

Received: 23/09/2015

J. Biol. Chem. Research. Vol. 32, No. 2: 914-919, 2015 (An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry) Ms 33/1/05/2016 All rights reserved ISSN 0970-4973 (Print) ISSN 2319-3077 (Online/Electronic)



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> **RESEARCH PAPER** Accepted: 08/11/2015

Epidemiological Study of Malaria in Selected Primary Schools in Egume, Dekina Local Government Area. Kogi State, Nigeria

Revised: 02/11/2015

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ABSTRACT

Epidemiological study of malaria was carried out in Egume community of Dekina Local Government Area of Kogi State, Nigeria to determine the prevalence of malaria among primary school children. Blood samples were obtained from 368 participants based on consent, from four (4) Nursery & Primary Schools in Egume community. Rapid Diagnosis Test was used to detect malaria parasites in the blood. From the 368 participants examined 36 (9.78%) were positive with malaria parasites. The age-group of under ten (U10) years had the highest malaria prevalence 24 (11.01%) while the age-group of above ten (A10) had the least 12 (8.00%). The males 20 (9.17%) were slightly more infected than the females 16 (10.67%). The result of Statistical analysis indicated no significant difference in infection between age and sex of the pupils. The study has revealed that malaria infection is neither age nor sex dependent irrespective of parental educational status and/or occupational cadre. Public enlightenment efforts need to be intensified towards the prevention of malaria. There is a strong need to assess the use of available malaria control measures among the people in endemic areas.

Key words: Epidemiology, Malaria, Prevalence, Parasitemia and Egume.

INTRODUCTION

Malaria is the world's most deadly parasitic diseases and is caused by infection with single celled parasites of the genius Plasmodium belonging to the Apicomplexan phylum. The parasites are transmitted by Anopheles mosquito (Microsoft Encarta, 2009). It is one of the most prevalent and widespread deadly parasitic diseases in the world. Over 500 million people suffer clinical malaria episodes annually caused by *Plasmodium falciparum* infection alone resulting in a conservative estimate of 1 million deaths (Guinovart et al., 2006;

Vaughan *et al.*, 2008). Current estimates predict over two hundred million cases annually. The number of clinical cases exceeds 150 million with approximately 2.3 million deaths. Most of the victims are infants and young children below age five (5). Over half of the world's population lives in malaria endemic areas (WHO, 2005; Okeke *et al.*, 2006).

MATERIAL AND METHODS

The materials used for the practical work of this project research included blood lancet, methyl alcohol (methanol), cotton wool, disposable pipette, hand gloves, alcohol pre-pad, buffer solution (Epidi et al., 2008). The test items were collected. The finger tips of 334 pupils were cleaned with alcohol prepared pad and was allowed to dry and a finger-prick blood specimen were collected (5µl) from each pupil with the used of disposable pipette and was transferred unto the test trips, which was accurately labeled with the pupils identification number. The blood specimen each was mixed with washing buffer solution of (6µl) which was added by depositing it directly on the strips to assay well in order to remove the hemoglobin and permit visualization of any colored line on the strips. The labeled antigen-antibody complex migrated up the test strips by capillary action towards testspecific reagents that was pre-deposited during manufacture. These include (a) a line that captured antibody specific for the antigen under investigation which is called test line (T), (b) a procedural control line (C) that captured the labeled antibody. At the presence of the antigen under investigation, an antigen/antibody complex was formed. The blood contained the antigen was assay; the labeled antigen-antibody complex was immobilized at the predeposited line of capture antibody and was visually detected. Whether the blood contains antigen or not, the control line became visible as labeled, antibody was captured by the pre deposited line of antibody directed against it. The completed test run off time was 20 minutes.

Positive specimens were identified using standard methods (WHO, 2014) with the interpretation of the result obtained.

RESULTS

A total of 334 children from four (4) Nursery and Primary Schools which were randomly selected in Egume community were enrolled in the study, in which one hundred and eighty four were males, and one hundred and fifty were females. The age distribution was 5 to 16 years. One hundred and thirteen (113) male pupils were below 10 years old and Seventy one (71) male pupils were above 10 years old. Out of the total number of one hundred fifty (150) female pupils, one hundred and five (105) were below 10 years old, while forty five (45) were above 10 years old.

The prevalence of malaria infection among school aged children in four primary schools in Egume, Dekina Local Government area of Kogi state was 9.78% Infection prevalence among the males and females showed that out of 218 male children examined, 20 (9.17%) of males were positive for malaria while out of 150 female children examined, 16 (10.67%) were positive for malaria (Table 1).

This study also showed that malaria prevalence was higher in males less than ten years of age (U10) with the value of 11.01%, than male above ten years of age (A10) with the value of 8.00% (Table 2).

The percentage morbidity for male pupils under ten was 11.5%, male pupils above ten was 6.67%, while that of female pupils under ten was 10.48%, and above ten was 11.11% respectively (Table 3).

	Male		Female		Total		
Name of School	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)	
U.E.C. Primary School	73	7 (9.59)	47	3 (6.38)	120	10 (8.33)	
S.O.W. Nursery & Primary School	41	4 (9.76)	47	4 (8.51)	88	8 (9.09)	
F.I. Nursery & Primary School	33	5 (15.15)	31	4 (12.90)	64	9 (14.06)	
S.S. Peter & Paul Primary School.	37	4 (10.81)	25	5 (20.00)	62	9 (14.52)	
Total	218	20 (9.17)	150	16 (10.67)	368	36 (9.78)	
		C	hi-square	df	P	value	
Between Male and Female		3.768		3 0.28		.288ns	

Table 1. Malaria Parasitemia According to Sex of Pupils.

U10 – Below Ten Years of Age, A10 – Above Ten Years of Age, ns – Not significant at $P \ge 0.05$.

Table 2. Malaria Parasitemia According to Age of Pupils.

	U10		A10		Total	
Name of School	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)
U.E.C. Primary School	73	6 (8.22)	47	4 (8.51)	120	10 (8.33)
S.O.W. Nursery & Primary School	53	5 (9.43)	35	3 (8.57)	88	8 (9.09)
F.I. Nursery & Primary School	45	7 (15.56)	19	2 (10.53)	64	9 (14.06)
S.S. Peter & Paul Primary School.	47	6 (12.77)	15	3 (20.00)	62	9 (14.52)
Total	218	24 (11.01)	150	12 (8.00)	368	36 (9.78)
		Chi-square		df	P value	
Male: Between U10 and A10		2.377		3	0.498ns	

U10 – Below Ten Years of Age, A10 – Above Ten Years of Age, ns – Not significant at $P \ge 0.05$.

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Table 3. Prevalence of Malaria Parasitemia Obtained from School Children in Four (4)Primary Schools in Egume Dekina Local Government Area.

	Male				Female			
Name of School	U10		A10		U10		A10	
	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)	Number Examined	Number Positive (%)
U.E.C. Primary School	40	4 (10.00)	33	3 (9.09)	33	2 (6.06)	14	1 (7.14)
S.O.W. Nursery & Primary School	24	3 (12.50)	17	1 (5.88)	29	2 (6.90)	18	2 (11.11)
F.I. Nursery & Primary School	23	4 (17.39)	10	1 (10.00)	22	3 (13.64)	9	1 (11.11)
S.S. Peter & Paul Primary School.	26	2 (7.69)	11	2 (18.18)	21	4 (19.05)	4	1 (25.00)
Total	113	13 (11.50)	105	7 (6.67)	105	11 (10.48)	45	5 (11.11)

	Chi-square	df	P value
Male: Between U10 and A10	8.042	3	0.045*
Female: Between U10 and A10	1.514	3	0.679ns

U10 – Below Ten Years of Age, A10 – Above Ten Years of Age

* - significant at P<0.05,

Ns – Not significant

DISCUSSION

Malaria has remained a major public health problem in developing countries of the world, particularly in Nigeria. 36 out of the total 334 school children examined had malaria parasitemia. The overall prevalence of Malaria in this study is in line with Atif *et al.* (2009), who reported a prevalence rate of 9.78% malaria infection in a similar study among 1000 patients in Hyderabad, Sind, Pakistan. The prevalence obtained in this study is considered higher when compared to 6.8% prevalence recorded by Uko *et al.* (1998). Several studies have shown high parasite rates among primary school children in Nigeria. Salako *et al.* (1990) reported a parasite rate of 74 % in Nigeria. The reason for relatively lower prevalence rate [9.78%] might be because the survey was carried out in dry season, February 2015 when the vector population was low. Higher population of mosquitoes is likely to occur during the dry season (May June to November). The result in this study revealed that the rate of transmission of *Plasmodium* parasite is a function of climate. In accordance with the earlier findings of (Okeke *et al.*, 2006) which states that environmental factors such as wet and dry seasons influence the infection rate of *Plasmodium*.

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It has been observed that during the rainy season, there is a high density of mosquito and reduced density during dry season.

A new analysis of data revealed that the prevalence of malaria infection, including both symptomatic and asymptomatic infections, decreased significantly across sub-Saharan Africa since 2000. In sub-Saharan Africa, average prevalence in children aged 2–10 years fell from 26% in 2000 to 14% in 2013 – a relative decline of 48% (WHO, 2014).

Lack of significance in prevalence among the sex and age agrees with the findings of Mbanugo and Ejim (2000) who reported that sex has no effect on the prevalence of malaria and that malaria can affect all age groups and both male and female sexes. Studies have also shown seasonal variations in the rate of infections and differences in the types of malaria parasite depending upon the geographical conditions.

The higher prevalence in males of less than ten years of age (U10) compared to those above ten years of age (A10) is in agreement with the findings of Ibekwe (2004) and Ibekwe *et al.* (2009) in a similar study in Southeastern, Nigeria. There is also an indication that malaria was more prevalent among male children than in female children. This is in line with the result of Atif *et al.* (2009) who reported infection rate of malaria parasite seemed to be higher in young adult male than female children. The low prevalence of malaria parasitemia with age as revealed in this study and could be explained by the fact that with age comes immunity and thus a reduced chance of succumbing to disease. This corresponds to other studies also found in the South-west region of Cameroon (Nkuo *et al.*, 2006). Asymptomatic parasitemia in these pupils indicate the degree of immunity that has developed. So far malaria control relies mostly on prompt diagnosis and treatment. This study suggests intermittent preventive treatment especially in schools and the use of mosquito treated nets in houses.

CONLUSION

From the findings of this study it could be concluded that there is a substantial rate of malaria infection in the study area.

This research has revealed the level of malaria parasites among the primary school children age 1 - 16. Insecticide-treated mosquito nets are a new and promising tool for malaria control, and should be made available in Egume community and Nigeria at large.

This study has therefore demonstrated that malaria parasite infection is common among children 1 - 16 years living in the community. As chloroquine is still sufficiently effective as first-line treatment drug in *P. falciparum* malaria in the study area, malaria control efforts should concentrate on early treatment of young febrile children through their mothers in the villages and on appropriate referral to the peripheral health centers in case of resistance. In addition, protection of all young children with Insecticide Treated Nets should be promoted in the malaria endemic areas.

It is strongly recommended that the use of the available vector control strategies (insecticide bed nets ITNs, insecticide wall liners, and aerosol) be assessed; in addition to health education and information.

ACKNOWLEDGEMENTS

Authors are grateful to Professor (Mrs.) Ubachukwu P. O. a Mother and Mentor for her encouragement during the course of this investigation.

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