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PREVALENCE OF MALARIA INFECTION AMONG SCHOOL CHILDREN IN PANKSHIN LGA OF PLATEAU STATE, NIGERIA

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ABSTRACT :

One of the dreadful parasitic infections that ravages the lives of the very young and old in Sub-Saharan Africa is Malaria which is a serious public health problem. Hence, this study examined the prevalence of malaria infection among school children in Pankshin LGA of Plateau state. Nigeria. Blood samples were collected from 3000 participants between June 2024 - September 2024. Malaria parasites was determined from blood using Rapid Test Kit and the results were read after 15 minutes. The findings revealed that the overall prevalence rate of school children infected with malaria parasitaemia is 9(0.3%) under the study. Out of three thousand (3000) subjects screened for malaria infection 1,420 (0.4%) were male while 1,580 (0.1%) were female. In term of age 0(0%) were between the age group of 6 –10 years while 9 (0.7%) were between the age group 11-15. In conclusion, low malaria infection was recorded and this might be as a result of frequent prophylaxis or preventive treatment going on in the study area, supply of mosquito treated bed nets and fumigation by the government and the study area weather condition. The study recommends patients with suspected malaria cases should have prompt parasitological confirmation of diagnosis, with either microscopy or MRDT, policy makers and the government should channel more attention to health education, continuous supply of mosquito treated bed nets, put in place good health care facilities and employ trained medical personnel in the study area for complete eradication of the parasite.

Keywords: Prevalence; Malaria, Infection, school, and children

INTRODUCTION :

Malaria is a human disease that is caused by sporozoan parasites (genus *Plasmodium*) in the red blood cells (Abubakar *et al*., 2023) and transmitted by the bite of anopheline mosquitoes which are hematophagous and require blood meals from vertebrates (reptiles, birds, mammals and amphibians) to obtain nutrients to develop their eggs. It is characterized by periodic attacks of chills and fever (WHO, 2021). Malaria is also a life-threatening disease common in both the tropics and subtropics where it causes approximately 650 million morbidity and 2 million mortality yearly (WHO, 2021). It is caused by an obligate, intracellular, protozoon parasite of the genus *Plasmodium* and transmitted when female *Anopheles* mosquitoes take blood meal off their host (Aschale *et al.*, 2023)**.** Malaria is one of the oldest and the most frequently occurring infectious diseases in humans and the second leading infectious and deadly disease in Africa, after human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), and it is the first leading cause of death in Nigeria (Adamu *et al*., 2023). Malaria remains a global health problem despite concerted efforts towards complete eradication (WHO, 2021). WHO have reported that there were 212 million new cases of malaria worldwide in the year 2015 (i.e. range 148-304 million) with the WHO African region accounting for most global cases (90%), the south east Asia Region (7%) and the eastern Mediterranean region (2%) (Agidi *et al*., 2017). There were also estimated 429,000 malaria deaths (range 235,000-639,000). Statistics for these deaths trend as follows, African region (92%), the south east Asia region (6%) and the eastern Mediterranean (2%) (Abubakar *et al*., 2023).

Malaria symptoms typically includes fever, tiredness, vomiting, headaches, and in severe cases it cause yellow skin, seizures, coma, or death (Ahouandjinou *et al*., 2024). Symptoms usually begin ten to fifteen days after being bitten by an infected female anopheles mosquito, and when not properly treated, recurrences of the disease may arise months later. In those who have recently survived an infection, re-infection usually causes milder symptoms (WHO, 2021). This partial resistance disappears over months to years if the person has no continuing exposure to malaria. Splenomegaly, Hepatomegaly, Pulmonary Oedema, Renal failure, and others are complications of malaria (Adugna *et al.*, 2021). Five species of *Plasmodium* are known to cause malaria in humans especially, within the tropical areas of the world, these are *Plasmodium falciparum*, *P. vivax*, *P. ovale*, *P. malariae*, and *Plasmodium knowlesi* (Altahir *et al.*, 2022).

Transmission also depends on climatic conditions that may affect the number and survival of mosquitoes, such as rainfall patterns, temperature and humidity. In many places, transmission is seasonal, with the peak during and just after the rainy season. Malaria epidemics can occur when climate and other conditions suddenly favour transmission in areas where people have little or no immunity to malaria. They can also occur when people with low immunity move into areas with intense malaria transmission, for instance to find work, or as refugees (WHO, 2021).

In Nigeria, *P. falciparum* is the major cause of the disease (Baiden *et al.*, 2016). In 2015, there were approximately 212 million malaria cases and an estimated 4,290,000 malaria deaths globally (Bello *et al.*, 2019). The Sub-Saharan region experienced around 92% of these deaths, while mortality is concentrated around several high-risk groups which include pregnant women and infants (Bayil *et al.*, 2018). Malaria can be prevented through the use of mosquito insecticide-treated bed nets or through improved housing construction to prevent mosquito entry since malaria is transmitted through the bites of female *Anopheles* mosquitoes (Belquis *et al.*, 2020). There are more than 400 different species of *Anopheles* mosquito; around 30 are malaria vectors of major importance. All of the important vector species bite between dusk and dawn. The intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment (WHO, 2021).

MATERIAL AND METHODS :

Study population

The study population consisted of school children of ages between 6 to 15 years because they form most accessible age group and most vulnerable to malaria infection in our community. A sample of 3000 school-aged children were used for the study. A questionnaire was administered to survey the pupil's data such as age, sex, and occupation of parents or guardians. Ethical approval for the study was granted by the Parents. Those who refused to give consent were excluded from the study.

SAMPLE COLLECTION :

Blood Specimen

To determine malaria parasites from blood using Rapid Test Kit.

PROCEDURE:

CareStart and First Response Malaria HRP2 (Pf) was used. The cassette was removed from its pouch, and placed on a flat surface. The end of the finger will be cleansed with a sterile swab and dried with a clean tissue.

With a lancet the end of a finger (at the side) was carefully pricked and squeezed gently to increase blood flow. The end of the capillary tube was applied to the blood flow to draw blood into the tube. The blood automatically flowed into the plastic capillary tube. It was ensured that the plastic capillary tube is filled to its line, by holding the capillary tube in a vertical position, the blood from the capillary tube will be immediately apply into the center of the cassette sample well by pressing the end of the tube onto the absorbent paper in the well. The specimen was allowed to absorb for 30 seconds before adding the reagent, 2 drops of the reagent will be added into the sample. Results will be read in 5 – 10 minutes for strong positives and 15 minutes for weaker positives and to make sure negatives are confirmed. The results were read after 15 minutes. If the membrane does not clear sufficiently after 2 minutes, one more drop of reagent will be added to the (sample) well of the cassette.

RESULTS :

4.1. Prevalence of Malaria Infection in Sampled Schools

A total number of 3000 pupils were screened for malaria parasites, out of which 9(0.3%) were malaria positive using the rapid diagnostic test (MRDT). The highest rate of infection was recorded site 2 with 5(0.7%), site 4 followed with 2(0.3%), the least infection was recorded site 1 and 3 with 1(0.1%). The difference in the infection rate within the schools was not statistically significant ($\chi^2 = 4.778$, df = 3, P = 0.189, Table 1).

Out of the 3000 children, 7(2.33%) were male and 2(0.06%) were female. As reflected in Table 2. The highest prevalence was observed among the male students. Table 2 attests to this. In term of age 0(0%) were between the age group of 6 –10 years while 9 (0.7%) were between the age group 11-15. The difference in the infection rate within the gender was not statistically significant ($\chi^2 = 2.778$, df = 1, P = 0.096) while difference in the infection rate within the age group was statistically significant ($\chi^2 = 18$, df = 2, P = 0.000).

Table 1: Prevalence of *Plasmodium* Infection in Sampled Schools

Schools	**No. Sampled (n)**	**MRDT (%)**
Site 1	800	1(0.1)
Site 2	700	5(0.7)
Site 3	800	1(0.1)
Site 4	700	2(0.3)
Total N (%)	**3000**	**9(0.3)**

($\chi^2 = 4.778$, df = 3, P = 0.189)

N= total number sampled and n= number sampled per a site

Table 2: Distribution Of Malaria Parasites According to Age Group and Gender

AGE GROUP (YRS)	MALE INFECTED (%)	FEMALE INFECTED (%)	TOTAL NO EXAMINED	TOTAL INFECTED (%)
1-5	0	0	0	0(0)
6-10	0(0.0)	0(0)	1,822	0(0)
11-15	7(0.5)	2(0.1)	1,178	9(0.76)
T0TAL	7(2.33)	2(0.06)	3000	9(0.3)

Between gender = (χ^2 = 2.778, df = 1, P = 0.096)
Between Age = (χ^2 = 18, df = 2, P = 0.000)

Table 3: Socio-Demographic Characteristics of the Study Population

EXPOSURE FACTORS	**EXAMINED NO = 3000**	**INFECTED N =9 (%)**
AGE GROUP(yrs)		
6-10	1822	0(0)
11-15	1178	9(0.3)
MALES	1420	7(0.4)
FEMALE	1580	2(0.1)
FARMERS	1740	5(0.2)
CIVIL SERVANTS	510	0(0)
BUSINESS	750	2(0.2)
PIT	1500	5(0.3)
MODERN	920	0(0)
BUSH	580	2(0.3)
PRIMARY	998	0(0)
SECONDARY	876	0(0)
UNIVERSITY	504	0(0)
ILLETRATE	622	7(1.1)

DISCUSSION :

Malaria prevalence remains high in Nigeria despite concerted efforts towards its control and eradication. However, the results of the present study shows that the overall prevalence of malaria was 9(0.3%) out of the 3000 sampled participants using the rapid diagnostic test (MRDT). This revealed a relatively low malaria infection among children in Pankshin Local Government Area of Plateau State. This might be as a result of frequent prophylaxis or preventive treatment going on in the study area, supply of mosquito treated bed nets and fumigation by the government and the study area weather condition. This finding agrees with the of Adino *et al.* (2021) who carried out analysis of the five-year trend of malaria at Bichena and recorded a low prevalence of 9.28% and attributed the low prevalence and transmission of the malaria parasite to the climatic and ecological weather conditions and frequent preventive treatment. Also, Molla and Ayele (2015), who reported prevalence of 7.1% in a study conducted in Dilla and attributed the low prevalence to frequent supply of mosquito treated bed nets and health education in the study area.

However, the present study contradicts with the studies of Oladosu, and Oyibo (2013) who carried out a study on the prevalence of malaria parasite among asymptomatic primary school children in Angiama Community Bayelsa State with 63.30%, report of Mengistu and Solomon (2015) carried out on the prevalence of malaria in children under five years in Arsi with 22.8% prevalence rate, Mordi and Ngwodo, (2007) who studied blood parasites on school pupils in Edo State with 35% and Osidoma *et al*., (2023) who carried out a study on mosquitos' composition and malaria transmission in some communities in Doma Local Government Area of Nasarawa State, Nigeria and recorded 77.4% in Doma. The high prevalence could be attributed to the environment which present with mining and quarry sites leading to stagnant waters due to poor drainage system which encourage vector breeding. This

is also supported by the studies of Orsborne, *et al*., 2021, who reported 55% with similar prevalence. However, malaria is quite a deadly disease for children under 5 years, who may have low malaria parasite densities between 1-500 parasites/µL that can easily progress to death in a malaria-naive infant (Ombugadu *et al*., 2020).

Gender is another important factor that determines the prevalence of malaria in a population (Oluwaseun *et al.*, 2021). The prevalence of *plasmodium* parasites in relation to the sex of pupils recorded a higher prevalence in males as compare to the female subjects. This agrees with the findings of Awosolu *et al*. (2021) who made a cross-sectional study of the prevalence, density, and risk factors associated with malaria transmission in urban communities of Ibadan and recorded 44.3% for males, while females represented 55.7%. The higher prevalence recorded in males may be due to the reduced movement restrictions given to the male children than the female children, especially at dusk or the evening hours.

According to Orsborne *et al.* (2021) age is an important factor that determines prevalence of malaria. In term of age 0(0%) were between the age group of 6 –10 years while 9 (0.7%) were between the age group 11-15. From the study, age group 11-15 had the highest prevalence rate. This result agrees with the findings of Aschale *et al*. (2023) who studied Prevalence of malaria and associated risk factors among asymptomatic migrant laborers in Ethiopia with 18.4%. The low prevalence reported among subjects within age range 6-8 agrees with Worku *et al*. (2014) who conducted a study in Ethiopia among asymptomatic school children with 6.8%.

CONCLUSION :

In the present study, low malaria infection was recorded 9(0.3%) and this might be as a result of frequent prophylaxis or preventive treatment going on in the study area, supply of mosquito treated bed nets and fumigation by the government and the study area weather condition. The prevalence of *plasmodium* parasites in relation to the sex of pupils recorded a higher prevalence in males as compare to the female subjects. 11-15 years age group had the highest prevalence rate.

RECOMMENDATIONS :

1. Policy makers and the government should channel more attention to health education, supply of mosquito treated bed nets, put in place good health care facilities and employ trained medical personnel in the study area so as to eradicate the parasite in the study area completely.
2. Other Local Government Areas in Plateau State and other state of the country should learn from Pankshin LGA of Plateau State by providing free treatment mosquito nets, preventive treatment, health education and even frequent environmental fumigation exercise in order to mitigate the wide transmission of mosquitoes in the environment.
3. Patients with suspected malaria cases should have prompt parasitological confirmation of diagnosis, with either microscopy or MRDT.
4. Health education on mosquito prevention and use of chemoprophylaxis before and during travel to rural areas is important and recommended.

CONFLICT OF INTEREST :

The authors declared no conflict of Interest

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