The Occurrence of Malariaparasitaemia among Children between 1-15 years of Age Attending Talba Clinic Suleja Niger State, Nigeria

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Running Title: The Occurrence of Malaria parasitaemia among Children

Abstract: This study was conducted to find out the occurrence of malaria parasite infection among children between 1-15 years of age attending Talba Clinic Suleja Niger State, Nigeria. The samples collected was ninety seven (97)from children including both males and females. Two milliliter of venipuncture blood samples withdrawn from each of the 97 children was kept undisturbed in an anticoagulant sample container. Thick and thin blood smears for malaria were prepared. Both smear were flooded and viewed to check for the presence of malaria parasite under the bright field using high power objective lens. Malaria parasite were mostly domicile among 11-15 years of age (29.9%) while 1-5 and 6-10 had 5.2% and 13.3% infection respectively. The occurrence of plasmodium infection was significant among different sex groups in this present study (This suggest that the occurrence of these infection is sex dependent). The species in this community were found to be plasmodium falciparum. Public awareness can be created in order to further sensitize for the use of these interventions meant for children to live a malaria infection free life.

Keywords: Talba, P.falciparum, Malaria infection, Suleja, Niger state, and Nigeria

1. Introduction

One of the highest causes of disease and death in Nigeria is Malaria, et al. [1] and Udoh, et al. [2]. This disease can be averted though is constantly present to a greater extent in many locations of the universe and has proceed in a definite state uninterrupted [3]. Grievously affected children frequently die in many cases between the hours of 1-72 hours (3days) after developing symptoms. The fetal nature of malaria parasite infection has left most of the surviving children are deficit of important nutrients thereby affecting their total physical and cognitive development[4]. Single celled protozoan parasites are microorganism that belongs to the genus plasmodium, they are the major causes of malaria, it is of the phylumapsi complex an Krief., et al.[5] The five major plasmodium species of humanare (plasmodium falciparum, plasmodium vivax, plasmodium knowlesi, plasmodium malariae, plasmodium ovale) [6]. The greatest damages are usually caused by P. falciparum and P. vivax, with P. falciparum being the most devastating. Death caused by severe malaria parasite infection (P.I) yearly is approximately 1-3 million Snow., et al.[7]The report according to [8] of all malaria incidence in the globe, Africa had 60% occurrence., 75% of worldwide Malaria cases are P.falciparum, 80% of mortality cases are also been documented. Diverse forms of complications were in the increase such as abortion, still birth, low birth weight in and also deaths [9][10]

All over the world it is estimated that two-hundred and fourteen million (214 million) episodes of malaria infection happens per annum and 3.2 million individuals are susceptible of been infected [11]. A total of 438,000 deaths were estimated to have been caused by malaria parasite infection in 2015, especially in black Africans region where about 90% of the major malaria death cases happens [11]. Direct and indirect cases of children living in Africa yearly is estimated to be more than 1 million [12].

The threat posed by malaria in Nigeria is one of the highest so far, with occurrence of almost 51 million and 207,000 mortality documented per year (about 30% of total malaria cases are prevalence in Africa) while 97% of the total population which is (estimated to be 173million) is at the threat of the infection [3].

The need to have a true picture of the malaria parasite infection case incidence in Niger State would help in identifying the rate of malaria among children. This will intrigue the government and private individuals to map out strategies and to implement interventions in order to drastically bring down the burden of the disease. The experiment was performed with purpose to study the occurrence of malaria parasitaemia among children of 1-15 years of age attending talba Clinic, Suleja in Niger State, Nigeria based on major predisposing factors such as sex, Age range and Occurrence.

2. Materials and Methods

Study Area
Suleja is a major town in Niger state. It is located at 9.18 latitude and 7.18 longitude. The distance from the state capital is about 104km away. The entire population of this
and dependent for reject H that distribution of plasmodium parasites by sex. This c
Critical region:Reject H Test statistic= \( X^2 \)

The investigation was basically performed on a specimen which cover of ninety seven (97) children, between the age range of 1 – 15 attending Talba Clinic Suleja Niger State, Nigeria. The hospital serves people from Eminene, Rijiyan, Bature area

Sample Collection
Ethylene diamine tetra-acetic acid (EDTA) tube were employed to collect blood samples. The tubes were labelled with the patient’s name, types of investigation, date, Age and sex. The presence of malaria parasite screened for within the month of June, 2019.

Staining Technique
The techniques used for staining and detection of malaria parasite in red blood cell sample collected was as suggested by [14]

Smear Preparation.
A well labelled thick and thin films were made on a grease free glass slides according to the world health organization (WHO) recommendation [15]. Giemsa stain was used to flood the thick and thin films and was then allowed to stand for 30 minutes. Clean water was used to wash the slide and the back side of the slides were subsequently wiped out using cotton wool in order to remove the excess stain and water. The slides were then air dried in a draining rack.

Microscopic Examination
Malaria parasites were investigated from the stained slides. Immersion oil was added on the slides to cover approximately 10 millimeter in diameter. The smears were both examined microscopically with x100 objectivels. This is in line with Cheesbrough [16] and Mukherjee [17].

3. Results
Table 1: Malaria distribution is shown based on age and sex groups. Ages between 1-5, 12 males together with 12 females were tested in which 3(3.1%) and 2(2.1%) were infected with malaria parasite respectively. Also in ages range of 6-10, 10 males and 11 females were tested out of which 8(8.2%) males and 5(5.1%) female were positive respectively. Between 11-15 years of age 21 males and 31 female were diagnosed of which 15(15.5%) males and 14(14.4%) female were positive respectively. In total 43 males and 54 females underwent the investigation. While 26(26.8%) males and 21(21.6%) females were infected

H_0: The malaria prevalence is independent of the sex
H_1: The malaria prevalence is dependent of the sex \( \alpha = 0.05 \)

Test statistic= \( X^2 \)-test
Critical region:Reject \( H_0 \) if \( X^2 \) calculation > \( \chi^2 \) table

Chi-square test was employed to calculate the overall distribution of plasmodium parasites by sex. This concluded that since the \( X^2 \) calculated=8.38 is greater than \( X^2 = 5.99 \), we reject \( H_0 \) and conclude that the prevalence of malaria is sex dependent for male and female at \( \alpha = 0.05 \) significance level and 2 degree of freedom respectively as shown below.

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Number Examined</th>
<th>Number Infected</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Female</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>1-5</td>
<td>12</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>6-10</td>
<td>10</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>11-15</td>
<td>21</td>
<td>31</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>54</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 1: Distribution of Malaria parasite infection according to Age and Sex groups

For Infected Males

<table>
<thead>
<tr>
<th></th>
<th>Observed (O)</th>
<th>Expected (E)</th>
<th>(Observed-Expected)</th>
<th>(Observed-Expected)^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>8.67</td>
<td>-567</td>
<td>32.15</td>
<td>8.38</td>
</tr>
<tr>
<td>8</td>
<td>8.67</td>
<td>-0.67</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>8.67</td>
<td>6.33</td>
<td>40.07</td>
<td>72.67</td>
</tr>
</tbody>
</table>

\( X^2 = \sum \frac{(O-E)^2}{E} = 72.67 \)

Degree of Freedom – df = n-1 (n=3)
3-1 = 2

\( X^2 \) tab @ 0.05 = 5.99
For Infected Females

<table>
<thead>
<tr>
<th>Observed (O)</th>
<th>Expected (E)</th>
<th>(Observed-Expected)</th>
<th>(Observed-Expected)²</th>
<th>E = E²/²</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>7.0</td>
<td>-5</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>7.0</td>
<td>-2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>7.0</td>
<td>7</td>
<td>49</td>
<td>78.0</td>
</tr>
</tbody>
</table>

\[X^2 = \sum \frac{(O-E)^2}{E} = \frac{78.0}{7.0} = 11.2\]

Degree of Freedom – df = n-1 (n=3)
3-1 =2
\[X^2\] Tabulated @ 0.05 =559
\[X^2\] =Chi-square
\[\Sigma\] = Summation
O = Observed frequency
E = Expected frequency

Table 2: Species of Plasmodium seen during diagnosis of children 1-15 years of age

<table>
<thead>
<tr>
<th>Variation in (ages)</th>
<th>1-5</th>
<th>6-10</th>
<th>11-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species of Plasmodium</td>
<td>No of Positive</td>
<td>%</td>
<td>No of Positive</td>
</tr>
<tr>
<td>Plasmodium falciparum</td>
<td>5</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Plasmodium malariae</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plasmodium ovale</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plasmodium vivax</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Examined number</td>
<td>5</td>
<td>20</td>
<td>13</td>
</tr>
</tbody>
</table>

4. Discussion

This study has shown that the highest cases of malaria infection occurs in children between the ages range of 11-15 years old (Table 1). The reason for this group of individuals having this rate of infection may be due to the reason that children of these age range are expected to have a higher bite at the night by vectors that harbor plasmodium because they participate in more outdoor activities when compared with the little children. The findings of this study is in line with immediate past reports that says that the frequency of insecticide treated (ITNs) used were statistically significant among the youngest children, more especially those less than five (5) years of age and heads of the homes, and this may also be as a result of inadequate ITNs per household smith., et al. [18]. Hence, this study suggests that the number of ITNs accessible to household should be increase in order to attain world wide scope coverage in the affected communities. Likewise, another investigation shows that boys of the ages of puberty have the lowest degree on the use of ITNs Garley., et al. [19]. Previously, studies in Abia and Plateau reveals that occurrence of plasmodium infection was not in relation with age, with the high intensity among children between ages of 5-9 years Noland., et al. [20]. On the opposite recent investigation was carried out among the Kenyans school children and it was found out that plasmodium falciparum infection declines with increase in age, and those with age between 11-15 years had 0.78 odds of infection compared with those aged 5-10 years Kepha., et [8] WHO/UNICEF (2005) world malaria report. WHO Geneva, Switzerland

5. Conclusions

The research result of 97 children (1-15 years old) sample size, 47(48.4%) had malaria parasite infection, out of which children between 11-15 years of age were found to have the greater percentage (29.9%) of parasitic infection, this was followed by 6-10 and 1-5 years age groups respectively as revealed in Table 1. The highest causative agent was plasmodium falciparum which was shown in Table 2. In order to prevail on the present menace of infection these recommendations are made; Health education sensitization campaign to impact knowledge that may lead to reduction of reservoirs of malaria infection. Subsidized and free ITNs should be accessible to mothers, this will enhance malaria control among all categories of children. More health personnel should be recruited by the government in order to further equipped the health facilities in the rural areas so as to further increase control and prevention rate of this parasitic infection

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