80)</td>
</tr>
<tr>
<td>51-60</td>
<td>63 (15.91)</td>
<td>37 (9.34)</td>
<td>14 (3.54)</td>
<td>26 (6.57)</td>
</tr>
<tr>
<td>Total</td>
<td>396</td>
<td>255 (64.39)</td>
<td>129 (32.58)</td>
<td>129 (32.58)</td>
</tr>
</tbody>
</table>

Table 3 Relationship between blood donors and sex in the study area.

<table>
<thead>
<tr>
<th>Blood donor types</th>
<th>Total Number Examined (%)</th>
<th>Male</th>
<th>Female</th>
<th>Total Number Positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial donor</td>
<td>123 (31.06)</td>
<td>79 (19.95)</td>
<td>44 (11.11)</td>
<td>44 (11.11)</td>
</tr>
<tr>
<td>Relative donor</td>
<td>98 (24.75)</td>
<td>59 (14.90)</td>
<td>39 (9.85)</td>
<td>39 (9.85)</td>
</tr>
<tr>
<td>Voluntary donors</td>
<td>175 (44.19)</td>
<td>117 (29.55)</td>
<td>58 (14.65)</td>
<td>58 (14.65)</td>
</tr>
<tr>
<td>Total</td>
<td>396</td>
<td>255 (64.39)</td>
<td>141 (35.61)</td>
<td>141 (35.61)</td>
</tr>
</tbody>
</table>

5. DISCUSSIONS

The prevalence of malaria parasitaemia among blood donors in this study is relatively high. This is a reflection of high rate of asymptomatic malaria parasitaemia in endemic regions. This observation is in agreement with the reports of [9], [10] and [11]. The implication of this regarding blood transfusion is enormous and shows that blood transfusion carries a risk of transmitting malaria parasites to people who are highly vulnerable to malaria [5].

Though, there was variation in malaria prevalence among the age groups and sex, the proportion of the number screened for each age group and sex could have accounted for this. Majority of the blood donors (39.14%) fall between the ages of 20-30 years and are predominantly males (64.39%). Sex prevalence showed 13.89% for females. The low number of females obtained in the study is not a surprise as the females are naturally and physiologically inhibited from blood donation due to the loss of blood during their monthly menstruation.

The significant variation in malaria parasitaemia in relation to blood donor types suggests that the donor types may be associated with malaria transmission. The high prevalence among commercial donors (29.29%) may be related to the possibility that they indulge in certain unhealthy lifestyle like smoking and alcoholism which predispose them to low immunity as well as non-compliance with certain malaria control practices such as lack of or non-use of treated nets, unhygienic environment that occasion uncontrolled breeding of mosquitoes, lack of strict adherence to therapeutic prescription of malaria drugs, stagnant water around inhabited surroundings etc.

In conclusion, the present study showed that there is high prevalence of malaria parasitaemia among blood donors in the study area. Therefore, there is the risk of malaria parasites being transmitted to recipients during blood transfusion. We, therefore recommend that all blood meant for transfusion be screened for malaria parasites and marked negative or positive as the case may be. In case a patient is transfused with blood that tested positive to malaria parasites, such a patient can be given a curative regimen of antimalarial, especially when the patient falls within the malaria vulnerable group. Alternatively, it might be considered expedient to give prophylactic antimalarial to every patient transfused with blood as suggested by [10]. This is without prejudice to the normal prophylactic intermittent treatment (IPT) given to pregnant women.

6. ACKNOWLEDGEMENTS

The authors thank all the members of staff of the blood bank unit as well as the technologists at the Department of Haematology and Blood Transfusion of the study area.

7. REFERENCES


