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## PREVALENCE OF MALARIA PARASITE INFECTION AMONG CHILDREN ATTENDING PAEDIATRICWARD, UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL, MAIDUGURI, NIGERIA

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### ABSTRACT

Malaria is a major cause of morbidity and mortality, particularly among children under 5 years and pregnant women especially in Africa. In this cross-sectional study of 100 children, consisting 65 male and 35 female, aged 0-15 years were enrolled. Thick blood films were prepared from a finger prick of each of the patients, stained and examined for malaria parasite using a microscope. The overall prevalence rate of the malaria parasite infection was 57.0%. The prevalence rate of 60.0% and 51.4% were obtained among male and female subjects respectively. The infection was found to be most prevalent among 0-5 years (71.4%), while 6-10 years and 11-15 years have 37.5% and 23.1% respectively. In relation to the educational status of the mothers, the prevalence rate of the infection was lower (40.0%) among children whom mothers were educated up to tertiary levels compared to mothers who had only primary, secondary and non-formal education 75.0%, 63.0% and 62.0% respectively. Therefore, government should control the vector and provide Insecticide treated nets to protect children from mosquito bite.

### KEYWORDS

Malaria parasite infection, Protect children and Awareness on malaria infection.

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### INTRODUCTON

Malaria is a life-threatening mosquito-borne blood disease caused by a *Plasmodium species*. The parasite transmitted to humans through the bite of the *Anopheles* mosquito, which carry infective sporozoite stage of *Plasmodium* parasite in their salivary glands. It is one of the biggest impediments to progress in Africa and is the biggest killer in Africa, with 90% of the global malaria deaths occurring on this continent (Isa et al., 2015)<sup>1</sup>. There are 5 parasite species that cause malaria in humans:

*Plasmodium vivax*, *P. malariae*, *P. ovale*, *P. falciparum* and *P. knowlesi* (Brooks *et al.*, 2010)<sup>2</sup>. Two of these species *P. falciparum* and *P. vivax* pose the greatest threat. *P. falciparum* is the most prevalent malaria parasite on the African continent. It is responsible for the mortality and morbidity of all malaria-related disease around the globe. However, *P. vivax* is the most widely distributed *Plasmodium species* in non-sub-Saharan Africa. Malaria is transmitted through the bites of infected female Anopheles mosquitoes. When this mosquito bites, the parasite is released into the blood stream. Once the parasites are inside the body, they travel to the liver, where they mature. After several days, the mature parasites enter the bloodstream and begin to infect red blood cells. Within 48 to 72 hours, the parasite multiplies inside the red blood cells, causing the infected cells to burst. In a non-immune individual, symptoms usually appear 10-15 days after the infective mosquito bite. The symptom which appear at the initial stage of malaria disease, include fever, headache, and chills, although this may be mild and will not be consider as malaria at the early stage. If not treated within 24 hours, *P. falciparum* malaria can progress to severe illness, often leading to death (Brooks *et al.*, 2010)<sup>2</sup>. Chronic malaria infection in children exhibit one or more symptoms which include: severe anaemia, respiratory distress in relation to metabolic acidosis, or cerebral malaria. In adults, multi-organ involvement is also frequent. In malaria endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur. The estimated number of malaria deaths stood at 445 000 in 2016, a similar number to the previous year (446 000) in 2015 (WHO 2017)<sup>3</sup>. In areas with high transmission of malaria, the majority of the cases (65%) occur in children under 15 years old (Nadjim *et al.*, 2012)<sup>4</sup>. The burden of malaria is greatest among the developing countries with only 0.2% of global malaria deaths found in the developed countries (Gwatkinand Guillot, 2012)<sup>5</sup>. Therefore, this study was aimed to determine the prevalence of malaria among paediatrics attending University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Borno State.

## MATERIAL AND METHODS

### Study Area

The study was carried out at the Emergency Paediatrics Unit (EPU) of UMTH, Maiduguri, Borno State, Nigeria. Borno State is situated in the North -Eastern part of Nigeria, which lies between latitude 10<sup>0</sup>N and 13<sup>0</sup>E. It shares boundaries with the Republic of Niger to the North, Chad to the North-East and Cameroon to the East. It also shares boundaries with Adamawa to the South, Yobe to the West and Gombe to the South West. Borno state has an area of 69, 435 square kilometers about 7.69% of the total land area of the country. The state has a total population of 4,151,193, and a population density of approximately 60 inhabitants per square meter (NPC, 2006, Isa *et al.*, 2015)<sup>6</sup>.

### Study population

The study was carried out on children attending the University of Maiduguri Teaching Hospital (UMTH), Maiduguri. The study population consists of male and female patients attending the hospital.

### Ethical Approval

Ethical approval to undertake the study was obtained from the ethical committee of the University of Maiduguri Teaching Hospital. Verbal consents were obtained from children's parents or caregivers.

### Collection and processing of samples

Thick films were prepared on grease free slides using a sterile lancet. Numbers were allotted to every participant at the point of entry and was used for identification of slides and questionnaire from the same patient. Each slide was subsequently stained with Field stain A and B solution for 8 second. All blood smears were examined microscopically under x100 oil immersion. The thick smears were used for diagnosis of *Plasmodium* specie. Smears were considered negative if no parasites were seen in x100 oil-immersion fields.

### Statistical analysis

The data obtained from questionnaires and laboratory analysis was analyzed using Statistical Package for Social Sciences version 20. Pearson Chi-square was calculated at 95% confidence interval and p-value < 0.05 was considered significant to determine the presence of the parasite and socio-demographics variable such as gender,

age, preventive methods and educational status of the mother/caregiver.

## RESULTS

A total of 100 children consisting 65 male and 35 female were enrolled and the overall prevalence was 57.0% (57/100). The present study revealed that malaria parasite infection was more prevalent in male (60.0%) than in their female counterparts (51.4%) as shown in Table No.1.

It was observed that children between the ages of 0 - 5 years had the highest prevalence 45(71.4%) of the infection when compared with the other age groups 6-10 years and 11-15 years where the prevalence of 37.5% and 23.1% respectively were obtained (Table No.2).

Based on the preventive measure, those using Insecticide Treated Nets (ITN) and Insecticide spray have lower infection rates of 56.7% and 40.0% respectively. Higher infection rate of 80.0% was observed among patients covering their body as the means of prevention method (Table No.3).

Based on educational status, prevalence of 75.0%, 63.9%, 40.6% and 62.5% were obtained among mothers who had primary, secondary, tertiary and non-formal education (Table No.4).

## DISCUSSION

The malaria parasite is a devastating parasite cause by *Plasmodium species* and its most prevalent tropical disease with high morbidity and mortality (Isa et al., 2015)<sup>1,6</sup>. This study was carried out during the onset of rain. The mosquitoes are more vicious at the onset of rain as they get ample breeding grounds near homesteads. The prevalence of 57.0% obtained in this study is similar to 58.8% reported by Etusim et al. (2013)<sup>7</sup> from Abia and 62.7% by Olasehinde et al. (2007)<sup>8</sup> from Ogun, Nigeria. In this study, it was observed that children between the ages of 0-5 years had the highest prevalence rate (Table No.2). This may be due to the fact, their immunity to parasitic infection has not been fully developed (CDC, 2012)<sup>9</sup>.

Although it has been established that residual immunity derived from mothers could be very effective in younger children but environmental conditions and inability of children of this age to overcome the mosquito attacks made them vulnerable to the malaria parasite infection. The prevalence of the infection has been found to reduce with other age group (6 - 10 and 11 - 15 years) this could be attributed to the fact that children of this age have developed immunity against *Plasmodium parasite*. (Brown, 2008)<sup>10</sup>. The present study has shown that *Plasmodium* infection were more common in the male than in the female subjects (Table No.1). The result is in conformity with the work of Nmadu et al, (2012)<sup>11</sup> who reported higher values in male than in female. However studies have shown that females have better immunity to parasitic diseases and this was attributed to genetic and hormonal factors (Krogstad, 2006)<sup>12</sup>. In this study, higher infection rate 80.0% was observed among patients covering their body as the means of prevention. Vector control is the main way to prevent and reduce malaria transmission. If coverage of vector control interventions within a specific area is high enough, then a measure of protection will be conferred across the community. World Health Organization recommended protection for all people at risk of malaria with effective malaria vector control. Several studies in malaria endemic regions of the world have documented average reduction of 20% in all causes of mortality in children under five years old within two years of increasing insecticide treated nets (ITN) use from 0 to 50-70%. In this study, lower prevalence of the infection was obtained among children whom mothers were educated up to tertiary levels. Maternal education has an enormous effect, it has been found that the higher a mother's education, the lesser the chance their child been infected.

**Table No.1: Prevalence of malaria parasite infection among peditrics based on gender**

S.No	Gender	Total Number of Samples	Positive	Positive (%)
1	Male	65	39	60.0
2	Female	35	18	51.4
3	Total	100	57	57.0

(P-value =0.657)

**Table No.2: Prevalence of malariaparasite infection among peditrics based on age**

S.No	Age	Total Number of Samples	Positive	Positive (%)
1	0 – 5	63	45	71.4
2	6–10	24	9	37.5
3	11–15	13	3	23.1
4	Total	100	57	57.0

(P-value =0.153)

**Table No.3: Prevalence of malaria parasite infection among paediatrics based on preventive measure**

S.No	Prevention Methods	Total Number of Samples	Positive	Positive (%)
1	Insecticide Net	90	51	56.7
2	Insecticide Spray	5	2	40.0
3	Covering Body	5	4	80.0
4	Total	100	57	57.0

(P-value =0.519)

**Table No.4: Prevalence of malaria parasite infection among paediatrics based on educational status of mother**

S.No	Educational status	Total Number of Samples	Positive	Positive (%)
1	Primary	8	6	75.0
2	Secondary	36	23	63.0
3	Tertiary	32	13	40.6
4	Non-formal	24	15	62.5
5	Total	100	57	57.0

(P-value=0.136)

## CONCLUSION

The Prevalence was high in the population studied despite the various control measures. It was observed that children between the ages of 0 - 5years had the highest prevalence and the infection is more common in male than female. There is need to create awareness on malaria infection to mothers and other caregivers. Government should control the vector and provide Insecticide treated nets to protect children from mosquito bite.

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## CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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