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RESEARCH ARTICLE

PREVALENCE OF MALARIA INFECTION AMONG CHILDREN ATTENDING FEDERAL MEDICAL CENTRE YOLA, ADAMAWA STATE, NIAGERIA

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ABSTRACT

This study was aimed to determine the prevalence of malaria infection among children aged 6 months-15 years and considered only Out-Patient children at EPU, Federal Medical Centre, Yola from the months of June to November 2015. Ethical Clearance and Informed Consent was obtained. Questionnaires were used to gather information on age, gender of children and parents/guardians sociodemographic characteristics. Malaria was screened using Thick and Thin blood film. The prevalence of malaria infection was 29.2%. The malaria species found was *P. falciparum*.Male subjects (32.2%) were more infected than the females (25.6%) and age-group 5-9 years (34.2%) had the highest infection rate while the least was among age ≤15 years. χ^2 test on the infection rate according to gender and age were both insignificant ($p>0.05$) indicating gender and age were not dependent. According to parents/guardians sociodemographic characteristics, malaria infection was higher among children whose parents/guardians were unemployed (38.5%), had primary education (52.6%) and live in village setting (31.4%). χ^2 test between the malaria infection and according to parents/guardians occupation, educational qualification and place of residence were statistically insignificant ($p>0.05$). Considering the lower social class of Nigeria populace, malaria intervention programs should be made accessible to children irrespective of their socioeconomic status and their location.

INTRODUCTION

Malaria has been one of the prominent and ancient diseases which has been profiled and studied. It is the second leading health problem in Sub-Saharan Africa, accounting for over 1 million deaths yearly in the region (Etusim *et al*., 2013). Malaria is characterized by periodic bouts of severe chills and high fever. It is one of the most significant public health problems in Nigeria and the commonest cause of ill health in Africa (WHO, 1992). Data from World Health Organization shows that approximately 216 million cases of clinical malaria occurs worldwide, with deaths of about 655,000 occurring most among African children (WHO, 2011).According to World Health Organization, every minute a child dies from malaria in Africa (Malaria Consortium, 2016). Recent malaria world malaria report indicates that Nigeria accounts for a quarter of all malaria cases in the 45 malaria endemic countries in Africa (WHO, 2008).

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The clinical manifestation of malaria is dependent on the previous immune status of the host (White, 2009). In areas where endemicity of *P. falciparum* malaria is stable, severe malaria most commonly occurs in children up to 5 years of age, while is less common in older children and adults because of the acquisition of partial immunity. In areas of lower defined and may also occur in adult semi-immune persons (Alessandro and Lorenzo, 2012). Severe malaria is a potentially fatal disease, any malaria patient must be assessed and treated rapidly, and frequent observations are needed to look for early signs of systemic complication (Harinasuta and Bunnang, 1988). The aim of this study was to determine the prevalence of malaria infection among children age 6 months-15 years and to relate with their gender, age and parents/guardians sociodemographic characteristics.

MATERIALS AND METHODS

Study Area

This study was carried out at Federal Medical Centre (FMC), Yola South Local Government Area (LGA).

FMC, Yola it is the biggest and most visited hospital in Yola South. The area has a tropical climate, marked by dry and rainy seasons, with the rainy season commencing from April through October, with an average rainfall of about 79mm in the north and 190mm in the south. The dry season starts in November and ends in April with an average recorded temperature of about 35-42^{o}C. Most indigenes of Yola are civil servants and farmers, producing crops like guinea corn, millet, beans and kola-nut. Cattle rearing are the major occupation in the South.

Study Design and Population

The target subjects consist of 168 randomly selected children who came to the Emergency Paediatric Unit (EPU) Federal Medical Centre, that were diagnosed for malaria test. This study considered only Out-Patient children aged 6 months-15 years Children aged 6 months-15 years. Parents/guardians of the children were briefed on the research and its purpose. After informed consent was obtained, followed by questionnaire, blood sample was collected from the subjects.

Sample Collection and Parasitological Examination

Medical Doctors assisted in the collection of blood samples. The method of sample collection employed was finger prick and venipuncture techniques alternatively (Cheesbrough, 2006). Each blood sample was labelled correctly with number and each carries the child personal data like gender, age to avoid any mix up. The sample collected was processed at Federal Medical Centre Yola Laboratory (Parasitology Unit). Thick and Thin blood film were prepared and stained with Giemsa according to the technique outlined by Cheesbrough (2006). A Thick film was used to search for malaria parasite and infective stage while the thin film used to confirm the malaria species. The slides were read by experienced Medical Laboratory Scientist.

Research Ethics

Introductory letter was obtained from the Department of Zoology, Modibbo Adamawa University of Technology Yola to the Ethical Committee Federal Medical Centre Yola where Ethical Clearance for the research was issued. Informed consent from parents/guardians of the children was obtained as evidence of their consent.

Data Analysis

The statistical analysis was done using IBM Statistical Package for Social Sciences (SPSS) version 20 (SPSS, Inc., Chicago. IL, USA).χ^2 test to account for the association between different variable. $p<0.05$ were considered significant.

RESULTS

Table 1. Prevalence of malaria infection according to children gender

Gender	Number examined	Infected	% Infected
Male	90	29	32.2
Female	78	20	25.6
Total	168	49	29.2

Prevalence of malaria infection according to gender is shown in Table 1. Malaria infection was significantly higher among males 29 (32.2%) than females 20(25.6%). Analysis indicates no significant difference between gender and malaria infection ($p>0.05$).

Table 2. Prevalence of Malaria Infection in relation to age-group

Age group	Number examined	Infected	% Infected
6 months-4 years	90	26	28.9
5-9 years	38	13	34.2
10-14 years	35	9	25.7
≥15 years	5	1	20.0
Total	168	49	29.2

Age-related prevalence of malaria infection is shown in table 2. Age-group 5-9 years (34.2%) had the highest infection rate followed by age-group 6 months-4 years (28.9), 10-14 years (25.7%). While children age ≤15 years (20.0%) recorded the least infection rate. The analysis shows no significant difference between age-group and malaria infection ($p>0.0$).

Table 3. Prevalence of Malaria Infection according to Parents/Guardians Occupation

Parents/guardian occupation	Number examined	Infected	% infected
Civil servant	53	12	22.6
Business/trading	49	18	36.7
Farming	36	11	30.6
Unemployed	13	5	38.5
Others	17	3	17.6
Total	168	49	29.2

Table 3 highlight the prevalence of malaria infection according to parents/guardians occupation. Children whose parents were unemployed (38.5%) were most infected with malaria, followed by business/trading (36.7%), farming (30.6) civil servant (22.6%) and the least was recorded among others profession (17.6%). The difference was not statistically significantly ($p>0.05$). Prevalence of malaria infection according to parents/guardians educational qualification is shown in table 4. The highest prevalence of malaria infection was recorded among children whose parents/guardians had primary education (52.6%). This was followed by non formal education (32.1%), secondary education (26.3%). Those with tertiary education (20.7%) recorded the least. The analysis indicates no significant difference between parents/guardians educational qualification and malaria infection ($p>0.05$). Table 5 highlights the prevalence of malaria infection according to place of residence. Those children from village setting (31.4%) recorded with highest infection rate, followed by those living in city/town setting (30.1%) while the least infection rate was among those living in quarters (11.1%). This was statistically insignificant ($p>0.05$)

Table 4. Prevalence of Malaria Infection according to Parents/Guardians Educational Qualification

Parents/guardians educational qualification	Number examined	Infected	% Infected
Tertiary	58	12	20.7
Secondary	38	10	26.3
Primary	19	10	52.6
Non formal	53	17	32.1
Total	168	49	29.2

Table 5. Prevalence of Malaria Infection according to Place of Residence

Place of residence	Number examined	Infected	% Infected
Housing estate	1	0	0.0
Quarters	9	1	11.1
City/Town setting	123	37	30.1
Village setting	35	11	31.4
Total	168	49	29.2

DISCUSSION

Plasmodium falciparum infection is the major cause of morbidity and mortality especially among children which are the vulnerable group among the others (Idro *et al*., 2007). In this study the prevalence rate of malaria infection was 29.2%. This result of this study was in consonance with 29.2% recorded in Yaounde Specialist Hospital by Chiabi*et al*. (2009) and was slightly lower than 29.8% recorded among the under-five children attending Kampala International University Teaching Hospital, Bushenyi, Western Uganda: Pilot study by Ogah *et al*. (2013). This finding also differs when compared to 58.2% among children 1-10 years old in communities in Akwa North Local Government Area Anambara State South East Nigeria by Nwaorgu and Orajaka (2011). Malaria infection according to gender reveals that males were more infected than the females with prevalence rate of 32.2% and 25.6% respectively. The result shows no significant difference between gender and malaria infection ($p>0.05$). This is in agreement with the reports of Olasunkanmi *et al*. (2013) although females (31.8%) were more infected than the males (31.2%). However, there is no scientific evidence to show malaria infection is significantly associated with gender.

Based on age-related prevalence, children of age-group 5-9 years (34.2%) recorded the highest malaria infection and the least was among ≤15 years (20.0%). This high prevalence rate among 5-9 years might be that, these children are more active and exposed more to mosquito bites than those of the other age-group. However, the infection rate decreases in older children. Age group 10-14 years had 25.7% and ≤15 years had 20.0% indicating that infection rate decreases with increasing age. Therefore, older children are less susceptible to malaria attach because it seems to have developed their own active immunity against malaria (Angyo *et al*., 1996). However, in this study there was no child below the age of 6 months. Studies shows that Haemoglobin F (HbF), present in high concentration at birth (Riley *et al*., 2001), can inhibit parasite development (Gitau and Eldred, 2005) and can protect the infant in the first few months of life (Umberto *et al*., 2012). Children whose parents/guardians were unemployed had the highest malaria infection. This might be due to the fact that may be they are not earning money or had no tangible means of getting money that could be able to cater for their life and family, that might result them unable to buy those preventive measures against mosquito vector. It was observed in this study that parents/guardians level of education is associated with high rate of malaria infection in children. Since those parents/guardians had primary education recorded the highest prevalence rate of 52.6%. Although the analysis indicates no significant difference between parents/guardians educational qualification and infection rate ($p>0.05$). This high malaria infection may be associated with either the fact that they have deficient education or lack knowledge on the causative agent of malaria parasites and its preventive measures among other factors. Comparing with those parents/guardians that had tertiary education (20.7%) showed the least. The high infection rate could be attributed to ignorance and poverty as reported by Brieger *et al*. (1997). Observation of high rate of malaria infection among those children that live in village setting (31.4%) followed by city/town setting (30.1%). Malaria transmission is higher in rural areas than urban settlements in Africa (Hay *et al*., 2005; Omumbo *et al*., 2005). Factors such as lower vector density, higher human density, better and quality housing, improved drainage systems and relative ease of assessing healthcare facilities in urban areas are reasons for observed lower prevalence of malaria in urban setting (Lindsay *et al*., 1990; Hay *et al*., 2005). The above-mentioned factors may virtually none exist in some village setting, town settings of Adamawa State, hence this prevalence rate of malaria.

Conclusion

P. falciparum infection plays an important role and its susceptibility links with young children and unemployment, low education qualification and place of residence of parents/guardians also exacerbate the menace. Considering the lower social class of Nigeria Populace, provision of malaria intervention programs should be made accessible to children in respective of their socioeconomic status and their location.

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