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PREVALENCE OF MALARIA INFECTION AMONG THE PUPILS IN SOME SELECTED COMMUNITIES OF SHINKAFI LOCAL GOVERNMENT AREA OF ZMFARA STATE, NIGEIA

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ABSTRACT

Malaria disease was reported annually to be the most dangerous and killer disease in Nigeria especially in poor communities who lacked knowledge for prevention and control of malaria infection. This study was conducted to investigate the frequency of malaria infection among pupils in Shinkafi Local Government of Zamfara State, Nigeria, some villages were selected from ten (10) district of Shinkafi local government using simple random selection, the blood samples were collected from four hundred (400) pupils from Badarawa, Jangeru, Kurya and Kware primary schools (100 blood samples from each) and analyzed using Rapid Diagnostic Test (RDT) kits. The results were analyzed using Multiple regression analysis to sort out any significant association at $P<0.05$, an overall prevalence of 64.5% was observed among the pupils; it was observed that pupils from Badarwa had significantly highest infection rate (71.0%) followed those from Jangeru (67.3%) then Kurya pupils (67.3%) and those from Kware had lowest prevalence (50.0%) ; similarly, male were highly infected (68.1%) than female (63.7%) with no significant association; pupils aged 4-8 had higher malaria infection rate (75.0%) followed by 9-13 age group (70.5%) then $\geq$14 age group (60.7%) with no significant association; it was reported that; pupils whose parents are fishermen had highest prevalence (67.1%) followed by children whose parents were farmers with 65.8% then those children whose parents were businessmen (55.6%) and lowest prevalence (54.3%) was observed among the children of civil servants, however, there was no significant association. Based on these findings malaria infection was found to be higher among the pupils in the study areas, therefore, urgent need for control measure is promptly need by the households, governmental and non-governmental organizations.

1.0 INTRODUCTION

Malaria is a parasitic disease spread by infected female Anopheles mosquitoes and caused by *Plasmodium* parasite (Diadier *et al.*, 2013; Robert and Boudin, 2013). Currently over 200 species of *Plasmodium* were recognized worldwide and new species continue to be described (Diadier *et al.*, 2013). Of the over 200 known species of *Plasmodium*, at least 11 species infect humans (CDC, 2015). However, other species were found to infect other animals, such as monkeys, rodents, and reptiles (Kuti *et al.*, 2011).

About 90% of all Malaria deaths in the world occur in Africa because the majority of infections in Africa are caused by *Plasmodium falciparum*, which is the most dangerous of the four human malaria species (WHO, 2012). It is also because the most effective malaria vector mosquito (*Anopheles gambiae)* is the most widespread in Africa and the most difficult to control (WHO, 2015).

Infection with Malaria is increasing in tropical areas due to climatic changes including high rainfall patterns, new development projects such as dams and agricultural irrigation works which causes higher environmental changes and allowed more conducive environment for mosquito breeding and malaria transmission (Gayawan *et al.*, 2014).

Symptoms of Malaria infection are non-specific, however, most commonly symptoms consist of fever, malaise, weakness, gastrointestinal symptoms (nausea, vomiting, and diarrhea), neurologic symptoms (dizziness, confusion, disorientation, and coma), headache, back pain, myalgia, chills, and/or cough (Ibeanu *et al*., 2012).

Malaria infection during the first five years of life is a major public health problem in tropical and subtropical regions throughout the world (Ogbodo *et al*., 2014). It has been estimated that about 3.3 billion pupils are at risk

of acquiring malaria, of these pupils, 86% in Africa are infected and nearly 1 million mostly Nigerian children died due to the infection (WHO, 2011). According to Tropical Disease and Research (TDR) (TDR, 2014). The disease accounts for 25 per cent of infant mortality and 30 per cent of childhood mortality in Nigeria thereby imposing great burden on the country in terms of pains and trauma suffered by its victims as well as loss in outputs and cost of treatments (Nnanyelugo, 2013).

Malaria is a risk for 97% of Nigeria's population. The remaining 3% of the population live in the Malaria free highlands. There are an estimated 100 million Malaria cases with over 300,000 deaths per year in Nigeria. This compares with 215,000 deaths per year in Nigeria from HIV/AIDS. Malaria also contributes to an estimated 11% of maternal mortality (Rogerson and Boeuf, 2013). Hence, this research was conducted to access the prevalence of malaria in Shinkafi local government, Zamfara

2.0 METHODOLOGY

2.1 Study Area

This study was carry out in some villages around Shinkafi, which is a Local Government Area in Zamfara State, Nigeria. Its Headquarters is in the town of Shinkafi at 13°03′00″N 6°29′004″E with an area of about 674mk^2 and population of 135,649. It shares boundaries with Isa Local Government Area (Sokoto State) and Niger Republic from the north, Zurmi Local Government Area to the South and South-East, Maradun Local Government Area and Raba Local Government Area (Sokoto State) by the west. Distance from the State Capital, Gusau is approximately 116 km. The selected communities are Badarawa (6.52N12. 89E), Kware (6.59N 12.97E), Kurya (6.65N, 12.98E) and Jangeru (6.49N 12.98E);. The unique landscape feature associated with these villages is that they are adjacently near rivers. The rivers are significantly seasonal even though they often flood the surrounding villages annually (September in every year) when the rainfall is at its peak, the average amount of rainfall in the areas fluctuates between 36 and 80 millimeters in a year, the people of the selected villages are predominantly Hausas and Fulanis, however other tribes such as Igbo, Yoruba, Tivs and Zabarmawa are also found (Kabiru, 2013). The vegetation is Sudan Savannah type characterized by plentiful short grasses of about 1.5 -2m and scarce short shrubs/trees that are hardly above 10m tall. The texture of the topsoil is sandy clay loam soil and average monthly dry season temperature is above 35^0 C but significantly drop in the harmattan periods which stretch from November to February. During this period, the ambient air mass is very dry and cold, dusty during the day and chilly at night. During this period night temperature can drop to as low as between 18 and 21^{o}C resulting in a relatively high diurnal range of temperature. In the rainy season months of July to September, temperature of about 22 -28^o C

2.2 Ethical Consideration

Written introduction letter was obtained from Head of Biological Sciences, Usmanu Danfodiyo University, Sokoto. Permission was also obtained from Zamfara State's Ministry of Health and Local Government Education Authority of Shinkafi Local Government, as well as district heads of communities and Head Masters of the Primary Schools. When seeking the consent from the research participants in each school, the objectives and procedures of the study were clearly explained to them in local language (Hausa). Participants were informed that they will be withdrawn from the study without any consequences as a result of any fault. Hence, signature or thumb-print was used to indicate that each participant and his guardians/parents agreed to participate before starting the survey.

2.3 Sample Size Estimation

Sample size was calculated using a formula adopted by Ikekpeazu, (2016).

Hence, 100 primary school children from each village were recruited which gave grand total of 400 students.

2.4 Study Design and Respondents

The study was designed to target a total of 400 primary school pupils from four (4) selected villages of the ten (10) districts of Shinkafi Local Government. Meanwhile, individual(s) who are unwilling and those who either refused to return samples were not included in the survey.

Simple random sampling technique by assigning number to each individual child in each class of the primary school was employed.

2.5 Questionnaire Administration

Questionnaires were also used for this research, the individual-based questionnaires were administered to each child who wished to participate in the study.
Children questionnaires were administered to collect information on age, sex and parent occupation of the participants as well as parasitological information from each child.

2.6 Detection of Malaria Infection by Rapid Diagnostic Test (RDT).

For detection of Malaria parasites, finger of each child was cleaned with alcohol swap and allowed to dry, then the finger was pricked with a lancet to get the blood using dropper, 5µl of the blood was collected and dropped in to the round sample well of test strip, four drops of assay diluent was added in to square assay diluent and results were read after 15/minutes as instructed by the manufacturers (Ibidapo, 2005). The test was carried out with help of Community Health workers.

Principles

The result was read positive when the presence of two-colored band appeared on the strip; one band in the line

"C" and another band in the "T" line. The result was read negative when the band line appears in the "C" area only. The result was read invalid if the line in "C" area does not appear and test was repeated for confirmation.

2.7 Statistical Analysis

Data obtained from the survey were analyzed with SPSS version 20.0. demographic factors (age, sex and parent occupations), were treated as categorical variable and presented as frequencies and percentages for inferential statistics. Multiple regression analysis was used to identify the factors significantly associated with malaria at $P<0.05$.

3.0 RESULT

Out of the 400 blood samples examined, 258 pupils were infected with malaria giving a prevalence of 64.5%. Pupils from Badarawa village had higher prevalence (71.0%), followed by pupils in Jangeru (70.0%), then those from Kurya (67.3%) and pupils from Kware had least prevalence (50.0%) (Figure 1)

According to gender the results of the study showed that, males were the highest infected (68.1%) with malaria when compared with females (63.7%) (Figure 2)

The results of this study showed that prevalence of malaria seem to decreased with age group as pupils aged 4-8 had higher malaria infection rate (75.0%) followed by 9-13 age group (70.5%) then ≥14 age group with lowest prevalence rate of 60.7% (Figure 3)

It was found that children whose parents are fishermen had highest prevalence (67.1%) followed by children whose parents were farmers with 65.8% then those children whose parents were business men (55.6) and lowest prevalence (54.3%) was observed among the children of civil servants.

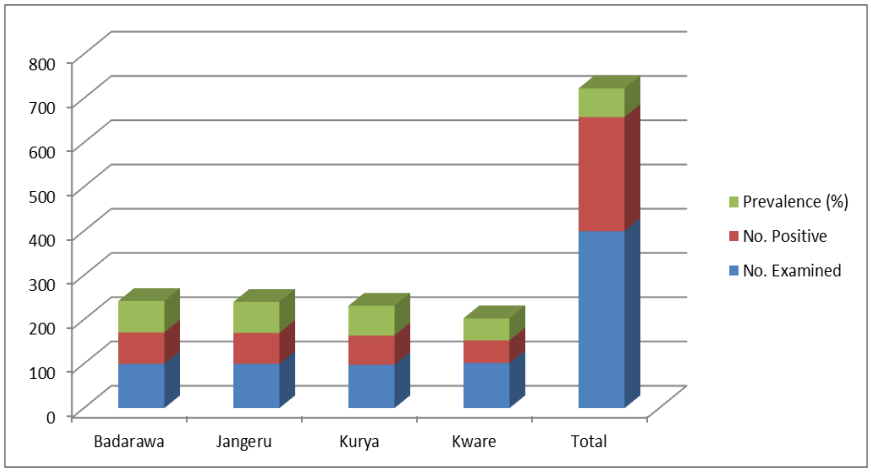

Figure 1: Prevalence of Malaria Infection in villages of Shinkafi Local Government.

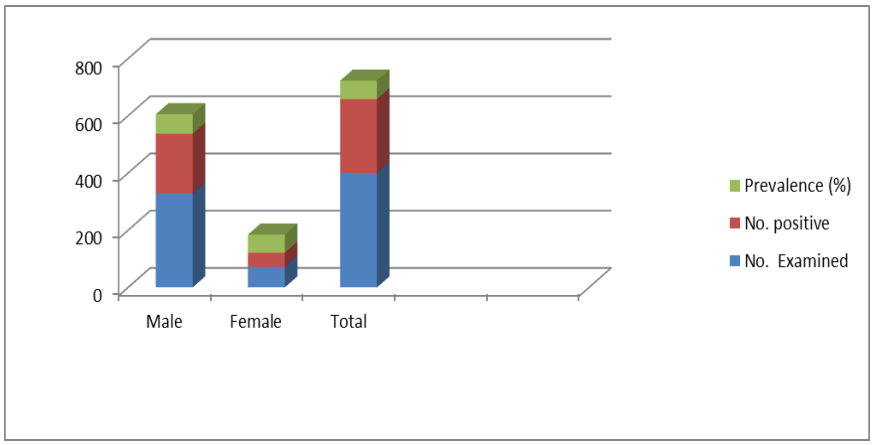

Figure 2: Gender specific prevalence of malaria infection in the study area.

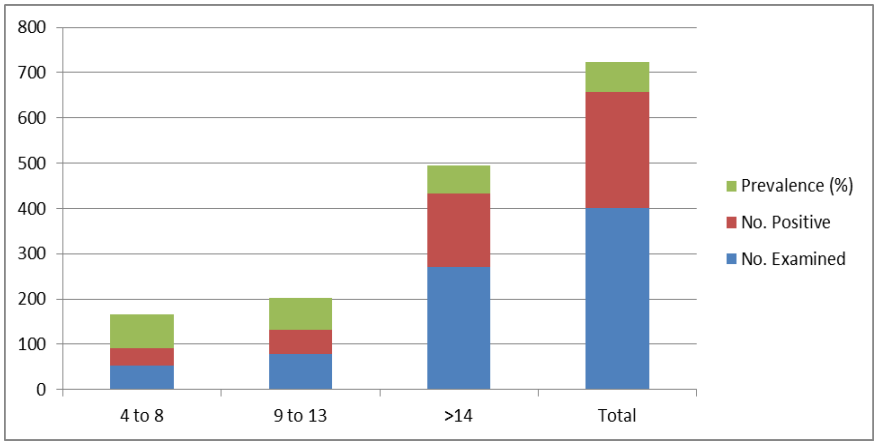

Figure 3: Age specific prevalence of malaria infection in the study area.

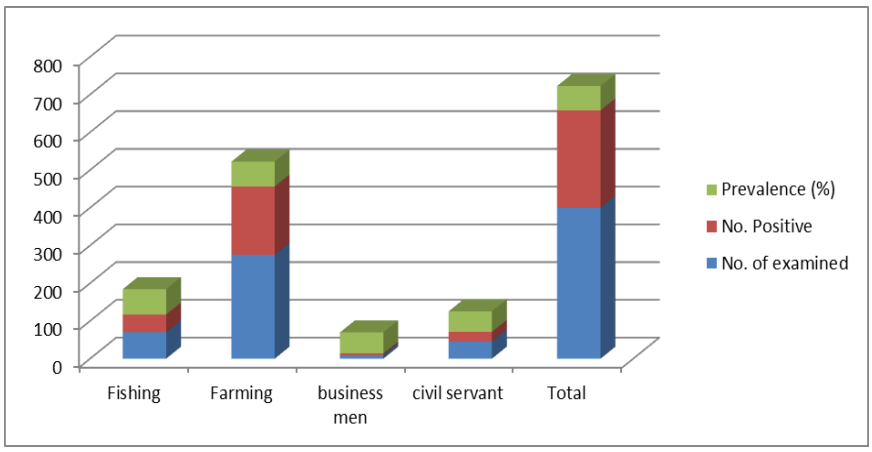

Figure 4: malaria infection among the pupils in relation to parents' occupation in the study area

3.3 DISCUSSION

The prevalence of 71.0% of malaria among the pupils in the study area could be attributed to predisposing factors to malaria infection such as not sleeping under net, inadequate knowledge of mosquito transmission and proximity to water bodies. This prevalence is higher than the observations of several researchers across Nigeria; Okeke *et al.* (2015) reported 46.3% in Anambra State, 36.5% was reported in Katsina State (Bawa, and Auta, 2014). Aribodor *et al*. (2014), reported 66.0% in Ndiowu Community of Anambra State. However, the prevalence is lower than report of some researchers; Oparaocha (2003) reported 88.8% in Abia, Aribodor *et al*. (2003) recorded 76% in Anambra state, however, report of this research was in consistent with the report of Atife *et al*. (2012), who reported malaria prevalence of 71.43% in their research. This wide range of difference could be attributed to climate factors and behavioural patterns of the people in the area which promote mosquito breeding and susceptibility of people to vector bites.

The significant association of malaria infection with pupils from Badarawa primary school could be attributed to poor sanitary behavior of the villagers and numerous stagnant water which serve as breeding sites for mosquito. This agrees with the report of Obianumba, (2012) among pregnant women from area with poor sanitation in Ozubulu, Anambra State, Nigeria.

Male were found to be highly infected than male with no significant association, this was because, female were mostly not going out in the night for playing were mosquito breed frequently this was in agreement with the report of many researchers around the globe (Katrin *et al*., 2009; Adefioye *et al*, 2013)

Although, significant association was not observed for the malaria infection due to age, Prevalence of malaria was observed to decrease with an increase in age and this could be result to maternal derived antibodies as reported by many researches, such as Mbanugo and Ejim (2000), who reported that 0 -1 year olds had low prevalence for plasmodium infection and attributed this to maternal derived antibodies. The markedly increase level of parasitaemia in children 2 -3 years old according to Mbanugo and Ejim (2000) could be attributed to the gradual loss of these maternally derived antibodies. Mbanugo and Ejim worked in urban area where children are more protected from mosquito bites.

Malaria infection based on pupils parent occupation was not significantly associated among the participant, however, children of fishermen were seen to have higher prevalence rate and those of civil servant were observed

with lowest infection rate, these could be due to the prevention and control measures taken by their parent because the civil servant had more knowledge for malaria control and prevention than fishermen

CONCLUSION

Malaria distribution in the study areas was seen to be high among pupils from Badarawa with significant association, followed by those from Jangeru, then Kurya, and then Kware pupils had least prervalence. Male children were highly infected than the female with no significant association. Although, Malaria was seen to decrease with increase of age among the children, however, no significant association and lastly children of fishermen had highest prevalence while those of civil servant had least prevalence with no significant association.

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