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Research Paper

Screening of blood samples from school aged children (0 – 12 years) for the detection of plasmodia parasites in paikoro local government area, Niger state, Nigeria

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Abstract

This study was conducted to determine the prevalence of malaria among school aged children (0-12years) in 3 primary schools in paikoro local government area of Niger State. Two hundred and fifty (250) blood samples were collected from children in 3 primary schools in Niger State. The blood samples were screened for possible detection of malarial parasites, using thick and thin blood film techniques. One hundred and forty four blood samples were positive representing 57.6%. Male children recorded prevalence of 37.6%, while females had 20.0% prevalence. Similarly, children within the age group of <1-6 years recorded high prevalence of 48.8% compare to other age groups. Children living in rural areas recorded prevalence of 38.8% compared to those living in urban areas (18.8%). More proactive measures towards eradication of malaria parasites through vector control and treatment of infected individuals in Niger State and the country at large should be enforced.

Key words: Prevalence, *Malaria fever*, children, Plasmodium, parasite

Introduction

Malaria is the most prevalent tropical disease in the world today. Each year, about 650 million people are killed out of which majority are children [1]. Malaria in Nigeria is the leading cause of morbidity and mortality. Available records show that at least 50 percent of the Nigerian population suffers from at least one episode of malaria each year and this accounts for over 45 percent of all outpatient visits. It has also been documented that children visiting their country of origin import malaria from Nigeria and other hyper endemic countries to the low and non-endemic countries [2]. The disease is caused by protozoan parasites of the genus *Plasmodium*. The most serious forms of the disease are caused by *Plasmodium falciparum* and *Plasmodium vivax* [3]. The parasite is transmitted by female anopheles mosquitoes [4]. Consequences of severe malaria include coma and death if untreated. In endemic areas, treatment is often less satisfactory and the overall fatality rate for all cases of malaria can be as high as one in ten for reasons that are poorly understood. Children with malaria, frequently exhibit abnormal posturing, a sign indicating severe brain damage [5]. Malaria has been found to cause cognitive impairments, especially in children. Malaria causes wide spread anemia during a period of rapid brain development and also direct brain damage and this neurologic damage results from cerebral malaria to which children are more vulnerable [6]. Developmental impairments have been documented in children who have suffered episodes of severe malaria [3]. Therefore, this study was an attempt to determine the presence of malaria parasites in the blood of apparently healthy school aged children in Paikoro local government of Niger

State, Nigeria.

Materials and Methods

Description of the study Area: Paiko, is the headquarter of paikoro Local Government Area in Niger state. The Local Government Area is about 25km away from Minna, Niger state capital. Paiko is located on latitude 9.433 and longitude 6.633. The dominant ethnic group in Paikoro is the Gbagyis and Fulani's .The major occupation of the inhabitants is farming and cattle rearing..

Sample size determination: The sample size for this study was determined by the formula below.

$$\frac{t^2 \times P(1-P)}{m^2}$$ [7]

Where:
n = Sample size
t = Standard normal deviate at 1.96
p = prevalence of the disease (National prevalence)
m=marginal tolerable error at 0.05%

Sample collection : Blood samples were collected in accordance with the technique described by Ekpenyong et al. [8]. Using a disposable sterile syringes and needle, two milliliter of blood was collected from each of the 250 children between the ages of 0 - 12 years. The blood samples were transferred into clean sample bottles coated with anti-coagulant and were transported to Microbiology laboratory, Federal University of Technology, Minna for further analysis.

Preparation of slides and Microscopy: The procedure described by Ekpenyong et al. [8] for the preparation of thin smears and staining (Leishman) technique was followed. The smears of all the blood samples collected were prepared, fixed and stained with leishman reagents and left for 5 seconds and 2 minutes respectively. The stained slides were washed and air dried. The slides were examined at x100 objective lens and the results recorded

Results

Out of 250 blood samples collected, 144 blood samples were positive representing prevalence of 57.6%. Male children recorded a prevalence of 37.6% while the female children had 20% (Table 1).

Table 1
Prevalence of malaria infection among children according to sex

Sex	Number tested	Number of positive	Prevalence (%)
Male	152	94	37.6
Female	98	50	20.0
Total	250	144	57.6

Children within the age group of <1-6 years recorded high prevalence of 48.8% compare to other age groups (Table 2).

Table 2
Prevalence of malaria infection among children according to Age

Age (years)	Number tested	Number of positive	Prevalence (%)
<1 – 6	211	122	48.8
7 – 9	28	20	8.0
10 – 12	11	02	0.8
Total	250	144	57.6

Children that lives in rural areas had high prevalence (38.8%) compared to those that live in the urban areas (18.8%) (Table 3).

Table 3
Prevalence of malaria infection among children according to Location of residence

Location	Number tested	Number of positive	Prevalence (%)
Rural	130	97	38.8
Urban	120	47	18.8
Total	250	144	57.6

Discussion

Malaria has remains a major public health problem in developing countries of the world, particularly in Nigeria. In this study, the prevalence of malaria infection among school aged children in 3 primary schools in Paikoro Local Government area of Niger state was determined to be 57.6%. Similar study has been reported in Ota, Ogun State, Nigeria and the prevalence was 80.5% by Sotimehin et al. [9]. The high prevalence observed in this study and previous study could be attributed to poor sanitary condition of the environment coupled with ignorance about vector control particularly in the rural settings like paiko.
Male children recorded high prevalence compared to their female counterparts (Table1). Already Ekpenyong et al. [8] reported high prevalence of malaria among male children in ogun state. The higher prevalence of malaria among male children in this study makes the report comparable with the previous. However, chi square test revealed that sex was not a factor behind the high rate of infection with plasmodia (Table 4).

Table 4
Detection of malarial parasites in relation to demograghic information of the children

Factor	Number of positive blood samples	P-value
Sex		
Male	94	
Female	50	0.039
Age		
<1 – 6	122	
7 – 9	20	0.352
10 – 12	02	
Location of residence		
Rural	97	
Urban	47	0.039

Children within the age group of <1-6 years recorded high prevalence of 48.8% compare to other age groups (Table 2). Similar observations have been reported by Sotimehin et al. [9], where it was found that the rate was high in children within the age of < 1-9 years. This could be attributed to premature nature of the immune system. However, chi square test revealed that the hypothesis connecting age and the rate of the infection is not significant (Table 4).

The prevalence of malaria as observed in Table 3 was high among children from rural areas of the study area. This may be due to poor sanitary condition of the environment, poverty peculiar with most rural settings in Nigeria. Despite the prevalence observed in Table 3, chi square test indicated that the hypothesis linking *Plasmodium* infection rate with location of residence does not hold (Table 4).

Conclusion

From the findings of this study, it is apparent that infection with plasmodia parasites among school aged children in the study area is not associated with age, sex, location of residents etc as evident from the statistical analysis. Therefore, more proactive measures should be encouraged towards eradication of vector parasites and prompt treatment should be given to the infected children.

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