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Prevalence of Malaria Infection in Yola-South L.G.A of Adamawa State

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Abstract: *Malaria and other mosquitoes borne diseases have caused a huge economic loss, mortality, low productivity and social discrimination. A total of 495 blood samples were collected from individuals within the study area and were examined for malaria parasite using a rapid diagnostic test strip, out of which 134(27.10%) were positive for malaria infection. Prevalence of malaria infection was observed to be more among males, 89(33.30%) compared to the female, 45(19.70%). The highest infection rate was recorded among subjects within age group 46-57,* 3 (42.86) *years, while 34-45, 4(12.10%) years old had the lowest prevalence rate. Prevalence of malaria infection based on location revealed that Anguwan Fulani, 14(32.60%) was the more affected and Upper Benue Staff Quarters, 9(6.72%) had the lowest infection rate. Prevalence of malaria infection in relation to months was observed that the month of August had the highest prevalence 62(33.20%), followed by the month of July, 42(26.90%), while the month of September was the least 30(19.70%), However, Chi-square statistical analysis showed a significant difference in the prevalence of malaria infection based on age, location and month in the study area. There is a need for timely sensitization awareness.*

Keywords: *Diseases, Malaria, Mosquitoes, Parasites, Prevalence,*

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I. Introduction

Malaria is a complex disease due to its complex transmission process. The complexity of the disease vector (the anopheles mosquito) is only articulated by the complex life cycle of the parasite (plasmodium). The sub- Saharan African region has the greatest number of people exposed to malaria transmission and the highest malaria morbidity and mortality rates in the world [11]. Malaria is known to have a negative impact on performance and learning in children [5]. It also aggravates anemia and malnutrition in children and pregnant women [8]. According to the World Health Organization [11], the number of annual malaria cases worldwide is actually decreasing, yet the impact of the disease burden remains an enormous challenge, for sheer numbers and threat to human life. Nigeria is one of Africa's hardest-hit, accounting for between 30 and 40 percent of malaria deaths on the continent [11]. This magnitude of occurrence in this part of the world correlates with poverty, ignorance and social deprivations in the community [11]. On the possible eradication of malaria, [3] opined that prevention is better than cure, advising that people should learn to maintain personal and environmental hygiene. Malaria is a major cause of morbidity and mortality in Nigeria [3]. It is endemic throughout the country with more than 90% of the total population at risk of stable endemic malaria. At least 50% of the population suffers from at least one episode of malaria each year and it is the commonest cause of outpatient attendance across all age groups [3]. Some categories of people are, however, at highest risk of infection. These include children aged less than 5 years, pregnant women, visitors from non-malarious regions and those with sickle cell anaemia.

II. Materials and Methods

This study was conducted in Yola-South Local Government Area of Adamawa State, Nigeria. Yola has a geographical coordinates of 9°12'0" North and 12°29'0" East. It is the capital city of Adamawa State, located on the River Benue. It has a population of 194,607. The study area lies within the Sudan savannah zone with marked dry and wet seasons. Yola has an annual rainfall from the months of April to October and a dry season from the month of November to March. Temperature drops in the rainy season especially in the month of July to October. The movement of the inter-tropical discontinuity, and associated zones of rainfall during the course of the year, is the major factor controlling rainfall and temperature variation in the study area. Temperature rises slightly after the rainfall ceases in the months of March-May and that could reach as high as 42°C. In the months

of December-February, the dry harmattan weather characterizes the area, which is cold and dusty. The movement of the wind by December sweeps across the study area and the movement continue eastward. Like most areas in northern Nigeria, the soil of Yola-South are derived from the basement complex rock, however, there is some alluvial soil along the Benue flood plains. The soil of the study area is loamy and it drains easily when it rains. The vegetation of Yola-South consists of short grasses and medium shrubs, more especially in the months of August and September during which the area records higher amount of rainfall.

2.1 Blood sample collection and Examination Malaria Parasite

The blood sample samples were collected from the study subjects using pricking techniques. Blood sample were examined for malaria parasite in all the study sites at the end of each month selected for this research. Rapid diagnostic test strip were used for malaria parasite diagnostic since it is suitable for large sample size. First response malaria Ag. *P. falciparum* (HRP2) card test was employed for the rapid diagnosis of *plasmodium falciparum.*

2.2 Statistical Analysis

The data obtained were analyzed using Chi-Square (χ^2) statistical analysis. $P<0.05$ was regarded as an acceptable level of significance and results obtained were represented in tables.

III. Results

A total of 495 persons from different households in the different communities and location within the study area were enrolled in the study for blood sample collection. Rapid diagnostic test card was employed for the diagnostic of the blood samples collected. Presence of a line on both the T (test region) and C (control region) on the test card indicates positive results. Examination of the samples showed that 134(27.07%) of the subjects were positive for malaria parasite. Prevalence of malaria infection by gender showed that males were the more infected 89(33.30%) compared to the females 45(19.70%) (TABLE 1). Chi-square statistical analysis showed that there was significant difference in the prevalence of malaria infection based on gender in the study area (p=0.039). Prevalence rate of malaria infection among subjects in relation to age were the age group between 1-10 year was 69(28.50%), 11-21 years 34(26.00%), 22-33 years 23(29.50%), 34-45 years 4(12.10%), 46-57 years 3(42.80%) and 58-69 1(25.00%). The highest infection rate was observed among the age group between 46-57 years 3(42.80%) and the lowest among 34-45 years 4(12.10%) (TABLE 1). However, Chi-square statistical analysis showed that there was no significance difference in the prevalence of malaria infection in relation to age group in the study area (p=0.894).Prevalence of malaria infection based on sites of location. Upper Benue Staff Quarters, Mbamba Mission, Rumde Jabbe, Anguwan Fulani and Mopol Barrack had infection rates of 9(6.72%), 41(29.50%), 32(25.6%), 14(32.60%) and 38(31.7%) respectively with Anguwan Fulani being the most affected while Upper Benue staff Quarter had the lowest infection rate (TABLE 2). When the values were subjected to statistical analysis there was a significant difference in the prevalence of malaria infection between the locations (p=0.026).Prevalence of malaria infection in relation to months showed that the month of August had the highest infection rates 62(33.20%), followed by the month of July 42(26.90%), while the month of September was the least 30(19.70%) (TABLE 2). Chi-square statistical analysis showed that there was a significant difference in the prevalence of malaria infection based on month in the study area (p=0.019).

Table 1: Prevalence of Malaria Infection based on Gender and Age

	Number of sample examined	Number (%) of positive sample
Gender		
Male	267	89 (33.30)
Female	228	45 (19.70)
χ^2=0.281,df=1, p(0.039)		
Total	495	134(27.10)
Age group (years)		
1-10	242	69 (28.51)
11-21	131	34 (26.00)
22-33	78	23 (29.50)
34-45	33	4 (12.12)
46-57	7	3 (42.86)
58-69	4	1 (25.00)
χ^2=1.66, df=1, p(0.04)		
Total	495	134 (27.10)

Table 2: Prevalence of Malaria Infection based on Location and Month

	Number of sample examined	Number (%) of positive sample
Location		
Upper Quarters	58	9 (15.50)
Mbamba Mission	139	41 (29.50)
Rumde Jabbe	125	32 (25.60)
Anguwan Fulani	43	14 (32.60)
Mopol Barracks	130	38 (31.70)
χ^2=5.260, df=1, p(0.026)		
Total	495	134(27.10)
Month		
July	156	42 (26.90)
August	187	62 (33.20)
September	152	30 (19.70)
χ^2=7.875, df=1, P (0.019)		
Total	495	134(27.10)

IV. Discussion

The result of this study revealed that malaria parasite infection is prevalent in the study area and that malaria parasitaemia washigher among the males than the female subject and it was statistically significant (P<0.05). This result agrees with the findings of [2] who recorded higher prevalence of Plasmodium infection in male than in female school children in Ebonyi and Edo States, Nigeria. Also, the result of this study agrees with the finding of [1] who in a study in Sokoto observed the prevalence of 30.24% in male and a prevalence of 21.47% in female. The higher prevalence of Plasmodium infection in males than in females may be attributed to the fact that males expose their bare bodies more than females especially when the weather is hot. Thus, such males are more likely to be bitten by mosquitoes. Females, on the other hand, are usually not exposing most parts of their bodies and tend to stay indoors, helping out with household chores. This reduced their contact with the mosquito vectors as pointed out. Also, studies have shown that females have better immunity to malaria and varieties of other parasitic diseases and this was attributed to hormonal and genetic factors [7]. [9]suggested that genetic factors could play a role by endowing females with immuno-regulatory potentials to cope better with some disease infections. Exception is found during pregnancy and reproductive ages, when females are more vulnerable to malaria attacks due to immune suppression [3]. Again, females prefer treating themselves at the onset of every infection. They visit medical centres and hospitals more than males who prefer enduring illness. Also, from the analyses of the study conducted, malaria prevalence measured in relation to sites of locations was statistically significant (P<0.05). Malaria infections were observed in all persons from different areas within the study location irrespective of the fact that the participants were apparently healthy.The total prevalence of malaria infection in all the five location is 27.10% which is close related with the findings of [1], who observed a total prevalence rate of 27.29% in Sokoto State. However the a prevalence rate (27.10%) of this study is far lower compare to the prevalence rate reported by [6] who in a comparative study of the prevalence of malaria infection in Aba and Umuahia urban areas of Abia State, observed that both Aba and Umuahia has a high prevalence rate of 93.33% and 80.39% respectively. The wide range of difference in the prevalence of malaria infection observed in Yola and in Aba/Umuahia could be due to some factors such as amount of rainfall, relative humidity, temperature, extent in urbanization, availability of breeding places of malaria vectors, overcrowded human populations and behavioral attitude of the inhabitants among others. Recently, several authors focused attention on urban malaria [4] and stressed the need to investigate risk factors for urban malaria. Although levels of transmission in urban areas may be lower than in contiguous rural areas, high population densities and possible lower immunity may result in more disease impact in urban settings. In addition, this study revealed that malaria prevalence was statistically significant in the various age groups (P<0.05). The result of this study showed that the older age groups (46-57 years) were more infected with a prevalence rate of 42.80% than the other age group. This result contradicts the findings of [1] who in a research conducted in Sokoto State reported a higher prevalence in children between the ages of 0-5 (43.77%) than in adult between 46and above (16.60%). However, the result of this study agrees with the finding of [10] who recorded higher prevalence among the older age groups in a similar study in Jos, Nigeria. The reason behind high rate of malaria in the adult age group could be due fact that during hot weathers, adults are mostly seen sleeping outdoors, sometimes for the whole night exposing themselves to the risk of mosquito bites. Children sleep indoors, properly covered and sometimes under bed nets. Some parents also give their young children anti-malaria drugs with multivitamin supplements as a prophylaxis especially during rainy seasons when rates of vector bites and malaria transmission are high. Also, this study revealed that malaria prevalence was statistically significant in relation to month (P<0.05). The result of this finding showed that the highest prevalence (33.20%) was recorded in the month of August than in other months. This agrees with the finding of [1] who in a research conducted in Sokoto observed highest prevalence (59.50%) of malaria in the month of August than in other months. The high prevalence of malaria in the month of August could be due to high amount of rainfall that creates mosquitoes breeding sites there by increasing the number of mosquitoes within and around house.

V. Conclusion

The findings showed that the prevalence of malaria is high among the participants in all the five study sites even though the rates differ depending on the location of the study sites, age of the participants, gender of the participants and the month employ for the parasitemia examination among the participants. Poor environmental condition favors mosquitoes breeding sites, hence the possible leading factor of the malaria infection. However, multi sectoral approach of attacking both the parasites and vectors of the diseases will definitely lead to a reduced rate of malaria and increase economic development of the communities. Also, there is a need for timely sensitization awareness on the need of taking malaria prevention measures and Environmental sanitization should be encouraged in all locality across the nation.

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