



Prevalence of Malaria among Patients Attending Aisha Muhammadu Buhari General Hospital Jega, Kebbi State, Nigeria

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ABSTRACT

This study was conducted to determine the prevalence of malaria parasites among patient attending Aisha Muhammadu Buhari General Hospital Jega, Kebbi State. A total of 199 samples were examined, 170/199(85.4%) were recorded positive to different plasmodium parasite and 29/199(14.6%) were negative. The highest prevalence 74/80(92.5%) was recorded between the age-group of 21-30 years old and the lowest prevalence 3/8(37.5%) was recorded between the age-group of 41-50 years old. The prevalence of Plasmodium infection in relation to gender of the patients. The highest prevalence 104/113(92.03%) was recorded in female and the least 66/86(76.74%) was recorded in male. However, the difference was not statistically significant at ($P>0.05$). The risk factor that determine plasmodium infection among patient in the study area, include the following: Educational Status, Occupation, Type of House, Bushes close to House, Treatment of Malaria Infection, Prevention mosquito bit and Type of water bodies/pool close to house. In conclusion, the high prevalence of plasmodium infection could be attributed to environmental factors such as altitude and rainfall and poor sanitation, which promote the intensity of mosquitoes breeding and transmission.

ARTICLE INFO

Article History

Received: September, 2021

Received in revised form: October, 2021

Accepted: December, 2021

Published online: January, 2022

KEYWORDS

Prevalence, Malaria, Infestation, Patients,
General Hospital, Jega.

INTRODUCTION

Malaria is a mosquito-borne infectious disease of human and other animal caused by parasitic protozoans of the genus plasmodium. Commonly, the disease is transmitted via a bit from an infected female *Anopheles* mosquito, which introduces the organism from its saliva into a person's circulatory system. In the blood, the protists travel to the liver to mature and reproduce. The presentation may include headache, fever, and shivering, joint pain, vomiting, hemolytic anaemia, and jaundice, haemoglobin in the urine, retinal damage, and convulsions and in severe cases can progress to coma or death. The disease is widespread in tropical and subtropical regions in a broad band around the equator, including much of sub-Sahara Africa, Asia, and the Americas (Layne *et al.*, 2014). Five species of Plasmodium can infect and be transmitted. The vast majority of deaths are caused by *P.*

falciparum and *P. vivax*, while *P. ovale*, and *P. malariae* cause a generally milder form of malaria that is rarely fatal (Sutherland *et al.*, 2015). The zoonotic species *P. knowlesi*, prevalent in Southeast Asia, causes malaria in macaques but can also cause severe infection in humans (Singh *et al.*, 2014). Malaria is prevalent in tropical and subtropical regions because rainfall, warm temperature, and stagnant waters provide habitats ideal for mosquito larvae. The World Health Organization has documented 219 cases of malaria in 2010, that year, the disease killed between 660,000 and 1.2 million people many of whom were children in Africa (Murray *et al.*, 2016), the actual number of death is not known with certainty, as accurate data is unavailable in many rural areas, and many cases are undocumented. Malaria is commonly associated with poverty and may also be a major hindrance to economic development (Worrall *et al.*, 2015).



Malaria fevers is a diseases that is still of major public health problems due to the high morbidity and mortality figures associated with it especially in sub-Saharan Africa where misdiagnosis and treatment failures pose a significant challenge in the management of these disease. It is common place today to see patients being concurrently treated for malaria largely because of reliance on symptomatology instead of laboratory confirmed diagnosis. Malaria have been tagged as one of the world most deadly and life threatening parasitic diseases especially in tropical and subtropical regions of the world. The causative agents of malaria is a unicellular obligate protozoan parasite of the genus *Plasmodium* and four major species responsible for malaria are *Plasmodium ovale*, *P. vivax*, *P. falciparum*, *P. malariae* (pam *et al.*, 2015).

On the global scale, malaria is one of the main causes of morbidity and mortality affecting people of all age groups and gender especially children in endemic areas such as Nigeria. It poses a major challenge to human capital and economic development among other factors (Okoli and Solomon 2014). Different methods of treatment of malaria has been reported previously and new methods of treatments are daily coming up due to modern techniques of understanding drugs and the parasite mode of resistance to these drugs continues daily (Olowe, 2016). Quinine which has been used for more than three centuries is one of the four main alkaloids found in the bark of cinchona tree, and it's the only drug which over a long period of time has remained largely effective for treating the disease, partly because of undesirable side effects. It is used for treating severe *Falciparum* malaria (Newton *et al.*, 2017). Chloroquine was first used in the 1940 shortly after the Second World War, is a low cost drug but very effective for treatment and prophylaxis. It was used in curing all forms of malaria, with few side effects when taken in the prescribed dose, Unfortunately most strains of *falciparum* malaria are now resistant to chloroquine (Meerman *et al.*, 2015).

Methods used to prevent malaria include medications, mosquito elimination and the prevention of bites. The presence of malaria in an area requires a combination of high human

population density, high anopheles mosquito population density and high rates of transmission from humans to mosquitoes and from mosquitoes to humans. In areas where malaria is common, children under five years old often have anaemia which is sometimes due to malaria. Giving children with anaemia in these areas preventive anti-malarial medication, improves red blood cell levels slightly but did not affect the risk of death or need for hospitalization (Athuman *et al.*, 2015).

MATERIALS AND METHODS

The study was carried out between December and January 2021 at Aisha Muhammadu Buhari General Hospital, Jega Local Government Area, Kebbi State, Nigeria. Jega Local Government Area is located between Latitude 12° 13' 19.88" N and Longitude 4° 22' 46.67" E of Kebbi State in the Sudan savanna ecological zone, Northern Nigeria. Jega is characterized by erratic and scanty rainfall that last for about five months. The climate of the area is semi-arid with average rainfall of about 550mm-650mm per annum. The relative humidity ranges from 21-48% and 51-83% during dry and rainy seasons, respectively. The temperature average is between 41°C during dry season and 25-41°C during rainy season. The predominant occupation of the people of Jega are Farming and fishing, the majority of the people are Muslims and Hausa/Fulani by tribe.

Permission to carry out the research was obtained from Kebbi State Ministry of Health and from the Chief Medical Director Aisha Muhammadu Buhari General Hospital, Jega. The study participants were patients attending Aisha Muhammadu Buhari General Hospital Jega, Kebbi State.

The study design was cross sectional in nature. The subjects included patients of different ages, sexes, reporting to the Hospital. The patients were directed to the Hospital Laboratory for blood screening for malaria parasites. All individuals that are willing to participate were recruited for the survey. Sampling was done based on the availability of the individuals at a given period of time, 25 to 30 samples were analysed every day.

Demographic information, socioeconomic status and other risk factors



associated with malaria infection from each that volunteered was assessed. In the case of patient, the mother or persons that brought them were interviewed to obtain the information. The questionnaires were administered using a face to face interview approach and was collected back immediately.

The blood samples were collected daily between 8am to 4pm and syringe was used to collect five milliliters (5ml) of whole blood using standard technique of vein puncture and transferred into ethylene diamine tetra acetic acid (EDTA) bottles, allowed to properly mixed and samples properly labeled, to tally with the questionnaire and transported to Zoology Laboratory in the Department of Animal and Environmental Biology Aleiro, for further analysis.

Thick and thin blood smears were prepared together on a single slide from the blood collection in the EDTA bottles. All slides were arranged on slide rack then covered by using Giemsa solution (diluted 1/10) for 25 minutes then

washed by using tap water. The slides were dried on the top of tray at the same time by protecting slides from dust and flies. This was followed by microscopic examination using oil immersion. The parasites were identified using the chat of (Guidelines, 2010). At x40 and x100 objective lens of the microscope (WHO, 2014).

Data was analyzed using statistical package for social sciences (SPSS) version 26.0 (Chicago, USA). The sample data was analyzed using descriptive statistic and Chi-square (X^2)

RESULTS

Table 1 presented the Prevalence of plasmodium parasites among patients attending Aisha Muhammadu Buhari General Hospital Jega. A total of 199 samples were examined, 170(85.4%) were recorded positive to different plasmodium parasite and 29(14.6%) were negative respectively. The prevalence of malaria was not statistically significant ($p=1.00$).

Table1: Prevalence of plasmodium parasites among patients attending Aisha Muhammadu Buhari General Hospital Jega

Patient	No. Examined (%)	Total	P-value
No. Positive	170(85.4%)	170	1.000
No. Negative	29(14.6%)	29	
Total	199(100%)	199	

$X^2=0.000$ DF=1

The prevalence of Plasmodium infection in relation to age group of patients. The highest prevalence 74/80(92.5%) was recorded between the age-group of 21-30 years old, and the lowest

prevalence 3/8(37.5%) was recorded between the age-group of 41-50 years old respectively. However, the difference was not statistically significant ($p=0.944$) (Table 2).

Table 2: Prevalence of Infection in Relation to Age-group of Patient

Age	No. Examined	No. Infected	(%) Prevalence	P-Value
1-10	13(6.53%)	10(5.88%)	76.92%	0.944
11-20	66(33.1%)	56(32.9%)	84.84%	
21-30	80(40.2%)	74(43.5%)	92.50%	
31-40	32(16.1%)	27(15.9%)	84.37%	
41-50	8(4.02%)	3(1.80%)	37.5%	
Total	199(100%)	170(100%)	85.42%	

$X^2=2.841$ DF=8

The prevalence of Plasmodium infection in relation to gender of the patients. The highest prevalence 104/113(92.03%) was recorded in

female and the least 66/86(76.74%) was recorded in male respectively. However, the difference was not statistically significant ($p=0.393$) (Table 3).



Table 3: Prevalence of Infection In Relation To Sex of the Patient

Sex	No. Examined	No. Infected	(%) Prevalence	P-value
Male	86(43.2%)	66(38.8%)	76.74%	0.393
Female	113(56.8%)	104(61.2%)	92.03%	
Total	199(100%)	170(100%)	85.42%	

$\chi^2=0.730$ DF=1

The risk factor that determine plasmodium infection among patient in the study area, include the following: Educational Status, Occupation, Type of House, Bushes close to

House, Treatment of Malaria Infection, Prevention mosquito bit and Type of water bodies/pool close to your house.

Table 4: The risk factors Associated Plasmodium Infection.

Risk Factors	Frequency	Percentage (%)	Positive Case	P-value	Odds Ratio
Education					
Educated	92	46.2%	49	0.998	1.0000
Not Educated	107	53.8%	121		
Occupation					
Civil servant	38	19.0%	9	0.999	2.6389
House wife	69	34.7%	93		
Farmer	51	25.6%	55		
Trader	41	20.6%	13		
Type of house					
tharf house	100	50.3%	126	1.000	1.0000
Cement building	99	49.8%	44		
Bushes close to house					
Yes	109	54.8%	145	1.000	1.0000
No	90	45.2%	25		
Treat malaria					
Visit hospital	56	28.1%	22	1.000	1.0000
Self-medication	83	41.7%	109		
Use of herbs	60	30.2%	39		
Prevent mosquito bit					
Use of mosquito net	30	15.0%	45	1.000	1.0000
Close doors and windows	63	31.7%	62		
Use of coil	73	36.7%	39		
Spraying insecticides	33	16.6%	24		
Stagnant water/pool close to your house					
Yes	107	53.8%	139	0.921	1.0000
No	92	46.2%	31		



DISCUSSION

Females had higher prevalence to *Plasmodium falciparum* infection than male. This may be due to the fact that most females who perform most of the house chores are the ones who fetch water from polluted water bodies like wells and streams thus making them highly vulnerable to the infection. The risk factor that determine plasmodium infection among patient in the study include the following female has a prevalence and majority of patient were less education on plasmodium infection the patient live in tharf house which exposed them to plasmodium infection. In this study it was observed that there high level of plasmodium infection among patient attending General hospital Jega. This could be due to socio-economic, demographic, and geographical location of the study area such as temperature that facilitates life of malaria vector. The number of persons infected by plasmodium infection is increased by due to low level of sanitation of the study area. The high rate of malaria prevalence in the blood samples examined was quite worrisome. This is a reflection of the high rate of asymptomatic malaria parasitaemia in endemic malaria regions. The malaria prevalence (69%) was higher than the findings of Eneanya (1998), who reported malaria prevalence of 59.8% in Udi community in Enugu state, South-eastern Nigeria and also that of Onyido *et al* (2010) who reported malaria prevalence of 62.0% in Umudioka community in Anambra State of Nigeria. Mbanugo and Ejims (2000) also observed a malaria prevalence of 58.3% among school children in Awka. It is far higher than the prevalence of 6% recorded by Ahmed *et al* (2001) among donor population in Maiduguri, north-eastern Nigeria. This high prevalence of malaria parasitaemia could be attributed to environmental factors such as altitude and rainfall and poor sanitation, which promote the intensity of mosquitoes breeding and transmission. Also, could be worsened due to their poor knowledge of methods for prevention/control of mosquitoes bites, hence malaria.

CONCLUSION

This study confirmed the presence of plasmodium parasites among patients attending Aisha Muhammadu Buhari General Hospital Jega.

It also showed that patients within the age-group of 21-30years old most susceptible to malaria infection, also patterns of distribution of the disease in different seasons and among different groups is in a very high rate. Females had higher prevalence to *Plasmodium falciparum* infection than male; this may be due to the fact that most females who perform most of the house chores are the ones who fetch water from polluted water bodies like wells and streams thus making them highly vulnerable to the infection. The risk factor that determine plasmodium infection among patient in the study include the following female has a prevalence and majority of patient were less education on plasmodium infection the patient live in tharf house which exposed them to plasmodium infection.

RECOMMENDATIONS

In order to minimize the prevalence of malaria Among Patients Attending Aisha Muhammadu Buhari General Hospital Jega the following recommendations are made based on the findings of the study.

1. In order to get a clear picture of the prevalence of malaria and the distribution of the parasite in particular, proper diagnosis methods should be established.
2. More attention to malaria control activities must be focused on the residence near to breeding sites with high prevalence that might relate to their exposure to mosquito breeding sites.
3. To give efficient services and save time, the malaria diagnosing laboratory should establish separately.
4. Laboratory diagnosis should be established in all health facilities found in a rural areas, the services provide at this level should be available free of charge.
5. All the information regarding to malaria should be registered in a good manner and documented separately.
6. Further research on the prevalence of malaria should be conducted to prevent and control of the series consequence of this disease, especially during malaria transmission.



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