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Short Communication

Prevalence of Malaria Parasitaemia among Children Resident in Orphanages in Anambra State, Nigeria

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ABSTRACT

Malaria parasitemia in Anambra State and in Nigeria at large is of public health significance. Determination of malaria parasite density is helpful in disease monitoring and assessment of drug efficacy. This study investigated the prevalence of malaria parasitemia among children resident in orphanages located in Anambra State, Nigeria and related the malaria parasite density gotten from actual WBC count with value got using World Health Organization (WHO) assumed mean. A total of 272 subjects comprising 172 orphans and 100 children in family setting (controls) were investigated for malaria parasitemia using Giemsa stain. Malaria parasite density was carried out according to WHO recommendation. A prevalence of 23.3% and 12.0% malaria parasitemia were observed for children in orphanage and family setting respectively ($p < 0.05$). The disease significantly affected the children in all the age ranges with children in ages 0-5 most affected ($p < 0.05$). The mean malaria parasite density measured based on WHO assumed WBC mean value was significantly higher than using the actual WBC count ($p < 0.05$). The use of total WBC count reference value for a given locality in measuring malaria parasite density is recommended rather than an assumed value.

Keywords: Prevalence, Malaria Parasitaemia, Orphanage, Parasite Density

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INTRODUCTION

Malaria parasitaemia is of public health concern in Anambra State and in Nigeria at large. Okocha *et al.*, (2005) recorded malaria parasite prevalence of 30.2% in blood donors in Anambra State. Yusuf (2005) and Onyido *et al.*, (2011) worked among pregnant women in Ihiala and residents in Uli, Anambra State respectively and reported prevalence of 65.7% and 70.8%. Determination of malaria parasite density is helpful in disease monitoring and assessment of drug efficacy. Lack of facilities in some malaria-endemic countries for the quantification of White Blood Cells of patients in microliters made the World Health Organization to set an assumed White Blood Cells mean value of 8,000 cells/ μ l of blood (WHO, 2010) to help in estimating malaria parasite densities. How does the malaria parasite density estimated using assumed

WBC value compare with malaria parasite density using actual WBC count? This study investigated the prevalence of malaria parasitemia of children resident in orphanages in Anambra State, Nigeria, and related the malaria parasite density derived from actual WBC count with the estimation using WHO assumed mean value.

MATERIALS AND METHODS

Children in 8 orphanages between 6 weeks and 18 years old were sampled. A total of 272 subjects consisting of 172 orphans and 100 children from family setting serving as control were investigated for malaria parasitaemia using thick and thin blood film stained with Giemsa stain. Of the 172 children in the orphanages, 79 were males while 93 were females. The children living in family settings, who served as

control, consisted of 50 males and 50 females. The children were grouped into 4 age groups of 5- year intervals (0-5, 6-10, 11-15 and 16-20 years).

The Giemsa staining method of WHO (1991) was used for staining the thin and thick films at Mega Diagnostic Laboratories, Nnewi, Anambra State. The films were observed microscopically. Leucocytes count was carried out using Beckman Coulter AC. T diff Analyzer at General hospital, Ekwulobia, Anambra State for the estimation of malaria parasite density. The different species of Plasmodia were identified on the thin Giemsa stained film. The number of parasites in a thick blood film was counted in relation to the number of leukocytes counted. This number of malaria parasites/200 WBC or parasite/500 WBC was converted to parasites per microlitre of blood (Parasite Density); (WHO, 1991).

RESULTS

Malaria parasite prevalence of 23.3% in children resident in orphanage homes was significantly higher than malaria parasite prevalence of 12.0% recorded in family based children (p<0.05), (Table 1). In Table 2, malaria parasitaemia significantly affected children in all the age ranges (p<0.05). However, children in ages 0 to 5 were more infected than in older ages in both orphanages and family settings (Controls).

The mean malaria parasite density based on WHO assumed WBC mean (603/μl) was significantly higher than the mean malaria parasite density observed with actual WBC count (368/μl), (p<0.05). The prevalence of Plasmodium species observed were: *Plasmodium falciparum* 82.5%, *Plasmodium malariae* 12.5% and *Plasmodium vivax* 5.0% in orphanage children and *Plasmodium falciparum* 9 (75%), *Plasmodium malariae* 2 (16.7%) and *Plasmodium vivax* 1 (8.3%) in control children (Table 3).

Table 1
showing the prevalence of malaria parasitaemia among children resident in orphanage homes in Anambra State

| Prevalence of malaria parasitaemia | | χ ² | p-value |
|------------------------------------|----------------------------|----------------|---------|
| Orphanage (N = 172) (%) | Family (N = 100) (%) | | |
| 40 (23.3) | 12 (12.0) | 5.181 | 0.023* |

Table 2
Prevalence of malaria parasites by age range in children resident in orphanages in Anambra State (N = 172).

| | No. sampled | No. positive within age range (yrs) | | | | | χ ² | p- value |
|-----------|-------------|-------------------------------------|--------|---------|---------|--------------------|----------------|---------------|
| | | 0 - 5 | 6 - 10 | 11 - 15 | 16 - 20 | Total Positive (%) | | |
| Orphanage | 172 | 21 | 7 | 9 | 3 | 40 (23.3) | 25.641 | 0.001* |
| Family | 100 | 7 | 1 | 2 | 2 | 12 (12.0) | | |

*= Significant at p < 0.05

*= Significant at p < 0.05

DISCUSSION

The total malaria parasite prevalence of 23.3% recorded for malaria parasite in children resident in orphanage homes in Anambra State was significantly higher in relation to the control group (p<0.05). This prevalence is comparably lower than 30.2% recorded by Okocha *et al.*, (2005), though in a different study population of blood donors in Anambra State. Yusuf (2005) and Onyido *et al.*, (2011) worked among different study groups of pregnant women in Ihiala and residents in Uli both in Anambra State respectively and recorded high prevalence of 65.7% and 70.8% respectively. Frequency of malaria parasitaemia within various orphanage homes was high. Children between 0 - 5 years of age were the most vulnerable group. This is in agreement with WHO report that children under 5 years of age constituted 69% out of estimated malaria deaths around the world (WHO, 2016). The highest specie of malaria parasite infecting the children was *Plasmodium falciparum* (82.5%) followed by *Plasmodium malariae* (12.5%) and *Plasmodium vivax* (5.0%). This is consistent with a malaria parasitaemia prevalence of 82.2% for *Plasmodium falciparum*, 13.6% for *Plasmodium malariae* and 4.4% for *Plasmodium vivax* recorded by Onyido *et al.*, (2011) among residents of Uli in Anambra State, though not in children. Yusuf (2005) recorded an equally high prevalence of *Plasmodium falciparum* of 65.7% and *Plasmodium vivax* of 23.6% among pregnant women in Ihiala, Anambra State.

Table 3
Percentage distribution of the species of malaria parasites in orphanages and family settings

| | Malaria parasite distribution (%) | |
|------------------------------|-----------------------------------|--------|
| | Orphanage | Family |
| <i>Plasmodium falciparum</i> | 82.5 | 75.0 |
| <i>Plasmodium malariae</i> | 12.5 | 16.7 |
| <i>Plasmodium vivax</i> | 5.0 | 8.3 |

The mean malaria parasite density in the orphanage homes (368/μl of blood) was almost doubled (603/μl of blood) when assumed WBC value was used for estimation. Use of assumed mean may be misleading especially where accuracy of result may be very crucial in taken clinical decision. Though there were significant numbers of children infected by malaria parasite, only few were down with the disease.

In conclusion, the prevalence of malaria parasitaemia in 8 orphanage homes in Anambra State was 23.3%. Malaria parasitemia was significantly higher in orphanage homes in Anambra State than in children cared for in family setting. Children in ages 0-5 were most vulnerable. Establishment and use of total WBC reference value in a given locality is recommended rather than an assumed value for measuring malaria parasite density.

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